



Smart4Europe2

Catalysing Digitisation throughout Europe

Deliverable 5.4

Report on training activities

| Cover and Control Page of Document | |
|------------------------------------|----------------------------------------------------------------|
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¹ R=Report, DEC= Websites, patents filling, Ethics, ORDP: Open Research Data Pilot, etc., O=Other

² PU = Public, CO = Confidential, only for members of the consortium (including the Commission Services)

| Acronyms Listed in Document | |
|-----------------------------|-----------------------------------------------|
| CSA | Coordination and Support Action |
| DIH | Digital Innovation Hub |
| DoA | Description of Action |
| EC | European Commission |
| IA | Innovation Action |
| ICT | Information and Communication Technologies |
| H2020 | Horizon 2020 |
| KET | Key Enabling Technologies |
| KPI | Key Performance Indicator |
| RTO | Research and Technology Organisation |
| SAE | Smart Anything Everywhere |
| SME | Small and Medium-sized Enterprise |
| STEM | Science, technology, engineering, mathematics |
| WP | Work Package |

| Version | Date | Changes made | by | Sent to | purpose |
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Executive Summary

The successful development and implementation of digital innovations and the full realization of digital transformation processes in companies bring an associated need for new knowledge and skills. Unfortunately, in Europe, the availability of the necessary skills is one of the top barriers for companies, especially SMEs, that want to embrace digital technologies in their products, processes and business models.

In this respect, the aim of Smart4Europe2 task 5.4 is to contribute to address the skill needs of European companies as well as current and future workers. Specifically, the main target groups addressed by task 5.4 are:

- Entrepreneurs, managers and workers, especially those employed by traditional SMEs and mid-caps but also digital technology frontrunners.
- University students willing to combine top technical education with innovation and entrepreneurship.
- Representatives of Digital Innovation Hubs that play a central role in fostering the broad uptake of digital technologies by industry.

The main focus of the task 5.4 is on hard/technical skills crucial for the design, development and adoption of Smart Anything Everywhere (SAE) technologies, i.e., cyber-physical and embedded systems, customized low energy computing powering cyber-physical systems and the Internet of Things, flexible and wearable electronics/organic large area electronics. These hard/technical skills are complemented by innovation-related, management and entrepreneurship skills that are relevant to make progress and succeed in the digitalization journey.

In this regard, Smart4Europe2 task 5.4 aims at:

1. gathering and advertising education and training opportunities offered by the SAE community on a continuous basis.
2. developing a catalogue of trainings in the fields of SAE technologies as well as innovation management and entrepreneurship.
3. implementing skill development activities on the topics mentioned above (also in collaboration with SAE Innovation Actions and other “sister projects”, such as I4MS and DIHNET).
4. collecting lessons learnt and highlighting recommendations for Horizon and Digital Europe.

Accordingly, deliverable D 5.4 reports the activities and results related to objective 1 and objective 2, which represent the focal points of the first period of the Smart4Europe2 project. In particular, the deliverable illustrates the collection of publicly available trainings from SAE Innovation Actions and other sister projects (e.g., DIHNET) gathered by means of a desk research, and their ongoing dissemination through the dedicated “SAE Service” page of the Innovation Portal and SAE social media (i.e., LinkedIn and Twitter). Finally, the deliverable presents the design of the “skills and training” space of the SAE Marketplace, detailing the information for the description of each training offering in order to help users find and access to the most appropriate one according to their needs and requirements.

1 Introduction

Disruptive technological advances in cyber-physical systems, IoT, big data, computing, artificial intelligence, etc. will have major and lasting effects on job content, tasks and skills in Europe (Cedefop, 2020). People will require not only strong skill foundations, but also constant updating and acquiring new skills to engage more comprehensively with digital technologies as part of their everyday activities (Figure 1). They will need to develop new technical and non-technical competencies (McKinsey Global Institute, 2018) to perform effectively in the workplace as well as to increase their employability, achieve their full potential and play an active role in society.

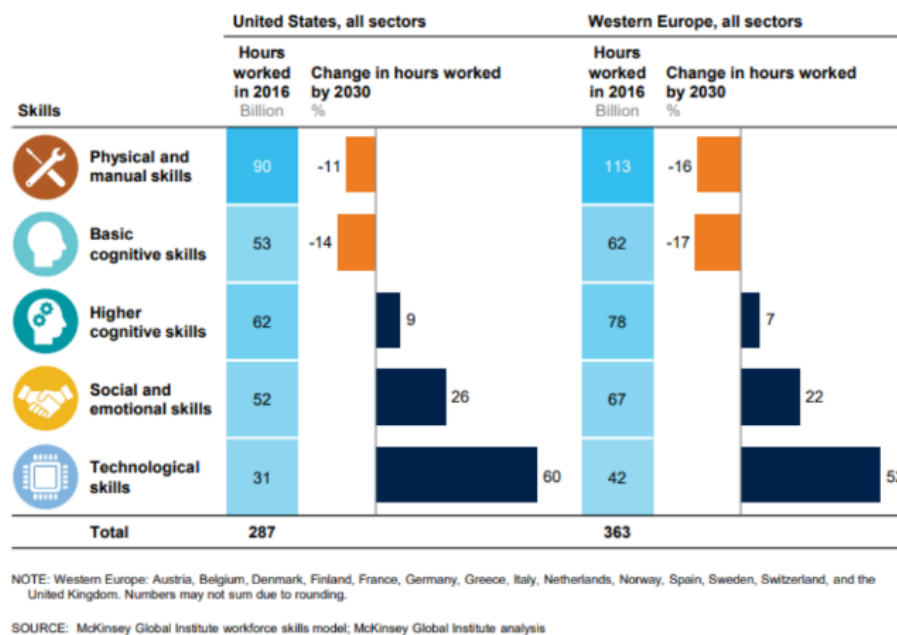


Figure 1 Skill shifts by 2030 (source: McKinsey Global Institute, 2018)

In this respect European society and economy are facing important challenges (Figure 2). According to Eurostat data, 37% of the European labour force does not have basic digital skills. Additionally, not enough young people choose to pursue Science Technology Engineering and Mathematics (STEM), Key Enabling Technologies (KETs) and Information and Communication Technologies (ICT) related education and training programmes (Cedefop, 2016). The skills gaps affect every Member State (López Cobo et al., 2020) and sector of the EU economy (European Commission, 2020). About 60% of EU companies that wish to hire digital specialists report difficulties in recruiting, and 80% of companies cite a lack of appropriate skills as one of the main barriers to new investments (European Commission, 2020).

Upskilling and reskilling of adults is thus an urgent priority. Similarly, education and training are essential to meet the needs of the future labour market and to sustain European industry competitiveness. Lifelong learning is also pivotal in realizing the cultural transformation needed to create an innovative and successful industrial base.

