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Magnus Simons
VTT Technical research centre of Finland
Tekniikantie 21, Espoo
P.O.Box 1000
FI-02044 VTT, Finland
e-mail: Magnus.simons@vtt.fi
tel. +358405438586

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Magnus Simons		Ali Muhammad		
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Abstract

The success stories of the seven Knowledge Transfer Experiments in the first round of open calls in the BetterFactory project are presented in seven Success story videos that are made publicly available on YouTube. This document is a summary of the seven experiments, their consortia, objectives and success stories. For more details on the cases, the developed technology and the success stories, the reader is asked to look at the videos.

Coordinator contact

Magnus Simons
VTT Technical Research Centre of Finland Ltd
Tekniikantie 21, P.O. Box 1000, Espoo, Finland
E-mail: magnus.simons@vtt.fi
Tel: +358 40 543 8586

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EXECUTIVE SUMMARY

In the first round of Knowledge Transfer Experiment (KTE) in the BetterFactory project, seven consortia were funded and have fulfilled their plans of developing and testing new digital solutions in the industrial settings of the SMEs involved. Each KTE consortium consisted of one manufacturing SME, one Artist and one Technology supplier.

Of the seven KTE accepted from the first Open call, all have achieved success in implementing the new technologies developed and tested in the sixteen months long Knowledge Transfer Experiment. The KTE consortia have in their videos defined what they see as the main success stories from their tests. In some cases, the results are already implemented and used in the SMEs daily operation, but in most cases the tests have shown how operations can be improved using new digital technology.

This document shortly describes each KTE, it's consortium, objectives and successes stories. For more details on the cases, the developed technology and the success stories, the reader is asked to look at the videos through the links added after each KTE description in this document. The document is based on reports prepared by the KTE consortiums.

1 Introduction

In the first round of Knowledge Transfer Experiment (KTE) in the BetterFactory project, seven consortia were funded and have fulfilled their plans of developing and testing new digital solutions in the industrial settings of the SMEs involved. Each KTE consortium consisted of one manufacturing SME, one Artist and one Technology supplier.

Each KTE consortium defined their objectives, use cases and KPIs to measure the success of their Knowledge Transfer Experiment. At the end of the sixteen-months long experiments, the consortia have reported the results of their work. The main successes of each KTE are presented in a Success story video. These videos are publicly available on YouTube.

This document shortly describes each KTE, it's consortium, objectives and success stories. For more details on the cases, the developed technology and the success stories the reader is asked to look at the videos. Links to the videos can be found in this document.

The seven KTE consortia are:

1. Better CNC Factory
2. DSBSF – Digital Solutions for Better Scales Factory
3. FOLD
4. ODC3D – Optimisation of Digital Craftmanship in 3D printing
5. MiniRoboFab
6. SmartHam
7. RWC – Robotic Welding Cell

2 BETTER CNC Factory

Fiction Factory builds custom interiors for B2B brands globally and has the ambition to become fully circular. In the Better CNC Factory Knowledge Transfer Experiment supported by the BetterFactory project, Fiction Factory cooperates with **Jesse Howard,** an artist and designer focused on reimagining everyday objects in response to new forms of digital fabrication, and with technology supplier **IAAC,** a research and production center for robotic architecture with a focus on future habitats and building technologies.

The **objective** of the KTE is to reduce waste for the CNC machining of wood sheets at Fiction Factory. To do this the consortium created a **five-step process for nesting**. First the principle was changed from a project-based process to a material and thickness driven process. In step 1: parts from projects needed now are added, in step 2; internal parts from waiting list are added, in step 3: external parts from collaboration with designers are added, in step 4: nesting is started, and for step 5 a software fool called FOUND OBJECTS was developed to generate new parts out of leftover space on the sheet material. For the phase after nesting and machining, a projection and labelling tool was created to find machined parts easily.

The **FOUND OBJECTS** tool can be used to create new artistic products – like a stool.

This project secured 1) additional funding for using Found Objects, 2) a continuing collaboration between all three entities after KTE end, and 3) presented the outcomes on various stages, including Dutch Design Week 2022 and upcoming Milan Design Week 2023.

The success story of the Better CNC Factory is described in more detail in the following video:

[Better Factory Experiment - BCF: Better CNC Factory](#)

3 DSBSF – Digital Solutions for Better Scales Factory

Delmac Scales is a Greek weighing equipment manufacturer producing from basic retail scales to advanced industrial platforms and check weighers. Specifically advanced solutions consist of customized weighing equipment, that is produced attending to customer needs. In the DSBSF Knowledge Transfer Experiment supported by the Better Factory project, Delmac cooperated with technology supplier **NO Solutions,** a software developer and digital systems integrator, and with **Sara Alvarez** who is an artist with an engineering background and a fascination for digital fabrication applications.

The objective of the KTE is to help Delmac improve the production process as well as products in order to improve the productivity, robustness, efficiency and fleixibility respecting market requirements regarding mass customization and digital ready capabilities, and taking care of social responsibilities.

