DOCUMENT TITLE:

CRITICAL FACTOR
SME DIAGNOSIS REPORT
FOR CZECH REPUBLIC

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

Acronym: Smart Factory Hub

Work package	WP3: Benchmark and RIS3 based SFH model definition
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Deliverable	D 3.2.2: Critical factor SME Diagnosis Report (SDR)
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Dissemination level		
PU	Public	X
PP	Restricted to other Programme participants	
RE	Restricted to a group specified by the consortium	
CO	Confidential, only for members of the consortium	

TARGET GROUP ASSESSMENT

Has this deliverable addressed any of the target group indicated in the application form?

<u>Yes</u> / No

If yes, please describe the involvement of each individual target group in the table below.

Target group	Number reached by the deliverable	Description of target group involvement
SME	20	SMEs have provided their answers to the questionnaire
Regional public authority		
National public authority		
Higher education and research		
Business support organisation		

CONTENT

1 Introduction

The collection of questionnaires has taken place from 14th of April until end of June 2017. The main target group were smaller production oriented SME's from the western Bohemia however we allowed also large enterprises to participate at the survey. 184 company representatives entered the survey but only 37 of them completed the whole questionnaire thus the success rate was 20%. From this amount 20 companies were SMEs and 17 were large companies.

Response rate (?) Base: Entered intro

| Status	Frequency	State
Entered intro	184	100%
Entered first page	89	48%
Started responding	59	32%
Partially completed	59	32%
Completed	37	20%
Unit usability (50%/80%)		
Usable units	42	71%
Partially usable units	1	2%
Unusable units	16	27%
Breakoffs		
Introductory breakoffs	125	68%
Questionnaire breakoffs	22	12% (neto 37%)
Total breakoffs	147	80%

Below we are providing the analysis of the results based on the key questions set out in the questionnaire development.

2 Survey results for Czech Republic

2.1 KEY QUESTION 1: How well are SMEs familiar with the Smart Specialization strategy or related policy and what was their involvement in creating it?

With this measure, the share of SMEs, who are familiar with the Smart Specialization strategy is provided, alongside with the share of SMEs involved in preparing it. Moreover, by summarizing the answers, we are able to determine the share of SMEs involved in preparation of Smart Specialization strategy.

Q3 - Are you familiar with the national Smart Specialization strategy* or related policy initiative defining Smart Manufacturing? *Also known as Smart manufacturing policy, RIS3 strategy, Industry 4.0 policy, Regional Innovation Strategy for Intelligent specialization, Smart Factory.
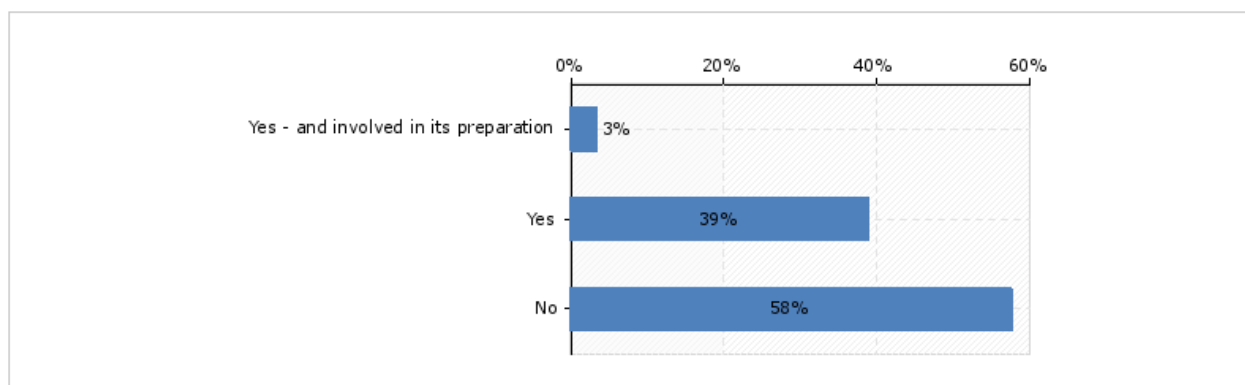
Based on answers to the first question we are able to conclude that 58% of companies are not familiar with the Smart Specialization strategy. On other hand, 39% of companies are familiar with the strategy, but it is interesting to know that nearly none of them were involved in its preparation. Only one company (3%) stated their involvement in its preparation.


KEY MESSAGE:
SMEs have mainly not been involved in development of the Smart Specialization strategy, while also the Strategy is not well recognised either by the SMEs or large companies.


2.2 KEY QUESTION 2: How well is Smart Manufacturing perceived at strategic and spread at operational level (maturity of Smart Manufacturing in the SMEs)?

This measure will give us the answer to the question about how well is Smart Manufacturing understood at strategic level, by giving us the share of SMEs that understand the impact of Smart Manufacturing for their organisation. The second measure is used for determining how well the Smart Manufacturing is implemented in targeted region, by giving us the share of SMEs that currently use Smart Manufacturing systems/solutions in their organisations.