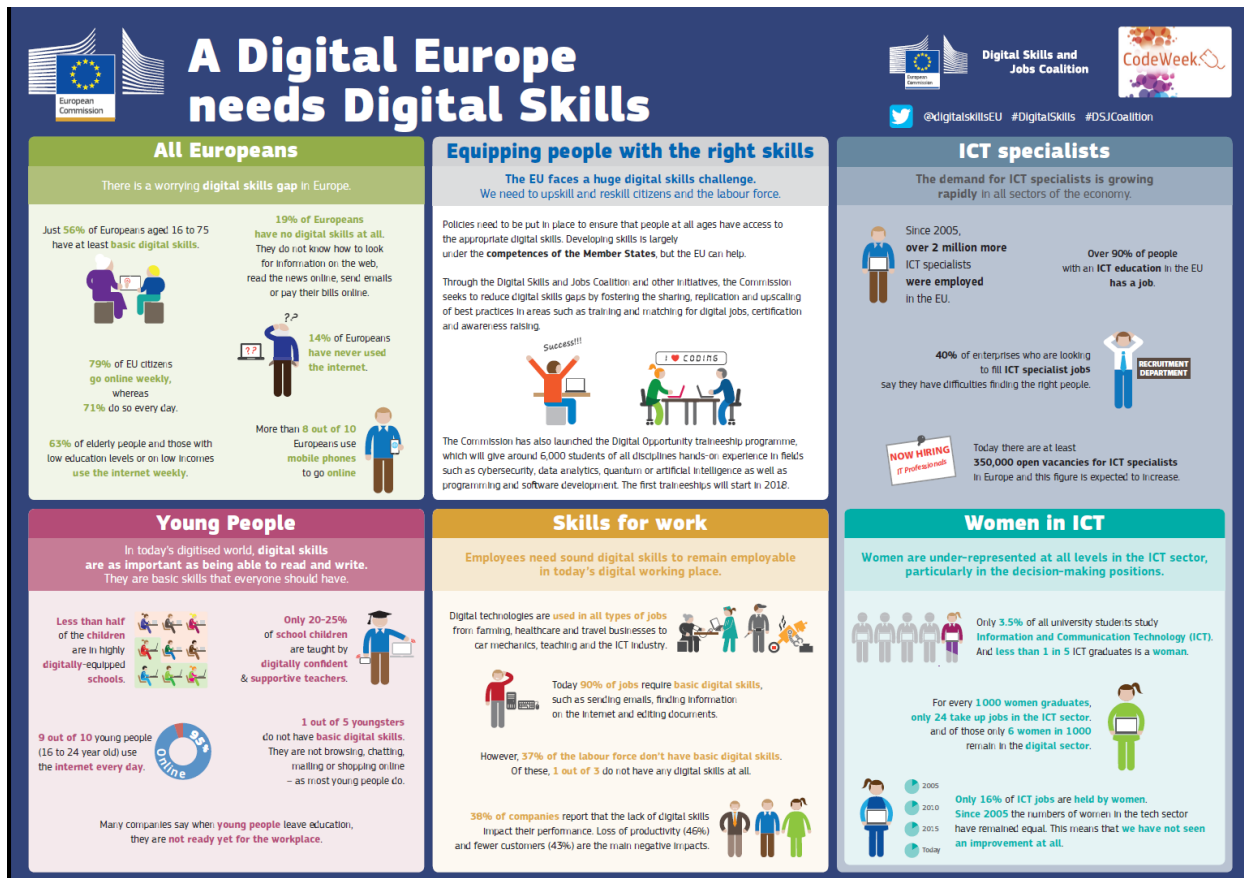


Figure 2 Digital Skills in Europe (source: DG CONNECT, 2020)

Recently, the new European Skills Agenda sets the objective of ensuring that 70% of 16-to-74-year olds have at least basic digital skills by 2025 and underlines the importance of lifelong learning. Up- and reskilling is one of the flagship investment priorities of the Recovery and Resilience Facility. Making education and training fit for the digital age is also the aim of the Digital Education Action Plan (2021-2027). Besides, the new Digital Europe Programme, with a budget dedicated to advanced digital skills, will focus on three types of actions:

1. Short-term specialized training courses in advanced digital technologies for job seekers and employed people, especially in SMEs.
2. Master's Programmes in cutting-edge digital technologies.
3. Job placements in companies or research centres where advanced digital technologies are developed or used.

To this end, cooperation with Competence Centres and Digital Innovation Hubs will play an important role in fostering the broad uptake of digital technologies and development of skills by industry by means of dedicated services, such as providing companies with a clear view on funds available for their skilling needs, skill assessment, e-learning courses, boot-camps, traineeships, implementation of teaching/learning factories, exchange of curricula and training material (Figure 3).

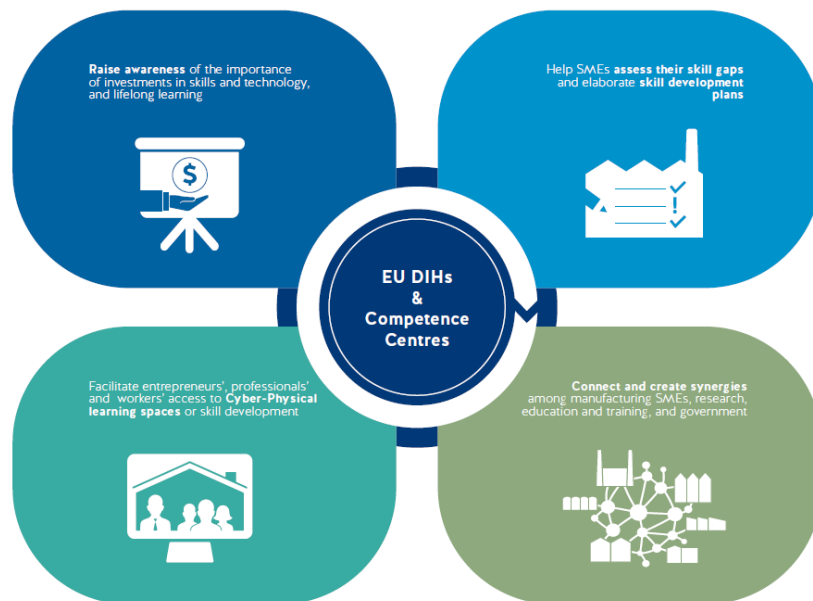


Figure 3 Digital Innovation Hubs and skills development (source: The 2019 World Manufacturing Report)

2 Smart4Europe2's objectives and approach to skills and training

To contribute to address the above-mentioned challenge, within Smart4Europe2 work package 5, task 5.4 focuses on education and training, and it aims at addressing SAE-related knowledge and skills of both the current and future workforce.

Specifically, the main target groups identified by Smart4Europe2 are:

- Entrepreneurs, managers and workers, especially those employed by traditional SMEs and mid-caps but also digital technology frontrunners.
- University Students willing to combine top technical education with innovation.
- Representatives of Digital Innovation Hubs that play a central role in fostering the broad uptake of digital technologies by industry.

The main focus of the task 5.4 is on hard/technical skills relevant to the design, development and adoption of SAE technologies, i.e., cyber-physical and embedded systems, customized low energy computing powering cyber-physical systems and the Internet of Things, flexible and wearable electronics/organic large area electronics.

However, as highlighted in many studies (e.g., McKinsey Global Institute, 2018; Capgemini Invent, 2019), technical skills must go together with business expertise and soft/transversal skills to have well-rounded, future-proof human capital that foster digital innovation and the business development of their organization. Indeed, in task 5.4, attention is also paid to those trainings aimed at enhancing skills for business planning, approaching private and public investors, etc.

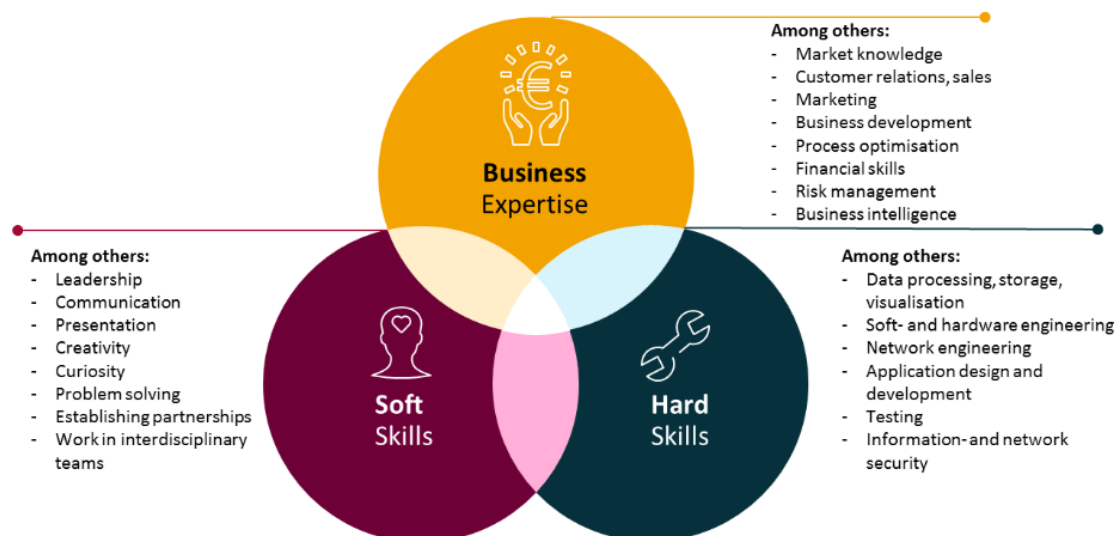


Figure 4 Examples of skills deemed important for SMEs in Europe (source: Capgemini Invent, 2019)

In this respect, Smart4Europe2 task 5.4 aims at:

1. gathering and advertising education and training opportunities offered by the SAE community on a continuous basis.
2. developing a catalogue of trainings in the fields of Smart Anything Everywhere technologies as well as innovation management and entrepreneurship.
3. implementing skill development activities on the topics mentioned above (also in collaboration with SAE Innovation Actions and other “sister projects”, such as I4MS and DIHNET).
4. collecting lessons learnt and highlighting recommendations towards Horizon and Digital Europe.

