DOCUMENT TITLE:

GOOD PRACTICE REPORT FOR AUSTRIA

Project: Improving RD and business policy conditions for transnational cooperation in the manufacturing industry

Acronym: Smart Factory Hub

Work package	WP4: Improving Knowledge Base
Activity	A 4.2: Good practice handbook tool
Deliverable	D 4.2.2: Regional good practice report
Date of issue	28.12.2017
Document issued by	PROFACTOR
Contributors	NA
Version	A1.0
Number of Pages	96

Dissemination level		
PU	Public	
PP	Restricted to other Programme participants	
RE	Restricted to a group specified by the consortium	X
CO	Confidential, only for members of the consortium	

Contents

1 INTRODUCTION

Regional Good Practice Report for Austria contains eight good practices collected using the Good Practice Template developed in D4.2.1.
The data in this report was collected during September – December 2017 as part of the project entitled "*Improving RD and Business Policy for Transnational Cooperation in the Manufacturing Industry – Smart Factory Hub (SFH)"*.

These eight examples are the basis of the regional report, the Handbook tool report and the Good Practice Handbook, which together with the Mapping tool will allow project partners to present and promote specific smart manufacturing solutions. Based on the collected data, the Handbook tool report will be prepared by the UTC-N, WP4 leader.

The handbook will be available in electronic format on the web portal, while, for disseminating the work package, also 250 handbooks will be printed, which will be available to the participants at the closing dissemination event.

The data collected during this period will also be used for ex-ante evaluation.

PROFACTOR collected the following good practices cases:

No.	Name of the Good Practice	Classification[1]
1	GP1: EVOLARIS - Live-Video-Assistance-System called EVOCALL	Digital working instruction
2	GP2: ABF- OneBase – MFT (material flow control), intralogistics solution	Digital Factory, Simulation
3	GP3: Tablet Solution – Work Held Voice Assistant	Digital working instruction
4	GP4: CDI, Cooperation Development Innovation - FIT (Factory Incident Tracker)	Intelligent production, maintenance,
5	GP5: XiTrust - Secure QR-Code (sQR)	Data Security, Industry 4.0
6	GP 6: Plasmo - Quality Assurance Solutions for automated production processes and additive manufacturing applications	Zero Defect Manufacturing
7	GP 7: PROFACTOR – X Rob - easy robot configuration	Robotics
8	GP 8: Business Upper Austria - Industry 4.0 Maturity Model	Industry 4.0

[1] According GOOD PRACTICE GUIDELINES

2 GP1: EVOLARIS - Live-Video-Assistance-System called EVOCALL

EVOLARIS

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Keywords : WebRTC solution, audio-visual support, reduced repair time, reduced on-site presence, positive influenced problem-solving process
Good practice applied in: (NACE code) : C33

By using the EVOLARIS Live-Video-Assistance-System named EVOCALL, the problem-solving process can be influenced positively. EVOCALL is able to replace non-effective communication channels. Besides, in combination with a "work-shadowing" approach, the on-site presence of experts as well as the repair times can be reduced.

2.1 GOOD PRACTICE DESCRIPTION

The system was created based on research work conducted within the COMET Centre of Excellence Programme and knowledge gained from a project funded by the Austrian Research promotion Agency (FFG). Building on these outcomes, a first prototype was created in the course of a master thesis and then iteratively improved with lead customers.

eAWARD Winner 2017; https://evocall.evolaris.net/

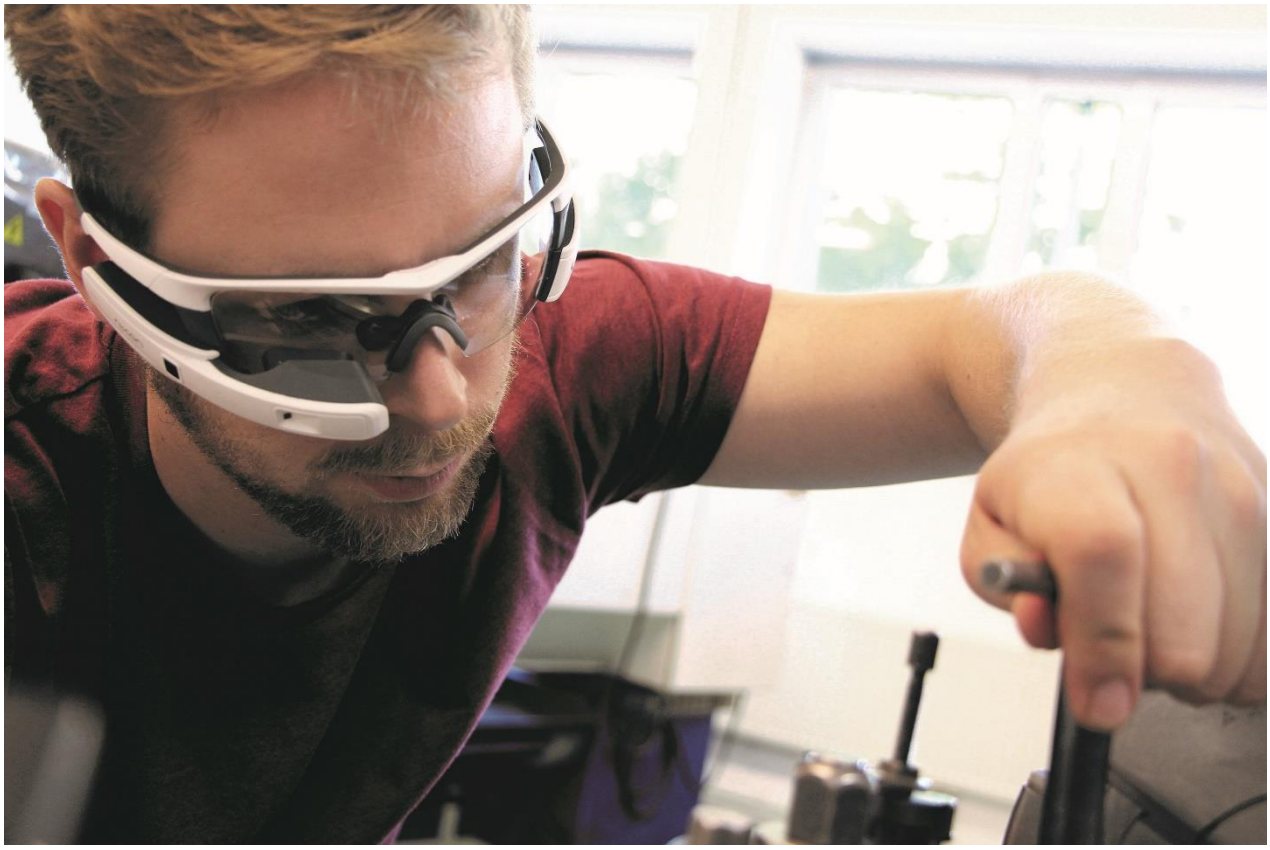

Figure 1: EVO-Call Data googles

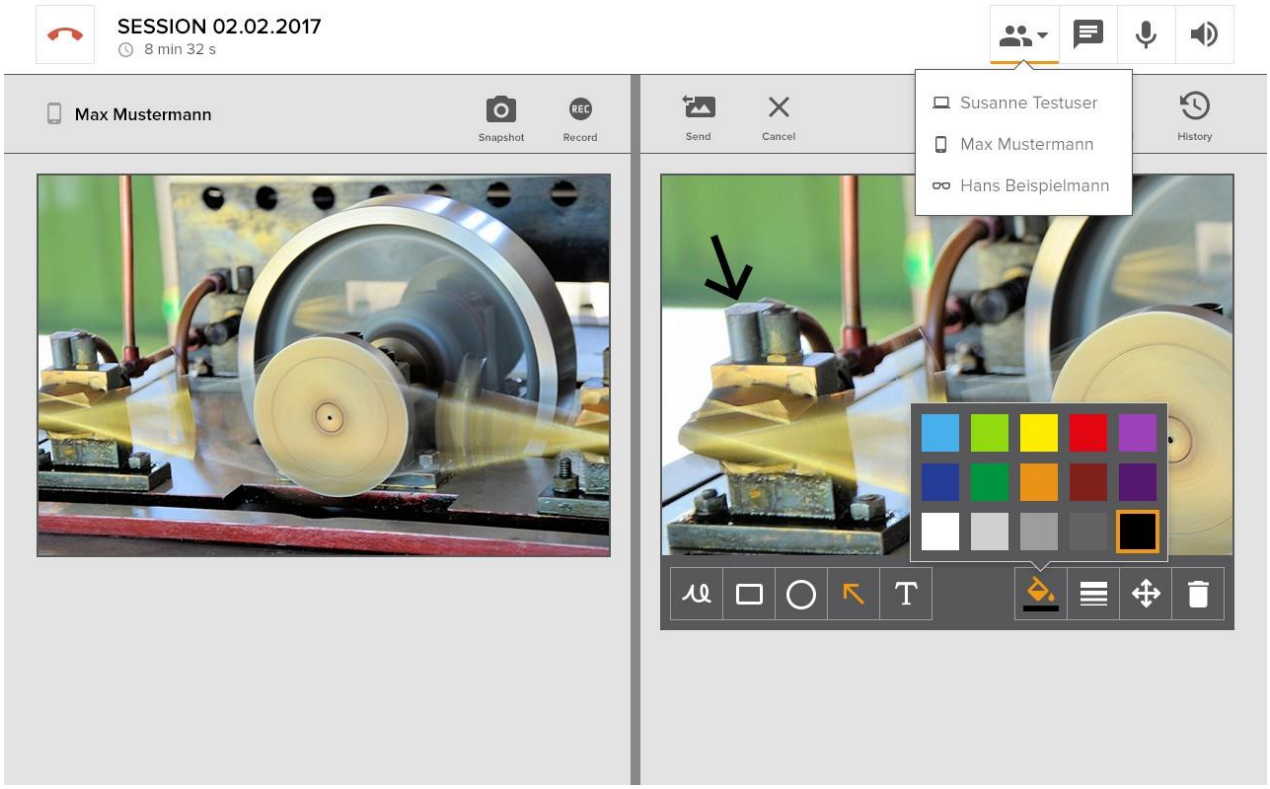

Figure 2: Visualisation of EVO-CALL Session

2.2 OBJECTIVE AND TARGET AUDIENCE

Geographical range where the good practice has been used / tested / validated was:
Primarily Austrian HQ and internationally operating companies.
Countries they used EVOCALL: USA, China, Bulgaria, Hungary, Spain, UK,…
Target audience/potential customers are:
Service and maintenance employees and the head of departments, After Sales, IT Support, …

Target group of costumer is:
Beginning from SMEs less than 40 employees, up to large companies (more than 2500 employees) to public institutes (university)

2.3 METHODOLOGICAL APPROACH

From the costs point of view, the solution minimize on-site presence of experts, minimize travelling cost, reduce repair time, increase plant availability

The starting point for the implementation of EVOCAll for a company interested would be a proof of concept with EVOLARIS consisting of: an initial workshop to identify the processes and stakeholders with the highest impact potential, training and hands-on experience of the smartglass-based solution; assistance for integrating the solution into the internal IT environment; 3 monthly test licenses

Resources necessary for implementation are:
EVOCALL WebApplication – Computer for Expert, Smartphone for Fieldclient, Chrome Browser on both devices (minimum resources). Timespan incl. Kick-off Workshop less than one day.
Financial resources: costs for concurrent licence – 460€ per licence per month

2.4 VALIDATION PROCESS

The solution was implemented with two lead customers, TGW logistics and AVL List. After a first trail with a single device at each site, a test phase with approx.. 10 devices took place, evaluating the solution regarding the stability and performance (e.g. by testing it in a live-like setting between AVL HQ in Graz, Austria, and a AVL subsidiary in the US) and regarding the acceptance of the solution by various employees, which was measured via qualitative interviews.

2.5 RESULTS / IMPACT

Reduce the response time. Before between 24h – 36h worldwide, in combination with EVOCALL round about 30 Minutes.

2.6 SUCCESS FACTORS AND CONSTRAINTS

Limitations are network shares and network (WLAN) infrastructure constraints (e.g. firewall ports needed to be opened)
Benefits are placed in data centre, high secured communication, in combination with smart glass hands free;
Minimize on-site presence of experts, minimize travelling cost, reduce repair time, and increase plant availability
Important factor to improve the impact of the good practice is the user acceptance

2.7 LESSON LEARNED & SUSTAINABILITY

Even if the companies are working in the same field, there are often quite different processes that need to be reflected and supported by the solution. Customizing is an important requirement for user acceptance.

The example minimizes travelling of experts

2.8 REPLICABILITY AND UP SCALING

The solution requires only the WebApp license, a browser and smartphone and can thus be easily deployed. For hands-free operations, smartglasses are advisable, which cost about 1.500 EUR each.

2.9 FINAL REMARKS

Concluding, the good practice example EVO-Call minimize on-site presence of experts, minimize travelling cost, reduce repair time, increase plant availability

3 GP2: ABF- OneBase – MFT (material flow control), intralogistics solution

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Keywords : OneBase – MFT, Material flow tracking, warehouse management system, forklift guidance system, crane control system, 3D warehouse, RTLS, Real Time Locating System, automatic load detection, hands-free, fleet management
Good practice applied in: (NACE code) : C

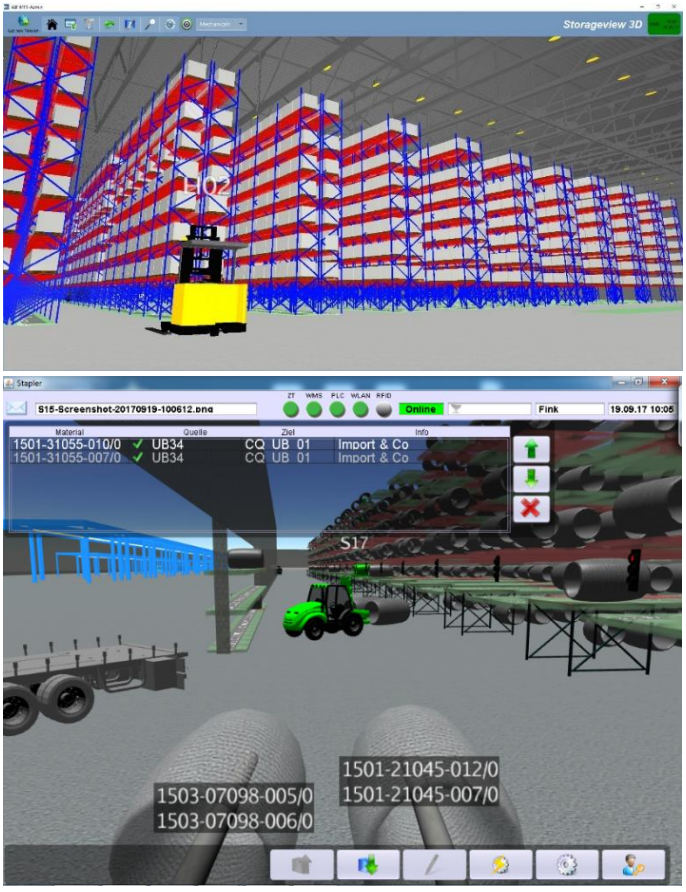
This industry independent intralogistics solution integrates a high-performance warehouse management system with continual material tracking for the in-plant logistics processes. With a multitude of modules, this flexible, total solution forms the basis for modern logistics. The material movements are posted automatically and the products get continuously tracked through the warehouse. Hereby the operator has an exact and complete overview where each and every piece of material is in the logistics chain at any time.
Optimization algorithms and a dynamic, adaptive set of rules automatically ensure the ongoing calculation of the necessary transport orders for quick processing of all the required in-plant material transports. This optimized real-time procedure leads to efficient usage of the available warehousing and transport capacities and assures the efficient material flow.