Q4 - Do you understand what are benefits/impacts of ''Smart manufacturing'' for your organization?
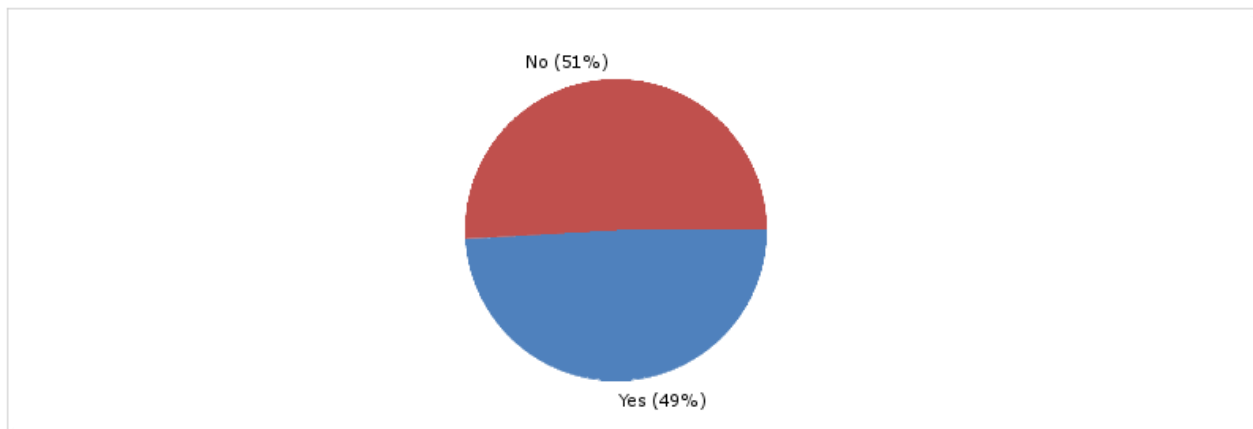
Q6 -   Do you currently use Smart Manufacturing systems/solutions in your organisation?
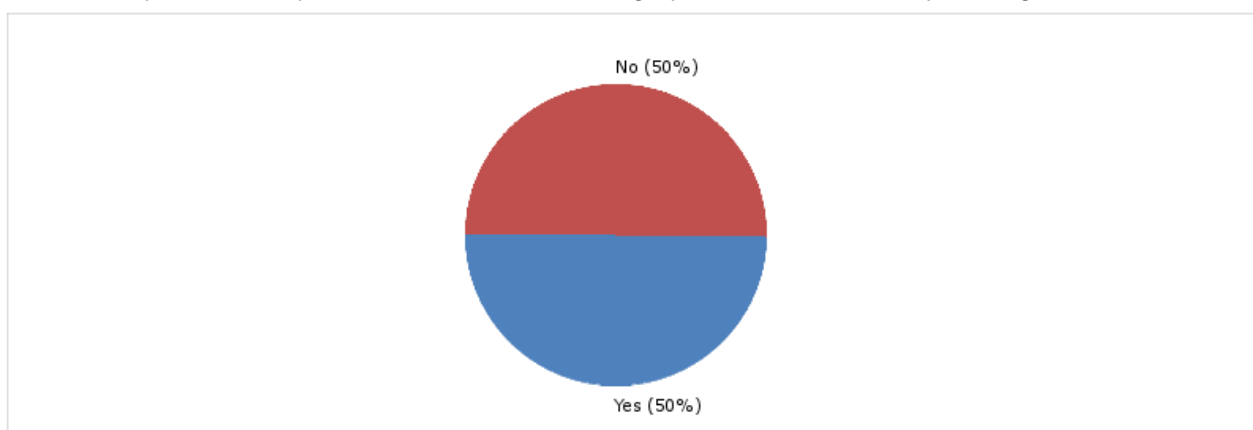
Based on answers to the question 4 we are able to conclude that almost half of the companies (49%) understand the benefits of Smart manufacturing for their organization, while the other half doesn't understand or have difficulties with understanding. The same amount of companies (50%) are currently using some kind of Smart Manufacturing systems/solutions in their organization.


> **KEY MESSAGE:**
> **Companies in Czech Republic are divided in half in case of understanding Smart manufacturing impacts and benefits. The same amount of them is currently using some kind of Smart Manufacturing systems or solutions. We can say that if the company understand the benefits they also implement the smart solutions.**

2.3 KEY QUESTION 3: What kind of challenges are SMEs facing in implementing Smart Manufacturing technologies and solutions?

This measure is one of the most important ones and will provide information on different challenges and obstacles SMEs are facing in implementing Smart Manufacturing technologies and solutions.

Q7 - What challenges are you facing in implementing Smart Manufacturing technologies?
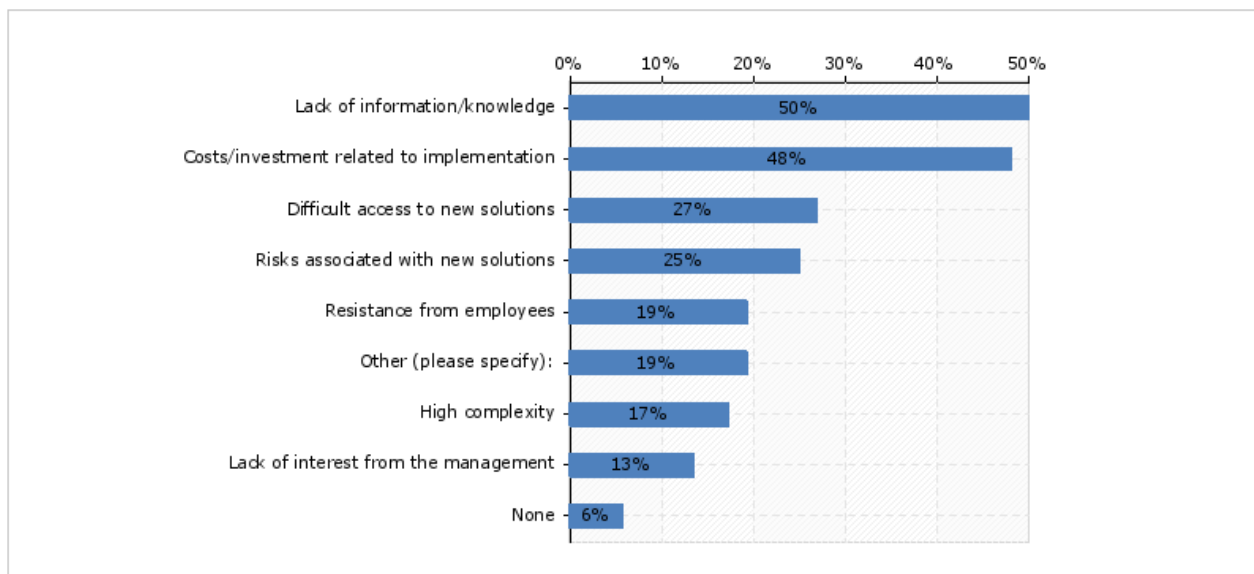
The most organizations (50%) believe that the biggest challenge for implementing Smart manufacturing technologies and solutions is in the Lack of information or knowledge, followed by Costs/investments related to implementation of smart manufacturing technologies (48%). Companies in some occasions also believe that it is Difficult to access new solutions (27%), while Risks associated with new solutions (25%) are rather low. Also the attitude of people may be an obstacle during implementation. Resistance of employees with 19% and Lack of interest from the management with 13% shows these assumptions. There are also some Other challenges from which employees are quite frequently mentioned:

- lack of process knowledgeable employees,

- reluctance of existing employees which are in charge of production control,
- lack of technicians,
- many different interfaces - complicated interface required,
- lack of experience and best practice.