With the help of No Solutions, Delmac has developed and tested a new **production schedule system** for assembly flow planning on the assembly line for digital scales. The developed solution is a kind of Manufacturing Operations Management (MOM) software that enables DELMAC to create work orders for each assembly location allowing improvement of the complete assembly process workflow. Workstation PCs at each position is connected on RAMP platform through Apache Superset. The use of the new system lead to reengineering of the assembly line, it reduces cost of assembly and improves quality.

The Tech Supplier No Solutions also developed a **software solution** to improve the software ability of DELMAC scales to be more customizable and more agile towards integration in the digital ecosystem of DELMAC's customers. This product can be easily represented as element of Industry 4.0 and can be used in a wide range of industries. These new features in the digital scale are expected to open new markets for Delmac products.

For Delmac's employees, the artist Sara Alvarez developed a **virtual break room** using Augmented Reality (AR) technology. This project addresses a potential (near) future in which AR becomes a tool to make people happier in their working environments, while also improving productivity and therefore financial benefits for the company.

The success story of the DSBSF KTE is described in more detail in the following video:

[Better Factory Experiment - DSBSF: Digital Solutions for Better Scales Factory](#)

4 FOLD

Europack Bulgaria designs and produces paper bag packaging products for the Bulgarian market. In their ambition to work with recyclable materials they came across paper from CaCO3. In the FOLD Knowledge Transfer Experiment supported by the BetterFactory project, Europack cooperated with **Isaac Monté,** an artist and designer working with unusual, new materials, and with technology provider **Oviso Robotics,** a collaborative robots solution company.

The **objective** of the KTE was the automation and robotization to achieve higher productivity in Europack's production of grow tubes from stone paper. The success story video presents how the Ovi mobile concept developed by Oviso Robotics was used to design a **modular cobot** for folding and gluing in the production of grow tubes from stone paper.

This project secured: 1) additional funding to develop the stone paper printing head, 2) successful market entry in Romania, 3) a continuing collaboration between all three entities after KTE end.

The success story of the FOLD KTE is described in more detail in the following video:

[Better Factory Experiment - FOLD: Modular Cobot for production of Stone Paper Innovative Products](#)

5 ODC3D – Optimisation of Digital Craftmanship in 3D printing

The New Raw is a furniture manufacturer employing robotic 3D printing to process plastic waste. In the ODC3D Knowledge Transfer Experiment supported by the Better Factory project The New Raw cooperated with **Gareth Neal,** an artist and designer in the field of furniture, experimental design and digital manufacturing technologies, and with technology supplier **Artific Intelligence,** a software company specialized in data science and machine learning algorithm development.

The **objective** of this KTE was optimization of digital craftsmanship in 3D printing. A central result of the experiment was the design of the **AI powered cooling system for 3D printing**. The success story video presents a new **workflow management tool** for 3D printing and tools for **process data collection** and **data visualization**. In the video we can also see the robot 3D printing arm producing a vessel deploying a **weaving method** developed by artist Gareth Neal.

This project: 1) presented the outcomes at Design Miami 2022, 2) secured continuous collaboration between artist and SME on producing works of art/design for the artist.

The success story of the ODC3D KTE is described in more detail in the following video:

[Better Factory Experiment - ODC 3D: Optimization of Digital Craftmanship in 3D Printing](#)

6 MiniRoboFab

Ritherdon is an engineering and production company specializing in sheet metal products such as electric enclosures and metering products. In the MiniRoboFab Knowledge Transfer Experiment supported by the BetterFactory project, Ritheron cooperated whith **Nicola Ellis,** who is an artist experienced in a wide range of manual metal fabrication techniques and fascinated by the dynamics of infrastructural environments, and with the technology provider **Digiotouch,** a cloud based, digital transformation software developer.

The **objective** of this KTE is to experiment with robot human interaction, with new digital systems for improving **data capture** and analysis at the Ritherdon factory, as well as, to find ways to **recycle** and use powder for new types of **powder coating finishes** for Ritherdon's products. The success story video demonstrates how these objectives have been implemented.

This project achieved: 1) successful market entry of the new product line with artist as remaining in-house artist for new clients.

The success story of the MiniRoboFab KTE is described in more detail in the following video:

[Better Factory Experiment - MiniRoboFab: Exploring Product Customisation and Robotic Fabrication](#)

7 SmartHam

Capanna Prosciutti is specialized in curing and maturing almost 200,000 Parma Hams each year and has the ambition to innovate this highly restrictive process through digital tech. In the SmartHam Knowledge Transfer Experiment supported by the BetterFactory project, Capanne cooperated with **Frederik de Wilde,** an artist excelling in combining digital technologies with craftmanship with a focus on innovation, and with technology supplier **SiriumERP,** which is a software development IT company specialized in food warehousing.

The **objective** of this KTE was to find solutions for problems faced at Capanna Prosciutti. The main challenges were high fluctuations in input prices, swings in product demand and continuous changes in workforce structure and labor turnover and poor inventory visibility. The KTE provided **automation** and **digitailization solutions** combined with **artistic customization** and **marketing tools** like the EEG brain reading software developed by the artist for creating an image of your taste while eating Parma ham. In the success story video, you get to hear more about the digital information layer around ham, the **digital twin** of the production process, of **mathematical forecast of sales**, **fatigue level measuring** for employees and RFID tags for **traceability** of hams during entire production process. The technology supplier also created an **inventory management system** utilizing Apace superset dashboard, advance plant modelling and the agent optimization tool kits from BetterFactory project. The artist Frederik de Wilde also created a **visual game** of young customers to learn more about Parma Hams.

