



DC4WORK
Digital Competence 4.0



LEARNING IN A DIGITAL AGE – A JOB-RELATED APPROACH

White Paper

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Co-funded by the
Erasmus+ Programme
of the European Union

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1. Executive Summary

The digitalization of the economy and society is driving countries through the 4th Industrial Revolution, known in Europe as Industry 4.0. Digitalization and work transformation are globalized and happening in all business' sectors, namely in tourism and commerce/trade sectors, requiring: 1) the continuous monitoring and update of workers' digital competencies and 2) companies to have the adequate competencies and tools to successfully assess and promote workers' digital competencies. Aware of this, DC4Work partners designed a project aiming at addressing two main challenges: 1) promoting work-based learning through Industry 4.0 in SMEs of the sectors of tourism and commerce/trade and 2) guaranteeing the capacity building of SMEs' human resources from the sectors of tourism and commerce/trade, concerning the digital competencies for the Industry 4.0. To accomplish this and be successful, partners designed and performed a comprehensive study at the beginning of the project aimed to partners knows and understand the awareness and practices existent in the SMEs of the sectors of tourism and commerce/trade, in what concerns the measure, promotion and development of employees' digital competencies at their workplace. In detail, the study contributed to identifying: i) key-digital competencies required by SMEs of Tourism and Commerce/Trade sectors; ii) mismatches between employers' qualification/competencies and SME's needs (in these sectors) and iii) flagship initiatives of practices existent in SMEs, suitable to be used as a benchmark. The study was organized in four main tasks – T1.1 desk research, T1.2 collection of surveys/implementation of focus group/interviews, T1.-3 identification of flagship initiatives and T1.4 recommendations – and have two main results: a) Work-based learning in a Digital Age: study on training needs and trends of the Tourism and Trade sector, a final report with the main findings from the study; b) Learning in a Digital Age – a Job related Approach, the white paper introduced in this document. Besides this white paper, the project will provide two other products, available to SMEs of tourism and commerce/trade will be provided: Guidelines "Digital Competencies promoter" in SMEs (Intellectual Output 2) and Online Toolbox 4.0 (Intellectual Output 3).

Key-words: Industry 4.0; Workers' digital competencies; Digitalization in tourism; Digitalization in commerce/trade; Work-based learning 4.0

2. Introduction

2.1. DC4Work Project

DC4WORK project, supported by the European Commission under the Erasmus+ programme, aims at achieving high-quality skills and competencies, supporting individuals in acquiring and developing key competencies – including transversal and soft skills and especially digital skills – to foster long-term employability and professional development.

To accomplish this aim, the project will generate the following results:

- Study on “Learning in a digital age – a job-related approach” involving SMEs from tourism and commerce/trade sectors;
- Guidelines and training to support digital competence promoters in integrating and implementing learning processes in SMEs in a digital age;
- Online Toolbox 4.0 addressed to digital competence (DC) promoters in SMEs.

Involving five partners from Germany, Austria, Portugal, Belgium and Finland, the project has as main beneficiaries, staff and professionals (e.g. trainers, consultants, tutors, among others) of Small and Medium Enterprises and of Vocational Education and Training organisations from the sectors of tourism and commerce/trade. Overall, all professionals that may act as multipliers and promoters of Digital Competences in SMEs are potential beneficiaries of the project.

During the 2-years of the project the consortium expects to:

- raise the awareness of professionals on what digitalization requires from them and why;
- actively use informal learning at the workplace with Information and Communications Technology (ICT) (work-based learning 4.0);
- assess staff's digital competences adapting and implementing the DigComp Framework;
- propose means to improve digital competences of staff according to their needs and companies' strategy.

2.2. The study in the context of the project

The comprehensive study performed at the beginning of DC4Work aimed to partners knows and understand the awareness and practices existent in the SMEs of the sectors of tourism and commerce/trade, in what concerns the measure, promotion and development of employees' digital competencies at their workplace. In detail, the study contributed to identifying:

- Key-digital competencies required by SMEs of Tourism and Commerce/Trade sectors;
- Mismatches between employers' qualification/competencies and SME's needs (in these sectors);
- Flagship initiatives of practices existent in SMEs, suitable to be used as a benchmark.

A methodology and tools were designed to support partners during the study, that combined desk research (e.g. identification of policies, practices and relevant documents) and field work (e.g. collection of surveys, implementation of interviews and focus group).

The main goal with the methodology was to gather reliable information and data to support the consortium in the identification of needs and trends of both sectors, concerning the:

1. awareness and policy of European SMEs in what concerns the measure and development of digital competencies of their workers;
2. most relevant digital competencies for each one of the sectors of activity, identifying companies' needs in what concerns the training in digital competencies.

To accomplish this, the study comprised four main tasks, as follows:

T1.1 Desk Research	T1.2 Survey	T1.3 Flagship Initiatives	T1.4 Recommendations
<ul style="list-style-type: none"> • Promotion/application of digital competencies in SME of the two sectors – tourism and retail – in each partner country. 	<ul style="list-style-type: none"> • Survey collection: 20 touristic and commerce/trade SMEs per country • Focus group: 1 session involving 10 representatives from SMEs/business associations or interviews to 10 representatives from SMEs/business associations 	<ul style="list-style-type: none"> • Identification of 5 innovative/good practices in each country, focused on the improvement of digital competencies. 	<ul style="list-style-type: none"> • National reports related to T1.1, T1.2 and T1.3 • Draw of conclusions from the research and design of recommendations by each partner • Development of the European report • Design of the White Paper

FIGURE 1 – STRUCTURE OF THE COMPREHENSIVE STUDY HELD BY PARTNERS IN THE FIRST PERIOD OF THE DC4WORK PROJECT AND BRIEF DESCRIPTION OF THEIR FOCUS AND MAIN RESULTS.

