Efficient construction through
digital technologies in the construction
and finishing trade

Work Package 2, Activity 1 and Activity 2

Digital Technology and Training Best Practices

Prepared by:

IVSZ

Edit Kaiser, Klara Süveges Heilingbrunner and Balázs Tordai

February 2023

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

Table of Contents

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

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

Introduction

The demand for good apartments and houses has rarely been as high as it is now, and yet there is far too little affordable housing available. Hence, significant increase in efficiency and acceleration of construction planning and execution is needed in the construction industry.

Construction projects can be carried out more efficiently through the application of targeted digital tools. In fact, around 30% of planning capacities can be saved this way. In addition, digital technologies make the identification of risks in the construction possible at an early stage so that they can be avoided. When building one- and two-family houses, up to 25% of the total construction costs go to coordination work, which can be reduced to a very large extent through self-coordination using digital tools. Since the construction industry is characterized by a highly specialized division of labor, coordination errors can quickly occur, which often result in inferior quality and delays. Furthermore, energy and environmental aspects are often not given enough attention during new constructions and reconstructions.

With the help of digital technologies, building owners, architects, engineers and craftsmen can plan together easily, increase the quality and ensure the adherence to deadlines. Moreover, new technologies make it possible to determine the energy costs of a building at an early stage and to eliminate risks or hidden costs. Individual priorities can be placed on technical features or environmental aspects. Although digital technologies and tools are already being tested and used in practice, the overall digitalization in the construction sector is only advancing very slowly.

The shortage of skilled workers is particularly severe in the construction industry. The attractiveness for vocational training and construction activities is clearly suffering from the high specialization, physically difficult work, heteronomy, etc. The targeted use of digital technologies can reverse these barriers and lead to decisive increases in attractiveness. Large companies and general contractors in the construction industry often use their own digital systems, which they impose on their SME subcontractors, making them dependent and completely transparent. This leads to the rejection of digitalization in SMEs.

The present document provides a helping hand in terms of best practice digital technologies used in the sector to cooperate with each other or provide the service in a more effective and professional way to the customers as well as in respect of training programmes targeting the digital skills development of SMEs, which could be adapted to local circumstances and used to enhance the digital skills level of workers. In addition four forward looking cooperation cases have been identified and introduced.

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

Methodology

The primary objective of WP2 Task A1 was to collect, analyze and provide best practices regarding **the use of digital technologies and the realization of cooperation and coordination through digital tools within SMEs.** Similarly to A1, A2 focused also on best practice identification, in the field of **SME specific training programs to teach digital competencies and skills**. Both activities terminate with the publication of a best practice catalogue in their respective fields.

The ultimate outputs of the activities (present document) were key for the knowledge transfer activities of the project, namely the train the trainers workshop as well as the elaboration of the training materials.

As both activities had similar objectives the same methodology was proposed by IVSZ for the DIG-CON consortium regarding the implementation of the tasks. The present chapter will introduce the different steps of the process, the timeline applied and also the templates used.

Since the project aimed at collecting different number of best practices in the field of technologies and in trainings, in the below description we will indicate the difference in every step with a symbol "/".

Main steps of best practice development

The best practice elaboration process can be divided into 5 main steps:

1. **Preliminary data collection:**

Objective: identification of 20-25 technology/13-15 training good practices from all over Europe that enables the consortium to select 10-12 technology/6-7 training cases and elaborate the best practices in detail. The BP identification activity was supposed to cover 13 European countries.

Data collection method: Online English questionnaires were created in Survey Monkey Technology survey and Training survey. The links to the English surveys were made available for the partners, who received the questionnaires in word too. Partners could decide individually if a translated survey was needed. In case such a need was indicated the language version of the survey was prepared based on the translated questions that the respective partner provided (versions developed: German, Hungarian, Polish).

Partners were offered the freedom to decide if they preferred to collect data online or offline (personal meeting or call). Independent from the data collection method and language, the responses had to be submitted in English via the Survey Monkey link or in the word template. (Template of the preliminary data collection questionnaire is attached in Annex 1).

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

Process: DIG-CON project partners, acting as multiplicators, promoted the preliminary questionnaires to stakeholders in their countries (if a partner had wider outreach than a country, it was expected to promote the survey in a larger geographical area). In order to eliminate the language barrier for the target groups, partners could translate the online questionnaire into their native languages. In case of native language information collection, partners had to ensure that the responses were translated into English to enable the processing of information.

DIG-CON partners have track record of relevant activities and experience in the field therefore they could also propose good practice without contacting any target group member.

Targeted stakeholders: The target group/stakeholders consist both of technology providers in construction and finishing trades industry, as well as groupings of technology companies or vocational education providers having a special focus on this industry. Examples: chambers, educational organizations (VET, college, universities), thematic clusters, associations and other BSOs in the sector, major manufacturer representations.

To facilitate the good practice identification activity of partners, a list of potential sources of good practices were provided:

- innovation prize nominees or winners
- exhibitors in respective fairs

In addition, special characteristics of GPs were also identified:

- the size of the user group,
- type of users (if it is used by few large companies, it is probably used in many locations)
- does it have an international user group – is the service available in many languages?
- how fast has the technology been spread among the target groups?
- etc.

Indicator for each partner: Each partner had to identify at least 3 GPs in the technology and 1-2 cases in the training questionnaire. Partners had to cover their own countries but if they were aware of any good practice outside of their home country, they could propose a case also from a different country. HP, due to its wide own network was requested to distribute information about the activities in its whole network (which ensured the outreach in at least 8 additional countries).

Deadline for the preliminary information collection: 31 July 2022.

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

Results of Step 1: Each partner provided good practice proposals in both questionnaires. 28 technology and 20 training cases were collected in the first step.

2. Selection of best practices from the identified good practices

The ultimate objective of this step was to select 10-12 technology and 6-7 training best practice cases from the identified good practices to be elaborated in detail in Step 3.

Process: The selection was based on scoring and performed by IVSZ.

To select the technology cases to be elaborated in detail the following aspects were taken into account:

- How wide is the potential user group? Scoring based on answers provided for the following questions: list of stakeholders, description. Scores: narrow (2), average (4), wide (5)
- Estimated adaptation potential. Scoring based on the following points of the questionnaire: national vs international, adaptation information, subsector and country, description. Scores: low (1), medium (4), high (5)
- Estimated resource requirement to adapt the case (personnel and investment). Score: low (5), medium (3), high (1)
- Time to adaptation (e.g. is there a need for development before the adaptation). Scores: low (5), medium (3), high (1)
- Level of digital technology usage: Scoring based on the description. Scores: low (2), medium (3), high (5)

To select the training cases to be elaborated in detail the following aspects were taken into account:

- Outreach:
  - How wide is the target group of the case? scores: narrow (1), average (3), wide (5)
- Aggregated points based on the main characteristics of the training:
  - Is the case national or international? scores: national (4), international (5)
  - How can the training be accomplished? scores: offline (3), hybrid (5), online (5)
  - How much does the training help to acquire the skills? scores: theoretical (3), both (5); irrelevant training (0)
  - What skills does the training aim to develop? scores: soft only (0), non-digital skills (1), hard (3), hard-soft (5)
  - Is the training accredited? scores: accredited (2), non-accredited (1)

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

- How much will the training contribute to increasing the digital competencies of target groups? score: individual scoring based on the answers of the following points of the questionnaire: length, description.
- How much effort is required to localise the good practice? Scores: individual scoring based on the following points of the questionnaire: formal/non-formal, required technical background; translation and/or software development requirements; time to adaptation

The short-listed practices were sent to the partnership for verification. The lists were considered final after their verification which also opened the third step of the process.

Deadlines

- provision of the preliminary short lists: 5 August 2022,
- verification of the lists by the Dig-CON partnership or proposition of replacements: 12 August 2022.

Results:

Based on the total scoring the best 11 cases were selected to be included in the technology best practice catalogue.

In addition, during analysis of the technology good practices, tree Finnish and a German case was marked as interesting cases. They have a technology focus in the construction sector but are directly not describing a technology. Each case describes an initiative or a concept that will bring benefits in the long-term to the construction and finishing trade sector. These initiatives are introduced in detail in the present output document in a separate chapter entitled Forward looking cooperation best practices.

Based on the total scoring the best 10 cases were selected to be included in the training best practice catalogue.

3. Detailed data collection

Objective: to collect detailed information about the 13 short-listed technology, 10 training and 2 strategy best practices with the aim of presenting them in the BP catalogue and using them a basis for the train the trainer session in 2023.

Process: IVSZ created a dedicated templates/data sheet for both types of cases (template attached in Annex 2). Every partner was responsible for the detailed elaboration of those cases that it has proposed during the preliminary data collection phase and which were selected from these cases in Step 2.

Partners could decide if they prefer using the English questionnaire or it is more practical to develop a national version to collect the necessary information from the

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

stakeholders (technology owner or training provider) involved. Independent from the decision, the final response had to be provided in English in the required format.

Method: depending on the BP owners/stakeholders DIG-CON partners could decide if an interview is the most appropriate method to collect the information or the BP owner can be requested to fill in the template himself. In exceptional cases when the DIG-CON partner was aware of the BP in detail, he could fill in the questionnaire independently but it was advisable to verify the descriptions with the owner too.

Deadline to fill in detailed datasheets for the selected practices was 7 October 2022.

In order to follow-up the elaboration progress, two online status meetings were organized.

Result: DIG-CON partners elaborated 13 technology, 10 training and 2 strategy best practices in detail that have been harmonized by IVSZ and integrated into 2 BP catalogues. The catalogues are Word documents that were used in the consecutive step.

4. Collecting feedback on adaptation potential of the best practices

As part of this step the BP catalogues were published for the DIG-CON partners with the aim of collecting feedback from them regarding the adaptation potential of these cases in their home countries. We were interested to know how partners and their stakeholders think of these cases especially in respect of their adaptation and implementation potentials. Partners were encouraged to introduce the cases to final target groups, groupings and collect their feedback too. Each partner was requested to provide a consolidated adaptation potential response regarding his country.

The BP catalogues contained every elaborated BP case, which have been harmonized in terms of style

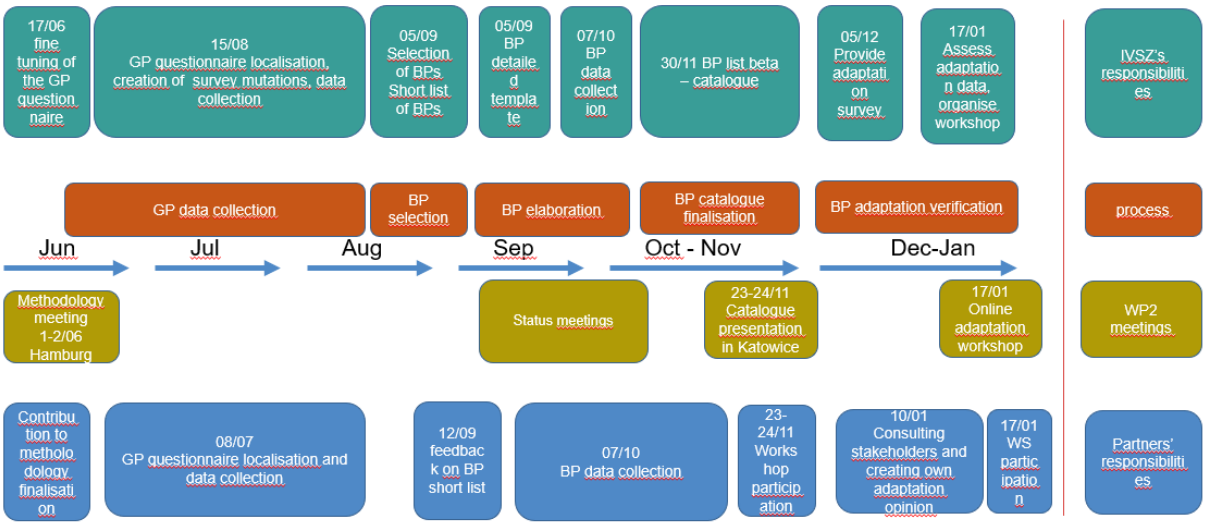
- Method: In order to collect the feedback of the partners in this regard, a simple online questionnaire (Technologies and Training) was used for both catalogues with the following questions:
- To what extent do you consider the given BP comprehensive?
- To what extent do you consider the given BP understandable?
- Do you believe there is a potential for introducing the practice in your own country/professional field?
- In your opinion how long is the necessary adaptation time frame of the individual BPs?
- In your opinion what else is needed to implement the BPs in your country?
- Do you see any need for customization in case of any of the given BPs to be able to adapt and implement them in your own country?

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

Deadline: The feedback collection process started in December 2022 and lasted a month with a deadline in mid-January 2023. During this period partners could consult their relevant stakeholders and conclude their final response to the questionnaires.

To share and discuss BP implementation opinions with each other, a final online workshop was organised between the partners, where the main conclusions of the adaptation potential surveys were shared with partners. This online meeting was held on 17 January 2023.

Timing of the best practice elaboration activities



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

Technology best practices

Tool Connect

What is this?

This is a construction tool tagging and online inventory system provided by DeWalt tool manufacturer.

Introduction of the solution

In average, construction workers spend 10 minutes every day for looking for lost equipment. That makes 38 hours annually (statistic is from 2020 and based UK research). The added value of this solution is the support it provides for asset management and through that increased efficiency. The added value comes in form of a productivity increase and saved time in the long term. The user can efficiently locate the tools they are looking for.

This application can be used on all tools within all teams in the construction and finishing trade. It is used mainly by construction companies (owners, inventory managers, site managers, team leads, productivity analysts and construction employees).

There are three case scenarios, where this solution can be used:

- SME has non DeWalt tools and attaches Bluetooth tags (Case addressed: asset management and asset protection): The app helps track and locate tools.
- SME has DeWalt tools which have built in Tool Tech chips and sensors (Case addressed: asset management and asset protection): The app helps track and locate tools and check on which building site they are being used. With built in chips the application can also track battery status and other diagnostics (temperature). It has the option to “disable” a tool to prevent theft or unauthorized use when it would be used outside of a set range and it informs where a tool has been last seen if it can’t be located.
- SME uses Tool Tech as a manual inventory app (no DeWalt tools and no Bluetooth tags attached to owned tools)

All the above scenarios work when the company has the Tool Control application and a DeWalt web portal account (same credentials).

Additionally, there is a DeWalt Construction Site account, but this is currently available for USA and Canada only.

Once the Tool Connect is downloaded and the account registered, users can log in into their DeWalt app and add tools. The user can buy tags if they are not using DeWalt

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

compatible products and physically attach them to the tool. The app will allow to pair the tools via Bluetooth.

What are the innovative elements of this case?

- The Tool Connect App and DeWalt Manager web portal is free of charge (no service charges)
- Tool Connect can be used with non-DeWalt tools also.
- You can upload existing inventory spreadsheets into Tool Connect (this may work only for DeWalt tools)
- It offers personal tool tracking and can be used for inventory audits.
- Asset protection and asset management.

Adaptation

Challenges encountered

Adding non DeWalt tools to the app and pairing up them needs to be done manually, which is a time-consuming process.

This product is tailored mainly to the North American market. This solution is not available in most EU countries.

Potential for learning or transfer

Even though this solution is available in multiple languages (Web Portal and Tool Connect), the DeWalt Construction Site Manager (which can be linked to the Tool Connect and gives additional options, productivity reports etc.) is available only in the North American Market.

Accordingly, the use of this solution is currently not an option in most European countries but despite this it can serve as a best practice concept for an Asset Tool Management System and might provide a good basis for application development in Europe.

Actually, there are other similar applications, which are available in Europe e.g.:

- ABAX
- Construction Tool Inventory Management - Asset Panda
- Construction Tool Inventory Software - Tool Works (toolworksapp.com)

It is advisable to include a strong customer support in the service.

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

Additional information

Further information – our contact person

Hanseatic Parliament

Dr. Jürgen Hogeforster, *Senior-Manager*

jhogeforster@hanse-parlament.eu

Tel: + 49 40 822 447 10

www.hanse-parlament.eu

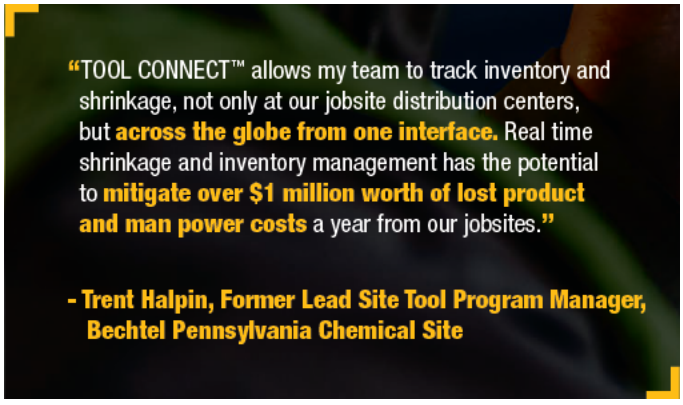
Further information – available materials online

How to use the app:

https://support.dewalt.com/hc/en-us/articles/4414574623501-Site-Manager-How-to-Videos (tailored to DeWalt tools but shows overall functionalities of app very well)

All support articles available:

https://support.dewalt.com/hc/en-us/sections/360004726657-Site-Manager



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

123ONSITE / 123QUALITY / 123FLEET

What is this?

These are three software systems to resolve the needs of site management, quality management and fleet management. The software is independent, but able to collaborate.

Introduction of the solution

123ONSITE was born from an idea by a construction company owner who had been looking for a mobile time-tracking solution for his company for quite some time but couldn't find a suitable package – so he developed one himself!

He had the goal to develop software for construction companies that would make their work much easier. This is achieved by tracking all the construction site data by using a tool that every construction worker now carries – the smartphone. Together with a software developer, 123ONSITE was developed as a smart and efficient solution. Just a few years later, the app has grown tremendously, and so has the company – with consistent growth averaging 60 to 80% per year, 123onsite has now become the market leader in mobile construction site management.

In 2018 123onsite.de GmbH was acquired by NEVARIS Bausoftware GmbH, the technology leader for digital processes in the construction industry in Germany. What started with two highly motivated experts has developed into a modern company with a Silicon Valley atmosphere. We are passionate about developing our software and do so as an energetic and highly motivated team.

This software family supports the management of the entire construction site from start to finish - without data loss, with maximum time savings and cost-efficiently.

It is a useful tool for company managers, construction companies on site, general contractors, site management and also for construction supervisors.

With the help of this tool the usual problems of construction can be handled: higher costs, low time saving, huge effort organization, difficult long-process defect management are few examples that the introduced solution helps to handle.

It is a software-based construction management solution. It is a multi-device / multi-platform application, well-designed for working on site with. The multi-platform solution consists of 123ONSITE, 123QUALITY and 123FLEET, where each solution is a perfect solution to ensure cooperation of different stakeholders involved in the construction work.

Main elements of the solution and their main functionalities are:

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

- 123ONSITE: All-in-one mobile construction site management solution: In addition to hours worked, it is possible to record all other relevant data of the construction site.
    - Time tracking: The data collected on the smartphone is transferred to the software in the back office instantly.
    - Photo documentation: This allows employees on the construction site to use their smartphones to record the status of the project, take photos of the site safety measures, and record all steps in the construction process right up to project completion.
    - Daily reports: It generates daily reports from all the collected data.
    - Scheduling: It supports the daily job-scheduling and considers not only different trades working at the same time on the construction site but also special working time regulations of various crews and their vacation plans.
    - Custom Forms: To make the process of collecting information easier, more flexible and clearer, it allows to digitally capture the data needed using self-developed custom forms.
- 123QUALITY: Defect management app for the construction industry that helps both the recording of the defect and its assignment to a worker
    - Greater transparency
    - Save time & money: No more paper-based defect lists, no more ambiguous responsibilities
    - Manage construction plans & projects via our defect management app: Easily upload your blueprints to the app and directly locate defects and tasks.
    - Secure your evidence: Beside knowing what is the actual status of a defect it helps also in case of disputes that may arise later.
    - Construction Chat: The chat function included in 123quality allows quick and easy communication between all colleagues on a construction site
    - Reporting
    - Deadline Management
    - Construction Handover
- 123FLEET: All equipment-related performance data is consolidated centrally and displayed clearly in one interface. The equipment data is automatically recorded on the construction site and incorporated in the various reports. It enables for instance:
    - Direct billing for equipment usage on the construction site
    - Status display with position of all devices in a live map view
    - Time savings through automation

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

- Automatic billing thanks to interfaces to common commercial systems
- Device data is automatically incorporated into reports (construction day reports, etc.)
- Independent of any specific manufacturer – 123fleet works with any construction equipment from any manufacturer

Adaptation

Challenges encountered

If the construction management team decides to use the solution it is extremely important to ensure the training of employees and making them compulsory to use the solution in order to achieve the expected impact.

Potential for learning or transfer

The 123 software family provides advanced mobile applications that are especially designed for the construction industry. It provides everything from a single source, affordable for every business, and ready to go.

It was developed by a building contractor knowing exactly what makes construction tick.

Anyone who has anything to do with construction (and beyond) can use the apps – the customers currently include contractors, carpenters and joiners, gas, water, electricity installers, architects/planners and roofers. This list includes companies of all sizes! 123ONSITE is currently optimized for the construction industry and craftsmen – and they are interested in adapting the system for other industries as well – so if one industry is not yet optimally represented in the system, it is possible to discuss this with.

123ONSITE is very easy to use and the company provides also excellent web -based and email support. However, especially when introducing a new system, it often makes sense to include the employees in the introductory process – for this purpose, they come to the company and train all employees in the use of 123onsite.com.

Additional information

Further information – our contact person

hochschule 21, University of Applied Sciences

Tamás Ferenczi, Research Assistant

Tel: +495781641291

E-Mail: ferenczi@hs21.de

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

www.hs21.de

Further information – available materials online

https://www.123onsite.com/features/

https://www.123onsite.com/defect-management/

https://www.123onsite.com/123fleet/

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

CAPMO - The intuitive construction SOFTWARE

What is this?

This is a software application for construction management and controlling, which helps to increase the efficiency of construction processes on the construction site and in the office. Over 800 companies in the construction and real estate industry in German-speaking countries use it every day and save time, money and tedious duplication of work by Capmo.

Introduction of the solution

Campo is a software-based solution, that ensures construction management through a multidevice / multiplatform application, well-designed for working on site with. With the help of this solution users can ease the complex day-to-day construction and management of every projects. The tool supports various phases of construction: Planning - Execution - Monitoring - Defect Management.

By using Campo users can avoid higher costs, low time saving, huge effort organization, difficult long-process defect management are typical problems that arise at a construction site. Capmo enables its user to save valuable time and avoid tedious duplication of effort to drive the success of the projects.

