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Benchmarking Report

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Executive Summary

A total of 29 examples of EU, national and regional practices and success cases concerning the benefit for SMEs from digitalisation for their products and services, their processes as well as new business models have been collected by all PPs.

Examples of businesses with an average workforce of about 40 employees including the smallest ones with under 10 employees were obtained.

As it turned out, the focus of the applied technologies mainly lays on the integration of new software products and simulation methods. Whereas very few companies rely solely on hardware purchases.

Regarding the resulting effects, a reduction of administration efforts was achieved by far most often. Other frequent aims were new business models with new products and services or new production forms. Remarkably, no company used outsourcing to concentrate on its core competences.

Generally, the main purpose was to digitalize established businesses, only a few examples of start-ups could be found.

The main difficulties in the digitalisation process can be divided in technological and human challenges.

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1. Introduction

The superior aim is to improve the competitiveness of SMEs in the Alpine Space with the help of Smart Technologies.

Therefore, as one of the first activities both an analysis of SMEs' needs and awareness campaigns with regional events opened to all SMEs are developed. These increase the companies' knowledge on digital technology potentialities, the added value for their innovation processes and the entrepreneurial opportunities from their application. The online survey collects information on SMEs' needs, checks SMEs' attitude to smart technologies and the involvement within the project with a special focus on the selected industrial sectors.

(P8 coord; PPs inv.)

2. Objective of investigation/objective of the deliverable

As part of the activity on "Smart Technologies to improve AS SMEs competitiveness" (A.T1.2), the objective of this delivery is to collect EU, national and regional practices and success cases concerning the benefit for SMEs from digitalisation from all project partners and to summarize them for future usage. Specific examples of successful applications of practices on products and services, processes and new business models are discussed and summarized.

Thereby, unawareness and doubts of entrepreneurs should be eradicated and it shall be demonstrated, how inevitable and useful digitalisation is for their competitiveness. This way, SMEs can orient themselves to the given examples, overcome their inhibitions and transfer and implement the methods in their own businesses.

3. Applied approach/methodology adopted

First, the responsible PP (PP8 – University of Applied Sciences Rosenheim) sent out instructions and a template to all PPs. The PPs were invited to provide PP8 with a variety of crucial information about the respective enterprise and its digitalisation strategy.

In order to be able to provide standardized results suitable for proper comparison an Excel template was created. This template requested the following information from the PPs:

Project Partner NO; Project Partner Name; Industry sector of interviewed; Affected parts of business; Interviewed company; Company origin; Company description; Initial position; Possible strategies; Chosen approach; Difficulties encountered; New environment; Summarized advantages.

Additionally, the template provided a filled out example for a better understanding.

After their completion the templates were sent back to PP8, who collected and categorized the results. The categorization aims at grouping all applied technologies and the consequential value-adding effects for SMEs.

The categories regarding the applied technologies are:

- Robotics
- Simulation
- System Integration
- IoT
- Cybersecurity
- Cloud Computing
- Additive Manufacturing
- Augmented Reality
- Big Data

The effects are categorized by:

- Supply chain networking
- Optimization of administration
- New production forms
- Increase in efficiency
- New business models

The categories were defined in advance according to the expected results.

4. Results

In a first step the 29 collected success stories are categorized as shown above and, additionally, sorted by regions. Each PP delivered 1-4 cases from individual businesses acting in their region.

The provided information demonstrates a focus of applied technologies in System Integration and Simulation (see *figure 1* below).