Objective 1 and objective 2 represent the focal points of the activities performed during the first period of the Smart4Europe2 project (M1-M12), which are reported in the present deliverable. In particular, the deliverable illustrates the collection of publicly available trainings from SAE Innovation Actions and other sister projects (e.g., DIHNET) gathered by means of a desk research performed throughout the year. Moreover, it reports the ongoing dissemination of the identified opportunities via the dedicated “SAE Service” page of the Innovation Portal and SAE social media (i.e., LinkedIn and Twitter). Finally, the deliverable presents the design of the “skills and training” space of the SAE Marketplace, detailing the information for the description of training offerings and materials to help users access to the most appropriate ones according to their requirements.

3 Trainings mapped till December 2020 (M12)

| TARGET: SMEs | | | | | |
|---------------|-----------|---------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SOURCE | DOMAIN | TYPE | TITLE | CONTENT | LINK |
| Smart4Europe2 | Business | Webinar | How to make investors fall in love with your company | Participants will know how to increase outreach and raise interest of private investors | https://old.smartanythingeverywhere.eu/wp-content/uploads/2019/07/SAE-workshop-How-to-make-investors-falling-in-love-with-your-company.mp4 |
| HUBCAP | Technical | Webinar | Joint Webinar from HUBCAP, Centre for Digital Twins, INTO-CPS Association | <ul style="list-style-type: none"> - The Future of Model Based Design CPS Development - Demonstrating The INTO-CPS Application inside The HUBCAP collaboration platform sandbox - Demonstrating The RT-Tester functionality and its connection to INTO-CPS Application - Demonstrating the FMU Static Checker - Demonstrating the Python FMU capabilities - Presenting the RabbitFMU capability | https://digit.au.dk/currently/events/show/artikel/joint-webinar-from-hubcap-centre-for-digital-twins-into-cps-association-1/ |
| HUBCAP | Technical | Webinar | INTO-CPS Webinar | <ul style="list-style-type: none"> - Setting the context of the INTO-CPS and Digital Twin Webinar - Overview of the new MaestroV2 - Demonstrating of the newest INTO-CPS Application release - Demonstrating the FMU Static Checker - Demonstrating the Python FMU capabilities - Presenting the RabbitMQ capability and its use inside the AgroRobottiFleet - Integrating FMI, TLM, VISTAS to Extend Virtual System Integration Capability – an Overview | https://into-cps.org/events/show/artikel/into-cps-webinar-1/ |

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| | | | | <ul style="list-style-type: none"> - Engineering CPS with AutoFOCUS3 - Overview of the new UPSIM project - Getting Data from and Calibrating Universal Robot Arms - New research for verification of termination of Co-simulation - New research with an Adaptive Master Algorithm | |
| DigiFed | Technical | Webinar | Digitising Europe's industry together - Part II (Technical offer) | Digifed's technical partners present their technical offer for the project. | https://digifed.org/2020/03/19/digifed-digitising-europes-industry-together-part-ii/ |
| DigiFed | Technical | Webinar | Digitising Europe's industry together - Part III (Technical offer) | Digifed's technical partners present their technical offer for the project. | https://digifed.org/2020/04/02/digifed-digitising-europes-industry-together-part-iii/ |
| DigiFed | Business | Online bootcamp | DigiFed Online bootcamp | A series of online interactive thematic training sessions – “online bootcamps”, to help guide applicants in the preparation for the submission of their technical offer proposals. The bootcamp sessions will last between 1 and 2 hours each and will include the opportunity to interact with experts in the field of Cybersecurity, Internet of Things, Artificial Intelligence and Autonomous Vehicles | https://digifed.org/explore/online-bootcamps/ |
| DigiFed | Technical | Webinar | Meet DigiFed technical partners - part 1 | Technologies made available in the frame of DigiFed | https://digifed.org/explore/webinars/ |
| DigiFed | Technical | Webinar | Meet DigiFed technical partners - part 2 | Technologies made available in the frame of DigiFed | https://digifed.org/explore/webinars/ |
| DigiFed | Business | Online bootcamp | DigiFed Online Bootcamp Series 2 | A series of online interactive thematic training sessions – “online bootcamps” - to help applicants in the preparation for the submission of their technical offer proposals. The bootcamp sessions will last between 1 and 2 hours each and will include the opportunity | https://digifed.org/2020/12/04/digifed-bootcamp-series-2-download/ |

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| | | | | to interact will experts in the field of Cybersecurity, Internet of Things, Artificial Intelligence and Autonomous Vehicles | |
| DigiFed | Business | Online bootcamp | Pitch video dedicated session | DigiFed Bootcamp Open Call 2 Pitch guidelines | https://digifed.org/2020/12/04/digifed-bootcamp-series-2-download/ |
| SmartEEs2 | Business | Investment Readiness Workshop | How to get ready for your investment pitch | <p>The interactive workshop ‘How to get ready for your investment pitch’ offers participants a masterclass on the art of pitching for investors, an interactive Q&A session with the speaker and expert Fadi Naffah and opportunity for selected startups to exercise their pitch with a dedicated expert in the breakout sessions. The “how to get ready for your investment pitch” workshop has been set – up in an interactive way and will be divided into two main parts. Firstly, participants will enjoy a 30 minute masterclass on the do’s and don’ts regarding the art of pitching, which will be followed by a dynamic Q&A session (15 minutes). Our expert, Fadi Naffah will delve into the following elements:</p> <ul style="list-style-type: none"> - How to make your business idea understandable - How to tailor your pitch to your audience - How to perform a convincing pitch (visual story & delivery) <p>Following the Q&A session, the second part of the workshop will kickstart. A total of 24 selected companies’ start-ups will be divided into 4 breakout rooms. Each breakout rooms will include 6 companies and 1 expert. Each company will be asked to pitch their business</p> | https://smarteetees.eu/investment-readiness-workshop-by-innorate-and-smarteetees/ |

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| | | | | for 5 minutes and will then receive 3 minutes of feedback on their pitch from the expert. | |
| SmartEEs2 | Technical | Webinar | Hybrid Printed Electronics for Flexible, Stretchable and 3D Products | The webinar focuses on: Printed electronics market approach; Manufacturing methods; Printing, assembly, post processing; Printed electronics building blocks; Demonstrations. | https://smarteetes.eu/smarteetes2-webinar-hybrid-printed-electronics-for-flexible-stretchable-and-3d-products/ |
| SmartEEs2 | Technical and Business | Webinar | Workshop for Third Party Suppliers and Applicants | The webinar explains how SmartEEs and its ecosystem work and finally present the current status of the project. | https://smarteetes.eu/smarteetes2-workshop-for-third-party-suppliers-and-applicants_15th-dec-2020/ |
| Fed4SAE | Technical | Webinar | AI Computer Vision using Intel's Movidius™ VPU Platforms – the success stories from FED4SAE | AI Computer Vision using Intel's Movidius™ VPU Platforms – the success stories from FED4SAE | https://fed4sae.eu/news/webinars/ |
| Fed4SAE | Technical | Webinar | AI computer Vision using Intel's Movidius™ VPU platforms | This webinar is an introduction to the Movidius platform and the best design practice for the implementation of AI computer vision applications. 2 examples of applications are introduced by ISSD with a tunnel monitoring use case and UBOTICA with the analysis of fundus images to detect retinopathy. | https://fed4sae.eu/news/webinars/ |
| Fed4SAE | Business | Webinar | LPWAN applications using STM32 | In this video, BLUMORPHO and ST Microelectronics are interviewing 2 start-ups, SAFECILITY and SENTINUM that used the STM32 in their products. | https://fed4sae.eu/news/webinars/ |
| Fed4SAE | Technical | Webinar | Intel Neural Compute Stick webinar | Insights into how Movidius™ VPUs are pioneering DNN accelerated vision processing. Introduction to hardware and software components of NCS. Walkthrough of online resources for NCS developers. Workflow of network profiling and application development using NCS. Advanced demo and sample code built using NC SDK's API framework. | https://fed4sae.eu/news/webinars/ |