KEY MESSAGE:
Companies are facing variety of challenges when it comes to the implementation of Smart manufacturing technologies, but the most important two are related to investments and lack of information/knowledge.

2.4 KEY QUESTION 4: Which areas influenced by the Smart Manufacturing are most important for increasing the competitiveness of SMEs.

This measure is providing the overview of areas, influenced by the Smart Manufacturing, for which SMEs believe, will be essential for their competitiveness in the next three to five years.

Q8 - How much do you think the following areas of improvement will be essential for your company's competitiveness in the next three to five years?
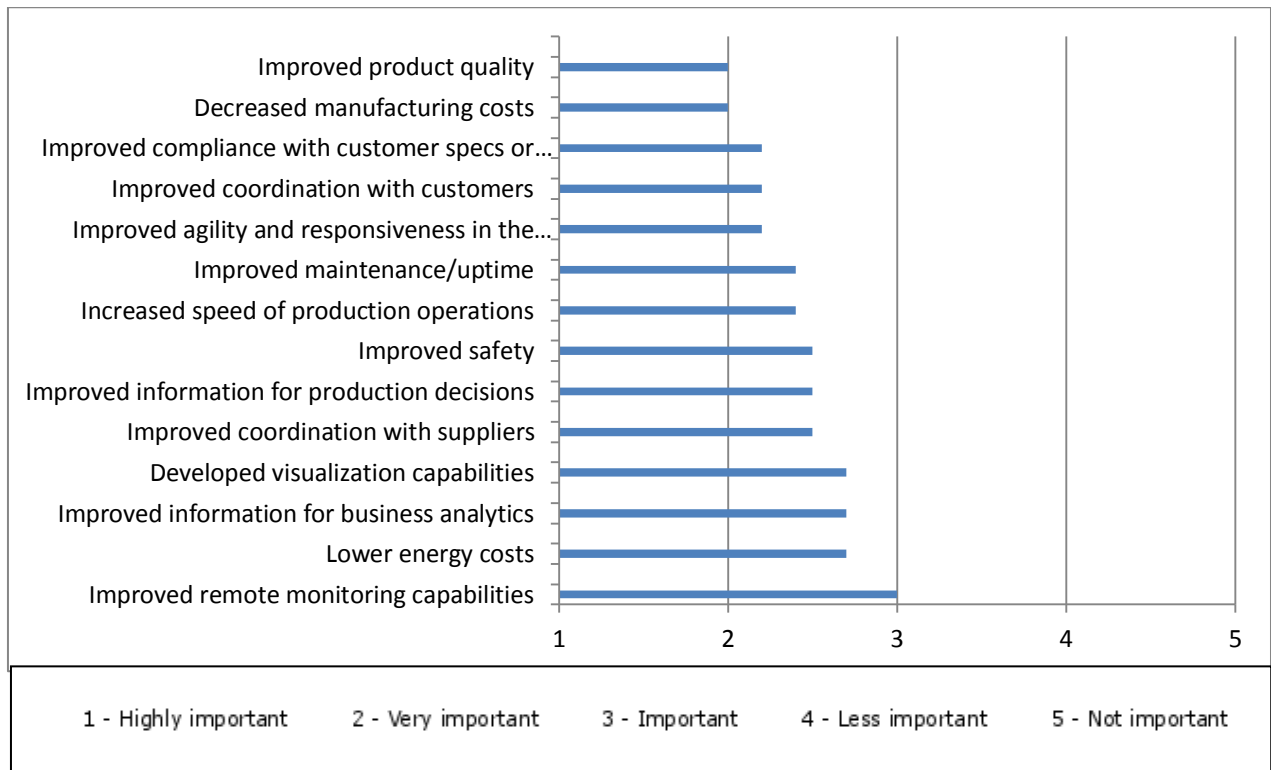
From the answers given to us by the SMEs, we are able to tell, which will be the most important areas of smart manufacturing in the next 3-5 years. The most important areas will be the improved product quality and decreased manufacturing costs (both marked as very important). Followed by improved compliance with customer specs or regulatory requirements, improved coordination with customers and improved agility and responsiveness in the production process. Furthermore results shows that quite important areas for companies competitiveness will be: maintenance, increased speed of production, safety, improved information for production decisions and improved coordination with suppliers. However none of the rest listed areas aren't less important.

> **KEY MESSAGE:**
> **The most influential areas for increasing SME's competitiveness in the future are (i) product quality, (ii) manufacturing costs (iii) and customer relations. Also all other areas haven't been marked as less important.**

2.5 KEY QUESTION 5: What are the current state-of-art and future plans/strategic orientation for implementation of SMEs in relation to all three areas of intervention?

This measure gives in-depth overview of SMEs current state-of-art and future plans/strategic orientation for implementation in relation to:
- *Novel technologies*
- *Production processes*
- *Human resource management*

This will provide insight and mapping possibility between the existing technologies solutions and good practices and future areas of interest.

