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GOOD PRACTICE REPORT FOR GERMANY

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1 INTRODUCTION

Regional Good Practice Report for Germany contains five 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 five 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.

USTUTT collected the following good practices cases:

No.	Name of the Good Practice	Classification ¹
1	SCHNAITHMANN cubu:S	Assisted assembly
2	SCHLAUER KLAUS	Assisted assembly
3	CHARME	Industry cockpit
4	SEW EURODRIVE	Digital working instruction
5	MILKRUN 4.0	Smart logistics

1 GP1: Schnaithmann cubu:S



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Keywords : assistive technology

Good practice applied in: (NACE code) : C28.2.3 Manufacture of office machinery and equipment (except computers and peripheral equipment)

¹ According GOOD PRACTICE GUIDELINES

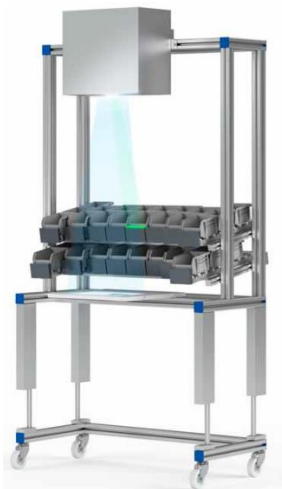
cubu:S is an intelligent and networkable infrastructure for manual workstations, primarily for assembly, packaging and order picking. The system was developed to support the employees at the assembly station to minimize possible user errors.

1.1 GOOD PRACTICE DESCRIPTION

In a joint project with Esslingen University of Applied Sciences and the Protective Workshop in Heilbronn, an assistance system was developed that guides employees systematically through assembly and commissioning processes based on movement recognition.

The technical solution is that a motion sensor from consumer electronics was integrated into the system. By combining it with a commercially available beamer and a PC, it was possible to design a flexible system with minimal hardware requirements.

A completely new kind of human-machine interaction is realized in the system itself. The use of "intelligent" component containers opens up unimagined possibilities for flexibility along the entire value chain.



The individual work steps are projected onto the assembly table. The "Pick-by-Light" principle is used to visualize the component removal from the correct container.

Fig. 1 - Work instruction are projected on assembly table

Source:

<https://www.schnaithmann.de/news/news-uebersicht/montage-assistenzsysteme/>

1.2 OBJECTIVE AND TARGET AUDIENCE

It is used at the Schnaithmann GmbH in Germany. It was tested at the Esslingen University of Applied Sciences and the Protective Workshop in Heilbronn.

All companies that are faced with the challenge of an increasing variety of variants and at the same time a declining number of units with a constantly changing workforce, but still want to produce economically efficient and high quality products can benefit from it.

The target group of customers are SME's (<250 employees) and large companies.

1.3 METHODOLOGICAL APPROACH

From the costs perspective, the solution proved to be highly efficient, as it requires minimum intervention (only for maintenance and software updates) and further investments after implementation are not needed, except in the case of training newly employed operators. For quality assurance aspects, the Good Practice is furthering, the employee receives information for the process and thus reduces the susceptibility to errors. The solution led to a significant decrease in the number of faulty and defective products reported by customers, which in turn increased customer satisfaction.

To implement the Good Practice the parts to be removed or picked are made available on a Kanban shelf. Necessary working information is projected directly into the working area as video, photo or instruction. Therefore, tools are needed to make this possible.

The companies need financial resources to integrate the new technologies.

1.4 VALIDATION PROCESS

The validation of the solution was achieved through testing at the Esslingen University of Applied Sciences. The validation process compares the manufacturing time before and after implementation.

1.5 RESULTS / IMPACT

The solution has a positive effect for employees and the companies. The employees can fix their mistakes immediately as soon as they made it. It also makes their work easier by giving them instructions on what to do and this saves them time, what results in less cost for the companies.

1.6 SUCCESS FACTORS AND CONSTRAINTS

There are limitations, for example, the system must have a certain technical state of art, otherwise the implementation is only possible with great effort or not at all.

As mentioned previously, as direct results of the implementation significantly increased productivity and customer satisfaction were obtained.

Operators also welcomed this technology as it made their activities easier, faster and “worker-friendly”.

1.7 LESSON LEARNED & SUSTAINABILITY

Human-machine interaction is very important and should be advanced, as this is an important point of Industry 4.0. The more people are confronted with it, the more acceptance increases. Currently the price of the technology can be prohibitive, however, due to future technological progress their price will decrease and the cost of implementation will be reduced. Moreover, the system it reduces the need for printed documentation.

1.8 REPLICABILITY AND UP SCALING

This solution can be implemented to a wide range of companies, without being tied specifically to a certain industry branch. It must be noted, however, that it initially requires a financial commitment and the organizational culture should be open to the use of new technologies. The system is currently undergoing further development to provide guided support for even more complex tasks.

1.9 FINAL REMARKS

The solution requires a financial commitment, but compared to the advantages it offers (increase in productivity, increase in customer satisfaction, reduction of assembly time, reduction of errors, and more efficient operation), it is worthwhile for companies.

Disclaimer / Acknowledgements

The company describing this good practice doesn't guarantee the successfulness of the solution and can't be held liable for its failure in application.

List of attachments:

Attachment 1: Picture of the cubu:S

Attachment 2: Video demonstration https://www.youtube.com/watch?v=tVTme30L_DM



2 GP2: Schlauer Klaus



OPTIMUM datamanagement solutions

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Keywords : Intelligent image processing for industry 4.0
Good practice applied in: (NACE code): C28.2.3 Manufacture of office machinery and equipment (except computers and peripheral equipment)

The intelligent database supported image processing software "Smart Klaus" was developed as an assistance system that offers a perfect solution to these challenges. Where RFID and barcodes reach their limits, industrial image recognition plays to its strengths along the entire supply chain - sometimes in combination with existing systems - or can even replace them with intelligent feature recognition.

2.1 GOOD PRACTICE DESCRIPTION

The production process is thus facilitated.

One or more cameras record the passing products. The software checks the image for certain characteristics. Intelligent algorithms then recognize distinctive points and compare them with the database. On the basis of the stored characteristics, the "Clever Klaus" now identifies and checks the products. If the system detects an error, the "Clever Klaus" outputs a signal in the form of a tone or screen hint. The employee receives a note.

There are similar solutions which, like the clever Klaus, support the worker. However, they all have other advantages and disadvantages. But smart Klaus is the solution with the most functions and the best development.



The “schlaue Klaus” guides the employee through the process audiovisually via a screen, he checks every step, he confirms that a task has been carried out correctly and he documents the results of the individual steps.

Fig. 2 Work instruction are projected on assembly table
Source: <https://www.handling.de/2--handhabung-und-montage-optimum.htm>

Since 2015, the “schlaue Klaus” received 5 innovation awards, for example the Award “100 Orte für Industrie 4.0 in Baden-Württemberg”.

2.2 OBJECTIVE AND TARGET AUDIENCE

The “schlaue Klaus” was tested at the OPTIMUM GmbH.

The solution can also be used by other companies that are willing to integrate image processing into their manufacturing processes, especially those that have staff involved in the assembly of products. The practice has a high degree of portability and can be adapted to companies in various industries.