With these activities, partners collected the necessary information and data to answer the following questions:

- ❖ To what extent is the topic "digital competencies in SMEs" recognised as being relevant in the countries of the partnership?
- ❖ Is there any strategy or programme in partners' countries, defined at policy level, fostering the promotion of digital competencies in SMEs?
- ❖ Do SMEs from touristic and commercial/trade sectors recognise the promotion of digital competences in companies as being strategic?
- ❖ Is there any qualification, curriculum or unit in the National Qualification Framework (NQF) of partners' countries focused on digital competencies acquisition?
- ❖ To what extent are Small and Medium Enterprises (SMEs) of the sectors of Tourism and Commerce/Trade aware and have the knowledge to successfully incorporate or promote digital competencies at the workplace?
- ❖ Are SMEs of Tourism and Commerce/Trade assessing their needs in what concerns digital competencies?
- ❖ Which are needs of the SME of Tourism and Commerce/Trade related to digital competencies?

As result, two main outcomes were produced within this study:

- **Work-based learning in a digital age: study on training needs and trends of the Tourism and Trade sector** – a final report introducing the process, tools and main findings of the study¹;
- **Learning in a digital age – a job-related approach** – a white paper with recommendations and guidance for SMEs and "Digital Competences Promoter" (this document).

¹ The full document is available [here](#).

4. Digital Competences in SMEs of Tourism and Commerce/Trade sectors

4.1. Project's challenges

The digitalization of the economy and society is driving countries through the 4th Industrial Revolution, characterized by the fusion between the methods of production with the most recent developments of the information and communication technologies (ICT). This development requires an investment in sustainable technology, based on interconnected intelligent "cyber-physic systems", allowing people, machines, equipment, logistic systems and products communicate and interact with each other. This industrial revolution is known, in Europe, as Industry 4.0.

Industry 4.0 means a shift in the focus of the economy and business, demanding a transformation of the working world in which, the relation between Enterprises, Products/Services and Customers is in the center of the new industrial/business models.

Digitalization and work transformation are globalized and happening in all business' sectors, namely in tourism and commerce/trade sectors, requiring:

- The continuous monitoring and update of workers' digital competencies;
- Companies to have the adequate competencies and tools to successfully assess and promote workers' digital competencies.

Considering this, the two challenges that are on the basis of the DC4Work project are:

- Promoting work-based learning through Industry 4.0 in SMEs of the sectors of tourism and commerce/trade
- Guaranteeing the capacity building of SMEs' human resources from the sectors of tourism and commerce/trade, concerning the digital competencies for the Industry 4.0.

To successfully answer to these challenges, the project comprises three main products as follows (see Figure 2.):



FIGURE 2 – IDENTIFICATION OF THE THREE PRODUCTS OF THE PROJECT THAT ARE IN LINE WITH THE CHALLENGES IDENTIFIED ABOVE.

4.2. Project's general approach

There are two premises behind the DC4Work project:

- SMEs are a privileged context of learning
- Industry 4.0 requires Employees 4.0

SMEs as a privileged context of learning

Companies are learning organisations in which new and experienced workers can learn and acquire/update their competencies. It is crucial to promote the awareness of companies' managers to the role of the companies in the initial and continuous learning and training of their workers, essential to:

- Guarantee the management of workers' knowledge and experience;
- Identify young qualified human resources to be integrated in the company;
- Promote the competitiveness of the company in accordance to economic and social challenges and demands.

This means that companies' managers need to be aware of its role as a privileged context of learning and invest on the preparation of the company to:

- successfully assess workers' digital competencies;
- design tailor-made further digital education activities;
- create learning-friendly working conditions for workplace learning ("digital workplaces");
- set up a "Digital Culture", because effective digitization begins in the mind of the employees.

Employees 4.0: a demand of the Industry 4.0

Companies' digitalization is leading to the transformation of the world of work and the emergence of new job profiles, mostly to guarantee that: along the introduction of new devices and digital media at the workplace, companies also promote the comprehensive digital competencies of workers, enabling the effective management of information, promoting the active social inclusion and increasing the capacity of employability of workers.

This means that, if on one hand, it is important to raise awareness of managers and prepare the companies for digitalization, on another hand, it is also important to endow workers with the necessary knowledge and skills to accompany the companies' digital transformation and to monitor and increase their digital competencies. In detail it is important to:

- raise the workers' awareness related to their role in the digitalization process of the company;
- actively promote informal learning at the workplace using ICT, promoting the work-based learning 4.0;
- assess workers' digital competencies having as starting point the [European Digital Competences Framework for Citizens \(DigComp\)](#);
- guarantee the continuous monitoring and update of workers' digital competencies at the workplace.

Thus, considering this double approach – raise awareness of companies' manager and workers - DC4Work partners defined as being strategic the identification of a worker, responsible for the definition, monitoring and implementation of a digital strategy of the companies, fostering the assessment and promotion of workers' digital competencies. In some large companies there is already the “Chief Digital Officer” with a position in the Executive Commission of the companies and connected with CEO, responsible for the definition, implementation and monitoring of the digital strategy. So, basically, the idea is to transfer the same system to SMEs and identify the “digital competencies promoter” in SMEs.

4.3. Project's results

Three main results will be designed to address the challenges mentioned above and based on the premises identified in the previously (see Figure 3.):