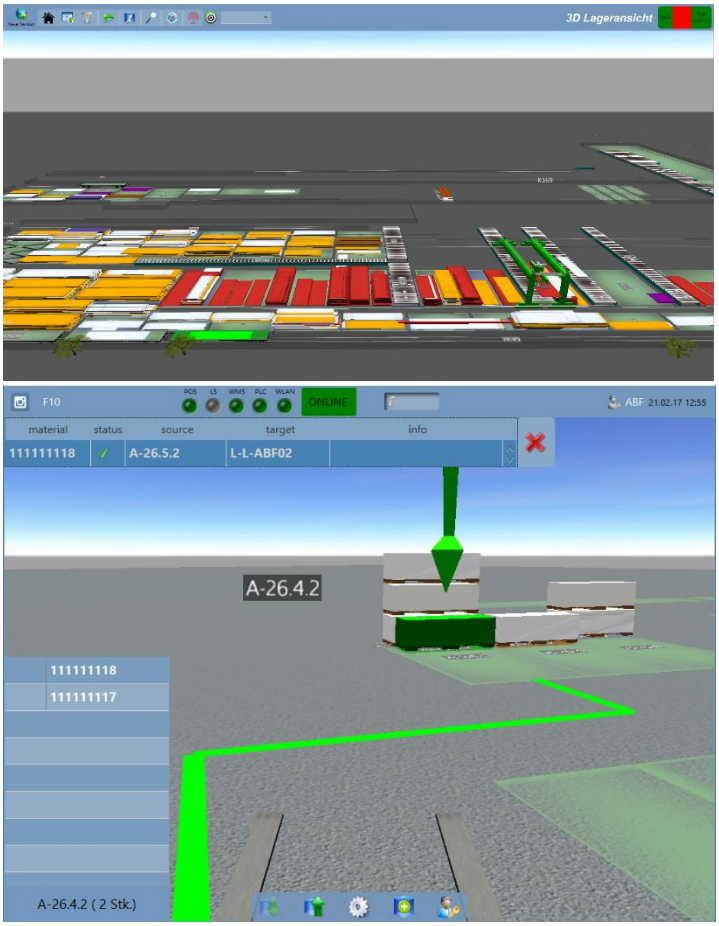
3.1 GOOD PRACTICE DESCRIPTION

OneBase – MFT provides innovative material tracking and control functions for the intralogistics in the industry's production processes. This solution optimizes the efficiency of the customer's intralogistics.

The solution provides a situation adaptive warehouse management, a forklift guidance system, a crane tracking system, a tight integration of the production facilities and interfaces with the existing IT infrastructure to form a complete solution for the optimization of the production and intralogistics processes. The innovation is the continuous material tracking of every movement within the intralogistics chain, by integrating RTLS on forklift trucks, cranes, milk runs and AGVs. The system determines the vehicle position precisely in a X, Y coordinate system. All movements are tracked and controlled, starting from the goods receipt, covering the work in progress movements and managing the final products.
Using a RTLS and load detection sensors the movements can be tracked fully automatic in block and high-bay warehouses although the warehouse is managed in manual operation.
OneBase – MFT, Material flow tracking, warehouse management system, forklift guidance system, crane control system, 3D warehouse, RTLS, Real Time Locating System, automatic load detection, hands-free, fleet management

The ABF intralogistics solution is probably the most modern RTLS material tracking solution including a highly optimized warehouse management system.
In comparison to warehousing solutions based on barcodes or RFID technology the RTLS based OneBase – MFT solution can be realized with very high accuracy (X, Y, Z coordinate within the warehouse) and offers by this the highest possible grade of digitalization and automation of the customer's intralogistics processes.

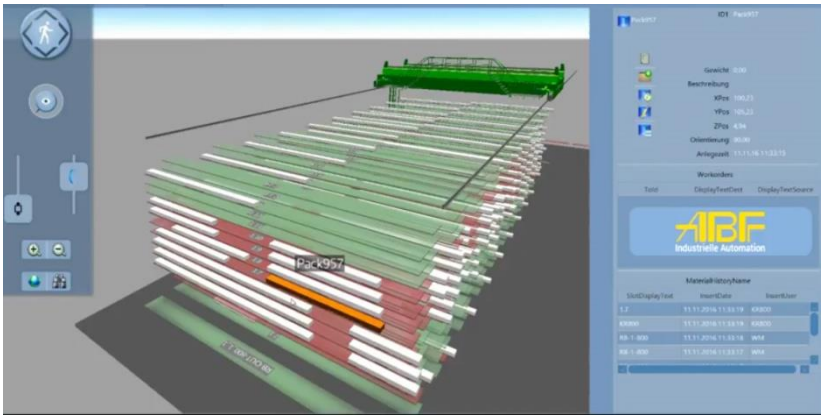




Award: Finalist in the Austrian logistics award
Website: www.abf.at/en/products/warehousing-solution-onebase-mft

Videos:
MFT forklift guidance system: https://www.youtube.com/watch?v=AWZAJdSPVZE

MFT for automatic cranes:
https://www.youtube.com/watch?v=awHp9qwBB68



MFT in a crane warehouse:
https://www.youtube.com/watch?v=qCnquzsHqwM

MFT in a steel wire rod production:
https://www.youtube.com/watch?v=xkJG1aGwkxc

Pictures of realization examples:

3.2 OBJECTIVE AND TARGET AUDIENCE

The target customers are industrial production facilities and logistic centres that are handling big material units (e.g. steel coils or steel heavy plates, wood products) or storing products in pallets, containers, lattice boxes

3.3 METHODOLOGICAL APPROACH

From the costs point of view:

- No time consuming search times for material
- No time consuming material identification times (scan-less material identification
- No time consuming manual warehouse bookings in the warehouse management system and ERP system
- Permanent inventory
- Optimization of the intralogistics fleet by route optimized transport order handling
- Time and cost

Regarding the quality assurance, the solution avoids manual operator mistakes in the warehousing process (wrong material in production, wrong storage location) and while shipment of final goods. Addiationally, it reduces downtimes of production aggregates by time efficient supply of materials

MFT improves the safety of used personnel and equipment resources.

3.4 VALIDATION PROCESS

Implementation of ***OneBase*** – MFT intralogistics software solution with RTLS components on the means of transport (forklifts, cranes, …) as well as the integration or mounting of additional sensors for automatic load detection. Integration of in and outbound facilities of the production aggregates and the IT systems (MES, ERP).

The impact can be validated if the results of the solution realization can be compared to an actual situation survey, which could be done in advance.

3.5 RESULTS / IMPACT

More transparency in intralogistics and enablement for automatic warehouse management by continuous material tracking and situation adaptive material flow control.

3.6 SUCCESS FACTORS AND CONSTRAINTS

The automatic load detection depends on the possible accuracy of the used RTLS. On cranes the positioning precision sometimes also depends on the used hoist. To assure a continuous and error free material tracking the accuracy of the RTLS needs to be less than the half size of the transport unit's shortest side. On forklifts the solution works fine with transport units of a size bigger than a Euro pallet.
Automatic vehicles or manipulators with a fixed hoist can achieve a higher positioning precision.

OneBase – MFT and its automated intralogistics environment introduces a high grade of innovation and significant improvement in quality and efficiency of logistics and production supply processes, because:

- The warehouse management will no longer be done in the minds of the operators
- You know where the material precisely is at any time
- Intralogistics availability around the clock
- No more barcode scanning and manual mistakes, because the automatic load detection avoids manual actions for identification (hands-free)
- Situation adaptive transport management with route optimized transport orders under consideration of the current transporter position (forklift, cranes, AGVs …)
- Fleet management and optimization
- Digitalization of the intralogistics processes
- Performance optimization for manually operated vehicles (automated load detection, guidance systems for better orientation within the warehouse by a state-of-the-art 3D environment, transport orders)
- Improvement of human and machine safety by providing location related safety function like collision avoidance and speed control

The best impact will be achieved, for customers who have a middle to big sized fleet of transport vehicles and have big warehouse areas and / or numerous production areas that need to be supplied with WIP material.

3.7 LESSON LEARNED & SUSTAINABILITY

The OneBase – MFT solution is able to optimize the intralogistics processes, efficiency and costs. The improvement of a well automated intralogistics transportation fleet (e.g. forklift trucks) will lead to a reduction of travelled distances and to possible reduction of needed vehicles. By this there is not only a rise of efficiency in terms of costs but also in terms of energy consumption and exhaust emissions.

3.8 REPLICABILITY AND UP SCALING

The solution can be useful for any industrial production facilities and logistic centres that are handling big material units (e.g. steel coils or steel heavy plates, wood products) or storing products

in pallets, containers, lattice boxes. The high grade of standardization allows to use the solution in different kind of industries. It also applies to different means of transports no matter if manually or automatically operated.
The solution has very good scalability features. Roll-out to the customer's other facilities as well as internationalization is supported.

3.9 FINAL REMARKS

Concluding, OneBase – MFT and its automated intralogistics environment introduces a high grade of innovation in the logistics and production supply processes because:

- The warehouse management will no longer be done in the minds of the operators
- You know where the material precisely is at any time
- Availability around the clock
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4 GP3: Tablet Solution – Work Held Voice Assistant

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Keywords : AI, Artificial Intelligence, Voice Assistant, NLP, NLU, Speech Recognition.
Good practice applied in: (NACE code) : C, Manufacturing,
Plant Equipment Engineering, Field Services

WorkHeld seamlessly connects field technicians with their project coordinators in the head office. Construction plans, checklists and work orders are continuously updated and defects can be reported immediately. WorkHeld enables all involved parties to always be up to date on the project progress.

4.1 GOOD PRACTICE DESCRIPTION

We developed a new form of interaction for workers and technicians with low IT skills. WorkHeld seamlessly connects field technicians with their project coordinators in the head office. Construction plans, checklists and work orders are continuously updated and defects can be reported immediately. WorkHeld enables all involved parties to always be up to date on the project progress.
Novel Technology: AI based voice assistant similar to Amazon Alexa or Apple Siri build with NLP (natural language processing) and Speech to Text Technologies.
Voice Assistant that runs on smartphones and tablets and can be connected to headsets.

Awards:

- DBS Award,
- Handelsblatt Industriegipfel - vielversprechendsten Start-Up Lösung
- Born Global Champion

4.2 OBJECTIVE AND TARGET AUDIENCE

Geographical range where the good practice has been used / tested / validated, is:
Austria and the DACH region

Target group:
SME's and Large companies

4.3 METHODOLOGICAL APPROACH

Design a good conversational interface for specific usecases before you start with implementation.

Conversational User Interfaces are the future of human machine interaction but have to be designed to feel natural. Than build on top of existing NLP Frameworks.

From the costs point of view:

- 20-30 % (estimated)

4.4 VALIDATION PROCESS

VALIDATION PROCESS with industrial partners

4.5 RESULTS / IMPACT

They are more motivated to document their work and have access to data an information even though they are not highly skilled in IT.

SUCCESS FACTORS AND CONSTRAINTS

Dialects can be problematic.Voice Assistants open up completely new forms of interaction with IT systems and can be applied to all sorts of Use-cases.

4.6 LESSON LEARNED & SUSTAINABILITY

Good conversation design is essential.

4.7 REPLICABILITY AND UP SCALING

Easy Access and Interaction with complex IT systems
Can be applied to almost all business processes.

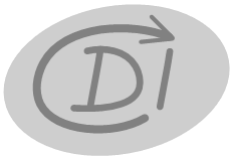
4.8 FINAL REMARKS

Voice Recognition is expected to have a major impact on all industries in the next 1-3 years. Lets make sure the manufacturing industry is a technology leader this time!

Disclaimer / Acknowledgements

Address any legal loose ends or limitations for dissemination, certify the use of this information for dissemination, online and printed (Yes/No)	YES

5 GP4: CDI, Cooperation Development Innovation - FIT (Factory Incident Tracker)



CDI, Cooperation Development Innovation

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Keywords : efficiency and effectiveness production planning for SMEs,
Good practice applied in: (NACE code) :

FIT (Factory Incident Tracker): Problem Analysis in productive environments for long term failure preventation

Small and Medium Enterprises are lacking of ERP / MES Software that is in fact to big for their scale. Furthermore producing companies focus on fast solution of any incidents that may occur and then pass the further analysis.
The good practise of said solution is to track, analysis and avoid often occuring failures in the long run. This might as well shorten the expenditures of maintainance, could lead to easily keep delivery goals and in long run give SME the possibility to do efficiency and effectness planing with a low level technique.

5.1 GOOD PRACTICE DESCRIPTION

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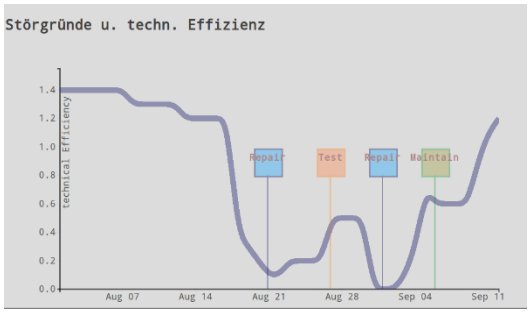
goals and in long run give SME the possibility to do efficiency and effectiveness planning with a low level technique.
The solution is a very handy easy to use webapplication that is combined with a short eye to eye customizing with IT and Production consultants



This is a crop of the dashboard, that provides data to the customer; blue line is a technical process (here the production output of a bunch of machines). Blue orange and olive boxes represent Incidents of said process. These incidents later have to be analysed.

5.2 OBJECTIVE AND TARGET AUDIENCE

Target groups are:
SMEs (below 150 Employees) that have rather none or few IT Systems yet implemented or not using data for long term Problem Analysis

5.3 METHODOLOGICAL APPROACH

From the costs point of view:

- Cost Cuts by process analysis, critical / longest path meth.

Related quality assurance and risk management:

- New method set combined of: FMEA, functional description, asset management, risk evaluation and mitigation

The tool can be implemented by (BI, KPI, Data) workshop, small adaption of dashboard, review from time to time HTML Browser, eventually data base or some kind of standard data format that can be read through a browser

5.4 VALIDATION PROCESS

5.5 RESULTS / IMPACT

5.6 SUCCESS FACTORS AND CONSTRAINTS

Benefit is that improvement potential is discovered at all, which cannot be detected without problem analysis via FIT.