Q10 - What kinds of novel technologies are currently implemented in your company?
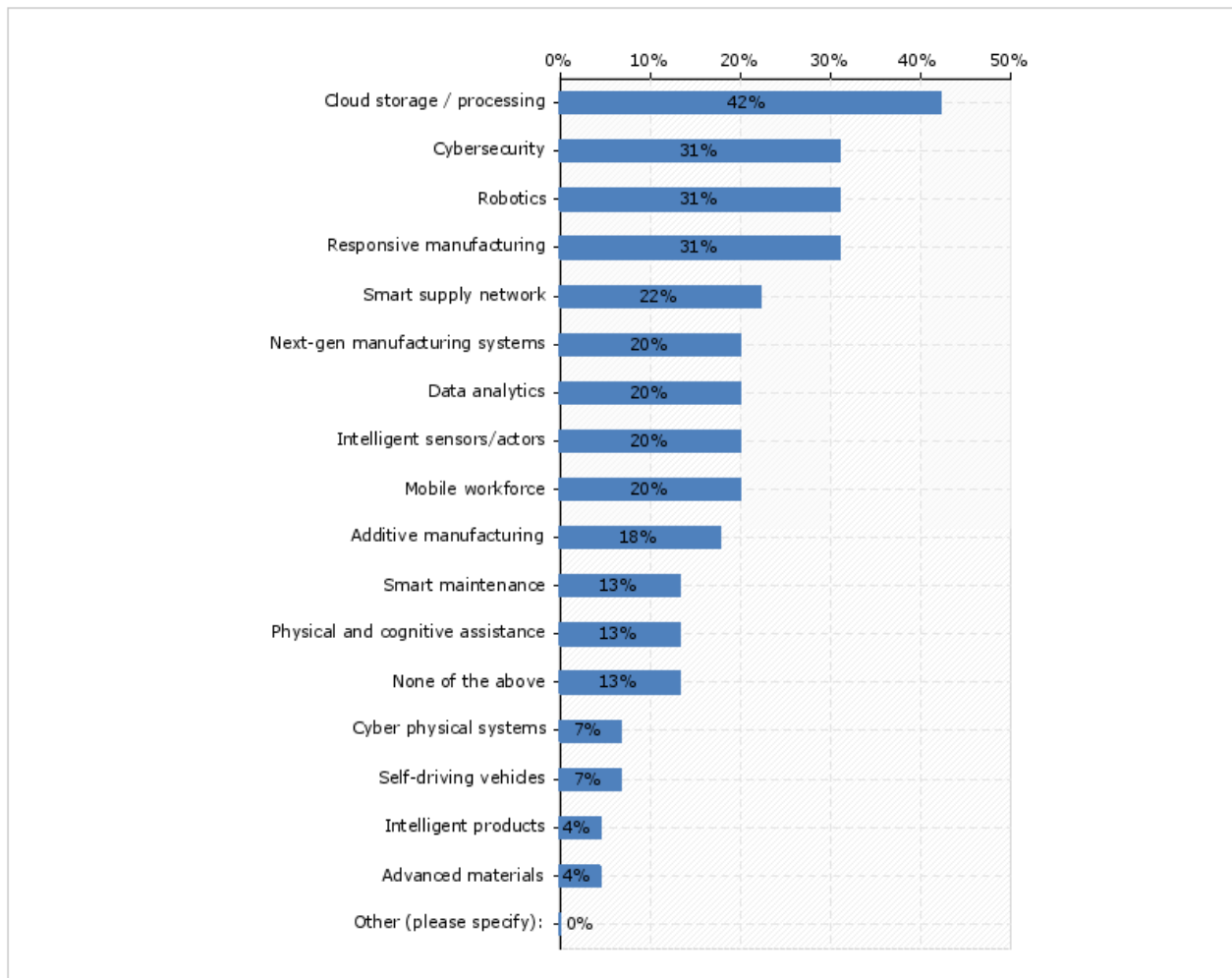
As seen above, 42% of companies replied that are currently using cloud storage or cloud processing. 31% of companies are also using novel technologies like cybersecurity, robotics and responsive manufacturing. Here we can see that cybersecurity and data security is one big issue but on the other hand belongs to one of the top areas of implementation. Only 13% of all

respondents does not use any smart manufacturing systems/solutions in their production at all. Those numbers says, that SMEs and large companies in Czech Republic are quite progressive in implementation of novel technologies.

Q11 - What kinds of novel technologies are relevant and/or planned to be implemented in the future?
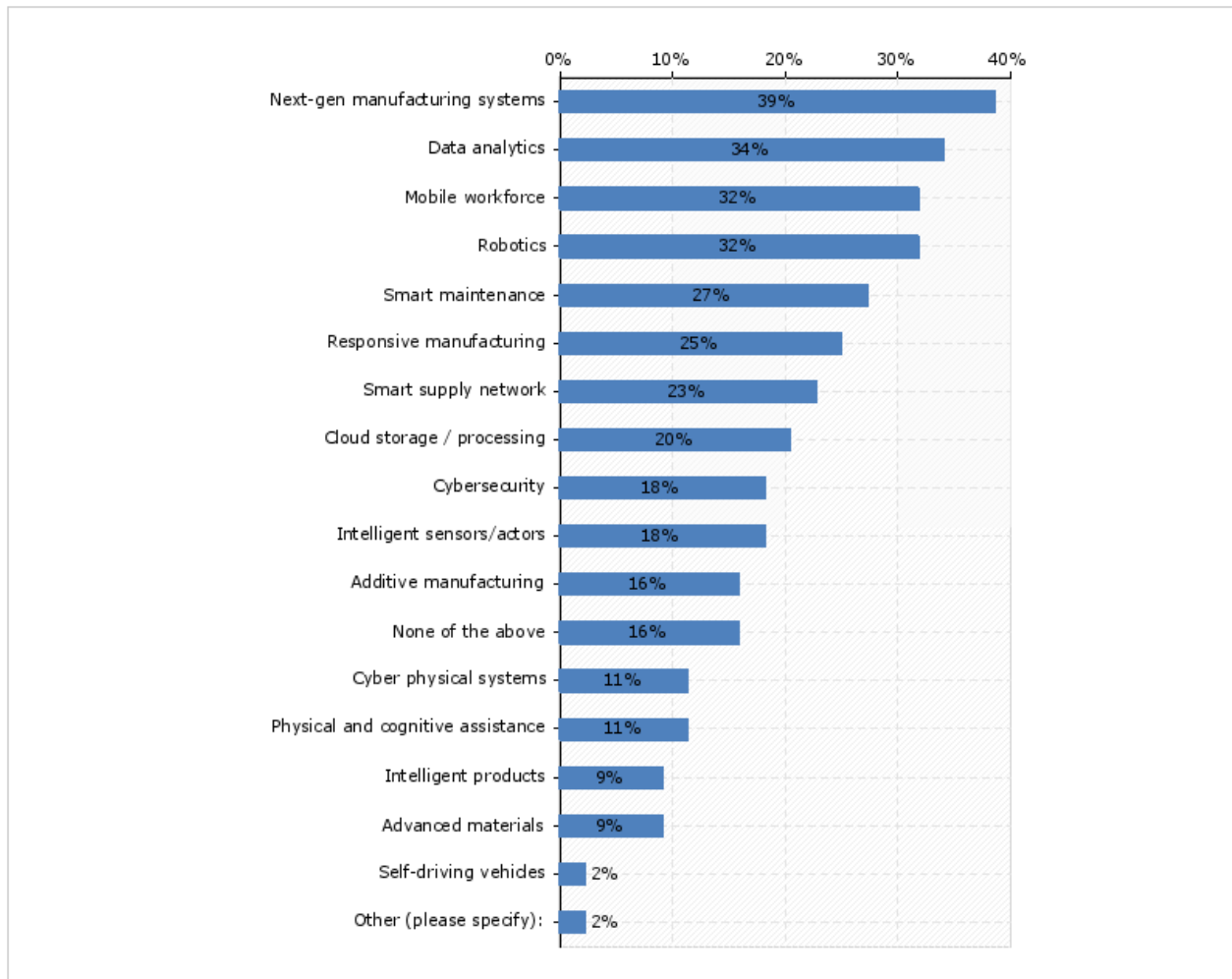