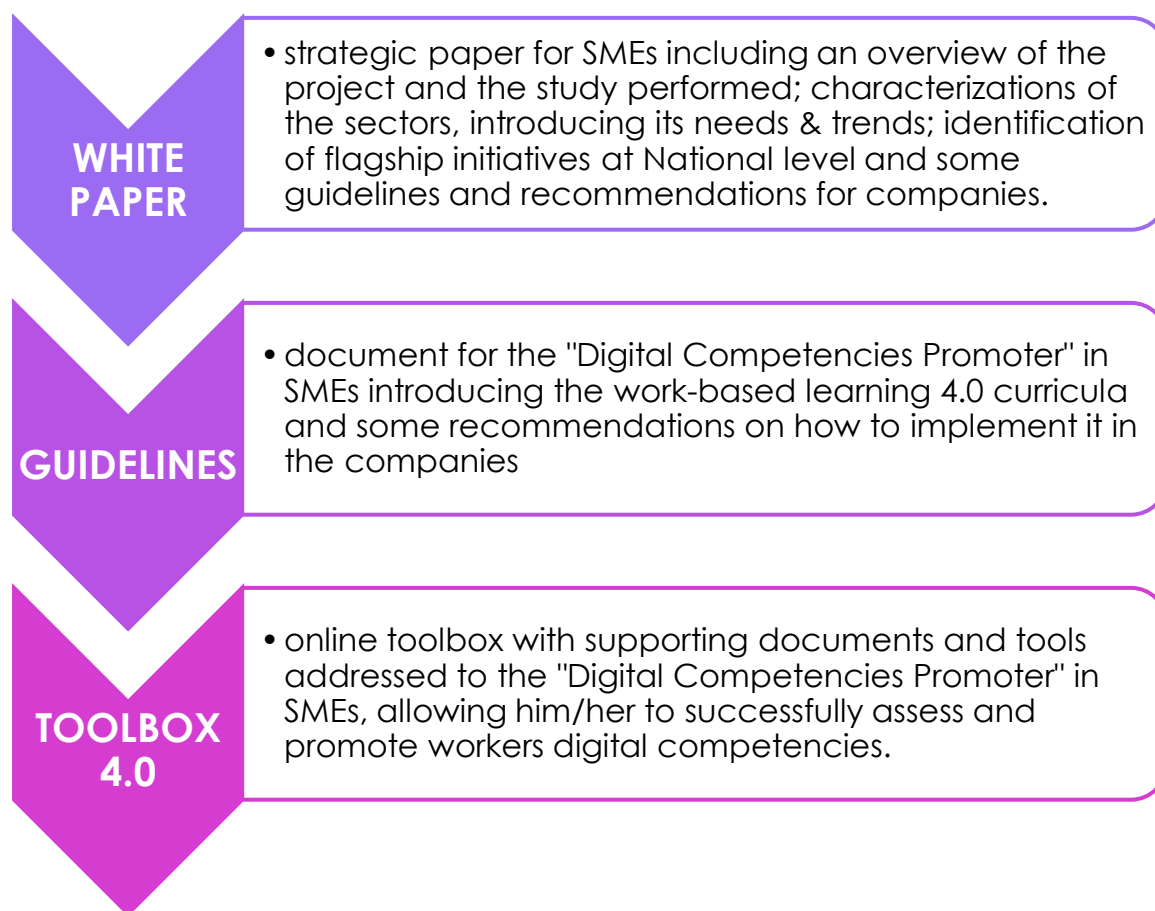


FIGURE 3 – PRESENTATION OF THE THREE MAIN RESULTS OF DC4WORK PROJECT.

Altogether, these three results will allow to:

- Support companies in the definition, monitor and implementation of the digital strategy, fostering the assessment and promotion of workers' digital competencies;
- Provide a training curriculum addressed to the "Digital Competencies Promoter" in SMEs, endowing him/he with the adequate knowledge and skills for the definition and implementation of the digital strategy in the company;
- Display a set of online tools to support the "Digital Competencies Promoter in SMEs in the implementation of the digital strategy in the company.

The results will be available online as an Open Educational Resource in the website of the project, available for the SMEs, VET organisations and professionals of the sectors of tourism and commerce/trade.

5. Learning in a digital age – a job-related approach

5.1. Characterization of the sectors

The project was designed to answer to the digitalization needs of two sectors - tourism and commerce/trade - in particular in what concerns the design, implementation and monitor of a strategy for the assessment and development of workers digital competencies in both sectors.

A brief analysis of the sectors in Germany, Austria, Portugal and Finland was made, allowing the identification of some similarities between the sectors of the four countries.

a. Tourism

In the four countries, the tourism sector is characterized by being:

- represented, in large scale, by Small and Medium Enterprises (SMEs);
- one of the sectors growing, being strategic for the boost of National economies;
- an International sector that is growing every year.

There are some differences related to the sector, in what concerns the digitalization and the promotion of digital competencies of the workers, nevertheless, it is clear that the development of strategies and programmes for both (industry/services digitalization and development of digital competencies of workers) is a growing need in all countries.

b. Commerce/Trade

This sector is also important in the four countries and widely represented by SMEs in Germany, Austria, Portugal and Finland. As in the tourism sector, commerce/trade represent an important sector in the countries and is growing as well. However, the subsector in which they are growing is different (see Annexes I to IV).

The digitalization of this sector in the four countries is a demand of the costumers, nonetheless, many companies are not ready to incorporate it and to invest in the promotion of workers digital competencies. This means that an investment in raising the awareness of the companies related to the impact of the digitalization in the sector and the need of investing in capacity building programmes is crucial for the continuous growth, competitiveness and innovation of the sector.

5.2. Digital competences in tourism and trade sectors: Needs and trends

Digitalization of the economy and companies is globalized and is happening in all sectors, which means that:

- digital competencies are crucial in actual economic settings;
- workers digital competencies are a key-aspect for companies from any sector of activity;
- due to digitalization new professional profiles and set of skills need to be acquired and developed by workers.

From surveys and focus group/interviews it becomes clear that:

- the demand of digitalization in tourism and trade sectors is occurring in different speeds (is faster in tourism) and the drivers are also different (tourism: as an answer to the competitiveness of the sector; trade: as a demand of the costumers).
- many of the organisations of the sectors provide digital devices to support workers in their work, namely desktop PC, smartphones, notebooks with internet access and tablets. Nonetheless, considering other devices (e.g. Orderman, Internet of Things, communication assistants, 3D-printers and wearables) are not some common as that.
- most part of the organisations display of the necessary media needed to workers perform their activities, which includes the existence of: office software, safety media and office software, social media and networks and search engines, communication and collaboration media, intranet/virtual private network, cloud services and process software.

Despite the demand of digitalization and of many organisations of the sectors have the adequate devices and media to support workers in their daily work (more evident in the tourism sector), the results of the study indicate that:

- The generality of the companies, in particular SMEs of these sectors, don't have a structured and formal strategy fostering the acquisition and development of workers' digital competencies, even in the cases in which companies recognise this strategy as being relevant².
- It seems that companies are not aware of the digital potential and competencies that its workers have, mostly because they do not know how to assess their workers' digital competencies³.
- In the perspective of the organisations, their workers have the necessary competencies to use the devices and media available in the company, however, at the same time they mention that workers have potential to use those devices and media in a more efficient way.