5.7 LESSON LEARNED & SUSTAINABILITY

Many SMEs react to incidents only, i. e. accidents or if necessary exchange something in advance on suspicion. Very few SMEs think about it closely what kind of malfunctions you are experiencing all the time.
SME (below 150 Employees) that have rather none or few IT Systems yet implemented and SME are not using data for long term problem analysis.

5.8 REPLICABILITY AND UP SCALING

5.9 FINAL REMARKS

6 GP5: XiTrust - Secure QR-Code (sQR)

Photo of the contact person

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XiTrust is your provider for all services concerning electronic signatures. For more than 15 years, we have been advising clients seeking tailored solutions for business processes without cross-media conversion. Our innovative products grow with the requirements that your company places on them now and in the future.

Keywords : Signed and encrypted QR code
Good practice applied in: (NACE code) :

The sQR features another level of security and offers new possibilities regarding the use of QR codes with respect to authentication. Basically, the sQR contains information such as the ID, name of a person or machine, respectively. This information is electronically signed to ensure data integrity. An APP which is able to check the validity of this signature has been developed. Additionally, it is also possible to encrypt the information of the QR Code and to decrypt it with the corresponding public key within the APP. After the information is decrypted and the signature is validated, the APP provides a possibility to verify the real identity of a person or a machine. In case of a person, there is the additional possibility to compare a photo and in case of a machine, additional information regarding the location of the machine can be provided

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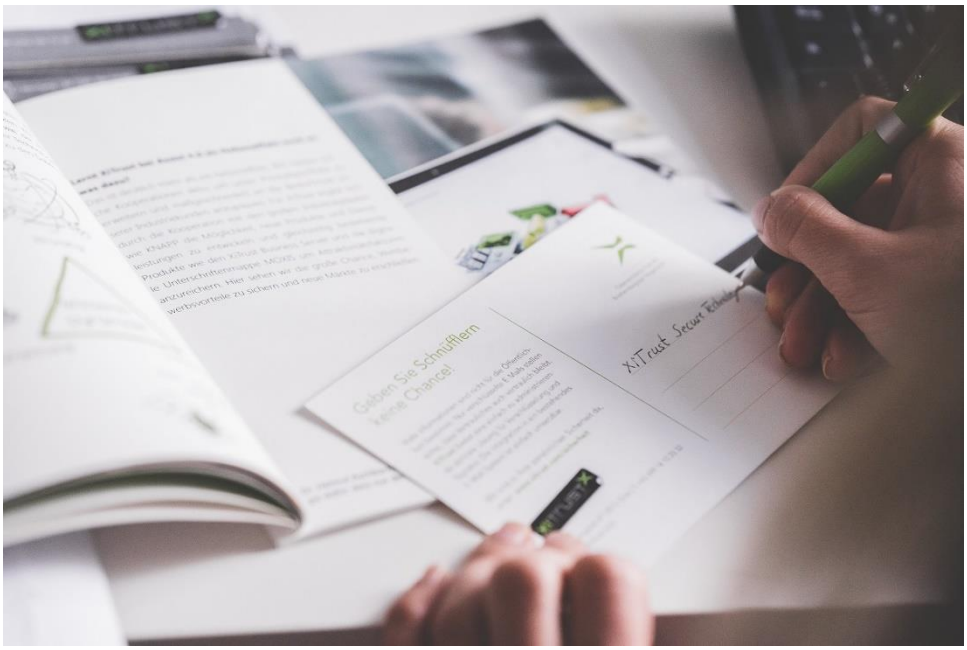
The fact that the information within the QR code can be signed and/or encrypted represents a novel approach regarding authentication.



6.2 OBJECTIVE AND TARGET AUDIENCE

Worldwide
All institutions that issue a secure identification card for a person and all big production/logistic companies with many locations over the world. Additionally, the sQR-Code can also be used for instructions for a specific machine

6.3 METHODOLOGICAL APPROACH

Quality Assurance:
All the information within the QR code cannot be read or changed.

There is no additional device needed for the identification card and there is also no specific device needed for the APP, which also works offline.

This depends on the amount of QR codes that need to be issued. The process of issuing such codes is not very time consuming and then just the process of handing out these codes is left. Generally speaking, the implementation of these QR code can be easily integrated into existing workflows.

6.4 VALIDATION PROCESS

The sQR was part of a research project and customer project.

The keys for decrypting the information are available within the APP and for validating the signature one needs the public keys.

6.5 RESULTS / IMPACT

Proof of identity of the person/machine can be ensured by easy means.

6.6 SUCCESS FACTORS AND CONSTRAINTS

Only a limited amount of data can be stored within a QR code. In case of machines, the QR code itself has to be applied in a way that malpractice is prevented. Furthermore, it has to be ensured that the camera of the device where the APP is installed (e.g., mobile phone, virtual reality glasses) is capable of scanning the QR code properly.
The use of QR codes which contain signed and/or encrypted information features a fast and easy solution for strong authentication of a person/machine.

6.7 LESSON LEARNED & SUSTAINABILITY

The described solution represents a great possibility to connect the analogue world with the digital world, however, the user acceptance strongly correlates with the level of experience concerning the technologies involved.

6.8 REPLICABILITY AND UP SCALING

They can use the secure QR Code for strong authentication of persons or machines, e.g. if they are a production/logistic company.
This solution can be easily transferred to basically every use case where QR codes come into play, such as vouchers or e-tickets.

6.9 FINAL REMARKS

This solution can be implemented very easy and ensures the integrity, authenticity and confidentiality of the information within the QR Code. For this reason, it is the ideal tool to authenticate a person or machine and to provide important instructions of a machine in order to activate or repair it. This secure QR Code in conjunction with the APP perfectly connects the analog world with the digital world in a secure manner as the information is signed and encrypted.

7 GP 6: Plasmo - Quality Assurance Solutions for automated production processes and additive manufacturing applications

Photo of the contact person

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Keywords : Quality Assurance, Process Control, Process Monitoring, AM
Good practice applied in: (NACE code) : 25620

plasmo offers quality assurance solutions that enable our customers to implement a secure, efficient and cost-optimized production mainly in automated metal working industry. plasmo has a large clientele of top global companies established in different industries (automotive, steel, mobility, aerospace industry, suppliers etc.).

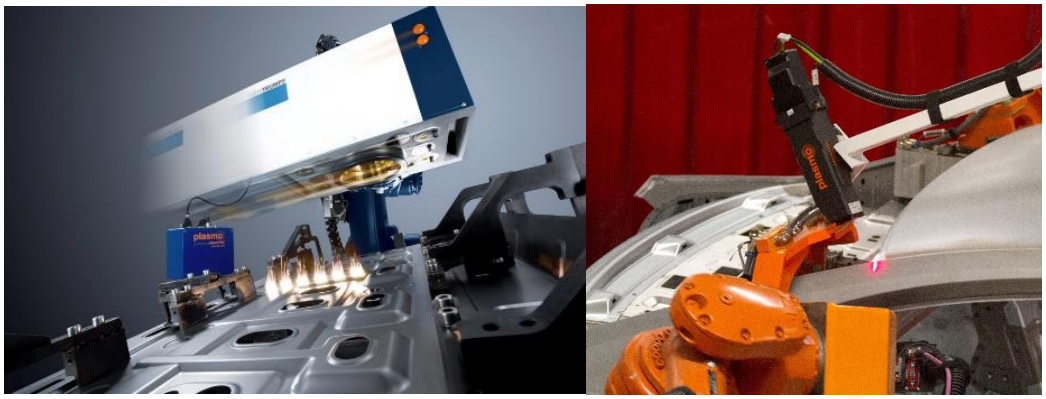
7.1 GOOD PRACTICE DESCRIPTION

plasmo systems inspect the quality of components of i.e. vehicles, aircraft, ships, turbines, furnaces, household appliances, windows or steel structures to make these and many other products safer and more efficient. Our solutions capture all relevant data for process optimization (errors, defects, process deviations, tracking of component data) and visualisation adopted to the relevant user level.
plasmo solutions enable a fault-free production and documentation of produced components as well as a visualisation of deviations in the production process. To produce 100% quality and avoid call back actions as well as produce as efficient as possible is our customers' goal and our purpose.

plasmo contributes to these goals by providing absolute transparency of the respective production process and considering customisation requirements. This transparency supports the worker in optimization of all steps and starting the necessary measures in case of detection of failures or process deteriorations. This means, that the investment in monitoring systems and training

activities helps to reduce the risk of defective parts or components which may havel been returned by the customer of our customers. Plasmo solutions are often installed in combination with other non-destructive technologies like eddy current tests or ultrasonic inspection methods just to be sure that all produced components fulfil all internal and external specifications.

The plasmo portfolio ranges from monitoring of welding and laser brazing processes, control of weld seams, geometric shapes and surfaces up to tailored solutions in the field of machine vision and analysis software. Plasmo has an own business field for AM monitoring activities.
In addition plasmo plasmo builds on know-how including the following disciplines: hardware development, software development, optical sensors, laser technique, machine and computer vision, mechatronics, physics and mathematical algorithms as well as deep learning. All solutions and customisation procedures are implemented at plasmo. For all solutions plasmo provides a global service and training network.



7.2 OBJECTIVE AND TARGET AUDIENCE

plasmo is represented with its products and services worldwide. While it´s headquarter is based in Vienna, the company maintains 2 branches (USA, Detroit- Plymouth MI & Stuttgart-DE) and a worldwide network of partners and resellers.

Various automobile manufacturers like Audi, BMW, Daimler, GM, Opel, PSA, Suzuki, Volvo, VW, Ford, Tesla as well as companies in the steel industry such as ThyssenKrupp, Salzgitter, Tokyu Steel and Posco, SMS trust in quality assurance solutions of plasmo.

A partnership with EOS is the basis of our initiative to offer quality assurance solutions for industrial 3D metal printing based on powderbed applications. In addition plasmo offers a combination of plasmo systems to machine builders in AM industries especially for DED based AM processes.
Large companies, SMEs especially job shops and Public institutions
Others: research institutions and private public partnerships like pilot factory in Vienna, Aspern Seestadt.

7.3 METHODOLOGICAL APPROACH

The expert team assists its customers from the moment the control task is defined until implementation of the control system. Starting with support from the decision phase, if and how and which technology can be implemented in automated production and what is needed for implementation including relevant expertise (planning phase), training and accompanied services and consulting. All relevant internal or external standards are considered in the technology selection and implementation of the monitoring systems as well as intercultural issues.
Resources needed are:
Production manager, quality representative, production staff, service & maintenance department, electrical and control engineering department. Production line should produce first trial parts. Also old production lines can be upgraded by a retro-fit package.
Time span: from planning to implementation incl. training (about 16 weeks)

From the costs point of view:
The solultions minimize the number and costs of rejects and claims by 50%; Optimization of cycle time by 20%, process optimisation by 20%, reduction of machine stand stills or interruptions nearly to zero, efficient tool to plan predictive maintenance activities.

Increase the quality of produced parts, optimization of the production process in general, consider safety and optical aspects. Plasmo solutions make quality visible.

Our solutions capture all relevant data for process optimization (errors, defects, process deviations including full traceability etc.) to keep the quality of our customer´s products at the highest possible level. Plasmo provides additional technical consulting services for interpretation and further use of production data, individualised illustration by dashboards and implementation of process optimisation measures. Plasmo solutions are monitoring solutions contributing to minimisation of production failures.

7.4 VALIDATION PROCESS

plasmo gathers all relevant process data, correlates and evaluates this data. This evaluation enables identifying the real cause of a defect and provides visualisation tools serving for continuous improvement of the process.

7.5 RESULTS / IMPACT

Customers have told us that plasmo quality assurance solutions make their production process significantly more efficient (by optimization of the production process and further reducing costs created by new insights due to the implementation of monitoring systems – “customers know their production processes better” and use the existing information for defined measures).

7.6 SUCCESS FACTORS AND CONSTRAINTS

Limitations are:
resources and know-how in various disciplines (mechatronic, electronic, measurement and control systems, laser material processing, plant construction & engineering, industrial automation), awareness and trust in the new technology, misunderstanding of benefits of the system, lack of knowledge of best practices from our customers (use cases)
Benefits are:
Flexibility: Our solutions are independent from the integrator or laser manufacturer.
Customized solutions: the plasmo quality platform offers solutions adoptable to individual requirements of production processes.
Expertise: plasmo aggregates all necessary disciplines for the implementation of quality assurance systems in house, in the headquarter in Vienna. Plasmo works cooperates with research institutes and industrial partners to focus all expertise optimally on plasmo’s core topic: quality assurance and monitoring of production processes. All plasmo systems are industrialised and accepted in automotive, steel and aerospace industry as well as in electro mobility.

To improve the impact of the good practice:
gain experience with the provided technology during tests in laboratory and industrial circumstances, adequate training and additional technology consulting, involvement of production and quality manager as well as purchasing and maintenance department to understand the benefits, limited rental time with possibility to return the product, offering a proof of concept phase to confirm covering the most important individual requirements. Success stories of best practice cases highlight the needs and provide an impression how customers use plasmo solutions.

7.7 LESSON LEARNED & SUSTAINABILITY

With plasmo solutions, our customers are able to produce the highest quality as possible and to better understand their production process. It is necessary to provide use cases and highlight benefits and possibilities of plasmo systems, make additional use of generated information by data

created during the production process. Adequate trainings adopted to the know-how level of the trained organization and remote & hotline services are necessary to increase the awareness for the new technology, provide demonstration facilities. Expected benefits need to be illustrated explain to companies' stakeholders, especially the champions.

plasmo hardware-independent solutions offer the opportunity to plan quality assurance in your production flexibly. This ensures sustainability

7.8 REPLICABILITY AND UP SCALING

The provided solutions are also relevant for SMEs, especially job shops. plasmo contributes to making quality visible and gaining more information about the production process.
At corporation level: In addition plasmo provides a detailed track record for all components produced (long-term archive) which can be used in case of call back actions or process comparisons (i.e. comparison of the same applications in different locations and plants.
Dissemination of good practice more widely: reference business cases and use cases published at congresses or journals, illustrate a list of reference customers to visit reference installations.

7.9 FINAL REMARKS

plasmo offers tailor made quality assurance solutions that enable our customers to implement a secure, efficient and cost-optimized production.

Disclaimer / Acknowledgements

NDA (non-disclosure agreement) for new customers as well as agreement on data hosting and security, agreement on use of photos and videos (if required)
All information illustrated in this tab can be published and disseminated online and printed.

8 GP 7: PROFACTOR – X Rob - easy robot configuration

Contact Data
HELMUT NÖHMAYER
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Robotics & Assistiv Systems

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email.: helmut.noehmayer@profactor.at
www.profactor.at
ATU 38420507

Keywords : Flexible robotics
Human machine interaction
One interface
Easy-to-use features
Automatic path planning
Fast configuration of complex processes
Good practice applied in: (NACE code) : C - Manufacturing

ONE ROBOT. ONE AUTOMATION-SOFTWARE.
CHANGE PROCESSES EASILY
WITHIN A FEW MINUTES.