The tool is used mainly by construction companies on site, site management companies, architect's offices, property developers, project developers, general contractors, engineering offices, builders, and project developers. The tool offers benefits for every target group:

- Capmo for general contractors: With Capmo's construction management software, general contractors simplify communication and collaboration with their trades, saving valuable time.
- Capmo for architecture offices: As an architect, keeping track of all construction projects is time-consuming and paper intensive, which can be optimized by Campo.
- Capmo for engineering offices: with Capmo it is possible to control, document, and monitor your construction projects digitally.
- For property developers & project developers: Relieve your employees, keep track of the construction progress, and save time and costs.

Campo uses a flexible ticket system which enables the documentation of the construction process quickly and easily thanks to the diverse options, as well as to coordinate tasks and defects, and keep an eye on deadlines and coordinate them with external partners. Examples for the use of the ticket system: Task management, Acceptance, Project management, Warranty management, Delivery & Performance

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

assessment, Defect management, Supplementary audit, Due Diligence, Building documentation, Logging, and Obstruction notices.

Most important further functions:

- Automated construction diary:
- Intuitive construction schedule
- Clever jour fixe function
- Always up-to-date plans
- Successful cooperation
- Progress always in view
- Individual templates according to your wishes

Adaptation

To implement the solution in another country/company the training of employees and the purchase of the software and the necessary digital devices such as smartphones, tablets, notebooks for working on site with is essential.

Challenges encountered

Training of employees, digital cooperation with other companies are the most important challenges that users might face.

Potential for learning or transfer

- Automated work steps: Complex steps (whether in the documentation or administration of your projects) are automated by intuitive and easy-to-use functions.
- Digital quality assurance: Increase the quality of the projects and avoid unnecessary errors with clear standards and configurability.
- Clear project overviews: Always keep everything in view - with digital construction plans, user-friendly scheduling and dashboards for project overview.
- Digital functions instead of paper chaos: Whether it's quality assurance, documentation or process optimization: so that you can finally build easily, Capmo contains exactly the functions you need in your everyday work.

Additional information

Further information – our contact person

hochschule 21, University of Applied Sciences

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

Tamás Ferenczi, Research Assistant

Tel: +495781641291

E-Mail: ferenczi@hs21.de

www.hs21.de

Further information – available materials online

Further information: https://www.capmo.com/en/

https://vimeo.com/745391459

https://uploads-ssl.webflow.com/620fb9c4a7a29bb3b2650350/63106481698714e00fe68288_Referenz_phase-10-OnePager.pdf

Case Studies for evidence of success: https://www.capmo.com/en/referenzen

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

PlanRadar

What is this?

This is a construction, facility management & real estate platform for collaboration purposes. It helps to track construction progress and to identify quickly problems and monitor project progress on the construction plan.

Introduction of the solution

PlanRadar is a mobile-ready construction site management app. The iPhone and Android app stores all your project plans and documentation and allows all stakeholders on a project to monitor progress and communicate with one another.

PlanRadar contributes to the following very important challenges/objectives:

- Increased productivity: the latest blueprints, documents, and updates are at a fingertips away, saving hours on locating information.
- Reduced re-work: it prevents errors by standardizing work orders and inspection processes.
- Remote working: it manages and signs off completed work from any location.
- Manage the team with confidence: Permissions settings keep team members focused on the information they need.
- Secure data and file storage: no more lost documents, keep everything in the Cloud.
- Deliver high-quality projects: manage all workflows, from punch lists to handovers to claims management and more.

PlanRadar is tailored to the needs of site managers and provides key features that help them to do the job faster, avoid frustration and be more adaptable to the current challenges in construction. With PlanRadar it is possible to:

- Assign tasks to individual staff or teams in real-time
- View photos from around the site to track progress from a distance
- Automatically generate reports on productivity, costs, defects and more
- Complete checklists or inspections using a mobile device rather than paper
- Demonstrate compliance with all health and safety standards using a digital “paper trail”
- Always view the most up to date project plans, including project schedules

These are just some of the many PlanRadar features that can help Site Managers digitize their projects and adapt to the changing world of construction.

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

As an online application system it is capable to run in a multiplatform environment with sophisticated ergonomic design optimized to use on different form factors like desktop, tablet, or even phones.

PlanRadar is used by different stakeholders and provide different benefits:

- Specialty Contractor
- Facility Managers: Facility managers and owners can see real-time status of scheduled tasks
- External Experts: In legal disputes, evidence is critical to prove your case. PlanRadar makes it easy to gather the right evidence for litigation procedures as information is well structured and automated.
- General Contractors: as a comprehensive project management platform it enables task management, statistics generation and documentation etc.
- Owners: owners can get valuable insights into the progress of their project, understand the financial impact of changes, and identify bottlenecks
- Architects & Engineers: a fast and efficient platform to distribute drawings and ensures that the team is working according to the current plan.

Adaptation

The end-user equipment is at cost of the subscribers, similarly to the training of employees. There are different scale subscription plans are available.

Challenges encountered

The subscription cost is high, probably worth more for larger companies.

There is a possible longer ramp up period until the end-users has an advanced knowledge about the daily usage.

The most difficult task for implementation is the training of employees. If the staff is not familiarized to handle the mobile devices, than it is advisable to register for a “0” level infrastructure basics training also.

Potential for learning or transfer

There are a wide range of training materials and local support in almost all EU languages.

There are a lot of connectors to collaborate with existing software environments:

- PlanRadar Connect: it provides seamless integration with a suite of applications to automate work processes on real estate and construction projects. With pre-built, no-code connectors, it’s fast and simple to get started.

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

- API Integrations: With their API it is possible to connect existing tools and build solutions to meet exact requirements – including:
  - Importing & exporting data
  - Syncing with other programs
  - Receiving task management alerts
  - Integrating with Business Intelligence tools
  - Backing up data for archiving or storage purposes
- Document Management: It enables co-working using simple versioning and compare features. It stores plans securely and enables sharing and also exporting.
- BIM Model Viewer: IFC files from Revit, ArchiCAD, AllPlan can be uploaded in PlanRadar and extracts from PlanRadar can be exported back into CAD software, for seamless connection from design into the build and beyond.
- Near Field Communication Technology: PlanRadar works with NFC tags, saving time and reducing errors on-site. Place NFC tags around a project site to instantly access PlanRadar Tickets.

Additional information

Further information – our contact person

ICT Association of Hungary (IVSZ)
Balázs Tordai, Industry Digitalization Lead
E-mail: tordai.balazs@ivsz.hu
Tel: +36 20 943 3335
www.ivsz.hu

Further information – available materials online

PlanRadar published guidebooks for Site managers and Civil Engineers introduce their methodology. These e-books are available on several European languages even in engish: Free e-book: The future of construction site management (planradar.com)

PlanRadar's Platform Overview

PlanRadar Customers & Case Studies

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

OrthoGraph

What is this?

This is a measurement platform what is capable surveying 2000sqm daily into BIM.

https://www.youtube.com/embed/vdZ3wUgyNEk

Introduction of the solution

OrthoGraph is a tool for the whole lifecycle of a building from planning via construction to the facility management also.

The real strength of OrthoGraph's technology has been to support building surveying and creating floor plans for more than 1.5 decades. In addition, our technology has been used for large inventories, several times at large companies handling more than 150 000 elements countrywide.
With further development of OrthoGraph Enterprise we have opened up the BIM models surveyed to any software system to take part in the everyday building operation work facilitating mobile and web technologies. OrthoGraph Enterprise has also been developed to easily follow up changes made on the building by refurbishments, moves or changes needed by tenants.

The Operational BIM approach represented by OrthoGraph® allow the use of custom data sets from the first moment, which were developed at the beginning of each project during a 3 day consultation and customization phase in collaboration between partner, client and OrthoGraph®. The most recent OrthoGraph® version simplifies the procedure of creating custom project templates a lot, as custom data sets, fixed lists will be available to all customers without manufacturer's intervention. What's more: as the needs, and served tasks, workflows are changing and expanding continuously, anyone with the right authorization can change these data sets later, also without the involvement of the developer or the introductory company.

The most innovative element of the software is the significant link between planning tasks and the measurements by the construction crew making at the field of construction.

The estimated savings of implementation can be reached 5-10% when settling accounts with subcontractors, when you know the precise quantities. This saving can be made several times over in the operation of the property when you have up-to-date data, supplemented with effective planning and communication to subcontractors and staff.

The OrthoGraph surveying processes can be fast, there is no building that cannot be surveyed and inventoried in a few weeks with high accuracy, and with digital quality assurance. Furthermore, all this data can become a part of the everyday operation ensuring that the digital twin of the building will contain every building knowledge

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

instead of storing them in the heads of the operational crew. This improves operational performance while reduces the risk of data loss due to the fluctuation of employees.

Adaptation

The basic features are accessible with cheap Bluetooth capable laser meters, but the advanced work requires pricy equipment. (Advanced scanning capabilities requires usage of expensive (5-10K) lidars.)

The field work is optimized for IPads.

All OrthoGraph components are licensed in subscription model, typically on a usage basis.

- The OrthoGraph Enterprise Ecosystem is built up from client side and server-side components. The licensing of the whole system is in-line with their usage models, so the client and server components are licensed by the amount of data handled by the system (net area, number of objects and attached documents), there is no limit on the number of end-user accounts accessing these projects. These users can view the OrthoGraph BIM models both in the mobile client and the web browser, and integration to external systems is available. On mobile client-side users can also edit the graphical inventory of objects but cannot edit the graphical floor plan like walls or the placement and size of doors and windows. (SME list price ~2000EUR/Y)
- Graphical floor plan editing is connected to subscribing to an additional license of OrthoGraph Enterprise mobile client, that lets users do any changes on the floor plan too and can own and dispose above the storage and access rights of the owned projects for other user accounts too.

There is a proven methodology to learn for the surveyors, but OrthoGraph offers several **trainings ang certification programs** for the customers.

Advises for reuse, tips and tricks

The savings you can achieve differ in various fields based on how the properties are operated using real OrthoGraph BIM models and a CAFM (Computer Aided Facility Management System) system built on it. The keeping basis of the entire system, the up-to-date BIM models in many cases is done as a “side-product”. In other words, keeping the live data constantly up to date does not involve any extra work or expense. As a result, communication between the maintenance personnel on-site and those located in the office becomes instantaneous, and significantly simpler than keeping in contact by telephone and, of course, in person.

The mentioned functionality and integration can be achieved by using most IWMS (Integrated Workspace Management System), CAFM and CMMS (Computerized

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

Maintenance Management System)systems. The key of achieving the results is to base the operation on real-life data and making the information available not just in the office, but also on-site. Existing integration functionality is already available with several IWMS systems and can easily be extended to any kind of existing building operation or enterprise resource planning software system.

Additional information

- BIM methodologies penetrated mostly only on the planning side. It's needed to have a strong management to extend this to the constructor sides. The project implementation and surveying process is creating a new way of collaboration on a BIM platform:
- Customer and implementer company discusses and identifies the goals expected to reach with the Operation BIM. This might be the most important step in this process.
- They define together the data sets to be surveyed:
  - asset types to be inventoried
  - room, opening and asset properties
  - fixed list entries, default values and mandatory fields.
- The surveying firm creates the custom project template.
- At this point typically the extent of data set is reduced, and other stakeholders and areas (e.g., IT) get involved, which changes are implemented in the project template by the implementation partner.
- The surveying company carries out the full survey project (including the repeated survey of the showrooms)
- The surveyed model is handed over to the client. This can be also made gradually during the project, so they can follow and inspect the data quality.

Further information – our contact person

ICT Association of Hungary (IVSZ)
Balázs Tordai, Industry Digitalization Lead
E-mail: tordai.balazs@ivsz.hu
Tel: +36 20 943 3335
www.ivsz.hu

Further information – available materials online

Significant references are listed here: https://www.orthograph.com/references/

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

Artesa Handwerk-Planer

What is this?

This is an easy-to-use task management software platform.

Introduction of the solution

The target group is craft enterprises from the construction and finishing trades as well as commercial needs. Due to its modular structure, the product is suitable both for companies with their own workshop production and for companies that only carry out construction site or assembly activities. The greatest potential is achieved in companies whose added value consists of workshop and construction site activities.

The state of the art in planning and communication in the skilled crafts sector is characterized by analogue processes with pen and paper. Many companies have little digital competence and, in addition to their daily business, have little capacity to deal with digitalization, which slows down the digital transformation in the skilled crafts sector. In addition to analogue planning boards, routing slips and order folders, digital makeshift solutions are often used in the office. Often, self-conceived Excel spreadsheets are laboriously developed and maintained by individual employees. However, these tables are rarely scalable, and their creation, maintenance and further development require a lot of effort.

- In some cases, individual stand-alone solutions are used to digitally map sub-areas such as time recording. However, the data that results from this is often only used for payroll accounting and not integrated holistically into the process flow.
- On the other hand, there are ERP systems that attempt to digitally map operations as complete solutions. However, these are usually technically outdated and too complicated for employees with little digital competence. For example, the external processes for preparing quotations, invoicing, purchasing and transmission to tax consultants are usually carried out digitally. What is missing, however, is an internal digital system that is easy to use for all employees in the office, in the workshop and on the construction site and that supports employees in their value-creating activities and does not prevent them from doing so.

It's a cloud-based and device-independent app that enables a two-way exchange in real time along the entire value chain. All participants always and everywhere have all relevant information at their disposal and can react quickly to changes in planning.

Artesa is in productive use at several craft enterprises in various trades. All employees of these companies in the office, on the construction site and in production work with the software daily.

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

The software is a web application that runs in the browser. The data is stored in the cloud in a DSGVO-compliant manner. The software designed so that several customers can work on one server instance. The admin area in the software for the onboarding process of new customers. This allows our employees to manage the data of our customers even without programming knowledge.

Developers are continuously in the process of transferring the implementation for the pilot customers in staircase construction, metal construction, electrics, and heat pump installation to other trades such as painting and bricklaying. The different requirements of the companies must be combined in one solution. The software designed in a very modular way and offer setting options in many places, individualized the solution for the respective company.

Interfaces to our customers' existing digital systems represent a major challenge. These systems have often been in use for many years and are usually not state of the art. It means an effort to develop an interface to widely used systems such as "Sage", "TopKontor" and "Hapak", which allows us to cover most of the clients. Moreover, the customers already have an advantage using Artesa even without an interface. Thus, the development of the interface takes place in parallel to the productive use.

Artesa is innovative for craft businesses. This is shown by the Innovation Award of the Schwerin Chamber of Crafts, which our pilot customer *Treppenbau Plath* was able to win in 2021 by using Artesa. Our solution, which is already in productive use, offers enormous potential. In addition to short-term effects such as increased productivity and the reduction of overtime, craft businesses are digitally repositioning themselves with Artesa. Topics such as quality assurance, new work, home office and a 4-day week first become possible by Artesa. As the customer base grows, the data obtained will be used in the long term through machine learning to further optimize the crafts businesses. In the future, planning changes can be processed automatically, and optimized production processes can be suggested automatically by AI.

What are the innovative elements of this case?

- Artesa is an innovative Progressive Web App (PWA) that originated at Fraunhofer IGP in Rostock and is being developed specifically for employees with low digital literacy. Office staff use Artesa on their desktop PCs as a comprehensive planning tool that grows with their needs.
- Artesa offers various planning views to clearly depict both long-term capacity planning by comparing capacity requirements and available capacity as well as short-term staff planning and thus to be able to specify the target state. The feedback of the actual status is provided by each individual employee in the workshop and on the construction site through a tidy application on the smartphone, tablet, or an industrial panel PC.

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

- All employees who can handle simple messenger services, such as WhatsApp, also understand the recording in Artesa immediately. It is visible immediately which orders are to be processed. Uploaded production documents can be viewed in the digital order file.
- In addition to value-adding activities, the software is used for time recording and documentation. The Information arrives live in the office. Constant synchronization shortens walking distances and reduces time-consuming arrangements.

In this way, it is possible to react to planning changes that occur several times a day due to dependencies on construction sites to upstream trades, delays due to delivery bottlenecks of materials or sick leave of employees.

Adaptation

In most cases, the necessary hardware for use is already available in the company. Standard desktop PCs are suitable for employees in the office and smartphones from any manufacturer for mobile employees. In addition, larger touch screens, panel PCs and tablets contribute to optimal use, the acquisition of which (if not already available) is associated with additional costs. In this way, daily planning and weekly team meetings in the company can be made clearer and more interactive, and order execution and documentation on the construction site can be supported in an even more modern way.

No special software knowledge is required. To guarantee the best possible introduction to the system, we offer the use of a demo phase after a short introductory meeting. During this phase, all functions can be tested in detail and questions of understanding can be put to us at any time. Surveys with one of our pilot companies showed that it only takes a few days to familiarize oneself with the software and gain a comprehensive understanding of it. Our telephone and e-mail support and optional set-up and training offers ensure full support.

The software-as-a-service is sold as a subscription model. The monthly license costs for operation depend on the number of users and the scope or the required authorizations of the licenses. The craftsman's license is intended for employees in the workshop and on the construction site and costs 10.00 € per month. The office staff, who mainly deal with planning and coordination, need the office license for 30,00 €. With the admin license for 50.00 €, extended settings and evaluations, e.g., for payroll accounting, can be made.

A ramp-up constantly offers challenges in several areas.

- One challenge to be overcome is in sales.

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

- Explanations are needed on how the system works and how the benefits can be used profitably.
- For companies, the use of a new system is always associated with more work, so that threshold fears must be alleviated, and potentials must be raised.
- In some cases, there are outdated companies that are worried about succession and are therefore inhibited from investing in the future. Rising interest rates and the downturn in the markets are also causing concern that construction projects will become fewer and thus capacity utilization will also decline.
- Sometimes it also seems as if the market has no need or is already equipped with old solutions and at the same time is not fully satisfied with the solution. In addition, there are concerns such as hacker attacks, data protection and the start-up ecosystem. However, because old solutions in the software segment have not created a database from which one can read off advantages, it is difficult to guarantee valid savings.
- The effort behind programming a function is also often underestimated. The expectation is for an "egg-laying pillow", which at best is offered for a small penny. The fact that months of development work are sometimes behind simple-looking features such as time recording is not recognized.

Digitization only works with a strong infrastructure. In an area like Mecklenburg-Western Pomerania, for example, there are still some places without a connection to the mobile internet. This can lead to difficulties in real-time recording. However, it is possible to upload subsequently captured content, which means that in such regions, time-critical capture should be avoided. With young developments, there are potentially teething problems in the algorithms of the functions offered, which have a negligible effect on performance. However, this is constantly being worked on and further developed, so that these can be avoided as well as eliminated.

The use of aids, tools, tips and tricks always requires a profitable advantage in some way. How this is shaped in detail always depends on the situation one wants to face.

Additional information

Further information – our contact person

Schwerin Chamber of Skilled Crafts
Jens Dettmann, project manager
E-Mail: j.dettmann&hwk-schwerein.de
Tel: Tel.: +49 856435-130
https://www.hwk-schwerin.de/

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

Further information – available materials online

The solution offers considerable savings in time-consuming planning. In the process, communication is facilitated and bundled in one place. This results in fewer reactive services and corresponding faulty services. With this level of transparency, adherence to schedules and planning reliability can reach new spheres, resulting in less uncertainty and pain for all involved. Whether it is the planning, the management, the craftsmen or ultimately the clientele, it does not matter - everyone involved benefits. Within this, thanks to simple implementation, the software can be easily put into operation during day-to-day business through plug & play. Planning that has already been done can simply be transferred and applied directly. There are therefore no entry barriers. In addition, the licenses are allocated flexibly so that there are no lock-in effects. Our interface is open for all systems, which makes the software extremely compatible with other systems. This means, for example, that recorded working times can be used directly in accounting or for calculation purposes. The order files are also stored in the system for a long time, which is why, if necessary, the order you are looking for is quickly at hand thanks to intelligent search and filter options. The size of the company plays a subordinate role, because even sole traders can benefit from digitalization.

The founders of Artesa GmbH are strongly networked with the University of Rostok and the Fraunhofer IGP in Rostock. They are part of the Accelerate program "FoundersBay" and "Accelerate.MV". The team has already been able to establish numerous contacts with industry associations. Treppenbau Plath GmbH has acted as a pilot customer and development partner since the beginning.

During the EXIST start-up grant, the two founders were able to collect 15 expressions of interest from craft businesses and cooperation partners, which are continuously being converted into paying customers. Among others, the Schwerin Chamber of Skilled Crafts proved to be an increasingly helpful sparring and networking partner.

Several customers use and work successfully with the system. In addition, Marvin Fink's master's thesis showed a saving of 20%, in planning. However, this did not consider how much more planning security could be generated through a higher and more secure flow of information.

In general, the potential benefits of digitalization have not yet been fully exploited across all sectors. In some cases, there are absolute high-tech productions that still document their progress in analogue form and manage it in physical files. We want to remedy this and have concentrated primarily on the craft sector. Craft has golden ground and offers both actors with the necessary means to realize such projects without worrying, and the breadth of actors that makes it interesting to offer them a solution. Here, a lot goes via "word of mouth", which can often set off a snowball effect. If the competitive advantages that such systems can bring are recognized here,

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

all doors are open for successful scaling. At the same time, the generation change paves the way for new, modern processes that want to find their application.

Support for this is also being driven forward by the relevant associations, guilds and chambers of crafts. They provide information and advice on innovations. In addition, exchange on specialist topics is made possible at events, which is meeting with fertile ground and is being continued in development. Germany as a business location, the EU and the federal states also offer numerous funding opportunities that can be applied for and thus facilitate modernization in general.

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

Archline XP

What is this?

Archline XP is a BIM enabled 3D planning CAD software platform.

Introduction of the solution

The primary target users of the software are the Architects, Civil Engineers, and Interior Designers. On the other hand, the plans and 3D models are prepared even for the customers, and construction specialist, who can also receive appropriate documents which are precise and accurate; thus, it can help their work.

The easy-to-use software is developed in Hungary and is suitable for visualization and preparing residential or industrial construction plans. This is an integrated tool fits for all the necessary planning tasks.

A continuous improvement based on designer feedback. Every year, new additional functions and new solutions are added to the program, which provides practical assistance to designers.

Adaptation

The software can be purchased in a lump sum or with subscription plans . This option helps reduce illegal software use.

- Software cost: several plans, but the professional one-time fee is 2 600EUR
- Maintenance cost: 300EUR/Y
- HW cost: An MS Windows based graphical or gamer workstation

The software is used by design professionals who can learn how to use it in the framework of adult education or other courses. The introductory course consists of 7 parts, which, together with practice and learning, can be achieved at intermediate level in about net 35-50 hours. Most of the training materials are accessible on YouTube @cadlinekft channel even in English. It is possible to prepare, even in a self-taught way, on different levels, from which the designer can also take an exam.