² It must be highlighted that there is a discrepancy between the results from surveys and from focus/group/interviews in what concerns the existence of this strategy: in surveys 62% of the companies mention that this strategy does exist, however in the focus group/interviews experts mentioned that this is not a general practice.

³ Once again, there is a mismatch between the results from surveys – in which 72% of the respondents consider that the companies are aware of workers digital competencies – and experts' feedback – who understands that companies don't know which digital competencies their workers have and at what level.

Considering this, **why are not companies investing in the development of their digital strategy and providing training** fostering the acquisition and development of their **workers' digital competencies**?

In accordance with the results, this is happening mostly due to the lack of the:

- Know-how of companies to assess workers' digital skills, essential to plan training to strengthen these skills;
- expertise of companies to structure and provide specific training on digital skills;
- time, investment and vision of the companies to do it.

So, **what it needs to be done to change this?**

The study has shown that is important to structure a set of activities to be implemented in companies aiming at:

- raising the awareness of companies to embrace the digitalization and to the relevance of share information and responsibilities;
- raising awareness of workers/entrepreneurs/trainees for the relevance of acquiring and developing digital competencies;
- promoting the acquisition of knowledge and skills of managers/tutors on how to promote workers' digital competencies assessment and development (e.g. combining training with consultancy);
- creating the setting and conditions for the acquisition and development of workers' digital competencies (e.g. by Individual learning, peer learning (at the workplace), intergenerational learning (at the workplace). Support from an external tutor/expert (at the workplace) and/or learning groups in social media).

In what concerns the training, which **areas** are **considered** as **more relevant** to approach, **in these sectors**?

Considering the five areas identified in the DigComp, the three considered as more relevant are: communication and collaboration, safety and content creation.

Based on these areas, organisations and experts identified some of the topics that should be approached in training programmes in companies:

- Social media management: how to use social media platforms; how to deal with costumers complains online
- Office (basics are important)
- Cloud technologies
- Awareness of data security
- Fundamentals of electronics, data technology, telecommunications for the average consumer.
- Online marketing
- Basics on Google Tools
- Market research, market innovation
- Retail: Online Distribution
- Tourism: Social media management

5.3. Digital competences in SMEs

Another important part of the study is related to the identification of innovative/good practices focused on the improvement of digital competencies at the workplace, in general, and in SMEs, in particular.

All partners identified flagship Initiatives, mostly related to:

- practices for promoting digital competencies (education);
- Examples for new digital (technical) developments at the company level
- Example to raise awareness and involve staff in the course of the companies' digital development.

Altogether, partners identified **30 practices** that are introduced in Figure 6.:

N.	Practice	Country	Brief description	Source
1	KMU Digital Status Quo Check – Potentialanalyse (potential analyse)	Austria	KMU digital is a support program from the Austrian Economic Chamber (WKO). It provides digital status checks and potential analysis for enterprises (with special developed KMU digital trend carts) in order to collect their status quo and to offer adequate advanced training possibilities to specific subjects concerning digital education. The offers are available for small and medium-sized corporations and are financially supported by the WKO. Besides, the KMU digital offers workshops and tutorials to different topics concerning digitalisation.	
2	Reifegradmodell 4.0 – Fraunhofer (maturity model for Leaders)	Austria	Fraunhofer Austria wants to guide enterprises towards digitalisation of production by integrating information- and communication technologies into physical products and processes. With the maturity model 4.0, experts evaluate how far Industry 4.0 is already being implemented within the company and what can still be achieved in this area. Based on the model, 4-day workshops are offered to support the concern and to guide him towards individualised digitalisation.	
3	Werde.digital.at	Austria	werdedigital.at collects and offers different kinds of material about digitalisation. It also provides workshops and additional training possibilities concerning the subject.	More info

N.	Practice	Country	Brief description	Source
4	Schule 4.0	Austria	The aim of Schule4.0 is to gradually incorporate all changes resulting from the advancing digitalization into the Austrian education system. The Austrian ministry of education is therefore about to develop a masterplan which can be followed on the website.	
5	Digital Roadmap Austria	Austria	An information platform of the Austrian government that sums up all measures and fields of action concerning digitalisation in Austria.	More info
6	EB-MOOC	Austria	EBmooc offers free online courses for teachers and trainers of adult education where basics and tools for digital learning with adults are provided in six different units. In addition to self-study, the platform also includes forums, online meetings (webinars) and groups for exchange with other students.	
7	Pakt für digitale Kompetenz & Fit4Internet	Austria	The Digital Competence Pact is an association of business and educational institutions and public administration to promote basic digital skills within the whole population. The Fit4Internet initiative should equip the group of citizens who are not embedded in any educational process with digital skills in mobile Internet use.	More info
8	Gronda Plattform – Recruiting employees Tourism	Austria	The Gronda platform simplifies the recruiting process in the tourism and hotel branch by directly connecting enterprises and employees via their profiles.	
9	Learning Analytics - Tailor-made individual learning opportunities	Austria	This project uses data elevated by universities in order to support the students in their learning progress and to optimize success both for the learner and for the trainer. The first conference about this topic took place in Montreal in 2008. Further information about meetings and assessments can be found on	More info
10	Training Digital Competences Online	Finland	The concept "Oppiminen Online" (Training Digital Competencies Online) is the MOOC (Massive Open Online Course) for VET teachers. By the MOOC there is available about 50 different kind of small courses to learn digital approaches to learning, like web tools, learning environments, pedagogical approaches and networking. There are mainly videos as a learning material. After studying a topic, it is possible to show competencies related by applying an Open Digital Badge. There are three levels of qualifications: some novice, some expert and some developer. The program is funded by the Finnish National Agency of Education and it is free for its participants.	More info