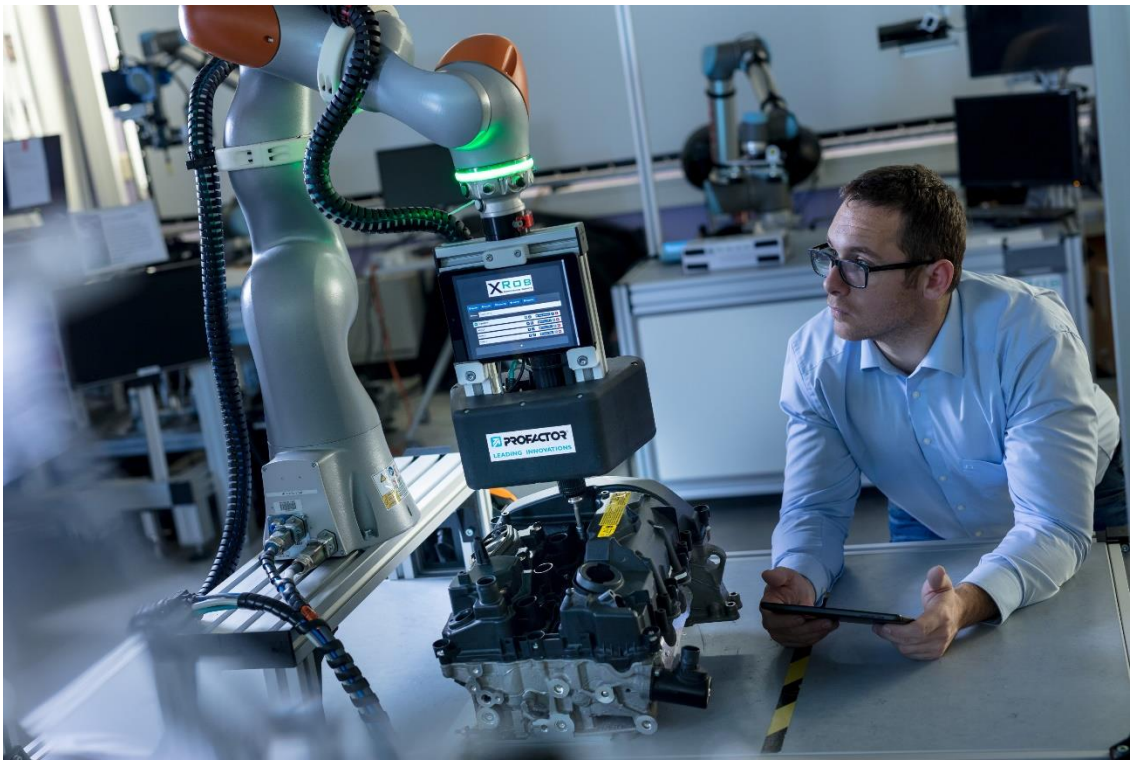
With XRob users with minimal training experiences are able to create robotic processes in a new and effective way. The system is designed to be cost effective also for small companies.

The benefits are
» Easy & fast configuration – no programming skills required
» Fast retooling for a high number of variants
» Intuitive process setup within few minutes
» Easy integration into existing environment and processes
» Versatile and expandable
» Supports all popular robot brands

8.1 GOOD PRACTICE DESCRIPTION

The software system XRob allows the creation of complex robot applications within a few minutes. With unique and easy-to-use features significant speed up will be accomplished during ramp up. This makes the operation more efficient and flexible than common programming methods. The novel software architecture allows easy and intuitive creation of processes and configuration of the components of a robot system by only one single user interface.
Onboard key technologies are:

- On-board 3D modeling of work spaces for automatic collision model
- Process simulator with automatic path planning
- Inline 2D/3D position recognition
- Object recognition in real-time
- Mobile user interface



https://www.youtube.com/watch?v=RnLznMFj5Y8&t=2s

https://www.profactor.at/en/solutions/flexible-robotic/

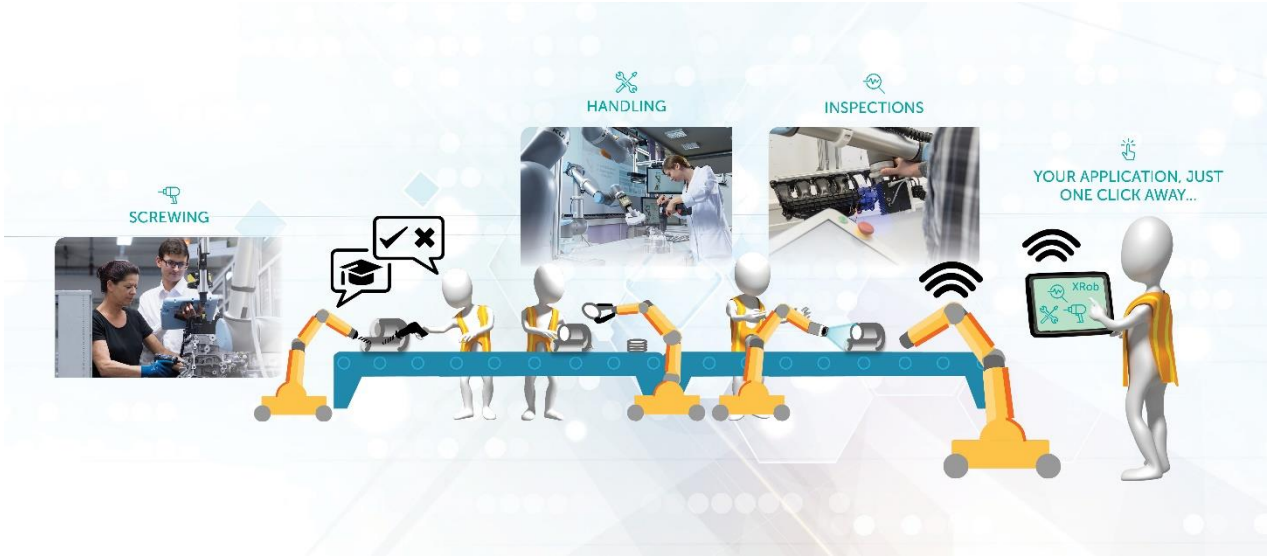


Figure 3: Your Application one Click away, make robot usage simple

8.2 OBJECTIVE AND TARGET AUDIENCE

Main application fields
» Pin picking
» Handling
» Assembling
» Inspection
» Screwing

Key references
» 3-D inspection of engines parts

» Screwing Assistant for engine assembly
» Automatic crankshaft picking
» Automotive: Acoustics inspection
» Flexible screwing station

Target Audience:
Production oriented SMEs (<250 employees)
Large companies

8.3 METHODOLOGICAL APPROACH

With its partners, PROFACTOR develops customized pilot plants and prototypical plants for the evaluation of the latest robotic technologies. The range extends from feasibility studies to real systems – which are implemented and realized together with experienced system integrators.

8.4 VALIDATION PROCESS

Amongst others, the following were tested at the project partner
: Haptic Technologies (Forced Feedback),
Image Processing Techniques Spatial Augmented Reality and a Tangibles User interfaces (TUI) were used.
Here balls or hoppers mark the positions that the robot must approach.
The technologies were evaluated in a three-step user study with assemblers aged 20-60 years. The persons did not have any previous knowledge of robotics, their requirements to the Interaction could therefore describe them without bias.
At the beginning, the robot only had one operator panel. The system has been made more and more flexible by various sensors.
Ultimately, it was equipped with a combination of projection, 3D and gesture detection. The interaction time could thus be reduced to less than half of the time required for the interaction.
The results showed that even complex systems, the are suitable for batch size 1, can be operated efficiently by non-professionals
This requires automatic service functions in the background that the user does not perceive.

The teaching duration was extracted by video recordings. The average teaching time decreased from 6:25 to 3:36. The usage of physical guidance increased from 0% to 71,57%. This shift to physical robot guidance was also measureable in two dimensions of user experience Usablilty (SUS System Usability Scale) and Performance Expectancy (PE). PE describes one's belief that using the system will help to attain gain in job performance, and was measured using two items which were derived from.

The implemented XRob programming system supports a linear programming approach, robot motion commands, sensorics-data handling, Computer Vision algorithms and software-templates. XRob supports more possibilities like vision-based, automated compensation of position deviations. This fact led to increased duration for the whole parametrization process from 13 to 20 minutes caused by the additional functions (Computer Vision).

8.5 RESULTS / IMPACT

The Impact of X-Rob is manly for SMEs. If the system is integrated after a common definition phase, processes which were done manually today could be done by / with a robot and it is easy to reconfigure. This enables the SME to be faster, more accurate and deliver a better quality.

8.6 SUCCESS FACTORS AND CONSTRAINTS

The benefits are
» Easy & fast configuration – no programming skills required
» Fast retooling for a high number of variants
» Intuitive process setup within few minutes
» Easy integration into existing environment and processes
» Versatile and expandable
» Supports all popular robot brands

Limitations may result through user acceptance.

8.7 LESSON LEARNED & SUSTAINABILITY

A “universal system” does not exist, even if you have such a flexible and easy to “configurate and instalate” system like X-Rob. A careful definition of the tasks the SME expects from the system is strictly necessary

8.8 REPLICABILITY AND UP SCALING

The system can be replicability after a first feasibility study at each organisation, also until lot size

8.9 FINAL REMARKS

Attachments
Folder: XRob

9 GP 8: Business Upper Austria - Industry 4.0 Maturity Model

Photo of the contact person

Contact Data
Company: Business Upper Austria – OÖ Wirtschaftsagentur GmbH;
Department: Mechatronik Cluster;
Contact person: Manuel Brunner;
Representative:

Keywords : Benchmark, maturity, implementation road map, experience in 16 cases
Good practice applied in: (NACE code) : C28, C23.42, C26.1, C31.01, C31.09, C28.15,

The Maturity Model is a structured methodology to evaluate the Industry 4.0 status quo of a company, create a tailor-made vision and derive an individual road map to get from status quo to the vision.

9.1 GOOD PRACTICE DESCRIPTION

This model is a new approach to structure the technological change process through Industry 4.0 in a company and realized as a software cloud application on license. Production processes, organizational processes, machines, software applications can be investigated with the model and the outcome will lead to cost efficiency and process optimization. Enclosed to the software tool is a benchmark database where all investigations are saved anonymous.
The maturity model is the first known approach to describe the Industry 4.0 status of an entity with 24 criteria including a derivation of a road map for implementation.

www.reifegradmodell.at

9.2 OBJECTIVE AND TARGET AUDIENCE

Upper Austria, Lower Austria, Bavaria.
Mostly producing companies but also service provider.
The model was tested in large companies as well as in SMEs

9.3 METHODOLOGICAL APPROACH

When using the model, cost efficiency could be an aim.

Attending a one day training and using the given process and software.
The training costs EUR 500,-- for a day and the licence EUR 1.000,-- in the first year and after that EUR 500,-. Or you engage a consultant. For an investigation a company can calculate with about a week and 3 days of providing staff.

9.4 VALIDATION PROCESS

Since the launch of the Model (01/2017) it was used in 16 companies and so the process is validated.

9.5 RESULTS / IMPACT

The beneficiaries get a detailed road map for implementation of Industry 4.0. Thus save money, be more flexible and getting ideas of new business models.

9.6 SUCCESS FACTORS AND CONSTRAINTS

The Model is not a tool for assessing a whole company and make general improvement suggestions. It is a specialized tool going in depth a providing an action plan.

Individuality, investigation on the spot, tailor-made implementation road map, not limited to a branch, software support.

More investigations to keep the benchmark database growing.

9.7 LESSON LEARNED & SUSTAINABILITY

Implementation of smart factory projects in companies is difficult.

9.8 REPLICABILITY AND UP SCALING

This software can be used in nearly every SME and providing them to make the first steps towards a smart factory.

Get new data for the benchmark, developed more services and also get more references for the maturity model and thus improve quality.

9.9 FINAL REMARKS

The maturity model is in use and delivers great results wherever implemented. It delivers a tailor-made road map for a company to become a smart factory

Disclaimer / Acknowledgements

Address any legal loose ends or limitations for dissemination, certify the use of this information for dissemination, online and printed (Yes/No)	Yes

List of attachments:

10 LESSON LEARNED

This section contains the learned lessons related to the good practice collection activity from the perspective of the partner and who provided the data for each good practice.

Lessons learned from the perspective of the companies who provided the good practice information

The responders were questioned about the learned lessons from their point of view and asked to provide information about the most important aspects. These are summarized as follow:

- ***EVOLARIS:*** Customizing is an important requirement for user acceptance. .Different processes need to be reflected and supported by the solution
- ***ABF:*** reduction of travelled distances and to possible reduction of needed vehicles
- ***Tablet Solution:*** Good conversation design is essential
- ***CDI:*** SME (below 150 Employees) that have rather none or few IT Systems yet implemented and SME are not using data for long term problem analysis.
- ***XiTrust:*** User acceptance strongly correlates with the level of experience concerning the technologies involved.
- ***Plasmo:*** Adequate trainings adopted to the know-how level of the trained organization and remote & hotline services are necessary to increase the awareness for the new technology, provide demonstration facilities.
- ***PROFACTOR:*** an intuitive user interface is essential, as workers have now programming skills. Acceptance of the half-automated tasks for the works
- ***FH OÖ:*** Due to the complexity of industry 4.0, SMEs are struggling with implementing technology, as they cannot know determine at which stage of implementation and which technology will be useful for them.

Lesson learned from the perspective of PROFACTOR

PROFACTOR has a well-established network with SMEs and LE, additionally PROFACTOR provides itself solution to SMEs. We faced difficulties with the comprehensive questionnaire, SMEs tend to be overwhelmed by the quantity of questions. Helping the SMEs in filling out the questionnaire a lot of useful input was delivered. The possibility of providing results and theire products to a broader audience was seen as a chance by all SMEs.

