

Transferring V4 expertise in knowledge/technology transfer

Workshop on Knowledge and Technology Transfer

5 March 2021: Tbilisi

12 March 2021: Yerevan

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Knowledge-based economy

Technology transfer is a process of the flow of skills, knowledge, methods of producing products or designing services, aimed at ensuring that the developed solutions (scientific and technological) will be available to a wide range of users who will be able to transform them into new products, processes or services. **Thanks to the transfer of knowledge and / or technology, two worlds between which there were no relations before - the world of science and the world of business - are connected.**



GENERAL IDEA, BASIC TASKS,

Effective knowledge transfer is one of the basic factors of economic development, the assumption of which is the transfer of knowledge between science and business, which is the basis for the processes of creating the competitiveness of enterprises on the market. Innovative enterprises cooperating with the scientific and research community create a dynamic regional business environment.



The forms of technology transfer from Research and Development Units to the sector of small and medium-sized enterprises :

- information in published sources and computer databases of research and development institutions;
- providing expert knowledge (consulting);
- submission of technical documentation (against payment or free of charge) and innovation projects;
- sale of licenses for the use of patents;
- carrying out process modeling or surveys;
- quality certification (various forms of certificates);
- training the technical staff of the enterprise;
- participation of the staff of research and development units in running the company.



The determinant of the development of medium and small enterprises is their innovativeness. This, in turn, requires effective cooperation of these organizations with research and development centers, conditioned, inter alia, by

- having a development and restructuring strategy by the company;
- having plans and management improvement programs;
- proper preparation of the company's management for cooperation at various levels of management;
- preparing the company's own funds or funds that can be obtained for innovative activities;
- making efforts to enter various European Union programs enabling co-financing of the introduction of new production technologies in the company.

GENERAL IDEA, BASIC TASKS,

Model of technology transfer from university to business



Commercialization of the R&D research results:

- transformation of knowledge into new products, services, technologies and organizational solutions
 - making the intellectual property or rights owned by the Research Institutions (RIs) University available to other entities (e.g. SMEs) in order to obtain financial benefits by the RIs.

Technology Transfer:

Practical implementation of advanced technical knowledge developed by RIs in order to meet requirements of modern market and needs of business, industry and services.

Technology Implementation:

Adapting particular technology and/or product developed by the RIs to the users' needs and requirements.

GENERAL IDEA, BASIC TASKS,

KNOW-HOW:

Information of an economic value of a technical, technical and organizational, technological, scientific nature (including research results) or of any other nature, for which the University/ Research Institute has taken the necessary steps to maintain confidentiality.

DIRECT COMMERCIALIZATION:

Sale of the results of scientific research, development works or know-how related to these results or giving them use, in particular on the basis of a license, rental and lease agreement.

INDIRECT COMMERCIALIZATION:

Taking up shares or stocks in companies in order to implement or prepare for implementation the results of scientific research, development works or know-how related to these results.



SUT's Gliwice (PL) organisational model for technology transfer, incubation and innovations

Activities:

- ✓ coordinated by the Centre for Incubation and Technology Transfer (CITT, created in 2009) and its Business Processing Office (BPO)
- ✓ enhancement of the implementations of research potential of SUT's faculties
- ✓ establishing and maintaining relationships between SUT'S researchers and enterprises
- ✓ helping researchers to
 - seek industrial and SMEs partnerships
 - apply for external funds, grants, projects (national and international)
 - commercialize technologies and incubate new companies (developing academic entrepreneurship)
- ✓ management and protection of SUT's intellectual property
- ✓ leading own project (with and without external support) and promotional activities
- ✓ supporting companies in common applications for projects with SUT's participation (e.g. National Centre of R&D, Ministry of Science and Higher Education)
- ✓ mediation and negotiation of commercialization proces within its whole life(from the „technology request” to implementation and further development)
- ✓ administrative support for entire proces (from the order to the invoice)



Management of the Intellectual Property (IP) rights at the SUT's Gliwice (PL)

Activities:

based on the:

- SUT's own „Rules of Procedure for the Management of Intellectual Property”
 - rules of the Polish Industrial Property Law
- (copies of English translation of both documents will be made available to participants)*

