

# Project Deliverable 7.6

## Activities Report

Worker-Centric Workplaces in Smart Factories

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## About this document



## Executive Summary

This document presents the achieved results of dissemination and exploitation activities in the fourth and final year of the FACTS4WORKERS project. This document covers the main work done in fields of dissemination and exploitation with greater focus on the latter since using and building upon the project's results was a clear focus for the project's consortium in the final project year.

The document is structured as follows: 1) Introduction 2) Communication 3), Accomplishment of WP7 goals as stated in the project proposal, 4) Dissemination 5) List of implemented activities in the project period 6) Exploitation 7) Balance of efforts and priorities between stakeholder's interests.

The activities performed in the final year are the culmination of the project's activities as outlined and performed in previous years (descriptions available in D7.2. -updated, D7.3, D7.4 and D7.5). After a strong focus on dissemination, the final project year focused on exploitation activities to ensure a wide deployment and usage of the developed solutions.

On the dissemination aspect, the project received TV airing time on the television, the members engaged in project networking processes with SATISFACTORY project and the solutions of the project were represented on an additional i40 cases website.

The project's exploitation effort build upon the Business plan that was completed in the last project year. The project consortium defined clear exploitation pillars to be used in the process: consultancy services, products and services induced other research activities. Furthermore, the solutions developed in the project were applied in each of the 6 industrial use-cases. Industrial partners used the FACTS4WORKERS project for further internal, bilateral or European project activities and initiatives. Scientific partners within the project also exploited the results via new services and projects -as was already visible in the project's third year – greatly surpassed the project plan in field of scientific dissemination as outlined in the project' application.

As a whole this document shows that the consortium managed to lead this 4-year project in an organized way, step-by-step. From first dissemination plans, brainstorming activities on the consortium level regarding exploitation, developed Business plan and the final FACTS4WORKERS' solution roll-out at the industrial partners with a clear interest to continue research activities after the project's end, the project has grown and developed as the work progressed. Taking into account the rapidly developing and maturing IT technologies that were used in the project, the consortium managed to form relevant solutions for all the stakeholders proving the usability and adoptability of the UC-related solutions in a wider industrial field.

The work in the WP7 was a close collaboration between the two responsible partners: SiEVA Research Centre (SIA) and the Virtual Vehicle Research Center (VIF). The two partners closely supported each other and provided help when and where needed. Communication was always open and strategically included industrial and scientific partners if necessary. The distribution of efforts per partners has been also proven as very realistically planned.

At the project's end, the FACTS4WORKERS consortium achieved its goal in developing a wide array of useful solutions that would have as large scope of implementability as possible and would be beneficial for multiple branches of European industry in the 21<sup>st</sup> century.

## Keywords

#FACTS4WORKERS, #Dissemination, #Exploitation, #Business plan #Deliverable, #Communication, #Strategy



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SIA.....SiEVA d.o.o.	UNIFI..... Università degli Studi di Firenze
ITA.....Instituto Tecnológico de Aragón	SCA..... Schaeffler
VUT..... TU Wien	THO..... Thermolympic
EVO.....Evolaris next level	HIR.....Hidria Rotomatika
EMO.....EMO Orodjarna	HID.....Hidria TC
UZH.....University of Zurich	VIF.....Virtual Vehicle Research Center
IMI.....IMINDS	UC ..... use-case
LUT.....Lappeenranta University of Technology	IP ..... industrial partner
TKSE.....ThyssenKrupp Steel Europe	KER..... key exploitable results

# 1 Introduction



Compared to previous live documents within the WP7, this document presents the final outcome of activities within this work package of the FACTS4WORKERS - “Worker - Centric Workplaces in Smart Factories” project. The document outlines the communication-, dissemination- and exploitation activities performed in the fourth final year of the project.

The document presents the dissemination and exploitation activities and their overview in the four years of the project. The document is heavily focused on direct exploitable results of the project; the direct exploitable results at the industrial and scientific partners have all been described and consultancy services and products started also described.



## 2 Communication

The scope of this chapter is to present dissemination as the key tool to raise awareness about the project and project results. The dissemination strategy of FACTS4WORKERS foresees *internal and external* actions.

-  Internal communication and dissemination allow members of the FACTS4WORKERS project consortium to be involved in every project activity and share their knowledge and experience, which is essential for successful project execution.
-  External dissemination and communication have utmost importance for the project, because in this way we present the project to the wide target audiences and raise project awareness amongst our most important stakeholders.

### 2.1 Internal communication

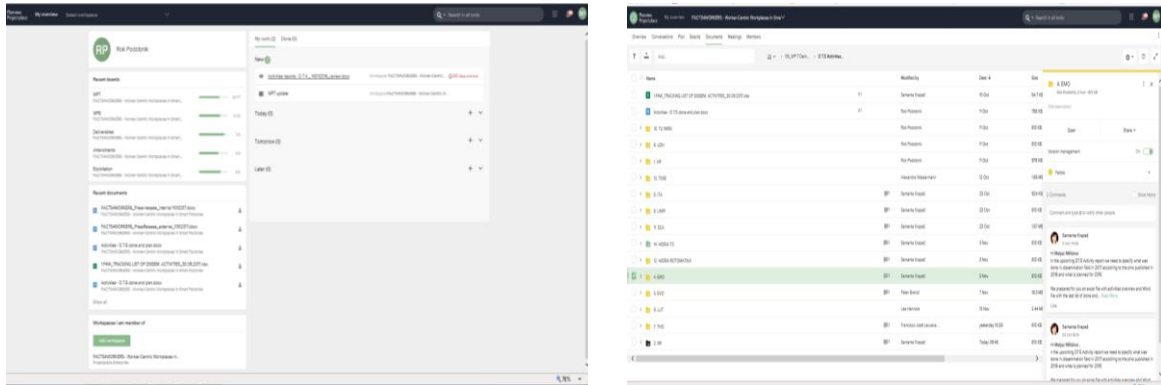
The same as in the first three years of the project, internal communication in the fourth and final project year was mainly conducted *via telephone-conferences, Webex meetings, e-mail and periodic physical meetings of core teams*.

Data exchange in the last year was - as in the previous one - completely conducted on the *Projectplace*<sup>1</sup> data transfer platform

In field of dissemination and exploitation activities Projectplace was the **main tool for data management, report and deliverables'** preparation since it has proven its worth in enabling fast, regular and active update of documents from multiple authors and reviewers.

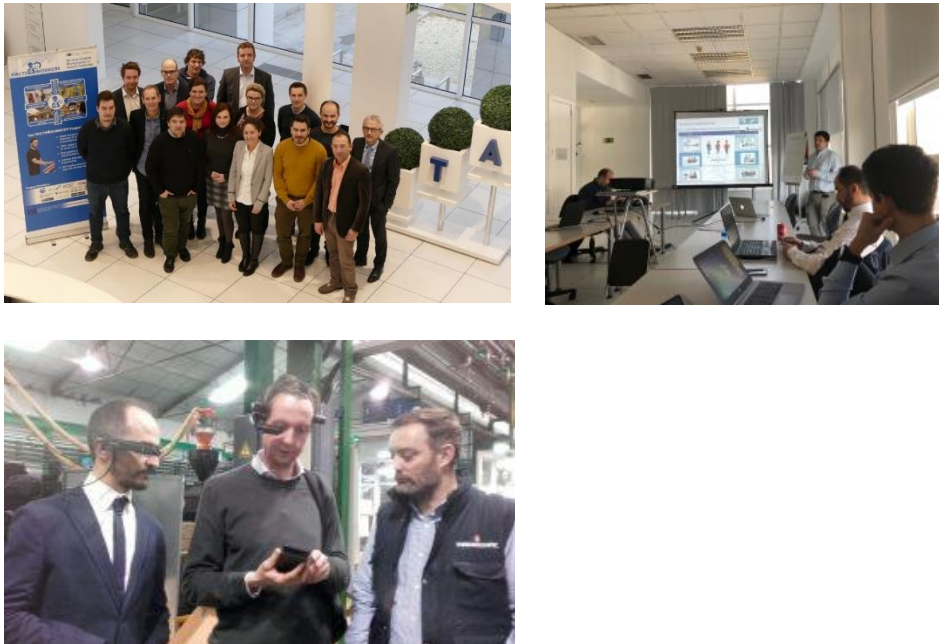
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<sup>1</sup> [www.projectplace.com](http://www.projectplace.com)



*Figure 1 : ProjectPlace first page (left) and an example of work being coordinated per partner for documentation preparation in WP7 (right)*

An important bulk of the project's communication in the final year was managed via **the Projectplace** application. In addition two F2F meetings were conducted: At ITA in Zaragoza, Spain from 31<sup>st</sup> January to 1<sup>st</sup> February 2018 and at TKSE, Germany.



*Figure 2: F2F meeting in Zaragoza at Itainnva*





*Figure 3: F2F meeting in Duisburg at ThyssenKrupp*

## 2.2 External communication

The focus areas and communication channels regarding external communication were defined in the previous deliverables: D7.2, D7.3, and D7.4. Later focus of the consortium was described within D7.5.

To repeat one more, the main target groups as defined for the project are:

### **These were:**

- Scientific community.
- Industrial sector.
- Public.

### **The main channels are:**

- Social Media (Facebook, Twitter, LinkedIn, YouTube, etc.).
- Publications (peer-reviewed scientific journal).
- Events (conferences, workshops, trade fairs etc.).

Having an already well-established project focus from the project's first three years, the consortium retained the main project goals and targets as specified for the project's second half. The project's second half brought a clear focus on the project's goals, as at the time of this deliverable the project's focus was shifted from internal communication to effective roll-out of the solutions and their presentation to a wide audience.

- ✓ Set up the dissemination mechanisms and strategies (e.g. conference plan, updated web page, etc.).
- ✓ Create a community composed by the project partners and interested stakeholders that may interact at all the project stages.
- ✓ Ensure targeted communication activities both tailored to different stakeholders' interests.
- ✓ Carry out dissemination activities, to raise international awareness and interest in project activities and achieved results in the scientific and commercial community and with the European public and social policy stakeholders.
- ✓ Investigate the routes by which the partners can secure a successful downstream exploitation of the results.
- ✓ Balance dissemination efforts between the partners.
- ✓ Contribute the relevant project results to the corresponding standardization bodies (if applicable).
- ✓ Liaison with other EU and national projects will maximize the impact.

The project's focus was described as moving from collecting the necessary information and knowledge from the workers (internal communication or inward oriented communications – D7.3, D7.4) to building up momentum in external communication that would coincide with the first FACTS4WORKERS solutions' deployment phases and tests at IPs' UCs (D7.5).

In the final project year the FACTS4WORKERS consortium continued with Our main communication **priority** in building networking liaisons and communication channels with the **scientific community**.

Outreach was done also on the regional level. Here one needs to mention **FACTS4WORKERS presentation at a local Spanish television in 2018**. FACTS4WORKERS video footage was also used in a **local employment video by Hidria**.

In the fourth project year the FACTS4WORKERS consortium also participated at the **closing event of the SATISFACTORY project**, which was co-funded under the same H2020 call. FACTS4WORKERS' representatives participation at the event was flowed by the SATISFACTORY representatives visiting the FACTS4WORKERS closing event in Graz on 22. November 2018.

A major external communication push in 2018 was on field of scientific cooperation (*journals, conferences*). In this field the project consortium continued its already highly successful work where the **pre-set goals were exceeded**.

## 3 Accomplishment of WP7 goals as stated in the project proposal

### 3.1 Key components of activities within WP7

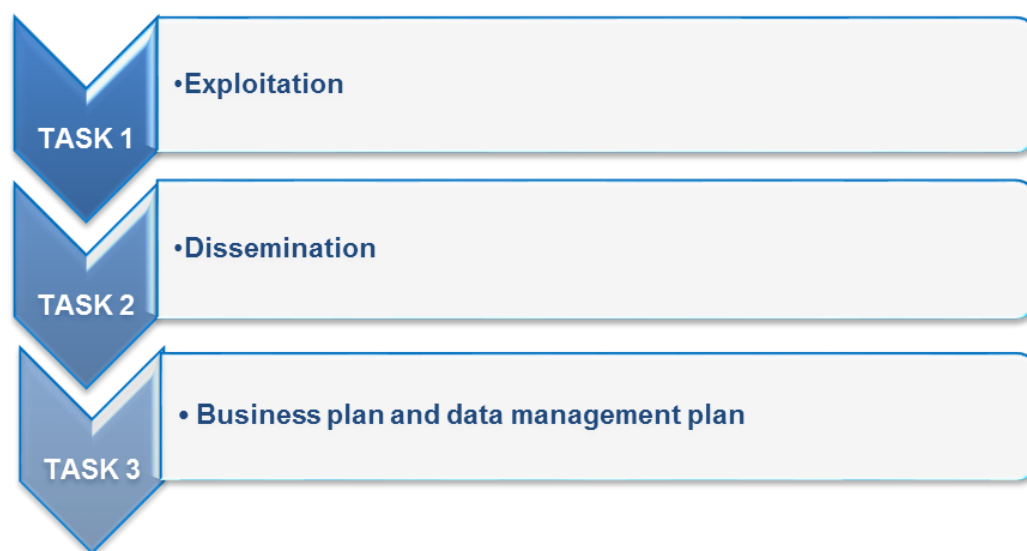


Figure 4: Key areas of planned activities within WP7

The FACTS4WORKERS project activities within *WP7 – project management* – covered three distinct fields:

- **Project exploitation**
- **Project dissemination**
- **Project business plan and data management plan**

As planned the activities were led by SIA with support from VIF who also took over as planned the preparation of the project's business plan. All three tasks were being conducted in a concise and coordinated manner throughout the project with cooperation from both sides.

### 3.2 Achievement of deliverables – status at the end of the project

As presented in the table below, the FACTS4WORKERS consortium successfully achieved – as of October 2018 – all of its pre-set deliverable goals. Partner SIA was

responsible for D7.6, D7.1, D7.2, D7.3, D7.4, D7.5 and partner VIF was responsible for D7.7. All deliverables were presented on time and as planned.

<i><b>DELIVERABLE</b></i>	<i><b>DESCRIPTION</b></i>	<i><b>DELIVERABLE MONTH</b></i>	<i><b>RESPONSIBLE PARTNER</b></i>	<i><b>STATUS</b></i>
D 7.1	Project website and public networking	M 6	SIA	Done ✓
D 7.2	Dissemination and Exploitation plan	M 6	SIA	Done ✓
D 7.2	Dissemination and Exploitation plan - updated	M 18	SIA	Done ✓
D 7.3	Activities report	M 12	SIA	Done ✓
D 7.4	Activities report	M 24	SIA	Done ✓
D 7.5	Activities report	M 36	SIA	Done ✓
D 7.7	Business plan	M 30	VIF	Done ✓
D 7.6	Activities report	M 48	SIA	Done ✓

*Figure 5: WP 7 deliverables*

## 4 Dissemination

### 4.1 Webpage

As already stated in D7.5, after long deliberations and preparations, the FACTS4WORKERS consortium completed the overhaul of the webpage last year. Since then the FACTS4WORKERS webpage was regularly updated with new contents.

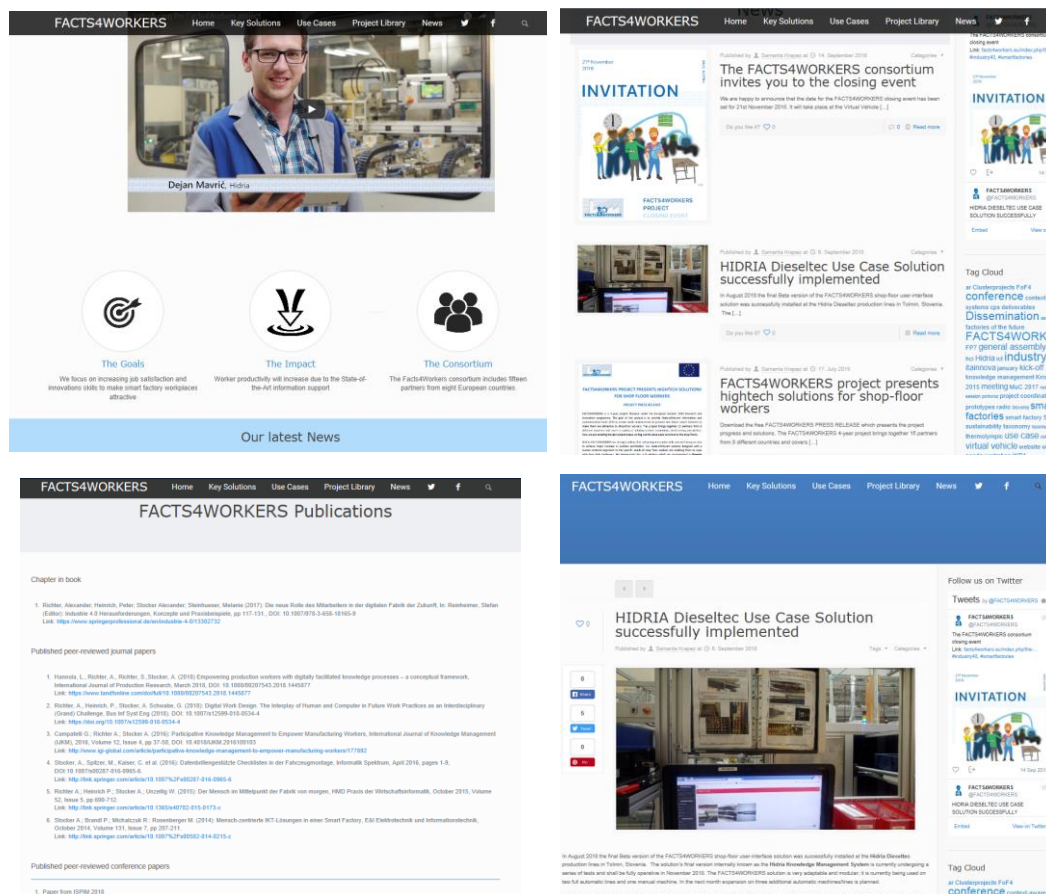


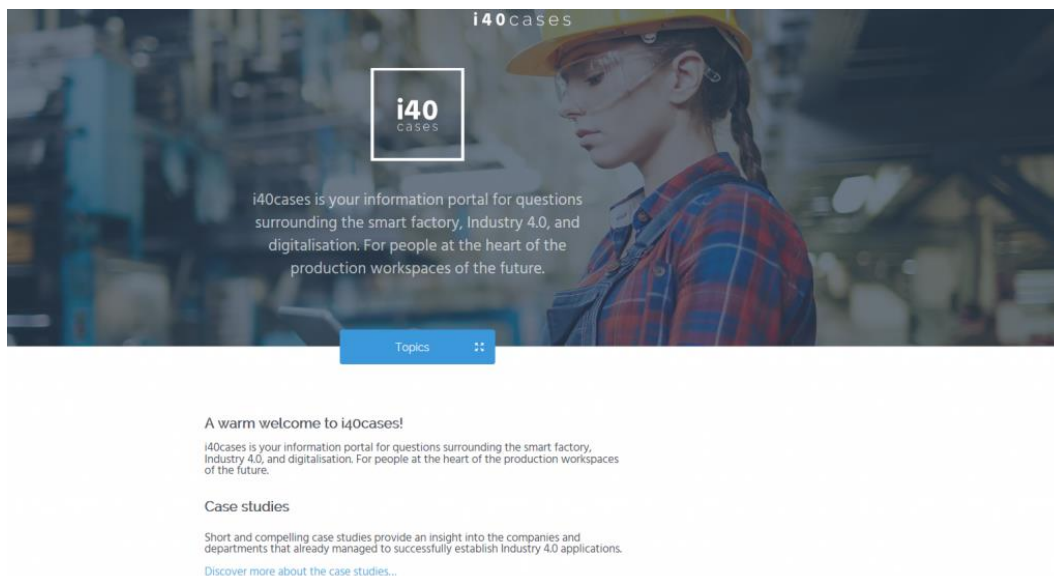
Figure 6: FACTS4WORKERS webpage

According to **Google Analytics**<sup>2</sup> the FACTS4WORKERS webpage gathered a very respectable result of **56.903 page views in 4 years**. Taking into account the geographical distribution of the webpage visitors the top three countries are from: 1) **Germany** 2) **France** and 3) **Slovenia**.

<sup>2</sup>The data were obtained on 27.11.2018

## 4.2 New i40cases website

Well documented case studies, applications and introduction methods around the topics smart Factory, Industry 4.0 and digitization for humans at the center of the production workplaces of the future – all this can be found on the platform i40cases (<http://i40cases.com>). The idea behind the i40cases platform is to inform interested parties and to pass on and develop extensive knowledge from industrial and research projects. From now on, the information is also available in English. i40cases is primarily aimed at decision-makers in medium-sized companies or departments in larger corporations, but also scientists, teachers, students and media representatives interested in Industry 4.0, who want to pick up and further process the content. Read more about i40cases on our blog at <http://i40cases.com/news/new-platform-i40cases-informed-to-industry-4-0/>.