The target group for customers are SMEs (<250 employees) and large companies.

2.3 METHODOLOGICAL APPROACH

From the costs perspective, the solution proved to be highly efficient, as it requires minimum intervention (only for maintenance and software updates) and further investments after implementation are not needed, except in the case of training newly employed operators.

From the quality assurance aspects, the “schlaue Klaus” is really helpful. The employee receives information for the process and thus reduces the susceptibility to errors. The solution led to a significant decrease in the number of faulty and defective products reported by customers, which in turn increased customer satisfaction.

OPTIMUM integrates the “smart Klaus” into the existing system and process. Depending on the customer's requirements, it is equipped with one or more cameras, a computer with individually adapted software and database management. A lighting unit ensures consistent measurement results.

The companies need capital to integrate the new technologies.

2.4 VALIDATION PROCESS

The validation process compares the manufacturing time before and after the implementation

2.5 RESULTS / IMPACT

The solution has a positive effect for employees and the companies. The employees can fix their mistakes immediately as soon as they made it. It also makes their work easier by giving them instructions on what to do and this saves them time, what results in less cost for the companies.

2.6 SUCCESS FACTORS AND CONSTRAINTS

There is a limitation, for example, the system must have a certain technical state of art, otherwise the implementation is only possible with great effort or not at all.

As mentioned previously, as direct results of the implementation significantly increased productivity and customer satisfaction were obtained.

Operators also welcomed this technology as it made their activities easier, faster and “worker-friendly”.

At the moment the price of new technology is high, but in the future the price will decrease, so that it is really pays off.

2.7 LESSON LEARNED & SUSTAINABILITY

Human-machine interaction is very important and should be developed further, as this is an important point of Industry 4.0. The more people are confronted with it, the more acceptance increases. The “smart Klaus” can not only support you directly in the production process, but also in goods receipt, returns, quality assurance, order picking and goods issue.

2.8 REPLICABILITY AND UP SCALING

This solution can be implemented to a wide range of companies, without being tied specifically to a certain industry branch. It must be noted, however, that it initially requires a financial commitment and the organizational culture should be open to the use of new technologies.

The system is currently undergoing further development to provide guided support for even more complex tasks.

2.9 FINAL REMARKS

The solution requires a financial commitment, but compared to the advantages it offers (increase in productivity, increase in customer satisfaction, reduction of assembly time, reduction of errors, and more efficient operation), it is worthwhile for companies.

Disclaimer / Acknowledgements

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List of attachments:

Attachment 1: picture of the "schlaue Klaus"

Attachment 2: Video about the "schlaue Klaus":

https://www.youtube.com/watch?v=S4eJH0MN1_U



3 GP3: CHARME



Pickert & Partner GmbH

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Keywords : Industry cockpit

Good practice applied in: (NACE code) : C26- Manufacture of computer, electronic and optical products

The industrial cockpit RQM. CHARM is an easy-to-use tool for individual and dynamic cockpits to monitor production, reaction and alerting in real time as well as for decision support.

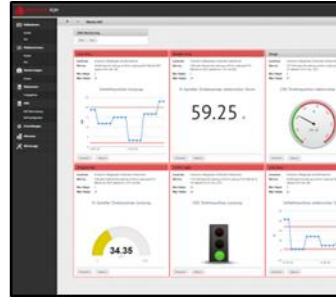
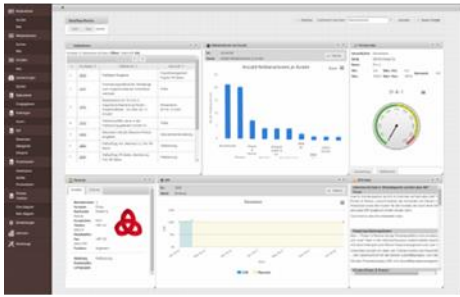
3.1 GOOD PRACTICE DESCRIPTION

The relationship to SFH approach is die production process and the cost efficiency.

The technical solution is that the data, which are important during production, can be clearly displayed with CHARM. The innovation is that all data is displayed in a bundled form, thus saving unnecessary searching.

This is the only tool that bundles these parts. Other technologies also represent cockpits. However, they do not display exactly the same tools.

A mobile version for smartphones and tablets is available, too.



All required information is displayed on the CHARME interface. These are displayed in diagrams, displays and many other graphic representations.



Fig. 3 Work instruction are projected on assembly table
Source:

<http://www.pickert.de/caq-mes/information/industrieco-ckpit-charm/>

3.2 OBJECTIVE AND TARGET AUDIENCE

CHARME was tested at the Pickert & Partner GmbH and at the Industrial Automation Show 2017, too.

For all companies that have a high amount of data and that want to show each employee the data that is relevant for him/her with regard to the order being processed, is CHARME a possibility to do that.

The target group are SMEs (<250 employees) and large companies.

3.3 METHODOLOGICAL APPROACH

From the costs perspective, the solution proved to be highly efficient, as it requires minimum intervention (only for initial commissioning, maintenance and software updates) and further investments after implementation are not needed, except in the case of training newly employed operators.

From quality assurance aspects, CHARME is very helpful. The employee receives information for the process and thus reduces the susceptibility to errors. The solution led to a significant decrease in the number of faulty and defective products reported by customers, which in turn increased customer satisfaction.

The implementation is simple through standardization and the use of plugins. A step-by-step demand-oriented expansion is possible through the approach configuration instead of programming.

At the start, capital is needed to install the new technologies.

3.4 VALIDATION PROCESS

The validation process compares the time it takes to get the necessary information with CHARM, with the time it takes without getting the plug-in to get the information it needs.

3.5 RESULTS / IMPACT

Employees save valuable time by seeing all important information instantly without having to search for it. Unimportant information is also hidden.

3.6 SUCCESS FACTORS AND CONSTRAINTS

A technical limitation is that the plug-ins must be updated regularly. The hardware must also be kept up to date. As already mentioned, CHARME supports the worker with exactly the information that is important for him. These vary from person to person and from order to order. This ability to provide the right information to the right person at the right time is one of CHARME's most important tasks.

3.7 LESSON LEARNED & SUSTAINABILITY

This program is something new that many employees have to arrange with, because they are not used to this kind of information provision.

This good practice saves resources, as all information is displayed on the screen and therefore no printed documentation is required.

3.8 REPLICABILITY AND UP SCALING

This solution can be implemented for a wide range of companies without any industry-specific ties. It should be noted, however, that it requires a financial commitment and that the organisational culture should be open to the use of new technologies.

The system is currently undergoing further development in order to provide guided support even for more complex tasks.

3.9 FINAL REMARKS

The solution requires a financial commitment at the beginning, but the new technology can save a lot of time and effort. This makes it worthwhile for companies with a huge amount of information.

Disclaimer / Acknowledgements

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List of attachments:

Attachment 1: Screenshots of the cockpit CHARME

4 GP4: SEW EURODRIVE

°CENTIGRADE

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Keywords :

*Good practice applied in: (NACE code) : C26 –
Manufacture of computer, electronic and optical products*

A production line of the future, the Smart Factory, is presented in the smallest possible space. In order to make them functional, various systems are used: autonomous transport and assembly vehicles (AGVs) are combined and the most advanced industrial robots are coupled with state-of-the-art user interfaces. These support the user with gesture control, 3D real-time visualization and augmented reality.