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| Fed4SAE | Technical | Free educational resources created by STM (books, MOOCs, online courses) | ST online training material on STM32s | Free educational resources on STM32 processor family created by STMicroelectronics' engineers. Learn at your own pace, watch classes on your own schedule, anytime, anywhere, on any device, or join one of our live learning sessions led by our experts, close to you (trainings, tutorials, books, videos and much more). | https://fed4sae.eu/news/webinars/ |
| diatomic | Technical | Webinar | From the Ground to the Cloud | From Ground to the Cloud is an IoT Platform for Industry Digitalization. In this webinar, the participants learnt more about the optimizing industrial process, monitoring control and real examples of that application, following the evolution of the industry. IoT devices and applications will spread into nearly all domains of our lives, from smart homes and connected vehicles to infrastructure and logistics as well as into healthcare. Further, the technology is one of the pillars of Industry 4.0, which strives for self-organizing smart factories that are capable of (mass-) producing highly customized products. Besides the integration of IoT devices into existing production lines and products, one of the major challenges is to identify valuable use cases and sustainable business models within the field of IoT. The exploration of concrete and tangible use cases demonstrates how companies can connect their products, manufacturing processes, and product development to obtain more customer-centric products and services. | https://diatomic.eu/index.php/from-ground-to-the-cloud-webinar/ |
| diatomic | Technical | Webinar | Internet of Bodies | Internet of Bodies (IoB) is not more than an extension of Internet of Things (IoT), | https://diatomic.eu/index.php/internet-of-bodies-webinar/ |

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|----------|----------|---------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | | <p>connecting bodies with the internet. In this webinar, participants learnt more about this theme, as definition, generations and IoB examples. With the Internet of Bodies, connected devices from tech companies are now being implanted, ingested and affixed to the human body in ways never before imagined. And these connected devices are simultaneously generating tremendous amounts of data about our behaviors, our physiology, and even our DNA. Examples of Internet of Bodies innovations include smart contact lenses that are able to monitor glucose levels, artificial lenses used to correct vision, Bluetooth-equipped electronic pills, digital tattoos, and even Fitbit devices that monitor and analyze very intimate profiles of your health and physiological functions.</p> | |
| diatomic | Business | Webinar | From Innovation to Standardization | <p>The webinar covered the principles of standardization on how to boost innovation through the standards and how to use them in the DIATOMIC project. Successful products do more than simply solve a market problem. You can trust that they'll always be of a certain quality, be safe to use, and are readily available when you need them. What makes a product into a household name? The ability to scale while maintaining consistency. Standardization — misunderstood by many as a simple checkbox for regulators — is a way to ensure your product's consistency as you scale and grow into different markets. This can help</p> | <p>https://diatomic.eu/index.php/from-innovation-to-standardization-webinar/</p> |

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| | | | | accelerate market entry while clearly communicating what your customers can expect from you. | |
| diatomic | Business | Webinar | PR for Startups | The webinar gave an overview of PR in terms of inbound marketing used to reach the right audience with the right content at the right time and place, i.e. how to draw customers to one's products and services via content marketing, social media marketing, search engine optimization and branding. | https://diatomic.eu/index.php/pr-for-startups-webinar/ |
| diatomic | Business | Webinar | Digital marketing – where to start? | The webinar gave an overview of digital marketing options for SMEs and startups for establishing a strong online presence. It covered how to identify and reach the right audience, how to get started with keywords, how to choose the right social media platform, how to create content, how set up a content mix and scale it, as well as some tips & tricks. | https://diatomic.eu/index.php/digital-marketing-where-to-start-webinar/ |
| diatomic | Business | Webinar | Public Funding for Startups | The webinar covered the SME Instrument and Fast Track to Innovation, including the descriptions of eligible applicants, the application process, evaluation criteria, amount of available funding and upcoming deadlines, as well as some general tips & advice. | https://diatomic.eu/index.php/public-funding-for-startups-webinar/ |
| diatomic | Business | Webinar | How to find the right investors to fund your startup | The webinar gave an overview of the type of investors that entrepreneurs need and should look for, depending on the stage that their project is. Likewise, it contains the hints how to easily search/find the investors (companies, relevant personas) through desktop research and social media. | https://diatomic.eu/index.php/how-to-find-the-right-investors-to-fund-your-startup-webinar/ |

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| diatomic | Business | Webinar | Customers' Needs | The webinar provided an insight on how to identify and better understand customer needs, in order to be able to develop properly tailored solutions. It covers the types of customer needs, how to perform customer needs analyses, as well as how to use the obtained results to provide marketable solutions. | https://diatomic.eu/index.php/customers-needs-webinar/ |
| diatomic | Business | Webinar | Social media | The online workshop covered the ins and outs of social media channels and provided insights on reaching and engaging customers on the social network platforms that they use most in their free time. | https://diatomic.eu/index.php/social-media-webinar/ |
| diatomic | Business | Webinar | Legal DOs and DON'Ts of conducting business in the EU | The webinar offered a better understanding of the range of legal issues that a growing startup may encounter, in order to avoid the common pitfalls of developing and scaling a new business, as well as to gain a better position for long-term success. | https://diatomic.eu/index.php/legal-dos-and-donts-of-conducting-business-in-the-eu/ |
| diatomic | Business | Webinar | Pitching Skills-How to pitch to investors | The webinar gave tips and advice on how to prepare and present a business pitch to potential investors in order to secure funding for a project. It covers different approaches ranging from an elevator pitch to a longer business pitch, including market analysis, business model and strategy, an overview of the competition, risks, and financial projections. | https://diatomic.eu/index.php/how-to-pitch-to-investors/ |
| Digit-T | Technical and Business | Online Training Course and e-Book | Digital Manufacturing Training | Online training programme aimed at helping users understand what Digital Manufacturing is, the associated terminology, the expected benefits, and how an organisation can start adopting it. | https://training.digit-t.eu/ |

| | | | | The training materials, which are available in English, Spanish and Italian, are split into 2 parts: Online Training Course; e-Book | |
|---------------------------|------------------------|--------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Fit4FoF | Technical | Training catalogue | Digital Upskilling Initiatives Catalogue | The Digital Upskilling Initiatives Catalogue aims to improve the skills of the workers of the Factory of the Future through collecting this initiatives from people around the world. The catalogue includes initiatives such as forums, grants and scholarships, policies and regulations, projects or training activities (courses, programs or training plans) that can be focused on different sectors: automotive, naval, technological, chemical, medical-technological, etc. | https://www.fit4fof.eu/catalogue |
| I4MS | Technical | Training catalogue | I4MS training catalogue | In-demand and sought-after skills and access to training opportunities and materials. | https://trainings.i4ms.eu/Trainings |
| EIT Digital | Technical and Business | Training catalogue | EIT Digital Academy | Access high-quality professional courses developed by Europe's top digital innovation actors and translate your educational experience into actions for the advancement of your career and success of your company. | https://www.eitdigital.eu/eit-digital-academy/ |
| TRAINING MATERIALS | | | | | |
| SOURCE | DOMAIN | TYPE | TITLE | CONTENT | LINK |
| DigiFed | Technical and Business | Presentation | DigiFed Presentation | DigiFed Presentation | https://digifed.org/2020/12/04/digifed-bootcamp-series-2-download/ |