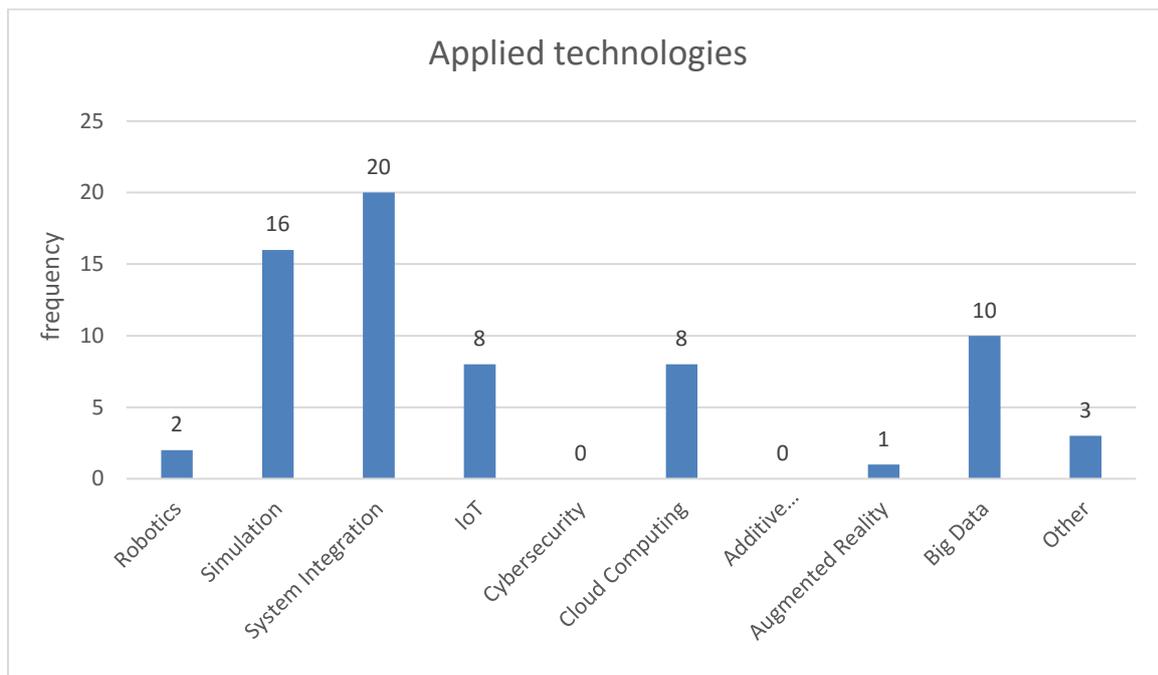


figure 1: frequency of applied technologies

A good example is the **Hofmann GmbH & Co. KG** (provided by PP8 – UAS Rosenheim). It shows a successfully done system integration in the digital printing company. “By implementing a web based Service, all production relevant information was automatically gathered and sent to the factory by a self-developed Workflow System.” Before the production starts, the collected information is “computed and divided into Just in Time products and pick on demand Stock items”. At the end of the process, the orders “get attached with an individual label and transported to customers just in time”. Finally, an automated, digital payment system is used to collect the payments”.

The textile company **Emmanuel Lang** in France (PP2- Alsace Innovation) used a combination of Simulation and System Integration to assert itself on the market. They developed a new e-platform, where now customers have the opportunity to create their own “personalised tailored-made shirts”. Therefore the purchaser enters his or her main body measures and chooses the type and the colour of the fabrics directly on the platform.

Another successful Industry 4.0 solution was integrated by the flowmeter manufacturer **Rota Yokogawa** (PP5- Bwcon GmbH). It “shows all devices in the last 7 production steps with their size and current location. With this transparency, it is possible to predict when a

device will arrive in the shipment. The entire digitization is a real-time representation. At any given time, the dispatch and the production control can view the current situation in the production line and, if necessary, intervene in order to process, for example, a single device which is still missing for the finalization of a customer order prioritized.”

Also one of the more frequently implemented technologies are IoT solutions with intelligent products.

Such an approach was selected by the Swiss business **Elite Bed** (PP8 – UAS Rosenheim). “Elite chose to change their sales model to an after sales leasing system based on IOT Technology. All Mattresses got attached with sensors, being able to monitor usage and activities. This creating the possibilities of pay per use leasing”.

The company **Belleri**, located in Italy (PP6 – Associazione Fabbrica Intelligente Lombardia), uses “Big Data” together with a Graphical User Interface, which provides “information like real-time production, scraps, scraps declaration [...], counting operative times listed in working time, failure time, recovery time, setup time and so on. The output of the system is statistical information about costs, effort, resources employed and orders management.” This way, the aggregated information about previous orders can be used to estimate number of scraps, delivery time or costs of current and future orders.

In contrast to the above-mentioned examples very few or even no businesses at all used Robotics, Augmented Reality, Cybersecurity or Additive Manufacturing for their digitalization process. New technologies which could not be assigned to any of the given categories were summarized as “Other”.