4.1 GOOD PRACTICE DESCRIPTION

Together with the world market leader in drive technology, Centigrade worked on an exhibit for Hannover Messe 2015.

The relationship to SFH approach is the production process.

The control panel brings together all the information necessary for a quick decision by the user. He thus has an intelligent, permanently up-to-date schedule in front of him. He hardly has to modify it any more - but if he wants to, he only needs a single, fingers-fast tap.

Cameras on the ceiling track the movement of the storage containers with the product.

Thanks to Augmented Reality, users can see where their goods are located at any time on the control panel of the intralogistics station - 3D models and additional information are rendered live into the video stream of the cameras on the ceiling.

Users can easily drag live data to their smartphones or tablets via Touch Live. Maintenance workers in the factory no longer have to run to every device for simple maintenance steps.

It is one of the first technologies that enables the digital monitoring and modification of the production process from start to finish.

SEW EURODRIVE received a few awards, for example the German Design Award Special 2017 or the Industrie Preis 2016 Best of.



All necessary information is brought together on the control panel. The employee thus has an intelligent, permanently up-to-date schedule in front of him.

Fig. 4 Work instructions are projected on assembly table

Source:

<https://www.centigrade.de/de/referenzen/portfolio/sew-industrie-4-0>

4.2 OBJECTIVE AND TARGET AUDIENCE

SEW EURODRIVE was tested at the Hannover Messe 2015.

Every manufacturing company is a potential user, since the production process has several work steps that can be digitally monitored and controlled by SEW-EURODRIVES.

Target groups for the SEW EURODRIVE are SMEs (<250 employees) and large companies.

4.3 METHODOLOGICAL APPROACH

From a cost perspective, it is initially a very large effort, since all parts of the production process have to be connected, and tablets have to be purchased to control the processes.

From the quality assurance aspects, it is very helpful because everything is networked with each other, it is easy to locate and fix an error.

To implement the solution, the existing structures are analysed and a detailed plan is drawn up as to how everything can be linked.

In the beginning, a large amount of money is needed because many new interfaces are created and must be networked. This results in high costs and a large expenditure of time.

4.4 VALIDATION PROCESS

The production line was validated at the Hannover Messe 2015

4.5 RESULTS / IMPACT

The results are very positive, for workers and for the companies. The employees will therefore have less work, as they can control everything from a central point and see directly where there may be problems. For the companies it is easy, to see where potentials are and where problems.

4.6 SUCCESS FACTORS AND CONSTRAINTS

The technology must be maintained regularly to prevent errors. This production line with the nets is not unrivalled. However, each provider offers different advantages. Every company has to find the right supplier for its needs.

4.7 LESSON LEARNED & SUSTAINABILITY

Everyone does not directly accept a fully networked production line, as they do not know this. However, the user-friendliness makes every day work much easier. The more people involved, the greater the acceptance of new technologies will be. At the moment, the price for technology is very high. However, in a few years, the price will increase. In addition, with the networked production line, resources are conserved, as some parts of the production will be eliminated.

4.8 REPLICABILITY AND UP SCALING

The production line makes work easier and clearer for employees. Errors can also be assigned and rectified directly. An example how to extend the solution more widely is to show production lines at trade fairs and reach new customers.

4.9 FINAL REMARKS

The solution requires a financial commitment at the beginning, but compared to the advantages it offers, such as shortening the production time, it is a good investment for companies.

Disclaimer / Acknowledgements

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List of attachments:

Attachment 1: Picture of the control panel while using SEW EURODRIVE

Attachment 2: Video about SEW EURODRIVE <https://www.youtube.com/watch?v=tfsM6pHEICM>



5 GP5: Milkrun 4.0



WITTENSTEIN



WITTENSTEIN bastian GmbH

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Keywords : production planning
*Good practice applied in: (NACE code): C -
Manufacturing*

The challenge for WITTENSTEIN bastian GmbH was to avoid a media discontinuity between the paper-based planning board for controlling order processing and IT-supported production planning. The media discontinuity resulted in long and inflexible production planning cycles. This meant that workers could not call up the information directly at the machine and digitally transfer it back to the production planning system. This has changed with the introduction of Industry 4.0 technology: In addition to increased flexibility in production planning and improved information transfer, a transparent and consistent database for extended approaches to production planning and failure analysis has been established.

5.1 GOOD PRACTICE DESCRIPTION

The relationship to SFH approach is production processes. WITTENSTEIN bastian GmbH has further developed existing IT back-end production systems and networked them with each other. LED screens are now showing the planning status electronically. In addition, all machines and order papers were provided with a DataMatrix code, which means that identification is also carried out digitally. Tablet PCs enable mobile access to the production planning system. Problems and causes of problems that endanger the execution of the order are fully recorded in an escalation database. Problem causes can thus be methodically and analytically eliminated. The database also provides the basis for applying Big Data algorithms. In the future, it will be possible to analyze fundamental interrelationships with regard to materials, tools, setup parts, production machines and suppliers. This improves the processing of orders.

It is one of the first technologies that enables the digital monitoring and modification of the production process from start to finish.

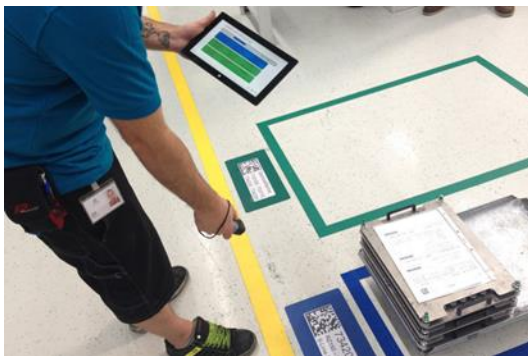


The "Dynamic Milkrun 4.0" supply train optimally compiles orders according to demand

Fig. 5 Work instruction are projected on assembly table

Source:

<https://www.elektrotechnik.vogel.de/der-milchbote-fuer-die-schaufensterfabrik-a-506312/index2.html>



The "Dynamic Milkrun 4.0" supply train optimally compiles orders according to demand

Fig. 6 Work instruction are projected on assembly table

Source:

<https://www.wfb-bremen.de/de/page/stories/digitalisierung-industrie40/wie-der-milchbote-der-dynamische-milkrun-40-beliefert-maschinen-in-der-fabrik-nur-bei-bedarf>

5.2 OBJECTIVE AND TARGET AUDIENCE

The mobile assistance system was tested in real-life environments before the competition.

The target audience are all companies that want to make their logistic processes more efficient are potential customers.

The target group are SMEs (<250 employees) and large companies.

5.3 METHODOLOGICAL APPROACH

From a cost perspective, it is first of all a great effort that has to be done until the journeys of the route train are automated. However, this effort is worthwhile because it gives employees more productive time for the actual main activities of picking, shipping and warehousing.

Consistent quality is ensured by demonstrating the processes and making them transparent. Potential for improvement and potential sources of error can be identified and then eliminated.