N.	Practice	Country	Brief description	Source
			In the year 2018, we have started a development project related to the MOOC. The target is to disseminate still the MOOC in order to offer it even to wider audience (teachers).	
11	See the Goal Project	Finland	SEE THE GOAL is an EU-financed cross-national project under the Erasmus+ K2 Action. Experts and practitioners from Slovenia, Denmark, Finland and Portugal want to strengthen their VET systems. SEE THE GOAL focuses on in-company training and learning processes in practice. The partners develop methods to support the design, communication, training and self-assessment of in-company learning outcomes. The material related to the project is freely usable through web pages and is partly translated also in Finnish to be able to share the best practices among teachers.	More info
12	MOOC: Designing online learning process	Finland	MocomaMOOC project aims to improve VET teachers' skills for designing online learning processes. It is MOOC fully based on online course with personal scaffolding. The contents of the MOOC are: pedagogical models online, individual study plans online, visualizing learning and competencies by digital tools, and learning analytics as teacher's tool for scaffolding. The program is funded by the Finnish National board of education and it is free for its participants. The target group is VET teachers. The practices are implementable also in companies for enhancing employees' digital skills.	More info
13	EEP - Empowering ePortfolio project	Finland	<p>The aim of EEP is to develop student-centered education by focusing on assessment and guidance practices and by developing an empowering and dynamic approach to the ePortfolio process. This is being done in order to increase students' motivation in their learning and career management, enhance employability prospects as well as their social participation in the digital world. The main target of the project is to develop students' continuous engagement in assessment and improve their digital competence in making their professional identity transparent by steering their career learning using an ePortfolio.</p> <p>The project seeks innovative ways and models to improve the educational environment in a way that the students can create portfolios during their studies and use them in different transition stages from one level of education to another or from education to work life (and vice versa).</p> <p>EEP enhances digital integration in learning through an improved ePortfolio process used in HE institutions, which eases the students' guidance and assessment processes and enables their competencies to become more transparent both to their HE institutions/teachers and to their possible future employers.</p>	More info

N.	Practice	Country	Brief description	Source
14	Training program for VET teachers and company trainers / Digitalisation in learning (30ECTS)	Finland	In the year 2017 a new curriculum (30 ECTS) for a special education program for VET teachers and trainers of the world of work was approved by Finnish National Agency of Education and the first course started last October to be continued the whole springtime. The program is for teachers and the content is related to digitalization of learning processes and more deeply it is searching answers to digitalization in general in each discipline. The participants will develop their work in their organizations during the program and apply their personal learning environments (PLEs) as well as their connections to working life SMEs in the learning process. The digital competencies are demonstrated by Open Digital Badges.	More info
15	DigiReWork - Regional Development Work - Digitalization Renewing Working Life	Finland	DigiReWork is a regional training programme of digitalization in Häme region in Finland for SMEs. The goal is to increase awareness of digital disruption in businesses as well as train new skills and know-how. The target group of the programme are over 50-year-old employers, who need guidance and support in the new digital working environment. There are both individual and group-based training in the programme and workshops on reforming business as well as wellbeing and effectiveness in work.	More info
16	The Federation of Finnish Enterprises: DigiSchool	Finland	<p>The Federation of Finnish Enterprises organises free workshops of digital leap in SMEs in Finland. The workshops include practical examples of digitalisation in SMEs and working on participants current digital challenges. The partners in coaching are companies Fennia, Elisa and Holvi. The specific theme areas in 2018 are Cyber Safety, Cloud Services and Digital Accounting and Finances.</p> <p>The training is national, free and modified for all branches. It collects the best practices from the Finnish SMEs and presents them to all as models and pathways to digitalization.</p>	More info
17	General schools: integrated media education	Germany	In the context of the transformation process towards a digital education, the government of the Federal State of Brandenburg grants absolute priority to the pedagogical mission. Against this background, the framework curriculum for a grade one to ten (relevant to new semester 2017/2018) includes the new basic curriculum on media education. Therefore, media education is not designed as separate subject, but as a subject-integrative task. According to this concept media education covers the competencies: collect, communicate, present, produce, reflect and analyse information. The focus is on learning with, through hand about media.	More info
18	New apprenticeship programme "Management assistant in e-commerce"	Germany	In the wake of booming online trade, the new dual training occupation of "management assistant in e-commerce" was introduced on 1st August 2018. This is the first new commercial training occupation to be launched for ten years and has been specially tailored to the needs of this specific growth market. Management assistants in e-commerce will work for companies	More info and here

N.	Practice	Country	Brief description	Source
			which sell goods or services online. These include manufacturers and service providers as well as firms involved in the wholesale sector, foreign trade, retail or tourism.	
19	Pilot initiative for Vocational Education and Training 4.0	Germany	Vocational Education and Training 4.0 has been launched. This is the joint initiative of the Federal Ministry of Education and Research (BMBF) and the Federal Institute for Vocational Education and Training (BIBB). Within the next two years, qualifications for specialist staff and competencies for the digitalised world of tomorrow will be systematically examined on an example basis. A wide range of projects has also been brought together under the umbrella of the initiative. These include projects already underway such as the preliminary examination of the potential restructuring of IT occupations, the joint VW-BIBB project on operational maintenance 4.0 and the new special programme "Digital transformation in inter-company vocational training centres (ÜBS) and competence centres".	More info
20	JOBSTARTER plus-Projects promote Vocational Training 4.0	Germany	"JOBSTARTER plus" supports the goals of the National Alliance for Initial and Further Training 2015-2018 and is part of the Federal Government's Skills Development Initiative to strengthen educational opportunities and increase the permeability of the education system. It also forms part of the "Education Links to Obtain a Training Qualification" initiative.	More info and here
21	Retail Dialogue Platform	Germany	In order to flag up new prospects in the structural change of retail trade (demographic change, digitalization etc.), to counteract a decline in inner-city areas and a lack of supply in rural areas, the Economic Affairs Ministry has set up the Retail Dialogue Platform. It seeks to open up new prospects for retailers and all others affected by these developments. The focus is on a dialogue between the relevant stakeholders, i.e. companies and business associations, academia, the trade union, the Federal Government, the Länder and municipalities. How can the retailers, municipalities, Länder and the Federal Government respond to the far-reaching structural change? What are the challenges for the employees? These and other questions are to be discussed with the stakeholders in workshops, and ways forward are to be mapped out. In their recommendations, the members of the Retail Trade Dialogue Platform have spoken out in favour of pilot projects that would see new cooperation between different retail companies. This would allow these firms to pool their staff and their retail and warehouse space and thus cut costs. Furthermore, cooperation between several different municipalities could ensure that citizens have access to local shopping facilities. For instance, it would be possible to establish small-scale department stores that would also cooperate with providers of different kinds of services. The main outcomes of the work completed by the Retail Trade Dialogue Platform can be found in the brochure 'New Prospects for the Retail Sector' (in German), which is available for download	More info