Licences for education schools, with computer background are also provided.

Timescale of adaptation depends on many factors because it is possible to study in person, in a group, individually or via online education. On the contractor or the customer side there is downloadable a free viewer.

There are three levels of education, and on each of the three levels, you can take a separate exam, for which Cadline Kft. issues a diploma.

It also depends a lot on whether someone has used similar design software before and how much affinity they have for this program.

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

The presence of the necessary computer background can be difficult for an entrant, which requires a more serious investment.

Beyond the tutorials and videos there a is a widely used FB group, where users and the company moderator help each other's work.

In Hungary, the program is very widely used by interior designers. The development company provides legal, unique development and effective continuous online assistance.

Further information – our contact person

Hungarian Association of Craftsmen's corporations
Tamas Rettich, Project manager
E-mail: rettich@iposz.hu
Tel: +36303856048
www.iposz.hu

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

iFresco

What is this?

iFresco is a luxury wall covering, custom designed, re-usable fabric wall decoration that uses superior digital printing technology to create luminous, one of kind, decorative focal features for residential or commercial spaces.

Introduction of the solution

iFresco prints digital images on a translucent fabric that is adhered to a white primed wall with a water-based adhesive. This technology creates a bespoke texture while enhancing the luminosity of the imagery. iFresco's can then be easily removed with soap and water, leaving behind only a finished white wall.

iFresco's can be created from any digital medium; photographs, art and even textiles can be custom designed to meet your wall decoration needs.

iFresco's adhere to white primer painted drywall, MDF (medium density fiberboard) and ceilings. For high traffic areas and wet/humid environments, iFresco's can be protected with a topcoat of wax that will not compromise the luminosity of the imagery. This environmentally friendly finish allows for regular easy washing without damaging the fresco. Our ink is also UV protected, minimizing the effects of long-term fading, for those rooms with sunny areas.

The target groups are the Decorators, Painters, Interior architects, Interior designers.

- Creating family pictures on a wall, e.g., photos of grandchildren for their grandparents or other important family events, or those what can't longer be repeated, e.g., dead family pets (kittens, dogs),
- Large size corporate images,
- Creating wall decorations from Pinterest-selected images.

This practice is used to create unique, high-quality wall decorations and images with our unique technology.

- Presentation of a complete product, from creating unique graphics to putting the printed material on the wall as a decorative element.
- Specialized software application workflow
- The practical know-how of iFresco technology, its specialties and comparison with traditional wallpapering.

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

Adaptation

For the products they make, customers pay a luxurious price which is explained by the excellent nature of every single element of their products, such as graphics creation and iFresco technology itself, as well.

Resources needed:

- Hardware: To determine if an image has the proper resolution for printing, a computer is required, and the cursor must be hovered over the image, which shows how many pixels the image consists of. From this, it is possible to estimate how large an image can be printed in good quality from the imagery. The hardware and software used for the presentation are also important. On the computer, the CPU, as well as the video card and the available RAM must be powerful. Therefore, the software runs on a desktop computer; for a presentation, it is advisable to have a laptop on which the software described above is also installed; this is not available for the time being.
- Software: To organize images, you need image editing software, preferably Photoshop, as well as Topaz software (Gigapixel, Denoise, Sharpen, Mask) or Filter Forge. We all bought them; I don't know if there is any discounted version.
- Surface and tools: Small, adequately prepared wall surfaces, wallpapering tools, wallpaper adhesive, and iFresco material so that participants can try putting the material on the wall in practice.

The graphic design training itself is about a half-day long, but here only the individual elements and the result are presented. The acquisition of practice and the detailed acquaintance with the software is based on curiosity and the professional love of the training participants. Practicing the application of iFresco material and presenting tricks and opportunities are also another half-day training.

However, crowding the entire training for one whole day is not advisable because it would be too tiring. The participants need to understand that this training only provides basic knowledge; then, the process must be continued by everyone themselves.

Accurate and understandable information about the presentation, e.g., what the interested person can expect, and of course, it is also important to receive what he expects.

In addition, it may be important to give, for example, graphic designers the opportunity to make great works in practice, and the person can even earn money with this. Fortunately, we have the chance to do this because that's what we are dealing with.

When creating digital graphics, it is essential to check the finished graphics, and this can only be done with appropriate graphic tools on a large monitor. Additionally, it's a

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

boring job that everyone is used to. We have a systematic way to do this, and it is advisable to apply it, although they will not like it.

The practice can be used in other countries. In Hungary, this was funded by the National Wallpaper Painting Industry Board. Although, in this case, the digital part was only touched on at a basic level, and the emphasis was on getting to know the iFresco technology. I don't see how it could be funded in other countries.

Decorations made by using this technique are not cheap. Obviously, graphics production is not cheap, and printing technology is also expensive. There are much cheaper techniques than this, but the process is quite unique, and this cannot be replaced by anything else now. Due to the relatively high price, it is worth looking for the best in the profession, that is, the best interior architects, the best graphic designers, and the best wallpapering painting specialists, since it is those professionals who can use and make customers pay for this product and technology.

Additional information

Further information – our contact person

Hungarian Association of Craftsmen's corporations
Tamas Rettich, Project manager
E-mail: rettich@iposz.hu
Tel: +36303856048
www.iposz.hu

Further information – available materials online

Wall decorations made using the mentioned methods (a DropBox link):

https://www.dropbox.com/sh/mibggibli9lbudc/AABwQ4pPbgu8SdVIFna63PRDa?dl=0

Their Canadian partner presented the product at an internal architectural exhibition, and they also won 2 first prizes. They also received the award for the best new product and the award for the booth that attracts the most customers. With this technique and product, they could work in places where they did not have the chance to use any other technologies: they made church and ceiling decorations in the Cathedral of St. Sofia in Kyiv.

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

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

Microsoft One Drive

What is this?

OneDrive can help make even construction companies easier. The Microsoft One Drive file service allows you to collect in one place the so-called "cloud" of files. This is a cost-effective solution to share information with all the stakeholders of a building project.

Any person who has access to the "cloud" can view, add, and edit files placed there from anywhere. This service is intended for both companies and customer representatives.

- Access files. All your files, from Office docs to photos—even files others have shared with you—are always on your OneDrive. And you can store and access your work or school files from any device via a web browser, mobile app, or PC and Mac with robust sync options. This includes your personal files and files co-workers, or classmates have shared with you in Office 365 from Microsoft Teams and SharePoint.
- Securely share files with teammates or partners and customers. By default, your OneDrive files are accessible only to you until you choose to share them. When you're ready, you can set file permissions for individuals and groups and control how they access files via OneDrive, Teams, or Outlook. You can even securely share files with people who don't have a Microsoft account using email verification to prove their identity. So, you can share files with external colleagues for review or ask a friend to help edit your paper without risking the need to send it via email and worry about security or version control. You can also apply access controls and expiration dates to whatever you share.
- Smooth integration with other applications like mail, office, or calendar. Whether you're working on an important client presentation or pulling together a school project, you can engage with colleagues or classmates to simultaneously edit documents from anywhere, across web, desktop, and mobile clients. You can also track changes and add @ mentions in real-time while you work, so nobody misses a beat.
- Working in distributed environment access Teams and SharePoint files (yours or those that have been shared with you) from right inside OneDrive. Now you can use the library dropdown to switch between multiple document libraries associated with a Teams channel or SharePoint site. So, if you're working on projects for multiple clients or working on assignments for different classes at school, you can move easily between content libraries without switching context. You can also pin libraries to the Quick Access section so you can find them faster.

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

- Intelligent search powered by Microsoft Graph, to surface what you need. You can quickly return to your recent files, files that have been shared with you, or recommended files based on your working relationships with others. These personalized recommendations can help you discover content you might not have been aware of and that is unique to OneDrive and Office 365.
- Create, access, view, edit, and share files on the go with the OneDrive mobile app. Easily capture whiteboards, scan documents for safe keeping, and annotate PDFs with the app's built-in features. You can access your content on your iOS or Android device from virtually anywhere.
- **Shift seamlessly between professional files and personal files.** You can easily switch between your professional or school and personal OneDrive accounts, or even between separate professional accounts you might maintain for multiple clients if you're a consultant or freelancer. This means you don't have to spend a lot of time opening and closing apps and searching for what you need—and who can't use a little extra time these days?
- **Edit photos directly in OneDrive**. Whether you're managing social media for a client, sharing pictures of the latest product designs with your team, or pulling together the latest edition of the school paper, you can edit photos directly in OneDrive on the web. You can crop photos, adjust light and color, add creative filters, and mark up photos for editing all in one place.
- **Upload, preview, and edit large files and videos.** If you're working on an important video project for a client or a 3D model for a computer design class, you can upload file sizes up to 250GB in OneDrive. In addition, OneDrive has more than 320+ rich file previewers —from AutoCAD drawings to 3D designs to DICOM images.
- **Save valuable disk space** by keeping your files in the cloud and print files from anywhere. With OneDrive Files On-Demand, you can access your work or school files in the cloud without using valuable file storage space on your Windows or Mac device. And with Universal Print integration with OneDrive, you can print documents stored in OneDrive directly to a printer in your organization or home office without requiring you to first install a printer on your device.
- P**rotect proprietary documents and data**. Protect your company data with advanced encryption, compliance, and other enterprise-grade security features. If you lose your device or are subject to a cyberattack, OneDrive has your back, allowing you to recover your files and minimize any loss of work.

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

- **Back up or redirect known folders (Desktop, Documents, Pictures)** to OneDrive. For large organizations, this can help IT keep things running smoothly for users and reduce a few administrative headaches. This ensures files in these important folders are protected and available on other devices. Users with personal OneDrive can also backup these important folders at no extra cost with PC folder backup (up to 5 GB of files without a subscription).

- **Get centralized control over content across the organization**. As many organizations adopt hybrid work, IT admins may be seeing their workloads increase. But with Microsoft 365, you have an integrated admin center to help you manage everything at an organizational level: control internal and external sharing, set user access controls, manage default storage limits, enable user device notifications, specify retention policies, and manage sync controls for OneDrive.

- Add extra protection for your personal documents with Personal Vault. This enables you to safeguard sensitive photos and files, like social security cards, drivers' licenses, passports and more. Microsoft 365 Personal and Family subscribers can store as many files as they want in Personal Vault, up to their storage limit.

- **Share files and photos with family and friends in one click**. If you're using a free or paid OneDrive consumer plan or Microsoft 365 Personal or Family plan, you can create family or friend groups to share photos, videos, and other files with. So next time you want to share photos of the family reunion with your relatives or share the team roster for your bowling league with the team, you can do it in one click, instead of typing in all those addresses.

All employees of the company are connected to One Drive. Everyone has their own account, thanks to which we have an insight into who and when posted the file in the "cloud", as well as who undertook the possible editing of the file. This service is very intuitive, its use looks practically like using a normal laptop, so this service does not need too long implementation process. This service is currently used by most companies, but also by individuals, which encouraged us to improve our work.

With the help of this service, we avoid turbulence in papers, because all documents are added to the "cloud". Due to the general access to files from any device, we avoid waiting for sending documents between employees. In addition, with the help of programs and programs from Microsoft Windows 365, we can combine functions.

- Planning (Microsoft Project)
- Cost estimation (Microsoft Excel)

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

- Scheduling (Exchange Calendar, Microsoft Project)
- Control of the course and time of work (Microsoft Project)
- Budget Control (Microsoft Excel)

Maintaining contact with all departments is done using the Teams platform.

Adaptation

There is wide variety of subscription plans https://www.microsoft.com/en-in/microsoft-365/onedrive/compare-onedrive-plans?activetab=tab:primaryr2

Every employee of the company should take part in the familiarization with the service. The implementation does not require expensive training, because the service is easy to use and only requires having a laptop with a web browser. The cost of one position depends on the number of positions and whether the service is provided for a private person or a company and oscillates in the amount of.

PLN 300 for a position for a year for a company where the data warehouse is 1 TB (1000GB)

If we are talking about software, it is the amount for the position that has in its package (Microsoft Windows 365 Professional) programs such as:

- Outlook with assigned e-mail
- Word
- Excel
- Power Point
- Teams (Teams platform is used to keep in touch with colleagues, chat with them and video conferencing. It is also for independent or team work on files and coordinating the organization.

Anyone who intends to use the One Drive service must have an email account, because it allows access to the "cloud" where files are stored, and a device with Internet access.

Before the introduction of this service, all accounting and construction documentation was carried out manually, this service made it possible to get rid of a pile of paperwork, which streamlined the processes.

The service itself is done very well, which is why the issue of processes determines the organization of the work of a given company. Only when working with this service should you avoid and verify all e-mails to which we give permission to manage files.

The service has no legal restrictions. It is intended for both companies and individual clients. Of course, there are some limitations as to the size of the files posted, but only in limited free versions.

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

The only blocker is if poor the access of internet than it's more trouble than advantage.

As a company, we recommend using the One Drive service, which helps to improve communication between employees or executive departments, which translates into greater efficiency. In addition, good organization of company processes with the participation of a given application improves the overall operation of the company.

Additional information

Further information – our contact person

Chamber of Crafts and Small and Medium Sized Enterprises in Katowice
Anna Palowska, Assistant to the Chief Executive
izba@ir.katowice.pl
+48 515 037 301
www.ir.katowice.pl

Thanks to this service, all documents in our possession quickly get into the possession of other employees of the company. Thanks to this, communication between employees has improved, in addition, "Cloud" allows you to work not only stationary from the office, but also remotely from home. The speed of the data posted improves the processes related to administration, banking, as well as the transfer of data between executive departments. The data placed on the disk is reserved, because only authorized persons have access to it.

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

QElectroTech

What is this?

QElectroTech is a free software to create electric diagrams.

Introduction of the solution

It is for Electrician Designers – Installers – Customers (clients) With its help you are able to arrange

- Remote consultations,
- Simultaneous works of many people from many locations.

Based on consultation with the customer, an electrical design of the machine or installation is created, at this stage it is possible to cooperate with different people in different locations (sending the project file). Then, at the customer's premises, the installer implements the project – in case of problems, he can make the necessary changes (updates). Once completed and put into service, the current project is given to the customer for service or maintenance purposes.

Self-training based on the help available in the program, software found by a search engine on forums dedicated to the design of electrical diagrams.

Adaptation

To run this environment you should have Windows PCs, Qelektrotech compliant. For implementation, you need a modern computer with an operating system connected to the Internet and a printer.

Early versions of the software had English version, but this was not a big problem. Not all elements of the program are translated into other languages , and some translations are not correct.

The software easily marks the terminals, eliminates possible design errors, has libraries of the most important currently used components of larger manufacturers of electrical/electronic parts .

Software provided free of charge (GNU license- General Public License), similar in functionality to paid programs, if you need to use paid programs, can be an example/transition platform before purchase.

Software licensed under the GNU license can stop being updated to new operating system requirements at any time, there is no guarantee if it will function properly!

It can be used as an initial practice, free of charge, in the case of checking the functionality in the enterprise, paid software can be used.

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

Starting work with paid software limits the freedom to choose other software due to the costs incurred, demo versions of paid programs are very limited.

The success is confirmed by subsequent orders from the same customers, and the acceleration of the implementation of projects, installers do not comment on the readability and correctness of the schemes.

Pay attention to the security of transferring project files (protection of intellectual data)

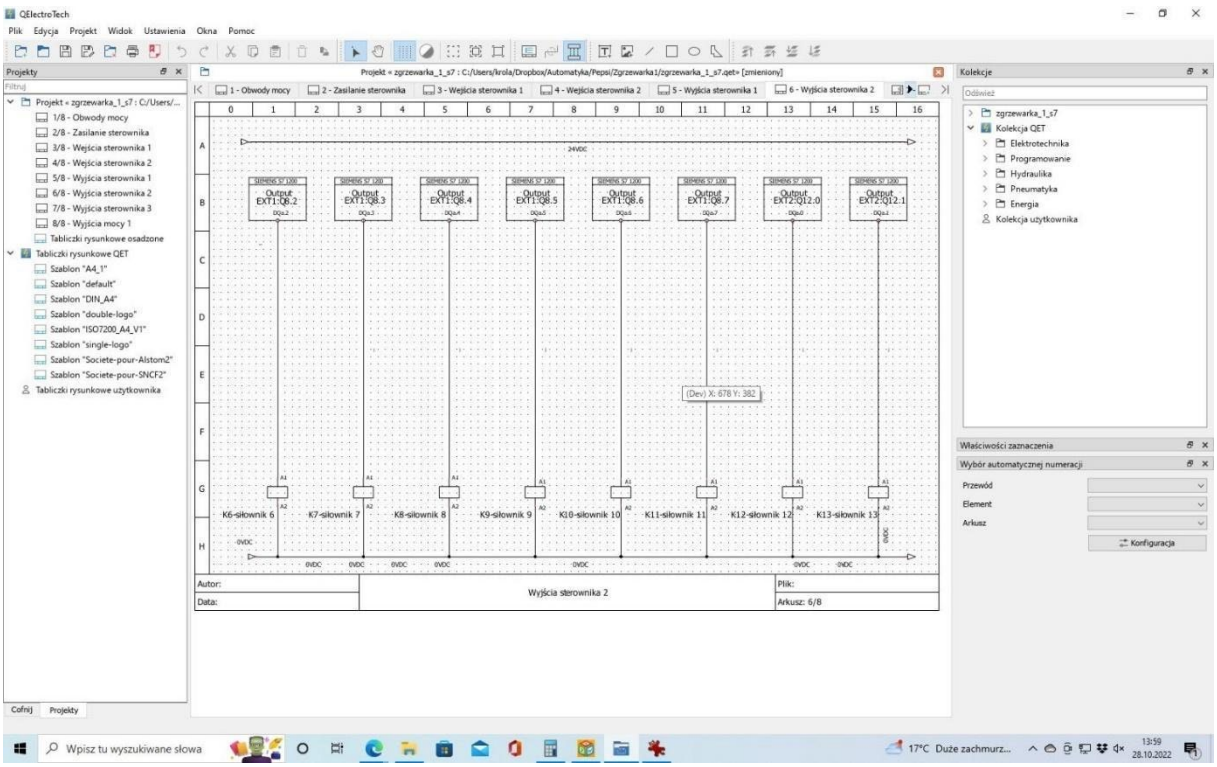
Additional information

Further information – our contact person

Chamber of Crafts and Small and Medium Sized Enterprises in Katowice
Anna Palowska, Assistant to the Chief Executive
izba@ir.katowice.pl
+48 515 037 301
www.ir.katowice.pl

Further information – available materials online

https://qelectrotech.org/



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

MEEMO - e-work safety

What is this?

It's an occupational health and safety management software solution.

Introduction of the solution

MEEMO can be used by any construction company to implement basic health and safety processes regardless of their size and industry. This helps them significantly lower legal and reputation risks associated with safety incidents that might occur in the future. This solution is for the board members as they bear the main responsibility for any employee or visitors on their site. Daily, they can monitor the situation and see how they fulfil all the requirements.

The software address three main problems at once. First, it reduces legal risks associated with health and safety requirements because it helps to easily fulfil all related tasks on time. Second, it gives real control to board members to see if there are some violations or unfulfilled tasks on the daily basis. Third, it helps companies to go fully paperless in these processes and manage all the documentation digitally. This solution covers all employees, even if they lack some basic IT skills crucial for construction companies. This software has two separate but very similar e-training functions – one for health and safety requirements, and the second for any other topic that client desires. In other words, this second option allows the addition of any sort of learning materials including documents, test questions and so on. It does not have to be regarding health and safety itself.

Implementation steps:

- First, the client's current health & safety data are migrated into the software. At this stage, the client needs to prepare all the documentation and data, so all the necessary information is accessible. This usually takes about one month but is crucial. Without it, it is not possible to use the software properly.
- Second, automatic data synchronization with clients' current HR software is created. It helps to minimize double data input on the daily basis and helps to inform responsible persons about new employees and all relevant changes with them. This can be called the integration stage.
- The third stage is change management. Responsible persons are taught about how and why to use the software. This is the final stage of work with the client, where cases and data in real-world situations are used.

Do you always want to read complicated laws and regulations to know how to act in certain situations or do you want to call someone who does the job for you? Software's highest value hides in the fact that all the legislative requirements are written in its code, so it knows how to act automatically. What is meant by that? Simply put, you

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

cannot skip to the next tasks without fulfilling previous and mandatory tasks first. For example, employee changes his construction site, how do you remember or know that he needs to undergo new training? The software solution helps with it.

Adaptation

There are only two main cost categories for the client.

- First, there is a single-time software installation costs, which include data migration, employee training and everything else so that the solution is ready to use. This cost is calculated based on the client's company needs and size, and usually, it is around 5000 EUR.
- Second, there is a monthly subscription fee of 300 EUR for the organization, regardless of how many users they have. After the solution is implemented, clients do not have to add additional human resources to run this process.

In general, it takes about 2 months to implement the solution. Usually, agreement signing takes a much longer time.

The only main challenge that is faced typically involves resistance from employees. Resistance is meant for making excuses for not using the tool. However, if members of the board give a clear message that this is the way forward and there is no option not to use it, it significantly reduces this challenge. To successfully implement the solution, you must work or at least convince all major stakeholders in the organization.

The most valuable thing is that people who are responsible for these processes can no longer do only administrative work but concentrate on real-world problems without worrying that they can miss some important deadlines. It gives a new purpose to these processes benefiting the organization in a long term. The purpose of health and safety processes is to protect and enhance productivity. If you have a sick or injured employee, it affects your bottom line by adding unnecessary expenses. The point here is that only working with papers, will not help to make any impact or change that, so this is a complete turnover in terms of what you focus on.

In the future, it would be very beneficial to make data synchronization with time management systems on construction sites. Why is it necessary? This could automatically check if you can allow passing this person to the construction site, based on information in the software. For example, if this person has not completed his mandatory training, he cannot be allowed to enter. This is not something that is offered right now, but this could benefit both sides.

The results that clients usually can achieve with MEEMO:

- Control the compliance percentage at any given time in the whole organization or on a particular site.
- Trace which of the tasks are not completed by the employee.
- Reduce time spent on safety briefings.

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

- Reduce time spent on the preparation of documentation.
- Reduce the number of employees needed to do the administrative work.
- Reduce health insurance budget.

In almost all countries, governmental bodies who are responsible for these issues should organize an encouraging initiative that enhances organizations to use more digital products. The problem is that many times organizations say – yes, it sounds great, but what does the government say about this? Is it legal? The point is, they are afraid to use many tools that are available only because they are not informed or encouraged. This is a much bigger issue than anybody realizes. From digitalization, all involved parties can benefit, even governmental bodies that monitor compliance with regulations.