*Figure 7: i40 cases website*



### 4.3 Project video

The FACTS4WORKERS project video was a major dissemination milestone in the third year. The video features Hidria Dieselttec UC presentation and features contributions from VIF, UNIFI, EVO and SIA. A detailed description of the video is available in the D7.5.



*Figure 8: FACTS4WORKERS video*

In the final year, parts of the FACTS4WORKERS video showing the new Hidria Dieselttec application were reused in a **Hidria Group recruitment video**, depicting different open job posts. The FACTS4WORKERS clips used **depicted job position of maintenance/control technician**. The FACTS4WORKERS imagery was used in order to highlight the Hidria Group's new strong focus towards 4.0. Industrial solutions on the shop-floor which consequently also mean better workplaces for the shop-floor workers.

As of October 2018 the FACTS4WORKERS video gathered **915 views**.



*Figure 9: FACTS4WORKERS video material used in a Hidria Group recruitment video*

The original FACTS4WORKERS video premise was also used in the Hidria recruitment video: IT handheld device and its context of use on the project shop floor bringing attention towards the **role of the shop floor worker and use of modern IT technologies to improve the workspace and empower the decision-making abilities of the workers.**

As of October 2018, the Hidria recruitment video featuring FACTS4WORKERS contents gathered **760 views.**



## 4.4 Social media tools

Playing an active role in social media is a far more effective way of engaging in conversation than merely posting something on the project website. The good thing about taking part in the social web is that it does not require us to share only full formed ideas or complete pieces of research. We can share work in progress and immediately get feedback that will improve our results.

### Research Gate

ResearchGate is an important focus point for researchers and research projects and topics from not just all over Europe, but also beyond. The FACTS4WORKES project got its project log in December 2016. As of October 2018 it had 3 followers, 5 updates and 19 reads.

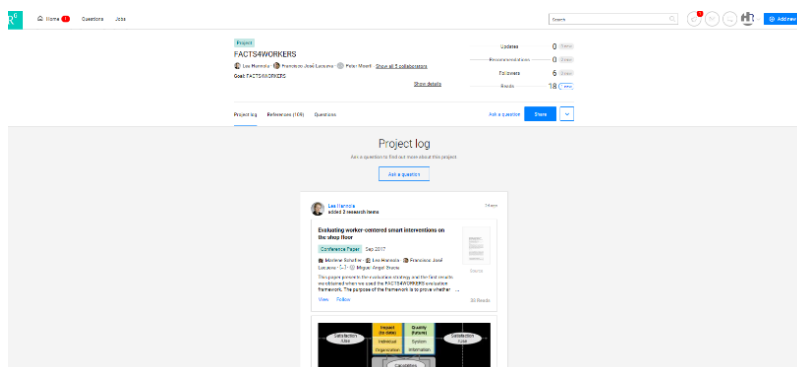


Figure 10: FACTS4WORKERS Research gate presentation

### YouTube



As was already mentioned the FACTS4WORKERS received its project video. The video is now featured on the YouTube channel. To accomplish this a special YouTube channel was created.

### **Twitter<sup>3</sup>**

Twitter analytic	
Tweets	498
Followers	294
Followings	313

*Figure 11: Twitter analytic*

\*The data were obtained on the 27.11.2018.

### **Blog (Tumblr, website blog)**

We operate two blogs, a Tumblr and a WordPress Blog (WordPress is the content management system of our project website). Tumblr is a microblogging platform and social networking website. The service allows users to post multimedia and other content to a short-form blog.<sup>4</sup>

Blog post analytic	
Posts	83

*Figure 12: Blog post analytic*

\*The data were obtained on the 22.11.2018.

### **Facebook**

Facebook is an online social networking service. After registering to use the site, users can create a user profile, add other users as "friends", exchange messages, post status updates and photos, share videos and receive notifications when others update their profiles. Additionally, users may join common-interest user groups, organized by workplace, school or college, or other characteristics.<sup>5</sup>

Facebook analytic	
Number of likes	53
Number of follows	55

*Figure 13: Facebook analytic*

*The data were obtained on the 27.11.2018.*

<sup>3</sup> More info about Twitter: <https://en.wikipedia.org/wiki/Twitter>

<sup>4</sup> More info about Tumblr: <https://en.wikipedia.org/wiki/Tumblr>

<sup>5</sup> More info about Facebook: <https://en.wikipedia.org/wiki/Facebook>

## LinkedIn

LinkedIn is a business-oriented social networking service. It is mainly used for professional networking<sup>6</sup>.

LinkedIn analytic	
Connections (dated 27.11.2018)	159

Figure 14: LinkedIn analytic

## 4.5 Press release

In the year 2018 the FACTS4WORKERS consortium published a **new press release**. This time the document was the same for external and internal communication purposes, since due to being **focused on UC-applicable solutions** the document conveys the same message for internal target audiences (*staff and employees, shopfloor workers*) and external target audiences as well (*interested stakeholders such as industrial associations, clusters, etc.*).



<sup>6</sup> <https://en.wikipedia.org/wiki/LinkedIn>



## 4.6 FACTS4WORKERS TV-article

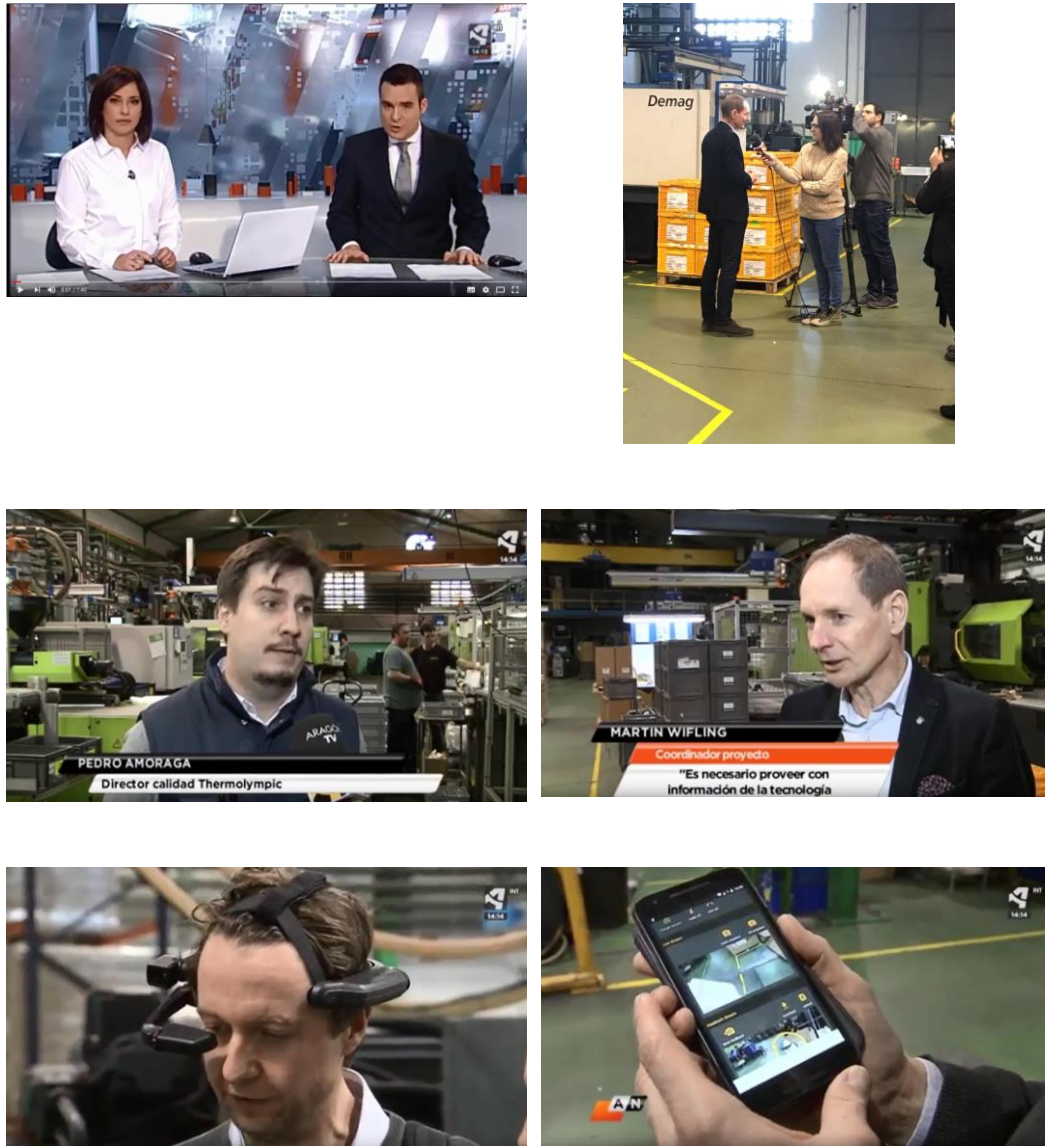


Figure 16 : FACTS4WORKERS-related news bulletin presented on the local Spanish Aragón TV

In 2018 an additional video presentation of the FACTS4WORKERS project was achieved. During the FACTS4WORKERS Zaragoza meeting and the visit to the THO plant a local TV film crew from the local *Aragón TV* joined to film article for the local evening news bulletin.

The 1:40s **TV news article** features presentation of the FACTS4WORKERS solution applied for THO – application of the **EVO Call and EVO Assist** – plus spoken parts from representatives of **THO and VIF**. The video article is accessible also via the ITA's **Youtube channel and Twitter feed**.

#### 4.7 Participation at the SATISFACTORY project's final workshop

Representative from FACTS4WORKERS have been cordially invited to contribute as experts at the final workshop of the **SATISFACTORY project** which was held at CO-MAU facility in Turin (Italy) on 15th of December.

In addition to members of both consortia, representatives of further projects which have been approved by the European Commission in the topic FoF4 of the H2020 program have been invited. The work of this set of projects aims to advance the continuous adaptation of jobs in European factories, coping with an increasing levels of automation required by the evolution of current production systems. In addition to the results of Satisfactory, the projects presented were also **A4BLUE Adaptive Automation in Assembly for BLUE collar workers satisfaction in Evolvable context, MANUWORK Balancing Human and Automation Levels for the Manufacturing Workplaces of the Future and Factory2Fit**.

On behalf of the **EFFRA, the European Factories of the Future Research Association**, Chris Decubber presented the general picture of the European vision on this topic and, more specifically, on these projects.



Figure 17: SATISFACTORY project's final workshop



## 4.8 Closing consortium event

FACTS4WORKERS closing was on 21st November 2018 at the Virtual Vehicle Research Centre in Graz, Austria.

The event gave possibility to all who were interested to see the prototype solutions workshop floor workers developed within the FACTS4WORKERS project. It was open to all members of the interested public.



Figure 18: FACTS4WORKERS closing event

## 4.9 Dissemination material

Dissemination material used for informing interested stakeholders at specialized industry- and research-related events was designed as reported already in the first project year. In the second and third project year we continued to make use of the prepared dissemination materials. As stated in the previous deliverable D7.4., in addition to the general roll-up we acquired a special TKES UC specific roll up.

**The already established dissemination tools include:**

### **Project brochure and**

### **Project roll-up**

- *basic/generic*
- *TKSE UC specific*



Figure 19: Project Roll-ups

### **Video release** *(already described)*



## 4.10 Project publications

Blog posts, external releases and papers are key dissemination tools. All of these activities will ensure the long lasting impact beyond project duration, particularly in relation to academic discourse in the area.

### 4.10.1 Published Blog posts

NUMBER <sup>7</sup>	TITLE	PARTNER	TUMBLR	WEBSITE BLOG
1	Deliverable "Technology Monitoring: Report on Information Needed For the Industrial Challenges Workers with Taxonomy"	ITA, SIA		X
2	FACTS4WORKERS attended the final workshop of the SATISFACTORY project	ITA, SIA		X
3	FACTS4WORKERS General Assembly Meeting	SIA		X
4	Presenting the new i40cases website	UZH	X	X
5	Presenting EVOCALL application	EVO, SIA	X	X
6	TU Wien presented FACTS4WORKERS at the ICEIS 2018 conference	WUT, SIA		X
7	TU Wien presented FACTS4WORKERS at the CIRP CMS 2018 conference	WUT, SIA	X	X
8	FACTS4WORKERS at the ISPIM Conference	LUT, SIA	X	X
9	FACTS4WORKERS presented at the Automatica 2018 fair	HID, SIA		X
10	FACTS4WORKERS project presents hightech solutions for shop-floor workers	SIA	X	X
11	HIDRIA Dieseltec Use Case Solution successfully implemented	SIA, HID	X	X
12	The FACTS4WORKERS consortium invites you to the closing event	SIA		X
13	FACTS4WORKERS solution was successfully deployed at thyssenkrupp Steel Europe	VUT, SIA		X
14	SCHAEFFLER use case 2 solution successfully deployed in Ingolstadt	VIF		X

<sup>7</sup> Dated on the 15.11.2018

15	Final version of FACTS4WORKERS solution successfully deployed at EMO-Orodjarna	VIF		X
16	HoloLens Application to support workers deployed at Schaeffler	VIF		X
17	<u><b>FACTS4WORKERS successfully passes its final review meeting in Brussels</b></u>	<b>SIA</b>		<b>X</b>

Figure 20: Achieved blog post in fourth project year

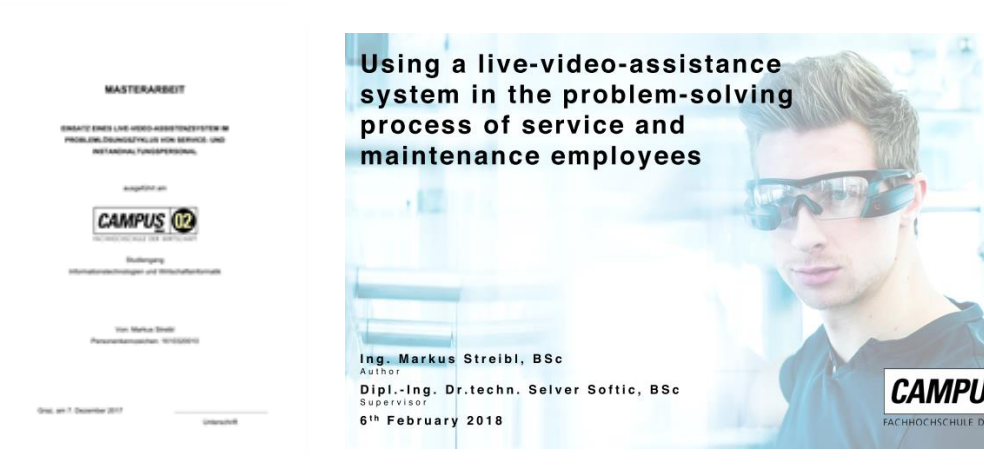
#### 4.10.2 Publications and mentions

It should be specifically mentioned that the **FACTS4WORKERS project consortium has already reached the goals that were set in the project's application** – 21 publications during the project's duration. In the project's final year we shall continue in our strong push for an even more strong presence in the scientific field

##### **Master Thesis**

EVO helped facilitate a **master's thesis** by Markus Streibl 'Einsatz eines Live-Video-Assistenzsystem im Problemlösungszyklus von Service- und Instandhaltungspersonal' - Using a live-video-assistance system in the problem-solving process of service and maintenance employees.

The master thesis shows how the use of a live video assistance system can support service and maintenance staff and influence the problem-solving process positively. The theoretical section the document expresses hypotheses, which are tested by a "mixed-method" approach, based upon collected data from different Austrian internationally operating companies. The results of the study show that live video assistance systems, such as EVOCALL, are able to replace not expedient communication channels. In combination with a "work-shadowing" approach, the on-site presence of experts as well as the repair times can be reduced. Solid training and qualification for service and maintenance employees outline a challenge for companies they have to face, despite the usage of a live video assistance system.



Figures 21 and 22: Master thesis by Markus Streibl done on the work by EVO in the FACTS4WORKERS project

### **Bachelor Thesis**

As a result of the research done within FACTS4WORKERS VUT sponsored a **bachelor thesis by Maximilian Hermann Kronseder: 'Konzeptentwicklung für die Evaluation kontextbasierter Systeme in der Industrie' – 'Concept Development of Evaluation of Context-Based Industrial Systems'** Context-aware systems are becoming increasingly important as these systems sense their environment to recognize specific contexts and provide situational assistance. Despite these advantages, their development requires higher efforts compared to regular systems. To facilitate the development of context-aware systems, the bachelor thesis provided an overview over the State of Art regarding the evaluation of such systems.

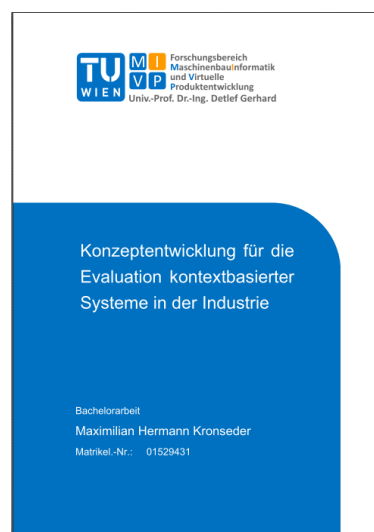


Figure 23: Bachelor thesis by Maximilian Hermann Kronseder sponsored by VUT research activities within FACST4WORKERS

### **Conference papers**

In the fourth year of the project we have achieved **8 conference papers**. All papers are published on the website and are free for download:

1. **Paper from ISPIM 2018**  
Hannola L; Ojanen V; Heinonen M (2018): Adoption of VR and AR technologies in the enterprise; Stockholm, Sweden, June 2018  
Link: [ISPIM Adoption of VR and AR technologies in the enterprise](#)
2. **Papers from DAEM2**  
Lacueva-Pérez F-J; Khakurel J; Brandl P; Hannola L; Gracia-Bandrés M; Schafler M (2018): Assessing TRL of HCI Technologies Supporting Shop Floor Workers, Genova, Italy, June 2018  
Link: [Assessing TRL of HCI Technologies Supporting Shop Floor Workers](#)
3. Lacueva-Pérez F-J; Hannola L; Schafler M; Damalas S; Nierhoff J; Herrmann T (2018): Insights into the Introduction of Digital Interventions at the shop floor; Corfu, Greece, June 2018  
Link: [Insights into the Introduction of Digital Interventions at the shop floor](#)
4. **Paper from 51st CIRP conference on Manufacturing Systems**  
Rosenberger P ; Gerhard D; Rosenberger P (2018): Context-awareness in industrial applications: definition, classification and use case; Stockholm, Sweden, May 2018, DOI: 10.1016/j.procir.2018.03.242  
Link: <https://www.sciencedirect.com/science/article/pii/S2212827118304128>
5. **Paper from ICEIS 2018**  
Rosenberger P ; Gerhard D; Rosenberger P (2018): Context-Aware System Analysis: Introduction of a Process Model for Industrial Applications; Funchal, Madeira, Portugal , March 2018, DOI: 10.5220/0006802703680375  
Link: <http://www.scitepress.org/PublicationsDetail.aspx?ID=rVNetjdG-POo=&t=1>
6. **Paper from GROUP 2018 conference**  
Heinrich P.; Richter A.; Christensen L. R.; Schwabe G. (2018): Creating, Reinterpreting, Combining, Cuing – Paper Practices on the Shopfloor, ACM International Conference on Supporting Group Work, Sanibel Island, USA, January 2018  
Link: [http://facts4workers.eu/wp-content/uploads/2017/01/2018\\_Heinrich-et-al\\_Group-2018\\_Paper-on-the-shopfloor\\_PRINT\\_final.pdf](http://facts4workers.eu/wp-content/uploads/2017/01/2018_Heinrich-et-al_Group-2018_Paper-on-the-shopfloor_PRINT_final.pdf)
7. **Paper from ACIS 2017 conference**  
Richter S.; Trier M.; Richter A. (2017): Value co-creation in the digital factory – The empowered role of shop floor workers, Australasian Conference on Information Systems, Hobart, Australia, December 2018  
Link: [http://facts4workers.eu/wp-content/uploads/2017/01/2017\\_Richter-et-al-ACIS2017-Final-Revised.pdf](http://facts4workers.eu/wp-content/uploads/2017/01/2017_Richter-et-al-ACIS2017-Final-Revised.pdf)

8. **Paper from Production Economics conference** Hannola, L., Steinhüser, M., Richter, A., Schafler, M. & Lacuera-Pérez F.J. (2018) Assessing the Impact of Digital Interventions on the Shop Floor, Proceedings of the 17th International Working Seminar on Production Economics, February 20-25, 2012, Innsbruck, Austria.

