DIGIMAT

South Moravian Digital Manufacturing Hub

Basics

Region: South Moravian Region (SMR) - Czech Republic (CR)

- Population 1.1 million inhabitants, capital city Brno, 400,000 inhabitants, the second most important economic centre of the Czech Republic and a major centre of innovation and research
- The economy of the South Moravia is largely dependent on manufacturing and IT services, as well as public services, including a sizable research sector (13 universities and 7 institutes of Academy of Sciences of the Czech Republic
- South Moravia is home to some 1,300 manufacturing companies, mostly in metalworking (316 companies), production machinery and equipment (230 companies) and manufacture of plastics and rubber (122 companies).

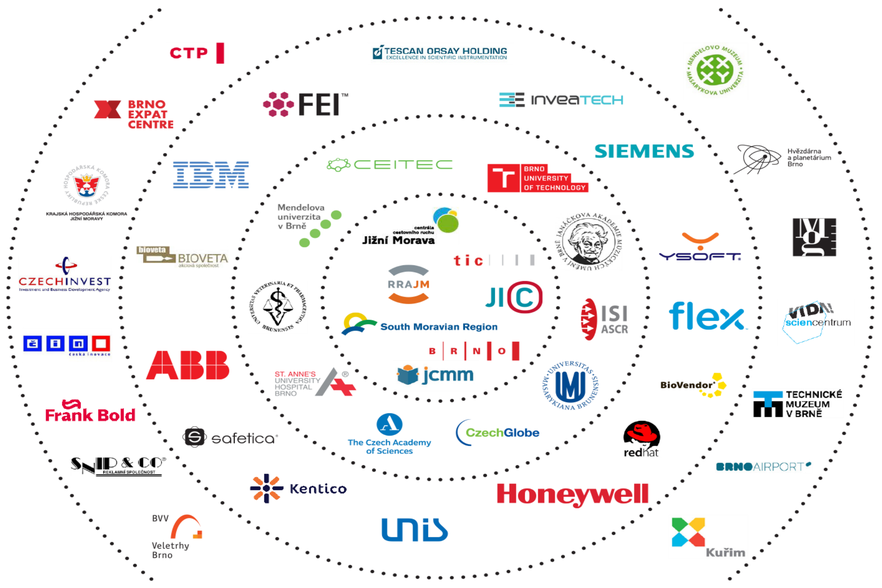
Introduction:

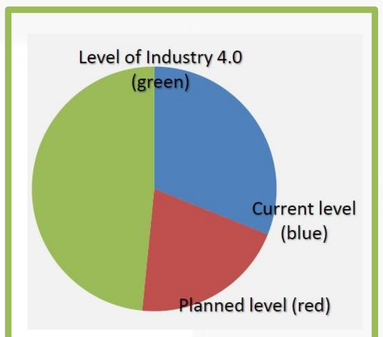
The project DIGIMAT and the creation of DIGIMAT Digital Innovation Hub (DIH) in South Moravia is a first example of a Czech regional initiative that aims at practical implementation of the elements of Industry 4.0 agenda for the benefit of local manufacturing enterprises. Moreover, it also fully complies with Czech national strategy for Industry 4.0 "National Initiative Industry 4.0" and it represents a first of its kind policy instrument addressing the knowledge gap of manufacturing SMEs.

The regional innovation ecosystem in the South Moravia has been systematically nurtured since 2005 under umbrella of Regional Innovation Strategy / S3. The ambition of DIGIMAT was to provide a delivery mechanism for bringing digital technologies to manufacturing firms while creating a platform of all relevant partners: INTEMAC Competence Centre, Brno University of Technology and Industry Cluster4.0, JIC.

Technology:

- 13 universities located in Brno
- Technological companies
- Innovation and research centers





Identification of innovation potential

DIGIMAT details:

Why is DIGIMAT needed and what problems it will solve?