The most organizations (39%) are planning to implement technologies related to next-gen manufacturing systems, which is followed by the data analytics (34%), mobile workforce and robotics (32%). Those four areas are in the upfront of all the answers from the organizations and should be the main orientation for the mapping possibilities in the future. It is also good to know that companies want to focus on smart maintenance (27%) because as we saw in previous question this area was little bit neglected. Smart maintenance is one of the key topics for successful and smooth production flow.

Q13 - What kinds of solutions/methods related to production processes are currently implemented in your company?
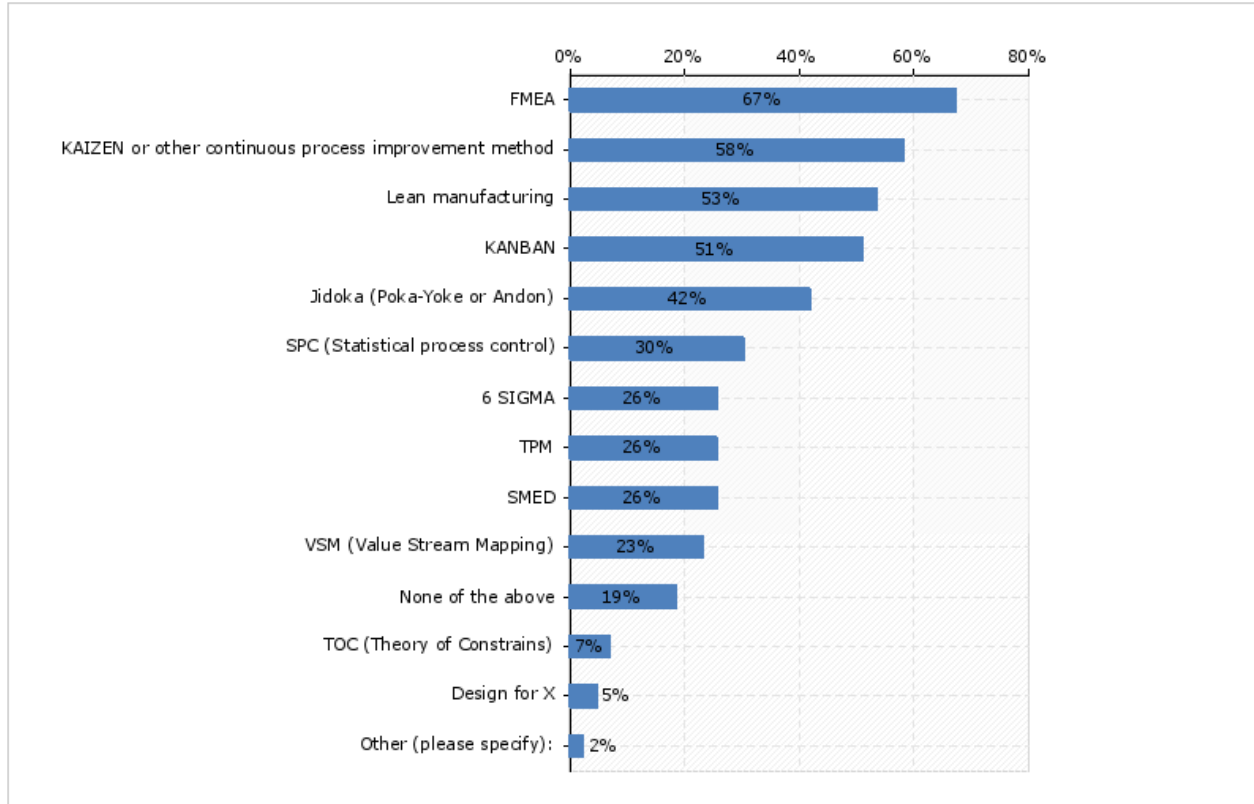

About 67% companies responded that they are currently using FMEA method. Another commonly used method is KAIZEN (58%) followed by Lean manufacturing (53%), KANBAN (51%) and Jidoka (42%). Only 19% SMEs responded, that there is no implementation of solutions/methods related to the production process. Similar to previous questions we see that methods focused on machine efficiency like TPM and SMED (26%) are not utilised in very large scale.