1 TEMPLATE FOR GOOD PRACTICE DOCUMENTATION

Element	Guiding questions	Answers
INTRODUCTION		
Company information	Data identification, logo, contact person, possible representative image(s).	plasmo Industrietechnik GmbH Dresdner Straße 81 – 85, 1200 Vienna/Austria T +43 1 236 2607-0 F +43 1 236 2607-99  Jasmin Zeleznik, MA (Marketing & Communication)
Name and brief description.	Name or acronym: what is the name that captures the essence of the good practice	Quality Assurance Solutions for automated production processes and additive manufacturing applications
	Provide a concise description of the good practice being addressed	plasmo offers quality assurance solutions that enable our customers to implement a secure, efficient and cost-optimized production mainly in automated metal working industry. plasmo has a large clientele of top global companies established in different industries (automotive, steel, mobility, aerospace industry, suppliers etc.).
GOOD PRACTICE DESCRIPTION		
Detailed description	How did the SME create good practice / new product?	plasmo systems inspect the quality of components of i.e. vehicles, aircraft, ships, turbines, furnaces, household appliances, windows or steel structures to make these and many other products safer and more

Element	Guiding questions	Answers
		efficient. Our solutions capture all relevant data for process optimization (errors, defects, process deviations, tracking of component data) and visualisation adopted to the relevant user level.
	What is the relationship to SFH approach: novel technology, production processes, HRM or cost efficiency, quality assurance, risk management?	Plasmo solutions enable a fault-free production and documentation of produced components as well as a visualisation of deviations in the production process. To produce 100% quality and avoid call back actions as well as produce as efficient as possible is our customers' goal and our purpose. plasmo contributes to these goals by providing absolute transparency of the respective production process and considering customisation requirements. This transparency supports the worker in optimization of all steps and starting the necessary measures in case of detection of failures or process deteriorations. This means, that the investment in monitoring systems and training activities helps to reduce the risk of defective parts or components which may havel been returned by the customer of our customers. Plasmo solutions are often installed in combination with other non-destructive technologies like eddy current tests or ultrasonic inspection methods just to be sure that all produced components fulfil all internal and external specifications.
	Describe what are the technical solutions and innovations: of the good practice	The plasmo portfolio ranges from monitoring of welding and laser brazing processes, control of weld seams, geometric shapes and surfaces up to tailored solutions in the field of machine vision and analysis

Element	Guiding questions	Answers
		software. Plasmo has an own business field for AM monitoring activities. In addition plasmo plasmo builds on know-how including the following disciplines: hardware development, software development, optical sensors, laser technique, machine and computer vision, mechatronics, physics and mathematical algorithms as well as deep learning. All solutions and customisation procedures are implemented at plasmo. For all solutions plasmo provides a global service and training network.
	Highlights (or keywords) of the Best Practice	Quality Assurance, Process Control, Process Monitoring, AM
	Good practice applied in : (NACE code)	25620
Benchmarking	How does your solution related to others provided by competitors	Our solutions are independent from the plant or laser and optics manufacturer. This is important because our customers wish to obtain the best (customized) solution for their own application.
Additional information's / materials	Provide additional information if existing such as case studies, datasheets, whitepapers, awards and other relevant information. Electronic sources (websites, social media, pictures, videos) are encouraged to be included in this section. Training manuals, guidelines, technical fact sheets, posters, pictures, video animations, audio documents, 3D files, and/or other material about the Good practice implementation (if existing).	Find datasheets, articles, case studies on our website! http://www.plasmo.eu/en/ http://www.plasmo.eu/en/plasmo-quality-assurance-quality-control-laser-welding/press/ http://www.plasmo.eu/en/solutions/products/ https://www.youtube.com/channel/UCQlbT_SQd6zEKY2x9PiXSjg
OBJECTIVE AND TARGET AUDIENCE		

Element	Guiding questions	Answers
Geographical coverage and target audience	What is the geographical range where the good practice has been used / tested / validated: country, region, Danube Region if is relevant and possible	plasmo is represented with its products and services worldwide. While it´s headquarter is based in Vienna, the company maintains 2 branches (USA, Detroit-Plymouth MI & Stuttgart-DE) and a worldwide network of partners and resellers.
	Specify also the target audience/potential customers and stakeholders (stakeholders can affect or be affected)	Various automobile manufacturers like Audi, BMW, Daimler, GM, Opel, PSA, Suzuki, Volvo, VW, Ford, Tesla as well as companies in the steel industry such as ThyssenKrupp, Salzgitter, Tokyu Steel and Posco, SMS trust in quality assurance solutions of plasmo. A partnership with EOS is the basis of our initiative to offer quality assurance solutions for industrial 3D metal printing based on powderbed applications. In addition plasmo offers a combination of plasmo systems to machine builders in AM industries especially for DED based AM processes.
Targeted customers and scale of use	Select the target group of customers: 1. SMEs (<250 employees) 2. Large companies 3. Public institutions 4. End customer (Business to Customer) Other, please specify	Large companies, SMEs especially job shops and Public institutions Others: research institutions and private public partnerships like pilot factory in Vienna, Aspern Seestadt.
METHODOLOGICAL APPROACH		
Managerial aspects	Cost efficiency of the good practice, if applicable	Minimize the number and costs of rejects and claims by 50%; Optimization of cycle time by 20%, process optimisation by 20%, reduction of machine stand stills or interruptions nearly to zero, efficient tool to plan predictive maintenance activities.

Element	Guiding questions	Answers
	Quality assurance aspects, if applicable	Increase the quality of produced parts, optimization of the production process in general, consider safety and optical aspects. Plasmo solutions make quality visible.
	Risk management aspects, if applicable	Our solutions capture all relevant data for process optimization (errors, defects, process deviations including full traceability etc.) to keep the quality of our customer´s products at the highest possible level. Plasmo provides additional technical consulting services for interpretation and further use of production data, individualised illustration by dashboards and implementation of process optimisation measures. Plasmo solutions are monitoring solutions contributing to minimisation of production failures.
Implementation guidelines	How can the Good practice be implemented?	The expert team assists its customers from the moment the control task is defined until implementation of the control system. Starting with support from the decision phase, if and how and which technology can be implemented in automated production and what is needed for implementation including relevant expertise (planning phase), training and accompanied services and consulting. All relevant internal or external standards are considered in the technology selection and implementation of the monitoring systems as well as intercultural issues.
	What resources are necessary for implementation (personnel, finance, infrastructure and timespan)?	Production manager, quality representative, production staff, service & maintenance department, electrical and control engineering department. Production line should

Element	Guiding questions	Answers
		produce first trial parts. Also old production lines can be upgraded by a retro-fit package. Time span: from planning to implementation incl. training (about 16 weeks)
VALIDATION PROCESS		
Validation	Provide a brief description of the good practice validation process.	plasmo gathers all relevant process data, correlates and evaluates this data. This evaluation enables identifying the real cause of a defect and provides visualisation tools serving for continuous improvement of the process.
RESULTS / IMPACT		
Solution impact	What has been the impact (positive or negative) of this good practice on the beneficiaries	Customers have told us that plasmo quality assurance solutions make their production process significantly more efficient (by optimization of the production process and further reducing costs created by new insights due to the implementation of monitoring systems – “customers know their production processes better” and use the existing information for defined measures).
SUCCESS FACTORS AND CONSTRAINTS		
Limitations and Strong points	Describe limitations, both from the technical and implementation point of view	resources and know-how in various disciplines (mechatronic, electronic, measurement and control systems, laser material processing, plant construction & engineering, industrial automation), awareness and trust in the new technology, misunderstanding of benefits of the system, lack of knowledge of best practices from our customers (use cases)

Element	Guiding questions	Answers
	Selling points – list the real or perceived benefit of a good practice that differentiates it from the competing brands and gives its client a logical reason to prefer it over other brands	**Flexibility:** Our solutions are independent from the integrator or laser manufacturer. **Customized solutions:** the plasmo quality platform offers solutions adoptable to individual requirements of production processes. **Expertise:** plasmo aggregates all necessary disciplines for the implementation of quality assurance systems in house, in the headquarter in Vienna. Plasmo works cooperates with research institutes and industrial partners to focus all expertise optimally on plasmo's core topic: quality assurance and monitoring of production processes. All plasmo systems are industrialised and accepted in automotive, steel and aerospace industry as well as in electro mobility.
Need assessment	What else would be needed in order to improve the impact of the Good practice	gain experience with the provided technology during tests in laboratory and industrial circumstances, adequate training and additional technology consulting, involvement of production and quality manager as well as purchasing and maintenance department to understand the benefits, limited rental time with possibility to return the product, offering a proof of concept phase to confirm covering the most important individual requirements. Success stories of best practice cases highlight the needs and provide an impression how customers use plasmo solutions.
LESSON LEARNED		
Lessons learned	What are the key messages and lessons learned to take away from the good practice experience	With plasmo solutions, our customers are able to produce the highest quality as possible and to better understand their production process. It is necessary to provide use cases and highlight benefits and

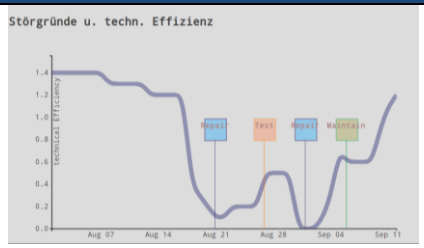
Element	Guiding questions	Answers
		possibilities of plasmo systems, make additional use of generated information by data created during the production process. Adequate trainings adopted to the know-how level of the trained organization and remote & hotline services are necessary to increase the awareness for the new technology, provide demonstration facilities. Expected benefits need to be illustrated explain to companies' stakeholders, especially the champions.
SUSTAINABILITY		
Sustainability of Good Practice	Describe aspects related to sustainability of the Good Practice, if applicable	plasmo hardware-independent solutions offer the opportunity to plan quality assurance in your production flexibly. This ensures sustainability.
REPLICABILITY AND UP SCALING		
Replicability and further application	How can the solution / good practice be useful for other SMEs?	The provided solutions are also relevant for SMEs, especially job shops. plasmo contributes to making quality visible and gaining more information about the production process.
	What are the possibilities of extending the good practice more widely?	At corporation level: In addition plasmo provides a detailed track record for all components produced (long-term archive) which can be used in case of call back actions or process comparisons (i.e. comparison of the same applications in different locations and plants. Dissemination of good practice more widely: reference business cases and use cases published at congresses or journals, illustrate a list of reference customers to visit reference installations.

Element	Guiding questions	Answers
FINAL REMARKS		
Conclusion	Conclude specifying / explaining the impact and usefulness of the good practice.	plasmo offers tailor made quality assurance solutions that enable our customers to implement a secure, efficient and cost-optimized production.
Disclaimer / Acknowledgements	Address any legal loose ends or limitations for dissemination, certify the use of this information for dissemination, online and printed (Yes/No)	NDA (non-disclosure agreement) for new customers as well as agreement on data hosting and security, agreement on use of photos and videos (if required) All information illustrated in this tab can be published and disseminated online and printed.

2 TEMPLATE FOR GOOD PRACTICE DOCUMENTATION

Element	Guiding questions	Answers
INTRODUCTION		
Company information	Data identification, logo, contact person, possible representative image(s).	CDI, Cooperation Development Innovation  Armin Hattmannsdorfer Birkenweg 7 4221 Steyregg office@cdi.co.at +43 676 814 69 279
Name and brief description.	Name or acronym: what is the name that captures the essence of the good practice	FIT (Factory Incident Tracker): Problem Analysis in productive environments for long term failure preventation

Element	Guiding questions	Answers
	). Provide a concise description of the good practice being addressed	1. Small and Medium Enterprises are lacking of ERP / MES Software that is in fact to big for their scale. Furthermore producing companies focus on fast solution of any incidents that may occur and then pass the further analysis. 2. The good practise of said solution is to track, analysis and avoid often occuring failures in the long run. This might as well shorten the expenditures of maintainance, could lead to easily keep delivery goals and in long run give SME the possibility to do efficiency and effectness planing with a low level technique.
GOOD PRACTICE DESCRIPTION		
Detailed description	23. How did the SME create good practice / new product?	24.
	25. What is the relationship to SFH approach: novel technology, production processes, HRM or cost efficiency, quality assurance, risk management?	26. Risk management as a part of evaluating any patterns of incidents in a productive environment 27. Long term quality assurance
	28. Describe what are the technical solutions and innovations: of the good practice	29. A very handy easy to use webapplication that is combined with a short eye to eye customizing with IT and Production consultants
	30. Highlights (or keywords) of the Best Practice	31. Sponsored by Upper Autrian TIM and FFG
	32. Good practice applied in : (NACE code)	33.
Benchmarking	How does your solution related to others provided by competitors	Any competitors have been not yet evaluated after a research of half a year with TIM and FH Oberösterreich

Element	Guiding questions	Answers
Additional information's / materials	Provide additional information if existing such as case studies, datasheets, whitepapers, awards and other relevant information. Electronic sources (websites, social media, pictures, videos) are encouraged to be included in this section. Training manuals, guidelines, technical fact sheets, posters, pictures, video animations, audio documents, 3D files, and/or other material about the Good practice implementation (if existing).	 This is a crop of the dashboard, that provides data to the customer; blue line is a technical process (here the production output of a bunch of machines). Blue orange and olive boxes represent Incidents of said process. These incidents later have to be analyzed.
OBJECTIVE AND TARGET AUDIENCE		
Geographical coverage and target audience	What is the geographical range where the good practice has been used / tested / validated: country, region, Danube Region if is relevant and possible	Upper Austria
	Specify also the target audience/potential customers and stakeholders (stakeholders can affect or be affected)	SME (below 150 Employees) that have rather none or few IT Systems yet implemented or not using data for long term Problem Analysis
Targeted customers and scale of use	Select the target group of customers: 1. SMEs (<250 employees) 2. Large companies 3. Public institutions 4. End customer (Business to Customer) Other, please specify	SME
METHODOLOGICAL APPROACH		

Element	Guiding questions	Answers
Managerial aspects	Cost efficiency of the good practice, if applicable	Cost Cuts by process analysis, critical / longest path meth.
	Quality assurance aspects, if applicable	New method set combined of: FMEA, functional description, asset management, risk evaluation and mitigation
	Risk management aspects, if applicable	See above
Implementation guidelines	How can the Good practice be implemented?	Implemented by (BI, KPI, Data) workshop, small adaption of dashboard, review from time to time
	What resources are necessary for implementation (personnel, finance, infrastructure and timespan)?	HTML Browser, eventually data base or some kind of standard data format that can be read through a browser
VALIDATION PROCESS		
Validation	Provide a brief description of the good practice validation process.	
RESULTS / IMPACT		
Solution impact	What has been the impact (positive or negative) of this good practice on the beneficiaries	
SUCCESS FACTORS AND CONSTRAINTS		
Limitations and Strong points	Describe limitations, both from the technical and implementation point of view	
	Selling points – list the real or perceived benefit of a good practice that differentiates it from the competing brands and gives its client a logical reason to prefer it over other brands	
Need assessment	What else would be needed in order to improve the impact of the Good practice	
LESSON LEARNED		

Element	Guiding questions	Answers
Lessons learned	What are the key messages and lessons learned to take away from the good practice experience	
SUSTAINABILITY		
Sustainability of Good Practice	Describe aspects related to sustainability of the Good Practice, if applicable	
REPLICABILITY AND UP SCALING		
Replicability and further application	How can the solution / good practice be useful for other SMEs?	
	What are the possibilities of extending the good practice more widely?	
FINAL REMARKS		
Conclusion	Conclude specifying / explaining the impact and usefulness of the good practice.	
Disclaimer / Acknowledgements	Address any legal loose ends or limitations for dissemination, certify the use of this information for dissemination, online and printed (Yes/No)	

3 TEMPLATE FOR GOOD PRACTICE DOCUMENTATION

Element	Guiding questions	Answers
INTRODUCTION		
Company information	Data identification, logo, contact person, possible representative image(s).	Company: Business Upper Austria – OÖ Wirtschaftsagentur GmbH; Logo: ; Department: Mechatronik Cluster; Contct person: Manuel Brunner; Representative: 
Name and brief description.	Name or acronym: what is the name that captures the essence of the good practice	Industry 4.0 Maturity Model
	Provide a concise description of the good practice being addressed	The Maturity Model is a structured methodology to evaluate the Industry 4.0 status quo of a company, create a tailor-made vision and derive an individual road map to get from status quo to the vision.
GOOD PRACTICE DESCRIPTION		
	How did the SME create good practice / new product?	