To implement the solution, first of all, the route train is automated so that it only drives when necessary. A tablet is attached to the route train so that the employee always sees the current transport orders in front of him/her and can process them.

In the beginning, a large amount of money is needed because many new interfaces are created and must be networked. This results in high costs and a large expenditure of time.

5.4 VALIDATION PROCESS

The tests were carried out in the competence and transfer centre of BIBA and the prototype test in the shop window factory in the real environment.

5.5 RESULTS / IMPACT

The results are very positive, for workers and for the companies. The employees will therefore have more time for their real work as they can control everything from a central point and see directly where there is a lack of material. For the companies it is easy, to see where potentials are and where problems.

5.6 SUCCESS FACTORS AND CONSTRAINTS

The technology must be maintained regularly to prevent errors.

This production line with the nets is not unrivalled. However, each provider offers different advantages. Every company has to find the right supplier for its needs.

5.7 LESSON LEARNED & SUSTAINABILITY

Not all employees will be able to deal with it immediately, but the new technology will make their work easier. You will find this out as soon as you have tried it.

At the moment, the price for technology is very high. However, in a few years, the price will increase. In addition, with the networked logistic, resources are conserved.

5.8 REPLICABILITY AND UP SCALING

This solution is also helpful for other SMEs, as they also have logistics problems. By implementing such a system, a lot of time and money can be saved.

5.9 FINAL REMARKS

The solution requires a financial commitment at the beginning, but is a good investment for companies compared to the advantages it offers, such as shortening production time due to the always up-to-date deliveries.

Disclaimer / Acknowledgements

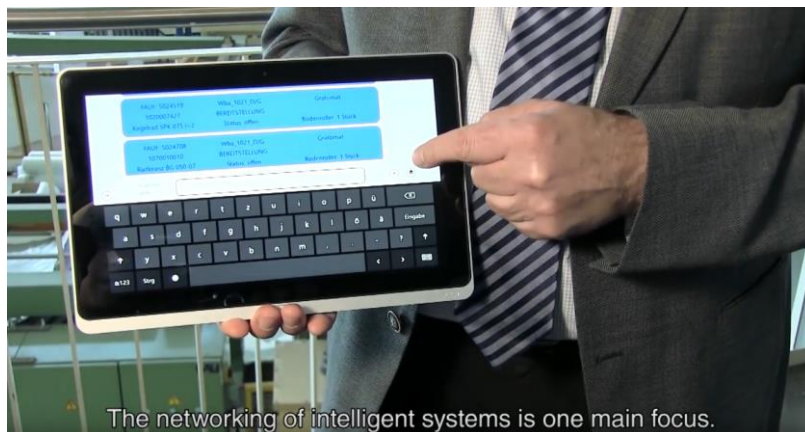
The company describing this good practice doesn't guarantee the successfulness of the solution and can't be held liable for its failure in application.

List of attachments:

Attachment 1: picture of a worker who gets work instruction that are projected on assembly table

Attachment 2: picture of the tablet with work instructions

Attachment 3: Video about Milkrun 4.0: https://www.youtube.com/watch?v=S_x02BX71X4



The networking of intelligent systems is one main focus.



6 LESSONS 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:


- **Schnaithmann:** Cubu:S was initially developed as an assisted assembly system for elderly and handicapped people. However, it turned out that also shop floor operators greatly benefit of digital working instructions. Cubu:S also reflects, what can be achieved by having clever students working at a project which aims at solving real world problems.

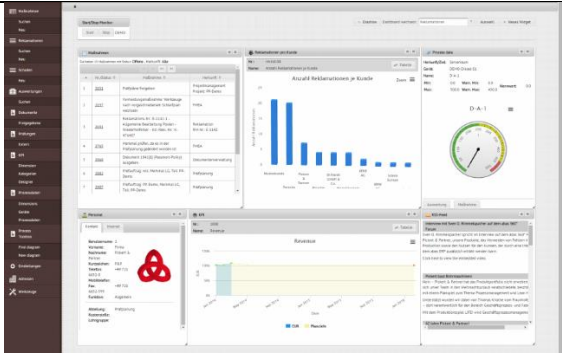
- **OPTIMUM:** Most SMEs require simple and cost-effective solutions. This is why we as a company developed “Schlauer Klaus”. It demonstrably provides support for a variety of assembly tasks but is also easy to configure and requires only low implementation costs.
- **Pickert & Partner:** Often, the problem of shop floor workers in SMEs is that different data is captured in different places. CHARME industry cockpit solves this issue by integrating various operational parameters into one comprehensive cockpit. This allows its user to quickly gain an understanding into potential bottlenecks and underperforming processes.
- **Centigrade:** In order to minimize organisational waste, for SMEs it is crucial to introduce smart assistance systems that provide decision support for workers. E.g. through digital planning and monitoring it is possible to reduce media breaks.
- **WITTENSTEIN:** Industry 4.0 is successfully implemented when companies learn from the practical implementation of concrete projects. The real value of use cases is within well thought-out applications and not within the technologies per se. Also, constant feedback from later users/ employees is very important during the development of potential solutions.

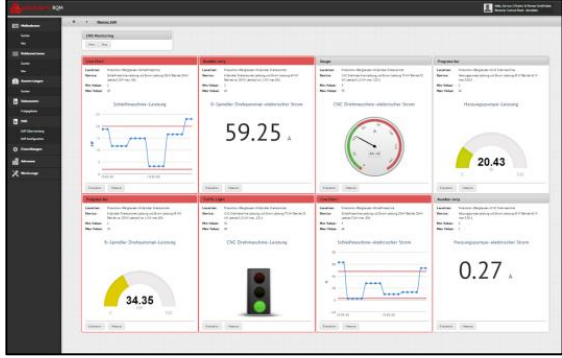

Lessons learned from the perspective of the USTUTT

SMEs often face the issue that integration of new, sophisticated technology demands high levels of expertise and investment costs. In addition, many SMEs shy away from real implementations because they lack the right contact person to consult. Furthermore, SMEs often lack resources that are committed to actually guide the digital transformation process of their company. Another big problem is within the acceptance of new technology. Especially older employees often have reservations regarding changes of their work tasks.

7 TEMPLATE FOR GOOD PRACTICE DOCUMENTATION

Element	Guiding questions	Answers
INTRODUCTION		
Company information	Data identification, logo, contact person, possible representative image(s).	 <p>Pickert & Partner GmbH Händelstraße 10, 76327 Pfinztal, Germany Tel.: +49 721/66520 www.pickert.de info@pickert.de</p> <p>Contact Person: Sven O. Rimmelspacher Sven.rimmelspacher@pickert.de</p>
Name and brief description.	Name or acronym: what is the name that captures the essence of the good practice	Industry Cockpit CHARM
	Provide a concise description of the good practice being addressed	The industrial cockpit RQM. CHARM is an easy-to-use tool for individual and dynamic cockpits to monitor production, reaction and alerting in real time as well as for decision support.
GOOD PRACTICE DESCRIPTION		
Detailed description	How did the SME create good practice / new product?	
	What is the relationship to SFH approach: novel technology, production processes, HRM or cost efficiency, quality assurance, risk management?	Production process, cost efficiency

Element	Guiding questions	Answers
	<p>Describe what are the technical solutions and innovations: of the good practice</p> <p>Highlights (or keywords) of the Best Practice</p> <p>Good practice applied in : (NACE code)</p>	<p>The technical solution is that the data, which are important during production, can be clearly displayed with CHARM. The innovation is that all data is displayed in a bundled form, thus saving unnecessary searching.</p> <p>Industry cockpit</p> <p>C26 – Manufacture of computer, electronic and optical products</p>
Benchmarking	How does your solution related to others provided by competitors	This is the only tool that bundles these parts. Other technologies also represent cockpits. However, they do not display exactly the same tools.
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).	