Q14 - What kinds of solutions/methods related to production processes are planned to be implemented in the future?
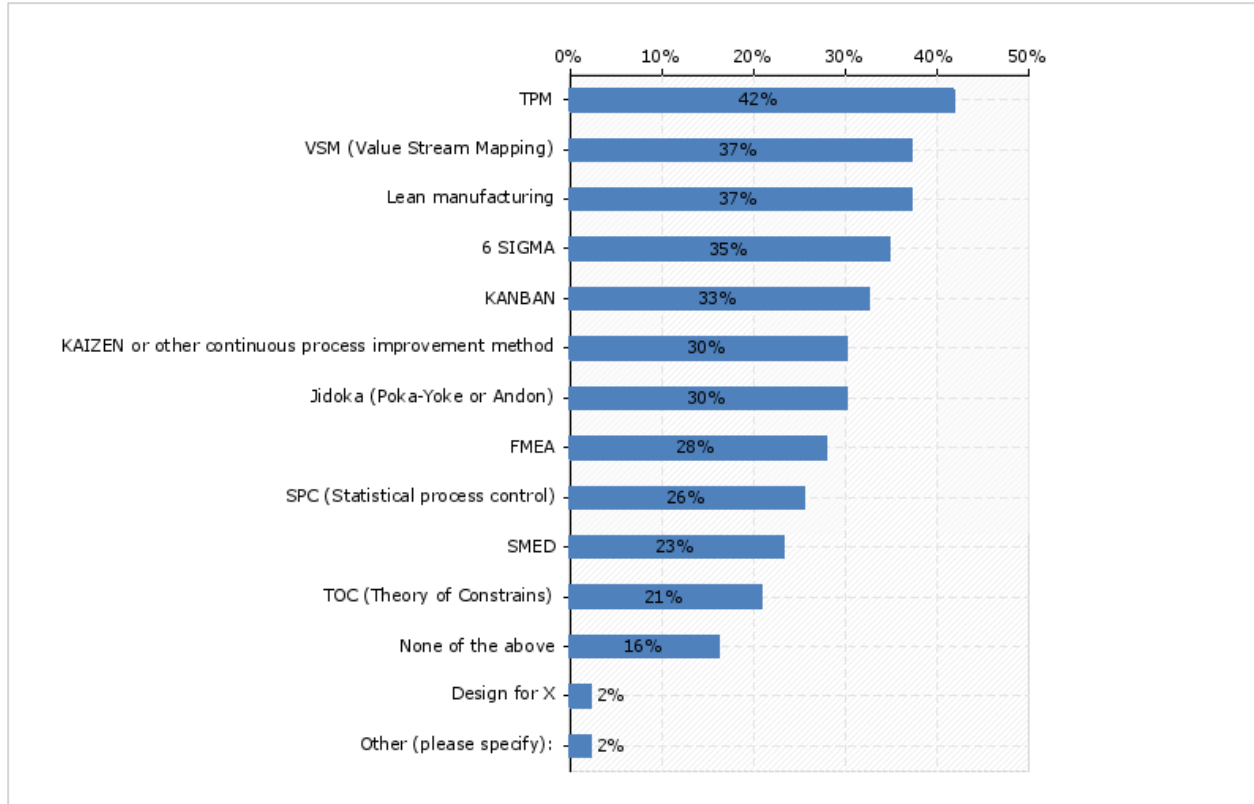

The companies' future plans are very progressive in the Czech Republic. 42% of them answered, that they are planning to implement TPM. 37% are planning to implement Value Stream Mapping and Lean manufacturing. Very popular are also methods like 6 SIGMA, KANBAN, KAIZEN, Jidoka and FMEA. These are in plan to be implemented by around 33% of companies in the future.

Q16 - What kinds of solutions/methods related to human resource management are currently implemented in your company?
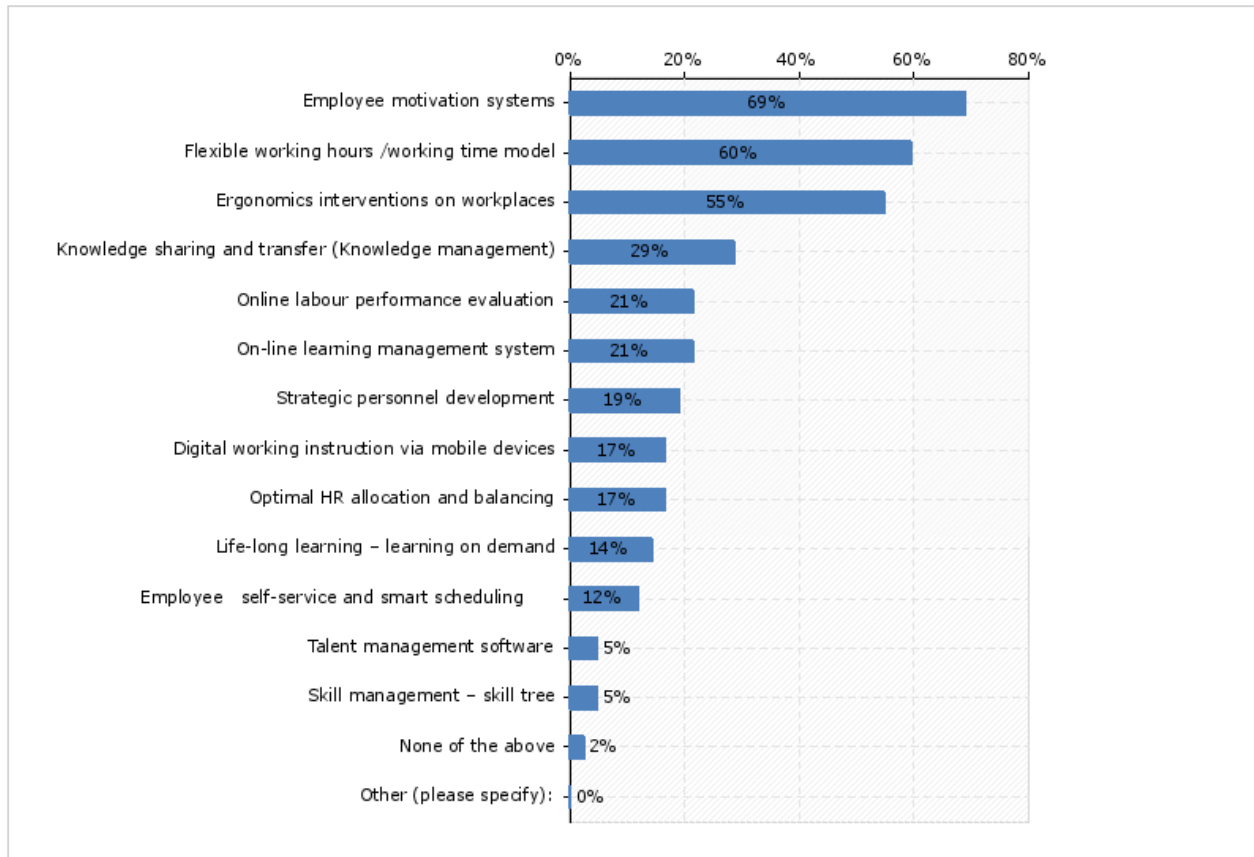
At least some of the solutions/methods related to human resource management are currently implemented in 98% of companies in the Czech Republic. The most used is employee motivation system (69%), followed by flexible working hours (60%) and ergonomics interventions on workplaces (55%). There are only 2% of SMEs who do not use any of the solutions/methods related to the human resource management.