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| DigiFed | Business | Online bootcamp - presentation | DigiFed Online bootcamp | How to prepare your pitch - guidelines | https://digifed.org/wp-content/uploads/2020/04/How-to-prepare-your-pitch-for-Digifed-application-slides.pdf |
| DigiFed | Technical | Online bootcamp - presentation | DigiFed Online bootcamp | IOT | https://digifed.org/wp-content/uploads/2020/05/DigiFed-IoT-Bootcamp.pdf |
| DigiFed | Technical | Online bootcamp - presentation | DigiFed Online bootcamp | AI Software | https://digifed.org/wp-content/uploads/2020/05/DigiFed-AI-Software-Bootcamp.pdf |
| DigiFed | Technical | Online bootcamp - presentation | DigiFed Online bootcamp | Lighting, Reliability & Autonomous Vehicle | https://digifed.org/wp-content/uploads/2020/05/DigiFed-Lighting-Reliability-and-Autonomous-Vehicle-Bootcamp.pdf |
| DigiFed | Technical | Online bootcamp - presentation | DigiFed Online bootcamp | Cybersecurity | https://digifed.org/wp-content/uploads/2020/05/DigiFed-Cybersecurity-Bootcamp.pdf |
| DigiFed | Technical | Online bootcamp Series 2 | DigiFed Bootcamp OC2 Cybersecurity | DigiFed Bootcamp OC2 Cybersecurity | https://digifed.org/2020/12/04/digifed-bootcamp-series-2-download/ https://digifed.org/wp-content/uploads/2020/12/DigiFed-Bootcamp-OC2-cybersecurity.pdf |
| DigiFed | Technical | Online bootcamp Series 2 | DigiFed Bootcamp OC2 IoT-AI | DigiFed Bootcamp OC2 IoT-AI | https://digifed.org/2020/12/04/digifed-bootcamp-series-2-download/ https://digifed.org/wp-content/uploads/2020/12/DigiFed-Bootcamp-OC2-IoT-AI.pdf |
| DigiFed | Technical | Online bootcamp Series 2 | DigiFed Bootcamp OC2 Lighting Reliability Testing and Autonomous Vehicles | DigiFed Bootcamp OC2 Lighting Reliability Testing and Autonomous Vehicles | https://digifed.org/2020/12/04/digifed-bootcamp-series-2-download/ |

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|-----------|-----------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | | | https://digifed.org/wp-content/uploads/2020/12/DigiFed-Bootcamp-OC2-Lighting-Reliability-Testing-and-Autonomous-Vehicles.pdf |
| DigiFed | Technical | Online bootcamp Series 2 | DigiFed Bootcamp OC2 ST dedicated session | DigiFed Bootcamp OC2 ST dedicated session | https://digifed.org/wp-content/uploads/2020/12/DigiFed-Bootcamp-OC2-ST-dedicated-session.pdf |
| SmartEEs2 | Technical | Webinar | Can flexible and wearable technologies innovate your products and services? How to get technical, business and financial support for testing it? | At the workshop, participants were informed about the SmartEEs2 project and its objectives and how to submit a proposal in the Call for Application Experiments. The webinar also included two examples of companies that were supported through the first SmartEEs project. | Introduction to SmartEEs2: https://smarteess.eu/wp-content/uploads/2020/12/Frycek_SmartEEs2_AMIRES_webinar.pdf Company testimonial 1 – ESYST https://smarteess.eu/wp-content/uploads/2020/12/ESYST_Olight-12.2020-full.pdf Company testimonial 2 – IDEA https://smasmart.eu/wp-content/uploads/2020/12/IDEA_WWebina-4th-SmartEES.ppt |
| Fed4SAE | Technical | Video | Thales Time4Sys Platform | Thales Time4Sys Platform | https://fed4sae.eu/news/webinar |
| Fed4SAE | Technical | Video | Introduction to the STM32 Open Development Environment | STM32 Open Development Environment | https://fed4sae.eu/news/webinars/ |

Table 1 SME targeted trainings and training materials

| TARGET: STUDENTS | | | | | |
|------------------|------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| SOURCE | DOMAIN | TYPE | TITLE | CONTENT | LINK |
| Smart4Europe2 | Business | One-day workshop in Summer School | Smart System Integration Summer School | The workshop subject was when and how to create start-ups, how to obtain funding, how to pitch, etc. Then, the students had to create in groups of 3 a new digital start-up and had to pitch in front of the group and experts. Their presentations were evaluated by the experts of Innomine and BME. | https://ssi-master.eu/ |
| Smart4Europe2 | Technical & business | Online Academic seminar | Human centric Industry 4.0 | The seminar for POLIMI students of the advanced and sustainable manufacturing course was focused on the implications of digital technologies on the role, tasks and skills of workers, and how I4.0 technologies and organizational innovations can be leveraged to realize human-centric and sustainable production models 4.0. | N/A |
| TETRAMAX | Technical and Business | (Online) Summer school | TETRAMAX- course track in the 16th International Summer School on Advanced Computer Architecture and Compilation for High-Performance and Embedded Systems | The summer school offers 11 virtual courses. There are three TETRAMAX courses: - Ray Garcia - Buoyant Capital: Entrepreneurship for scientist considering forming an innovative new venture - Paul Pietrangelo - Lira: Entrepreneurial finance - Riccardo Aprea - ErreQuadro: Intellectual Property Rights | https://www.tetramax.eu/news/130/tetramax-summer-school-2020/ |

Table 2 Trainings for students

| TARGET: DIGITAL INNOVATION HUBS | | | | |
|---------------------------------|---------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| SOURCE | TYPE | TITLE | CONTENT | LINK |
| I4MS | Webinar | I4MS mentoring programme for DIHs - Access to finance | Access to finance | https://www.youtube.com/watch?v=igHeNZQGsmw_ |
| I4MS | Webinar | I4MS mentoring programme for DIHs - Building a Business Plan | Building a Business Plan | https://www.youtube.com/watch?v=ngvdPZ1Wsuk_ |
| I4MS | Webinar | I4MS mentoring programme for DIHs - Business Models | Business Models | https://www.youtube.com/watch?v=9ZI_56w9zJl_ |
| I4MS | Webinar | I4MS mentoring programme for DIHs - Ecosystem Assessment | Ecosystem Assessment | https://www.youtube.com/watch?v=ddeKnZ3_P7l_ |
| I4MS | Webinar | I4MS mentoring programme for DIHs - Use cases | Use cases | https://www.youtube.com/watch?v=igHeNZQGsmw_ |
| I4MS | Webinar | I4MS mentoring programme for DIHs - Brokerage | Brokerage | N/A |
| DIHNET | Webinar | Digital Innovation Hubs as part of the European DIH network | European DIH network | https://www.youtube.com/watch?v=4axCsbeGkPU |
| DIHNET | Webinar | Cooperation between Start-Ups and Digital Innovation Hubs | Digital Innovation Hubs (DIHs) are one-stop-shops that supports organisations such as SMEs and the public sector, in their digital transformation journey. Watch this webinar organised by DIHNET.EU, the European initiative supporting the collaboration among Digital Innovation Hub Networks across Europe. Learn how DIHs can support start-ups to commercialise their products and services to end users. | https://www.youtube.com/watch?v=b6PfoZ9XIS4 |
| DIHNET | Webinar | Post-project sustainability for networks | Many EU projects are currently developing networks, often with DIHs as a core of their members. One of the challenges is how to ensure sustainability of these initiatives after the project end. The webinar will address this topic and will look into some of the key elements: what are the services and possible business | https://www.youtube.com/watch?v=07dUuxWAlqQ |

| | | | | |
|--------|---------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| | | | models, what are the financial implications, what are the organizational and governance changes that networks need to address after the project ends? The webinar will provide first insights into these questions, building on the input and discussions from the RODIN Working Group on Post-Project Sustainability for Innovation Actions as well as insights from other projects. | |
| DIHNET | Webinar | How can DIHs help in times of COVID | <p>DIHs have supported SMEs during COVID-19, and we will present you the cases of three DIHs, followed by a panel discussion: Transilvania IT identifies collaborative projects that benefit all stakeholders (clusters, companies, local public authorities, universities) in the IT, agriculture, energy efficiency, furniture, and creative industries sectors.</p> <p>IAM 3D HUB aims to accelerate the adoption of additive manufacturing (AM) and 3D printing, one of most useful tools in the fight of COVID-19.</p> <p>BDIH supports SMEs in their dual sustainable and digital industrial transition. They will present an initiative for the digital transformation of self-employed and micro-SMEs designed to get adapted to the COVID-19 circumstances, as well as the Deep Dives planned for the “new normal”.</p> | https://www.youtube.com/watch?v=7WbOvrootHk |
| DIHNET | Webinar | Digital skills opportunities and collaboration between DIH and EUBICs | The European Commission promoted the creation of Digital Innovation Hubs (DIH) which are one-stop shops to help companies become more competitive through digital technologies. They help SMEs improve their business/production processes, products or services, by providing access to technical expertise and experimentation, so that SMEs can “test before invest”. They also provide innovation services, such as financing advice, training and skills development for a successful digital transformation. - Which is the role of EU BICs (business and innovation centres) and other business support organisations (BSOs) within DIHs? - What opportunities do the EU programmes in the field of DIHs offer for EU BICs and other BSOs? - How can | https://www.youtube.com/watch?v=avQETm8MeFo |