There are probably only two big roadblocks – the IT skills of employees and the governmental attitude towards IT solutions. Both need to be more open and welcoming, otherwise, it is difficult to move forward. Employees need to embrace new skills and knowledge, but the government needs to be more welcoming towards new solutions – communicating with each other and making suggestions. Sometimes companies are afraid to implement some new solutions just because they think government supervising bodies will not accept that or would somehow be against them.

Start first with the current process audit and see how it runs right now. It is even suggested to attract a third-party service provider who will provide this audit for you. You will probably see that it is quite formal and administrative. After that, you will be available to communicate your requirements to the software provider more precisely and it should help to establish steps for implementation. Health and safety processes are quite broad and different organizations have different pain points.

Additional information

Further information – our contact persons

Latvian Chamber of Commerce and Industry

Jurijs Dubatovka, Project Coordinator of EU Projects Department

E-Mail: jurijs.dubatovka@ltrk.lv

T: +371 26514077

www.chamber.lv

Representatives of the BP owner company:

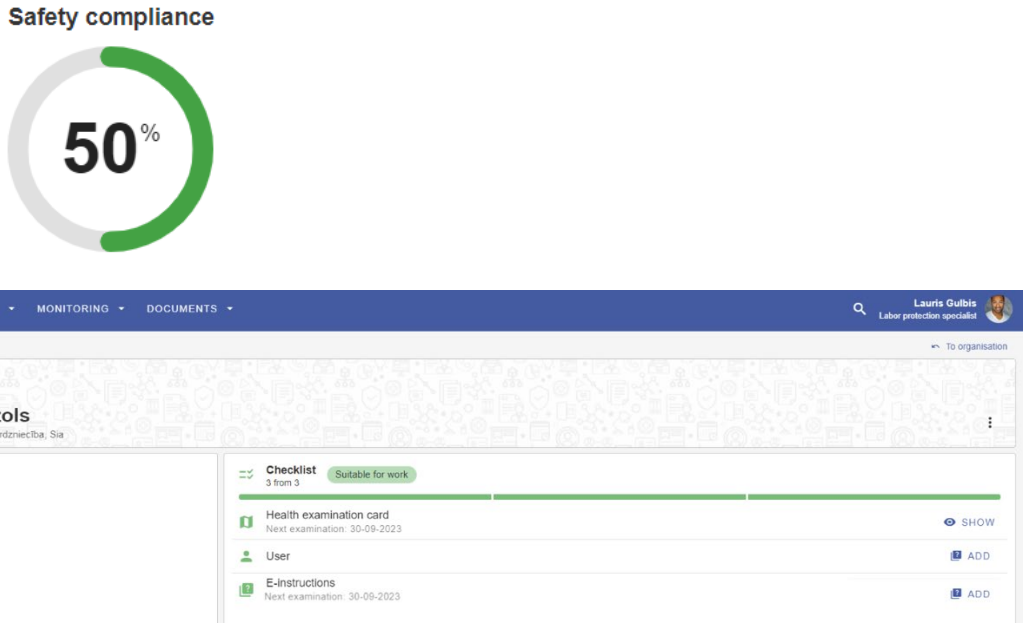
Mr. Raivis Šķilters

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

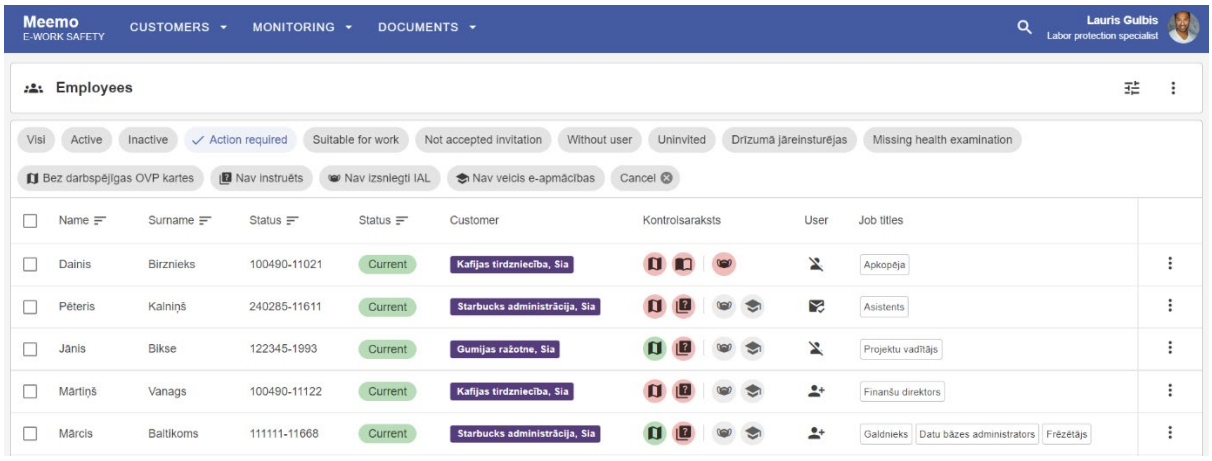
IT project manager
Mobile: +371 22005657
E-mail: raivis.skilters@sunstar.group

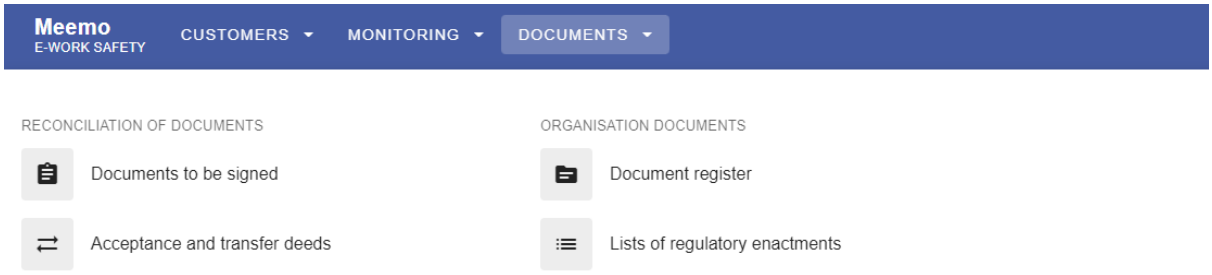
Ms. Rudīte Krūgaļauža
Member of the Board
Mobile: +371 29478674
E-mail: rudite.krugalauza@sunstar.group

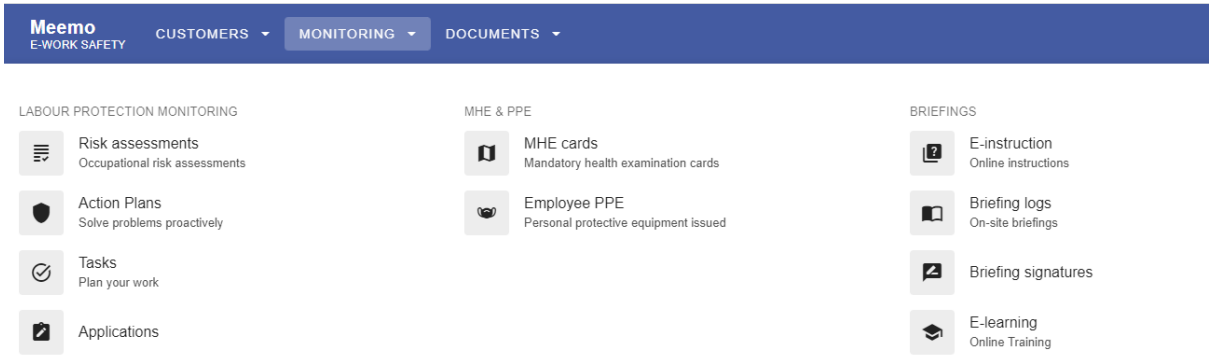
Further information – available materials online, pictures screen shots



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







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

Training best practices

Education program for SME executives and HR experts about digitalization

Overview of the training

Introduction to the training

Digitalization is influencing the modern working world and thus also HR management. In this training, participants learn what scaling effects digital tools contain and how to use them. They learn also how the organization and management of digital work "works" and why an active learning culture is important for innovation. In this training, HR managers are given the necessary tools to achieve accelerated innovation cycles in their respective companies.

The training consists of 2 blocks of 2 days each, with precision teaching and a long phase of learning on the job (3 to 4 months) in between, with simultaneous realisation of a development project with accompanying online or personal coaching. During this time development projects are implemented in the company, for example the introduction and use of digital technologies. Accordingly, the course consists of 65% practical and 35% theoretical training.

It is a non-accredited vocational training without any final examination or qualification. There are no subsequent continuous trainings that attendees could take after the completion of the course.

The training is conducted for SMEs usually by chambers, other SME promoters and VET providers. A Train the Trainer program is available for this training, which includes in-service training for teachers and lecturers. The Train the Trainer program lasts two to three days and can alternatively be conducted with face-to-face attendance or online. The Train the Trainer Program consists of 20 % practical and 80 % theoretical training.

The Train the Trainer program is implemented by Hanse-Parlament staff members and universities.

Both training courses have proven themselves in practice.

Who is it for?

Target group of the training includes SME owners and managers, as well as HR-experts/manager. It can be relevant also for advisors of SMEs.

Target groups of the Train the Trainer program are teachers and trainers of business development supporting organisations and of education providers.

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

The trainees shall have work experience and completed vocational training or studies (not specific).

Adaptability

Important to know

For implementing the training 3 to 4 teachers, classroom and presentation equipment are needed. Trainers shall have pedagogical skills and some training experience in professional development; extensive knowledge of digitalization and HR management. It is recommended to complete a train the trainer program in advance.

For the Train the Trainer program, 2 - 3 trainers are needed for three days, as well as classroom and presentation equipment.

The training was developed, tested, evaluated and implemented in Denmark. It was transferred and implemented in several countries with success:

- in Tallinn, Estonia
- in Opole, Poland, and
- in Poznan, Poland.

The Train the Trainer program was developed, tested, evaluated and implemented in Austria and transferred to 24 trainers from 9 countries.

Opportunities of the example

The training for SMEs can be transferred without restrictions, adjustments to different national legal regulations are not necessary. The implementation must be financed through participant fees. The fees should be kept as low as possible by obtaining national funding.

In addition to the costs, lack of time is usually a problem for SMEs. This is why the training is implemented with a very small proportion of face-to-face classes.

The Train the Trainer Program can be transferred also without restrictions, adjustments to different national legal regulations are not required. The implementation could be financed from national or own funds.

Advises for reuse, tips and tricks

The most difficult task is to persuade the SMEs and their employees to participate. SMEs need comprehensive information and advice in order to be engaged in the training.

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

Additional information

Further information – our contact person

Hanseatic Parliament

Dr. Jürgen Hogeforster, Senior-Manager

jhogeforster@hanse-parlament.eu

Tel: + 49 40 822 447 10

www.hanse-parlament.eu

Further information – available materials online

For further information on the training, please visit: https://re-grow.eu/

Further available materials:

- Curriculum on Training for SMEs and HR Experts
- Curriculum of the Train the Trainer course on Digital Competences

Evidence of success

The SME training was implemented with the participation of 37 people, who have very positively evaluated the training.

The Train the Trainer Program has so far been conducted once with 15 people.

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

Digital customer-centric Innovation in Small and Medium Enterprises

Overview of the training

Introduction to the training

The proposed international training contributes to SMEs' competence development in the field of digitalization and innovation and as such it combines qualifications in digitization with human resource management. After completing the course, the trainee has at least a sense of what innovative behaviour and digitalization are, and has an overview of digital tools that could be used in its business.

The training consists of 3 blocks of 1-2 days each, with precision teaching and a long phase of learning on the job (3 to 4 months) in between, with simultaneous realisation of a development project with accompanying online or personal coaching. During this time development projects are implemented in the company, for example the introduction and use of digital technologies. Accordingly, the course consists of 65% practical and 35% theoretical training.

It is a non-accredited vocational training without any final examination or qualification. There are no subsequent continuous trainings that attendees could take after the completion of the course.

The training is conducted for SMEs usually by chambers, other SME promoters and VET providers. A Train the Trainer program is available for this training, which includes in-service training for teachers and lecturers. The Train the Trainer program lasts two to three days and can alternatively be conducted with face-to-face attendance or online. The Train the Trainer Program consists of 20 % practical and 80 % theoretical training.

The Train the Trainer program is implemented by Hanse-Parlament staff members and universities.

Both training courses have proven themselves in practice.

Who is it for?

Target group of the training includes SME owners and managers. It can be relevant also for specialists of SMEs e.g. architects, engineers and planners.

Target groups of the Train the Trainer program are teachers and trainers of business development supporting organisations and of education providers.

The trainees shall have work experience and completed vocational training or studies (not specific).

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

Adaptability

Important to know

For implementing the training 3 to 4 teachers, classroom and presentation equipment are needed. Trainers shall have pedagogical skills and some training experience in professional development; extensive knowledge of digitalization and HR management. It is recommended to complete a train the trainer program in advance.

For the Train the Trainer program, 2 - 3 trainers are needed for three days, as well as classroom and presentation equipment.

The training was developed, tested, evaluated and implemented in Germany. It was transferred and implemented in several countries with success:

- Kolding, Denmark
- Wroclaw, Poland
- Olztyn, Poland
- Budapest, Hungary

The Train the Trainer program was developed, tested, evaluated and implemented in Austria and transferred to 24 trainers from 9 countries.

Opportunities of the example

The training for SMEs can be transferred without restrictions, adjustments to different national legal regulations are not necessary. The implementation must be financed through participant fees. The fees should be kept as low as possible by obtaining national funding.

In addition to the costs, lack of time is usually a problem for SMEs. This is why the training is implemented with a very small proportion of face-to-face classes.

The Train the Trainer Program can be transferred also without restrictions, adjustments to different national legal regulations are not required. The implementation could be financed from national or own funds.

Advises for reuse, tips and tricks

The most difficult task is to persuade the SMEs and their employees to participate. SMEs need comprehensive information and advice in order to be engaged in the training.

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

Additional information

Further information – our contact person

Hanseatic Parliament

Dr. Jürgen Hogeforster, Senior-Manager

jhogeforster@hanse-parlament.eu

Tel: + 49 40 822 447 10

www.hanse-parlament.eu

Further information – available materials online

For further information on the training, please visit: https://ci-smes.eu/

Further available materials:

- Curriculum Digital customer-centred Innovations
- Curriculum for Train the Trainer course in the field of Digital customer-centred Innovations

Evidence of success

The Train the Trainer Program has so far been conducted once with 15 people and with good success based on the post training assessment.

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

BIM LAB, a place to acquire BIM related skills and competences

Overview of the training

Introduction to the training

The exchange of information across different disciplines and trades plays a central role in the successful application of the Building Information Modelling (BIM) method. The aim of the BIM Lab is to bring together the various parties involved in a construction lifecycle and to learn about and test the collaborative working method BIM.

In the frame of specific workshops or other non-workshop type of events, different scenarios and application possibilities can be played out in a practice-oriented manner using the business game methodology. This gives the various players in the construction industry the opportunity to test common processes and uncover potential for their own workflows.

The BIM Lab is established at the Hochschule 21 in Buxtehude (Germany).

BIM LAB is a practice oriented “Laboratory”. The workshops, courses and the general usage provide mainly practical knowledge in the field of Building Information Modelling. These are non-formal training opportunities and as such their length is flexible. The individual workshops and short or standalone courses are adapted to the needs of the client. Accordingly, these trainings are not accredited nor provide a certified qualification.

Who is it for?

The BIM Lab was originally established to serve research purposes but due to business model changes the venue and the service is now also available for wider audiences including students, engineers, scientific staff, lecturers, professors, employees, managers, SMEs, members of chamber of crafts and career changers.

It offers an excellent space for building up and transferring knowledge to all company divisions in the construction industry.

SMEs that are looking for further education for equipping employees and managers with BIM related skills, the Lab offers a venue and also training to test various scenarios.

Accordingly, trainees must have basic computer skills and basic knowledge of Structural Engineering and Architectural Design and of their interactivity.

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

Adaptability

Important to know

Establishing the necessary conditions both in terms of venue and training staff is necessary to provide high level training and testing service.

The Lab at Hochschule 21 is equipped with a total of 16 powerful computer workstations with respective BIM-specific software (e.g. for modelling) and various multimedia technologies. Among other things, two 86-inch touch screens, video conferencing technology and, in the future, possibilities for VR and AR applications will be used.

The trainers must have Advanced Theoretical and Practical knowledge in Building Information Modelling to effectively support trainees in their skills development.

Currently the BIM LAB offers services for German professionals, and accordingly the materials are mostly available in German but translation and adjustment of materials into English is manageable with low effort. Several documents and software are of course available in English.

As the BIM LAB is voluntary based, a good promotion of the service is required towards the target groups.

Company managers hast to be convinced about the usage and interests has to be waked, e.g. through tangible case studies etc. Since it requires high self-initiative of companies to execute and implement such workshops therefore development of the skills of the staff shall be part of the company's routine.

Opportunities of the example

Different target groups can be involved in the training. As it is voluntary based, cross industrial cooperations are possible. Also multidisciplinary workshops can be worked out and initiated.

Advises for reuse, tips and tricks

It is recommended to cooperate with higher educational institutes such as universities or high schools regarding resources such as computer pools and LAB rooms.

Hochschule 21 is open for cooperation with such entities in other countries.

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

Additional information

Further information – our contact person

Hochschule 21 - University of Applied Sciences

Tamas Ferenczi, Research Assistant

ferenczi@hs21.de

+49 157 816 412 91

www.hs21.de

Further information – available materials online

BIM LAB was developed and published as part of the Research Project BIREM (BIM Innovation strategy for SMEs) on the Hochschule 21 Buxtehude.

Evidence of success

The BIM Lab was launched in Fall of 2020 at the Hochschule 21 and primarily used for research purposes. Currently, the simulations are under development and will be tested for the first time with interested SMEs in the course of 2023.

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

BIM Project Course

Overview of the training

Introduction to the training

Building Information Modelling (BIM) is currently a highly topical issue in the construction industry, which brings significant changes to the work processes in all service phases of construction projects. Building on the creation and work with BIM models (3D BIM), this course deals with the topics of 4D and 5D BIM, i.e. model-based scheduling and cost planning.

Starting from an existing model (Autodesk REVIT), trainees get to know the methods for BIM model-based tendering and cost calculation as well as for BIM model-based scheduling. For this purpose, they use the iTWO software system from RIB and, if necessary, also MS Project for scheduling.

In addition to theoretical explanations covering the topics of tendering, costing and scheduling and a comparison of the classic processes and workflows with the BIM-based processes, this course contains to a considerable extent also practical applications and exercises on the PC. In doing so, the possibilities of model-based cost and schedule planning with iTWO is worked out in group work. In the course soft skills as well as hard skills are trained with both theoretical and practical elements.

The Training consists of 12 training occasions (90 minutes each), in average 50% theoretical and 50% practical lessons.

Trainees need to have experience in the use of Autodesk REVIT and/or knowledge of BIM. Furthermore, basic knowledge of construction management, in particular the module BBL-B, is required. Accordingly this course is not adequate for employees who are not familiar with digital technologies.

This accredited formal training course is integrated in the curriculum of civil engineering studies at the Hochschule 21 in Buxtehude and concludes with a seminar paper (as group work) and an oral examination.

The course is currently offered only as part of the civil engineering bachelor programme and the corresponding tuition fees are currently included in the programme, but also a needs-based adjustment would be easily possible.

Who is it for?

The training course is relevant for civil engineering university students, for engineers with completed bachelor studies.

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

Adaptability

Important to know

The course requires the use of computers, therefore a room with computer workstations is necessary (own or centrally provided) and the necessary software need to be installed.

Highly qualified lecturers and supervisors must be provided so that the theory as well es practice parts will be provided profoundly and the connections between theory and practice are effectively stablished.

Trainers need to have advanced theoretical and practical knowledge in Building Information Modelling. Beyond theory they must have also basic knowledge of structural engineering and architectural design and their interactivity.

It is considered challenging to reach senior employees of companies because the course is long and requires high engagement.

Since the BIM Project Course is currently offered for German students, the teaching materials are only available in German at this moment. But translation and adjustment of materials into English is possible with low effort.

Opportunities of the example

It is well possible to implement this course with its contents in other regional contexts. For example, in other countries, other universities, or even directly in companies for the own employees.

Advises for reuse, tips and tricks

It is highly recommended for this course to cooperate with a higher educational institute such as universities or high schools regarding resources and lecturers.

Additional information

Further information – our contact person

Hochschule 21 - University of Applied Sciences

Tamas Ferenczi, Research Assistant

ferenczi@hs21.de

+49 157 816 412 91

www.hs21.de

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

Evidence of success

Plenty of students who are employed by companies have completed this course during their civil engineering studies. Both companies and students are well satisfied with the course contents regarding to its relevance to the engineering practice for contractors as well es for structural engineers or public employees.

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

Fundamentals of 2D and 3D Design

Overview of the training

Introduction to the training

Satakunta University of Applied Sciences, Finland (SAMK), created an accredited training course on Fundamentals of 2D and 3D Design. SAMK offers it as a bachelor-level course for first-year students, but anyone can participate the course via fee-based open studies. As result of this course, students acquire knowledge of the basic use of CAD design software, data model software and presentation instructions for building drawings. The course is based on practical use of the programs Autodesk Autocad and Autodesk Revit.

The programs are used with the help of examples, which have been drawn up from the perspectives of house building and construction technology. The drawing exercises are carried out with AutoCad and the modelling exercises with Revit. The drawing exercises include structural sections and detail drawings, and in the modelling exercise, a simple detached house is designed, and drawings used in the building license are automatically produced from it. About 15% of the course is theoretical studies, i.e. learning to use the programs. The practical part is 85%, containing drawing exercises and individual assignments.

The total workload consists of 60 hours of drawing exercises, 20 hours of individual studies on programs and 55 hours of independent assignment solving. The number of study days depends on the student, but in general, it takes about 17 working days to complete the course.

Pedagogically, the teaching focuses on video teaching, where the student studies the general operating principles and program functionalities independently with the help of videos. The course has exercises to be done independently, which measure competences related to the use of the program. The course also includes classroom tutoring, where the student gets support from the teacher for the exercises. The course has no traditional examination at the end, but students have to complete given assignments properly as part of the training, which ensures that the skills and competences required have been gained.

To enrol the course, students do not need to attend any other prerequisite courses. They can complete the course completely independently based on the materials uploaded to Moodle and YouTube. Due to this, students can improve their skills also after the course has finished.

The course for bachelor students enrolled in the programme is free.

The fee for this course attended via the Open Studies is 50 € at SAMK including the certification.

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

Who is it for?