Q17 - What kinds of solutions/methods related to human resource management are planned to be implemented in the future?
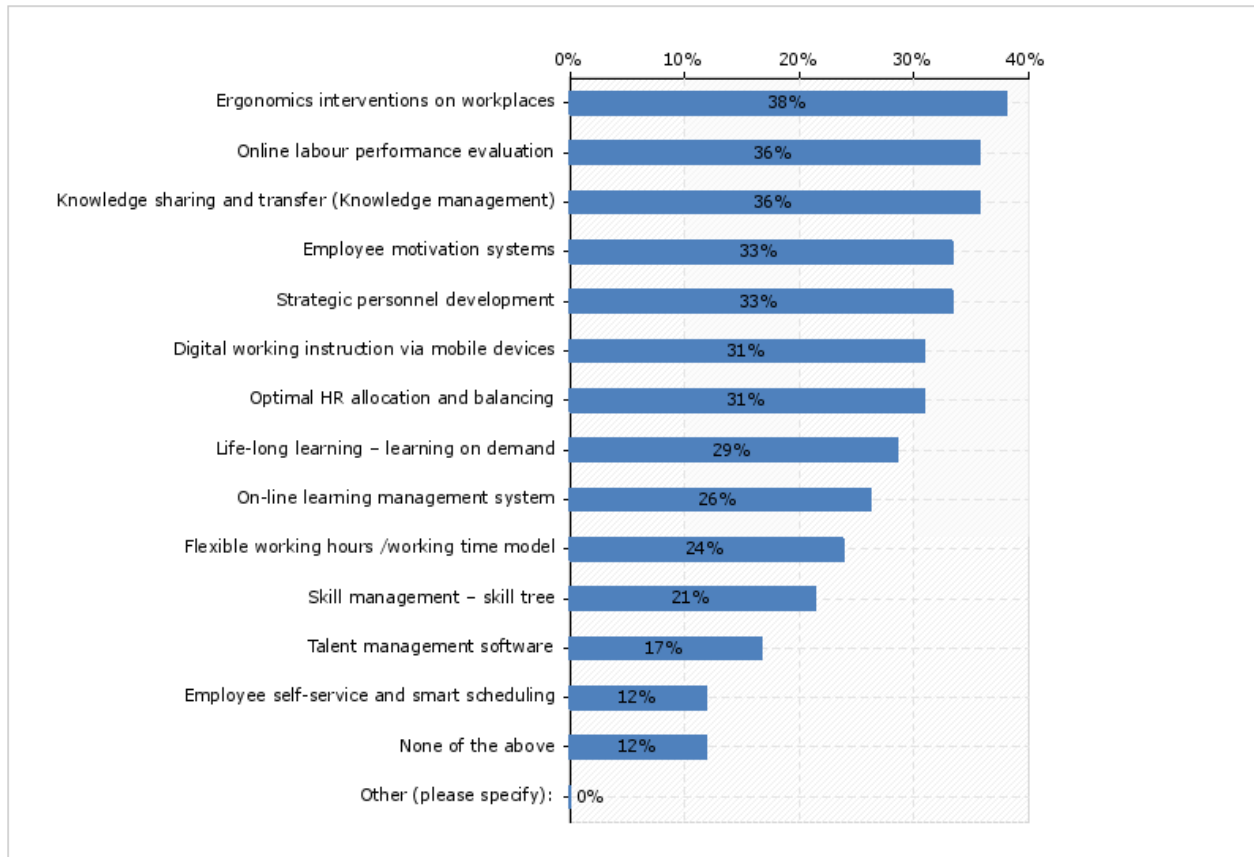
Quite strong involvement in nearly all areas of human resource management shows strong devotion of companies to this field. In the future, companies will be mostly looking to implement ergonomics interventions on workplaces (38%), online labour performance evaluation (36%) and knowledge sharing and transfer (36%). Only 12% do not have plans for implementing any human resource management solution or methods in the future.

KEY MESSAGE:
The Czech companies are quite proactive and are trying to utilise smart technologies and methods. More than 30% of Czech companies have currently implemented novel technologies like Cloud storage, Cybersecurity, Responsive manufacturing or robotics. Many companies do have plan to implement this kind of technologies in the future, mostly next-gen manufacturing systems and data analytics. FMEA is considered the most favourite production process optimisation system, while the most wanted in the future is TPM. At least some of the solutions/methods related to human resource management are currently implemented in 98% of SMEs in the Czech Republic, while the ergonomics interventions on workplaces are the top one to implement in the future.

2.6 KEY QUESTION 6: Would SMEs be willing to cooperate, in which areas and at what levels?

This measure will give a share of SMEs that would be willing to cooperate in implementation of Smart Manufacturing technologies and solutions. Moreover, the measure will provide in-depth view on which are the most favourable areas and levels of cooperation.