N.	Practice	Country	Brief description	Source
			here.	
22	Crowd-Delivery / Logistics	Germany	<p>Passenger car occupancy has been falling for years. Partly empty vehicles on our road networks decrease passenger transport sustainability but also contain an opportunity for freight transport. Within Crowd logistics (CL), delivery operations are carried out using passengers' excess capacity on journeys that are already taking place, resulting in economic, social and environmental benefits. Existing CL initiatives show, however, that there are important differences between concepts in terms of sustainability. The research aims to develop a suitable and comprehensive definition for CL and identify which factors determine the sustainability potential of CL.</p>	More info and here
23	Digital Customer Journey – made in Brandenburg	Germany	<p>Digital guest folders provided in form of software free of charge to guests and service providers in the state of Brandenburg via smartphones, tablets, touchscreens or information points in summer 2018.</p> <p>The guest benefits from: personalized excursion recommendations, georeferenced bad weather tips, digital travel diary with stored sights on site, voice control via hotel tablet possible, questions to be answered at any time, push notifications directly on their mobile devices etc.</p>	More info

N.	Practice	Country	Brief description	Source
24	A well-chosen customer card system	Germany	<p>One interviewed shop owner recommended the customer card system which is not new but needs to fit the shops concrete needs. He chose a plastic card version combined with an App version. The cards' information was linked to his customer management system (software).</p> <p>The conditions for the customer card were:</p> <ul style="list-style-type: none"> - only for core customers - only with this card customer can profit from discounts - customer profits from cashback world initiative = purchasing pool with cash back in 47 countries and more than 1060 online and offline shops in Germany: customer receives a certain amount back and shop earns i.e., 1% of each buying at these online shops - customer can collect shopping points <p>The advantages for the shop owner:</p> <ul style="list-style-type: none"> - ability to reach and inform customers, i.e. with newsletter, customer targeted information, birthday discount etc. - collect customer data i.e. name, address, e-mail, what they bought when -> evaluation of customer data and conclusions on buying behaviour - shop receives measurable data -> evaluation of effectiveness of the newsletters, events etc. 	
25	Staff sensitization – our way to become a digital company	Germany	<p>One best practice example was presented by staff of a city councils' tourism office: workers profit from a central information system on digital strategy and own digital development. When they open up their internet browser each morning, they are directed to a landing page with the headline "Our way to a digital city council". This way they are being sensitized, directly involved and supported in their digitalization process.</p>	

N.	Practice	Country	Brief description	Source
			<p>This landing page is structured by the following menu structure:</p> <ol style="list-style-type: none"> 1) timeline of process of digitalization (where are we) 2) social wall with postings in social media around the city 3) project description 4) ideas on digitization of city council suggested by different departments where change agents have been appointed 4) notice board 5) FAQs 6) contact 	
26	<p>ALL-ECOM - Sector Skills Alliance to set European standards for qualifications and skills in the e-commerce sector</p>		<p>This European project gathers three typologies of partners – organization representative from the trade sector, VET provider from the trade sector and regulatory body for the National Qualification Framework – from three countries – Portugal, Spain and Austria and has as main results:</p> <ol style="list-style-type: none"> 1. National and comparative reports regarding skills need related to e-commerce; 2. National and comparative reports presenting an analysis of training offer and innovative learning methods identified in each partner country; 3. New learning outcomes regarding e-commerce to integrate into the commerce sector qualifications; 4. Common map of qualifications in e-commerce; 5. Training curricula and training contents structured based on the learning outcomes structured in the project; 6. On-line tool for the self-assessment of competencies on e-commerce; 7. Open educational resources (MOOC). <p>The most relevant results for the DC4Work project are the:</p> <ul style="list-style-type: none"> • Training curricula and training contents • On-line tool for the self-assessment of competencies on e-commerce 	<p>More info</p>

N.	Practice	Country	Brief description	Source
			<ul style="list-style-type: none"> • Open educational resources (MOOC) <p>One important aspect of this project is related to the fact of the Portuguese regulatory body for the NQF being part of the consortium (ANQEP, I.P.), allowing the integration of the curricula in the National Catalogue of Qualifications.</p>	
27	Professional in Digital Tourism		<p>Integrated in the Portugal INCoDe.2030 it was created a specific qualification profile and related curricula fostering the development of adults' digital skills for the sector of tourism. This qualification aims at endowing adults of knowledge and skills allowing them to develop and implement a digital marketing plan in the tourism sector, namely by: selecting and managing digital platforms necessary for the implementation of the digital marketing actions in the communication and dissemination of touristic products and services, in line with the needs of the consumers. The training has three components:</p> <ul style="list-style-type: none"> • Entrepreneurship (50h): Leadership, Leader as a manager, Interpersonal communication; • VET Qualification (500h): Introduction to the Tourism (25h), Marketing strategy and planning (50h), Production of digital contents (50h), Geography and touristic resources (25h), Social Media Marketing (25h), Technics of creative writing (25h), Marketing of the product (25h), Behaviour of the online consumer (25h), Digital communication in tourism (50h), Video marketing for touristic destinations (50h), Business in tourism (25h), English (50h), Distribution channels and touristic booking (25h) and Project digital tourism (50h). • Practical Training in Real Context of Work (400h). 	
28	Tourism Center of Innovation - Centro de Inovação do Turismo (NEST)	Portugal	<p>Integrated in the programme Tourism 4.0 of the Portuguese Government, the Tourism Center of Innovation aims at:</p> <ul style="list-style-type: none"> • Promoting the entrepreneurship, innovation and research in tourism; • Supporting companies in the development of a creative and innovative vision; • Creating training laboratories in cooperation with Universities, Schools of Tourism, Incubators and Knowledge Centers; • Producing and transferring knowledge to companies. <p>Among all the initiatives, NEST will launch the Digital Tourism Academy in partnership with the network of tourism schools that will:</p> <ul style="list-style-type: none"> • Develop projects of capacity building in digital area; 	More info