Element	Guiding questions	Answers
		 <p>source: http://www.pickert.de/caq-mes/information/industriecockpit-charm/</p> <p>A mobile version is available, too.</p> 
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	CHARME was tested at the Pickert & Partner GmbH and at the Industrial Automation Show 2017, too.
	Specify also the target audience/potential customers and stakeholders (stakeholders can affect or be affected)	For all companies that have a high amount of data and want to show each employee the data that is relevant for him/her with regard to the order being processed.
Targeted customers and scale of use	Select the target group of customers: <ol style="list-style-type: none"> 1. SMEs (<250 employees) 2. Large companies 3. Public institutions 4. 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	From the costs perspective, the solution proved to be highly efficient, as it requires minimum intervention (only for initial commissioning, maintenance and software updates) and further investments after implementation are not needed, except in the case of training newly employed operators.
	Quality assurance aspects, if applicable	The employee receives information for the process and thus reduces the susceptibility to errors. The solution led to a significant decrease in the number of faulty and defective products reported by customers, which in turn increased customer satisfaction.
	Risk management aspects, if applicable	
Implementation guidelines	How can the Good practice be implemented?	The implementation is simple through standardization and the use of plugins. A step-by-step demand-oriented


Element	Guiding questions	Answers
		expansion is possible through the approach configuration instead of programming.
	What resources are necessary for implementation (personnel, finance, infrastructure and timespan)?	At the start, capital is needed to install the new technologies.
VALIDATION PROCESS		
Validation	Provide a brief description of the good practice validation process.	The validation process compares the time it takes to get the necessary information with CHARM, with the time it takes without getting the plug-in to get the information it needs.
RESULTS / IMPACT		
Solution impact	What has been the impact (positive or negative) of this good practice on the beneficiaries	Employees save valuable time by seeing all important information instantly without having to search for it. Unimportant information is also hidden.
SUCCESS FACTORS AND CONSTRAINTS		
Limitations and Strong points	Describe limitations, both from the technical and implementation point of view	A technical limitation is that the plug-ins must be updated regularly. The hardware must also be kept up to date.
	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	As already mentioned, CHARME supports the worker with exactly the information that is important for him. These vary from person to person and from order to order. This ability to provide the right information to the right person at the right time is one of CHARME's most important tasks.
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	This program is something new that many employees have to arrange with, because they are not used to this kind of information provision.
SUSTAINABILITY		
Sustainability of Good Practice	Describe aspects related to sustainability of the Good Practice, if applicable	This good practice saves resources, as all information is displayed on the screen and therefore no printed documentation is required.
REPLICABILITY AND UP SCALING		
Replicability and further application	How can the solution / good practice be useful for other SMEs?	This solution can be implemented for a wide range of companies without any industry-specific ties. It should be noted, however, that it requires a financial commitment and that the organisational culture should be open to the use of new technologies.
	What are the possibilities of extending the good practice more widely?	The system is currently undergoing further development in order to provide guided support even for more complex tasks.
FINAL REMARKS		
Conclusion	Conclude specifying / explaining the impact and usefulness of the good practice.	The solution requires a financial commitment at the beginning, but the new technology can save a lot of time and effort. This makes it worthwhile for companies with a huge amount of information.
Disclaimer / Acknowledgements	Address any legal loose ends or limitations for dissemination, certify the use of this information for dissemination, online and printed (Yes/No)	The company describing this good practice doesn't guarantee the successfulness of the solution and can't be held liable for its failure in application.

8 TEMPLATE FOR GOOD PRACTICE DOCUMENTATION

Element	Guiding questions	Answers
INTRODUCTION		
Company information	Data identification, logo, contact person, possible representative image(s).	 <p>OPTIMUM datamanagement solutions Hirschstraße 12-14, 76133 Karlsruhe, Germany Tel.: +49 (0) 721 / 5704495-0 https://www.optimum-gmbh.de/ info@optimum-gmbh.de</p> <p>contact person: Wolfgang Mahanty Tel.: +49 (0) 721 / 570 44 95-0</p>
Name and brief description.	Name or acronym: what is the name that captures the essence of the good practice	"der schlaue Klaus" – "the smart Klaus"
	Provide a concise description of the good practice being addressed	The intelligent database supported image processing software "Smart Klaus" was developed as an assistance system that offers a perfect solution to these challenges. Where RFID and barcodes reach their limits, industrial image recognition plays to its strengths along the entire supply chain - sometimes in combination with existing systems - or can even replace them with intelligent feature recognition.
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?	The production process is thus facilitated
	Describe what are the technical solutions and innovations: of the good practice	One or more cameras record the passing products. The software checks the image for certain characteristics. Intelligent algorithms then recognize distinctive points and compare them with the database. On the basis of the stored characteristics, the "Clever Klaus" now identifies and checks the products. If the system detects an error, the "Clever Klaus" outputs a signal in the form of a tone or screen hint. The employee receives a note.
	Highlights (or keywords) of the Best Practice	Intelligent image processing for industry 4.0
	Good practice applied in : (NACE code)	C28.2.3 Manufacture of office machinery and equipment (except computers and peripheral equipment)
Benchmarking	How does your solution related to others provided by competitors	There are similar solutions which, like the clever Klaus, support the worker. However, they all have other advantages and disadvantages. But smart Klaus is the solution with the most functions and the best development.

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).	 <p>Source: https://www.handling.de/2--handhabung-und-montage-optimum.htm Award "100 Orte für Industrie 4.0 in Baden-Württemberg"</p>
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	It was tested at the OPTIMUM GmbH


Element	Guiding questions	Answers
	Specify also the target audience/potential customers and stakeholders (stakeholders can affect or be affected)	The solution can also be used by other companies that are willing to integrate image processing into their manufacturing processes, especially those that have staff involved in the assembly of products. The practice has a high degree of portability and can be adapted to companies in various industries.
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	SMEs (<250 employees) and large companies
METHODOLOGICAL APPROACH		
Managerial aspects	Cost efficiency of the good practice, if applicable	From the costs perspective, the solution proved to be highly efficient, as it requires minimum intervention (only for maintenance and software updates) and further investments after implementation are not needed, except in the case of training newly employed operators.
	Quality assurance aspects, if applicable	The employee receives information for the process and thus reduces the susceptibility to errors. The solution led to a significant decrease in the number of faulty and defective products reported by customers, which in turn increased customer satisfaction.
	Risk management aspects, if applicable	
Implementation guidelines	How can the Good practice be implemented?	OPTIMUM integrates the “smart Klaus” into the existing system and process. Depending on the customer's