The primary target group of the course is the bachelor students in the degree programme in Construction and Municipal Engineering. However, it is available for anyone from the construction industry interested in the 2D and 3D applications in construction as the course is also available via open studies.

Adaptability

Important to know

To offer the training the possibility to use Autodesk programs is essential. Students and educators can get free one-year educational access to Autodesk products and services: https://www.autodesk.com/education/edu-software/overview?sorting=featured&filters=class-lab

The trainers must be professionals in construction engineering recognized for their product mastery, delivery, and teaching skills

Opportunities of the example

The training course can be attended by anyone via the open studies programme for 50 €. With a term fee (100 €/term) students can study an unlimited number of open UAS courses during the term. Open Studies are mainly available for those who already live in Finland. Open Studies are free for unemployed and temporary laid- off persons.

Advises for reuse, tips and tricks

2D/3D: Students and educators can get free one-year educational access to Autodesk products and services https://www.autodesk.com/education/edu-software/overview?sorting=featured&filters=class-lab .

It is worth to contact the local groups using Autocad:

https://knowledge.autodesk.com/community/groups#/overview

Additional information

Further information – our contact person

Satakunta University of Applied Sciences

Sirpa Sandelin, Principal Lecturer

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

sirpa.sandelin@samk.fi

+358 44 710 3227

www.samk.fi

Further information – available materials online

The curriculum for Construction and Municipal Engineering in Finnish (only) is on the webpage https://samk.opinto-opas.fi/curricula/degreeprogrammes/groups

Evidence of success

Hundreds of students have completed the course.

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

BIM coordinator Training (construction)

Overview of the training

Introduction to the training

Building Information Modelling (BIM) coordinators are responsible for digital processes associated with the design and construction stages of a project. They ensure that 3D models, drawings and structural data are hosted in one, accessible place, and that connects between host and clients are enabling project information model to be used. Usually BIM coordinators are working in bigger companies.

The BIM Coordinator Training (15 ECTS) is a unique accredited training programme of the Metropolia University of Applied Sciences (Finland). The programme aims to increase the understanding of the general information model requirements, understanding the concepts and methods of designing, developing, implementing and controlling data modelling at different stages of a construction project, and to familiarise with the technological systems and combination models in the field and increase software skills.

As part of the training, students have to work on construction projects and integrate tasks and development projects into their own work.

Content of the BIM Coordinator Training is:

- General building information model requirements, standards and guidelines
- Tasks of a BIM coordinator at different stages of a project
- Project information management and administration
- Collaborative Methods: BIG Room
- Software know-how and technological systems, combination of models: Solibri, Trimble Connect, Autodesk Construction Cloud
- Utilization of the BIM model at different stages of the construction project: project management, coordination and ownership, information production perspective in design, implementation perspective in construction, use, maintenance and repair perspective
- Practical exercises on the tasks of a BIM coordinator through own development projects.

The training is 400 hours long, consisting of about 30 % theoretical studies (i.e. background theory and learning to use the programmes) and 70% practical studies (i.e. solving practical tasks and development task). The BIM Coordinator Training consists of several courses, which include 16 full working days of contact and online teaching, and 34 full working days of individual learning, practical tasks and development task. The course can be completed in 10 months.

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

Students must have experience in working on a construction project and working with building engineering software tools.

BIM courses are arranged around the globe. Both education institutes and consulting companies offer courses.

The added value of this training is the online study option, where students can integrate course tasks and development projects into their daily work with BIM.

Who is it for?

The training programme is suitable for persons working on a construction project and oriented towards the tasks of a "building information model expert" in design, production and client companies.

Adaptability

Important to know

The trainers must be professionals in construction engineering and building information modelling recognized for their product mastery, delivery, and teaching skills.

In terms of technical equipment, computers with BIM software and tools are necessary.

Generally, open courses for university students are arranged once a year and last 10 months. However, companies can order company specific training at separately agreed times.

Price of the general, open training is 15 590 + VAT 24% per person.

It is worth noting that completing the practical tasks and development work needs also theoretical studies and research on the topic.

Similar individual courses on BIM content are offered in other higher education institutes in Finland and by private consulting companies. Other BIM coordinator courses are available for the infrastructure sector and building control authorities too.

In Finland BIM is mostly used in design and planning, which tasks require FISE qualifications (https://fise.fi/en/).

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

Opportunities of the example

Countries could integrate BIM courses separate into their curricula, which facilitates e.g. bachelor or master students' participation in courses.

Advises for reuse, tips and tricks

BIM coordinator qualifications should be recognized and certified in official registers.

Additional information

Further information – our contact person

Satakunta University of Applied Sciences

Sirpa Sandelin, Principal Lecturer

sirpa.sandelin@samk.fi

+358 44 710 3227

www.samk.fi

Further information – available materials online

The BIM course (in Finnish only) is available on the webpage of the Metropolia University: https://www.metropolia.fi/fi/opiskelu-metropoliassa/osaamisen-taydentaminen/taydennyskoulutus/rakentamisen-tietomallien-bim-koulutukset-yrityksille .

A couple of courses are explained in English too https://www.metropolia.fi/en/academics/continuing-education/bim-education .

For further information on BIM, it is advisable to visit:

https://www.autodesk.eu/search?qt=BIM%20360&sort=Relevance&sn=en_NL&us_op=dotcom

https://becomebimcoordinator.com/

https://www.linkedin.com/learning/topics/bim

https://bimzeed.eu/student-area/

Or see Coursera courses online: https://www.coursera.org/courses?query=bim

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

Any graphs, figures, pictures, tables, that are useful for the presentation of the case study?

See the case Tripla Pasila Station - BIM is important for safe construction in a trafficked area https://www.tekla.com/bim-awards/tripla-pasila-station .

Evidence of success

The success of the training is proved by the hundreds of students who have already completed the course.

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

Basic communication skills for construction contractors 25 hours training

Overview of the training

Introduction to the training

It can be stated in general, that small and medium sized enterprises (especially micros) are using digital tools only very limitedly in their daily practice. Improving the communication between architects, construction professionals and enterprises and the communication between clients and contractors is a continuously increasing need. In line with this, IPOSZ developed a communication skills development training for SMEs and their employees active in the construction sector. The learning materials were developed as part of a project funded by the European Union. As part of the project pilot trainings took also place in Hungary.

The primary objective of the training was to raise awareness of the participants of the available tools (50%) and to provide a one-off trial opportunity for them (50%). Accordingly, after presenting a tool or method in theory, which was always tied to a specific real case adapted to the construction sector, participants had the chance to immediately try the tool in practice. However, a deeper training with concrete practical elements is advisable to fix the knowledge and facilitate the daily application of the tools and methods.

The training is a 3*25-hours training with a personal presence, which prepared the participants from basic communication skills to using serious digital tools for the benefit of their companies. The training focuses on the following topics:

- Basic communication skills for construction contractors
- Construction project management, Professional digital knowledge
- Digital communication that serves planning and execution planning
- Digital communication that supports quotation and subcontractor cooperation

The training is a non-accredited training, that provided the participants a certificate on the completion of the training, issued by the training institution commissioned by IPOSZ to provide the training.

Who is it for?

The target group of the training includes civil engineers, construction companies and specialists engaged in their training and further training.

The training focuses primarily on companies of the construction industry sector, with particular attention to the building engineering contractors, and managers of other micro and small enterprises that play subcontracting and/or supplier roles.

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

Adaptability

Important to know

To implement the training an educational site is needed with appropriate presentation tools and Internet connection, where approximately 15-20 students can work at the same time, each on their own machine and device (no need for centrally provided tools).

The representatives and demonstrators of specialised companies presenting digital construction tools bring and present their own tools and solutions.

The instructor/trainer needs to have extensive experience in the field of digitisation in the construction industry and to be able to demonstrate reference activities.

The training was developed for and targeted at Hungarian professionals, but the knowledge handed over can be applied anywhere in Europe. The training materials are currently available in the Hungarian language, but easily translatable.

Advises for reuse, tips and tricks

It is advisable to conduct the trainings regionally with the support of local industry associations and groupings of the construction sector. They can support the awareness raising by separate regional briefings on the trainings.

It is advisable to hold each 25-hour training in one block and take a longer break between two training blocks so that what has been learned can be recorded and tested as there is not enough time to master digital tools at a skill level during the training. Additional time should be set aside for practising this either individually or with the support of instructors who could help the jammers at every step.

The students' levels of knowledge might vary on a wide scale, some use digital tools at a higher skill level, while for others, the use of digital tools is not part of the daily practice. The latter group needs naturally more patience and time to adapt the acquired knowledge. Therefore, it is advisable to carry out a pre-screening of skills levels and organise groups according to the results.

Take care of the timing of the training! Do not organise it in months, which are the most crowded times for the construction industry.

It is advisable to ask participants to bring their own digital devices (mobile phones, laptops, tablets) to the training so that they can practice the newly learned knowledge on their own devices.

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

Additional information

Further information – our contact person

Hungarian Association of Craftmen's Corporation

Tamás Rettich, international relationship referent

rettich@iposz.hu

+36 1 354 3152

https://www.iposz.hu/iposz-english/iposz-in-short

Further information – available materials online

The syllabus of the 3*25-hour training is available in Hungarian.

Evidence of success

The course was completed by 60 people.

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

Itemized price calculation in the construction sector (TERC training course)

Overview of the training

Introduction to the training

Adequate professional knowledge is essential for the long-term maintenance of any business. Creating and presenting appropriate pricing that is acceptable to the customer is at least as important as the professional knowledge. Itemized price calculation should be used by any construction entrepreneur, as it is the only one that stands up in any dispute and is accepted by the authorities (e.g. in litigation).

Unfortunately, nowadays the unit price pricing is very common (e.g. in Hungary), where the unit price is per square meter, for example. Every entrepreneur learned about the standard working time frames during their studies. These standard times have been the basis of itemized pricing for a very long time. By using them, pricing is based on standards, so it is unquestionable. The only variable is the employee's overhead hourly rate. And the overhead hourly rate includes cost items that include the "other additional" costs of a contractor. In Hungary, the minimum hourly overhead rate for the construction industry was defined in a decree, which can be the starting point for determining overhead hourly rates. It is important to point out that these standards can be met by trained professionals, so it can already be clear at the time of pricing that the contractor is a dabbler or acquired her/his knowledge at school.

Many entrepreneurs make the mistake of using inappropriate tools to assess the work. A painter at first prepares a professional opinion, based on a surface diagnostic test, in which he determines the defects of the surface (by visual inspection, mechanical inspection, and instruments). It judges the bearing capacity of the surface, as this is the most important. If the surface diagnostics gives unsatisfactory results, the coating systems on the surface must be removed, which greatly increases the costs. In the professional opinion, a work process is provided and broken-down item by item. Digital devices (laser distance meters, scanners) greatly help the accurate diagnostic, we can get accurate data. If the surface has been professionally inspected and assessed, an itemized pricing based on the results obtained can be carried out. A software that contains itemized workflows and the standard working times assigned to them can be of great use. TERC Ltd developed such a software to be used for prizing generation.

The software provides support both in terms of HR pricing and in respect of material needed for the work process. If a work process is selected (painting), the size of the surface to be painted needs to be added and the program automatically calculates the standard working time, i.e. the working time to be spent in hours. If the company specific overhead hourly rate is added, the program calculates the cost of the work. The program includes also the materials of almost every manufacturer what can be selected in the program. After the selection, the program also calculates the required amount of material for the surface based on the material requirements specified by

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

the manufacturers. The program can also determine the material cost of the work based on the manufacturers' "list prices" and the required amount of material. It is important to emphasize that only a qualified professional can meet the standard times, with adequate quality. This program can be used even after the design, already in the preliminary cost calculation. The program knows all professions and work processes of the construction industry, and assigns standard working times to all of them.

The training programme of TERC Ltd helps enterprises in the construction industry to set the correct pricing and to create authentic quotations using its own software tool.

The training consists of 20% theoretical education and 80% practical exercise. During the training, personalized examples (items) are used, and the functions can be tried in practice also through examples. While the training session lasts about 3-4-hours, to master the basic functions some extra hours of practicing is required.

After completing the training, users will be able to compile transparent, verifiable budgets that will help them in their daily work and more effective commitments.

The fee-based training course is not accredited nor provides any qualification. The fee is per person: ~25 EUR+ VAT

Who is it for?

Target groups of the training include planners for compiling a preliminary budget, investors for calculating estimable costs, contractors for specific price calculations and collecting norm needs in both procurement and schedule planning.

Trainees need to have basic computer skills and construction skills.

Adaptability

Important to know

To organise the training computers are needed (brought either by the participants or provided centrally. The TERC-ETALON software is provided for the sake of the training for free (to be purchased for daily used).

The instructor needs to have higher level of computer knowledge, knowledge of the software of TERC Ltd and the data store of the company (called ÖN) which contains the norms for the construction sector (currently for Hungary). In other countries, the use of collections of locally widespread norms is recommended.

Compiling budgets in detail initially requires more time than as the usual practice or an approximately head-calculated offer, but later it pays off the investment.

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

Additional information

Further information – our contact person

Hungarian Association of Craftmen's Corporation

Tamás Rettich, international relationship referent

rettich@iposz.hu

+36 1 354 3152

https://www.iposz.hu/iposz-english/iposz-in-short

Further information – available materials online

Print samples of the files that can be extracted from the program:

- Use of norms background: https://www.terc.hu/oldal/normahatter-modul2018
- Budgets: https://www.terc.hu/oldal/koltsegvetes-keszites2018

Evidence of success

IPOSZ organised the training for its members for free in order to ensure widespread use of the software.

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

eSME training portal

Overview of the training

Introduction to the training

Generation change and digitalization are significant challenges of Hungary's national economy, and especially in the life of SMEs. To support SMEs in overcoming these challenges a very comprehensive training pack (portal and trainings) was developed, which is 100% online, modular, and includes integrated tests.

The so called eSME (eKKV in Hungarian) portal (and its trainings) is Hungary's most comprehensive training for SMEs. It is a unique online digital curriculum, that covers all the relevant topics concerning enterprises, with special emphasis on the importance of human capital during digital transformation.

The 9-module online training provides participants with comprehensive knowledge on all topics affected by digitization and generational change. The duration of the entire course offer is 70 hours, which gives participants the opportunity to study the 9 different topics in depth and gain practical knowledge with the help of detailed examples. Modules of the training includes:

- Business innovation
- HR challenges and agile transformation
- Digitization
- Transfer of direct leadership
- Internal and external communication
- Change management
- International relations and expansion
- Financial planning and financing
- The sustainable business

In addition, a special modul focusing on Digitization by sector is available and contains accordingly sector specific courses. Building/Construction is among the industry focuses of the portal.

Focus areas of the digitalisation course aimed at construction enterprises:

- transparent document tracking
- troubleshooting, reports, records
- amendments and approvals
- coordinated plan processing: BIM-based work processes
- digitalisation opportunities of the guard service
- digital registry of work equipment

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

The courses are non-accredited and are entirely theoretical with no practical training elements. However, it provides a comprehensive insight into the operations of several companies that have successfully implemented generation change and digitization in a well-structured IT framework in the context of individual interviews.

The development of the portal and the training materials was financially supported via ERDF.

It is an innovative training solution as courses can be completed in your own pace, it is the complex knowledge base of 30+ experts, the focus of the trainings is not only on what to do, but also on how to implement it, and finally it provides a comprehensive insight into the operation of multiple successful companies' trends and solution proposals.

Enrolled students can go through the self-learning module(s) online in their own rhythm. In case of questions there is an online tutor to help.

Attending any courses of the eKKV portal is free of charge!

Who is it for?

The trainings and the portal are dedicated primarily for the strategic managers of SMEs who decide on enrolling staff members in the trainings and the content to be processed in the e-learning.

The target groups of the portal include business owners, unit managers, senior professionals, heads of HR division, heads of startups.

Adaptability

Important to know

To establish a similar comprehensive educational portal subject matter experts and a business development professional is necessary (starting number was 25, but later an industry digitalization experts joined too). In case the Hungarian content is translated into other languages, half of the human resources can be spared, but for QA (online tutorial help) several people are needed. In addition, at least one full time system developer and a part time system administrator is needed.

In terms of technological resources, a hosted environment for the web applications and the Learning Management System is essential, a storage subscription, LMS and CMS and CRM licenses are needed.

The cost and the financing structure is too unique to refer as a BP model.

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

Advertising the service among the construction businesses can't be implemented via the regular promotional channels like Google Adds, FB, Instagram, Tic-Toc etc., it's more useful to find dedicated product or technology events and introduce the service there.

Construction businesses are not so open for this method of knowledge sharing, therefore it is challenging to motivate them to register into the program.

Advises for reuse, tips and tricks

It is necessary to carefully determine the pre-qualification of the audience. It is also worth planning in advance how each module will be built on top of each other. The content experts of each of the related modules need to agree on the curriculum in advance.

Such a comprehensive training for SMEs is a national effort that shall be funded by national level programmes (e.g. ERDF). Engage with programme managing authorities and introduce the example to them.

Additional information

Further information – our contact person

ICT Association of Hungary

Balázs Tordai, Industry Digitalization Lead

tordai.balazs@ivsz.hu

+36 20 943 3335

www.ivsz.hu

Further information – available materials online

Please visit the eSME portal at www.ekkv.hu (portal available only in Hungarian).

Evidence of success

In the first 12 month – after the launch on 10 Dec 2020 - the site has already attracted more than 20,000 unique visitors & a total of 4,400 registrations for the 10 modules.

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

More than 60% of visitors were women. Most of the visits came from the 45-54 age group (27%).

The majority of EKKV users come from the service industry (25%), but technology, media, and telecommunication (10%) and construction (9%) managers are also well represented.

Most of the registrations came from Budapest (38%) and Pest county (13%), but more and more e-learning users are also from other counties e.g. Somogy County (5%) and Fejér County (5%)

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

Digital Coach – a new profession supporting enterprises in digital transformation

Overview of the training

Introduction to the training

The introduction and use of digital technologies in a company may bring various changes depending on the depth of the adaptation. Starting from transforming analogue data, processes and actions into a digital format (i.e. digitisation) to changing and adapting whole business models (i.e. digitalisation), digital technologies offer uncountable possibilities for providing new revenue and producing value.

Digital transformation poses significant challenges to individual actors, companies, the economy, and society. Orchestrating digital transformation in a company is a multidisciplinary task, it requires dedicated resources hired from outside or employed by the company. This challenge of finding a prepared topic owner is the same in every business sector, including ConTech/PropTech area too. Currently there are only few experts who have the multidisciplinary knowledge that combines business, technology and project management knowledge and skills. The so-called digital coaches will act as internal and external process promoters for the companies at once, who will support companies in developing and implementing digital business models. To this end, they will make particular use of cross-client and cross-sectoral approaches to enable new opportunities for businesses and to spread the concept of agile processes involving all stakeholders.

The Bochum based Ruhr University in corporation with Hungarian, Greek, Bulgarian institutions is currently developing a higher education curriculum for Digital Coaches as part of an Erasmus+ programme project. Digital Coaches will be able to support the digitalisation project in all industries, in the construction industry as well.

Digital Coach is a post gradual education methodology to train experts specialized for industrial digital transformation. The corresponding module programme comprises of 10 self-learning modules: (1) Quality management and process optimisation as the basis for digitalisation in companies, (2) Challenges of Industry 4.0 for young entrepreneurs, (3) Maturity model in the field of Industry 4.0, (4) Corporate strategy for digital transformation and agile project management, (5) Possibilities and limits of learning transfer as well as learning location cooperation, (6) Value creation processes as starting points for digitalisation, (7) Strategies for ensuring the acceptance of digital solutions in companies, (8) Limits and possibilities of participation in the implementation of digital solutions, (9) Development of new business models against the background of digitalisation, (10) Corporate cooperation for the implementation of digital solutions.

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

Digital Coaches will use the ADAPTION maturity model to determine the respective degree of digital transformation. The maturity model compares the target and actual state and thus shows strengths and further development needs with regard to digital competences of companies. This enables the systematisation of the introduction of new technologies in the area of digitalisation. The ADAPTION maturity model does not provide rigid migration paths but supports companies in deriving individual measures and identifying and designing their own development path.

The training is currently under finalisation. Training materials will be available in English. It will be an accredited training of the Ruhr University (or any other educational provider that takes over the course). However, it is possible to offer shorter trainings for professionals with special advanced knowledge. These trainings won't provide most probably the same higher education qualification (these training options are currently under development).

In case of the university training (EQF6/7) a higher education degree (EQF5) is essential, while in case of the adult training options (currently under development) the necessary preliminary training and qualifications of the trainee might be different.

Who is it for?

The target group of the project/training is primarily the teachers, i.e. groups of people who are responsible for vocational education and training, in order to be able to benefit from multiplier effects and thus, ideally, to bring about sustainable change. This group of persons includes, for example, trainers of instructors, instructors in companies and in inter-company training centres as well as teachers of vocational schools, but also employees of chambers of industry and commerce or of business development agencies.

At the same time naturally, the training is intended for individual experts who will act as digital coaches at companies about to enter the path of digital transformation.

The training could be especially relevant in the construction industry for the following players:

- For construction companies who decided to transform their production to digitalization
- For building industry clusters
- For chambers of building industry
- For consulting firms specialized for ConTech/PropTech
- For National/Regional/Municipal Authorities

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

Adaptability

Important to know

The adaptation depends on the targeted educational level. We can see three different scenarios:

- For experienced consultants with at least proficiency in two of the three knowledge areas (Factory Management, Production Technology, Project Management): the training could be shortened to a 8-12 half- day long training.
- For junior consultants with less experience: the minimum is estimated for 16-25 half-day long trainings.
- for students (consultants to be and/or companies' internal staff): it will be a formal, accredited EQF 6/7 professional training (postgraduate or a master level). The training lasts in this case about 1-1,5 years.

A decent portion of the knowledge is based on IT technology. To demonstrate them a Teaching/Learning factory is needed where the participants can meet with the major elements of the digitalisation. The minimum size of the demonstration area is about 250 m^2. For further information on Learning factory please check point 11.3.2.

In terms of human resources for a shorter training one or two trainers are enough but in a more complex scenario it should be 5-8 competent trainers. Trainers must have wide and well-based knowledge in all three key areas of the training.

It is important to note that the Digital Coach programme is currently under development. The first accredited training is foreseen to be offered by the Ruhr University in Bochum in 2023.

Opportunities of the example

In the future, Digital Coaches will support companies to develop and implement digital business models. In particular, they are to promote thinking from the customer's perspective as well as cross-industry thinking and spread agile process thinking involving all process participants. A central goal is to promote the acceptance of digital strategies in companies as well. Thus, the Digital Coaches can contribute their knowledge of value-added networks and the changes they bring about through digitization.