#### **Peer-reviewed journal papers**

1. Leyer M., Richter A., Steinhüser M. (2018): "Power to the workers": Empowering shop floor workers with worker-centric digital designs, International Journal of Operations & Production Management, June 2018, DOI: 10.1108/IJOPM-05-2017-0294  
Link: <https://doi.org/10.1108/IJOPM-05-2017-0294>
2. Hannola, L., Richter, A., Richter, S., Stocker, A. (2018) Empowering production workers with digitally facilitated knowledge processes – a conceptual framework, International Journal of Production Research, March 2018, DOI: 10.1080/00207543.2018.1445877  
Link: <https://www.tandfonline.com/doi/full/10.1080/00207543.2018.1445877>
3. Richter, A., Heinrich, P., Stocker, A. Schwabe, G. (2018): Digital Work Design. The Interplay of Human and Computer in Future Work Practices as an Interdisciplinary (Grand) Challenge, Bus Inf Syst Eng (2018). DOI: 10.1007/s12599-018-0534-4  
Link: <https://doi.org/10.1007/s12599-018-0534-4>
4. Spitzer M., Nanic I., Ebner M. (2018): Distance Learning and Assistance Using Smart Glasses, Educ. Sci. 2018, 8(1), 21, DOI: 10.3390/educsci8010021  
Link: <https://doi.org/10.3390/educsci8010021>

In accordance with our target we should achieve more than 20 papers, as follow:

- 1.) First project year:  
8 papers (2 peer-reviewed journals and 6 reviewed conference papers).
- 2.) Second project year:  
6 papers (1 peer-reviewed journal and 5 reviewed conference papers).
- 3.) Third project year:  
10 papers (1 peer-reviewed journal and 9 reviewed conference papers).
- 4.) Fourth year  
12 papers (4 peer-reviewed journal and 8 reviewed conference papers).

**Project target is achieved**

### **Other publications**

1. Promaint magazine: In Finnish: Digitaaliset työkalut tukevat teollisuuden työprosesseja, In English: Digital tools support the work processes of manufacturing industry  
Link: <https://promaintlehti.fi/Lehtiarkisto/Promaint-5-2017>
2. Tu Ciudad: ITAINNOVA acogerá un reunión sobre el proyecto europeo Facts4workers que potencia el factor humano en la industria  
Link: <https://www.20minutos.es/noticia/3246205/0/itainnova-acogera-reunion-sobre-proyecto-europeo-facts4workers-que-potencia-factor-humano-industria/>
3. Itainnova website: El proyecto FACTS4WORKERS lleva a una fábrica alemana soluciones con aportaciones de ITAINNOVA Link:  
<http://www.itainnova.es/noticias/asistimos-a-la-reunion-del-proyecto-facts4workers-celebrada-en-alemania>
4. mercadofinanciero europa press: El proyecto FACTS4WORKERS lleva a una fábrica alemana las soluciones propuestas por ITAINNOVA  
Link: <http://www.europapress.es/economia/red-empresas-00953/noticia-proyecto-facts4workers-lleva-fabrica-alemana-soluciones-propuestas-itainnova-20180710200000.html>
5. Aragón\_hoy: ITAINNOVA acogerá un reunión sobre el proyecto europeo FACTS4WORKERS que potencia el factor humano en la industria  
Link: <http://aragonhoy.aragon.es/index.php/mod.noticias/mem.detalle/reلمenu.33/id.213239>

## 4.11 Highlighted events in in the fourth project year

In the fourth and final project year the project's outreach covered academic and scientific communities and project presentations on different trade shows and fairs.

Below are the highlights from the FACTS4WORKERS consortium's dissemination efforts in the final project year:

### **ISPIM Conference <sup>8</sup>**

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<sup>8</sup> Source: <http://facts4workers.eu/index.php/facts4workers-at-the-ispim-conference/>



*Figures 24: FACTS4WORKERS consortium member LUT presented a research paper on the ISPIM 2018 conference*

#### **CIRP CMS 2018 conference <sup>9</sup>:**



The FACTS4WORKERS project was presented by the TU Wien on the annual Conference on Manufacturing Systems (CIRP CMS 2018). The event provides a platform for researchers and practitioners to present and discuss the advancements in manufacturing environments. This year, the conference focused on smart manufacturing and artificial intelligence.

FACTS4WORKERS research partner TU Wien presented its latest **research results on context-aware systems**. The publication defines the term context in the industrial domain. Further, the authors determined and classified the components of a context as well as how this information facilitates in later development stages.

During the **networking sessions** and social events, TUV team member, Patrick Rosenberger participated in private discussions about **possible applications and the advantages of context-aware systems**. In that regard, **the FACTS4WORKERS project was discussed as an example** of how such systems can assist workers during their daily tasks.

<sup>9</sup> Source: <http://facts4workers.eu/index.php/tu-wien-presented-facts4workers-at-the-cirp-cms-2018-conference/>

### **Automatica 2018 trade fair**

In 2018 FACTS4WORKERS was traditionally again presented at the Automatica between 19 and 22th June in Munich, Germany. The Automatica fair has established itself as one of the leading European industrial fairs for smart automation and robotics. It is therefore of crucial importance for the FACTS4WORKERS to be highlighted in such an event. Hidria TC presented the FACTS4WORKERS solutions at Automatica as a part of its product portfolio upgrade towards being Industry 4.0. friendly, with large emphasis on well-being of shop floor workers.



*Figure 25: Hidria at Automatica 2018 trade fair*



#### 4.11.1 Done activities

The table below presents conducted dissemination activities in fourth project year:

No	Type of dissemination activity	Name of event / title	Period / Location	Author / Responsible person
1	Conference	Wissensmanagement bei der thyssenkrupp Steel Europe AG - der Mensch im Mittelpunkt von Industrie 4.0	November 2017, Stuttgart, Germany	TKSE
2	Thesis	Thesis DOA 2nd Edition - Implementación de un departamento de RR.HH junto a un sistema formativo digitalizado	December 2018, Zaragoza, Spain	THO
3	Conference and paper	ACIS 2017 conference	December 2017 Hobart, Australia	UZH team
4	Radio interview	Project presentation and GAM	January 2018, Zaragoza, Spain	ITA
5	Conference	Digitalisierung und Diversity: Arbeitswelt 4.0 gemeinsam gestalten - Konferenz im Rahmen des vom BMBF geförderten Forschungsprojektes Women Ressource 4.0	January 2018, Bielefeld, Germany	TKSE
6	Conference and paper	GROUP 2018 conference	January 2018, Sanibel Island, FL, USA	UZH team
7	Thesis	Bachelor Thesis: Medición del Impacto en el trabajador desoluciones Industria 4.0 mediante el uso de logs.	February 2018, Zaragoza, Spain	ITA

8	Video release	Antena Aragón News - Proyecto FACTS4WORKERS en Noticias Aragón TV	February 2018, Zaragoza, Spain	THO, ITA
9	Conference	20th International Working Seminar on Production Economics	February 2018, Innsbruck, Austria	LUT
10	Workshop presentation	Impulsar el crecimiento basado en la innovación en el sector de la automoción en Aragón  FACTS4WORKERS: Factorías para Trabajadores.	February 2018, Zaragoza, Spain	ITA
11	Conference and paper	ICEIS 2018	March 2018, Funchal, Portugal	VUT
12	Workshop	Live-Video-Assistenzsystem in der Instandhaltung	March 2018, Graz Austria	EVO
13	Exhibition (shared booth)	Exhibition materials about Facts4Worker at the booth of an industrial partner of the University of Zurich. A project employee Facts4Workers is for visitors available to answer questions about the project Facts4Workers	April 2018, Hannover, Germany	UZH team
14	Conference and paper	51st CIRP conference on Manufacturing Systems	May 2018, Stockholm, Sweden	VUT
15	Master Thesis	Einflussfaktoren eines Live-Video-Assistenzsystems auf den Problemlösungszyklus von Service- und InstandhaltungsmitarbeiterInnen	Graz, Austria	HID
16	2x Conference and paper	DAEM2 conference	June 2018, Corfu, Greece	LUT, ITA, VIF, EVO
17	Conference and paper	ISPIM 2018 conference	June 2018, Stockholm, Sweden	LUT

18	Trade fair	Automatica 2018 fair	June 2018, Munich, Germany	HID
19	Workshop	Evaluation in EMO – EMO use cases	June 2018, Celje Slovenia	EMO, VIF
20	Participation	Participation in several Workshops in the field Industrie 4.0	June, July, September 2018 Stuttgart, Karlsruhe, Pforzheim, Germany	UZH team
21	Bachelor Thesis	Konzeptentwicklung für die Evaluation kontextbasierter Systeme in der Industrie	June 2018, Vienna, Austria	VUT
22	Workshop "Agile Development for I40"	Workshop zum Thema "Agile Software Development for Industrial 4.0 projects"	September 2018, Karlsruhe, Germany	UZH team
23	Presentation	B/S/H's day - Lean and Industry 4.0 at B/S/H suppliers – Presentation use case THO	September 2018	THO
24	Presentation	Project presentation for the industrial partners of the DigiPro project - Presentation of the F4W project results	October 2018, Vantaa, Finland	LUT
25	Round table	Segundo Congreso Internacional PRL y Seguridad Industrial: NUEVAS TECNOLOGÍAS Y SU APLICACIÓN EN LA SST.	October 2018, Zaragoza, Spain	ITA

Figure 26: Done activities in fourth project year

#### 4.11.2 Summary of done dissemination activities in fourth project year

Channel	Metric (Plan)	Achieved results in the first year of the project	Achieved results in the second year of the project	Achieved results in the third year of the project	Achieved results in the fourth year of the project
<b>Project website</b>	# visitors > 300/month # subscribers > 1,000	From April 2015 – October 2015, we have on an average value not only achieved the target, but have exceeded it by 169%	From November 2015 – October 2016, we have on an average value not only achieved the target, but have exceeded it by 131%.	Due to the website being hacked, we unfortunately also lost Google Analytics data that have been used until now (in the previous deliverable). The new data shall be acquired for the project's fourth year	We achieved 56.003 <sup>10</sup> website visitors in the project period.
<b>Blogs and social media</b>	# blog posts > 10/month # conversations > 3/month	On an average value, we have not only achieved the target, but we have exceeded it.	On an average value, we have not only achieved the target, but we have exceeded it.	We achieved the target.	We achieved the target.
<b>Private conversations</b>	# conversations	We have conducted numerous conversations via Projectplace, Webex meetings, and telephone conferences.	We have conducted numerous conversations via Project place, Webex meetings, and telephone conferences.	We have conducted numerous conversations via Project place, Webex meetings, telephone conferences, face to face meeting.	We have conducted numerous conversations via Project place, Webex meetings, telephone conferences, face to face meetings.

<sup>10</sup> Dated on 27.11.2018

<b>Scientific publications</b>	# papers > 20 # citations	In the first year of the project we have intensively contributed to the scientific community. We achieved: Peer-reviewed journals paper: 2 Conference papers: 6	In the second year of the project we have intensively contributed to the scientific community. We achieved: Peer-review journals: 1 Conference papers: 5	In the third year of the project we have very intensively contributed to the scientific community. We achieved: Peer-reviewed journals: 1 Conference papers: 9 Target is already achieved.	In the last year of the project we have very intensively contributed to the scientific community. We achieved: Peer-reviewed journals: 4 Conference papers: 8  Target is achieved and exceeded
<b>Other publications</b>	# articles > 16 Audience > 100,000	In the first year of the project we have intensively contributed to the public/industrial communities: Non reviewed journals: 4 Other publications: 26	In the second year of the project we have contributed to the public/industrial communities: Other publications: 7	In the third year of the project we have intensively contributed to the public/industrial communities. We achieved: Other publications: 24 Chapter in book: 1	In the last year of the project we achieved: Other publications: 5 We also published project press release.
<b>Conferences</b>	# presentations > 15 Audience > 1,000	In the first year of the project we have presented project at 12 conferences.	In the second year of the project we have presented project at 10 conferences.	In the third year of the project we presented project at 13 conferences	In the fourth year of the project we presented it at 9 conferences.
<b>Trade shows</b>	# interacting visitors visitor profile # mentions in press	In the first year of the project we have presented project in three Trade shows.	In the second year of the project we have presented project in 4 Trade shows and in 3 exhibitions.	In the third year of the project we presented project in 1 trade fair and 2 exhibitions.	In the fourth year of the project we presented project in 1 trade fair and 1 exhibitions.

<b>Research-through communications</b>	Reach - through audience	We have conducted networking with the coordinators of the two human-centered manufacturing projects Satisfactory and SO-PC-PRO.	We have conducted networking with the coordinators of the three human-centered manufacturing projects Satisfactory, SO-PC-PRO and AMBIWISE.	We have conducted networking with Satisfactory project and different industrial associations (Automotive Cluster of Slovenia, CEPAUTO event in Spain, Styrian Chamber of Commerce).	We have conducted networking with Satisfactory project and different industrial associations.
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*Figure 27: Summary of done activities*

## 5 List of implemented activities in the project period

This chapter presents conducted dissemination activities in the four years project period in the field of implemented events, publications and blog posts.

### 5.1 List of implemented events

No	Type of dissemination activity	Name of event / title	Period / Location	Author / Responsible person
1	Invited conference talk	International Conference on Knowledge Technologies and Data - Driven Business.  <u>Title:</u> Worker - Centric Workplaces in Smart Factory.	September 2014 / Graz (AT)	Alexander Stocker, Michael Schmeja, Martin Wifling
2	Invited conference talk	CMG - AE Convention; Computer Measurement Group - Austria & Eastern Europe - "Industrie 4.0: Revolutionäre Anforderungen an die IT oder Business as Usual?  <u>Title:</u> Worker Centric Workplaces in Smart Factories - Introduction.	February 2015 / Vienna (AT)	Martin Wifling
3	Project presentation	<u>Title:</u> Project presentation to high - school students (with participants in computer informatics and programming classes).	March 2015 / Spodnja Idrija (SLO)	Tobija Kovač
4	Invited conference talk	4. Wissensmanagement - Tage Krems.  <u>Title:</u> Mensch - zentrierte IKT in Smart Factories Anwendungsfälle aus dem Industrie - 4.0 -Projekt FACTS4WORKERS.	April 2015 / Krems (AT)	Martin Wifling, Wolfgang Unzeitig
5	Invited conference talk	Mensch - zentrierte IKT in Smart Factories Anwendungsfälle aus dem Industrie - 4.0 - Projekt FACTS4WORKERS.  <u>Title:</u> Human Resources - Expertenforum: "Arbeiten in der digitalen Welt - Was bedeutet Industrie 4.0 für die Mitarbeiter	April 2015 / Stuttgart	Michael Schmeja

		konkret" at Strategische Partnerschaft Sensorik e.V.		
6	Trade fair	Forma Tool Fair	April 2015/ Celje (SLO)	Matjaž Milfelner
7	A Panel discussion	Smart Manufacturing - Industry 4.0 <u>Title:</u> Keynote on Smart Manufacturing	May 2015 / Vienna (AT)	Detlef Gerhard
8	Conference: Paper and talk	MOTSP2015 - International Conference Management of Technology – Step to Sustainable Production (MOTSP 2015) <u>Title:</u> Industrial challenges in human-centred production	June 2015 / Brela (CRO)	Wolfgang Unzeitig, Martin Wifling,  Alexander Stocker
9	Invited talk with workshop	3. Zukunftstag der steirischen Wirtschaft - Smart Production & Services <u>Title:</u> Worker Centric Workplaces in Smart Factories Introduction	June 2015 / Graz (AT)	Martin Wifling
10	Invited talk	3. Zukunftstag der steirischen Wirtschaft - Smart Production & Services <u>Title:</u> Worker Centric Workplaces in Smart Factories	June 2015 / Graz (AT)	Michael Schmeja
11	Conference: Poster & Brainstorm	ESWC EU Networking Event <u>Title:</u> Presentation of FACTS4WORKERS Project	June 2015 / Portoroz (SLO)	Erik Mannens
12	Workshop	TECSMEDIA - "Challenges and Opportunities for the factories Of The Future"	June 2015 / Zaragoza (ES)	Sergio Mayo
13	Meeting	ESTEP Committee <u>Title:</u> Presentation of FACTS4WORKERS Project as example for impact of industry 4.0 to HR Management	June 2015 / Duisburg (DE)	Ann-Kathrin Lang, Peter Limberger
14	Panel Discussion on Austrian National Radio Programme (ORF)	Ernst Mach Forum - Arbeit 4.0. Wo bleibt der Mensch im Zeitalter der Automatisierung? Labour 4.0 - Implications on workers in the age of automation? <u>Title:</u> Industrie 4.0, Internet of Things and Future Workplaces	June 2015 / Vienna (AT)	Detlef Gerhard
15	Trade Fair	METEC Trade Fair & 2 <sup>nd</sup> European Steel Technology and Application Days	June 2015/ Düsseldorf (DE)	Markus Brummayer



16	Interview on the Radio	Collaboration at regional Aragon radio station program  <u>Title:</u> FACTS4WORKERS as an example of Industry 4.0	July 2015 / Zaragoza (ES)	Sergio Mayo
17	Conference Keynote	22. Industrieauseminar, INTEGRATED PLANNING FOR INDUSTRIAL BUILDING 4.0	July 2015 / Vienna (AT)	Detlef Gerhard
18	Industrial Conference	Industrie 4.0 Forums  <u>Title:</u> "Smart Worker" - the role of men in the factory of the future	July 2015 / Cham (DE)	Michael Schmeja
19	Conference: paper and talk	International Conference on Production Research (ICPR)	August 2015 / Manila (Philippines)	Lea Hannola, Antero Kutvonen, Jorma Papinniemi, Hannele Lampela
20	Conference: abstract and talk	Work2015 Conference - New Meanings of Work  Title: Digitalization and knowledge work in manufacturing – matching worker and organizational perspectives	August 2015 / Turku (FI)	Hannele Lampela
21	Conference: paper and talk	ILERA World Congress  Title: Identifying worker needs and organizational responses in implementing knowledge work tools in manufacturing	September 2015 / Cape Town (South Africa)	Lea Hannola,
22	Presentation	Project presentation at SiEVA's event	September 2015 / Spodnja Idrija (SLO)	Samanta Krapež
23	Conference and paper	Conference: Mensch und computer	September 2015 / Stuttgart (DE)	Alexandre Richter, Alexandre Stocker
24	Expo and conference	COILTECH	September 2015 / Pordenone (IT)	Tobija Kovač

25	Conference	World Usability Congress <u>Title:</u> Smart Production-Workers Requirements on ICT	October 2015 / Graz (AT)	Martin Wifling
26	Plenum talk / Smart Factories: Der Mensch im Mittelpunkt der Produktion von morgen	KnowTech – Wissensmanagement, Social Collaboration, Industrie 4.0 /	October 2015 / Hanau (DE)	Martin Wifling, Alexander Richter, Ann Kathrin Lang
27	Outreach activity, Invited talk	Digitaldialog "Digitale Assistenzsysteme in der Fabrik von morgen" <u>Title:</u> Smart Workers und attraktive Arbeitsplätze in der Industrie 4.0	November 2015 / Graz (DE)	Peter Brandl
28	Interview on the Radio	Radio interview <u>Title:</u> Ö1 MATRIX "Industrie 4.0"	November 2015 / Graz (AT)	Martin Wifling
29	Participation at event	Premiere des Films Augenhöhe Wege Participation at Open World Café about the topic "future workplaces". <a href="http://augenhoehe-wege.de/">http://augenhoehe-wege.de/</a>	March 2016 Karlsruhe (DE)	UZH team
30	Trade fair	Hannover Messe	April 2016 Hannover (DE)	Martin Wifling, Marlene Schafner UZH team
31	Radio interview	Interview on the radio- La ventana de Aragón - Industria 4.0 <a href="http://play.cadenaser.com/audio/016RD010000000553354/">http://play.cadenaser.com/audio/016RD010000000553354/</a>	May 2016 Zaragoza (ES)	Pedro Amoraga
32	Expo and conference	CWIEME Berlin	May 2016 Berlin (DE)	Tobija Kováč
33	Invited talk and conference	Learning by d0/Ing Title: Digitales Lernen in Zeiten von Smart Production & Services	May 2016 Graz (AT)	Martin Wifling Michael Spitzer
34	Expo and conference	AUTOMATICA, Trade Fair for Automation and Mechatronisch	June 2016 München (DE)	Tadej Kodelja
35	Invited conference talk	ProSTEP IVIP Symposium Title: Smart Workers – empowered people for advanced future manufacturing	June 2016 Stuttgart (DE)	Michael Schmeja Alexander Stocker
36	Invited conference talk	Forum Produktion 2016 Title: FACTS4WORKERS: Increasing efficiency through intelligent information systems in an Automotive Industry Case	June 2016 Linz (AT)	Alexander Stocker