N.	Practice	Country	Brief description	Source
			<ul style="list-style-type: none"> • Launch the innovation challenges; • Promote partnerships with clusters for the design of bi-annual action plans in specific fields. <p>At the same time, the academy will also focus on:</p> <ul style="list-style-type: none"> • Development of R&D international project in tourism; • International promotion of the innovation in tourism; • Identification of international trends of innovation and management of networks to support incubation spaces to start-ups and new companies, in cooperation with incubators. 	
29	Digital Commerce - Comércio Digital	Portugal	<p>Part of the Digital Commerce programme of the Portuguese Government, the Digital Commerce aims at mobilizing entrepreneurs for the digitalization of their business, namely by:</p> <ul style="list-style-type: none"> • Raise the awareness of the entrepreneurs to have a Digital Presence; • Promoting the incorporation of the technology in entrepreneurs' business' models; • Dematerialization of the process of the relationship with customers and providers, by using the technologies of information and communication. <p>One of the initiatives integrated in the programme is the Digital Academy that consists in the availability of training contents for the capacitation for the digital economy, addressed to professionals of micro-companies and SMEs of commerce and services. The contents of the training will be available in an E-learning platform to support the Digital Academy.</p>	More info
30	Training and capacity building of Human resources	Portugal	<p>Integrated in the Portuguese National Strategy for the Industry 4.0 (this is one of the six axes of the programme), this axe aims to adequate the training contents of the National system of education to the new technologies and promote measures of requalification and training of professionals at four levels:</p> <ul style="list-style-type: none"> • Low secondary, upper-secondary and vocational education - Raise the interest of new generations to the ICT, digitalisation and automotive, raising their awareness of the 	More info

N.	Practice	Country	Brief description	Source
			<p>actual key-factors for the global economy.</p> <ul style="list-style-type: none"> • High Education and Polytechnic - Adapt the High Education and Polytechnics, reinforcing the relevance of themes associated to ICT and innovation in the contents and activities, preparing students to the actual challenges of the labour market. • Requalification of active population - Promote initiatives, transversal to all generations, of democratization and reconversion of competencies in the ICT areas to all active population. • Attractiveness to the Industry - Elevate the attractiveness of the national industrial sector to the new generations, investing in the raise the awareness of entrepreneurs and decision-makers of the national entrepreneurial sector for the innovation in the context of Industry 4.0. 	

FIGURE 4 – IDENTIFICATION AND BRIEF CHARACTERIZATION OF THE GOOD PRACTICES IDENTIFIED AT NATIONAL LEVEL RELATED TO THE PROMOTION OF DIGITAL COMPETENCES (EDUCATION), EXAMPLES FOR NEW DIGITAL (TECHNICAL) DEVELOPMENTS AT COMPANY LEVEL AND EXAMPLE TO RAISE THE AWARENESS AND INVOLVE STAFF IN THE COURSE OF THE COMPANIES' DIGITAL DEVELOPMENT.

6. Business model for Digital Competences

6.1. Recommendations and guidelines for the companies

Business models with the inclusion of ICT and digital technologies requires extended or alternative competencies of the employees. New interdisciplinary skills are gaining importance due to the digitalization of our world. Employees should have access to these new fields of knowledge that is mostly not connected to their specialisation. The increasing degree of networking also requires professional competencies such as system- and process knowledge, self-organisation and communicative skills. Due to dynamic markets and the rapid change of new technologies, the importance of lifelong learning and innovative capacity seems to be growing.

Considering all these aspects and the need of the companies and employees benefit from support to successfully define, implement and monitor a digital strategy focused in the assessment, acquisition and development of workers' digital competencies, some suggestions to be included in the following intellectual outputs of the project were made.

These suggestions are organised in four main groups:

- Prerequisites of companies
- Guidelines for Digital Competencies promoter
- Competencies to be integrated in the training
- Online Toolbox 4.0

Prerequisites of companies

It is time for action and VET-Business cooperation is required to bring SMEs from "Management 1.0" to "Digital Empowering Leadership", fostering an active development of digital competencies of employees at their workplaces.

First, is important to prepare the companies at different levels, which includes:

- The design and integration of interfaces in the company (e.g. human-machine, human-human and human-object);
- Preparation of the working space for the integration and use of technology, attending to the demographic differences (e.g. ageing of the workers, integration of younger generations, multigenerational teams);
- Definition of strategies fostering the acceptance of the use of technologies and legal handling of personal data by workers;
- Definition of strategies fostering the development of digital competencies and qualification of workers, with a particular focus on the low-skilled workers.

Once having SMEs are aware of all these aspects, is important to raise the awareness of employees of the company as a privileged context of learning, essential for them see companies as a learning organisation, willing and prepared to:

- create digital competencies assessments of its employees;
- design tailor-made further digital education activities;
- create learning-friendly working conditions for workplace learning ("digital workplaces"); networked learning; learning on the job, experienced-based learning and to offer more specific time to learn! set up a "Digital Culture", because effective digitization begins in the mind of the employees

Guidelines for "Digital Competencies promoter" in SMEs

One of the results of the project will be **the guidelines for "Digital Competencies promoter" in SMEs**, a document introducing the work-based learning 4.0 curricula and some recommendations on how to implement it in the companies.

Addressed to managers/employees' responsible, these guidelines will provide the necessary information to support companies in the design of the digital strategy for the assessment and development of workers' digital competencies. The use of these guidelines requires some preparation from the companies (see "Prerequisites of companies") and also some reflection around the following key questions:

1. What do I understand within digital competence in the company context?
2. Do you have a strategy to develop and evaluate digital skills of your employees?
3. Is there any need for further training for your employees relating their digital skills and competencies?
4. Do you have the willingness to invest in digital competencies training of your employees?
5. What contents/topics do you think are most important for the training?
6. How can digital skills be trained most efficiently?

After thinking and answering to these questions, you are ready to work on the definition, implementation and monitor of the digital strategy of your company for the assessment and development of workers' digital competencies of the company.

Competencies to be integrated in the training

The starting point for the design of the work-based learning 4.0 curricula to be integrated in the **guidelines for "Digital Competencies promoter" in SMEs** is **The European Digital Competence Framework for Citizens (DigComp)**.