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

Additional information

Further information – our contact person

ICT Association of Hungary

Balázs Tordai, Industry Digitalization Lead

tordai.balazs@ivsz.hu

+36 20 943 3335

www.ivsz.hu

Project coordinator:

Ruhr University Bochum, Institute of Work Science

Prof. Dr. Martin Kröll

martin.kroell@rub.de

+49 234 32 23293

www.iaw.rub.de

Further information – available materials online

Please visit https://digitalcoaches.eu/our-goals/

ADAPTION maturity model: https://digitalcoaches.eu/wp-content/uploads/2022/06/ADAPTION-Maturity-Model.pdf

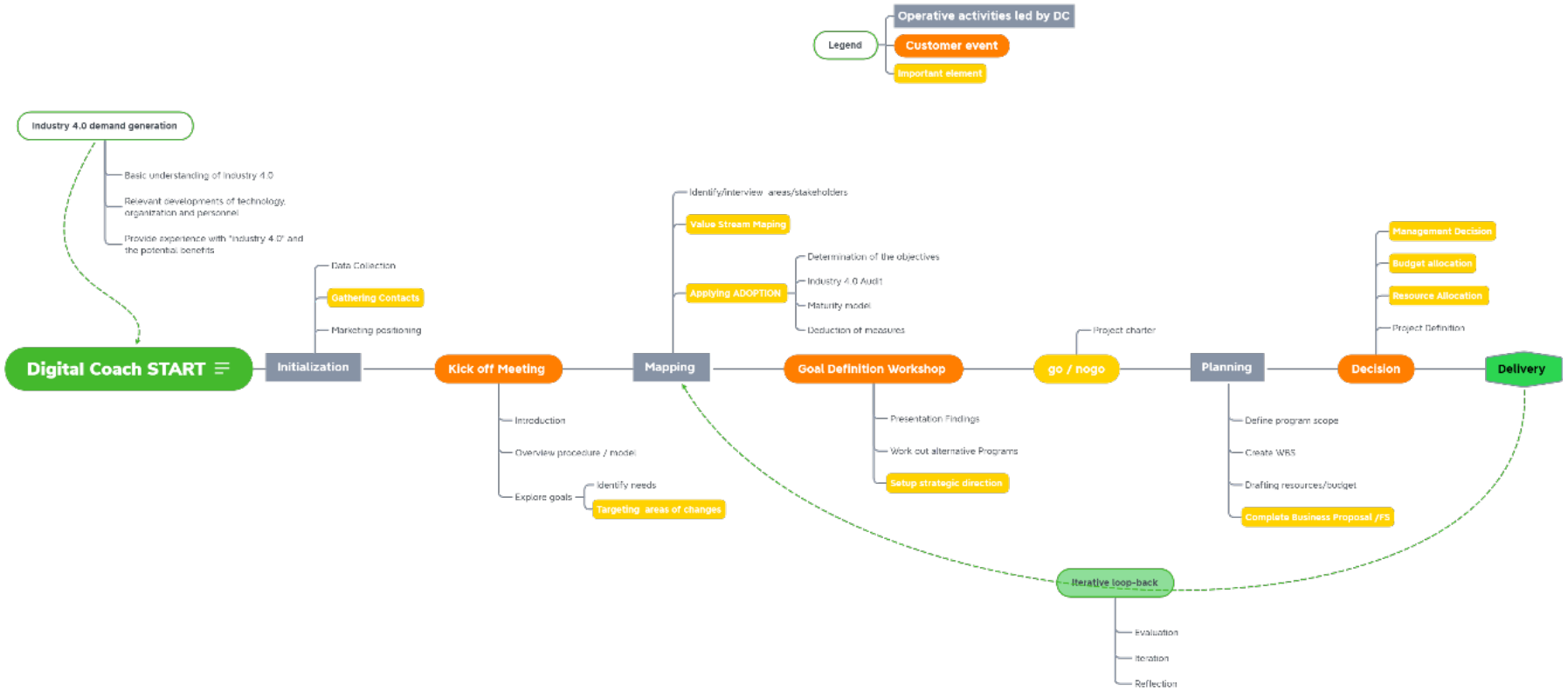
Learning Factory approach: https://digitalcoaches.eu/wp-content/uploads/2022/06/The-Learning-Factory-Approach.pdf

Profile of the digital coach: https://digitalcoaches.eu/wp-content/uploads/2022/06/Profile-of-the-Digital-Coach.pdf

The following figure gives an overview over the tasks, Digital Coach´s working area which can broadly be divided in preparation, definition, and execution.

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

Efficient construction through
digital technologies in the construction
and finishing trade



Forward looking best practices

The Building 2030 consortium

Introduction to the cooperation case

The Building 2030 is a consortium of various organisations which develops a vision for the Finnish construction sector in the year 2030 and works toward implementing it.
The aim of Building 2030 – consortium is to prepare the construction branch for future changes in the field of construction – digitalization, rapid urbanization, climate change – and to ensure a sustainable base for business in the construction sector. The work within the framework of Building 2030 is based on international benchmarking, adopting best practices from other fields, and the transformation of work brought on by digitalization and new technology.
The Consortium is open for companies designing and manufacturing the digital solutions, e.g., software producers, architecture offices, machinery companies etc. in all sizes. The consortium presented here, Building 2030 Consortium, is solely Finnish. The members of the consortium are voluntary collaborating to develop and implement digital solutions to be used in construction business. The purpose is to bring together the best ideas and the best knowledge and skills to realize these ideas.
The Consortium consists of Aalto University and 21 companies from the construction sector: A-Insinöörit, Amplit, Consolis Parma, Fira, Fluent Progress, Granlund, Haahtela, Jatke, Lujatalo, Peab, Pohjola Rakennus, Ramboll, Ramirent, Rejlers, Skanska, SRV, Stark, Tocoman, Trimble, Vastuu Group and YIT. Although these are relatively big companies, nothing prohibits SMEs to join or found a consortium of their own.

All the materials, also those that are not published in the open internet, are available for members, no matter whether this is a small machinery company or a huge construction corporate.

What are the innovative elements of this case?

Learning interdisciplinary from what others have done: international benchmarking, adopting best practices from other branches and the transformation of operations by adopting digitalization and new technologies, combining new ideas and the best available knowledge and skills to create something new.
One example of the innovation developed by the consortium is the dog-alike scanning robot that will be used, for example, to measure the constructions and to evaluate the degree of completion of the project. Before the measuring starts, the robot will be taught the exact route along which it scans its environment as a point cloud data model directly into the database. This point cloud is a dimensionally accurate three-dimensional model that together with photographic information forms a virtual model of the construction site. The model can be viewed from different angles with a web

browser or VR glasses. Accurate measurements of the model can be taken from freely selectable points.
The involvement of the potential end-users into the design of an application from very beginning accelerates the developing process and eliminates the problems caused by failures in requirement elicitation. The flexible organization and voluntary participation reduce both the administrative and development costs.

The work of the consortium is meant to be continuous. The scale of each project is individual and may cover the whole life cycle from designing to maintenance and demolition of the building.

Adaptation

Creating a consortium and working in it requires some time. Participation in the development projects is agreed case by case, and requires, in addition to time, knowledge, technical resources, like machines and equipment, and involvement of the RDI-resources of participating enterprises and institutions.
The best results and benefits of this kind of collaboration form could be gained, if such a consortium would be multinational and utilize all the knowledge, skills and experience of its members in international level.

Challenges encountered

The bad reputation of the construction branch, which contains a bad quality image, conservative organizational culture, hard physical work and minimal use of modern digital technology.
Rising building costs and tightening requirements set by legislation do not leave much space for innovational development and experimental construction plans.
Many of the participants are competitors with each other, thus, it is not necessarily easy to change the most confidential information and ideas. Any abuse of gained information should be avoided to increase trust between participants.

Potential for learning or transfer

The participants of the consortium have a strong motivation to develop the field of construction and the digital capabilities of the branch and of their own enterprises. This means, that new ideas will be adopted and applied more probably than outside the consortium. Concerning the example at hands, robodog, it can be used in more risky sites. Enables safer, faster, and more exact measurements and evaluations of e.g., degree of completion.

This model (Consortium) can be applied in any country. However, it is good to consider the competition legislation to be able to avoid suspects concerning the illegal restraint of competition.

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

Concerning the consortium, it is good to consider the competition legislation. If you are involved in the procurement process, the rules of the process should be considered.

Note for applying the concept in other countries

E.g.in Hungary Germany, Poland, and Baltic countries the chambers of commerce, industry, craft etc., or organizations like these, have a big role in collaboration between the companies. In Finland, however, there exists no entrepreneurial organization, to which an enterprise belongs automatic or by the law. Thus, in Finland this kind of consortiums are the best way to found and support co-operation in certain limited topic.

In countries where chambers have bigger role, they could find specific guild to promote this kind of co-operation in development and testing.

Additional information

Further information – our contact person

Satakunta University of Applied Sciences Faculty of Technology
Kari Lilja, Senior Researcher
kari.lilja@samk.fi
www.samk.fi

Further information – available materials online

https://www.aalto.fi/en/building-2030
https://www.youtube.com/watch?v=qy0LBlREdcI
https://www.aalto.fi/en/news/building-2030-tests-the-spot-robot-on-construction-sites
https://www.aalto.fi/en/building-2030/final-reports

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

OuluZONE+

What is this?

OuluZONE+ is an open testbed for autonomous machines to be tested in a construction site environment. Machines like for instance an autonomous excavator can be tested.

Introduction of the solution

Autonomous machines and vehicles are one of the emphasizing trends in digitalizing construction sites. However, there are several risks concerning both the work safety, material hazards and immaterial properties connected to developing and testing new applications at a real construction site. With an area that is like a real construction site but dedicated to testing and developing new applications, and reserved for one test team at a time, these risks can be minimized.

The forum is open to everyone who wants to develop and/or test autonomous machines and their applicability at a construction site. OuluZONE+ also offers an opportunity to test automatized vehicles in arctic climate.

In the Oulu Region, it is just the SMEs gaining the most benefits of the concept: Those designing the solutions have an opportunity to test new ideas and to present them to potential customers. Those needing e.g. autonomous machine, robot or something like that, can go and test it before final decision. The information, e.g. ideas and experiences goes to both directions, which is not possible if there were a big actor with a test field of its own, no matter whether this was a big machinery company or a huge construction corporate.

University of Oulu, the Oulu Region Joint Authority for Education (OSEKK), Oulu University of applied sciences and VTT Technical Research Centre of Finland are supporting the work of the area by giving both knowledge, research resources and equipment. TEKES (Technology development center, nowadays part of Business Finland) has given the funding, and potential users are all enterprises developing, manufacturing, using and maintaining machines needed and used at a construction site, their employees and entrepreneurs, the contractors and owners of buildings, authorities, etc.

What are the innovative elements of this case?

OuluZONE+ enables testing and developing in an environment that is as close to the real environment as possible, but safe, and with support given by TEKES and University of Oulu. OuluZONE+ is an open forum for designers, developers, researchers, enterprises and entrepreneurs to test and try autonomous excavators and other machines. In common, the test areas are private, closed and top-secret.

The collaboration between the supporting partners (Universities, vocational education institutes and research institutes), companies designing machines and vehicles, and

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

enterprises that are potential customers is working well, and all participants can reach the win-win -state.
There is a cluster of electronics, artificial intelligence, communications, and software developers, which can support the testing and developing. Furthermore, the northern location gives an opportunity to test the solutions and applications in arctic circumstances, which is often impossible in the manufacturers' own countries.

Adaptation

Suitable area to which a construction site can be founded. In best case, there should be buildings and infrastructure in different phases of the project to be able to test a big variation of new ideas in as many applications as possible, from empty site at the beginning of the project to the maintaining and demolition phase. In best case, the test site will be able to present the whole life cycle of the building / infrastructure.
Human resources are needed to maintain the site, use and maintain the measuring equipment provided by the facilitator, and administrative personnel to care about the reservations and other administrative routines.
Each development process and each test is individual; thus, it is impossible to define the time and other resources required in a certain project. The operative personnel should be provided by the company that is responsible for the test. However, if some special knowledge or skills are needed, facilitator should be able to provide this. The implementation under test, and machines, vehicles, programs, instruments etc., involved, as well as personnel using these should be provided by the developer. However, if the facilitator is a university, students preparing their thesis could be a good resource for companies.

Challenges encountered

Although there are a lot of enterprises developing software and electronic in the Oulu region, the companies developing and manufacturing vehicles and machines aimed to be used and driven by the application, are mostly located in other continents or at least at other side of the Europe. The distance is long, and the biggest factories have test sites of their own.
Due to the location, the transferring and travelling costs play a big role in the allover costs, particularly in the era of rising energy prices. Thus, getting known and becoming an acknowledged alternative as test platform for automation at construction sites has been a challenge.
Open environment enables data leaks, and furthermore, all the situations, that could be met in the real life are not possible to simulate forehand, or at least they can be difficult or expensive to facilitate. An example of these is different kind of accidents.

Potential for learning or transfer

In this case, the OuluZONE+ -area was originally funded by University of Oulu and TEKES (nowadays part of Business Finland). In common, this kind of open test sites are replicable and scalable for any country and any needs. However, it is good to bear in

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

mind that these should be funded with public and / or impartial funds and owned and facilitated by organization that is acknowledged impartial, like university, to avoid suspicions concerning the purposes of facilitators. It would also be good, if a facilitator could support the users in development work with their knowledge, research and other resources that particularly SMEs do not have.
If this kind of test site is founded, it would be good to consider, that

- To cover the whole life cycle of the building / infrastructure in a way or another
- To ensure there is a cluster of knowledge and technology available close to the site
- To ensure that the site is open for everyone in a reasonable price if not free, to gain biggest possible benefits

Additional information

Further information – our contact person

Satakunta University of Applied Sciences Faculty of Technology
Kari Lilja, Senior Researcher
kari.lilja@samk.fi
www.samk.fi

Further information – available materials online

http://jultika.oulu.fi/files/nbnfi-fe202201132300.pdf .

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

CHAOS – Urban collaboration

What is this?

The Chaos Crowd application enables gathering ideas and insights of different stakeholders without having to run many large co-creation sessions in connection to a construction project. It is a way for developers to test ideas and to provide fresh thoughts to support the creativity.

With the help of the app city dwellers can express their views and answer geographically limited surveys. When a person is passing by a plot of aimed project and has an app on their phone, a short query opens on the phone. In addition to answering surveys, anyone can give ideas by taking a picture and marking the location of their idea. The key idea is to make influencing and participating in the city smart.

Introduction of the solution

The aim of this solution is to improve communication between stakeholders of construction project during the life cycle of the whole project from needs assessments and areal planning to the demolition of the building, and cleaning of demolition site.

Introduction of the solution using the case of the Ruoholahti business center:

The new business center was planned to be developed for the needs of Ruoholahti residents, employees and daily passers-by. An aim was to build a house that serves the needs of working life in the best possible way.

CHAOS is an artificial intelligence company in Helsinki that specializes in forecasting urban development and finding out the opinions of citizens.

Finnish construction company NCC was cooperating with CHAOS to fulfil the wishes of the residents of Ruoholahti, those living and working in the area, and to build the most sustainable, innovative and community-based business center in Helsinki. The purpose of cooperation between NCC and CHAOS was to get closer to the people and open the designing and building process to the people of Ruoholahti even before construction work begins. To reach this goal, ideas and insights were gathered without holding heavy brainstorming sessions. In this way, the functionality of ideas can be tested, and new ideas generated to support the creative work. If people want to express their opinions, all they had to do was to download the CHAOS Crowd and talk about their wishes.

What are the innovative elements of this case?

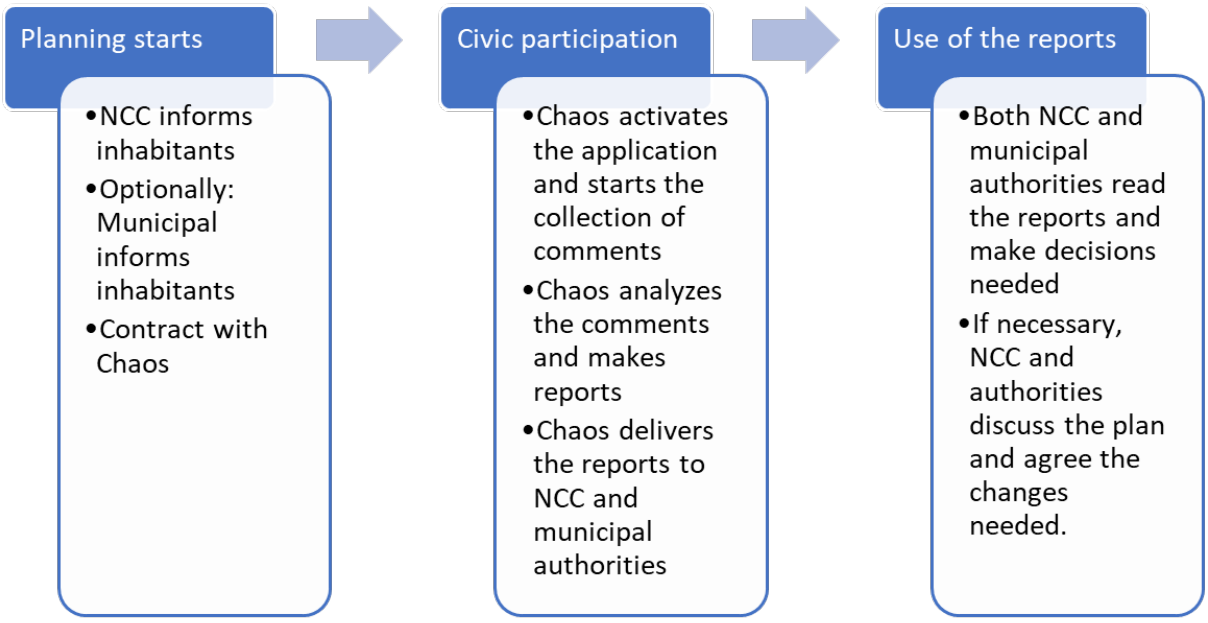
The initiative of NCC is an example of how residents can be involved and included at an early stage in urban development. The Smart City concept has emerged from the need to reconcile the diverse aspects of urban planning with the help of technology and data. To achieve the best possible level of development of a smart city, both the public and private sectors must strive to integrate participatory procedures, listening

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

to their wishes and values. This means effortless and dynamic collection of real-time data from residents and the use of such data in decisions that have an impact on the sustainability and live ability of cities. The quality of life of the residents can only be improved by understanding their needs.

Use of artificial intelligence and the tools of social media to enable and motivate parties of the construction project, including ordinary citizens, to collaborate and collect information and opinions concerning the planned project. The citizen opinions are collected by a crowd app.
The application is easy to install and use and is reusable in further projects too. The feedback, opinions and ideas of people living and working in the neighborhood are easily collected and processed for further use. However, it must be borne in mind, that only those who have strong opinions, will probably download and install the application, thus, it may not necessarily reach the whole target group.

Adaptation



The approach needs active, open-minded and idea-rich stakeholders, who really are eager to share and develop ideas together. The project also requires the construction company's willingness and commitment to co-develop the new area. The resources needed are:

- Application that is freely available and installable to mobile device (In this case CHAOS Crowd),

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

- An Internet site and software that can collect the information from apps, software than can analyze the data and report it,
- In both construction company's (NCC), service provider's (CHAOS), and municipal's site people who are ready to communicate and discuss with each other and have power to do decisions if needed.

Challenges encountered

The era of social media and all kinds of digi leaks has made a big group of people, mostly elderly, suspicious concerning any kind of polls on the internet and social media and, furthermore, some of them do not have skills and/or equipment to participate the influencing. However, elderly is the majority of people in modern societies, and their opinions and views would be appreciated. Therefore the main question is *How to reach those, who are invisible in social media, who do not stop to answer questions of a stranger, but who in a way or another should get their voices heard?* If this issue is not answered, the results of the collaboration are not generalizable.

The lack of suitable AI-partners might be a threat. In Finland, there are tens of construction companies, that could benefit the model, but are there enough AI-companies that are capable to offer such a service. The worst competitors do not necessary want to use same service provider. In Finland the construction business is very competitive, and in addition to about 5 international corporations there are hundreds of companies operating countrywide, and there is a huge threshold in companies minds being overcome if they are going to use same service provider than the other one competing the same areal project. In Finland probably, 10 – 20 AI companies would be enough to fulfil both the requirements of construction companies and the requirements of Procurement ACT if the service is paid by the municipality.

Potential for learning or transfer

The collaboration of two quite different branches, construction industry and artificial intelligence, enables collaboration of all stakeholders, and even those just passing by, to build an environment that supports everyone and responds to the needs of any kind of people.

The threshold for city dwellers to participate in urban development is lowering – in this way, it will be possible to test the functionality of ideas and to generate new ideas to support creative work. Residents can be included and involved already in the early stages of urban development

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

Additional information

Further information – our contact person

Satakunta University of Applied Sciences Faculty of Technology
Kari Lilja, Senior Researcher
kari.lilja@samk.fi
www.samk.fi

Further information – available materials online

WeLand –concept and the development of Ruoholahti region in Helsinki
https://www.ncc.fi/media/pressrelease-container/721c5a606639f2e6/
https://www.ncc.com/media/news/we-land-helsinki-one-thing-above-all-attracts/
https://www.ncc.com/media/news/participatory-city-development-made-easy-for-residents---we-land-ruoholahti-invites-passersby-to-give-insights/
https://www.ncc.com/media/news/a-headquarters-district-of-international-standard-to-be-built-in-ruoholahti-combining-the-environment-with-service-culture-in-an-entirely-new-way/

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

Hamburg Model

What is this?

This is a proven methodology how a successful building project can be realized without a main contractor, with the help of a common digital cooperation platform. It covers the comprehensive cooperation of all parties involved in the construction over the entire construction process from planning to completion.

Introduction to the solution

A strong division of labor requires a great deal of coordination. As result, quality suffers, deadlines are not met, costs explode and the attractiveness of construction activity declines. The Hamburg Model overcomes these problems through comprehensive cooperation.

In this special case the tender shall be not opened for individual construction services, but for the complete construction of building objects from planning to completion. Planners, architects, and all trades involved in the construction form a bidding consortium that takes over the complete construction. The bidding consortium that wins the contract forms an umbrella consortium or BGB company. All participants work together on an equal footing, and all are liable for the entire construction. All participants work intensively together during the entire planning and construction process, with a high degree of self-coordination.

This reduces costs, increases quality and enhances the enjoyment of work through a holistic approach.

Fewer resources are needed than in construction based on the division of labor. Coordination tasks, e.g., by a general contractor, are eliminated. The most important resource is to win over contractors for cooperation, as they have been used to construction based on the division of labor for many decades and have no experience with cooperation such as construction teams.