37	Conference and paper	ISPIM 2016 International Society for Professional Innovation Management Title: Sociotechnical challenges in knowledge-intensive production environments	June 2016 Porto (PT)	Lea Hannola
38	Conference	Siemens Executive Summit - "On the way to Industrie 4.0 - Driving the Digital Enterprise"	June 2016 Schloss Mondsee (DE)	Detlef Gerhard
39	Technology meeting	Global IE / Technology meeting Schaeffler	June 2016 Herzogenaurach (DE)	Schaeffler team
40	Keynote	SAP Education Forum Germany Keynote: Wie lernen und arbeiten wir in der Zukunft? <a href="http://www.slideshare.net/SAP-Learn/wie-arbeiten-und-lernen-wir-in-der-zukunft">http://www.slideshare.net/SAP-Learn/wie-arbeiten-und-lernen-wir-in-der-zukunft</a>	June 2016 Walldorf (DE)	UZH team
41	Workshop and conference	Commission on Innovation with Industry 4.0 - Comisión de Innovación en Industria 4.0	June Zaragoza (ES)	Jorge Millán
42	Conference and paper	Mensch und Computer 2016  (Paper: Einsatz eines Live Video Remote Systems in der Industrie)	September 2016 Aachen (DE)	Peter Brandl
43	Workshop on a Conference and paper	Mensch und Computer 2016  (Paper: Worker Characteristics moderate the Impact of Socio-technical Workplace Interventions on Job Satisfaction)	September 2016 Aachen (DE)	Peter Mörtl, Marlene Schafner Francisco José Lacueva-Pérez
44	Scientific Event	European Researchers' Night (Facts4Workers Presentation at evolaris stand)	September 2016 Vienna (AT)	Peter Brandl
45	Conference and paper	International Web Rule Symposium (RuleML) 2016	September 2016 Stony Brook, NY, (USA)	Dörthe Arndt, Joachim Van Herwegen Ruben Verborgh Erik Mannens
46	Congress	3rd Vienna Congress for Production Engineering 2016 Title: Adaptive & Smart manufacturing	September 2016 Vienna (AT)	Detlef Gerhard
47	Workshop on local strategy for implementing Industry 4.0	Project presentation and future local exploitation - Local stakeholder meeting for project TRINNO :	September 2016 Firenze (IT)	Gianni Campatelli

48	Lecture	Work Smart Week Lecture: General presentation of research results of work smart. In panel discussion facts4worker use cases were discussed among other topics. <a href="http://work-smart-initiative.ch/de/news/blog/work-smart-einfuehren-was-funktioniert-was-funktioniert-nicht/">http://work-smart-initiative.ch/de/news/blog/work-smart-einfuehren-was-funktioniert-was-funktioniert-nicht/</a>	September 2016 St. Gallen (CH)	UZH team
49	Invited talk and conference	Industrial Technologies for Inter-regional cooperation and growth- in the context of the Knowledge Exchange Platform (KEP) Title: Building ICT for smart factories which are attractive to workers	October 2016 Brussels (BE)	Martin Wifling
50	Exhibition	EARPA FORM Forum	October 2016 Brussels (BE)	Miloš Šturm Tanja Mohorič
51	Project presentation to the students from "School of Industrial Management".	Presentation of FACTS4WORKERS results - Project presentation, with special focus about how the results fit in the general Industry 4.0 picture (Lesson to a classroom of student from "School of Industrial Management". The school has been created by the local industry categories)	October 2016 Firenze (IT)	Gianni Campatelli
52	Conference and paper	International Conference on Knowledge Technologies and Data-driven Business – i-KNOW	October 2016 Firenze, Italy	Peter Mörtl, Marlene Schafner, Alexander Stocker
53	Workshop TCS	Presentation at workshop	December 2016, Slovenia	EMO
54	Conference	European Steel Technology Platform (ESTEP)	January 2017 Brussels	TKSE
55	Conference and paper	13th International Conference on Wirtschaftsinformatik	February 2017 St. Gallen, Switzerland,	UZH
56	Conference	T.A. Cook Berlin / Maindays2017 - Wissensmanagement für die lernende Organisation - Know-how-Sicherung in der Technik	March 2017, Berlin, Germany	TKSE
57	Conference	2. VDI Fachkonferenz: Virtuelle Techniken in der Fahrzeugentwicklung	March 2017,	VIF

		(DIY Assembly & Maintenance Instructions)	Stuttgart, Germany	
58	Trade fair	Forma Tool Fair - FACTS4WORKERS project presentation	April 2017, Slovenia	EMO
59	Future of Production Seminar	Seminar about digital assistance systems and augmented reality	April 2017, Amstetten, Austria	EVO
60	Project presentation	Presentation of FACTS4WORKERS Use Cases - Instandhaltungstage	April 2017, Klagenfurt, Austria	EVO
61	Industrial Workshop	CEPAUTO 2017. XV Jornada Internacional De Plásticos En Automoción	May 2017, Barcelona, Spain	ITA
62	Alignment Meetings	Corporate Project Organization	(Every quarter) Herzogenaurach, Germany	SCA
63	Conference	AC Styria Business Lounge (Der Mensch in der Fabrik der Zukunft)	June 2017 Graz, Austria	VIF
64	Conference: paper and talk	EdMedia 2017	June 2017 Washington DC, USA	VIF
65	Conference	AC Styria Business Lounge (Der Mensch in der Fabrik der Zukunft)	June 2017 (Graz, Austria)	VIF
66	Conference and paper	30th Bled eConference Title: IT on the shop floor – Challenges of the digitalization of manufacturing companies	June 2017 Bled, Slovenia,	UZH
67	Bachelor thesis	Bachelor Thesis at Graz University of Technology, Institute of General Management and Organization (Market and Competition Analysis for Smart Factory)	June 2017 Graz, Austria	VIF

		Solutions)		
<b>68</b>	Conference: paper and talk	International Conference on Production Research (ICPR) 2017  Title: An evaluation framework for worker-centric solutions	August 2017 Poznan, Poland,	LUT
<b>69</b>	Conference and papers (4X)	Mensch und Computer 2017	September 2017 Regensburg, Germany,	VIF, UZH, LUT,EVO
<b>70</b>	Conference paper and talk	IN-Tech2017: International Conference on Innovative Technologies	September 2017 Ljubljana, Slovenia,	VIF, EMO
<b>71</b>	Exhibition	NETSYNO booth with i40cases at practitioner conference: Industrie 4.0 – Startups meet Hidden Champions	October 2017 Heilbronn, Germany	UZH
<b>72</b>	Conference	i-Know 2017	October 2017 Graz, Austria,	VIF
<b>73</b>	Talk	Spark Summit Europe 2017 - Hiding apache spark complexity for fast prototyping of big data applications—industry 4.0 and logistics success examples.	October 2017  Dublin, Ireland	ITA
<b>74</b>	Master Thesis	Master Thesis - Gestaltung einer API zur Datenerfassung und -verwaltung mittels Eve (Oliver Willem (lecturer: Detlef Gerhard))	Vienna, Austria	VUT
<b>75</b>	Project presentation	NETSYNO booth with i40cases at practitioner conference: Creative Collaboration Culture Day	October 2017  Karlsruhe, Germany	UZH
<b>76</b>	Exhibition	NETSYNO booth with i40cases at practitioner conference: Startup the Future - Allianz Industrie4.0 Baden-Württemberg	November 2017 Stuttgart, Germany	UZH

77	Talk in event	NETSYNO talk with i40cases at practitioner event: Chancen der digitalen Transformation im Unternehmen nutzen	November 2017 Stuttgart, Germany	UZH
78	Conference	Wissensmanagement bei der thyssenkrupp Steel Europe AG - der Mensch im Mittelpunkt von Industrie 4.0	November 2017, Stuttgart, Germany	TKSE
79	Thesis	Thesis DOA 2nd Edition - Implementación de un departamento de RR.HH junto a un sistema formativo digitalizado	December 2018, Zaragoza, Spain	THO
80	Conference and paper	ACIS 2017 conference	December 2017 Hobart, Australia	UZH team
81	Radio interview	Project presentation and GAM	January 2018, Zaragoza, Spain	ITA
82	Conference	Digitalisierung und Diversity: Arbeitswelt 4.0 gemeinsam gestalten - Konferenz im Rahmen des vom BMBF geförderten Forschungsprojektes Women Ressource 4.0	January 2018, Bielefeld, Germany	TKSE
83	Conference and paper	GROUP 2018 conference	January 2018, Sanibel Island, FL, USA	UZH team
84	Thesis	Bachelor Thesis: Medición del Impacto en el trabajador desoluciones Industria 4.0 mediante el uso de logs.	February 2018, Zaragoza, Spain	ITA
85	Video release	Antena Aragón News - Proyecto FACTS4WORKERS en Noticias Aragón TV	February 2018, Zaragoza, Spain	THO, ITA
86	Conference	20th International Working Seminar on Production Economics  Title: Assessing the Impact of Digital Interventions on the Shop Floor	February 2018, Innsbruck, Austria	LUT

87	Workshop presentation	Impulsar el crecimiento basado en la innovación en el sector de la automoción en Aragón  FACTS4WORKERS: Factorías para Trabajadores.	February 2018, Zaragoza, Spain	ITA
88	Conference and paper	ICEIS 2018	March 2018, Funchal, Portugal	VUT
89	Workshop	Live-Video-Assistenzsystem in der Instandhaltung	March 2018, Graz Austria	EVO
90	Exhibition (shared booth)	Exhibition materials about Facts4Worker at the booth of an industrial partner of the University of Zurich. A project employee Facts4Workers is for visitors available to answer questions about the project Facts4Workers	April 2018, Hannover, Germany	UZH team
91	Conference and paper	51st CIRP conference on Manufacturing Systems	May 2018, Stockholm, Sweden	VUT
92	Master Thesis	Einflussfaktoren eines Live-Video-Assistenzsystems auf den Problemlösungszyklus von Service- und InstandhaltungsmitarbeiterInnen	Graz, Austria	HID
93	2x Conference and paper	DAEM2 conference  Title: Assessing TRL of HCI Technologies Supporting Shop Floor Workers  Title: Insights into the Introduction of Digital Interventions at the shop floor	June 2018, Corfu, Greece	LUT, ITA, VIF, EVO
94	Conference and paper	ISPIM 2018 conference  Title: Adoption of VR and AR technologies in the enterprise	June 2018, Stockholm, Sweden	LUT
95	Trade fair	Automatica 2018 fair	June 2018, Munich, Germany	HID
96	Workshop	Evaluation in EMO – EMO use cases	June 2018, Celje Slovenia	EMO, VIF



97	Participation	Participation in several Workshops in the field Industrie 4.0	June, July, September 2018  Stuttgart, Karlsruhe, Pforzheim, Germany	UZH team
98	Bachelor Thesis	Konzeptentwicklung für die Evaluation kontextbasierter Systeme in der Industrie	June 2018, Vienna, Austria	VUT
99	Workshop "Agile Development for I40"	Workshop zum Thema "Agile Software Development for Industrial 4.0 projects"	September 2018, Karlsruhe, Germany	UZH team
100	Presentation	B/S/H's day - Lean and Industry 4.0 at B/S/H suppliers – Presentation use case THO	September 2018	THO
101	Presentation	Project presentation for the industrial partners of the DigiPro project - Presentation of the F4W project results	October 2018, Vantaa, Finland	LUT
102	Round table	Segundo Congreso Internacional PRL y Seguridad Industrial: NUEVAS TECNOLOGÍAS Y SU APLICACIÓN EN LA SST.	October 2018, Zaragoza, Spain	ITA

Figure 28: Reached events in 4 project year

## 5.2 List of implemented scientific publications

### Chapter in book

1. Richter, Alexander; Heinrich, Peter; Stocker Alexander; Steinhueser, Melanie (2017): Die neue Rolle des Mitarbeiters in der digitalen Fabrik der Zukunft, In: Reinheimer, Stefan (Editor): Industrie 4.0 Herausforderungen, Konzepte und Praxisbeispiele, pp 117-131, DOI: 10.1007/978-3-658-18165-9  
Link: <https://www.springerprofessional.de/en/industrie-4-0/13302732>

### Published peer-reviewed journal papers

1. Leyer M., Richter A., Steinhüser M. (2018): "Power to the workers": Empowering shop floor workers with worker-centric digital designs, International Journal of Operations & Production Management, June 2018, DOI: 10.1108/IJOPM-05-2017-0294  
Link: <https://doi.org/10.1108/IJOPM-05-2017-0294>
2. Hannola, L., Richter, A., Richter, S., Stocker, A. (2018) Empowering production workers with digitally facilitated knowledge processes – a conceptual framework, International Journal of Production Research, March 2018, DOI: 10.1080/00207543.2018.1445877  
Link: <https://www.tandfonline.com/doi/full/10.1080/00207543.2018.1445877>
3. Richter, A., Heinrich, P., Stocker, A. Schwabe, G. (2018): Digital Work Design. The Interplay of Human and Computer in Future Work Practices as an Interdisciplinary (Grand) Challenge, Bus Inf Syst Eng (2018). DOI: 10.1007/s12599-018-0534-4  
Link: <https://doi.org/10.1007/s12599-018-0534-4>
4. Spitzer M., Nanic I., Ebner M. (2018): Distance Learning and Assistance Using Smart Glasses, Educ. Sci. 2018, 8(1), 21, DOI: 10.3390/educsci8010021  
Link: <https://doi.org/10.3390/educsci8010021>
5. Campatelli G.; Richter A.; Stocker A. (2016): Participative Knowledge Management to Empower Manufacturing Workers, International Journal of Knowledge Management (IJKM), 2016, Volume 12, Issue 4, pp 37-50, DOI: 10.4018/IJKM.2016100103  
Link: <http://www.igi-global.com/article/participative-knowledge-management-to-empower-manufacturing-workers/177892>
6. Stocker, A., Spitzer, M., Kaiser, C. et al. (2016): Datenbrillengestützte Checklisten in der Fahrzeugmontage, Informatik Spektrum, April 2016, pages 1-9, DOI: 10.1007/s00287-016-0965-6.  
Link: <http://link.springer.com/article/10.1007%2Fs00287-016-0965-6>
7. Richter A.; Heinrich P.; Stocker A.; Unzeitig W. (2015): Der Mensch im Mittelpunkt der Fabrik von morgen, HMD Praxis der Wirtschaftsinformatik, October 2015, Volume 52, Issue 5, pp 690-712.  
Link: <http://link.springer.com/article/10.1365/s40702-015-0173-x>
8. Stocker A.; Brandl P.; Michalczuk R.; Rosenberger M. (2014): Mensch-zentrierte IKT-Lösungen in einer Smart Factory, E&I Elektrotechnik und Informationstechnik, October 2014, Volume 131, Issue 7, pp 207-211.  
Link: <http://link.springer.com/article/10.1007%2Fs00502-014-0215-z>

### Published peer-reviewed conference papers

#### 1. **Paper from ISPIM 2018**

Hannola L; Ojanen V; Heinonen M (2018): Adoption of VR and AR technologies in the enterprise; Stockholm, Sweden, June 2018

Link: [ISPIM Adoption of VR and AR technologies in the enterprise](#)

#### 2. **Papers from DAEM2**

Lacueva-Pérez F-J; Khakurel J; Brandl P; Hannola L; Gracia-Bandrés M; Schafler M (2018): Assessing TRL of HCI Technologies Supporting Shop Floor Workers, Genova, Italy, June 2018

Link: [Assessing TRL of HCI Technologies Supporting Shop Floor Workers](#)

#### 3. Lacueva-Pérez F-J; Hannola L; Schafler M; Damalas S; Nierhoff J; Herrmann T (2018): Insights into the Introduction of Digital Interventions at the shop floor; Corfu, Greece, June 2018

Link: [Insights into the Introduction of Digital Interventions at the shop floor](#)

#### 4. **Paper from 51st CIRP conference on Manufacturing Systems**

Rosenberger P ; Gerhard D; Rosenberger P (2018): Context-awareness in industrial applications: definition, classification and use case; Stockholm, Sweden, May 2018, DOI: 10.1016/j.procir.2018.03.242

Link: <https://www.sciencedirect.com/science/article/pii/S2212827118304128>

#### 5. **Paper from ICEIS 2018**

Rosenberger P ; Gerhard D; Rosenberger P (2018): Context-Aware System Analysis: Introduction of a Process Model for Industrial Applications; Funchal, Madeira, Portugal, March 2018, DOI: 10.5220/0006802703680375

Link: <http://www.scitepress.org/PublicationsDetail.aspx?ID=rVNetjdG-POo=&t=1>

#### 6. **Paper from GROUP 2018 conference**

Heinrich P.; Richter A.; Christensen L. R.; Schwabe G. (2018): Creating, Reinterpreting, Combining, Cuing – Paper Practices on the Shopfloor, ACM International Conference on Supporting Group Work, Sanibel Island, USA, January 2018

Link: [http://facts4workers.eu/wp-content/uploads/2017/01/2018\\_Heinrich-et-al\\_Group-2018\\_Paper-on-the-shopfloor\\_PRINT\\_final.pdf](http://facts4workers.eu/wp-content/uploads/2017/01/2018_Heinrich-et-al_Group-2018_Paper-on-the-shopfloor_PRINT_final.pdf)

#### 7. **Paper from ACIS 2017 conference**

Richter S.; Trier M.; Richter A. (2017): Value co-creation in the digital factory – The empowered role of shop floor workers, Australasian Conference on Information Systems, Hobart, Australia, December 2018

Link: [http://facts4workers.eu/wp-content/uploads/2017/01/2017\\_Richter-et-al-ACIS2017-Final-Revised.pdf](http://facts4workers.eu/wp-content/uploads/2017/01/2017_Richter-et-al-ACIS2017-Final-Revised.pdf)

#### 8. **Paper from Production Economics conference**

Hannola, L., Steinhüser, M., Richter, A., Schafler, M. & Lacuera-Pérez F.J. (2018) Assessing the Impact of Digital Interventions on the Shop Floor, Proceedings of the 17th International Working Seminar on Production Economics, February 20-25, 2012, Innsbruck, Austria.

#### 9. **Paper from IN-TECH 2017**

Milfelner M.; Schafler M.; Spitzer M.; Wifling M. (2017): Smart oriented workplaces in tool production, International Conference on Innovative Technologies, Ljubljana, Slovenia, September 2017

Link: [http://facts4workers.eu/wp-content/uploads/2017/01/9\\_SMART-ORIENTED-WORKPLACES-IN-TOOL-PRODUCTION 1.pdf](http://facts4workers.eu/wp-content/uploads/2017/01/9_SMART-ORIENTED-WORKPLACES-IN-TOOL-PRODUCTION 1.pdf)

#### 10. **Papers from Mensch und Computer 2017**

Michael S.; Marlene S.; Matjaž M. (2017): Seamless Learning in the Production, Mensch und Computer 2017, Regensburg, Germany, September 2017

Link: [http://facts4workers.eu/wp-content/uploads/2017/01/8\\_MuC2017\\_Seamless-Learning-in-the-Production.pdf](http://facts4workers.eu/wp-content/uploads/2017/01/8_MuC2017_Seamless-Learning-in-the-Production.pdf)

#### 11. Steinhueser M.; Heinrich P.; Richter A. (2017): Von der digitalen Transformation der Produktion, Mensch und Computer 2017, Regensburg, Germany, September 2017

Link: [http://facts4workers.eu/wp-content/uploads/2017/01/7\\_MuC2017\\_Von-der-digitalen-Transformation-der-Produktion.pdf](http://facts4workers.eu/wp-content/uploads/2017/01/7_MuC2017_Von-der-digitalen-Transformation-der-Produktion.pdf)

#### 12. Schafler M.; Hannola L.; Lacueva-Pérez F. J.; Milfelner M.; Steinhueser M.; Gracia A.M. (2017): Evaluating worker-centered smart interventions on the shop floor, Mensch und Computer 2017, Regensburg, Germany, September 2017

Link: [http://facts4workers.eu/wp-content/uploads/2017/01/6\\_MuC2017\\_Evaluating-worker-centered-smart-interventions-on-the-shop-floor.pdf](http://facts4workers.eu/wp-content/uploads/2017/01/6_MuC2017_Evaluating-worker-centered-smart-interventions-on-the-shop-floor.pdf)

#### 13. Gödl A.; Brandl P. (2017): Multimodale Interaktion mit HMIs in der Smart Factory, Mensch und Computer 2017, Regensburg, Germany, September 2017

Link: [http://facts4workers.eu/wp-content/uploads/2017/01/5\\_MuC-2017-Multimodale-Interaktion-mit-HMIs-in-der-Smart-Factory\\_FINAL.pdf](http://facts4workers.eu/wp-content/uploads/2017/01/5_MuC-2017-Multimodale-Interaktion-mit-HMIs-in-der-Smart-Factory_FINAL.pdf)

#### 14. **Paper from 24th International Conference on Production Research**

Hannola L.; Lacuera-Pérez F.J.; Steinhueser M.; Kokkonen K.; Ojanen V.; Schafler M. (2017): An evaluation framework for worker-centric solutions in production environments, 24th International Conference on Production Research, Poznan, Poland, July 2017

Link: [http://facts4workers.eu/wp-content/uploads/2017/01/4\\_ICPR2017\\_Research\\_paper\\_Evaluation-Framework\\_31\\_05\\_2017\\_FINAL\\_1.0.pdf](http://facts4workers.eu/wp-content/uploads/2017/01/4_ICPR2017_Research_paper_Evaluation-Framework_31_05_2017_FINAL_1.0.pdf)

#### 15. **Paper from 30th Bled eConference**

Richter A.; Vodanovich S.; Steinhüser M.; Hannola L. (2017): IT on the Shop

Floor - Challenges of the Digitalization of manufacturing companies; 30th Bled eConference, Bled, Slovenia, June 2017

Link: [http://facts4workers.eu/wp-content/uploads/2017/01/3\\_eBled2017\\_IT-on-the-Shop-Floor\\_final.pdf](http://facts4workers.eu/wp-content/uploads/2017/01/3_eBled2017_IT-on-the-Shop-Floor_final.pdf)

**16. Paper from EdMedia 2017**

Spitzer M.; Ebner M. (2017): Project Based Learning: from the Idea to a Finished LEGO® Technic Artifact, Assembled by Using Smart Glasses; EdMedia: World Conference on Educational Media and Technology 2017, Washington D.C., USA, June 2017

Link: [https://www.researchgate.net/publication/317664086\\_Project\\_Based\\_Learning\\_from\\_the\\_Idea\\_to\\_a\\_Finished\\_LEGOR\\_Technic\\_Artifact\\_Assembled\\_by\\_Using\\_Smart\\_Glasses](https://www.researchgate.net/publication/317664086_Project_Based_Learning_from_the_Idea_to_a_Finished_LEGOR_Technic_Artifact_Assembled_by_Using_Smart_Glasses)

**17. Paper from Wirtschaftsinformatik 2017**

Engelmann A.; Heinrich P.; Schwabe G. (2017): Mobiles Lernen für Industrie 4.0: Probleme, Ziele, Lernarrangements; 13th International Conference on Wirtschaftsinformatik, St. Gallen, Switzerland, February 2017

Link: [http://facts4workers.eu/wpcontent/uploads/2017/01/MobilesLernen\\_WI2017\\_Revision\\_CAM\\_READY\\_ACK.pdf](http://facts4workers.eu/wpcontent/uploads/2017/01/MobilesLernen_WI2017_Revision_CAM_READY_ACK.pdf)

**18. Paper from International Conference on Knowledge Technologies and Data-driven Business – i-KNOW**

Mörtl P.; Schafler M.; Stocker A. (2016): A Psychological Framework for the Design of System Interventions that Increase Resilience, International Conference on Knowledge Technologies and Data-driven Business - i-KNOW, October 2016.