Q19 - In which cooperation area would you be interested?
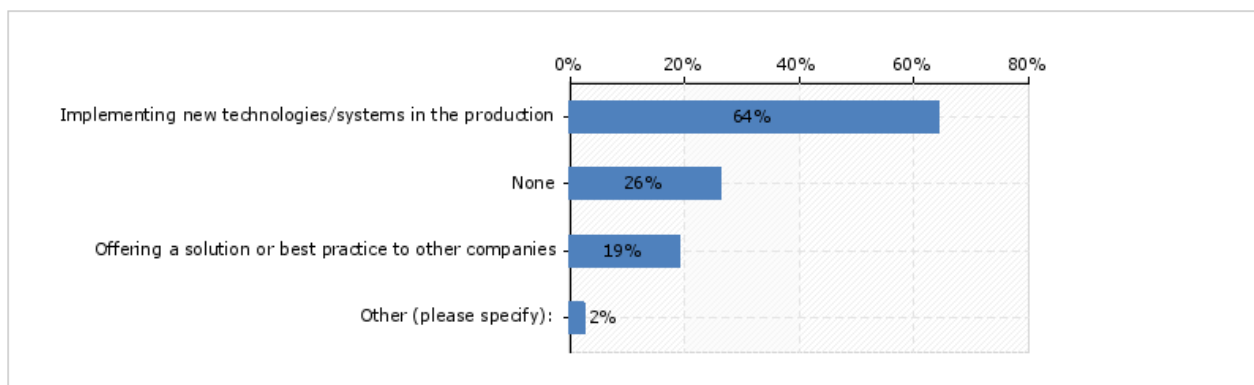
Q20 - At what level would you be interested in cooperation?
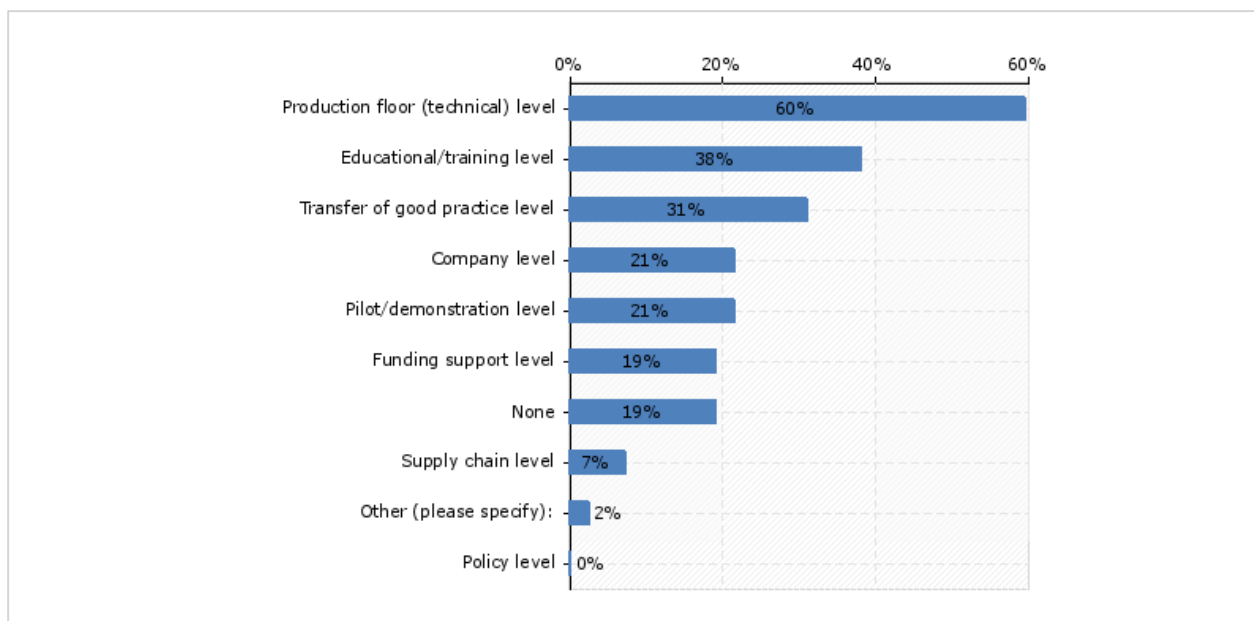
The majority of the organizations are willing to cooperate on implementation of new technologies/systems in their production (64%), while close to 26% answered that they are not interested in such cooperation. 19% answered that they would like to become the solution provider or best practice showcase to other companies.

Most of the companies (60%) answered, that they are interested in cooperation on production floor level. Almost 38% are interested in education, followed by transfer of good practice (31%).

Less than 20% aren't interested on any level of cooperation. Quite surprisingly only 19% stated that are interested in funding support level.

KEY MESSAGE:
About 64% of Czech companies are willing to cooperate in the future, predominantly acting as ''receivers'' of new technologies and systems. They are mostly interested in the cooperation on the production floor level or at the education level. This results clearly shows that we must focus on transfer of information and knowledge.

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3 Conclusion

The main target group of our survey were smaller production oriented SME's from the western Bohemia however we allowed also large enterprises to participate at the survey. 37 companies completed the whole questionnaire. From this amount 20 companies were SMEs and 17 were large companies. The success rate of the survey was 20%.

SMEs as well as large companies in the Czech Republic were mostly not involved in preparation of the Smart specialization strategy, however around 39% of them are aware of the existence of such strategy at the policy level. They find Smart manufacturing (in general) beneficial for their company and what matters even more, they are familiar with new trends in the industry and are starting to use the smart manufacturing solutions, technologies and methods. They are divided in half in case of understanding smart manufacturing impacts and benefits. The same amount of them (50%) are currently using some kind of smart manufacturing system of solutions.

There are still difficulties related to the implementation, since many consider costs related to implementation challenging, while others have troubles with lack of information and have difficulties to access to the new solution. On the other hand, Czech SMEs are still very interested in introduction of new technologies and think that the most important fields for their competitiveness are improved product quality, decreased manufacturing costs and improved compliance and coordination with customer, therefore it is important to focus on relevant technologies and solutions.

Current state-of-art shows that more than 87% of the companies currently do have implemented some kind of novel technology related to smart manufacturing. Also, majority of them is going to implement novel technologies in the future. There are even better results when it comes to the human resource management. There are only 2% of companies which didn't implement any modern solutions or methods in this area so far. On other hand we are very glad to see that almost all the respondents are willing to implement different technologies, solutions or methods in the future.

All this shows that Czech Republic has a very solid ground when it comes to current or future implementation of smart manufacturing technologies or solutions. More than 74% of respondents

are willing to cooperate in the future either through implementation of new technologies/systems in the production or by offering solutions or best practice to other companies. The most respondents are interested in cooperation on the production floor level or transfer of good practice to their companies. Almost 38% of them are also interested in education and training. Quite surprisingly only 19% stated that are interested in funding support level.