| | | | | |
|-----------------------------------------|-------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | EU BICs and other BSOs broaden their service portfolio, including their training and networking activities by taking part in a DIHs? - And how can EU BICs and DIHs collaborate and work effectively together to make an impact at the local level throughout Europe? | |
| Smart Factories in new EU Member States | Library | Library of the Smart Factories in new EU Member States project | Library of materials produced within the Project including presentations, templates, manuals and other types of documents. | https://smartfactories.eu/training/list |
| European Commission | Webinar | The role of Digital Innovation Hubs (DIH) in the post COVID-19 era | The workshop's main objective is to further increase awareness among regional / national policy makers on how DIHs can help SMEs in making the most of digital opportunities in their sector and becoming more resilient and competitive. Moreover, to present to policy makers current funding mechanisms and methodologies to help them reinforce DIHs and the uptake of digital transformation of SMEs in their regions/countries. | https://euregionsweek2020-video.eu/replay |
| European Commission | Webinar Documents | DIH Webinar: Artificial Intelligence for Smart Cities | The webinar addresses the following questions: What European tools / knowledge can DIHs use to help smart cities experiment with AI? What data sets are most relevant for smart city services and what governance mechanisms would be most useful? What kinds of AI-enabled solutions and services would cities benefit from the most? What role can DIHs take to help cities implement AI-enabled urban services or urban digital twins? | https://ec.europa.eu/digital-single-market/en/news/dih-webinar-artificial-intelligence-smart-cities |
| European Commission | Webinar Documents | DIH Webinar: How can Digital Innovation Hubs help the transition towards smart cities? | The webinar was structured around the following topics: Introduction; Building a digital / sustainable strategy in cities; Foundations of a European smart city; Smart and sustainable city services; Conclusions | https://ec.europa.eu/digital-single-market/en/news/dih-webinar-how-can-digital-innovation-hubs-help-transition-towards-smart-cities |

Table 3 Trainings for DIHs

4 Trainings dissemination via SAE Innovation Portal and social media

A dedicated sub-page of the “SAE Service” section of the Innovation Portal has been created to provide the user – especially SMEs and mid-caps - with relevant information about skill development opportunities and available online learning materials. The dedicated sub-page can be reached at the following link: <https://smartanythingeverywhere.eu/services/>.

Trainings have been clustered into:

- 1) Investor-related trainings, which refer to skills for investor pitching, financing, project proposal preparation, etc.
- 2) Technical trainings, which primarily focus on knowledge and skills related to SAE technologies but also include digital technologies at large.
- 3) Academic trainings, which are more oriented to students interested in developing their digital competences.

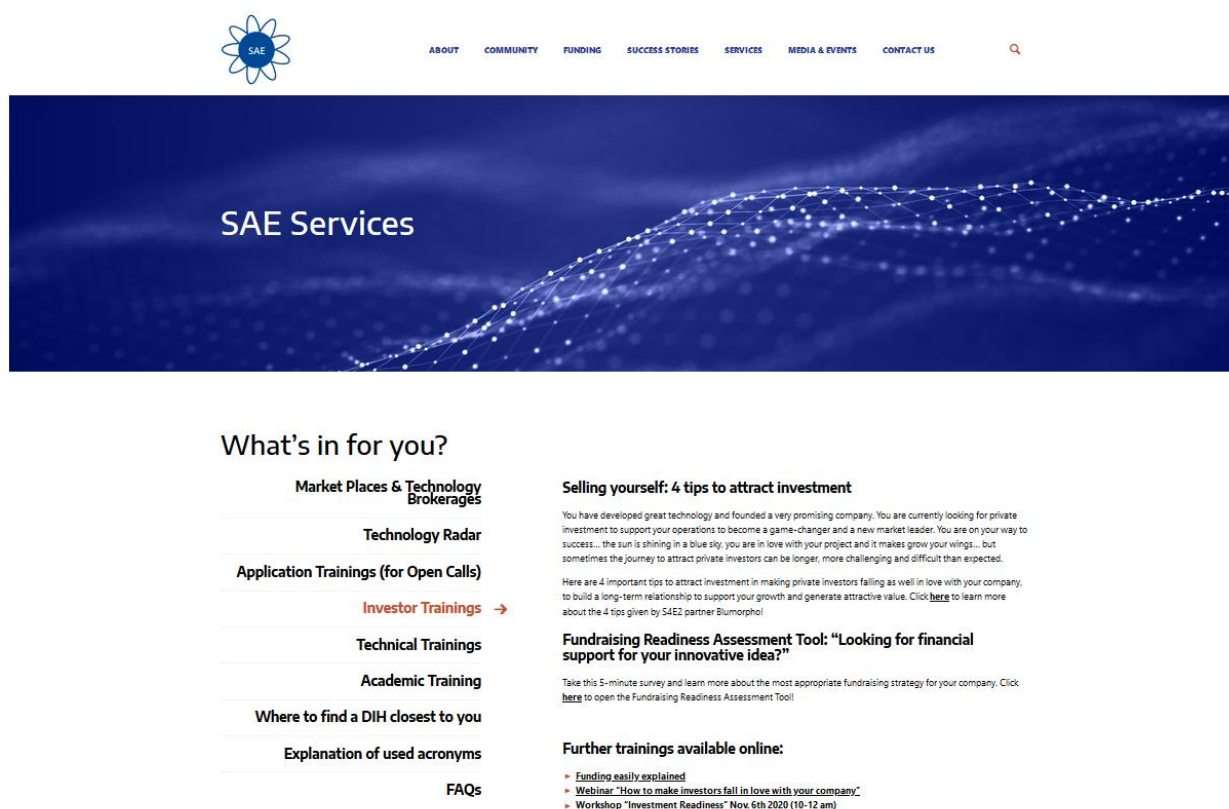


Figure 5 SAE Innovation Portal

Moreover, training and other skill development activities have been disseminated via SAE social media channels – i.e., LinkedIn and Twitter - to increase awareness of and encourage audience to take advantage of opportunities offered by Smart4Europe2, SAE Innovation Actions, other sister initiatives, like I4MS and DIHNET, and Erasmus+ projects (Figure 6; Figure 7).

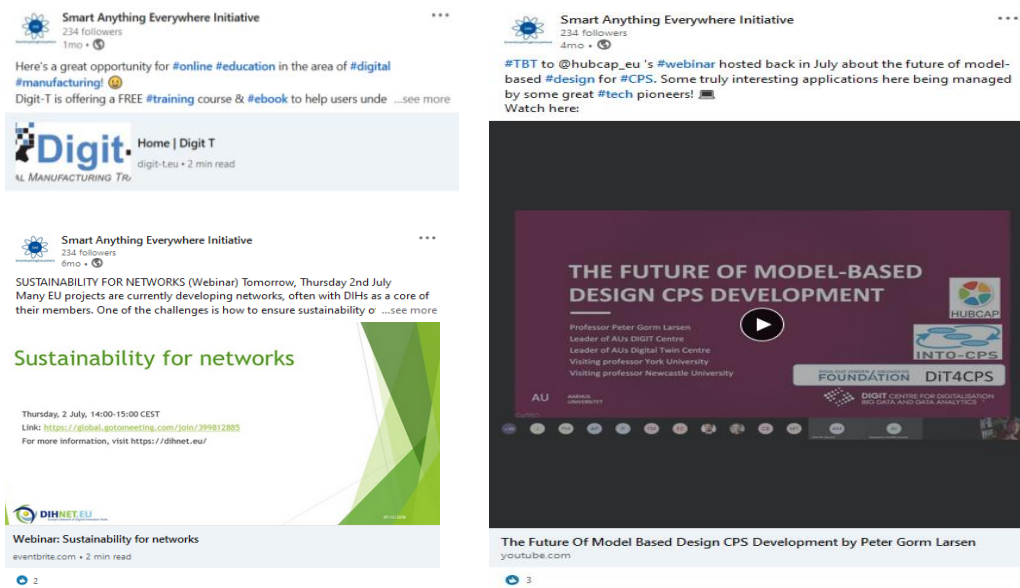


Figure 6 LinkedIn post on training opportunities



Figure 7 Tweets on training opportunities

5 Trainings in the SAE Marketplace

Skills and training opportunities are also included in the SAE Marketplace (Figure 8). As reported in deliverable D1.2, the corresponding space of the SAE Marketplace encompasses:

- An education and training catalogue: an online catalogue of education and trainings services (e.g., webinars, courses, summer schools, etc.) provided by SAE projects, competence centres and DIHs (Figure 9).
- Skills and training materials: a repository of reports, documents and relevant materials that are useful for the development of knowledge and skills on SAE technologies, business and other topics.