Link: [http://facts4workers.eu/wp-content/uploads/2017/01/5\\_Framework-for-Resilience-pmoertl-Aug-2016.pdf](http://facts4workers.eu/wp-content/uploads/2017/01/5_Framework-for-Resilience-pmoertl-Aug-2016.pdf)

**19. Papers from Mensch und Computer 2016**

Streibl M.; Brandl P. (2016), Einsatz eines Live Video Remote Systems in der Industrie, Mensch und Computer 2016, September 2016.

Link: [http://facts4workers.eu/wp-content/uploads/2017/01/2\\_Einsatz-eines-Live-Video-Remote-Systems-in-der-Industrie.pdf](http://facts4workers.eu/wp-content/uploads/2017/01/2_Einsatz-eines-Live-Video-Remote-Systems-in-der-Industrie.pdf)

**20. Mörtl P.; Schafler M.; José Lacueva-Pérez F. (2016), Worker Characteristics moderate the Impact of Socio-technical Workplace Interventions on Job Satisfaction, Mensch und Computer 2016, September 2016.**

Link: [http://facts4workers.eu/wp-content/uploads/2017/01/3\\_Mörtl\\_Schafler\\_Lacueva-Perez\\_2016.pdf](http://facts4workers.eu/wp-content/uploads/2017/01/3_Mörtl_Schafler_Lacueva-Perez_2016.pdf)

**21. Paper from RuleML conference**

Dörthe A.; Van Herwegen J.; Verborgh R.; Mannens E.; Van de Walle R. (2016), Using Rules to Generate and Execute Workflows in Smart Factories, RuleML conference, July 2016.

Link: [http://facts4workers.eu/wp-content/uploads/2017/01/4\\_RuleMLIndustry\\_2016.pdf](http://facts4workers.eu/wp-content/uploads/2017/01/4_RuleMLIndustry_2016.pdf)

**22. Paper from The XXVII ISPIM Innovation Conference**

Hannola L.; Heinrich P.; Richter A.; Stocker A. (2016), Sociotechnical challenges in knowledge-intensive production environments, The XXVII ISPIM Innovation Conference, June 2016.

Link: [http://facts4workers.eu/wp-content/uploads/2017/01/1\\_ISPIMPaper\\_HannolaHeinrichRichterStocker\\_FINAL\\_1.0.pdf](http://facts4workers.eu/wp-content/uploads/2017/01/1_ISPIMPaper_HannolaHeinrichRichterStocker_FINAL_1.0.pdf)

**23. Paper from KnowTech 2015**

Richter A.; Lang A-K.; Denner J.; Wifling M. (2015): Industrie 4.0.: Der Mensch im Mittelpunkt der Produktion von morgen - Wissensmanagement für mobile Instandhalter bei der ThyssenKrupp Steel Europe AG, KnowTech 2015, October 2015.

Link: [http://facts4workers.eu/wp-content/uploads/2017/07/Industrie40\\_KnowTech-2015.pdf](http://facts4workers.eu/wp-content/uploads/2017/07/Industrie40_KnowTech-2015.pdf)

**24. Paper from the 17<sup>th</sup> ILERA (International Labour and Employment Relations Associations) World Congress**

Lampela H.; Heilmann P.; Hurmelinna - Laukkanen P.; Lämsä T.; Hyrkäs E.; Hannola L. (2015): Identifying worker needs and organizational responses in implementing knowledge work tools in manufacturing, 17<sup>th</sup> ILERA World Congress, September 2015.

Link: <http://facts4workers.eu/wp-content/uploads/2017/01/FACTS4WORKERS-ILERA-2015-paper1.pdf>

**25. Paper from Mensch und Computer 2015**

Stocker A.; Denger A.; Wifling M.; Fritz J.; Kaiser C.; Kittl C.; Richter A. (2015), Smart factories: Mitarbeiter-zentrierte Informationssysteme für die Zusammenarbeit der Zukunft, Mensch und Computer 2015, September 2015.

Link: <http://facts4workers.eu/wp-content/uploads/2017/07/Mensch-und-computer-2015.pdf>

**26. Paper from the 23<sup>rd</sup> International Conference on Production Research**

Hannola L.; Kutvonen A.; Papinniemi J.; Lampela H. (2015): A conceptual framework for linking worker and organizational needs to data and information requirements, 23<sup>rd</sup> International Conference on Production Research, August 2015.

Link: <http://facts4workers.eu/wp-content/uploads/2017/01/ICPR-2015-Framework-for-linking-worker-and-organizational-needs-ByHannolaKutvonenPapinniemiLampela.pdf>

**27. Paper from 12<sup>th</sup> ESWC EU Networking Event**

Arndt D.; Van Herwegen J.; Verborgh R.; Mannens E.; Van De Walle R. (2015): Facts4workers: Worker centric Workplaces in Smart Factory, 12<sup>th</sup> ESWC 2015, June 2015.

Link: <http://facts4workers.eu/wp-content/uploads/2017/01/Paper-from-12th-ESWC-EU-Networking-Event.pdf>

**28. Paper from MOTSP 2015 - International Conference Management of Technology – Step to Sustainable Production**

Wolfgang U.; Wifling M.; Stocker A.; Rosenberger A. (2015): Industrial challenges in human –centred production, MOTSP 2015, June 2015.

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## 5.4 List of blog posts

NUMBER	TITLLE	PARTNER	TUMBLR	WEBSITE BLOG
1	Kick-off meeting in Graz	SIA		X
2	Project workshop (WP1)	SIA	X	X
3	1st general assembly meeting	SIA	X	X
4	1st official FACTS4WORKERSpress release	VIF	X	
5	Vision	VIF	X	
6	Second project meeting: The Kick-off meeting of the WP2, WP3, WP4 and WP5	HIR	X	
7	Project presentation to high school students	HIR	X	
8	Project presentation at ESWC 2015 conference	SIA, IMI		X
9	Visit our video from the TECSMEDIA conference on 10. June 2015 in Zaragoza, Spain	SIA, ITA		X
10	Visit our project brochure	SIA		X
11	FACTS4WORKERSpresented at conference MOTSP 2015	VIF	X	X
12	FACTS4WORKERSpresentation at TECSMEDIA 4 workshop	ITA	X	X
13	FACTS4WORKERSpresented at Aragón Radio program	ITA		X
14	FACTS4WORKERStalk at Kremser Wissensmanagement Tage	VIF	X	X
15	Google Glass „Enterprise Edition“	EVO	X	X
16	Mobile eye tracking - Tobii Glasses 2	ITA	X	
17	Workshop on Opportunities in Horizon 2020	VIF	X	
18	Why you should or shouldn't be involved in EU Horizon 2020 projects	VIF	X	
19	FACTS4WORKERStalk at the ICPR Conference	LUT, SIA	X	X
20	FACTS4WORKERSpresentation at Industrie 4.0 conference	VIF, SIA	X	X
21	Project presentation at SiEVA's event	SIA	X	X
22	FACTS4WORKERSnetworking workshop at Mensch und Computer 2015	VIF	X	X
23	The changing world of work presented at ILERA World Congress	LUT		X
24	FACTS4WORKERSmeets SO-PC-PRO in Graz	VIF		X

25	FACTS4WORKERSDissemination Workshop	SIA, VIF		X
26	FACTS4WORKERSpresented at COILTECH EXPO in Italy	HIR, SIA		X
27	FACTS4WORKERSat KnowTech 2015 Conference	VIF		X
28	Fruitful Cooperation of FoF-4 projects	VIF	X	X
29	Digital assistance systems as empowerment for workers in the smart factory	EVO		X
30	Smart Factories at KnowTech 2015	VIF	X	X
31	Radio broadcast on ICT in Industry 4.0	VIF		X
32	Smart Glasses Comparison	EMO	X	X
33	Taxonomy of HCI technologies	ITA	X	X
34	Requirements of workers and organisations	UZH, SIA	X	X
35	Evaluating HCI Technologies readiness for being used on the shop-floor	VIF	X	X
36	Project Deliverable 1.3 – Detailed and Refined Industrial Challenges, Version I	LUT,SIA		X
37	12month-Review meeting	VIF		X
38	Impressions of the HANNOVER MESSE 2016	VIF		X
39	The ISPIM Innovation Conference in Porto	LUT,SIA	X	X
40	Whitepaper: Industrial Suitability of Mobile HMIs	EMO, SIA		X
41	FACTS4WORKERSpresented at AUTOMATICA EXPO	HIR, SIA		X
42	FACTS4WORKERShosts workshop @ Mensch und Computer 2016 conference	VIF		X
43	Project Deliverable 5.1 – “Blueprint architecture and integration plan”	SIA		X
44	Project Deliverable 6.1- Evaluation Framework	ITA		X
45	FACTS4WORKERSpresented at RuleML conference	IMI, SIA	X	X
46	FACTS4WORKERSWorkshop Smart Factories: User-centered information systems for future collaboration	VIF	X	X
47	Testing of new Head Up Displays (HUD)	VIF		X
48	What trade-offs do we expect in the future of smart factories?	VIF	X	X
49	How does Industry 4.0 solutions influence the shop-floor workers satisfaction and productivity?	ITA, SIA	X	X
50	Deployment of first prototypes of FACTS4WORKERSsolution	VIF	X	X
51	Designing Resilience into Industry 4.0	VIF	X	X

52	How will be the future factories? FACTS4WORKERS bets that they will be social and collaborative.	UNIFI	X	X
53	FACTS4WORKERS presented at EARPA FORM Forum	SIA		X
54	Thyssenkrupp Steel Europe presents their FACTS4WORKERS use case at "Horizont 2020 – Erfolge im Blick - See more at	SIA, TKSE		X
55	To what extent can state of the art HCI technologies support the requirements of workers?	ITA	X	X
56	President of the Styrian Chamber of Labour visits Facts4Workers	VIF	X	X
57	FACTS4WORKERS 4th General Assembly meeting	SIA		X
58	FACTS4WORKERS PRESS RELEASE	SIA		X
59	Participative Knowledge Management to Empower Manufacturing Workers	VIF		X
60	FACTS4WORKERS introductory video release	SIA	X	X
61	Second Technical Review of the FACTS4WORKERS project held in Tolmin, Slovenia	SIA	X	X
62	The FACTS4WORKERS use cases on the website	VIF	X	X
63	Results and insights from our project at the workshop on the Mensch und Computer 2017 conference (MuC17)	VIF		X
64	The presentation of FACTS4WORKERS Evaluation Framework in Poznan	LUT, SIA	X	X
65	Presenting the refined F4W Evaluation Framework @ Mensch und Computer (MuC2017) in Regensburg	VIF	X	X
66	FACTS4WORKERS was presented in the 2nd International SAMI40 workshop at the iKnow Conference	VIF	X	X
67	Deliverable "Technology Monitoring: Report on Information Needed For the Industrial Challenges Workers with Taxonomy"	ITA, SIA		X
68	FACTS4WORKERS attended the final workshop of the SATISFACTORY project	ITA, SIA		X
69	FACTS4WORKERS General Assembly Meeting	SIA		X
70	Presenting the new i40cases website	UZH	X	X
71	Presenting EVOCALL application	EVO, SIA	X	X
72	TU Wien presented FACTS4WORKERS at the ICEIS 2018 conference	VUT, SIA		X



<b>73</b>	TU Wien presented FACTS4WORKERS at the CIRP CMS 2018 conference	VUT, SIA	X	X
<b>74</b>	FACTS4WORKERS at the ISPIM Conference	LUT, SIA	X	X
<b>75</b>	FACTS4WORKERS presented at the Automatica 2018 fair	HID, SIA		X
<b>76</b>	FACTS4WORKERS project presents hightech solutions for shop-floor workers	SIA	X	X
<b>77</b>	HIDRIA Dieseltec Use Case Solution successfully implemented	SIA, HID	X	X
<b>78</b>	The FACTS4WORKERS consortium invites you to the closing event	SIA		X
<b>79</b>	FACTS4WORKERS solution was successfully deployed at thyssenkrupp Steel Europe	VUT, SIA		X
<b>80</b>	SCHAEFFLER use case 2 solution successfully deployed in Ingolstadt	VIF		X
<b>81</b>	Final version of FACTS4WORKERS solution successfully deployed at EMO-Orodjarna	VIF		X
<b>82</b>	HoloLens Application to support workers deployed at Schaeffler	VIF		X
<b>83</b>	FACTS4WORKERS successfully passes its final review meeting in Brussels	SIA		X

*Figure 29: Reached blog posts in project period*









## 6 Exploitation

### 6.1 Introduction and a re-cap of the work done thus far

In 2017 exploitation efforts within the FACTS4WORKERS project received a significant boost. After the exploitation model has already been prepared in the updated D7.2 deliverable, the 2017 brought extensive work on the business model for the solutions to be exploited. This was accomplished in form of a business plan (D7.7), prepared by VIF (with help of outside partner TU Graz). The FACTS4WORKERS project is therefore now in shape to push for effective solution exploitation in the project's final year.

#### 6.1.1 Business plan

The business plan (D7.7) as specified by VIF had several main sections. These were:

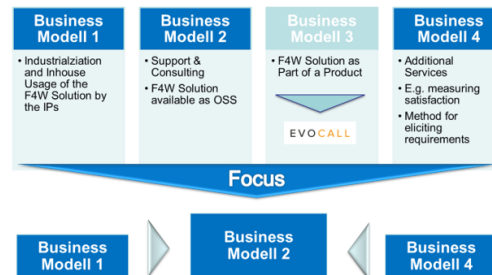
-  **Introduction**
-  **Results in the project F4W**
-  **IPR strategy within F4W**
-  **Business model**
-  **Market and competitive analysis**
-  **Summary – route to market**

## 4 Business Model

Within the following chapters a business model will be outlined, acting as an abstract representation of the aspired business. The development of the business model was based on a technique called “Business Model Canvas” as proposed by A. Osterwalder and Y. Pigneur, which covers and defines different important building blocks. The investigated dimensions in this case are the Expansion Stages, Consortium, Value Proposition, Customer Segments, Distribution Channels, Key Resources, Key Activities, Key Partners and Suppliers, Revenues and Expenses.

Considering in the beginning 4 business models, each model with 3 expansion stages it turned out that complexity is too high to handle. Therefore, we decided to focus on the most likely scenario “Support and Consulting” by integrating the relevant parts of the remaining three models.

*In the Business Plan we are focusing on Business Modell 2, integrating BM 1 and BM 4.  
Business Modell 3 is partially realized e.g. by Evocalis*



### 4.1 Expansion Stages

Figure 30: An outtake from the D7.7 Business Plan

## 6.1.2 Exploitation ideas

In order for the FACTS4WORKERS solutions to have the widest impact possible (regarding their reach in number of plants they can be used in and number of workers that can get acquainted with them and use them) the consortium started exploring possibilities on how to replicate, multiply and modify solutions in a way that they could be used beyond a solution’s specific UC.

Since the project was continuously evolving and since flexibility of industrial partners operation at the shop floor had to be taken into account, some exploitation ideas floated in the third project year haven’t materialized such as the idea to reuse SCA F4W building blocks at the HIR stamping lines at the Hidria Lamtec BU and to reuse the backbone of the EMO F4W solution at the HIR tool-shop.

An idea that was realized however was inclusion of parts of THO-related F4W knowledge in the HID UC by UNIFI. UNIFI also managed to successfully launch its own spin-off company Manulitic (*more info in the industrial partners’ results related chapter*) with first success in the local industrial region of Tuscany.

## 6.2 Pillars of exploitation

### 6.2.1 Direct project impact at industrial partners


The FACTS4WORKERS' developed solutions were directly tested in industrial environment at **6 industrial pilot sites**: EMO orodjarna UC (toolmaking; Slovenia), ThyssenKrupp Steel Europe (steel industry, Germany), Schaeffler Group (automotive, Germany), Thermolympic (automotive, Spain), Hidria Rotomatika (automotive, Slovenia) and Hidria TC (automotive, Slovenia).

The provided test pilot sites provide **very varied industrial settings**, reflecting different European industrial regions (German industrial environment, industrial sector in Spain, and inclusion of Slovenian industrial companies in European supply chains) as well as covering different positions of the industrial partners' companies within the European economy. In this regard **two of the pilots are SMEs**: Thermolympic and EMO. Companies also vary in size and position on the market: billion or multi-million industrial holdings and main suppliers (Tier-1 level) as is case of ThyssenKrupp Steel and Schaeffler group vs. large company of a smaller size and a Tier-2 supplier as is case with the two companies from Hidria Group (Rotomatika and Hidria TC).

The **variety of the challenges** is further also reflected in the selection of the industrial use-cases. The FACTS4WORKERS consortium has UC ranging from general **shop floor maintenance** (TKSE), **assembly line** maintenance (HID), maintenance together with **quality control** (EMO), **paperless information** management (SCA and THO), targeted **shop floor operator** support (HRO).

In the following passages this document shall present the achieved results of the FACTS4WORKERS project regarding the solutions that were developed for and deployed at each one of the above-mentioned industrial UCs:

#### 6.2.1.1 Hidria TC solution – implemented at Hidria Dieseltec BU (HID)

	Slovenia	Automotive
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The HID UC is a specially designed one since during the FACTS4WORKERS project it evolved from a specific targeted UC to a UC that includes collaboration from two BUs from Hidria Group: 1) The Hidria Industrial Automation BU (former company Hidria

TC d.o.o.)<sup>11</sup> The UC is focused on a development of a human-machine interface that can be applied to the case of assembly line module manufacturing in a company that created this business division from in-house knowledge and is now offering it to external customers as well.

The solution's final version is now **internally rebranded and integrated at a part of the upcoming IT system revamping at Hidria Dieseltec- the Hidria Knowledge Management System**. As of October 2018 the FACST4WORKERS solution is undergoing a series of tests and shall be **fully operative in November 2018**. The FACTS4WORKERS solution is currently being used on two full automatic lines and one manual machine. In the next month expansion on three additional automatic machines/lines is planned.

The purpose of the FACTS4WORKERS solution is to improve the **maintenance and operating work** at the Hidria Dieseltec BU's **glow plug assembly lines** at the company shop floor.

This UC is unique since as it involves an **already highly automatized production process**. The development partners also needed to take into account the already operating lines – all manufactured in-house – together with their software and hardware specifics.