Utilization of a commonly used digital platform is necessary and it contributes to comprehensive cooperation.

Adaptation

Challenges encountered

The cooperation requires the use of a digital platform. The use of digital technologies needs to be improved in these stakeholder groups, e.g.

- Use of computer-aided 3D planning

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

- Specific I and K technologies for information exchange and ongoing communication

Attitudes and behaviors of many building stakeholders who do not want to or cannot cooperate, might make the cooperation difficult or impossible.

Potential for learning or transfer

Once construction teams receive training in cooperation, the cooperation goes very well. A high level of trust and mutual acceptance must be built. Everyone must be involved on an equal footing.

Digital technologies facilitate cooperation to a great extent.

It is advisable to

- develop a country specific business model for each country according to specific, applicable legislation.
- all stakeholders need to be trained in cooperation and use of digital technologies.

Advises for reuse, tips and tricks:

- Just start,
- Convince builders to work with these models,
- Initially, only work with those companies whose are willing to cooperate,
- Start with a pilot project,
- Success is contagious, more builders and construction companies will follow you…

Additional information

Further information – our contact person

Hanseatic Parliament

Dr. Jürgen Hogeforster, *Senior-Manager*

jhogeforster@hanse-parlament.eu

Tel: + 49 40 822 447 10

www.hanse-parlament.eu

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

Further information – available materials online

The construction team model was practically tested in the construction of 15 terraced houses. The scientific evaluation led to the following results.

- The quality of the planning was very high. According to the preliminary planning, 14 terraced houses were to be built on the plot. Through greatly improved planning, 15 houses could be built.
- By involving the craftsmen and future residents, the quality was significantly improved, e.g., higher living comfort, more daylight, etc.
- All deadlines were met, there were no missed deadlines.
- The construction quality was significantly higher, and the total costs were about 15% lower than with conventional construction based on the division of labor.
- Everyone involved was highly motivated and very happy to work.
- A presentation entitled "Hamburg Model": Realization of 15 row houses by construction teams" is available upon request from HP.

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

The European Framework for Digitally Competent Educational Organisations (DigCompOrg)

What is this?

DigCompOrg, the European Framework for Digitally Competent Educational Organisations, is an initiative by the European Commission designed to promote effective digital age learning and support educational institutions in integrating digital technologies. It covers primary, secondary, vocational education and training (VET) and higher education, aiming to ensure transparency, comparability and peer-learning across Europe. The framework addresses fragmentation and uneven development in digital learning technologies, providing a comprehensive and adaptable structure with seven key elements and fifteen sub-elements that cater to all education sectors.

Introduction to the solution

DigCompOrg is an innovative framework designed to guide educational organizations through a structured process of self-reflection and strategic planning regarding their digital competencies. By offering a comprehensive approach, DigCompOrg helps institutions assess their current digital practices, identify gaps and develop actionable strategies for integrating digital technologies into their educational frameworks.

The tool is particularly valuable in addressing the disparate levels of digital technology adoption across different regions and institutions. It provides a standardized method for evaluating and comparing digital competencies, thereby promoting transparency and consistency across educational systems in Europe. This comparative aspect is crucial for understanding where different institutions stand in their digital evolution and for fostering a culture of continuous improvement.

By utilizing DigCompOrg, educational organizations can not only track their progress but also ensure that their digital integration strategies are both sustainable and scalable. This helps in aligning local practices with broader educational goals, supporting long-term development, and ensuring that technological advancements are harnessed to their fullest potential for educational excellence.

What are the innovative elements of this case?

DigCompOrg distinguishes itself through several key innovative elements that set it apart as a comprehensive framework for advancing digital competencies in education.

Firstly, DigCompOrg adopts a systemic approach that encompasses all critical dimensions of digital integration within educational institutions. It addresses leadership, governance, teaching, learning, assessment and infrastructure, ensuring

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

that every facet of the educational environment is considered in the digital transformation process. This holistic perspective is crucial for creating a well-rounded strategy that supports seamless digital integration across the entire institution.

The framework's structure is another notable innovation. It features seven key elements, 15 sub-elements and a total of 74 descriptors, providing a detailed and actionable roadmap for institutions. This meticulous organization allows educational institutions to navigate the complexities of digital integration with clarity, enabling them to identify specific areas for development and track their progress over time effectively. (see below)

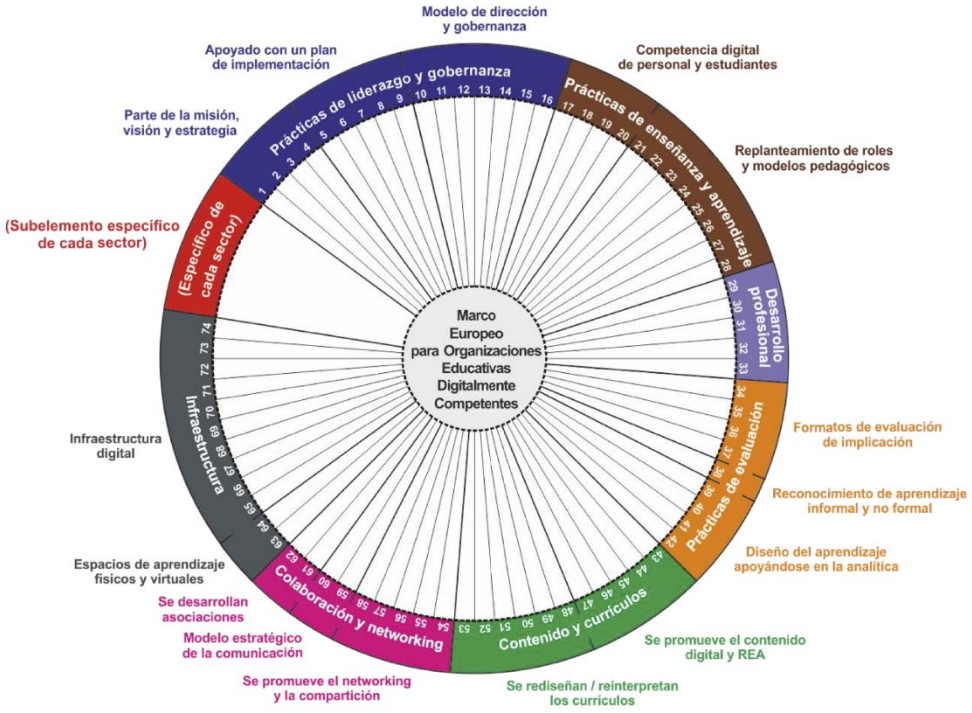


Figure 1: Synthesis of the DigCompOrg framework

A standout feature of DigCompOrg is its provision of tools for self-reflection and self-assessment. These tools empower institutions to evaluate their current digital practices, measure their progress and pinpoint areas needing improvement. This capacity for self-assessment is essential for fostering continuous growth and adaptation in the rapidly evolving digital landscape, ensuring that institutions remain responsive and dynamic.

Furthermore, DigCompOrg serves as a valuable resource for policymakers in addition to educational institutions. It assists in the design, implementation and evaluation of digital learning strategies at various administrative levels. By providing a structured framework, it helps policymakers develop informed and effective policies that address the needs of educational institutions and support broader educational goals.

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

The framework's comprehensive and adaptable design is also noteworthy. It emphasizes the integration of digital technologies into teaching, learning and assessment while balancing organizational and individual responsibilities for digital competence. This balanced approach ensures that both institutional and individual needs are addressed, facilitating effective digital adoption and use across various educational contexts.

DigCompOrg encompasses seven thematic elements: Leadership and Governance Practices, Teaching and Learning Practices, Professional Development, Assessment Practices, Content and Curricula, Collaboration and Networking, and Infrastructure. Each element is detailed with sub-elements and descriptors, providing specific practices and strategies for digital integration. This structured breakdown supports institutions in systematically addressing different aspects of digital competence, enhancing their ability to integrate digital technologies effectively.

Additionally, the framework promotes the use of diverse digital learning technologies and multi-modal content, tools and platforms. This emphasis on a variety of technologies supports student-centered learning approaches and ensures that educational practices are tailored to different learning contexts. It also encourages students to be active participants in their learning journey, including their involvement as co-designers of the learning process.

In summary, DigCompOrg is designed as a comprehensive meta-framework to enhance digital capacity within educational organizations. Its innovative approach to integrating digital technologies, combined with its structured and flexible design, is expected to drive the modernization of education systems and foster engaging and adaptable digital learning practices. This forward-thinking framework offers a robust solution for navigating the complexities of digital transformation in education.

Adaptation

The DigCompOrg framework stands out for its high adaptability across various educational contexts. Its design allows for the inclusion of sector-specific elements and descriptors, making it relevant and customizable for diverse educational settings. By encouraging educational institutions to tailor the framework according to their unique needs and goals, DigCompOrg ensures that digital integration strategies are personalized and effectively address the specific requirements of each institution.

The framework is structured around seven cross-sector thematic elements that reflect different aspects of the digital integration process. Each element is interconnected, providing a comprehensive approach to integrating digital technologies into educational practices.

Within each thematic element, DigCompOrg offers a set of sub-elements and descriptors that outline specific practices and strategies for effective digital integration. For example, the framework supports anytime/anyplace learning and

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

encourages Bring Your Own Device (BYOD) approaches, addressing the flexibility required for modern educational environments. It also tackles issues related to inequality and digital inclusion, ensuring that digital resources are accessible to all students. Additionally, the framework includes provisions for technical and user support, assistive technologies for special needs, and measures to protect privacy, confidentiality and safety. Effective procurement planning and a well-developed operational plan for core ICT services are integral components of the framework.

Moreover, DigCompOrg promotes a more integrated approach to subject-based learning by rescheduling learning times and places and making online provision a reality. It supports learning in authentic contexts and ensures that digital learning is embedded across curriculum areas. The framework also focuses on developing students' digital competence throughout the curriculum, reinforcing the importance of digital skills in all aspects of education.

In summary, the DigCompOrg framework provides a comprehensive and adaptable tool for educational organizations seeking to evaluate and enhance their digital capabilities. Its flexible approach to technology-enabled learning and teaching practices is designed to be engaging and responsive to the evolving needs of educational systems. By promoting a diverse range of digital learning practices, DigCompOrg has the potential to significantly contribute to the modernization of education systems and the advancement of digital age learning.

Challenges encountered

Implementing DigCompOrg comes with several challenges. One of the primary challenges is the fragmentation and uneven development in digital capacity across European educational institutions. This disparity makes it difficult to achieve uniform progress. Additionally, ensuring that digital integration efforts are sustainable and scalable across different types of educational institutions is a significant challenge. Furthermore, institutional resistance to adopting new technologies and pedagogical methods can hinder the effective implementation of DigCompOrg.

Potential for learning or transfer

The DigCompOrg framework is strategically designed to foster a culture of change, creativity, and innovation within educational environments through the effective use of digital technologies. By emphasizing the significance of learning in authentic contexts, the framework encourages students to apply their prior knowledge, engage in inquiry, and develop independent thinking skills. This approach helps create a dynamic learning atmosphere where digital tools enhance the relevance and application of knowledge.

A key feature of DigCompOrg is its recognition of both formal and informal learning. Formal learning takes place in structured, organized settings such as educational institutions, where the learning objectives are clearly defined and intentional from the

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

learner's perspective. In contrast, informal learning occurs through daily activities related to work, family, or leisure, often without structured objectives or support, and can be less intentional from the learner's perspective. By acknowledging both forms of learning, the framework ensures that digital technologies are leveraged to support and enhance learning across various contexts.

The framework also highlights the transformative potential of digital technologies to expand learning outcomes. It promotes the use of diverse digital learning technologies, multi-modal content and various tools and platforms that cater to student-centered approaches. This focus helps optimize learning experiences tailored to specific contexts, encouraging students to become self-directed learners and active participants in their educational journey, including co-designing their learning processes.

Furthermore, DigCompOrg emphasizes the evolving nature of learning spaces, which now encompass both physical and online environments. Traditional learning spaces, such as classrooms, studios, workshops, laboratories and libraries, are complemented by digital technologies that facilitate learning beyond these physical boundaries. By integrating these diverse learning environments, the framework supports a holistic approach to education that adapts to the needs of modern learners.

In summary, DigCompOrg offers a comprehensive tool for educational organizations to assess and enhance their digital capacities. Its adaptable and engaging approach to technology-enabled learning practices is designed to contribute significantly to the modernization of education systems and the advancement of digital-age learning. The framework's potential extends beyond individual institutions, promoting transparency and comparability across Europe. This enables educational organizations to share best practices and insights on integrating digital technologies, fostering peer learning and collaboration. Policymakers can also leverage the framework to develop and implement effective digital learning strategies, benefiting from the collective knowledge and data generated through DigCompOrg assessments.

Additional information

Further information – contact person

Address: Edificio Expo, C/ Inca Garcilaso 3, E-41092 Seville (Spain)

Yves Punie - Deputy Head of the JRC Unit on Algorithmic Transparency

Email: yves.punie@ec.europa.eu

Tel.: +34 954 488 318

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

Further information – available materials online

https://publications.jrc.ec.europa.eu/repository/bitstream/JRC98209/jrc98209_r_digcomporg_final.pdf

https://ec.europa.eu/jrc/en/digcomporg

https://www.youtube.com/watch?v=cIDOrZuJzVU

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

The European Framework for the Digital Competence of Educators (DigCompEdu)

What is this?

DigCompEdu addresses the growing need for educators across Europe to develop profession-specific digital competences. The framework aims to help educators leverage information and communication technologies (ICT) to enhance and innovate education at all levels.

Introduction to the solution

The European Framework for the Digital Competence of Educators (DigCompEdu) was developed in 2017 by the European Commission, building on the frameworks of DigComp 2.1 for citizens' digital competences and DigCompOrg for educational organizations' digital competences. DigCompEdu addresses the growing need for educators across Europe to develop profession-specific digital competences. The framework aims to help educators leverage information and communication technologies (ICT) to enhance and innovate education at all levels. It provides a common reference and guidance for fostering educators' digital competence and offers a structured approach to integrate digital skills into teaching practices. The framework supports policy development at various levels, aiding local stakeholders in quickly developing practical instruments without the need for a new conceptual foundation. DigCompEdu includes six main competence areas: Professional Engagement, Digital Resources, Teaching and Learning, Assessment, Empowering Learners, and Facilitating Learners' Digital Competence. These areas are further detailed into 22 competences that focus on using digital tools effectively to develop inclusive, innovative learning strategies. (see below)

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

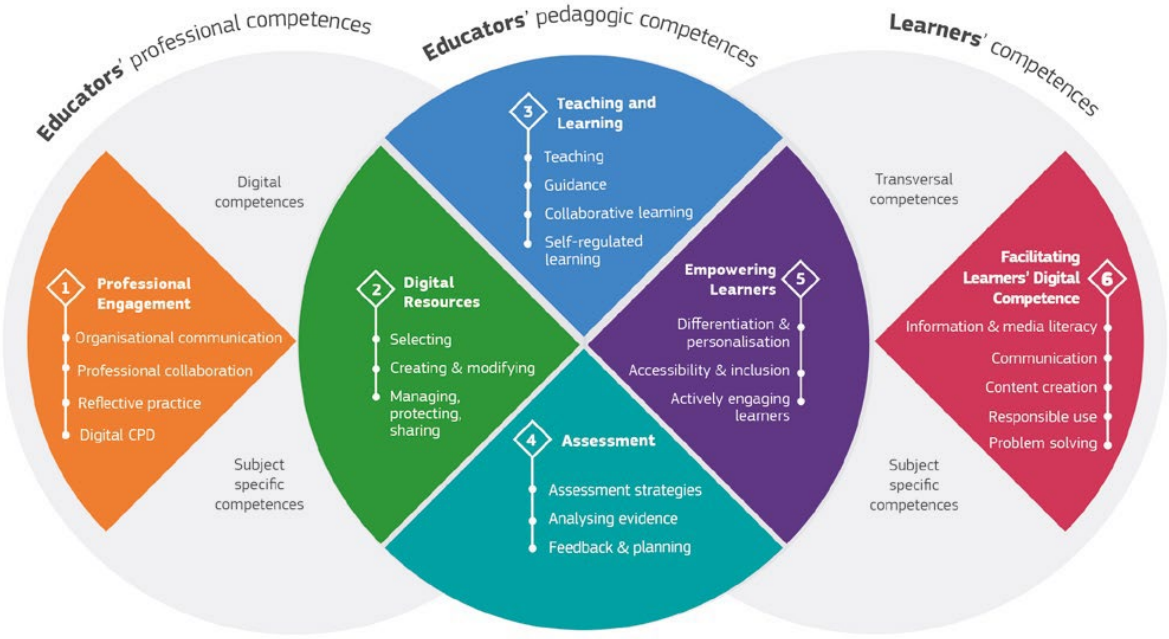


Figure 1: Synthesis of the DigCompEdu Framework

Empowering Companies

The DigCompEdu framework offers significant benefits to companies. By enhancing educators' digital competences, it indirectly impacts the workforce. Educators equipped with digital skills can create engaging, technology-enhanced learning experiences. This, in turn, fosters a more adaptable and tech-savvy workforce. Moreover, companies can leverage the framework to upskill their managers, trainers, and administrative staff, ensuring a cohesive approach to digital literacy across the organization. Ultimately, investing in digital competence pays off in improved productivity, innovation, and competitiveness.

What are the innovative elements of this case?

The innovative aspects of DigCompEdu lie in its comprehensive approach to integrating digital competences into the educational process. The framework is divided into six areas as it was mentioned above. Each area addresses different facets of digital competence, from using digital technologies for professional collaboration and communication to enhancing teaching strategies and assessing learners' digital skills. By providing detailed proficiency statements and examples of digital competence at various levels, DigCompEdu promotes a nuanced understanding and application of digital skills in educational settings. This structured approach enables educators to progressively develop their digital competences, ultimately aiming for innovation in pedagogical practices and the broader educational environment.

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

Additionally, the framework emphasizes the importance of educators being digitally competent not only as role models but also as facilitators of learning, capable of effectively using digital technologies to enhance teaching and learning processes. This dual focus ensures that educators are equipped to both demonstrate and teach digital competence, fostering a digitally literate educational community.

Adaptation

The DigCompEdu framework is designed to be adaptable to various educational contexts and levels, from primary to higher education. It provides a flexible structure that can be tailored to specific needs and seamlessly integrated into existing professional development programs. The framework includes a progression model for educators to assess and develop their digital competence, outlining six stages from newcomer to pioneer. This model allows educators to identify their current level of digital competence and follow a clear pathway for advancement, ensuring that the framework remains relevant and applicable across different educational settings and professional development initiatives.

Challenges encountered

One of the primary challenges encountered in the development of DigCompEdu was creating a framework that is both comprehensive and flexible enough to be applicable across diverse educational settings and cultures in Europe. Ensuring that the framework remains relevant amidst rapid technological changes is also a significant challenge.

Potential for learning or transfer

The DigCompEdu framework has significant potential for learning and transfer. It enables educators to systematically assess and enhance their digital competences. Educational institutions and policymakers can adopt and adapt the framework to support professional development programs and educational reforms. Additionally, DigCompEdu provides a common language and approach, facilitating dialogue and the exchange of best practices across educational levels and national borders.

Additional information

Further information – contact person

Address: Edificio Expo, C/ Inca Garcilaso 3, E-41092 Seville (Spain)

Yves Punie - Deputy Head of the JRC Unit on Algorithmic Transparency

Email: yves.punie@ec.europa.eu

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

Tel.: +34 954 488 318

Further information – available materials online

https://publications.jrc.ec.europa.eu/repository/bitstream/JRC107466/pdf_digcomedu_a4_final.pdf

https://joint-research-centre.ec.europa.eu/digcompedu_en

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

Adaptation potential of identified best practices

The adaptation potential of the identified best practices has been assessed with the coordination of the DIG-CON partners. Using the finalised best practice catalogues they were requested to discuss all the cases with their stakeholders and provide an adaptability assessment for each case.

Two online questionnaires (both surveys used the same questions) supported the information collection activity (please check Annex 3), which terminated with a best practice adaptation workshop in January 2023 where results were presented and partners could discuss potential emerging questions related to the adaptation of the BPs. The most important outcomes of the adaptation assessment are presented below. Slides used during the workshop are provided in Annex 4.

Based on the assessment of the individual cases along with the pre-defined questions four technology and four training cases could be selected that are the most rated among all the identified best practices.

Technology cases

- 123ONSITE / 123QUALITY / 123FLEET - by Hochschule 21
- CAPMO - The intuitive construction software - by Hochschule 21
- PlanRadar – by IVSZ
- Microsoft One Drive – BY IZBA

The above cases were all considered as well elaborated and easy to understand, but the two cases of Hochschule 21 were the most comprehensive of all the cases.

The 123Onsite solution and PlanRadar are considered to require long adaptation time, while the Campo case only medium (up to 1 year) and Microsoft OneDrive being the quickest solution to support the cooperation of different stakeholders.

To adapt a technology solution in another country

- Detailed training on the BP
- Finding local partners
- Funding

are the most needed additional requirements.

Training cases

- Fundamentals of 2D and 3D Design – by SAMK
- Digital Coach – a new profession supporting enterprises in digital transformation – by IVSZ
- BIM coordinator Training (construction) – by SAMK

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

- Basic communication skills for construction contractors 25 hours training – by IPOSZ

In case of the quality of the training cases all the “finalists” were among the most comprehensively described cases and they were considered also easily understandable.

The “Fundamentals of 2D and 3D Design – by SAMK” and the “Digital Coach training of IVSZ” were considered as having high adaptation potential in other countries.

3 of the most attractive training’s adaptation and introduction in a new country requires about a year according to the answers, while the BIM Coordinator training requires probably even more time.

Similarly to the technology cases the following requirements were mentioned in addition:

- Funding
- Detailed training on the BP
- Consultation with the BP owner
- Find local partners

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

Annexes

Annex 1 – Preliminary data collection questionnaires

Use of digital technologies and the realization of cooperation and coordination through digital tools in SMEs - Preliminary data collection questionnaires

Erasmus + | DIG-CON

Our project "Efficient construction through digital technologies in the construction and finishing trade" (DIG-CON) is funded by the Erasmus + Programme and is planned within the following time frame - 3/2022 - 2/2025.

The objective of this survey is to to collect good practice cases regarding the use of digital technologies and the realization of cooperation and coordination through digital tools in SMEs.

The collected personal data will be processed and used solely for research purposes within the framework of the DIG-CON project and will not be passed on to third parties.

Please assist us in our research by filling out the form below. It will take around 10 minutes. Thank you.

1. Please provide the following information.

Company size:

My company specializes in (area of activity):

Country:

2. DIG-CON partner organisation I am in contact with (please choose from the list). If you do not see the name of the organization, please choose "Other" and fill the comment box with the organizations name.