DigComp is organized in five key areas and 21 competences, as follows (see Figure 5.):

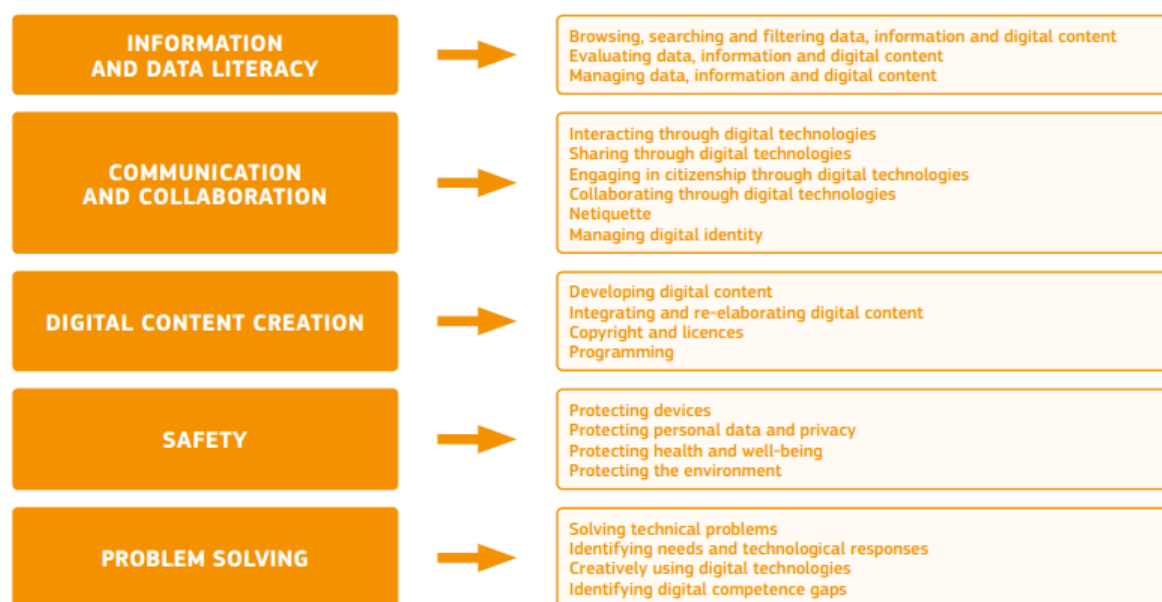


FIGURE 5 – IDENTIFICATION OF 5 KEY AREAS AND 21 COMPETENCES INTEGRATED IN THE DIGCOMP OF THE EUROPEAN UNION⁴.

So, the curricula for the “Digital competencies promoter” in SMEs will be designed based on this framework and, additional, will also integrate other areas and competencies related to the digitalization of the companies, work-based learning 4.0, digital competencies applied to the tourism sector and digital competencies applied to the commerce/trade sector.

Online Toolbox 4.0

Along with the guidelines, it will also be designed and make available to companies of the sectors of tourism and commerce/trade an online toolbox 4.0 to support the “Digital competence promoter” in SMEs, in the implementation and monitor of the digital strategy. The toolbox will be available online and comprises a set of complementary tools and materials, considered essential to support companies on:

- Preparation of the company and its worker for digitalization;
- Definition, implementation and monitoring of the strategy for the assessment and development of workers' digital competencies;
- Raise awareness and commitment of workers in the process.

⁴ Image extracted from the document “The European Digital Competence Framework for Citizens”, of the European Union, available [here](#).

6.2. Business benefits

Digitalization is changing the way companies are organized and the way people work. These changes are increasing in the last seven years and being a challenge for workers from different European countries, sectors and functions. Companies are, every day, more aware of the need of investing, not only in the strengthen of workers' digital competencies, but also in the assessment of those competencies, along with the monitoring of companies needs related to digitalization.

Main findings

DC4Work study⁵ reveals that there is a need of supporting and providing tools to companies of the tourism and commerce/trade sectors, endowing them with knowledge and tools for the continuous assessment and reinforcement of workers' digital competencies. Among other results, the main findings of the study are:

- Digital technologies are widely used in the companies of tourism and commerce/trade: more than half of the organisations have **Desktop PC (88,5%)**, **Smartphones (85,8%)**, **Notebooks with Web Access (69%)** and **Tablet (54,0%)**.
- Most part of the organisations display of the necessary media needed to workers perform their activities, which includes the existence of: office software (98,2%), safety media and office software (93,8%), social media and networks and search engines (86,7%), communication and collaboration media (72,6%), intranet/virtual private network (69,0%), cloud services (68,1%) process software (66,4%).
- Many functions of these sectors require the use of key digital competencies, namely: communication and collaboration, safety and content creation.
- Despite companies recognize that they can benefit from having a strategy for the evaluation and development of employees' digital competencies, the reality shows that most of the companies, in particularly the SMEs, don't have a strategy for this, mostly due to lack of know-how, time, investment and vision to do it.
- Is crucial to companies have knowledge of the digital potential of their workers and on how they can benefit from it, however, this is not being done, mostly due to the lack of knowledge and constrains in the assessing od workers digital competencies.

Recommendations

Besides introducing the main findings, the study has shown that is important to structure a set of activities to be implemented in companies aiming at:

- raising the awareness of companies to embrace the digitalization and to the relevance of share information and responsibilities;
- raising awareness of workers/entrepreneurs/trainees for the relevance of acquiring and developing digital competencies;
- promoting the acquisition of knowledge and skills of managers/tutors on how to promote workers' digital competencies assessment and development (e.g. combining training with consultancy);

⁵ Document identified as *Work-based learning in a Digital Age: study on training needs and trends of the Tourism and Trade sector*, available here.

- creating the setting and conditions for the acquisition and development of workers' digital competencies (e.g. by Individual learning, peer learning (at the workplace), intergenerational learning (at the workplace). Support from an external tutor/expert (at the workplace) and/or learning groups in social media).

7. Annexes

Annex I – National report – Austria (available [here](#))

Annex II – National report – Germany (available [here](#))

Annex III – National report – Finland (available [here](#))

Annex IV – National report – Portugal (available [here](#))

8. Sources

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