The FACTS4WORKERS solution addresses issue of **improving working conditions for manufacturing line operators and technicians and maintenance staff**. The final solution enables the workers to insert errors and faults that might occur during the process. In **significantly eases solution of rarely occurring mistakes** whose solving process can be quickly forgotten. This is especially true with some product faults or damage that might occur, or with increased scrap characteristics at a certain point in the process.

The solution **upgrades the current paper based error data sheets** at a separate shop floor workplace being **replaced with a fully electronic database**.

The **developed FACTS4WORKERS solution enables different options**: 1) role-based access for login (line operator, worker, leader, maintenance staff) 2) database filtering function 3) a special context-based database filtering function that gives the user the best possible solution by looking at its login data (i.e. the machine and part code in production gives exact needed errors etc.) 4) database search function 5) solution provider

Industrial partner Hidria aims to **use the developed FACTS4WORKERS solution in operator education processes**. Each line operator can access knowledge provided

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<sup>11</sup> In October 2018 the company Hidria TC d.o.o. was merged with the company Hidria Rotomatika into a new Hidria d.o.o. company.

to him by his predecessors on the line. The FACTS4WORKERS solution also greatly eases the maintenance staff's work who can now acquire instructions from previous tool maintenance/change processes on the line.

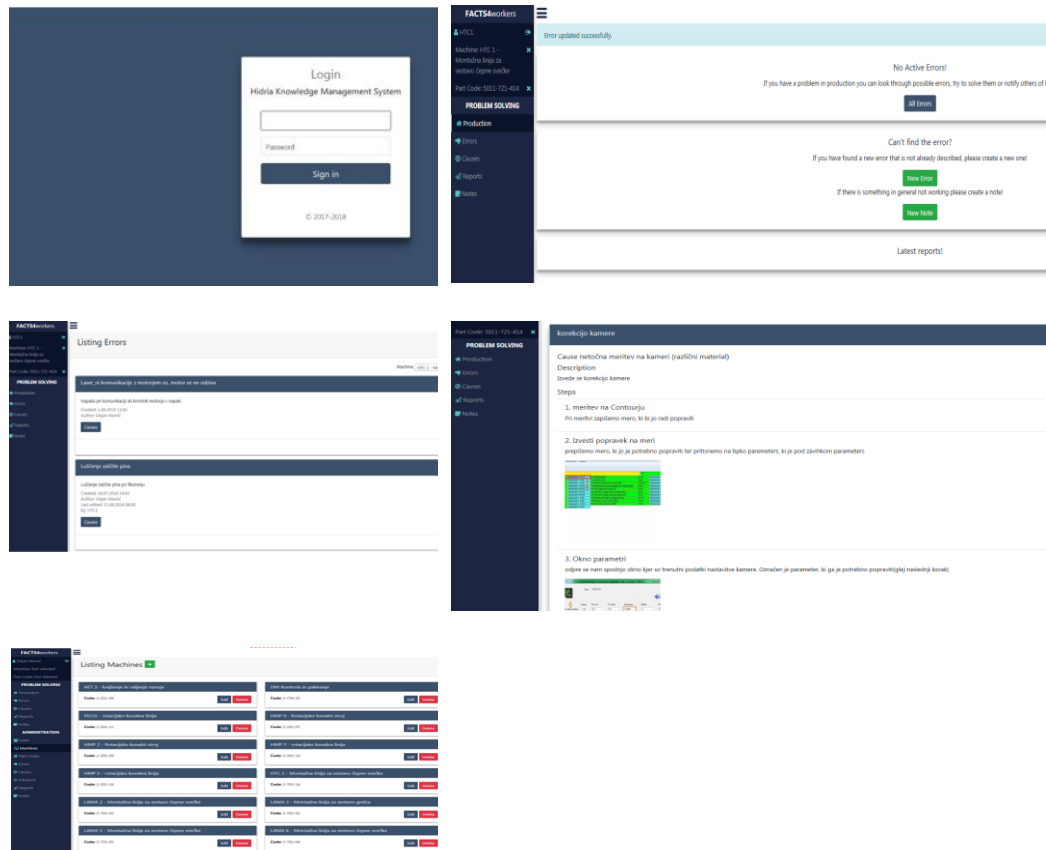



Figure 31: FACTS4WORKERS solution developed for HID UC (1. login function – upper left 2.) database filtering – upper right 3.) error reporting – middle left 4.) solution provision – middle right 5.) machine and user editing pane – lower left

### 6.2.1.2 Hidria Lamtec BU solution (HRO)

	Slovenia	Automotive
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The HRO UC's specifics lie herein being targeted for a specific workplace application. This UC addresses measurement and machining workplace in a stator/rotor assembly process. The workplace has crucial steps in the manufacturing process of rotors with a shaft. The assigned workers need to perform a **sequence of tedious steps:** 1)

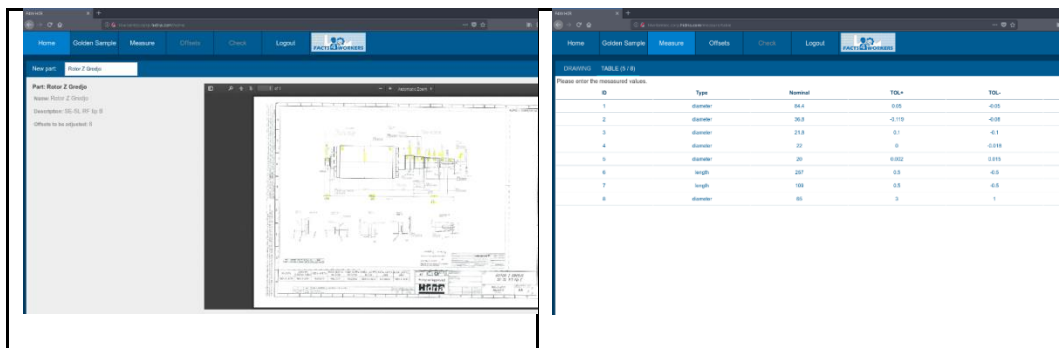
measurement of the rotor stack on calipers 2) milling of the stack on a CNC machine to the desired dimensions 3) re-measurement and re-milling if needed 4) shaft insertion into the stack 5) final shaft positioning control.

The developed normal HIR application has **two usage purposes**. First it is supposed to be **used by the operator** where they can check out the part schematics, insert the measurements and have the offsets calculated. Second, a special **admin application** is supposed to be used by the technical team when modifying or inserting new part codes.

The developed FACTS4WORKERS solution **enables the operator to have a full overview over the different parts** that need to be measured during his/her shift. A significant improvement is the automatic offset calculation algorithm which enables the production floor to **discard manual re-measuring step, enhancing the work conditions of the operator** which relieves him/her of the stress.

On the other hand, the developed solution **enables greater overview on the production status within a shift from the shop floor administration**. The administrator can keep track of the production plan and incoming rotor stacks and out coming measured shaft rotor stacks. This **significantly improves the communication between the shop floor level and the technology and quality department**, which was not regularly done until now.

The Hidria Lamtec BU management has been closely following the project and the **solution is now undergoing different trials**. The management aims to implement it on other cells with **further digitalization plans already underway**. The FACTS4WORKERS project has in the past 4 years greatly pushed the management in the company Hidria Rotomatika to invest more funds, time and efforts in the digitalization processes on the shop floor.



ID	Type	Measured	TOL+	TOL-
1	diameter	33.1	0.05	-0.05
2	diameter	30.3	-0.10	-0.08
3	diameter	25.3	0.1	-0.1
4	diameter	22	0	-0.015
5	diameter	20	0.002	0.015
6	length	207	0.5	-0.5
7	length	106	0.5	-0.5
8	diameter	35	0	1

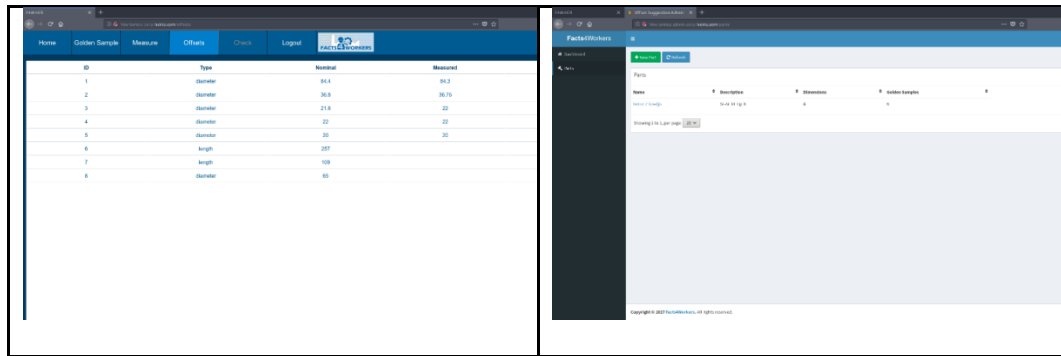



Figure 32: FACTS4WORKERS solution developed for HIR UC: 1.) Default page where operator can choose each part with partscheme – upper left 2.) measurement input page for the operator – upper right 3.) calculated offset calculation – lower left 4.) administrator's overview of all measured parts – lower right

### 6.2.1.3 EMO Orodjarna solution (EMO)

	Slovenia	Tooling
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EMO Orodjarna is a SME active in the tooling industry and supplying mostly to main European OEMs and Tier-1 suppliers. The FACTS4WORKERS solution for EMO addresses a crucial step in the tool manufacturing process at the tool shop: **1) quality control of newly manufactured tools** and **2) maintenance of tools** that were returned from the customer for need of repair. A modern stamping tool is a very complex piece. The UC addresses a specific workplace where a worker must **handle numerous building blocks** of the tool that are to be put and re-assembled in a **specific sequence that must be followed**. When a tool is build o re-build the worker must know what piece needs to go **where, when, in which sequence**. He must know **where in the process** is he currently standing and what needs to be done next.

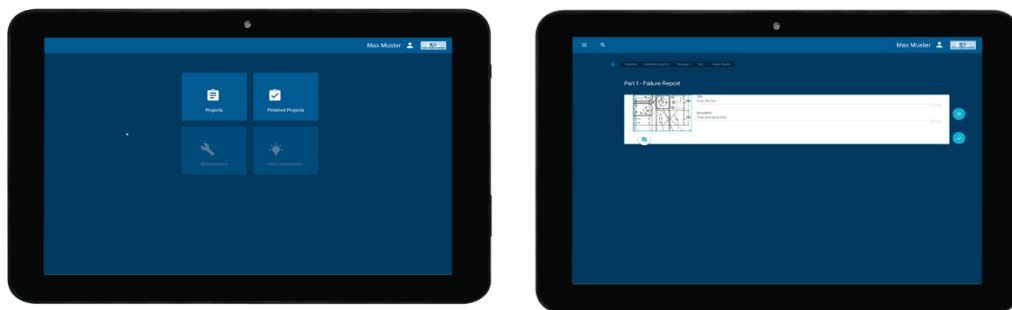
The developed prototype was for now only tested by the workers during the evaluation process of the prototype. The final version of the prototype will be ready for the **implementation in the production until end of the year/beginning of 2019**; it is expected to be very helpful for **shop floor assembly workers, since they could quickly obtain information** on already processed positions and will no longer search for them. The **developed solution allows for quick and easy overview of work orders and related positions**, because the **status of positions (IN TIME, CRITICAL, OVERTIME)** that they choose is also **colored differently** and it is easy to

**see.** The solution was therefore designed to be as **friendly as possible to also less educated and older workers on the shop floor.**

In the long term EMO expects the workers to support each other in knowledge sharing and problem solving at the click of a button, increasing overall job satisfaction and their ability to cultivate strong professional relationships. This will create new communication ways.

During the FACTS4WORKERS project, staff from the company ensured a **new communication rules that were being put in place**; all team members are now being kept in the loop on daily happenings and this will become natural part of the company's internal culture.

FACTS4WORKERS also led to several **internal projects** which have been initiated since its beginning; a project for product and material flow monitoring in the shop floor and a project for advance planning of production capacities (production planning & scheduling).



*Figure 31: FACTS4WORKERS solution developed for EMO UC: 1.) Project overview – left 2.) Documentation app – right*



#### 6.2.1.4 Thermolympic solution (TH0)

	Spain	Automotive
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Thermolympic is a SME active in the regional automotive supply chain in the city of Zaragoza. During the FACTS4WORKERS project the Thermolympic team has shown great openness towards the developed solutions. The solutions deployed are currently **working in a test machine** debugged to show the solution.

Currently the blocks have limited access as the solution is pending for bug corrections that prevent the use of the solution. The deployment outside of the test machine will be performed linked with a plan of expansion, validating outside of F4W if the solution provides support for upcoming changes or corrections needed.

The **workers within the company are satisfied with the solution shown**, as they think that to have quicker access to information is vital for them, feeling at the same time that they are part of the solution with their suggestions offering a more active environment for them. As a high point, they value over other aspects the access to **interactive and customizable content of the FACTS4WORKERS solution** and the improvement in the way to work with it, giving solutions through their experience and receiving it back from other workers. Further improvement should be expected from the feedback received.

Since the start of the FACTS4WORKERS project, **Thermolympic started to digitalize many of the current processes affecting the production lines** in order to provide better data for incoming solutions. Strategical moves were performed with the **setup of MES system, and Euromap interfaces** that are providing information for all the layers of the company. Paperless function is using modules from **ERP database** and the defect and solutions visualization on the charts is using **Euromap/Q-Master data**. Both **internal projects are linked to BMS system as strategic core for management team** having an overview of all the key company data and parameters.

From FACTS4WORKERS networking and experience **newer projects are expected to arise** with current and new partners. One such example is the **SHiON project** which will be presented at the **Cloudifactoring call at H2020**.

### 6.2.1.5 ThyssenKrupp Steel Europe solution (TKSE)

	Germany	Steel
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For the ThyssenKrupp company, one of the biggest and most important industrial groups in Germany in the steel sector, the FACTS4WORKERS solution focused on **repair and maintenance of HVAC units** throughout the whole large industrial site, encompassing approx.. **3.000 HVAC units**.

The FACTS4WORKERS solution addresses the situation at the industrial partner's site: For the smooth production of high-quality steel products, HVAC (Heating, Ventilation, and Air Conditioning) units play a central role. To ensure **their continuous functionality** several maintenance **teams work in separate shifts** carrying out **regular maintenance tasks** and reacting on errors. As around 3000 different HVAC units are deployed at the whole location, **getting the needed information and collaborating with other workers are of high importance**.

The developed FACTS4WORKERS solution for TKSE UC **has several functions**: 1) **Maintenance list**: The maintenance list contains all tasks a team has to perform during their shift. Based on their knowledge, their equipment, and their current location they can choose freely which tasks they want to tackle first. 2) **Error overview**: In case of an error all active teams are notified. The workers then have the possibility to review the assignment and decide if they are qualified to resolve the issue. If so, a team accepts the assignment and starts fixing the error. 3) **Unit information**: master data, photos of the unit, navigation – map showing location of the unit on the premises of the company 4) **logbook** – has former maintenance and repair tasks info tips – textual hints as a help 5) **chat and video chat app** – important as it enables interactive exchange of information for operators who get stuck in a task 6) **teambuilder** – an option that enables easy formation of teams for the teambuilder responsible person

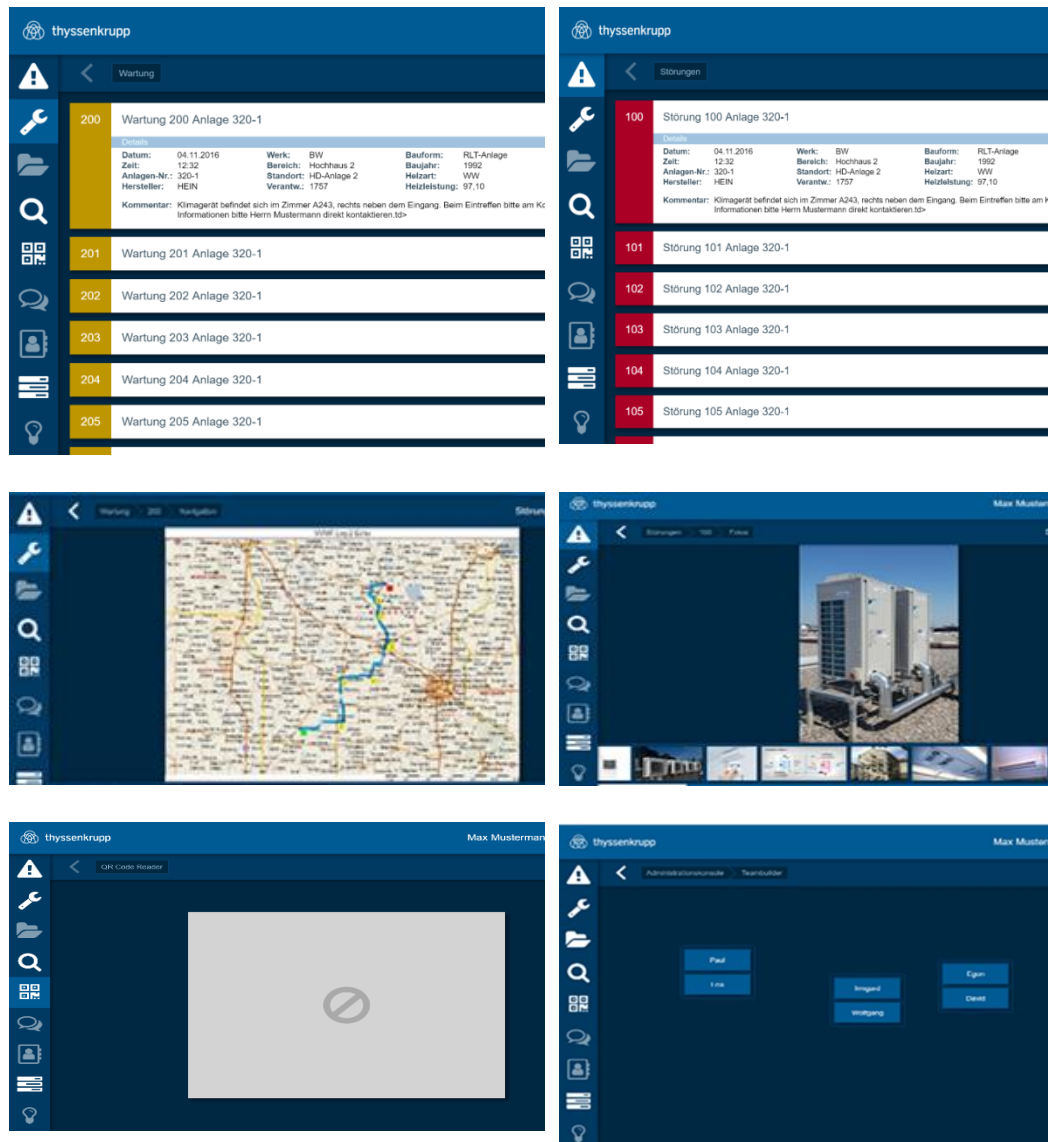



Figure 32: FACTS4WORKERS solution developed for TKSE UC: 1.) Maintenancelist – upper left 2.) Error overview – upper right 3.) Unit information – middle left and right 4.) chat & video-chat app – lower left 5.) teambuilder app – lower right

### 6.2.1.6 Schaeffler Group solution (SCA)

	Germany	Automotive
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The FACTS4WORKERS solution for SCA is focused on **supporting transition to a value stream oriented production** in this German industrial group. **SCA provided two fields within its UC: the SCA1 UC focused on field of testing of rolling bearings and the SCA2 UC focused on production of engine components.** The FACTS4WORKERS solution focused on the **enabling of learning support and application of a digital shift book.** The solution was tested and applied in two sites; In Schweinfurt plant for the rolling bearings testing bed and in Ingolstadt for the production of various engine components.