- ✓ managed by the Centre for Incubation and Technology (CITT), responsible for the:
 - assessment of the IP commercial value
 - maintaining patent protection for the most valuable IP items
 - looking for licensing opportunities
 - representing the SUT at the Polish Patent Office (by the CITT's Patent Attorney)
 - cooperating with the Patent Attorney in approving the IP applications from the SUT's community,
 - processing draft test, license, sale, confidentiality, consortium agreements, etc.
 - advising on the entire intellectual property process (from application to commercialization)



The CITT database contains 900 IP items (mainly patents, utility models and know-how).

An average of 100 IP applications are filled in annually at the SUT (e.g. in year 2020: 108 applications).

Define aspects of:

- ✓ subject, objective scope, confidentiality
- ✓ moral and property rights to intellectual property, business secrets and know-how
- ✓ principles of notifying intellectual property and procedures for their nation-wide and international level protection
- ✓ principles for concluding contracts
- ✓ commercialization models R&D wo
- ✓ distribution of funds for commercialization and principles of remuneration.

In the case of consortium projects:

- the issue of division of **rights to the results of R&D works** between the members of the consortium must be settled before starting any project
- *usually*, the scope of such property rights is granted in proportion to actual financial involvement of members in the implemented project
- clear division of the rights to the R&D works results has a significant impact on the cooperation among partners during the project, as well as in the subsequent commercialization and distribution of profits.



“innovation” is derived from the Latin verb *innovare* meaning *to renew*

Innovation means improvement or replacement of something: process, product, or service.

In the context of companies:

activities aimed at implementing changes leading to the increase of the company's modernity and competitiveness, and thus ultimately to the increase in its value.

For example:

- introduction of new products
- implementation of new technologies
- changes in production and distribution infrast
- activities aimed at better use of employees' k
- development of information networks

Components of Innovation Strategy:

- analysis of current position of organisation
- choosing an innovation strategy



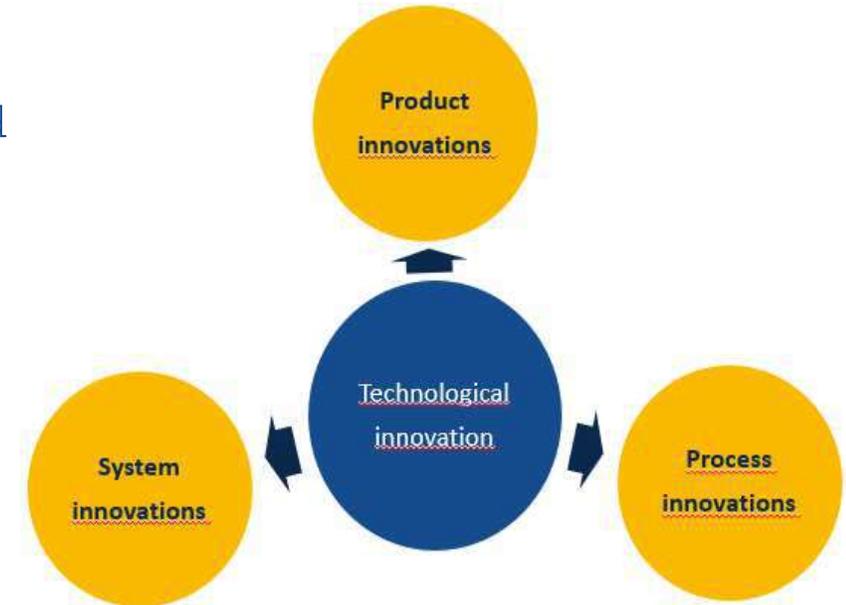
Technological Innovations:

cover new products and processes, as well as significant technological changes in products and processes.

Purpose of product innovation: to design and produce a new product with features that distinguish it from other products offered to the recipient.

Process innovation: a change in technology that includes the content (parameters) and sequence of operations that make up a given technological process.

System innovation: creation of a new technological and organizational solution (system), primarily in the field of the so-called information and communication technologies, leading to changes in information flows in logistics and management processes and in traditional processing.