Element	Guiding questions	Answers
		requirements, it is equipped with one or more cameras, a computer with individually adapted software and database management. A lighting unit ensures consistent measurement results.
	What resources are necessary for implementation (personnel, finance, infrastructure and timespan)?	The companies need capital to integrate the new technologies.
VALIDATION PROCESS		
Validation	Provide a brief description of the good practice validation process.	The validation process compares the manufacturing time before and after the implementation
RESULTS / IMPACT		
Solution impact	What has been the impact (positive or negative) of this good practice on the beneficiaries	The solution has a positive effect for employees and the companies. The employees can fix their mistakes immediately as soon as they made it. It also makes their work easier by giving them instructions on what to do and this saves them time, what results in less cost for the companies.
SUCCESS FACTORS AND CONSTRAINTS		
Limitations and Strong points	Describe limitations, both from the technical and implementation point of view	The system must have a certain technical state of art, otherwise the implementation is only possible with great effort or not at all.
	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	As mentioned previously, as direct results of the implementation significantly increased productivity and customer satisfaction were obtained. Operators also welcomed this technology as it made their activities easier, faster and “worker-friendly”.

Element	Guiding questions	Answers
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	Human-machine interaction is very important and should be developed further, as this is an important point of Industry 4.0. The more people are confronted with it, the more acceptance increases. The “smart Klaus” can not only support you directly in the production process, but also in goods receipt, returns, quality assurance, order picking and goods issue.
SUSTAINABILITY		
Sustainability of Good Practice	Describe aspects related to sustainability of the Good Practice, if applicable	At the moment the price of new technology is high, but in the future the price will decrease, so that it is really pays off.
REPLICABILITY AND UP SCALING		
Replicability and further application	How can the solution / good practice be useful for other SMEs?	This solution can be implemented to a wide range of companies, without being tied specifically to a certain industry branch. It must be noted, however, that it initially requires a financial commitment and the organizational culture should be open to the use of new technologies.
	What are the possibilities of extending the good practice more widely?	The system is currently undergoing further development to provide guided support for even more complex tasks.
FINAL REMARKS		

Element	Guiding questions	Answers
Conclusion	Conclude specifying / explaining the impact and usefulness of the good practice.	The solution requires a financial commitment, but compared to the advantages it offers (increase in productivity, increase in customer satisfaction, reduction of assembly time, reduction of errors, and more efficient operation), it is worthwhile for companies.
Disclaimer Acknowledgements	/ Address any legal loose ends or limitations for dissemination, certify the use of this information for dissemination, online and printed (Yes/No)	The company describing this good practice doesn't guarantee the successfulness of the solution and can't be held liable for its failure in application.

9 TEMPLATE FOR GOOD PRACTICE DOCUMENTATION

Element	Guiding questions	Answers
INTRODUCTION		
Company information	Data identification, logo, contact person, possible representative image(s).	 Schnaithmann Schnaithmann Maschinenbau GmbH Fellbacher Str.49, 73630 Remshalden-Grünbach Germany +49 (0) 7151/ 9732-0 https://www.schnaithmann.de/home/ info@schnaithmann.de Contact person: Volker Siebert
Name and brief description.	Name or acronym: what is the name that captures the essence of the good practice	cubu:S
	Provide a concise description of the good practice being addressed	cubu:S is an intelligent and networkable infrastructure for manual workstations, primarily for assembly, packaging and order picking. The system was developed to support the employees at the assembly station to minimize possible user errors.
GOOD PRACTICE DESCRIPTION		
Detailed description	How did the SME create good practice / new product?	In a joint project with Esslingen University of Applied Sciences and the Protective Workshop in Heilbronn, an assistance system was developed that guides employees step by step through assembly and

Element	Guiding questions	Answers
		commissioning processes on the basis of movement recognition.
	What is the relationship to SFH approach: novel technology, production processes, HRM or cost efficiency, quality assurance, risk management?	Production processes, cost efficiency
	Describe what are the technical solutions and innovations: of the good practice	The technical solution is that a motion sensor from consumer electronics was integrated into the system. By combining it with a commercially available beamer and a PC, it was possible to design a flexible system with minimal hardware requirements.
	Highlights (or keywords) of the Best Practice	Keywords: assistive technology
	Good practice applied in : (NACE code)	C28.2.3 Manufacture of office machinery and equipment (except computers and peripheral equipment)
Benchmarking	How does your solution related to others provided by competitors	A completely new kind of human-machine interaction is realized in the system itself. The use of “intelligent” component containers opens up unimagined possibilities for flexibility along the entire value chain.
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).	 <p>Source: https://www.schnaithmann.de/news/news-uebersicht/montage-assistenzsysteme/</p>


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	It is used in Germany at the Schnaithmann GmbH
	Specify also the target audience/potential customers and stakeholders (stakeholders can affect or be affected)	All companies that are faced with the challenge of an increasing variety of variants and at the same time a declining number of units with a constantly changing workforce, but still want to produce economically efficient and high quality products can benefit from it
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) Other, please specify	SMEs (<250 employees) and large companies
METHODOLOGICAL APPROACH		
Managerial aspects	Cost efficiency of the good practice, if applicable	From the costs perspective, the solution proved to be highly efficient, as it requires minimum intervention (only for maintenance and software updates) and further investments after implementation are not needed, except in the case of training newly employed operators.
	Quality assurance aspects, if applicable	The employee receives information for the process and thus reduces the susceptibility to errors. The solution led to a significant decrease in the number of faulty and defective products reported by customers, which in turn increased customer satisfaction.

Element	Guiding questions	Answers
	Risk management aspects, if applicable	
Implementation guidelines	How can the Good practice be implemented?	Parts to be removed or picked are made available on a Kanban shelf. Necessary working information is projected directly into the working area as video, photo or instruction. Therefore, tools are needed to make this possible.
	What resources are necessary for implementation (personnel, finance, infrastructure and timespan)?	The companies need capital to integrate the new technologies.
VALIDATION PROCESS		
Validation	Provide a brief description of the good practice validation process.	The validation process compares the manufacturing time before and after implementation.
RESULTS / IMPACT		
Solution impact	What has been the impact (positive or negative) of this good practice on the beneficiaries	It has a positive effect because employees can fix it immediately as soon as they make a mistake. It also makes their work easier by giving them instructions on what to do and this saves them time.
SUCCESS FACTORS AND CONSTRAINTS		
Limitations and Strong points	Describe limitations, both from the technical and implementation point of view	The system must have a certain technical state of art, otherwise the implementation is only possible with great effort or not at all.
	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	As mentioned previously, as direct results of the implementation significantly increased productivity and customer satisfaction were obtained. Operators also welcomed this technology as it made their activities easier, faster and “worker-friendly”.