Nonetheless, these technologies can be used very effective, too, as for example the company **Serelec** (PP3 – Agence Régionale de l'Innovation) has proven. With the integration of a “flexible, mobile charging robot that can be plugged to almost all traditional machining of the workshop”, the company ensured its competitiveness against the production in low and medium cost countries. “Now the robot can load and unload the different CNC and milling machines. For series, the robot works during night and weekend. Small series are made during the days.”

With those newly implemented technologies certain effects could be attained (see *figure 2* below). The outstanding frequency of the achieved optimization of administration is striking.

Almost half of the effects can be assigned to this category, the distribution of the frequency of the other effects is relatively even.

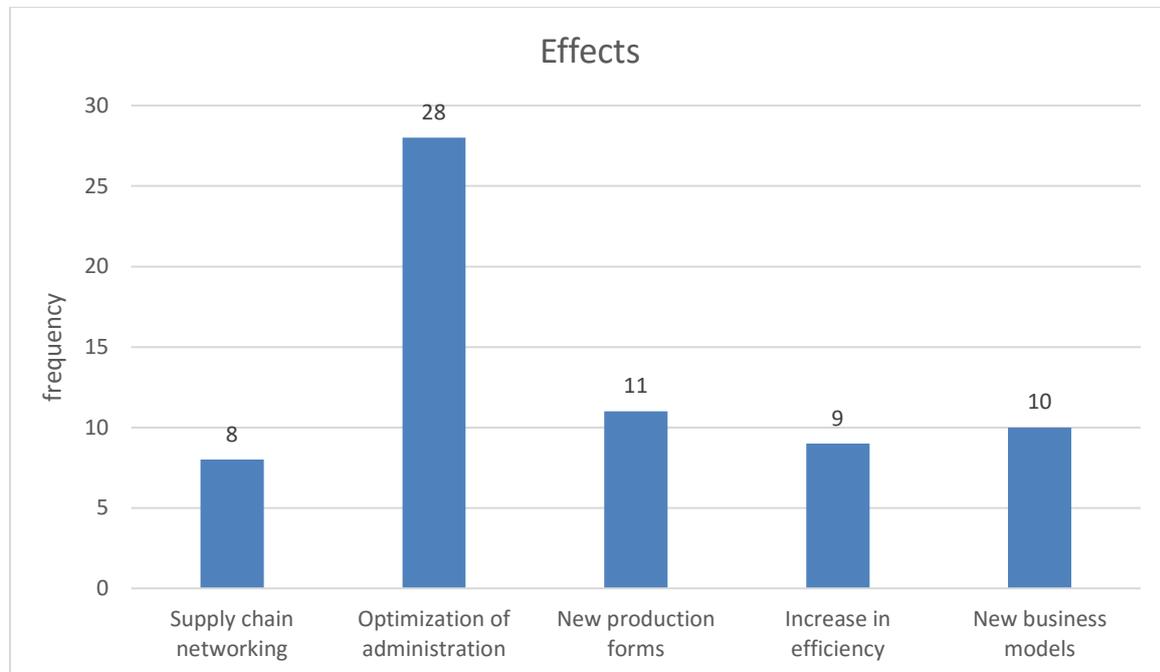


figure 2: frequency of achieved effects

An optimization of administration can include an improvement of services, flexibilisation of work or generally a reduction of administration efforts.

In the company **Carl Zeiss** (PP5 – Bwcon GmbH) “the use of the PDM system is the basis for a Smart Factory:

It manages and links all relevant data about a product as well as the associated processes throughout the product lifecycle. The system guarantees fast and interdepartmental information access. The transparency and central provision of the data can also increase productivity. In addition, it is possible to store specific metadata for each process step, which inform the user about the construction status, validity or status. By using QR codes, all relevant components can be identified. The process data can thus be assigned and combined into an electronic product documentation for the customer. This also enables the analysis of failures at the end customer, for example to show a repair scenario. On the basis of this analysis, the probability of failure of other products can also be ruled out” (statistical process control).