The developed FACTS4WORKERS logbook solution for SCA UC **has several functions:** 1) overview provides an overview of all activities in a department (for a day/week/month per user) 2) activities archive in a department to date regarding a machine – this helps communication and coordination efforts between shifts 3) shift book entry app (messages can be sent to the next shift, group room, semi-automatic entry of relevant activity logs)

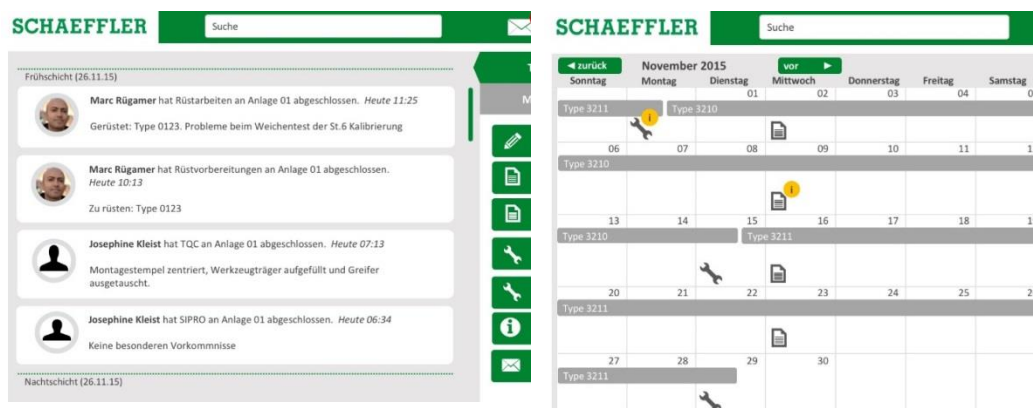


Figure 33: FACTS4WORKERS solution developed for SCA UC: 1.) Shiftbook department overview – upper left 2.) Activities archive – upper right 3.) Shiftbook entries – lower left

## 6.2.2 Direct project impact at scientific partners

The scientific partners in the FACTS4WORKERS project include **academic institutions** (UNIFI, VUT, LUT, UZH) and **research institutions** (ITA, VIF, SIA) and **developers** (IMI, EVO). Their interest is to use the project to gain insight into modern industrial processes that are taking place on the shop floor and the challenges in this regards that the most competitive European industries (automotive, steel, tooling, plastics) are facing. Academic institutions in the project have used their work for the FACTS4WORKERSUCs to expand their knowledge in industrial practice trends in the European industry and aim to exploit it through follow-up development projects and consultancy. Their closer involvement with the industry is also shown through orientation towards spin-off and start-up creation. The research institutions similarly aim to use gained knowledge for new consultancy services and products and acting as research hubs for further regional/national/European projects. IT developers shall use the gained knowledge to roll-out new products and consultancy services and to build upon work done in FACTS4WORKERS to enter new research projects.

### 6.2.2.1 Università degli Studi di Firenze (UNIFI)

	<p>UNIVERSITÀ DEGLI STUDI FIRENZE</p>	<p>Italy</p> <p>University, re- search</p>
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For the University of Firenze, the FACTS4WORKERS project has supported the development of competences within UNIFI about Industry 4.0 in general and cloud services in particular. UFI has gained a very good and deep knowledge about cloud services

and data analysis for manufacturing companies. The new competence acquired has enabled a growth in the dimension of the research group, that now has also 2 experts in the field of ICT and cloud service, while the core is focused on Industrial Engineering.

Starting from F4W experience **UNIFI started three more projects on similar topics**: 1 H2020 - BeInCPPS, 2 Regional- SHARE and SMARTIS and provided support to implement F4W style solutions to local companies.

The team of UNIFI that have worked on F4W has started a **spin-off companies** to cope with the increasing request of local companies. This spin-off, whose name is **MANULITIC** ([www.manulitic.com](http://www.manulitic.com)), wants to provide services that include also some **solutions developed within F4W, like the Knowledge Management System. The back end modules developed within F4W** would be the base for future products that UFI wants to **propose to the local market**.

#### 6.2.2.2 TU Wien (VUT)

 <b>TECHNISCHE UNIVERSITÄT WIEN</b>	Austria	University, research
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A university, TU Wien is a research organisation and thus does not have as its aim to actively promote or sell software and hardware products developed within research projects.


In the FACTS4WORKERS project TU Wien project team nevertheless gained significant **experience in architecting and implementing micro service oriented solutions based on container technology**. Thereby, the research group was able to **increase its competence in the field of smart manufacturing** as an extension to the former product development focus. For VUT as research institution, the more **generic results** predominantly with respect to augmented operator assistance, semantic content/knowledge management on shop floor level, and in-situ mobile self-educating systems contribute to a further extension of research know how and can be **exploited within subsequent projects covering similar fields of expertise**. Through the scientific lead of this project, VUT expects to **advance its research and consultation capabilities for the heavily multi-disciplinary Industry 4.0** related topics towards enterprises, generating additional third-party incomes for the institute.

The research group has **increased the staff head count** of 2018 by about one third compared to 2013. On average **1 FTE** is now working on this topic in different research projects

Based on FACTS4WORKERS experience VUT started **two more research projects (IPPIOS, SIMPLE) funded by the Austrian Federal Research Promotion Agency (FFG)** and provided support to implement F4W style solutions within the **TU Wien Pilot Factory Industry 4.0**.

Within the TU Wien Pilot Factory Industry 4.0, VUT is **using EVOcall in its demonstrator environment** (In the last two years, the factory site has had more than 5000 visitors). Container technology approaches and solution architectures similar to F4W have been widely adopted in TU Wien Pilot Factory Industry 4.0 and beyond in further projects of the research group.

#### 6.2.2.3 Lappeenranta University of Technology (LUT)


 <b>LUT</b> Lappeenranta University of Technology	Finland	University, research
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For LUT, the FACST4WORKERS project presented an opportunity to develop its competences in field of industrial needs assessment and requirements analysis, HCI technologies, front-end development, technology acceptance and evaluation processes. LUT currently has 4 FTE working on these topics in 2 national projects: **DigiPro (Digital Product Processes through Physics Based Real-Time Simulation)**, **Co-Sim (Co-creation Based Real-Time Simulation)**. For example in DigiPro project industrial needs assessment is made for 10 Finnish manufacturing companies. LUT applied technology input gained in FACST4WORKERS on digitalization of product processes in industrial vehicles; the FACTS4WORKERS project's orientation in key European industries was an impetus for LUT to focus its research work in the digitalization field in these key European sectors.

In addition, one Doctoral Thesis is about to finish related to the topic of HCI technologies. DigiPro project (Digital Product Processes through Physics Based Real-Time Simulation), LUT and 10 Finnish manufacturing companies Co-Sim project (Co-creation Based Real-Time Simulation), LUT and 6 Finnish companies.



#### 6.2.2.4 University of Zurich (UZH)


 <b>University of Zurich</b> <sup>UZH</sup>	Austria	University, re- search
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The University of Zürich as a research institution promoted its research results through scientific publication. When direct exploitation of results is concerned, the knowledge from FACTS\$WORKERS was shared and offered through a **private consulting company, established already in 2008 – NETSYNO**.

NETSYNO offers solutions in following fields: 1) Development for IoT, HMI & Mobile Apps 2) Framework for digital collaboration 3) Consulting, Research & Development 4) NETSYNO industries and references.

NETSYNO's current projects include: 1) DWD approach; Industry Insights for IoT, Industry 4.0 2) Extension of business network with establishment of contacts with 4 new industry partners: Evolaris, UniFI Startup - Manulitic, EWERK 3) Education for C-Level, senior & student employees.

#### 6.2.2.5 Instituto Tecnológico de Aragón (ITA)

 <b>ITAINNOVA</b> <small>INSTITUTO TECNOLÓGICO DE ARAGÓN</small>	Spain	Research institute, research
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For ITAINNOVA, The Technical Institute of Aragón, the FACTS4WORKERS project has proven an **effective testing-ground and information gathering opportunity** to upgrade and **improve ist existing service for clients** – i.e. the **Moriarty desicion-making IT tool**. In addition, ITAINNOVA is already involved in many different Industry 4.0. projects and FACTS4WORKERS has proven useful in **using the know-how gathered in development of solutions for industrial UCs for new projects**; ITA is currently involved in 4 projects using the know-how acquired in the UCs 3 and 4.

During the duration of the project, within the ICT group at the ITAINNOVA **number of staff involved** in these king of IT and Industry 4.0 related projects moved from 3



fully-dedicated staff to at least 8. The numbers are expected to increase in the near future as new projects get started. Other departments that might get involved in this field are the Logistics and Materials & Structures departments of ITAINNOVA.

The **evaluation framework and methodology developed within FACTS4WORKERS by ITAINNOVA** is going to be used in the future to support Institute's projects, both within Industry 4.0. and in other field projects. ITA implements an agile methodology involving several iterative development cycles ending and starting (after first iteration) in an evaluation trying to provide information for taking the decision about what to do next. Through this methodology ITA is currently involved in 3 projects related with the creation of I4.0 and it is **expected at least a couple of projects to be accepted in the near future** (end or beginning of the year).

A **specialized I4.0 branch of Moriarty** is being created for developing this kind of **Industry 4.0. solutions**. The **created demos** will be shown in the **Big Data and Cognitive Systems Lab**. More than a new product, ITA has **evolved existing Moriarty to a dockerized version** and is creating a I4.0 specialized release which will **include some of the BBs developed by the consortium**. ITAINNOVA plans to integrate some **FACTS4WORKERS BBs** (paperless, control charts, training, ...) within the Moriarty framework **aiming to support the fast prototyping of Industry 4.0 solutions**. This shall be quite easy to achieve, since ITA has migrated Moriarty to be deployable using a Docker/Kubernetes infrastructure which allow them to scale their solutions.

While initially ITA expected to be able to offer its solutions to local SMEs, the Institute is now also **involved in Industry 4.0 multinational companies of the automotive sector**. Since FACTS4WORKERS, Itainnova is also redefining the way they start the projects; taking as base the evaluation framework and its associated methodologies in order to be able to support their future R&D developments.

#### 6.2.2.6 Virtual Vehicle Research Center (VIF)

	Austria	Research institute, research
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Virtual Vehicle (VIF) is a research centre that also acts as the coordinator of the FACTS4WORKERS project. For Virtual Vehicle the FACTS4WORKERS project has proven an important benchmark in development of Industry 4.0. oriented solution that are and will be presented especially to the local industry in the Steiermark region of Austria.

VIF has ained a **lot of insight in acceptability and trust of ICT of people** which they are successfully transferring to their **development of car assistant systems in ADAS systems**.

VIF also used the FACTS4WORKERS knowledge to apply for other national or European projects. 4 projects altogether were started: 1) SemiI40 - Power Semiconductor and Electronics Manufacturing 4.0 2) Productive 4.0 3) MMAssist II - Assistenzsysteme in der Produktion im Kontext Mensch – Maschine Kooperation 4) iDev40. The project **SemiI40** covers “smart production” and “cyber-physical production systems” in power semiconductor and electronics manufacturing in Europe and is being run under ECSEL Joint Undertaking European programme. The project **Productive 4.0** focuses on enhancing production efficiency in the European industry through digitalization and also runs under ECSEL Joint Undertaking European programme. The **MMAssist II** project is an Austrian national project that will enable its partners to gain empirical and socio-technical understanding of the demands and requirements for assistance systems in the production context. The **iDev40** project is focused on digital integration of value chains through complex digitized systems and is also supported through ECSEL Joint Undertaking European programme.

#### 6.2.2.7 IMEC (IMI)

	Belgium	SME, development and consultancy
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Since IMEC is mainly involved in consultancy projects, the outcomes of F4W are typically becoming part of follow-up projects.

IMEC as an IT development centre used the FACTS4WORKERS project for as **a basis in follow-up projects: 1)** 3 projects were started which elaborated on the **SWE developed in F4W** (GPS4IntegratedCare, Dissect, FAST) 2) 1 project was started elaborating on the HUD learning application (ILLUMINATE). IMEC **works closely together with Ghent University**, so part of the **knowledge gained within FACTS4WORKERS** (both on semantics and AR/VR) is **actively taught to computer science students**.

As IMEC, the team gained a lot of **insight on delivering practical solutions onto a shop floor**. Especially the **human factor** involved in doing this successfully **was underestimated before the FACTS4WORKERS project**. The SWE developed in F4W created the basis on which several other projects built. Follow-up projects extended

the semantic API formalization and how workflow agents made use of it. The SWE is used as a basis in 3 follow-up projects, closer to market, but at this moment it is not a standalone product yet.

#### 6.2.2.8 Evolaris next level (EVO)

	Austria	SME, development and consultancy
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Evolaris as an IT solution provider focuses on digital assistance systems for the industry. This development of focussing on the topic evolved during the FACTS4WORKERS project so it can be claimed that the **project gave impetus to the company's plans, giving them the support they needed to develop and finalize their ideas**. Currently, 3 consultants and 4 developers within the company are utilizing the basis developed within the FACTS4WORKERS framework for company's new product and service development.

The most visible direct exploitable result is the **EVOCALL application**. The **product has been finalized within the FACTS4WORKERS project using valuable input from the industrial use-cases** (industrial framework in which shop floor workers in the industry operate today, boundaries of the workplace, relations to other departments – technology, R&D, supply, maintenance, industry's internal standards especially obvious in the automotive supply chains etc.). The EVOCALL as an exploitable result of the project is **used by 16 customers already** and further tested in the course of **proof-of-concepts by 24 potential customers**. In total, currently **55 EVOCALL licenses are in use**.

The requirements of several building blocks (especially defect & solution) have been transferred to build the **basis for a new product called EVOASSIST**. Starting from the core functionality of a multimedia asset database, EVOASSIST is **planned to become a full-fledged knowledge management platform**. The insights from the annual technology monitoring reports have been further exploited for a market watch project observing the development of smart glasses, wearable devices and augmented reality for the steel industry.

Based on their involvement in the FACTS4WORKERS project, Evolaris now participates in **several research projects which were a consequence of the gained knowledge**: MMAssist II, iDev40, Productive40, Interreg SI-AT.

**EVOLARIS recently won the SFR (Swiss federal railways) Augmented Reality platform competition**. EVOCALL is one of the platform's main modules. The whole

project has a low eight digit volume. Between 11.000 and 30.000 users are expected within the next 5 years.

#### 6.2.2.9 SiEVA (SIA)

	Slovenia	SME, Research Centre, research
---	----------	--------------------------------

SiEVA is a very specific partner within the FACTS4WORKERS consortium in it being a **network-based, decentralized research centre**, that was established by the biggest companies in Slovenian automotive industry. It operates as an SME, with small departments or. BUs located at each of the SiEVA stakeholders' locations.

SiEVA's stakeholders are all well-established Tier-1 or Tier-2 suppliers to the main automotive OEMs in the automotive sector in Europe. **Industry 4.0. and IT-related trends are very relevant to SiEVA's stakeholders** so internal dissemination of the FACTS4WORKERS project's findings and results found receptive audience in this regard.

With the FACTS4WORKERS project, SiEVA gained **knowledge on latest IT-related trends in the European manufacturing**. The FACTS4WORKERS project has enabled SiEVA to use the FACTS4WORKERS project and new links (partners) to identify possibilities for follow-up projects on this and similar issues within H2020 or national calls.

### 6.2.3 Intelligent application of SOTA technologies

The ability to utilize the knowledge gained in FACTS4WORKERS project is key for partners who provide software development as a service. The success and impact of the gathered abilities to apply SOTA technologies like Docker, Angular or SWE together with the application of the developed procedures such as DWD or the quantification process of the impacts measurement earlier than other developers is difficult to quantify. In this report, one example of the related software firm NETSYNO can serve as a blueprint of the possibilities.

Jonathan Denner as CEO and founder of NETSYNO has worked as PhD student in FACTS4WORKERS (as a part of UZH's team). While NETSYNO does not count as a spin-off as the company has been established already before the start of

FACTS4WORKERS, the business increase due to the FACTS4WORKERS project can be quantified.



**Development for IoT, HMI & Mobile Apps**  
 Digitalization of knowledge-intensive business processes and of intuitive user interfaces; among others three German automobile manufacturer, SMEs and network organizations

**Framework for digital collaboration**  
 in-house software platforms for digitalization of business processes and collaboration

**Consulting, Research & Development**  
 Concepts for Social Software, among others for DAX and large sized corporations; Research collaboration with Karlsruhe Institute of Technology, University of Zurich and research group „Kooperationssysteme Munich“

**NETSYNO industries and references**  
 mechanical engineering, automotive, public sector







- founded in 2008 as nwebs GbR; always owner-managed
- Headquarters in Karlsruhe (Germany), subsidiary in Sofia & Plovdiv (Bulgaria)
- more than 130 clients across Europe
- 28 employees + 5 freelance workers
- 11.12.2013 new name NETSYNO Software GmbH
- 12.09.2018 founding NETSYNO Bulgaria EOOD

Figure 34: NETSYNO Software GmbH

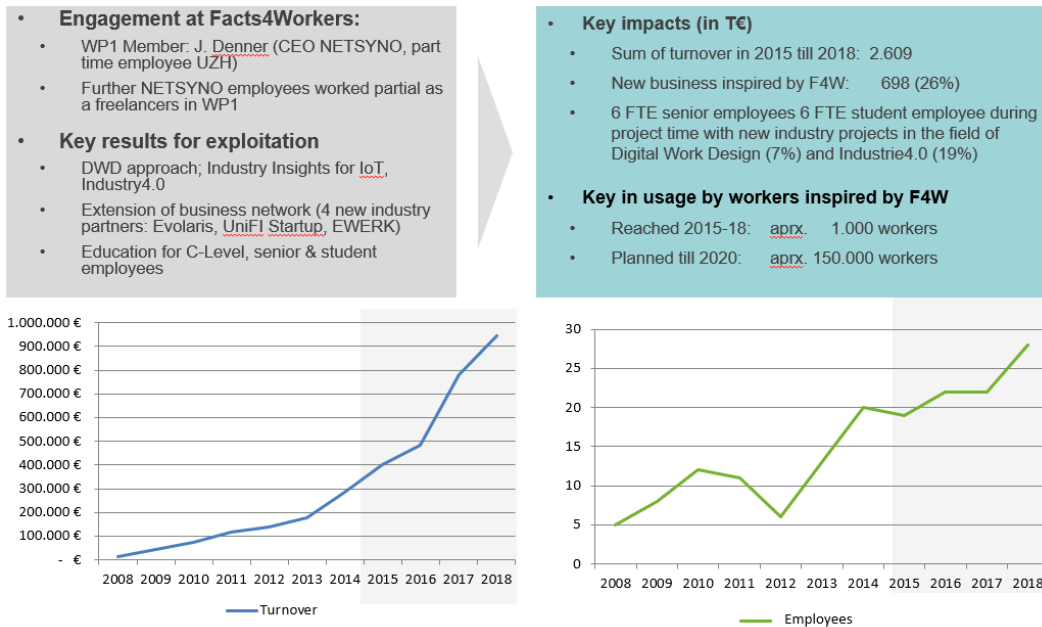


Figure 35: NETSYNO business impact

## 6.2.4 Other tangible achievements

### 6.2.4.1 Research activities enabled by the FACTS4WORKERS project

For the participating scientific partners one key exploitation target is the ability to get further research projects awarded. Firstly, the dissemination of the project results gathers the necessary visibility within the scientific community (possible project partners and reviewers). Secondly, the gathered knowledge fosters the ability to tackle further research questions.

As a grand total, the scientific partners have been able to acquire projects worth 10.7m€, with a total number of 67 (FTE) researchers and developers working in these projects (see Figure 36).