Element	Guiding questions	Answers
Detailed description	What is the relationship to SFH approach: novel technology, production processes, HRM or cost efficiency, quality assurance, risk management?	This model is a new approach to structure the technological change process through Industry 4.0 in a company and realized as a software cloud application on license. Production processes, organizational processes, machines, software applications can be investigated with the model and the outcome will lead to cost efficiency and process optimization. Enclosed to the software tool is a benchmark database where all investigations are saved anonymous.
	Describe what are the technical solutions and innovations: of the good practice	The maturity model is the first known approach to describe the Industry 4.0 status of an entity with 24 criteria including a derivation of a road map for implementation.
	Highlights (or keywords) of the Best Practice	Benchmark, maturity, implementation road map, experience in 16 cases
	Good practice applied in : (NACE code)	C28, C23.42, C26.1, C31.01, C31.09, C28.15,
Benchmarking	How does your solution related to others provided by competitors	No other model is focused on processes and detailed entities and includes a derivation of a road map.
Additional information's / materials	Provide additional information if existing such as case studies, datasheets, whitepapers, awards and other relevant information. Electronic sources (websites, social media, pictures, videos) are encouraged to be included in this section. Training manuals, guidelines, technical fact sheets, posters, pictures, video animations, audio documents, 3D files, and/or other material about the Good practice implementation (if existing).	www.reifegradmodell.at
OBJECTIVE AND TARGET AUDIENCE		

Element	Guiding questions	Answers
Geographical coverage and target audience	What is the geographical range where the good practice has been used / tested / validated: country, region, Danube Region if is relevant and possible	Upper Austria, Lower Austria, Bavaria.
	Specify also the target audience/potential customers and stakeholders (stakeholders can affect or be affected)	Mostly producing companies but also service provider.
Targeted customers and scale of use	Select the target group of customers: 5. SMEs (<250 employees) 6. Large companies 7. Public institutions 8. End customer (Business to Customer) Other, please specify	The model was tested in large companies as well as in SMEs
METHODOLOGICAL APPROACH		
Managerial aspects	Cost efficiency of the good practice, if applicable	When using the model, cost efficiency could be an aim.
	Quality assurance aspects, if applicable	
	Risk management aspects, if applicable	
Implementation guidelines	How can the Good practice be implemented?	Attending a one day training and using the given process and software.
	What resources are necessary for implementation (personnel, finance, infrastructure and timespan)?	The training costs EUR 500,-- for a day and the licence EUR 1.000,-- in the first year and after that EUR 500,-. Or you engage a consultant. For an investigation a company can calculate with about a week and 3 days of providing staff.
VALIDATION PROCESS		
Validation	Provide a brief description of the good practice validation process.	Since the launch of the Model (01/2017) it was used in 16 companies and so the process is validated.
RESULTS / IMPACT		

Element	Guiding questions	Answers
Solution impact	What has been the impact (positive or negative) of this good practice on the beneficiaries	The beneficiaries get a detailed road map for implementation of Industry 4.0. Thus save money, be more flexible and getting ideas of new business models.
SUCCESS FACTORS AND CONSTRAINTS		
Limitations and Strong points	Describe limitations, both from the technical and implementation point of view	The Model is not a tool for assessing a whole company and make general improvement suggestions. It is a specialized tool going in depth a providing an action plan.
	Selling points – list the real or perceived benefit of a good practice that differentiates it from the competing brands and gives its client a logical reason to prefer it over other brands	Individuality, investigation on the spot, tailor-made implementation road map, not limited to a branch, software support.
Need assessment	What else would be needed in order to improve the impact of the Good practice	More investigations to keep the benchmark database growing.
LESSON LEARNED		
Lessons learned	What are the key messages and lessons learned to take away from the good practice experience	Implementation of smart factory projects in companies is difficult.
SUSTAINABILITY		
Sustainability of Good Practice	Describe aspects related to sustainability of the Good Practice, if applicable	The Model is launched
REPLICABILITY AND UP SCALING		
Replicability and further application	How can the solution / good practice be useful for other SMEs?	This software can be used in nearly every SME and providing them to make the first steps towards a smart factory
	What are the possibilities of extending the good practice more widely?	Get new data for the benchmark, develope more services and also get more references for the maturity model and thus improve quality.

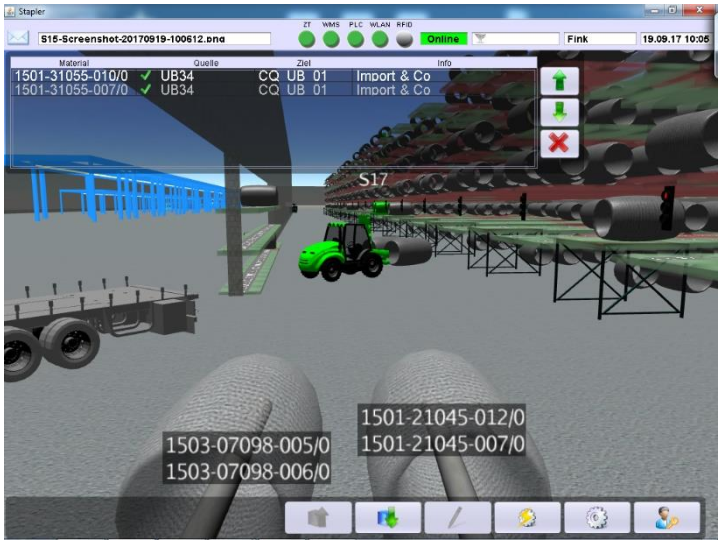
Element	Guiding questions	Answers
FINAL REMARKS		
Conclusion	Conclude specifying / explaining the impact and usefulness of the good practice.	The maturity model is in use and delivers great results wherever implemented. It delivers a tailor-made road map for a company to become a smart factory.
Disclaimer / Acknowledgements	Address any legal loose ends or limitations for dissemination, certify the use of this information for dissemination, online and printed (Yes/No)	yes

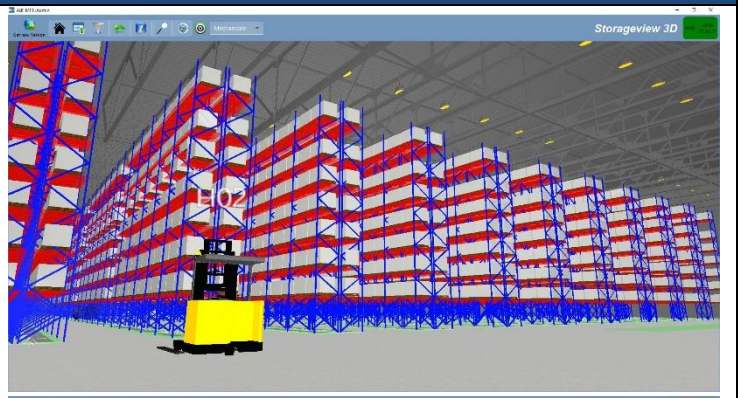
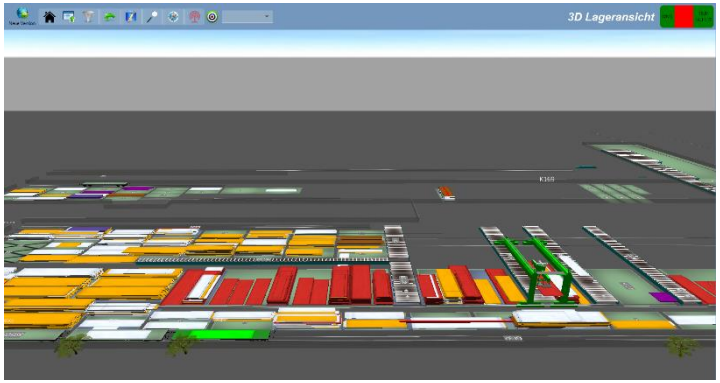
4 TEMPLATE FOR GOOD PRACTICE DOCUMENTATION

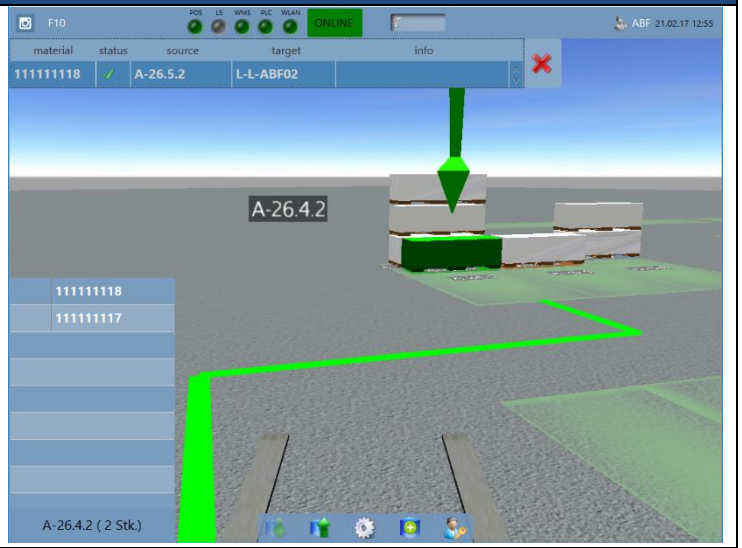
Element	Guiding questions	Answers
INTRODUCTION		
Company information	Data identification, logo, contact person, possible representative image(s).	ABF – Industrielle Automation GmbH Deggendorfstrasse 6, 4030 Linz, Austria Christian Hiebl, +43 676 83041 218 mailto:christian.hiebl@abf.at
Name and brief description.	Name or acronym: what is the name that captures the essence of the good practice	***OneBase*** – MFT
	Provide a concise description of the good practice being addressed	This industry independent intralogistics solution integrates a high-performance warehouse management system with continual material tracking for the in-plant logistics processes. With a multitude of modules, this flexible, total solution forms the basis for modern logistics. The material movements are posted automatically and the products get continuously tracked through the warehouse. Hereby the operator has an exact and complete overview where each and every piece of material is in the logistics chain at any time.

Element	Guiding questions	Answers
		Optimization algorithms and a dynamic, adaptive set of rules automatically ensure the ongoing calculation of the necessary transport orders for quick processing of all the required in-plant material transports. This optimized real-time procedure leads to efficient usage of the available warehousing and transport capacities and assures the efficient material flow.
GOOD PRACTICE DESCRIPTION		
Detailed description	How did the SME create good practice / new product?	Longstanding proven intralogistics methods and the extensive know-how as integrator of Real Time Locating Systems (RTLS) formed the basis for ***OneBase*** – MFT.
	What is the relationship to SFH approach: novel technology, production processes, HRM or cost efficiency, quality assurance, risk management?	***OneBase*** – MFT provides innovative material tracking and control functions for the intralogistics in the industry's production processes. This solution optimizes the efficiency of the customer's intralogistics.
	Describe what are the technical solutions and innovations: of the good practice	The solution provides a situation adaptive warehouse management, a forklift guidance system, a crane tracking system, a tight integration of the production facilities and interfaces with the existing IT infrastructure to form a complete solution for the optimization of the production and intralogistics processes. The innovation is the continuous material tracking of every movement within the intralogistics chain, by integrating RTLS on forklift trucks, cranes, milk runs and AGVs. The system determines the vehicle position precisely in a X, Y coordinate system. All movements are tracked and controlled, starting from the goods receipt, covering the work in progress movements and managing the final products.

Element	Guiding questions	Answers
		Using a RTLS and load detection sensors the movements can be tracked fully automatic in block and high-bay warehouses although the warehouse is managed in manual operation.
	Highlights (or keywords) of the Best Practice	***OneBase*** – MFT, Material flow tracking, warehouse management system, forklift guidance system, crane control system, 3D warehouse, RTLS, Real Time Locating System, automatic load detection, hands-free, fleet management
	Good practice applied in : (NACE code)	C
Benchmarking	How does your solution related to others provided by competitors	The ABF intralogistics solution is probably the most modern RTLS material tracking solution including a highly optimized warehouse management system. In comparison to warehousing solutions based on barcodes or RFID technology the RTLS based ***OneBase*** – MFT solution can be realized with very high accuracy (X, Y, Z coordinate within the warehouse) and offers by this the highest possible grade of digitalization and automation of the customer's intralogistics processes.
Additional information's / materials	Provide additional information if existing such as case studies, datasheets, whitepapers, awards and other relevant information. Electronic sources (websites, social media, pictures, videos) are encouraged to be included in this section. Training manuals, guidelines, technical fact sheets, posters, pictures, video animations, audio documents, 3D files, and/or other material about the Good practice implementation (if existing).	Award: Finalist in the Austrian logistics award Website: www.abf.at/en/products/warehousing-solution-onebase-mft Videos: MFT forklift guidance system: https://www.youtube.com/watch?v=AWZAJdSPVZE MFT for automatic cranes:

Element	Guiding questions	Answers
		https://www.youtube.com/watch?v=awHp9qwBB68 MFT in a crane warehouse: https://www.youtube.com/watch?v=qCnquzsHqwM MFT in a steel wire rod production: https://www.youtube.com/watch?v=xkJG1aGwkxc Pictures of realization examples: 

Element	Guiding questions	Answers
		 

Element	Guiding questions	Answers
		
OBJECTIVE AND TARGET AUDIENCE		
Geographical coverage and target audience	What is the geographical range where the good practice has been used / tested / validated: country, region, Danube Region if is relevant and possible	Brazil, Mexico, Spain, Germany, Austria
	Specify also the target audience/potential customers and stakeholders (stakeholders can affect or be affected)	The target customers are industrial production facilities and logistic centres that are handling big material units (e.g. steel coils or steel heavy plates, wood products) or storing products in pallets, containers, lattice boxes.
Targeted customers and scale of use	Select the target group of customers: 9. SMEs (<250 employees) 10. Large companies 11. Public institutions 12. End customer (Business to Customer)	1 and 2

Element	Guiding questions	Answers
	Other, please specify	
METHODOLOGICAL APPROACH		
Managerial aspects	Cost efficiency of the good practice, if applicable	- No time consuming search times for material - No time consuming material identification times (scan-less material identification - No time consuming manual warehouse bookings in the warehouse management system and ERP system - Permanent inventory - Optimization of the intralogistics fleet by route optimized transport order handling - Time and cost
	Quality assurance aspects, if applicable	- Avoiding manual operator mistakes in the warehousing process (wrong material in production, wrong storage location) and while shipment of final goods. - Reducing downtimes of production aggregates by time efficient supply of materials
	Risk management aspects, if applicable	MFT improves the safety of used personnel and equipment resources.
Implementation guidelines	How can the Good practice be implemented?	Implementation of ***OneBase*** – MFT intralogistics software solution with RTLS components on the means of transport (forklifts, cranes, …) as well as the integration or mounting of additional sensors for automatic load detection. Integration of in and outbound facilities of the production aggregates and the IT systems (MES, ERP).