“The Idea of **Waßmann** [PP8 – UAS Rosenheim] was to digitalize all information on the go with a central, always available access to all company Information. Combining of hand drafts and pictures of the existing environments were required. The chosen techniques implemented were tablets in combination with cloud services. They switched from paper

notes to Tablets. Digital Images taken on Tablets were instantly used to add Drawings at customers to define the needs and offer a better representation possibility. Those Information are stored in the cloud and accessible by all Company Members at all times. By optimizing times in making all information constantly available and combining tasks, time savings up to 14% were possible.”

At **SIR FULL** (PP2 - Alsace Innovation) the goal was the “internal development of an MES for welding to provide a real time reporting of welding production”.

The advantages are: “Centralised platform for production system management, predictive models for your non compliance management, quality management improvement initiatives, save time with document, event and action management system, real-time decision-making dashboards, convincing tool to prove skills to customers, facilitate trade with suppliers & relationship with inspections bodies.

Benefits are also to ensure compliance with applicable procedures within constant updates and accessibility, a real-time checking of the tasks list and an easy access to the right information in the right place at the right time.”

Rythmes et sons (PP2 – Alsace Innovation) describes their improvement in efficiency as follows.

“The project focuses on modelling the production process of flight cases and special packaging. [...]

It is used to capitalize and analyse production data, in order to:

- Have all the information in real time.
- Monitor the use of resources.
- Improve the decomposition of value added.
- Optimize the use of resources by identifying and improving the design of products and processes.
- Initiate the new design approaches of the Company.
- Improve company's competitiveness in a market where prices are pulled down by giving a better evaluation of the production time required for each operation and thus to better define the cost price of each object.”

The passenger transport business **GoOpti** (PP4 - Technology park Ljubljana) achieved a similar and comprehensive increase in efficiency: “Better planning in the company, better organization of transports cause better prices for customers and more work for drivers. Due to better system, the company can grow faster, obtain better reviews and acquire new customers. That means also increasing the network and new employment opportunities. Additional effects are in decrease in errors, more prompt notifications of drivers on changes. At the same time easier changes of schedules and notifications of passengers on possible delays is enabled as well. The GoOpti and Abelium project is a giant step towards a

unified European transport area, an increase in mobility, connecting people and spaces as well as sustainable transport means and sustainable care of the environment. “

New business models can be either new products and services or new channels of distribution and markets.

Biorfarm's (LP1 - Chambre of Commerce of Venice Rovigo Delta Lagunare) “start-up idea is to give to the consumers the opportunity to adopt a tree in a digital field, directly follow online the organic cultivation from the local farmers and finally receive the fruits at home. The consumers have more safety about what they are buying, will benefit from a higher quality” and additionally from low prices, which are difficult to achieve by using traditional sales channels for organic fruits. As an Agriculture 2.0 Biorfarm gives their customers the possibility to “communicate with the farmer who takes care of the tree”.

Whereas **Luxottica** (LP1 - Chambre of Commerce of Venice Rovigo Delta Lagunare) launched a completely new product. “Luxottica and Intel introduced "Radar Pace", Oakley-branded smart glasses with a voice-activated real time coaching system to improve the work-out experience and performance for runners and cyclists. They are the first company to enter into this new target market after the Google's surrender of the Google Glass. Designers and engineers are constantly engaged in exploring new possibilities to expand the boundaries of the eyewear world, creating models where stylistic innovation is combined with the most advanced technologies and new materials research with the capacity to rethink styles and functionality”

The main **difficulties** in the digitalisation process can be divided in technological and human challenges.

Eight stories described human caused difficulties as, for example, resistance (to changes) or lack of knowledge and competences regarding the new technologies.

A possible strategy to overcome the resistance would be to offer internal trainings and the implication of the operators in the development and implementation phases.

Even more companies (13) reported technological challenges. Problems appeared in linking of processes and creating a homogenous system, connecting new software with existing machines or interrupted interfaces. Often unique customized software solutions are required, which sometimes do not exist yet and have to be developed.

The preceding analysis of the gathered success stories is based on existing businesses, which are improved with I4.0-methods. Only four examples of successful start-ups with a high digitalisation level could be found.