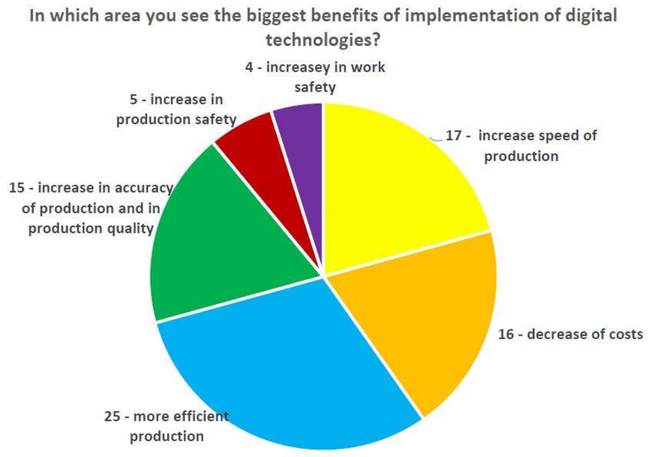
- If implemented successfully it is likely to help companies in SMR maintain and increase their competitive edge (increased productivity due to lower labour costs / greater automation, lower inventory costs, lower maintenance costs and better asset utilisation, savings due to improved quality).
- A complex, multidisciplinary approach is needed = need to create a platform that will be able to provide customised solutions to a wide spectrum of problems faced by a diverse group of companies, small and large, across a number of manufacturing sectors.
- Need to reach out especially to SMEs (awareness raising and support in implementing existing solutions), as well as work with established, larger firms (need to respond to the new digital technologies early enough, be early adopters, ready to accept new standards etc.).
- The platform approach is likely to provide a good match-making mechanism between, on one hand, the extensive expertise that exists in the different departments and faculties of BUT and, on the other hand, the companies inn South Moravia and more widely in Moravian region.

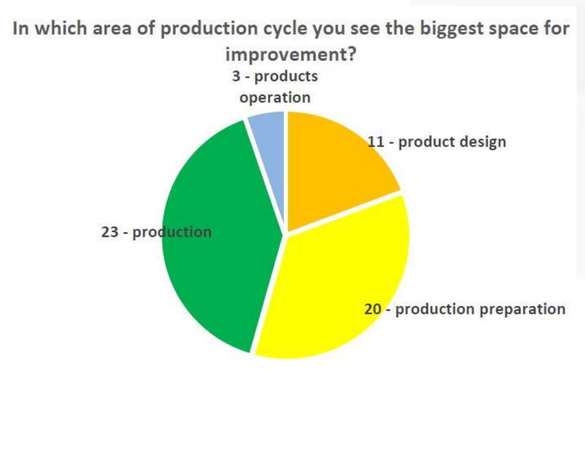
Establishing the DIGIMAT digital innovation hub responds to the pressing need identified during the regional innovation ecosystem assessment. Its implementation intends to address three objectives:

- to **raise awareness** about digitalisation and its benefits;
- to provide companies with **assessment** of their level of digitalisation by qualified, neutral experts;
- to deliver independent **recommendation for possible solutions** that increase efficiency and effectiveness.

Partners:

South Moravian Innovation Centre (JIC)
Brno University of Technology
INTEMAC Solutions (INTEMAC)
INDUSTRY Cluster 4.0 (CLASTER)





The results of survey among manufacturing companies in SMR carried out under DIGIMAT

Use case: 1. ZLOMEK (www.zlomek.cz)

DESCRIPTION OF THE USE CASE:

Zlomek is a small family company based in Hodonin. The company focuses on small-scale production of doors and doorframes. Doors/doorframes production is not a subject to quick and radical innovations when compared to other types of production. Innovations relate mainly to design (door mounting, door surface etc.). Currently, the company is planning a construction of a new production hall. It will need a plan for optimization of a new production site and to introduce a system for effective production line monitoring.