Element	Guiding questions	Answers
	What resources are necessary for implementation (personnel, finance, infrastructure and timespan)?	Personnel: IT, process, logistics Finance: ROI between 1 and 3 Infrastructure: IT Hardware, WiFi Timespan: Realization within 5 to 12 months
VALIDATION PROCESS		
Validation	Provide a brief description of the good practice validation process.	The impact can be validated if the results of the solution realization can be compared to an actual situation survey, which could be done in advance.
RESULTS / IMPACT		
Solution impact	What has been the impact (positive or negative) of this good practice on the beneficiaries	More transparency in intralogistics and enablement for automatic warehouse management by continuous material tracking and situation adaptive material flow control.
SUCCESS FACTORS AND CONSTRAINTS		
Limitations and Strong points	Describe limitations, both from the technical and implementation point of view	The automatic load detection depends on the possible accuracy of the used RTLS. On cranes the positioning precision sometimes also depends on the used hoist. To assure a continuous and error free material tracking the accuracy of the RTLS needs to be less than the half size of the transport unit's shortest side. On forklifts the solution works fine with transport units of a size bigger than a Euro pallet. Automatic vehicles or manipulators with a fixed hoist can achieve a higher positioning precision.

Element	Guiding questions	Answers
	Selling points – list the real or perceived benefit of a good practice that differentiates it from the competing brands and gives its client a logical reason to prefer it over other brands	***OneBase*** – MFT and its automated intralogistics environment introduces a high grade of innovation and significant improvement in quality and efficiency of logistics and production supply processes, because: - The warehouse management will no longer be done in the minds of the operators - You know where the material precisely is at any time - Intralogistics availability around the clock - No more barcode scanning and manual mistakes, because the automatic load detection avoids manual actions for identification (hands-free) - Situation adaptive transport management with route optimized transport orders under consideration of the current transporter position (forklift, cranes, AGVs …) - Fleet management and optimization - Digitalization of the intralogistics processes - Performance optimization for manually operated vehicles (automated load detection, guidance systems for better orientation within the warehouse by a state-of-the-art 3D environment, transport orders) - Improvement of human and machine safety by providing location related safety function like collision avoidance and speed control
Need assessment	What else would be needed in order to improve the impact of the Good practice	The best impact will be achieved, for customers who have a middle to big sized fleet of transport vehicles and have big warehouse areas and / or numerous

Element	Guiding questions	Answers
		production areas that need to be supplied with WIP material.
LESSON LEARNED		
Lessons learned	What are the key messages and lessons learned to take away from the good practice experience	The ***OneBase*** – MFT solution is able to optimize the intralogistics processes, efficiency and costs.
SUSTAINABILITY		
Sustainability of Good Practice	Describe aspects related to sustainability of the Good Practice, if applicable	The improvement of a well automated intralogistics transportation fleet (e.g. forklift trucks) will lead to a reduction of travelled distances and to possible reduction of needed vehicles. By this there is not only a rise of efficiency in terms of costs but also in terms of energy consumption and exhaust emissions.
REPLICABILITY AND UP SCALING		
Replicability and further application	How can the solution / good practice be useful for other SMEs?	The solution can be useful for any industrial production facilities and logistic centres that are handling big material units (e.g. steel coils or steel heavy plates, wood products) or storing products in pallets, containers, lattice boxes. The high grade of standardization allows to use the solution in different kind of industries. It also applies to different means of transports no matter if manually or automatically operated.
	What are the possibilities of extending the good practice more widely?	The solution has very good scalability features. Roll-out to the customer's other facilities as well as internationalization is supported.
FINAL REMARKS		

Element	Guiding questions	Answers
Conclusion	Conclude specifying / explaining the impact and usefulness of the good practice.	***OneBase*** – MFT and its automated intralogistics environment introduces a high grade of innovation in the logistics and production supply processes because: - The warehouse management will no longer be done in the minds of the operators - You know where the material precisely is at any time - Availability around the clock - No more barcode scanning and manual mistakes, because the automatic load detection avoids manual actions for identification (hands-free) - Situation adaptive transport management with route optimized transport orders under consideration of the current transporter position (forklift, cranes, AGVs …) - Fleet management and optimization - Digitalization of the intralogistics processes - Performance optimization for manually operated vehicles (automated load detection, guidance systems for better orientation within the warehouse by a state-of-the-art 3D environment, transport orders) Improvement of human and machine safety by providing location related safety function like collision avoidance and speed control

Element	Guiding questions	Answers
Disclaimer / Acknowledgements	Address any legal loose ends or limitations for dissemination, certify the use of this information for dissemination, online and printed (Yes/No)	No

5 TEMPLATE FOR GOOD PRACTICE DOCUMENTATION

https://www.youtube.com/watch?time_continue=32&v=Nprh3jBmYUo

Element	Guiding questions	Answers
INTRODUCTION		
Company information	Data identification, logo, contact person, possible representative image(s).	Evolaris next level GmbH  Dr. Christian Kittl

Element	Guiding questions	Answers
		 Ing. Markus Streibl, BSc.
Name and brief description.	Name or acronym: what is the name that captures the essence of the good practice	Impact of a Live-Video-Assistance-System on the problem-solving-competence of service and maintenance employees
	Provide a concise description of the good practice being addressed	By using the EVOLARIS Live-Video-Assistance-System named EVOCALL, the problem-solving process can be influenced positively. EVOCALL is able to replace non-effective communication channels. Besides, in combination with a “work-shadowing” approach, the on-site presence of experts as well as the repair times can be reduced.
GOOD PRACTICE DESCRIPTION		
Detailed description	How did the SME create good practice / new product?	The system was created based on research work conducted within the COMET Centre of Excellence Programme and knowledge gained from a project funded by the Austrian Research promotion Agency (FFG). Building on these outcomes, a first prototype was created in the course of a master thesis and then iteratively improved with lead customers.

Element	Guiding questions	Answers
	What is the relationship to SFH approach: novel technology, production processes, HRM or cost efficiency, quality assurance, risk management?	Novel technology, production processes
	Describe what are the technical solutions and innovations: of the good practice	audio-visual support of service- and maintenance employees based on a WebRTC solution.
	Highlights (or keywords) of the Best Practice	WebRTC solution, audio-visual support, reduced repair time, reduced on-site presence, positive influenced problem-solving process
	Good practice applied in : (NACE code)	C33
Benchmarking	How does your solution related to others provided by competitors	Simple to use, high user experience, support different devices, clear and licence model (concurrent licences)
Additional information's / materials	Provide additional information if existing such as case studies, datasheets, whitepapers, awards and other relevant information. Electronic sources (websites, social media, pictures, videos) are encouraged to be included in this section. Training manuals, guidelines, technical fact sheets, posters, pictures, video animations, audio documents, 3D files, and/or other material about the Good practice implementation (if existing).	eAWARD Winner 2017; https://evocall.evolaris.net/
OBJECTIVE AND TARGET AUDIENCE		
Geographical coverage and target audience	What is the geographical range where the good practice has been used / tested / validated: country, region, Danube Region if is relevant and possible	Primarily Austrian HQ and internationally operating companies. Countries they used EVOCALL: USA, China, Bulgaria, Hungary, Spain, UK,…
	Specify also the target audience/potential customers and stakeholders (stakeholders can affect or be affected)	Service and maintenance employees and the head of departments, After Sales, IT Support, …

Element	Guiding questions	Answers
Targeted customers and scale of use	Select the target group of customers: 13. SMEs (<250 employees) 14. Large companies 15. Public institutions 16. End customer (Business to Customer) Other, please specify	Beginning from SMEs less than 40 employees, up to large companies (more than 2500 employees) to public institutes (university)
METHODOLOGICAL APPROACH		
Managerial aspects	Cost efficiency of the good practice, if applicable	Minimize on-site presence of experts, minimize travelling cost, reduce repair time, increase plant availability
	Quality assurance aspects, if applicable	n.a.
	Risk management aspects, if applicable	n.a.
Implementation guidelines	How can the Good practice be implemented?	Typically a company interested would do a proof of concept with EVOLARIS consisting of: an initial workshop to identify the processes and stakeholders with the highest impact potential, training and hands-on experience of the smartglass-based solution; assistance for integrating the solution into the internal IT environment; 3 monthly test licenses
	What resources are necessary for implementation (personnel, finance, infrastructure and timespan)?	EVOCALL WebApplication – Computer for Expert, Smartphone for Fieldclient, Chrome Browser on both devices (minimum resources). Timespan incl. Kick-off Workshop less than one day. Financial resources: costs for concurrent licence – 460€ per licence per month
VALIDATION PROCESS		

Element	Guiding questions	Answers
Validation	Provide a brief description of the good practice validation process.	The solution was implemented with two lead customers, TGW logistics and AVL List. After a first trail with a single device at each site, a test phase with approx.. 10 devices took place, evaluating the solution regarding the stability and performance (e.g. by testing it in a live-like setting between AVL HQ in Graz, Austria, and a AVL subsidiary in the US) and regarding the acceptance of the solution by various employees, which was measured via qualitative interviews.
RESULTS / IMPACT		
Solution impact	What has been the impact (positive or negative) of this good practice on the beneficiaries	Reduce the response time. Before between 24h – 36h worldwide, in combination with EVOCALL round about 30 Minutes.
SUCCESS FACTORS AND CONSTRAINTS		
Limitations and Strong points	Describe limitations, both from the technical and implementation point of view	Limitations are network shares and network (WLAN) infrastructure constraints (e.g. firewall ports needed to be opened)
	Selling points – list the real or perceived benefit of a good practice that differentiates it from the competing brands and gives its client a logical reason to prefer it over other brands	placed in data centre, high secured communication, in combination with smart glass hands free;: Minimize on-site presence of experts, minimize travelling cost, reduce repair time, increase plant availability
Need assessment	What else would be needed in order to improve the impact of the Good practice	User acceptance
LESSON LEARNED		

Element	Guiding questions	Answers
Lessons learned	What are the key messages and lessons learned to take away from the good practice experience	Even if the companies are working in the same field, there are often quite different processes that need to be reflected and supported by the solution. Customizing is an important requirement for user acceptance.
SUSTAINABILITY		
Sustainability of Good Practice	Describe aspects related to sustainability of the Good Practice, if applicable	Minimize travelling of experts
REPLICABILITY AND UP SCALING		
Replicability and further application	How can the solution / good practice be useful for other SMEs?	The solution requires only the WebApp license, a browser and smartphone and can thus be easily deployed. For hands-free operations, smartglasses are advisable, which cost about 1.500 EUR each.
	What are the possibilities of extending the good practice more widely?	Communication, marketing, congress presence
FINAL REMARKS		
Conclusion	Conclude specifying / explaining the impact and usefulness of the good practice.	Minimize on-site presence of experts, minimize travelling cost, reduce repair time, increase plant availability
Disclaimer / Acknowledgements	Address any legal loose ends or limitations for dissemination, certify the use of this information for dissemination, online and printed (Yes/No)	Information can be used online and printed

6 TEMPLATE FOR GOOD PRACTICE DOCUMENTATION

Element	Guiding questions	Answers
INTRODUCTION		
Company information	Data identification, logo, contact person, possible representative image(s).	 HELMUT NÖHMAYER Business Development Robotics & Assistiv Systems --- PROFACTOR GmbH Im Stadtgut A2 A-4407 Steyr /Austria Tel.: +43 7252 885 305 Mob: +43 664 60885 305 Fax.: +43 7252 885 101 email.: helmut.noehmayer@profactor.at www.profactor.at ATU 38420507
Name and brief description.	Name or acronym: what is the name that captures the essence of the good practice	XROB Makes robot usage simple.

Element	Guiding questions	Answers
	Provide a concise description of the good practice being addressed	4. ONE ROBOT. ONE AUTOMATION-SOFTWARE. 5. CHANGE PROCESSES EASILY WITHIN A FEW MINUTES. 6. With XRob users with minimal training experiences are able to create robotic processes in a new and effective way. The system is designed to be cost effective also for small companies. 7. 8. The benefits are 9. » Easy & fast configuration – no programming 10. skills required 11. » Fast retooling for a high number of variants 12. » Intuitive process setup within few minutes 13. » Easy integration into existing environment 14. and processes 15. » Versatile and expandable » Supports all popular robot brands
GOOD PRACTICE DESCRIPTION		
Detailed description	How did the SME create good practice / new product?	In funded R&D Projects the software architecture was developed and is now widen with different features and applied already in industry.
	What is the relationship to SFH approach: novel technology, production processes, HRM or cost efficiency, quality assurance, risk management?	It is a novel technology, which can be used also for small lot sizes. It is more cost efficiency as it shorten ramp up time and no expert is need to configurate the robot for new tasks.
	Describe what are the technical solutions and innovations: of the good practice	The software system XRob allows the creation of complex robot applications within a few minutes. With

Element	Guiding questions	Answers
		unique and easy-to-use features significant speed up will be accomplished during ramp up. This makes the operation more efficient and flexible than common programming methods. The novel software architecture allows easy and intuitive creation of processes and configuration of the components of a robot system by only one single user interface. Onboard key technologies are: • On-board 3D modeling of work spaces for automatic collision model • Process simulator with automatic path planning • Inline 2D/3D position recognition • Object recognition in real-time • Mobile user interface
	Highlights (or keywords) of the Best Practice	Flexible robotics Human machine interaction One interface Easy-to-use features Automatic path planning Fast configuration of complex processes
	Good practice applied in : (NACE code)	C - Manufacturing
Benchmarking	How does your solution related to others provided by competitors	The single user interface is unique.
Additional information's / materials	Provide additional information if existing such as case studies, datasheets, whitepapers, awards and other relevant information. Electronic sources (websites, social media, pictures, videos) are encouraged to be included in this section. Training manuals, guidelines, technical fact sheets, posters, pictures, video animations, audio documents, 3D files, and/or	https://www.youtube.com/watch?v=RnLznMFj5Y8&t=2s https://www.profactor.at/en/solutions/flexible-robotic/

Element	Guiding questions	Answers
	other material about the Good practice implementation (if existing).	
OBJECTIVE AND TARGET AUDIENCE		
Geographical coverage and target audience	What is the geographical range where the good practice has been used / tested / validated: country, region, Danube Region if is relevant and possible	Austria/Germany. Main application fields » Pin picking » Handling » Assembling » Inspection » Screwing Key references » 3-D inspection of engines parts » Screwing Assistant for engine assembly » Automatic crankshaft picking » Automotive: Acoustics inspection » Flexible screwing station
	Specify also the target audience/potential customers and stakeholders (stakeholders can affect or be affected)	
Targeted customers and scale of use	Select the target group of customers: 17. SMEs (<250 employees) 18. Large companies 19. Public institutions 20. End customer (Business to Customer) Other, please specify	SMEs (<250 employees) Large companies
METHODOLOGICAL APPROACH		
Managerial aspects	Cost efficiency of the good practice, if applicable	