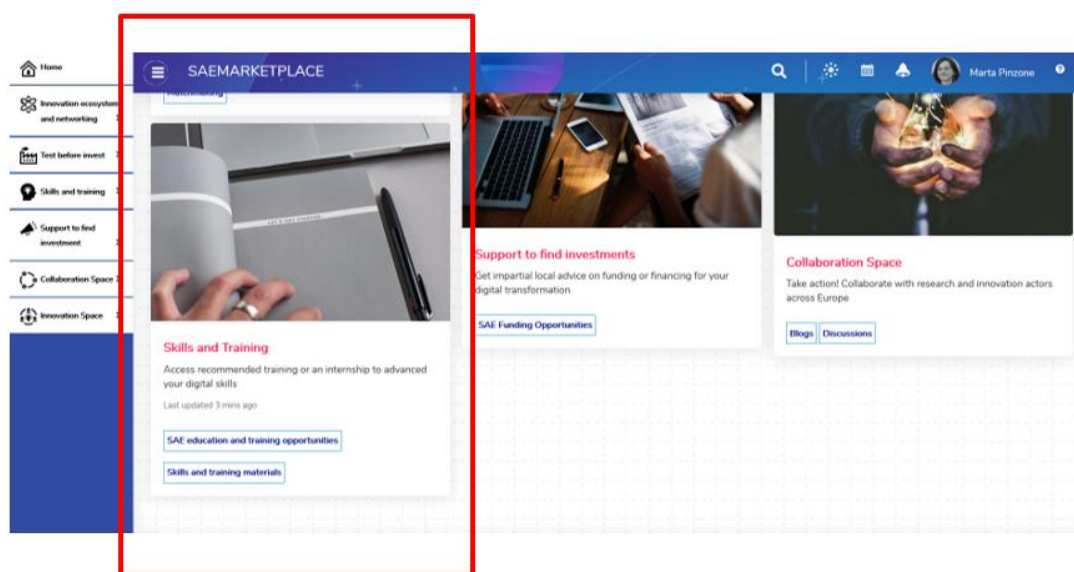


Figure 8 Home page of the SAE Marketplace

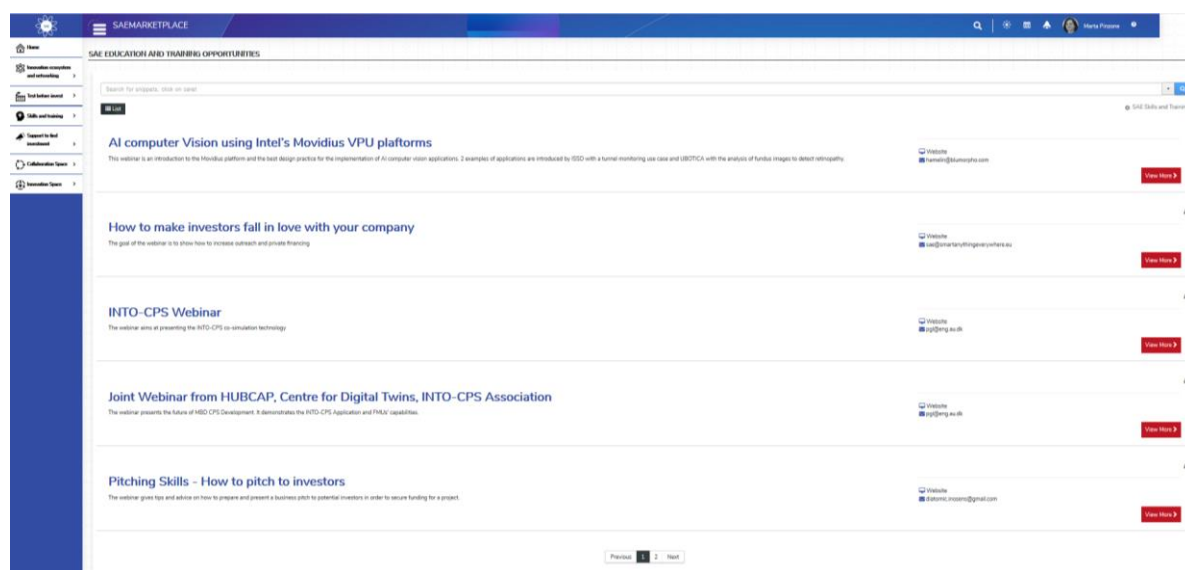


Figure 9 Catalogue of SAE training opportunities

For each training published in the online catalogue of the SAE marketplace, a summary description of the most important features of the training is provided according to a standardized template (Figure 10). This helps the user find the most interesting and suitable training for his/her skill development needs, discover the organization supplying the training and be directed to the content (if freely available) or the provider. The following information is included in the education & training template of the SAE marketplace:

- **Title** Title of the training
- **Description** Short description of the training and its aim
- **Domain** Technology: if yes, please indicate which one(s): advanced computing / advanced micro-electronics / smart system integration / customized low energy computing powering CPS / internet of things / Cyber physical and embedded systems / flexible and wearable electronics / organic and large area electronics (OLAE) / simulation and modelling
Business, Other(s) please specify, All
- **Sector** Is the training specific for any sector(s)? if yes, please indicate:
(aero)space / building and construction / consumer electronics/ digital manufacturing / energy / environment/ food and agriculture, IoT and smart connected objects/ medical, pharmaceutical, life science, health/ natural resources/ packaging and logistics/ Safety and security / transport, mobility, automotive /Other(s) please specify / All
- **Target** Group(s) of people identified as the recipient of the training: directors, engineers-professionals / operators / students / start-uppers / Digital Innovation Hub / Other(s) please specify / All
- **Competence level** Competence level of the training:
Foundation/ intermediate/ advanced/ highly specialized according to the definition provided in the DigComp framework³
- **Learning outcomes** A learning outcome is a written statement of what the successful learner is expected to be able to do at the end of the training unit
- **Learning content** The subjects or topics covered in the education/training
- **Delivery** How is the content delivered?
Face-to-face lectures / practical or on-the-job / e-learning (webinar, MOOC, etc.) / blended / Other(s) please specify
- **Assessment** Short description of the final assessment
- **Certification** Does the training lead to a certification? Which one?
- **Cost** How much does the training cost?
- **Duration** How much does the training last?
- **Date** When does the training take place?