Partner	Project (link)	Project description	Total project volume at Organisation k€	# Involved developers (FTE) at organisation	FACTS4WORKERS enabler
VIF	<a href="http://www.semi40.eu">http://www.semi40.eu</a>	Power Semiconductor and Electronics Manufacturing 4.0 focuses on two domains of key enabling technologies, "production" and "semiconductor technologies".	800	4	AR/VR workplace improvements, Worker support, TwinFactory Concepts
VIF	<a href="https://productive40.eu">https://productive40.eu</a>	The main objective of Productive4.0 is to achieve improvement of digitalizing the European industry by electronics and ICT.	650	4	Worker provision with contextual information
VIF	<a href="http://www.mmassist.at">http://www.mmassist.at</a>	The goal of the project MMAassist II is to research and implement modular, reusable assistance systems for employees in production companies.	150	1	Work satisfaction impact analysis
VIF	<a href="http://www.iddev40.eu">http://www.iddev40.eu</a>	iDev40 focuses on "digitally connecting" value chains to facilitate and strengthen the innovation capacity of large and small European Electronic Components and System actors for sustainably competitive Electronic Components and Systems.	550	4	AR/VR workplace improvements, Worker support, TwinFactory Concepts
EVO	<a href="https://productive40.eu">https://productive40.eu</a>	The main objective of Productive4.0 is to achieve improvement of digitalizing the European industry by electronics and ICT.	130	1	Information visualisation, mobile frontend development
EVO	<a href="http://www.mmassist.at">http://www.mmassist.at</a>	The goal of the project MMAassist II is to research and implement modular, reusable assistance systems for employees in production companies.	380	4	Industrial frontend design guidelines, mobile frontend development, EVOCALL as basis module
EVO	<a href="http://www.iddev40.eu">http://www.iddev40.eu</a>	iDev40 focuses on "digitally connecting" value chains to facilitate and strengthen the innovation capacity of large and small European Electronic Components and System actors for sustainably competitive Electronic Components and Systems.	500	4	Technology market overview, industrial frontend design guidelines, mobile frontend development
EVO	<a href="http://www.si-at.eu/si2/smart-production/">http://www.si-at.eu/si2/smart-production/</a>	The common challenge of the project is aimed at increasing the territorial competitiveness of the manufacturing industry	200	0	Industrial domain knowledge
UFI	<a href="http://www.beincpps.eu">http://www.beincpps.eu</a>	Application of Industry 4.0 technology for monitoring the status of production machines	60	3	Experience of data analysis for and from manufacturing companies, cloud services
UFI	SHARE (Tuscany Regional Project - website on development)	Development of predictive maintenance solution for production plants based on cloud services	130	2	Experience on data analysis, development of cloud services
UFI	SmartISS (Tuscany Regional Project - website on development)	Development of remote monitoring of large metal warehouses including stability of the warehouse, forklift collision, etc.	80	2	Experience on cloud services and their application to manufacturing data analysis
LUT	DigiPro (Business Finland project)	Digital Product Processes through Physics Based Real-Time Simulation	1250	4	Experience on HCI technologies, requirements analysis
LUT	Co-Sim (Contract research project)	Co-creation Based Real-Time Simulation	100	1	Workers centric approach on requirements analysis
TU Wien	<a href="#">Pilotfabrik Industrie 4.0</a>	Research and demonstration facility for advanced manufacturing technologies	4000	12	Worker centric approach for workplace assistant
TU Wien	SIMPLE	Semantic Integration of Manufacturing Execution and Product Lifecycle Management Systems	150	1	Container based flexible architecture for integration of industrial IT systems
UZH	<a href="http://netsyno.com">http://netsyno.com</a>	Extended business opportunity for Industrie4.0 projects; The main solution is a Shopfloor Dashboard System with a industry partner.	300	3	Industrial domain knowledge
UZH	<a href="http://netsyno.com">http://netsyno.com</a>	Extended business opportunity for Digital Work Design Projects	600	6	Digital Work Design Approach for worker centric solutions for shopfloor worker
UZH	<a href="http://netsyno.com">http://netsyno.com</a>	Digital Requirements Management for SME	300	3	Digital Work Design Approach for worker centric solutions for shopfloor worker
UZH	<a href="http://netsyno.com">http://netsyno.com</a>	Methodik zur selbstorganisierten Aggregation interaktiver Komponenten (short MOSAIK, Methodology for the self-organized aggregation of interactive components)	150	2	Industrial domain knowledge
ITA		Smart Thermoplastic Injection	120	2	Industrial BD
ITA		LPA Software for -----	80	2	Paperless Shop-floor processes support
UZH	SwissCom Study	Work Smart Manual - 7 case studies for smart and new methods of daily work	20	2	Overview of methods to introduce new ways of smart

Figure 36: FACTS4WORKERS enabled follow-up projects



### 6.2.4.2 Commercial products

The FACTS4WORKERS contributed to the creation of a new product by partner Evolaris (EVO). Evolaris launched two products:

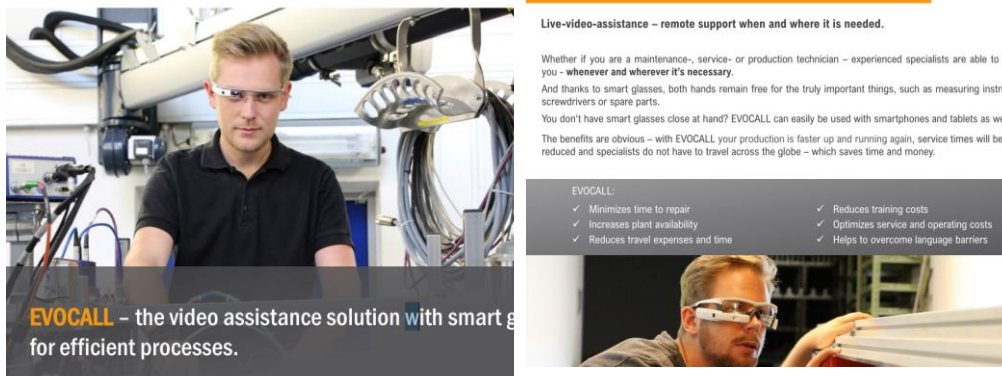
#### **EVOCALL<sup>12</sup>**

EVOCALL is a **video assistance via smart glasses, smartphones or mobile devices system**. The system enables experts to guide and support their less experienced colleagues via live video assistance. **Real time assistance** is possible from and on any mobile device no matter when and where. The entire support session can be recorded and used for training sessions and videos. For the customer/app user the result are increased after sales, efficiency, faster trouble shooting and higher machine availability.

The **product has been successfully introduced to the market** Among others, the following customers are using EVOCALL as their remote support solution: TGW, Haidlmayr, Palfinger, Armer Sports (Salomon, Atomic), BSH (Bosch), Santos (Australia), KPC Service Center

One customer Palfinger even published a marketing video featuring EVOCALL: <https://www.youtube.com/watch?v=nCfqmi-HiI8>

Evolaris also won the **Augmented Reality platform competition announced by the SFR** (Swiss federal railways) with EVOCALL as one of the main modules<sup>13</sup>.



**EVOCALL** – the video assistance solution with smart glasses for efficient processes.

**EVOCALL**

Live-video-assistance – remote support when and where it is needed.

Whether if you are a maintenance-, service- or production technician – experienced specialists are able to you - **whenever and wherever it's necessary**. And thanks to smart glasses, both hands remain free for the truly important things, such as measuring instruments, screwdrivers or spare parts.

You don't have smart glasses close at hand? EVOCALL can easily be used with smartphones and tablets as well.

The benefits are obvious – with EVOCALL your production is faster up and running again, service times will be reduced and specialists do not have to travel across the globe – which saves time and money.

EVOCALL:	
✓ Minimizes time to repair	✓ Reduces training costs
✓ Increases plant availability	✓ Optimizes service and operating costs
✓ Reduces travel expenses and time	✓ Helps to overcome language barriers

<sup>12</sup> More info here: <https://evocall.evolaris.net/en/>

<sup>13</sup> The whole project has a low eight digit volume. Between 11.000 and 30.000 users are expected within the next 5 years



## EVOCALL Features

With EVOCALL the specialist can be LIVE at all times.

Specialists can use live video and -audio to guide through the process and submit important information diagrams, data sheets or checklists directly to the mobile device and thereby support location-independent time. The entire support session can be recorded and further used for training sessions.



## EVOCALL in a nutshell:

- ✓ Live audio- and video transmission
- ✓ Record live transmission
- ✓ Create a screenshot
- ✓ Highlight objects in the video
- ✓ Live document sharing
- ✓ Easy login by using QR-Code
- ✓ Invitation management
- ✓ User administration

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## EVOCALL technical key points

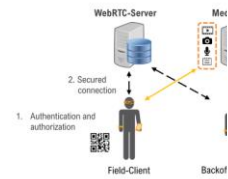
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## EVOCALL – real-time communication based on highest security standards

Your data and information are sacred to us – therefore we promise to handle them carefully. Every single session is encrypted and protected. To even enlarge the safety measures, the communication server, etc. live data, can be hosted in your own data center.

## Security Concept

1. Authentication and authorization via personal login or QR-code.
2. A secured and encrypted connection is established via the connection server.
3. Audio and video transmission, notes or files are also encrypted via a separate communication server.



## EVOCALL security key point:

- ✓ OWASP Top10 compliant
- ✓ Hosted in Austria's safest data center
- ✓ WebRTC-Server disconnected from Media-Server
- ✓ Encryption in all levels
- ✓ SaaS solution
- ✓ Authentication by using QR-Code

Figure 37: Imagery from the EVO Call promotional material

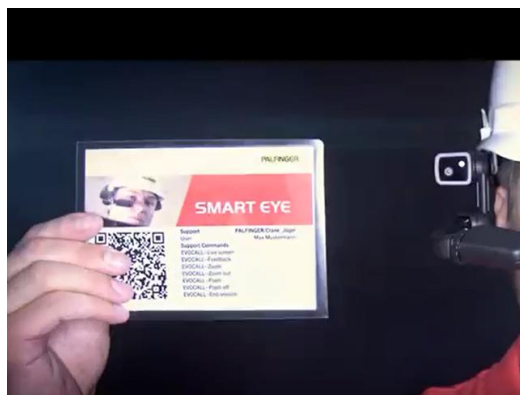
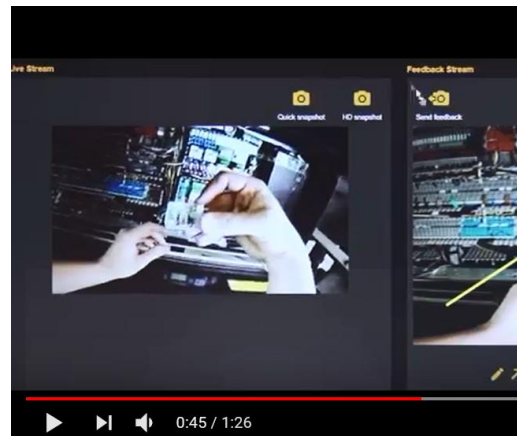
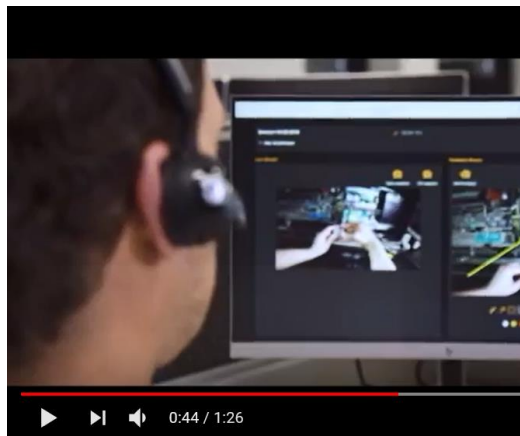


Figure 38: Excerpts from a PALFINGERadd featuring EVO Call

## EVOAssist

EVOAssist is a mobile **knowledge management system for smart glasses, smart phones and tablets**. The system enables technical experts to **keep record of their work while actually doing it** by taking photos or videos on smartphones, smart glasses or tablets. The system offers a very intuitive way to understand the activities being done and visual work instructions are made straightaway on the tablet out of this image based contents. The system is regulated by the context as user, order, task, machine, etc. relevant content gets provided and is shown automatically on mobile devices. The result is efficient knowledge management on the shop-floor or work-place.

### How EVOASSIST works - 2/4 - make work instructions

EVOASSIST

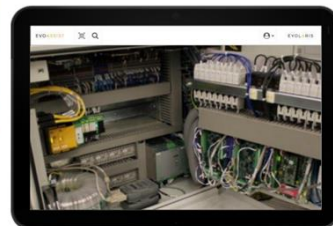
With the EVOASSIST instruction editor intuitive and understandable work instructions, based on existing photos or documented content, can be created.



### How EVOASSIST works - 1/4 - documenting knowledge

EVOASSIST

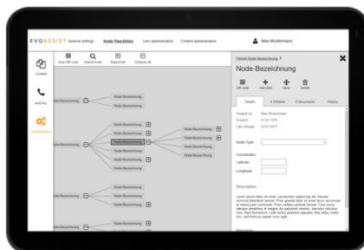
Knowledge and work can be photo- or video-documented easily with the EVOASSIST smart glass app or with the web version for smartphones and tablets.



### How EVOASSIST works - 3/4 - manage knowledge

EVOASSIST

With the EVOASSIST structure editor your work instructions or existing documents can be assigned and copied very flexible to the right node. Authorization by responsible e.g. the quality team can be managed easily.



### How EVOASSIST works - 4/4 - find and display knowledge

EVOASSIST

Relevant content gets displayed automatically on the mobile device of choice depending on the context.

1. The context gets recognized automatically by scanning a QR-code, log in as user, search for text / location / ERP or MES data / worker role, etc.

2. All information available for this node is provided prioritized, depending on the context and relevance.

3. Relevant knowledge chosen by the user is displayed as intuitive work instructions, photos, videos in common formats such as PDF, PPT, Word etc.



Figure 39: Imagery from the EVO Assist promotional material

### 6.2.4.3 Spin-offs

#### [Manulitic SRL](#)



Manulitic SRL is a **spin-off company by UNIFI**. The company is specialized in software and hardware development for Shopfloor collaborative tools and monitoring solutions.

The company is currently in the process of acquiring early adopters. The team is working on a **shop floor collaborative platform, inspired by F4W Building Blocks**, and on machine monitoring for predictive maintenance. **The F4W project has allowed the team** of the company to build up experience and competence in a new field of software for manufacturing and **have a direct feedback from industrial partners in the project about what is actually necessary in their shopfloor** to make it more effective and operator friendly. Starting from the project Manulitic was able to come in contact with companies in Italy that were interested in similar solutions.

Manulitic SRL currently has a contract with **GKN Driveline in Italy** and are in contact with Continental who have expressed interest in their solutions.

The spin-off is active since June of 2018, so still no financial data is available.

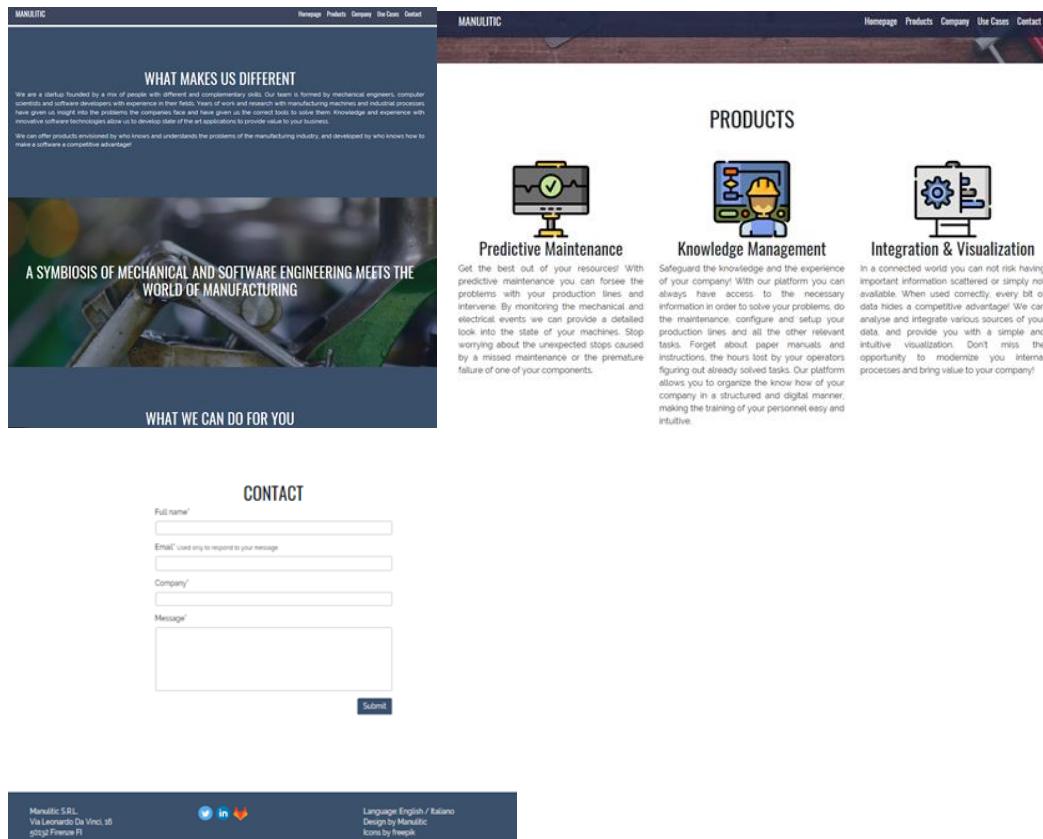


Figure 40: Imagery from the Manulitic SRL website<sup>14</sup>

<sup>14</sup> Website: <https://manulitic.com/>

## 7 Balance of efforts and priorities between stakeholder's interests, different results and partners

As previously the consortium retained a balanced input of efforts from project's partners also in the final project year. Dissemination efforts were evenly balanced by SIA and VIF. Academic partners (UNIFI, UZH, TUW, ITA, LUT) continued with strong output from the previous year.

In the exploitation field VIF took over the planning of the activities, preparing questionnaires that served as a basis for information gathering from the project's partners (industrial and scientific). Close collaboration among development and industrial partners in describing and presenting the results achieved at every use-case was also prepared by VIF. VIF also prepared the main outline of project's results and their division among pillars of exploitation.

For the demonstrator presentations and final project meeting coordination VIF took over the larger role. Using the data gathered by VIF, SIA took care for administrative tasks that enabled the consortium to gather the data. SIA was the main author of dissemination-related statistical data and took over tasks such as tracking of webpage visits, as well as having an overview over published scientific publications. SIA was the main author behind this document as-well, having an overview over the work done in the previous 3 years.

Regarding cooperation between SIA and VIF, the cooperation between the two partners remained very close until the end of the project. Relation were well established and in the fourth year the two partners managed to successfully implement the reach-out and exploitation-related activities.

In the end, the D7.6 we can offer the same conclusion as in D7.5 and D7.4. - the project partners' fairly balanced person months input structure (*see the table below*) was retained in the final year and the main efforts were conducted smoothly with no disruptions for work and effort shown by the partners.

PARTICIPANT NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SHORT NAME OF PARTICIPANT	VIF	HID	UNIFI	TUW	TKSE	HIR	IMI	SIA	UZH	THO	EMO	EVO	ITA	SCA	LUT
PERSON MONTHS PER PARTICIPANT	23	6	8	10	15	15	7	30	8	12	10	10	12	9	8

Figure 41: Person months per partner



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1. Grant Agreement Number 636778 - FACTS4WORKERS.
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3. Activities report - Deliverable 7.3
4. Activities report - Deliverable 7.4
5. Activities report - Deliverable 7.5
6. Business plan- Deliverable 7.7
7. Project website: <http://facts4workers.eu/>





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## About the project

The high ambition of the project FACTS4WORKERS is to create Factories of the Future with a pervasive, networked information and communication technology that collects processes and presents large amounts of data. These smart factories will autonomously keep track of inventory, machine parameters, product quality and workforce activities. But at the same time, the worker will play the central role within the future form of production. The ambition of the project is to create »Factories for WORKERS« (FACTS4WORKERS), to strengthen human workforce on all levels from shop floor to management since it is the most skilled, flexible, sophisticated and productive asset of any production system and this way ensure a long-term competitiveness of manufacturing industry. Therefore a serious effort will be put into integrating already available IT enablers into a seamless and flexible Smart Factory infrastructure based on work-centric and data-driven technology building blocks.

These solutions will be developed according to the following four industrial challenges which are generalizable to manufacturing in general:

- Personalized augmented operator,
- Worker-centric rich-media knowledge sharing management,
- Self-learning manufacturing workplaces,
- In-situ mobile learning in the production.



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SCHAEFFLER



LUT  
Lappeenranta  
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## PROJECT PARTNERS

The FACTS4WORKERS project is composed of 15 partners from 8 different European countries:

Virtual Vehicle Research Center	Austria
Hidria TC Tehnološki center d.o.o.	Slovenia
Università degli Studi di Firenze, Department of Industrial Engineering	Italy
Technische Universität Wien	Austria
ThyssenKrupp Steel Europe AG	Germany
Hidria Rotomatika d.o.o.,	
Industrija Rotacijskih Sistemov	Slovenia
iMinds VZW	Belgium
Sieva d.o.o.	Slovenia
University of Zurich, Department of Informatics	Switzerland
Thermolympic S.L.	Spain
EMO-Orodjarna d.o.o.	Slovenia
Evolaris Next Level GmbH	Austria
Itainnova - Instituto Tecnológico de Aragón	Spain
Schaeffler Technologies AG & Co. KG	Germany
Lappeenranta University of Technology	Finland

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# SUMMARY

This deliverable (D7.6) describes the final status of the work done on dissemination and exploitation fields within the WP7 of the FACTS4WORKERS project. achieved results in the final year of the project as well as a recap of the work done in all of project's four years. This deliverable focuses especially on the exploitation efforts which were on the forefront of the consortium's activity push in 2018. The highlights many breakthrough achievements in the dissemination field (scientific publications with their strong anchoring in international journals, video promotion) and results in the dissemination field (results implementation and evaluation at the industrial partners, post-project knowledge transfer, creation of new spin-off, new consultancy services for the interested stakeholders in industry and R&D spheres, new bilateral cooperation between partners, launch of a new product - EVO Call/EVO assist). Working upon the base set in the previous years, especially with the Business plan set out in the project's third year, the consortium managed to create a wide array of exploitation opportunities with different exploitation channels opened for further post-project

research and implementation efforts (new bilateral projects, new products, new services, spin-offs). This greatly increases FACTS4WORKERS' solution implementation for a much wider scale, as was envisaged in the original FACTS4WORKERS project application. Pragmatic and practical approach in the final year enabled the consortium to modify the approach first envisaged in the first three years and modify it for a realistic and applicable approach in the fourth year (less emphasis on new video outreach more emphasis on bilateral projects, contacts, etc.). This focus on a pragmatic field also enabled the consortium to push for a efficient solution implementation and solution finalization in the last year, enabling efficient solution roll-out amid coordinating the efforts with daily industrial challenge solving which the IPs had to manage and was evident throughout the project. The project now has everything in place to begin an intensive exploitation and solution roll-out phase in which as many opportunities as possible must be used to proliferate the FACTS4WORKERS solutions and present them to a wider European audience.