Examples of technology transfer from our University to business in the form of licenses concluded last year, i.e. 2020.

- Protective cover against virus infection by droplets.
- Automatic multifunctional sorter of waste type RVM (Reverse Vending machine) - a way to control the operation of the device.
- Technology of integrated surface treatment and decontamination of post-cable regrind as well as targeted physico-chemical functionalisation of its polymer fractions for conversion to heterogeneous composites
- Integrated technology of material properties prediction based on the identification of features and properties of non-homogeneous input stream of waste materials based on polyolefins
- Technology of surface decontamination of polymer waste from mixed-material contamination
- System for active background reduction of a scintillation detector and pulse separation in the measurement of low radioactivity
- Disinfection process control system in an automatic gate for decontamination of people in protective clothing WAAM Gate Med 1.0
- Integrated equipment and cybernetic system for product marking and verification of the compliance of identifying data with the optimization of reporting forms and the possibility of automatic skipping / caching incomplete / noisy data using algorithms and methodology based on artificial intelligence - ANN

SUCCESS of INNOVATION

Depends on integration of mental models and activities carried out in relation to business models and technology management.

Chances of success of innovation in companies are increased by:

- focus on clearly defined strategic goals
- long-term contacts supporting technological development
- project management skills
- management supporting innovation
- creating a climate conducive to innovation



TECHNOLOGY PORTFOLIO is determined by the attractiveness of the future technology. Key meanings:

Organizes products according to related or the same technologies

Determines the technology level attractiveness according to the established criteria

Influences the prognosis of technological changes

Examples of good practice in product commercialization: from idea to implementation - Shared Services Centre and the OEE Platform

Dr Zygmunt Łukaszczyk, SUT Gliwice (PL)



Shared Services Centre – SSC (Centrum Usług Wspólnych) is a the way to:

- efficient supply chain management
- standardize and optimize processes in public administration

All organisations are increasingly exposed to external factors and achieving their long-term goals becomes more and more challenging. *Rapid adaptation to the new realities is therefore a business priority.*

Volatility, uncertainty, complexity and similar external factors require good decisions to:

- ✓ be made
- ✓ be implemented effectively and quickly
- ✓ keep proper monitoring of effects

Concept of the SSC:

Shared Services Centre as an organisationally separate unit providing services to at least two entities (organisational units), usually within a single capital group, of an auxiliary or administrative nature (e.g. accounting services, human resources management, wage settlements, support of orders and purchases).



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1. Determinants of SSC creation:

- 01 Completion of unit sentences
- 02 Striving to improve the quality of services provided
- 03 The search for efficient ways to manage costs - savings
- 04** Implementation of the social mission of public administration
- 05 Modernisation of administration

3. Raising the standard of operations for efficient public administration:

- 01** Uniform **procedures**
- 02 Single **supervision/accountability**
- 03 Ease of **compliance with procedures/deadlines**

2. Integrated management information for improving the quality of governance:

- 01 Integrated management information for decision-makers
(upwards)
- 02 Integrated management information for managers
(downwards)
- 03 Support for the idea of cooperation and shared responsibility

5. The idea of Smarty City as introduction of modern solutions:

- 01** Innovative organisational, technical and IT solutions
- 02 Implementation of European trends
- 03 Ease of improvement
- 04 Increase in flexibility

4. Improving the safety of operations to reduce the business risk:

- 01 Uniform procedures
- 02 Increased fault tolerance
- 03 Increased resistance to irregularities
- 04** Ease of compliance with procedures/deadlines
- 05 Increased transparency
- 06 Easier audit and control processes

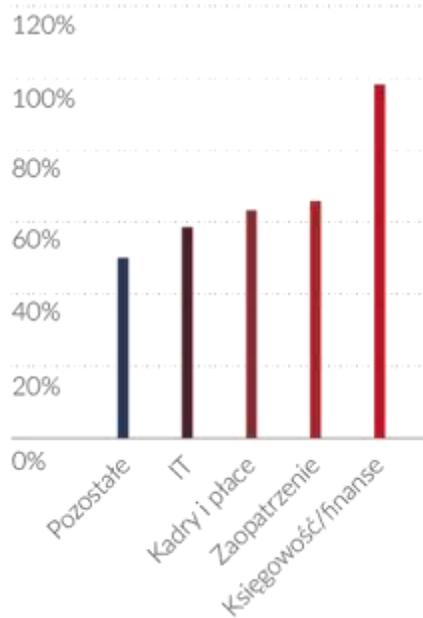
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Shared Services Centre (SSC)