³ Vuorikari, R., Punie, Y., Carretero Gomez S. & Van den Brande, G. (2016). DigComp 2.0: The Digital Competence Framework for Citizens. Update Phase 1: The Conceptual Reference Model. Luxembourg Publication Office of the European Union. DOI:10.2791/11517

- **Location** If not online, country/region/city where the training takes place
- **Language** The language used to provide training:
English / Bulgaria / Croatian / Czech / Danish / Dutch / Estonian / Finnish / French / German / Greek / Hungarian / Irish / Italian / Latvian / Lithuanian / Maltese / Polish / Portuguese / Romanian / Slovak / Slovenian / Spanish / Swedish
- **Organization** Name of the Competence Centre / Digital Innovation Hub / other institution that provides the training
- **Contact** Main contact name, e-mail address
- **Website** Reference to information and resources available online
- **Documentation** Document to upload or url
- **SAE project** Sae project to which the training is linked:
Phase 3: Bowi, Digifed, Dih4cps, Hubcap, Smart4all, Smartees2, Smart4europe2
Phase 2: Diatomic, Fed4sae, Tetramax, Smartees, Smart4europe
Phase 1: Cpselabs, Eurocps, Gateone, Smarter-Si, Tetracom
Other(s)

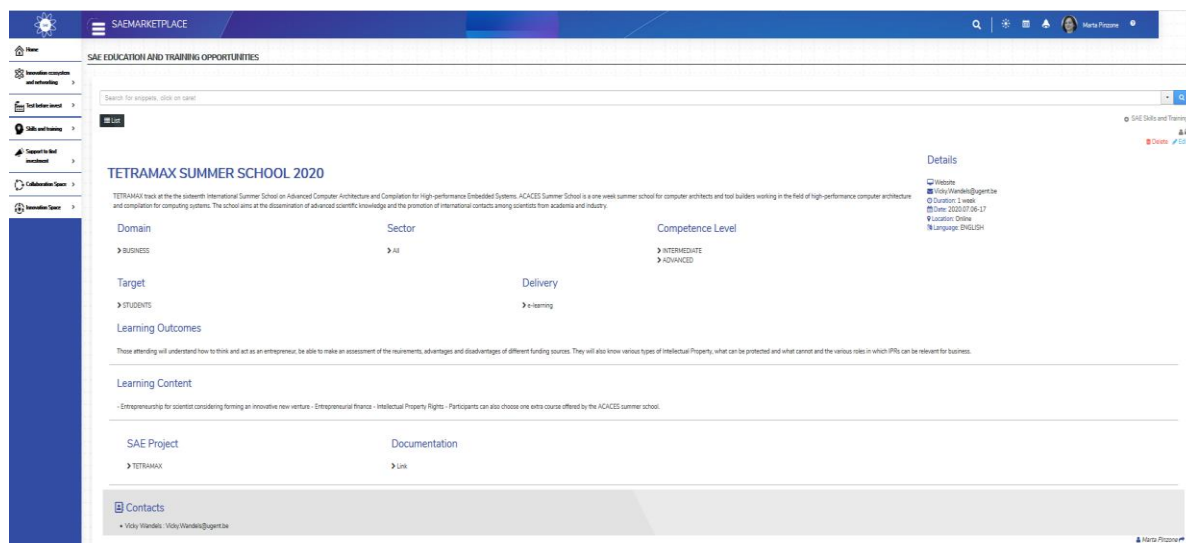


Figure 10 Description of an education/training opportunity available in the SAE Marketplace

In addition to the online catalogue of education and training opportunities, the user of the SAE marketplace can directly access to training materials, reports and other documents produced by SAE innovation actions and relevant stakeholders of the SAE ecosystem in a dedicated online repository.

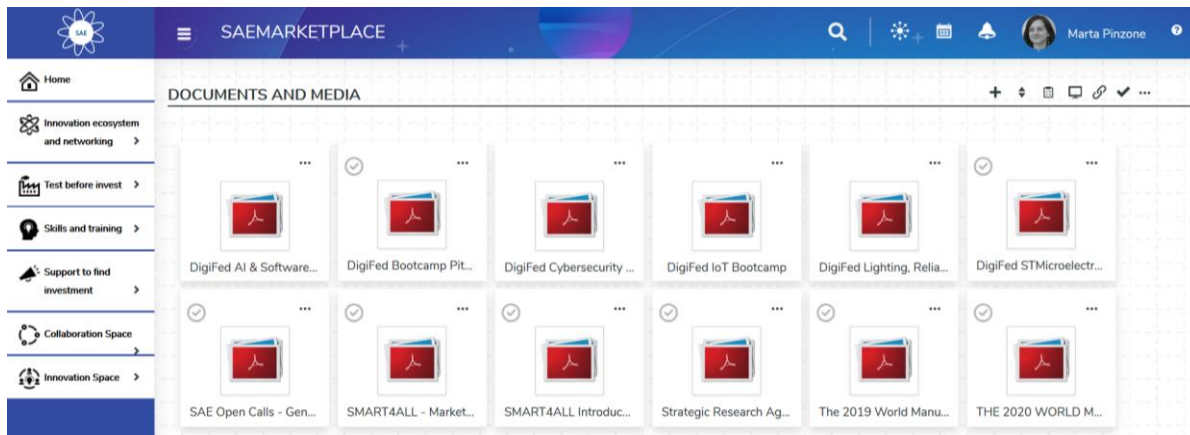


Figure 11 Examples of training materials available in the SAE Marketplace

6 Conclusions

In the context of Smart4Europe2's work package 5, the present deliverable focuses on skills and training. It presents the scope, approach and results of the first-year activities performed in task 5.4. The first step in the approach of task 5.4 consisted in desk research, which was performed during 2020, with the aim of identifying and collecting available trainings from Smart4Europe2, SAE Innovation Actions and other sister projects (e.g., DIHNET). Overall, about 50 training initiatives—mainly in the form of webinar—and resources targeting SMEs, students and DIHs were identified so far.

In parallel, the identified opportunities were promptly advertised via SAE social media (i.e., LinkedIn and Twitter) and disseminated via the dedicated page of the SAE Innovation Portal. Moreover, the design of a standardized template, the set-up and first population of the “skills and training” space of the SAE Marketplace were realized.

Task 5.4 plan for next year foresees not only the continuation of the above-mentioned activities but also the organization and realization of further Smart4Europe2's training initiatives, especially addressing SMEs and Digital Innovation Hubs, to complement and expand the ones already organized by SAE Innovation Actions. As the possibility to organize physical, face-to-face events is still uncertain due to the pandemic, it is likely that these training activities will be realized in the form of webinars and/or online workshops.

This represents a continuous and iterative process that Smart4Europe2 will be implementing throughout the course of the project to make new skill development opportunities available to the identified target groups and maintain the online training catalogue always up to date.

The impact of the Smart4Europe2's trainings on the intended target group will be also monitored and SAE stakeholders will be consulted in order to derive lessons learnt, good practices and recommendations to support the digital transition of companies in the future Horizon and Digital Europe programme.

7 References

- Capgemini Invent, the Technopolis Group and the European DIGITAL SME Alliance (2019). Supporting specialised skills development: Big Data, Internet of Things and Cybersecurity in SMEs. Available at: https://www.digitalsme.eu/digital/uploads/March-2019_Skills-for-SMEs_Interim_Report_final-version.pdf
- Cedefop (2016). Skill shortage and surplus occupations in Europe. Available at: <http://www.cedefop.europa.eu/en/publications-and-resources/publications/9115>
- Cedefop (2020). Empowering adults through upskilling and reskilling pathways. Volume 1: adult population with potential for upskilling and reskilling. Luxembourg: Publications Office of the European Union. Cedefop reference series; No 112. <http://data.europa.eu/doi/10.2801/47539>
- DG CONNECT (2020). Factsheet "A Digital Europe needs Digital Skills". Available at: <https://ec.europa.eu/digital-single-market/en/news/digital-europe-needs-digital-skills>
- European Commission (2020). Digital Education Action Plan (2021-2027). Available at: https://ec.europa.eu/education/education-in-the-eu/digital-education-action-plan_en
- López Cobo M., De Prato G., Alaveras G., Righi R., Samoilis S., Hradec J., Ziemba L.W., Pogorzelska K., Cardona M., Academic offer and demand for advanced profiles in the EU. Artificial Intelligence, High Performance Computing and Cybersecurity, EUR 29629 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-79-98983-4, doi:10.2760/016541, JRC113966
- McKinsey Global Institute (2018). Skill shift: Automation and the future of the workforce. Available at: <https://www.mckinsey.com/featured-insights/future-of-work/skill-shift-automation-and-the-future-of-the-workforce>
- World Manufacturing Forum (2019). The 2019 World Manufacturing Forum Report: Skills for the Future of Manufacturing. Available at: <https://worldmanufacturing.org/report/report-2019/>