Element	Guiding questions	Answers
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	Human-machine interaction is very important and should be advanced, as this is an important point of Industry 4.0. The more people are confronted with it, the more acceptance increases.
SUSTAINABILITY		
Sustainability of Good Practice	Describe aspects related to sustainability of the Good Practice, if applicable	Currently the price of the technology can be prohibitive, however, due to future technological progress their price will decrease and the cost of implementation will be reduced. Moreover, the system it reduces the need for printed documentation.
REPLICABILITY AND UP SCALING		
Replicability and further application	How can the solution / good practice be useful for other SMEs?	This solution can be implemented to a wide range of companies, without being tied specifically to a certain industry branch. It must be noted, however, that it initially requires a financial commitment and the organizational culture should be open to the use of new technologies.
	What are the possibilities of extending the good practice more widely?	The system is currently undergoing further development to provide guided support for even more complex tasks.
FINAL REMARKS		

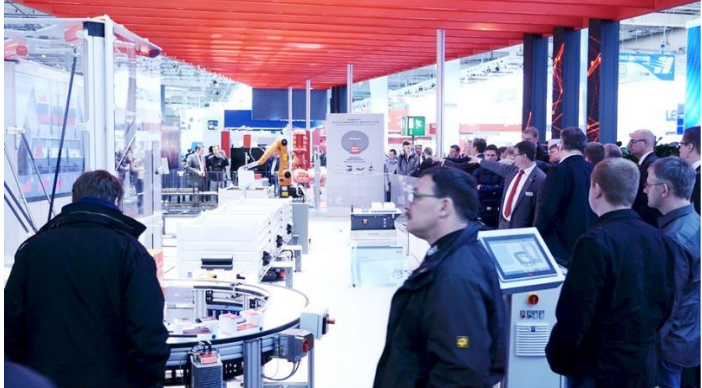
Element	Guiding questions	Answers
Conclusion	Conclude specifying / explaining the impact and usefulness of the good practice.	The solution requires a financial commitment, but compared to the advantages it offers (increase in productivity, increase in customer satisfaction, reduction of assembly time, reduction of errors, and more efficient operation), it is worthwhile for companies.
Disclaimer Acknowledgements	/ Address any legal loose ends or limitations for dissemination, certify the use of this information for dissemination, online and printed (Yes/No)	The company describing this good practice doesn't guarantee the successfulness of the solution and can't be held liable for its failure in application.

10 TEMPLATE FOR GOOD PRACTICE DOCUMENTATION

Element	Guiding questions	Answers
INTRODUCTION		
Company information	Data identification, logo, contact person, possible representative image(s).	 <p>Centigrade GmbH Science Park 2, 66123 Saarbrücken, Germany Tel.: +49 681 959 3110 www.centigrade.de info@centigrade.de</p> <p>Contact person: Jörg Niesenhaus Tel.: +49 208 883 672 89 projects@centigrade.de</p>
Name and brief description.	Name or acronym: what is the name that captures the essence of the good practice	SEW-EURODRIVES
	Provide a concise description of the good practice being addressed	A production line of the future, the Smart Factory, is presented in the smallest possible space. In order to make them functional, various systems are used: autonomous transport and assembly vehicles (AGVs) are combined and the most advanced industrial robots are coupled with state-of-the-art user interfaces. These support the user with gesture control, 3D real-time visualization and augmented reality.
GOOD PRACTICE DESCRIPTION		

Element	Guiding questions	Answers
Detailed description	How did the SME create good practice / new product?	Together with the world market leader in drive technology, Centigrade worked on an exhibit for Hannover Messe 2015.
	What is the relationship to SFH approach: novel technology, production processes, HRM or cost efficiency, quality assurance, risk management?	Production processes
	Describe what are the technical solutions and innovations: of the good practice	<p>The control panel brings together all the information necessary for a quick decision by the user. He thus has an intelligent, permanently up-to-date schedule in front of him. He hardly has to modify it any more - but if he wants to, he only needs a single, fingers-fast tap. Cameras on the ceiling track the movement of the storage containers with the product.</p> <p>Thanks to Augmented Reality, users can see where their goods are located at any time on the control panel of the intralogistics station - 3D models and additional information are rendered live into the video stream of the cameras on the ceiling.</p> <p>Users can easily drag live data to their smartphones or tablets via Touch Live. Maintenance workers in the factory no longer have to run to every device for simple maintenance steps.</p>
	Highlights (or keywords) of the Best Practice	Keyword: assistive technology
	Good practice applied in : (NACE code)	C26 – Manufacture of computer, electronic and optical products
Benchmarking	How does your solution related to others provided by competitors	It is one of the first technologies that enables the digital monitoring and modification of the production process from start to finish.

Element	Guiding questions	Answers
<p>Additional information's / materials</p>	<p>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).</p>	<p>Award: German Design Award Special 2017 Industrie Preis 2016 Best of</p>  <p>source: https://www.centigrade.de/de/referenzen/portfolio/sew-industrie-4-0</p>


Element	Guiding questions	Answers
		 <p>source: https://www.centigrade.de/de/referenzen/portfolio/sew-industrie-4-0</p>
OBJECTIVE AND TARGET AUDIENCE		
Geographical coverage and target audience	<p>What is the geographical range where the good practice has been used / tested / validated: country, region, Danube Region if is relevant and possible</p> <p>Specify also the target audience/potential customers and stakeholders (stakeholders can affect or be affected)</p>	<p>SEW EURODRIVE was tested at the Hannover Messe 2015.</p> <p>Every manufacturing company is a potential user, since the production process has several work steps that can be digitally monitored and controlled by SEW-EURODRIVEs.</p>
Targeted customers and scale of use	<p>Select the target group of customers:</p> <ul style="list-style-type: none"> 13. SMEs (<250 employees) 14. Large companies 15. Public institutions 16. End customer (Business to Customer) 	<p>SMEs (<250 employees), large companies</p>

Element	Guiding questions	Answers
	Other, please specify	
METHODOLOGICAL APPROACH		
Managerial aspects	Cost efficiency of the good practice, if applicable	From a cost perspective, it is initially a very large effort, since all parts of the production process have to be connected, and tablets have to be purchased to control the processes.
	Quality assurance aspects, if applicable	Because everything is networked with each other, it is easy to locate and fix an error.
	Risk management aspects, if applicable	
Implementation guidelines	How can the Good practice be implemented?	To implement the solution, the existing structures are analysed and a detailed plan is drawn up as to how everything can be linked.
	What resources are necessary for implementation (personnel, finance, infrastructure and timespan)?	In the beginning, a large amount of money is needed because many new interfaces are created and must be networked. This results in high costs and a large expenditure of time.
VALIDATION PROCESS		
Validation	Provide a brief description of the good practice validation process.	The production line was validated at the Hannover Messe 2015
RESULTS / IMPACT		
Solution impact	What has been the impact (positive or negative) of this good practice on the beneficiaries	The results are very positive, for workers and for the companies. The employees will therefore have less work, as they can control everything from a central point and see directly where there may be problems. For the companies it is easy, to see where potentials are and where problems.