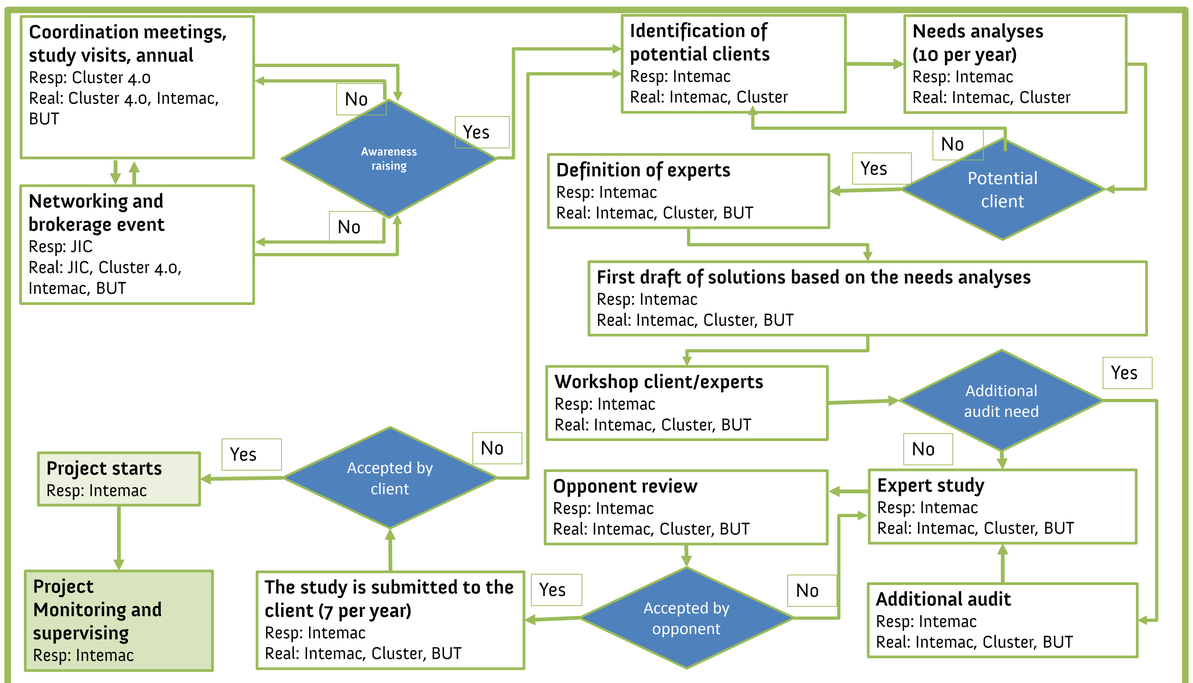
MAIN RESULTS OF NEEDS ANALYSIS

The needs analysis took place on 25th November 2016. Acute needs identified during the initial needs analysis were: production monitoring, production planning (a lot of errors occur when encoding manual requests from customers from one paper-sheet to another one, standards/norms setting the time needed for production of different types of doors/doorframes do not exist) and monitoring of transport of final products to customers. The most important need to be dealt with within DIGIMAT project is the production line monitoring.

PROPOSED SOLUTION RESPONDING TO THE NEEDS OF THE COMPANY

Two experts from Faculty of Information Technology (Brno University of Technology) were assigned with tasks to propose solutions for production line monitoring corresponding to Zlomek's production capacity and specific situation. In order to follow start and end of individual tasks during doors/doorframes production it is necessary to suggest and implement a suitable system. There are several options meeting these requirements:

a) Manual entering of data into PC which is placed near to workplace
b) Use of bar codes
c) Use of RFID tags



Schematic representation of DIGIMAT use-case workflow

Use cases: 2. PROJECT CONTROLS (WWW.PROJECTCONTROLS.CZ)

DESCRIPTION OF THE USE-CASE

Project Controls is medium-sized company established in 1999. It employees more than 150 employees. It produces cable control systems for cars. It is a supplier to all important car-manufacturers in the Czech Republic (Škoda Auto, Hyundai, TPCA etc). The company tries to add new components to these closed systems like plastic parts and electronics. Monthly production is approximately 1 million of sets. The company´s share of the world market is app. 0,7%. In the near future company wants to introduce full online management of documentation in all parts of production process.