Detailed case description based on specific examples provided by the PPs:

PP3 – Agence Régionale de l'Innovation: **“Osmose”**

As a small company in the HVAC sector Osmose “was facing a reduction of margin linked to very strong competitiveness of the sector”. To avoid far and frequent trips to customers, “a 3D scanner has been bought to scan the customer industrial plant. The idea is to increase the preparation of the design department to have a better quotation before the manufacturing.” This way, a lot of human resources could be saved because the quotation department only has to visit and scan the plant once. All further steps of the preparations can now be done virtually. Additionally, “all questions of the construction site are solved with the customer before the realization” and as a result “the time for building the solution in the customer plant is reduced”. With this Simulation method, Osmose is able to optimize their administration enormously. Not only the customer service is improved, but also working hours can be used in a more flexible and productive way.

PP4 - Technology park Ljubljana: **“Tosama”**

“Tosama is a successful company in Central Slovenia with 90 years of tradition in manufacturing of sanitary materials and medicinal supplies.

The company faced difficulties in dealing with business clients due to lack of real time information on supplies. The companies ordered products without knowing the available quantities. At the same time the company collected orders daily thus unnecessary delays happened in production of products with low quantities.

By choosing the cloud system to electronically connect the whole process from web based reception of the order to manufacturing and delivery the clients are enabled to constantly retrieve fresh data on products and supplies, and the orders received are immediately transferred to the business information system. The system is managed by several automatic mechanisms – for example if supplies are running low the order for manufacturing is immediately issued. [...]

By using the cloud based ERP system the company was provided with an affordable solution for constant functioning of the web based store for business customers. Clients can order products anytime/anywhere providing fresh data on products and supplies, and the orders can be directly transferred into the companies' information system. All orders including ones received through the web in the afternoon, evening or during the night, so out of the official hours of the sales services are shipped within 24 hours or on the next working day, which improved significantly the results of the web based business.”

PP11 – Austria Wirtschaftsservice GmbH: **“SMARTBOW”**

SMARTBOW is a start-up from Weibern, Upper Austria. The homonymous product “locates the animals in the barn and pasture with an accuracy of 1 meter, detects heat and changes in health and rumination behaviour in real-time. The customer gets alerted on PC,

smartphone or Tablet when a cow is in heat or behaviour is changing. The optimal insemination time is shown as well in the software. With Smartbow the farmer gets more time to focus on animals with problems, becomes more profitable and reduce the need of medication treatments like antibiotics.

There are already other similar systems on the market locating animals, detecting heat or changes in rumination behaviour, but none of them offers the combination of all this features in one single eartag. This creates an immense added value to Smartbow. Furthermore, Smartbow works in indoor and outdoor area. With all the data which are collected by Smartbow, it can deliver several additional functions in future. The system notices days in advance when an animal is starting to get sick. Due to the early detection the illness of the animal can be treated at an early stage with much less medication and reduce the use of antibiotics. Also there is no other device that can be used already at young stock and calves. This way the system monitors the animal from the beginning and can assess its social behaviour very accurately. The Smartbow Software is businesswise extremely scaleable (it is currently used at barns with between 20 up to 5.000 animals all over the world). The customer pays once for the hardware per cow which differs depending on the functions which the farmer wants to have plus an annual service fee per animal.”

5. Evaluation transnational added value

It can be considered of extraordinary value for all SMEs in the Alpine Space to get an impression and a general overview of 29 outstanding examples of already applied technologies and measures in the PPs' regions to raise awareness and support SMEs in their digitalization evolution.

Companies usually tend to develop their own strategies for competitiveness without exactly knowing those of other businesses in the region or even foreign countries. Through an exchange of experiences, the companies could benefit from each other and thus strengthen their own region.

The provided success cases give us a good impression of how similar SMEs' needs and the chosen approaches in the field of digitalization are. Therefore, with a more common knowledge those applied strategies and methods often could easily be transferred to and implemented by other businesses.

For this reason, it is very interesting and useful to have this benchmark for guidance and as an overview of successful measures which can be adapted for each other region in the Alpine Space.

6. Outlook and sustainability

Mostly businesses which implement digital technologies are more efficient and successful than those which keep up their traditional methods and processes. Thus it is essential to use effective strategies to remain competitive in a more and more globalized world. Especially for companies in the Alpine Space it is unavoidable to sustainably assert oneself on the market as rival products from low-cost countries and remote locations will also stay a threat in the future.

7. Annexes

For a detailed consideration all collected success cases are attached.