Element	Guiding questions	Answers
	Quality assurance aspects, if applicable	
	Risk management aspects, if applicable	
Implementation guidelines	How can the Good practice be implemented?	With its partners, PROFACTOR develops customized pilot plants and prototypical plants for the evaluation of the latest robotic technologies. The range extends from feasibility studies to real systems – which are implemented and realized together with experienced system integrators.
	What resources are necessary for implementation (personnel, finance, infrastructure and timespan)?	
VALIDATION PROCESS		
Validation	Provide a brief description of the good practice validation process.	The teaching duration was extracted by video recordings. The average teaching time decreased from 6:25 to 3:36. The usage of physical guidance increased from 0% to 71,57%. This shift to physical robot guidance was also measureable in two dimensions of user experience Usablilty (SUS System Usability Scale) and Performance Expectancy (PE). PE describes one's belief that using the system will help to attain gain in job performance, and was measured using two items which were derived from. The implemented XRob programming system supports a linear programming approach, robot motion commands, sensorics-data handling, Computer Vision algorithms and software-templates. XRob supports

Element	Guiding questions	Answers
		more possibilities like vision-based, automated compensation of position deviations. This fact led to increased duration for the whole parametrization process from 13 to 20 minutes caused by the additional functions (Computer Vision).
RESULTS / IMPACT		
Solution impact	What has been the impact (positive or negative) of this good practice on the beneficiaries	Cost savings
SUCCESS FACTORS AND CONSTRAINTS		
Limitations and Strong points	Describe limitations, both from the technical and implementation point of view	
	Selling points – list the real or perceived benefit of a good practice that differentiates it from the competing brands and gives its client a logical reason to prefer it over other brands	
Need assessment	What else would be needed in order to improve the impact of the Good practice	
LESSON LEARNED		
Lessons learned	What are the key messages and lessons learned to take away from the good practice experience	Amongst others, the following were tested at the project partner BMW Motoren Steyr plant: Haptic Technologies (Forced Feedback), Image Processing Techniques Spatial Augmented Reality and a Tangibles User interfaces (TUI) were used. here balls or hoppers mark the positions that the robot must approach.

Element	Guiding questions	Answers
		The technologies were evaluated in a three-step user study with assemblers aged 20-60 years. The persons did not have any previous knowledge of robotics, their requirements to the Interaction could therefore describe them without bias. At the beginning, the robot only had one operator panel. The system has been made more and more flexible by various sensors. Ultimately, it was equipped with a combination of projection, 3D and gesture detection. The interaction time could thus be reduced to less than half of the time required for the interaction. The results showed that even complex systems, the are suitable for batch size 1, can be operated efficiently by non-professionals This requires automatic service functions in the background that the user does not perceive.
SUSTAINABILITY		
Sustainability of Good Practice	Describe aspects related to sustainability of the Good Practice, if applicable	
REPLICABILITY AND UP SCALING		
Replicability and further application	How can the solution / good practice be useful for other SMEs?	
	What are the possibilities of extending the good practice more widely?	
FINAL REMARKS		

Element	Guiding questions	Answers
Conclusion	Conclude specifying / explaining the impact and usefulness of the good practice.	
Disclaimer / Acknowledgements	Address any legal loose ends or limitations for dissemination, certify the use of this information for dissemination, online and printed (Yes/No)	

7 TEMPLATE FOR GOOD PRACTICE DOCUMENTATION

Element	Guiding questions	Answers
INTRODUCTION		
Company information	Data identification, logo, contact person, possible representative image(s).	 **Benjamin Schwärzler, MSc** **Chief Executive Officer, Tablet Solutions GmbH** **T. +43 1 992 90 28 | M. +43 650 466 466 2** **W. www.workheld.com | Mehr Infos zu WorkHeld**
Name and brief description.	Name or acronym: what is the name that captures the essence of the good practice	**WorkHeldVoiceAssistant:**
	Provide a concise description of the good practice being addressed	WorkHeld seamlessly connects field technicians with their project coordinators in the head office. Construction plans, checklists and work orders are continuously updated and defects can be reported immediately. WorkHeld enables all involved parties to always be up to date on the project progress.
GOOD PRACTICE DESCRIPTION		
Detailed description	How did the SME create good practice / new product?	We developed a new form of interaction for workers and technicians with low IT skills

Element	Guiding questions	Answers
	What is the relationship to SFH approach: novel technology, production processes, HRM or cost efficiency, quality assurance, risk management?	Novel Technology: AI based voice assistant similar to Amazon Alexa or Apple Siri build with NLP (natural language processing) and Speech to Text Technologies.
	Describe what are the technical solutions and innovations: of the good practice	Voice Assistant that runs on smartphones and tablets and can be connected to headsets.
	Highlights (or keywords) of the Best Practice	AI, Artificial Intelligence, Voice Assistant, NLP, NLU, Speech Recognition.
	Good practice applied in : (NACE code)	Manufacturing, Plant Equipment Engineering, Field Services
Benchmarking	How does your solution related to others provided by competitors	It can be compared to field management solutions without voice assistance or other Voice Assistants like Apple Siro or Amazon Alexa.
Additional information's / materials	Provide additional information if existing such as case studies, datasheets, whitepapers, awards and other relevant information. Electronic sources (websites, social media, pictures, videos) are encouraged to be included in this section. Training manuals, guidelines, technical fact sheets, posters, pictures, video animations, audio documents, 3D files, and/or other material about the Good practice implementation (if existing).	• DBS Award, • Handelsblatt Industriegipfel - **vielversprechendsten Start-Up Lösung** • **Born Global Champion** • **Etc.**
OBJECTIVE AND TARGET AUDIENCE		
Geographical coverage and target audience	What is the geographical range where the good practice has been used / tested / validated: country, region, Danube Region if is relevant and possible	Austria and the DACH region
	Specify also the target audience/potential customers and stakeholders (stakeholders can affect or be affected)	

Element	Guiding questions	Answers
Targeted customers and scale of use	Select the target group of customers: 21. SMEs (<250 employees) 22. Large companies 23. Public institutions 24. End customer (Business to Customer) Other, please specify	SME's and Large companies
METHODOLOGICAL APPROACH		
Managerial aspects	Cost efficiency of the good practice, if applicable	20-30 % (estimated)
	Quality assurance aspects, if applicable	
	Risk management aspects, if applicable	Data Security Measures have to applied.
Implementation guidelines	How can the Good practice be implemented?	Design a good conversational interface for specific usecases before you start with implementation. Conversational User Interfaces are the future of human machine interaction but have to be designed to feel natural. Than build on top of existing NLP Frameworks.
	What resources are necessary for implementation (personnel, finance, infrastructure and timespan)?	Conversation Design and Developers
VALIDATION PROCESS		
Validation	Provide a brief description of the good practice validation process.	We validated it with industrial clients.
RESULTS / IMPACT		
Solution impact	What has been the impact (positive or negative) of this good practice on the beneficiaries	They are more motivated to document their work and have access to data an information even though they are not highly skilled in IT.
SUCCESS FACTORS AND CONSTRAINTS		

Element	Guiding questions	Answers
Limitations and Strong points	Describe limitations, both from the technical and implementation point of view	Dialects can be problematic.
	Selling points – list the real or perceived benefit of a good practice that differentiates it from the competing brands and gives its client a logical reason to prefer it over other brands	Voice Assistants open up completely new forms of interaction with IT systems and can be applied to all sorts of Use-cases.
Need assessment	What else would be needed in order to improve the impact of the Good practice	
LESSON LEARNED		
Lessons learned	What are the key messages and lessons learned to take away from the good practice experience	Good conversation design is essential.
SUSTAINABILITY		
Sustainability of Good Practice	Describe aspects related to sustainability of the Good Practice, if applicable	nA
REPLICABILITY AND UP SCALING		
Replicability and further application	How can the solution / good practice be useful for other SMEs?	Easy Access and Interaction with complex IT systems
	What are the possibilities of extending the good practice more widely?	Can be applied to almost all business processes.
FINAL REMARKS		
Conclusion	Conclude specifying / explaining the impact and usefulness of the good practice.	Voice Recognition is expected to have a major impact on all industries in the next 1-3 years. Lets make sure the manufacturing industry is a technology leader this time!
Disclaimer / Acknowledgements	Address any legal loose ends or limitations for dissemination, certify the use of this information for dissemination, online and printed (Yes/No)	YES

8 TEMPLATE FOR GOOD PRACTICE DOCUMENTATION

Element	Guiding questions	Answers
INTRODUCTION		
Company information	Data identification, logo, contact person, possible representative image(s).	XiTrust Secure Technologies GmbH Headquarters Grazbachgasse 67, 8010 Graz Austria +43 6 991 410 2032 office@xitrust.com Contact person: DI Katrin Riemer Tel.: +43 (0) 699 14 10 20 17 Katrin.Riemer@xitrust.com XiTrust is your provider for all services concerning electronic signatures. For more than 15 years, we have been advising clients seeking tailored solutions for business processes without cross-media conversion. Our innovative products grow with the requirements that your company places on them now and in the future.
Name and brief description.	Name or acronym: what is the name that captures the essence of the good practice	Secure QR-Code (sQR)

Element	Guiding questions	Answers
	Provide a concise description of the good practice being addressed	The sQR features another level of security and offers new possibilities regarding the use of QR codes with respect to authentication. Basically, the sQR contains information such as the ID, name of a person or machine, respectively. This information is electronically signed to ensure data integrity. An APP which is able to check the validity of this signature has been developed. Additionally, it is also possible to encrypt the information of the QR Code and to decrypt it with the corresponding public key within the APP. After the information is decrypted and the signature is validated, the APP provides a possibility to verify the real identity of a person or a machine. In case of a person, there is the additional possibility to compare a photo and in case of a machine, additional information regarding the location of the machine can be provided.
GOOD PRACTICE DESCRIPTION		
Detailed description	How did the SME create good practice / new product?	Implementation was realized together with a partner company which was responsible for the APP development.
	What is the relationship to SFH approach: novel technology, production processes, HRM or cost efficiency, quality assurance, risk management?	
	Describe what are the technical solutions and innovations: of the good practice	The fact that the information within the QR code can be signed and/or encrypted represents a novel approach regarding authentication.
	Highlights (or keywords) of the Best Practice	Signed and encrypted QR code
	Good practice applied in : (NACE code)	The sQR was part of a research project and customer project.

Element	Guiding questions	Answers
Benchmarking	How does your solution related to others provided by competitors	When it comes to signing and encryption of QR codes, there is no comparable solution on the market to the best of the author's knowledge.
Additional information's / materials	Provide additional information if existing such as case studies, datasheets, whitepapers, awards and other relevant information. Electronic sources (websites, social media, pictures, videos) are encouraged to be included in this section. Training manuals, guidelines, technical fact sheets, posters, pictures, video animations, audio documents, 3D files, and/or other material about the Good practice implementation (if existing).	There is a pending patent for this innovative technology.
OBJECTIVE AND TARGET AUDIENCE		
Geographical coverage and target audience	What is the geographical range where the good practice has been used / tested / validated: country, region, Danube Region if is relevant and possible	Worldwide
	Specify also the target audience/potential customers and stakeholders (stakeholders can affect or be affected)	All institutions that issue a secure identification card for a person and all big production/logistic companies with many locations over the world. Additionally, the sQR-Code can also be used for instructions for a specific machine
Targeted customers and scale of use	Select the target group of customers: 25. SMEs (<250 employees) 26. Large companies 27. Public institutions 28. End customer (Business to Customer) Other, please specify	All institutions that issue a secure identification card for a person and all big production/logistic companies with many locations over the world. Additionally, the sQR-Code can also be used for instructions for a specific machine
METHODOLOGICAL APPROACH		
Managerial aspects	Cost efficiency of the good practice, if applicable	

Element	Guiding questions	Answers
	Quality assurance aspects, if applicable	All the information within the QR code cannot be read or changed.
	Risk management aspects, if applicable	
Implementation guidelines	How can the Good practice be implemented?	There is no additional device needed for the identification card and there is also no specific device needed for the APP, which also works offline.
	What resources are necessary for implementation (personnel, finance, infrastructure and timespan)?	This depends on the amount of QR codes that need to be issued. The process of issuing such codes is not very time consuming and then just the process of handing out these codes is left. Generally speaking, the implementation of these QR code can be easily integrated into existing workflows.
VALIDATION PROCESS		
Validation	Provide a brief description of the good practice validation process.	The keys for decrypting the information are available within the APP and for validating the signature one needs the public keys.
RESULTS / IMPACT		
Solution impact	What has been the impact (positive or negative) of this good practice on the beneficiaries	Proof of identity of the person/machine can be ensured by easy means.
SUCCESS FACTORS AND CONSTRAINTS		
Limitations and Strong points	Describe limitations, both from the technical and implementation point of view	Only a limited amount of data can be stored within a QR code. In case of machines, the QR code itself has to be applied in a way that malpractice is prevented. Furthermore, it has to be ensured that the camera of the device where the APP is installed (e.g., mobile phone, virtual reality glasses) is capable of scanning the QR code properly.

Element	Guiding questions	Answers
	Selling points – list the real or perceived benefit of a good practice that differentiates it from the competing brands and gives its client a logical reason to prefer it over other brands	The use of QR codes which contain signed and/or encrypted information features a fast and easy solution for strong authentication of a person/machine.
Need assessment	What else would be needed in order to improve the impact of the Good practice	
LESSON LEARNED		
Lessons learned	What are the key messages and lessons learned to take away from the good practice experience	The described solution represents a great possibility to connect the analogue world with the digital world, however, the user acceptance strongly correlates with the level of experience concerning the technologies involved.
SUSTAINABILITY		
Sustainability of Good Practice	Describe aspects related to sustainability of the Good Practice, if applicable	
REPLICABILITY AND UP SCALING		
Replicability and further application	How can the solution / good practice be useful for other SMEs?	They can use the secure QR Code for strong authentication of persons or machines, e.g. if they are a production/logistic company.
	What are the possibilities of extending the good practice more widely?	This solution can be easily transferred to basically every use case where QR codes come into play, such as vouchers or e-tickets.
FINAL REMARKS		
Conclusion	Conclude specifying / explaining the impact and usefulness of the good practice.	This solution can be implemented very easy and ensures the integrity, authenticity and confidentiality of the information within the QR Code. For this reason, it is the ideal tool to authenticate a person or machine and to provide important instructions of a machine in order

Element	Guiding questions	Answers
		to activate or repair it. This secure QR Code in conjunction with the APP perfectly connects the analog world with the digital world in a secure manner as the information is signed and encrypted.
Disclaimer / Acknowledgements	Address any legal loose ends or limitations for dissemination, certify the use of this information for dissemination, online and printed (Yes/No)	