MAIN RESULTS OF NEEDS ANALYSIS:

The needs analysis took place on 18th January 2017. Main identified needs are: a need for data analytics during the production phase (evaluation of production – stand-time, production suspension, data about quality, data collection in general, availability of equipment; predictive maintenance, maintenance planning); semi-automatic processing of dispatch notes e.g. paper-less production in pre-production phase; IT solution for initiation and implementation of new projects and quality control (online management of employees trainings – system should not allow employee to do tasks s/he was not trained for). The main problem to be dealt with in the framework of DIGIMAT project – data collection and its analysis to gain important information for production management (prediction, stand-time, production prioritization).

PROPOSED SOLUTION RESPONDING TO THE NEEDS OF THE COMPANY

Identified experts defined these tasks to be done: definition of data structure, data analysis with aim to verify the cost of each problem identified; data analysis and visualization for prediction and minimization of stand-by.

Use cases: 3. ACE-TECH (HTTP://WWW.ACE-TECH.CZ/)

DESCRIPTION OF THE USE-CASE

ACE-TECH is a small engineering company (metal-working) with 35 employees. The company focuses on single piece-production and small-series production (up to 300 pieces) – CNC machining, complex machining of precision rotary parts, metal cutting etc. Individual components are of average size 10 to 70 kg. Regular customers represent more than 50 % of total production capacities. Company processes NC codes for more than 5 products. The company wants to increase its production efficiency via use of digital technologies.

MAIN RESULTS OF NEEDS ANALYSIS:

Needs analysis took place on 7th April 2017. Main need identified during the initial analysis was an increase of production effectiveness while keeping the same number of machines, employees and shifts.

Innovation challenge ahead of company:

- Long-term evaluation of finished orders so that the company can create appropriate directives and background papers. These pieces of information will be than used when processing new orders to better plan capacities, to more precise estimation of time demands and price calculation.
- Automated planning and visualization of production planning.
- Increase efficiency of production by the use of robot which will be properly linked to machine dealing with placing and replacing of semi-products (creation of autonomous cell robot-machine)
- Online visualization of production plan on machine terminal to ensure higher flexibility during the production planning (principle of critical chain)
- Quality control – 3D control generates a file with protocol in format which is not usable for the customers and therefore the company has to overdo it. What is needed is the automated transfer of the data from the protocol to Excel and then export from Excel to formats pre-defined by customer/s.

PROPOSED SOLUTION RESPONDING TO THE NEEDS OF THE COMPANY

The use-case has not reached this stage yet. The preliminary suggestions by relevant experts that would help to fulfill the needs of the company are as follows: to install terminals to the machines to monitor work done; to digitalize control parts of production lines; and install robots to the machines to ensure unattended operation of the machine.

Finance

Type of the cost	Amount spend in CZK	Amount spend in EUR
Salaries	234.001,15 CZK	8.851,94 EUR
Travel costs	82.614,77 CZK	3.125,20 EUR
Other costs	18.015,28 CZK	681,50 EUR
Pre-financing distributed to partners	271.320,00 CZK	10.263,67 EUR
Total COST	587.935,92 CZK	22.922,31 EUR

Next steps – DIGIMAT Programme

Based on experience gained during the pilot use-cases implementation we decided to continue implementation of use-cases. The process will follow the process tested in pilot use-cases e.g. needs-analysis-> workshop with group of experts -> definition of change project -> implementation of change project in the company. For 2018 we plan to launch **regional DIGIMAT Programme** and to implement 7 use-cases. Funding was already committed by Region of South Moravia.