Element	Guiding questions	Answers
SUCCESS FACTORS AND CONSTRAINTS		
Limitations and Strong points	Describe limitations, both from the technical and implementation point of view	The technology must be maintained regularly to prevent errors.
	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	This production line with the nets is not unrivalled. However, each provider offers different advantages. Every company has to find the right supplier for its needs.
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	Everyone does not directly accept a fully networked production line, as they do not know this. However, the user-friendliness makes every day work much easier. The more people involved, the greater the acceptance of new technologies will be.
SUSTAINABILITY		
Sustainability of Good Practice	Describe aspects related to sustainability of the Good Practice, if applicable	At the moment, the price for technology is very high. However, in a few years, the price will increase. In addition, with the networked production line, resources are conserved, as some parts of the production will be eliminated.
REPLICABILITY AND UP SCALING		
Replicability and further application	How can the solution / good practice be useful for other SMEs?	The production line makes work easier and clearer for employees. Errors can also be assigned and rectified directly.

Element	Guiding questions	Answers
	What are the possibilities of extending the good practice more widely?	For example, show production lines at trade fairs can reach new customers.
FINAL REMARKS		
Conclusion	Conclude specifying / explaining the impact and usefulness of the good practice.	The solution requires a financial commitment at the beginning, but compared to the advantages it offers, such as shortening the production time, it is a good investment for companies.
Disclaimer Acknowledgements	/ Address any legal loose ends or limitations for dissemination, certify the use of this information for dissemination, online and printed (Yes/No)	The company describing this good practice doesn't guarantee the successfulness of the solution and can't be held liable for its failure in application.

11 TEMPLATE FOR GOOD PRACTICE DOCUMENTATION

Element	Guiding questions	Answers
INTRODUCTION		
Company information	Data identification, logo, contact person, possible representative image(s).	 <p>WITTENSTEIN alpha WITTENSTEIN bastian GmbH Lise-Meitner-Str. 10, 70736 Fellbach, Germany Tel.: +49 711 57564 71072 www.wittenstein.de info@wittenstein.de</p> <p>Contact person: Dr. Peter Stephan Peter.stephan@wittenstein.de</p>
Name and brief description.	Name or acronym: what is the name that captures the essence of the good practice	Milkrun 4.0
	Provide a concise description of the good practice being addressed	The challenge for WITTENSTEIN bastian GmbH was to avoid a media discontinuity between the paper-based planning board for controlling order processing and IT-supported production planning. The media discontinuity resulted in long and inflexible production planning cycles. This meant that workers could not call up the information directly at the machine and digitally transfer it back to the production planning system. This has changed with the introduction of

Element	Guiding questions	Answers
		Industry 4.0 technology: In addition to increased flexibility in production planning and improved information transfer, a transparent and consistent database for extended approaches to production planning and failure analysis has been established.
GOOD PRACTICE DESCRIPTION		
Detailed description	How did the SME create good practice / new product?	
	What is the relationship to SFH approach: novel technology, production processes, HRM or cost efficiency, quality assurance, risk management?	Production processes
	Describe what are the technical solutions and innovations: of the good practice	WITTENSTEIN bastian GmbH has further developed existing IT back-end production systems and networked them with each other. LED screens are now showing the planning status electronically. In addition, all machines and order papers were provided with a DataMatrix code, which means that identification is also carried out digitally. Tablet PCs enable mobile access to the production planning system. Problems and causes of problems that endanger the execution of the order are fully recorded in an escalation database. Problem causes can thus be methodically and analytically eliminated. The database also provides the basis for applying Big Data algorithms. In the future, it will be possible to analyze fundamental interrelationships with regard to materials, tools, setup parts, production machines and suppliers. This improves the processing of orders
	Highlights (or keywords) of the Best Practice	Keyword: production planning
	Good practice applied in : (NACE code)	C-Manufacturing

Element	Guiding questions	Answers
Benchmarking	How does your solution related to others provided by competitors	It is one of the first technologies that enables the digital monitoring and modification of the production process from start to finish.
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).	 <p>source: http://www.plattform-i40.de/I40/Redaktion/DE/Anwendungsbeispiele/046-elektronische-plantafel-und-mobiles-produktionsmanagement-wittenstein-ag/beitrag-lektronische-plantafel-und-mobiles-produktionsmanagement-wittenstein-ag.html</p>
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	The mobile assistance system was tested in real-life environments before the competition.
	Specify also the target audience/potential customers and stakeholders (stakeholders can affect or be affected)	All companies that want to make their logistic processes more efficient are potential customers.
Targeted customers and scale of use	Select the target group of customers: 17. SMEs (<250 employees)	SMEs (<250 employees), large companies

Element	Guiding questions	Answers
	18. Large companies 19. Public institutions 20. End customer (Business to Customer) Other, please specify	
METHODOLOGICAL APPROACH		
Managerial aspects	Cost efficiency of the good practice, if applicable	From a cost perspective, it is first of all a great effort that has to be done until the journeys of the route train are automated. However, this effort is worthwhile because it gives employees more productive time for the actual main activities of picking, shipping and warehousing.
	Quality assurance aspects, if applicable	Consistent quality is ensured by demonstrating the processes and making them transparent. Potential for improvement and potential sources of error can be identified and then eliminated.
	Risk management aspects, if applicable	
Implementation guidelines	How can the Good practice be implemented?	First of all, the route train is automated so that it only drives when necessary. A tablet is attached to the route train so that the employee always sees the current transport orders in front of him/her and can process them.
	What resources are necessary for implementation (personnel, finance, infrastructure and timespan)?	In the beginning, a large amount of money is needed because many new interfaces are created and must be networked. This results in high costs and a large expenditure of time.
VALIDATION PROCESS		

Element	Guiding questions	Answers
Validation	Provide a brief description of the good practice validation process.	The tests were carried out in the competence and transfer centre of BIBA and the prototype test in the shop window factory in the real environment.
RESULTS / IMPACT		
Solution impact	What has been the impact (positive or negative) of this good practice on the beneficiaries	The results are very positive, for workers and for the companies. The employees will therefore have more time for their real work as they can control everything from a central point and see directly where there is a lack of material. For the companies it is easy, to see where potentials are and where problems.
SUCCESS FACTORS AND CONSTRAINTS		
Limitations and Strong points	Describe limitations, both from the technical and implementation point of view	The technology must be maintained regularly to prevent errors.
	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	This production line with the nets is not unrivalled. However, each provider offers different advantages. Every company has to find the right supplier for its needs.
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	Not all employees will be able to deal with it immediately, but the new technology will make their work easier. You will find this out as soon as you have tried it.
SUSTAINABILITY		

Element	Guiding questions	Answers
Sustainability of Good Practice	Describe aspects related to sustainability of the Good Practice, if applicable	At the moment, the price for technology is very high. However, in a few years, the price will increase. In addition, with the networked logistic, resources are conserved.
REPLICABILITY AND UP SCALING		
Replicability and further application	How can the solution / good practice be useful for other SMEs?	This solution is also helpful for other SMEs, as they also have logistics problems. By implementing such a system, a lot of time and money can be saved.
	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.	The solution requires a financial commitment at the beginning, but is a good investment for companies compared to the advantages it offers, such as shortening production time due to the always up-to-date deliveries.
Disclaimer / Acknowledgements	Address any legal loose ends or limitations for dissemination, certify the use of this information for dissemination, online and printed (Yes/No)	The company describing this good practice doesn't guarantee the successfulness of the solution and can't be held liable for its failure in application.