This consortium: continued collaboration between the SME and the Tech Supplier on traceability in the production process.

The success story of the SmartHam KTE is described in more detail in the following video:

[Better Factory Experiment - SMARTHam: Manufacturing of real-time traceability in ham production](#)

8 RWC – Robotic Welding Cell

Zovos-EKO is a traditional manufacturing company producing special steel containers. In the RWC Knowledge Transfer Experiment supported by BetterFactory, Zovos-EKO is cooperating artist **Tomas Libertiny** who focuses on implementing new ideas within fabrication processes and ample experience in welding technologies, and with technology supplier **Rossum Integration,** a robotic workstation design and manufacturing company.

The **objective** of the KTE was a shift from a manual production process towards a design and technology led collaborative robotic welding fabrication process for specialized container production to increase productivity, decrease costs and increase customization options for clients. In the RWC Success story video you see several new **"X" shaped welded door designs** created by artist Tomas Libertiny for robot welding, and also a demonstration of how the **robotic welding station** automatically performs the welding of this new door design. In the welding station, data from the welding process is transferred through the **RAMP IoT** system and visualized on the dashboard. The welder is waring a wrist watch for fatigue monitoring.

Follow up success: the SME offers the new product on the market with approval of the artist.

The success story of the RWC KTE is described in more detail in the following video:

[Better Factory Experiment - WRC: Welded metal door fabrication and automatization of production](#)
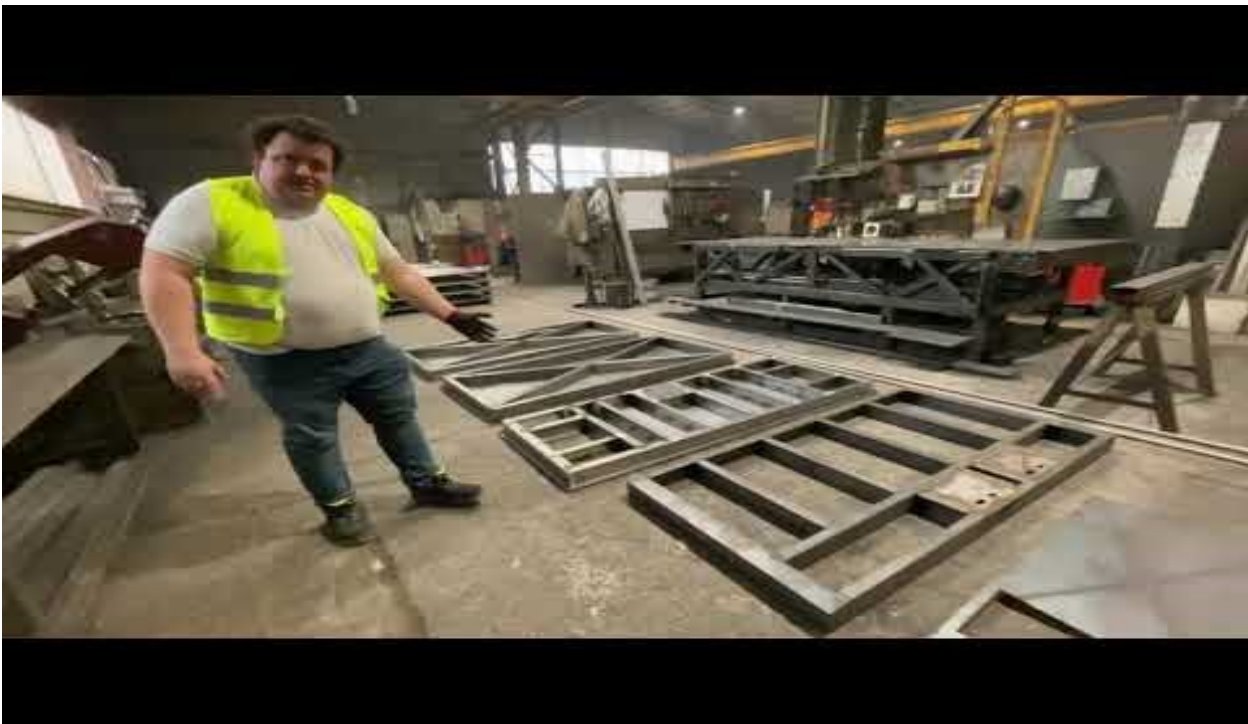
9 Conclusions

Of the seven KTE in the first Open call, all have achieved success in implementing the new technologies developed and tested in the sixteen months long Knowledge Transfer Experiment. Most use cases defined in each KTE have led to results. In some cases, the results are already implemented and used in the SMEs daily operation, but in most cases the tests have shown how operations can be improved using new digital technology. In some cases, the benefits of introducing this technology are considerable.