☐ Hanse-Parlament (HP), Germany (Lead Partner)

☐ Hochschule 21 gemeinnützige GmbH (HS21), Germany

☐Handwerkskammer Schwerin (HWKS), Germany

☐ Satakunta University of Applied Sciences (SAMK), Finland

☐ Latvian Chamber of Commerce and Industry (LCCI), Latvia

☐ Chamber of Crafts and SME in Katowice (CCSK), Poland

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

☐ Hungarian Association of Craftsmen Corporation (IPOSZ), Hungary

☐ Informatikai Távközlési Elektronikai Vállalalkozások Szövetsége (IVSZ), Hungary

3. Title/name of good practice:

4. List the stakeholders involved in the good practice (targeted and/or involved). Who is the good practice meant for?

5. Is it a national or international good practice?

(International means that the technology is available in several languages or it is used in several countries. National means it is available only in 1 language and used only in that country).

☐ National

☐ International

If you wish to explain your answer please explain here:

6. What phase of the construction life cycle does the good practice cover?

☐ Initiation

☐ Planning

☐ Execution

☐ Performance&Monitoring

☐ Closure

☐ Life cycle

☐ Other (please specify):

7. Is it a communication or a collaboration good practice?

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

☐ Communication

☐ Collaboration

☐ Other (please specify)

8. Has the practice already been adapted to other sub-sectors or countries?

☐ Yes

☐ No

If yes, please explain or if you have comments please add:

9. Has the good practice been published anywhere?

☐ Yes

☐ No

If yes, where was the good practice published?

10. Please provide a short description of the practice (max 1000 characters) When describing the practice please provide the name of the application/technology used (if available), describe the technology, the process, the involved parties, the benefits.

11. If needed, can we contact you for further information? If so, please provide the following data.

Contact person:

Email Address:

SME specific training programs to teach digital competencies and skills - Preliminary data collection questionnaire

Erasmus + Digitilization in Construction

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

Our project “Efficient construction through digital technologies in the construction and finishing trade” (DIG-CON) is funded by the Erasmus + Programme and is planned within the following time frame - 3/2022 - 2/2025.

The objective of this survey is to collect good practice cases regarding SME specific training programs to teach digital competencies and skills in the construction and finishing trade sector.

The collected data will be processed and used solely for research purposes within the framework of the DIG-CON project and will not be passed on to third parties.

Please assist us in our research by filling out the form below. Thank you.

1. Please provide the following information.

Type of organization:

Country of respondent:

2. DIG-CON partner organisation you are in contact with (please choose from the list).

If you do not see the name of the organization, please choose "Other" and add the organizations name.

☐ Hanse-Parlament (HP), Germany (Lead Partner)

☐ Hochschule 21 gemeinnützige GmbH (HS21), Germany

☐Handwerkskammer Schwerin (HWKS), Germany

☐ Satakunta University of Applied Sciences (SAMK), Finland

☐ Latvian Chamber of Commerce and Industry (LCCI), Latvia

☐ Chamber of Crafts and SME in Katowice (CCSK), Poland

☐ Hungarian Association of Craftsmen Corporation (IPOSZ), Hungary

☐ Informatikai Távközlési Elektronikai Vállalalkozások Szövetsége (IVSZ), Hungary

☒ Other:

3. Title/name of good practice:

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

4. List the stakeholders involved in the good practice (targeted and/or involved). Who is the good practice meant for?

5. Is it a national or international good practice?

(International means that the technology is available in several languages or it is used in several countries. National means it is available only in 1 language and used only in that country).

☐ National

☐ International

If you wish to explain your answer please explain here:

6. Who are the target groups of the training? Please describe:

7. What type of training is it (costs)?

☐ fee-based

☐ free of charge

☐ Other (please specify):

8. What type of training is it (duration)?

☐ less than one day long

☐ a few days long

☐ weeks or months long

☐ Other (please specify):

9. What type of training is it (format)?

☐ online

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

☐ offline

☐ hybrid

☐ Other (please specify):

10. What type of training is it (structure)?

☐ exclusively theoretical

☐ includes both theoretical and practical elements

☐ Other (please specify):

☐ 11. What type of training is it (skills structure)?

☐ hard skills

☐ soft skills

☐ hard skills & softs skills

☐ Other (please specify):

12. What type of training is it (formality)?

☐ formal

☐ non-formal

☐ Other (please specify):

13. What type of training is it ?

☐ public

☐ private

☐ Other (please specify):

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

14. Is it accredited training?

☐ Yes

☐ No

If yes, please state the accreditation details:

15. Shortly introduce the training by explaining target groups, type of training, how many times has the training been already organized, number of students per occasion etc. Is there any feedback survey collected from the students? Does it provide any certificate at the end? Is it linked to examination? (max 1000 characters)

16. If needed, can we contact you for further information? If so, please provide the following data.

Contact person:

Email Address:

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

Annex 2 – Detailed data collection questionnaires

Detailed data collection questionnaire for the technology best practices – data sheet

1. **Detailed information on the practice**
    a. Who is it for?

    b. What problems does the chosen case address and what are the solutions proposed?

    c. What are the innovative elements of this case?

    d. How is the case exactly implemented? (consider the stakeholders, their roles, the solutions & tools, inform a step-by-step process, etc.)

2. **Resources needed: What are the resources needed to implement the case? (consider human resources, time, cost…)**

3. **Timescale (start/end date) – if applicable**

4. **Evidence of success (results achieved): What are the tangible and intangible results? (please insert figures, facts, references, or any hard data that can support the case)**

5. **Challenges encountered**

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

6. **Potential for learning or transfer**
    a. Advantages of the example (What is working well? What is making a difference? What is the added value?)

    b. Disadvantages of the example (What is not working optimally? Which processes need improvement? What should be avoided?)

    c. Opportunities of the example (Think of the what initiatives/funding opportunities can be leveraged, is it particular to one country? how can this be replicated in another? Is the legislative environment favourable? Is there more work to be done to convinced certain actors? etc.)

    d. Threats of the example (What are the biggest issues? What roadblocks exists that could block the progress?)

7. **Advises for reuse, tips and tricks**

8. **Further information**

9. **Any graphs, figures, pictures, tables, that are useful for the presentation of the case study? (preferably open access)**

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

Detailed data collection questionnaire for the training best practices – data sheet

1. **Detailed information on the practice (from the GP questionnaire) – you can easily copy the data from the GP database, you find in the previous e-mail as Excel**
    a. List the stakeholders that are involved in the GP? consider well your answer again!

    b. Is it a national or an international GP?

    c. Who are the target groups of the training? (please be precise: architects, constructors, investors, building operators)

    d. Is there any expectation in respect of preliminary studies from the trainee?

    e. Is there any expectation in respect of preliminary studies from the trainer?

    f. What type of training is it?

    g. Length: short/long, number of lessons in total, number of teaching days)

    h. Percentage of theoretical and practical part of the training

    i. Has it already been adapted to other sub-sectors or countries? (own, taken from somewhere, transferred to somewhere)

    j. Has it been published somewhere? Where?

    k. Is it accredited training?

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

2. **Resources needed: What are the resources needed to implement the case? (consider human resources, time, cost…)**

3. **Timescale (start/end date) – if applicable**

4. **Evidence of success (results achieved): Number of people who finished the training**

5. **Challenges encountered**

6. **Potential for learning or transfer**
    a. Advantages of the example (What is working well? What is making a difference? What is the added value?)

    b. Disadvantages of the example (What is not working optimally? Which processes need improvement? What should be avoided?)

    c. Opportunities of the example (Think of the what initiatives/funding opportunities can be leveraged, is it particular to one country? how can this be replicated in another? Is the legislative environment favourable? Is there more work to be done to convinced certain actors? etc.)

    d. Threats of the example (What are the biggest issues? What roadblocks exists that could block the progress?)

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

7. **Advises for reuse, tips and tricks**

8. **Further information**

9. **Any graphs, figures, pictures, tables, that are useful for the presentation of the case study? (preferably open access)**

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

Annex 3 – Adaptation assessing questionnaire

1. **To what extent do you consider the given BP comprehensive?**

   Explanation: Please indicate your choice between 1-4, where 1 is “the least” and 4 is “absolutely”

2. **To what extent do you consider the given BP understandable?**
   Explanation: Please indicate your choice between 1-4, where 1 is “the least” and 4 is “absolutely”
3. **Do you believe there is a potential for introducing the practice in your own country/professional field?**
   Explanation (1 – I cannot decide, 2-No, 3-Maybe, 4-Yes
4. **In your opinion how long is the necessary adaptation time frame of the individual BPs?**
   Explanation: your answer is not a binding commitment, it is for national conditions' research purposes only. 1 – I cannot decide, 2 – half a year, 3 – 1 year, 4 3 years
5. **In your opinion what else is needed to implement the BPs in your country?**
   Explanation: You can choose also more than one answer.
6. **Do you see any need for customization in case of any of the given BPs to be able to adapt and implement them in your own country?**

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

Annex 4 – Presentation used during the adaptation workshop

AGENDA

- Review of the feedback received from the partners regarding adaptability of the technology and training cases
- Free discussion of the adaptability
- Next steps
- AOB – Anna Maria's time ☺ (or WP3 announcements)

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

ADAPTATION POTENTIAL CHECK

COLLECTING FEEDBACK ON ADAPTATION POTENTIAL OF THE BPS - REMINDER

Basis: IVSZ prepared the BP catalogue – available in Google Drive: Technologies ; Training.

Deadlines:

- Partners revise the catalogue and confirm (or modify if needed) their own cases – end of November 2022
- Partners provide feedback by mid January 2023 on every case's adaptability using the online feedback forms
  - Technology survey
  - Training survey
- Online workshop to discuss conclusions: 17 January 2023

ADAPTATION POTENTIAL SURVEY

ONLINE SURVEY (TO BE FILLED IN FOR EVERY CASE!):

- To what extent do you consider the given BP comprehensive and understandable? – it refers to its quality
- Do you believe there is a potential for introducing this practice in your own country/professional field?
- In your opinion how long is the necessary adaptation time frame of the individual BPs?
- What is needed to implement the BP in your country? Training, funding, BP transfer meeting with the BP owner etc.
- Do you see any need for changing in case of the given BP to be able to adapt and implement in your own country? E.g. any specific national conditions

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

DIG-CON TECHNOLOGY BEST PRACTICES

1. HAMBURG MODEL – BY HANSE-PARLAMENT
2. TOOL CONNECT – BY HANSE-PARLAMENT
3. 123ONSITE / 123QUALITY / 123FLEET - BY HOCHSCHULE 21
4. CAPMO - THE INTUITIVE CONSTRUCTION SOFTWARE - BY HOCHSCHULE 21
5. PLANRADAR – BY IVSZ
6. ORTHOGRAPH – BY IVSZ
7. ARTESA HANDWERK-PLANER – BY HWSK
8. ARCHLINE XP – BY IPOSZ NEM VÉGLEGES
9. IFRESCO – BY IPOSZ
10. MICROSOFT ONE DRIVE – BY IZBA
11. QELECTROTECH – BY IZBA
12. MEEMO - E-WORK SAFETY – BY LCCI
13. THE BUILDING 2030 CONSORTIUM – BY SAMK
14. OULUZONE+ - BY SAMK
15. CHAOS – URBAN COLLABORATION – BY SAMK

TECHNOLOGY BP– COMPREHENSIVENES

1. HAMBURG MODEL – BY HANSE-PARLAMENT
2. TOOL CONNECT – BY HANSE-PARLAMENT
3. **123ONSITE / 123QUALITY / 123FLEET - BY HOCHSCHULE 21**
4. **CAPMO - THE INTUITIVE CONSTRUCTION SOFTWARE - BY HOCHSCHULE 21**
5. PLANRADAR – BY IVSZ
6. ORTHOGRAPH – BY IVSZ
7. ARTESA HANDWERK-PLANER – BY HWSK
8. ARCHLINE XP – BY IPOSZ NEM VÉGLEGES
9. IFRESCO – BY IPOSZ
10. MICROSOFT ONE DRIVE – BY IZBA
11. QELECTROTECH – BY IZBA
12. MEEMO - E-WORK SAFETY – BY LCCI
13. THE BUILDING 2030 CONSORTIUM – BY SAMK
14. OULUZONE+ - BY SAMK
15. CHAOS – URBAN COLLABORATION – BY SAMK

Congrats for the
19/24 to
22/24 total points!

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

TECHNOLOGY BP - UNDERSTANDABILITY

1. HAMBURG MODEL – BY HANSE-PARLAMENT
2. TOOL CONNECT – BY HANSE-PARLAMENT
3. 123ONSITE / 123QUALITY / 123FLEET - BY HOCHSCHULE 21
4. CAPMO - THE INTUITIVE CONSTRUCTION SOFTWARE - BY HOCHSCHULE 21
5. PLANRADAR – BY IVSZ
6. ORTHOGRAPH – BY IVSZ
7. ARTESA HANDWERK-PLANER – BY HWSK
8. ARCHLINE XP – BY IPOSZ NEM VÉGLEGES
9. IFRESCO – BY IPOSZ
10. MICROSOFT ONE DRIVE – BY IZBA
11. QELECTROTECH – BY IZBA
12. MEEMO - E-WORK SAFETY – BY LCCI
13. THE BUILDING 2030 CONSORTIUM – BY SAMK
14. OULUZONE+ - BY SAMK
15. CHAOS – URBAN COLLABORATION – BY SAMK

All the solutions were above 19/24 total points!

TECHNOLOGY BP – MOST WANTED

1. HAMBURG MODEL – BY HANSE-PARLAMENT
2. TOOL CONNECT – BY HANSE-PARLAMENT
3. 123ONSITE / 123QUALITY / 123FLEET - BY HOCHSCHULE 21
4. CAPMO - THE INTUITIVE CONSTRUCTION SOFTWARE - BY HOCHSCHULE 21
5. PLANRADAR – BY IVSZ
6. ORTHOGRAPH – BY IVSZ
7. ARTESA HANDWERK-PLANER – BY HWSK
8. ARCHLINE XP – BY IPOSZ NEM VÉGLEGES
9. IFRESCO – BY IPOSZ
10. MICROSOFT ONE DRIVE – BY IZBA
11. QELECTROTECH – BY IZBA
12. MEEMO - E-WORK SAFETY – BY LCCI
13. THE BUILDING 2030 CONSORTIUM – BY SAMK
14. OULUZONE+ - BY SAMK
15. CHAOS – URBAN COLLABORATION – BY SAMK

General daily practice solutions

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

TECHNOLOGY BP – TIME TO IMPLEMENT

1. HAMBURG MODEL – BY HANSE-PARLAMENT
2. TOOL CONNECT – BY HANSE-PARLAMENT
3. 123ONSITE / 123QUALITY / 123FLEET - BY HOCHSCHULE 21
4. CAPMO - THE INTUITIVE CONSTRUCTION SOFTWARE - BY HOCHSCHULE 21
5. PLANRADAR – BY IVSZ
6. ORTHOGRAPH – BY IVSZ
7. ARTESA HANDWERK-PLANER – BY HWSK
8. ARCHLINE XP – BY IPOSZ NEM VÉGLEGES
9. IFRESCO – BY IPOSZ
10. MICROSOFT ONE DRIVE – BY IZBA
11. QELECTROTECH – BY IZBA
12. MEEMO - E-WORK SAFETY – BY LCCI
13. THE BUILDING 2030 CONSORTIUM – BY SAMK
14. OULUZONE+ - BY SAMK
15. CHAOS – URBAN COLLABORATION – BY SAMK

Short
Medium
Long

TECHNOLOGY BP PREREQUISITES

1. HAMBURG MODEL – BY HANSE-PARLAMENT
2. TOOL CONNECT – BY HANSE-PARLAMENT
3. 123ONSITE / 123QUALITY / 123FLEET - BY HOCHSCHULE 21
4. CAPMO - THE INTUITIVE CONSTRUCTION SOFTWARE - BY HOCHSCHULE 21
5. PLANRADAR – BY IVSZ
6. ORTHOGRAPH – BY IVSZ
7. ARTESA HANDWERK-PLANER – BY HWSK
8. ARCHLINE XP – BY IPOSZ NEM VÉGLEGES
9. IFRESCO – BY IPOSZ
10. MICROSOFT ONE DRIVE – BY IZBA
11. QELECTROTECH – BY IZBA
12. MEEMO - E-WORK SAFETY – BY LCCI
13. THE BUILDING 2030 CONSORTIUM – BY SAMK
14. OULUZONE+ - BY SAMK
15. CHAOS – URBAN COLLABORATION – BY SAMK

#1 Detailed training on the BP;
#2 Finding local partners
#3 Funding;

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

DIG-CON TRAINING BEST PRACTICES

1. EDUCATION PROGRAM FOR SME EXECUTIVES AND HR EXPERTS ABOUT DIGITALIZATION – BY HANSE-PARLAMENT
2. DIGITAL CUSTOMER-CENTRIC INNOVATION IN SMALL AND MEDIUM ENTERPRISES - BY HANSE-PARLAMENT
3. BIM LAB, A PLACE TO ACQUIRE BIM RELATED SKILLS AND COMPETENCES – BY HOCHSCHULE 21
4. BIM PROJECT COURSE – BY HOCHSCHULE 21
5. FUNDAMENTALS OF 2D AND 3D DESIGN – BY SAMK
6. BIM COORDINATOR TRAINING (CONSTRUCTION) – BY SAMK
7. BASIC COMMUNICATION SKILLS FOR CONSTRUCTION CONTRACTORS 25 HOURS TRAINING – BY IPOSZ
8. ITEMIZED PRICE CALCULATION IN THE CONSTRUCTION SECTOR (TERC TRAINING COURSE) – BY IPOSZ
9. ESME TRAINING PORTAL – BY IVSZ
10. DIGITAL COACH – A NEW PROFESSION SUPPORTING ENTERPRISES IN DIGITAL TRANSFORMATION – BY IVSZ

TRAINING FEEDBACK RECEIVED

5 answers

TO WHAT EXTENT DO YOU CONSIDER THE GIVEN BP COMPREHENSIVE? - QUALITY

- 5. Fundamentals of 2D and 3D Design – by SAMK – 19
- 6. BIM coordinator Training (construction) – by SAMK– 19
- 9. eSME training portal – by IVSZ – 19
- 10. Digital Coach – a new profession supporting enterprises in digital transformation – by IVSZ – 19
- 4. BIM Project Course – by Hochschule 21 – 18
- 7. Basic communication skills for construction contractors 25 hours training – by IPOSZ – 18

TO WHAT EXTENT DO YOU CONSIDER THE GIVEN BP UNDERSTANDABLE? - UNDERSTANDABLE

- 1. Education program for SME executives and HR experts about digitalization – by Hanse-Parlament - 19
- 3. BIM LAB, a place to acquire BIM related skills and competences – by Hochschule 21 - 19
- 4. BIM Project Course – by Hochschule 21 – 19
- 5. Fundamentals of 2D and 3D Design – by SAMK - 19
- 9. eSME training portal – by IVSZ – 19
- 6. BIM coordinator Training (construction) – by SAMK – 18
- 7. Basic communication skills for construction contractors 25 hours training – by IPOSZ – 18
- 10. Digital Coach – a new profession supporting enterprises in digital transformation – by IVSZ – 18

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

TRAINING FEEDBACK RECEIVED

DO YOU BELIEVE THERE IS A POTENTIAL FOR INTRODUCING THE PRACTICE IN YOUR OWN COUNTRY/PROFESSIONAL FIELD? - ADAPTABILITY

- 5. Fundamentals of 2D and 3D Design – by SAMK – 19
- 10. Digital Coach – a new profession supporting enterprises in digital transformation – by IVSZ – 19
- 1. Education program for SME executives and HR experts about digitalization – by Hanse-Parlament - 18
- 2. Digital customer-centric Innovation in Small and Medium Enterprises - by Hanse-Parlament – 18

IN YOUR OPINION HOW LONG IS THE NECESSARY ADAPTATION TIME FRAME OF THE INDIVIDUAL BPS? - INTRODUCTION

- More than a year: BIM LAB, a place to acquire BIM related skills and competences – by Hochschule 21; BIM coordinator Training (construction) – by SAMK; eSME training portal – by IVSZ
- Half a year – year: every other

TRAINING FEEDBACK RECEIVED

IN YOUR OPINION WHAT ELSE IS NEEDED TO IMPLEMENT THE BPS IN YOUR COUNTRY?

- 1. Funding
- 2. Detailed training on the BP
- 3. Consultation with the BP owner
- 4. Find local partners

DO YOU SEE ANY NEED FOR CUSTOMIZATION IN CASE OF ANY OF THE GIVEN BPS TO BE ABLE TO ADAPT AND IMPLEMENT THEM IN YOUR OWN COUNTRY?

- Yes < No
- Language barriers, accrediatation barriers (every training should be adaptable and localizable according to country and regional specific regulations and circumstances)

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

„THREE" MOST RATED TRAININGS (Q1,2,3)

- Fundamentals of 2D and 3D Design – by SAMK – 57
- Digital Coach – a new profession supporting enterprises in digital transformation – by IVSZ – 56
- BIM coordinator Training (construction) – by SAMK – 53
- Basic communication skills for construction contractors 25 hours training – by IPOSZ - 53

DISCUSSION

- Is there a training case you „fall in love with"? Would you share why and if you intend to kick-off the adaptation of it?
- Have you already shared information with any stakeholders? Did you get any feedback? (next tasks..)

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

FURTHER STEPS (2023)

1. DEVELOPMENT OF OUTPUT 1

Proposed structure of Output 1:

- definition of the issue
- methodology: processes, templates
- introduction of best practices (data sheets)
- adaptation potential of the cases/plans and implementation challenges

Deadline (IVSZ): ~mid February 2023
Revision by partners: ~ 28 February 2023
Final deadline for handing over Output 1: 31 March 2023

2. DISSEMINATION OF BPS TO TARGET GROUPS – START NOW!

- 1: Transfer to target group and advisory support of the implementations (implementation) by chambers and other SME promoters – by 28 February 2023
- 2: Permanent plementaton / transfer to SMEs as well as advisory implementations in SMEs by all project partners and by associated partners – by 30 April 2024
- 3: Testimonials from each partner – by 30 April 2024

- **Do you need anything to start the dissemination?**

Technology – SME target group	Training – VET and other training prov.
T1: PP3 HWKS, PP5 LCCI, PP6 CCSK PP7 IPOSZ	T1: PP3 HWKS, PP5 LCCI, PP6 CCSK PP7 IPOSZ
T2: Every partner	T2: Every partner
T3: Every partner	T3: Every partner

Thank you for your attention

Klara: hklara@ivsz.hu
Balázs: tordai.balazs@ivsz.hu

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