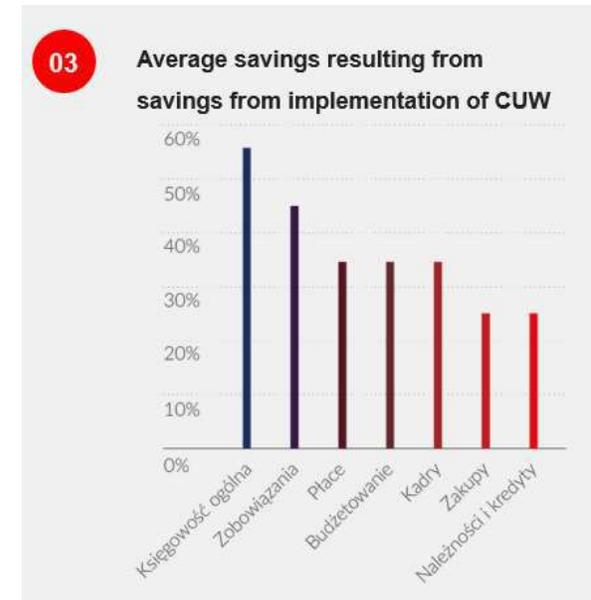
6. Financial optimisation for reduction of operating costs:



Most frequently consolidated services within the SSC

01 Lower costs (through economies of scale)
 Between **25 %** and **50**

02 Improved liquidity management



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Shared Services Centre (SSC)

OBJECTIVES OF STANDARDISATION

Standardisation makes it possible to

In industrial production, the purpose of standardisation is to apply uniform standards, e.g.: to standardise products in terms of dimensions, materials used, etc.

This reduces costs, enables mass production, the interoperability of equipment from different manufacturers, the exchange of used parts, easier trade orders.



Alignment

standardisation of certain services, objects, tools, so that regardless of where they are performed/used, their quality and quantity is the same or as similar as possible for each user creation of criteria for their performance pattern, which in subsequent processes translates into their control and evaluation,



Optimisation

cost optimisation - funds are not allocated to small and inefficient operations



Elimination of errors

eliminating errors, thus increasing the efficiency of the unit (enterprise)

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Shared Services Centre (SSC)

Examples

Improving work organisation (ensuring continuity of work by guaranteeing the replacement of staff)	●	Resistance of directors and staff to downsizing, reluctance to change
Improvement of the quality of internal control of unit expenditure (exchange of experience and knowledge among staff)	●	Organisational difficulties in reorganising staff
Making heads of units responsible for the circulation and maintenance of financial records	●	Separation of finance and accounting staff from heads of units
Harmonisation of accounting and reporting procedures	●	The need to develop a mutual system of cooperation between the serviced units and the servicing unit
Saving on staff salaries	●	Necessity of adequate housing conditions
Savings on current expenditure of units due to increase in scale of procurement	●	The need to incur costs related to the adaptation of employees to the new form of cooperation
Unification of management and planning system	●	Need to undertake registration activities for the new entity
Possibility to broaden the scope of CUW's tasks	●	



Advantages



Disadvantages

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Shared Services Centre (SSC)

POSSIBLE SERVICES COVERED BY SSC:

- ❖ Administrative services (handling business travels, assets protection, cleaning, real estate, fleet management, archiving, etc.)
- ❖ Finance and accounting services (accounting records, reporting, liquidity management, records of assets, management of receivables and payables, etc.)
- ❖ Human resources and payroll services (recruitment, personnel administration, training/professional development, etc.)
- ❖ IT processes (database management, planning and development, Help Desk, etc.)
- ❖ Purchasing and Procurement services (joint purchases, management of suppliers, etc.)

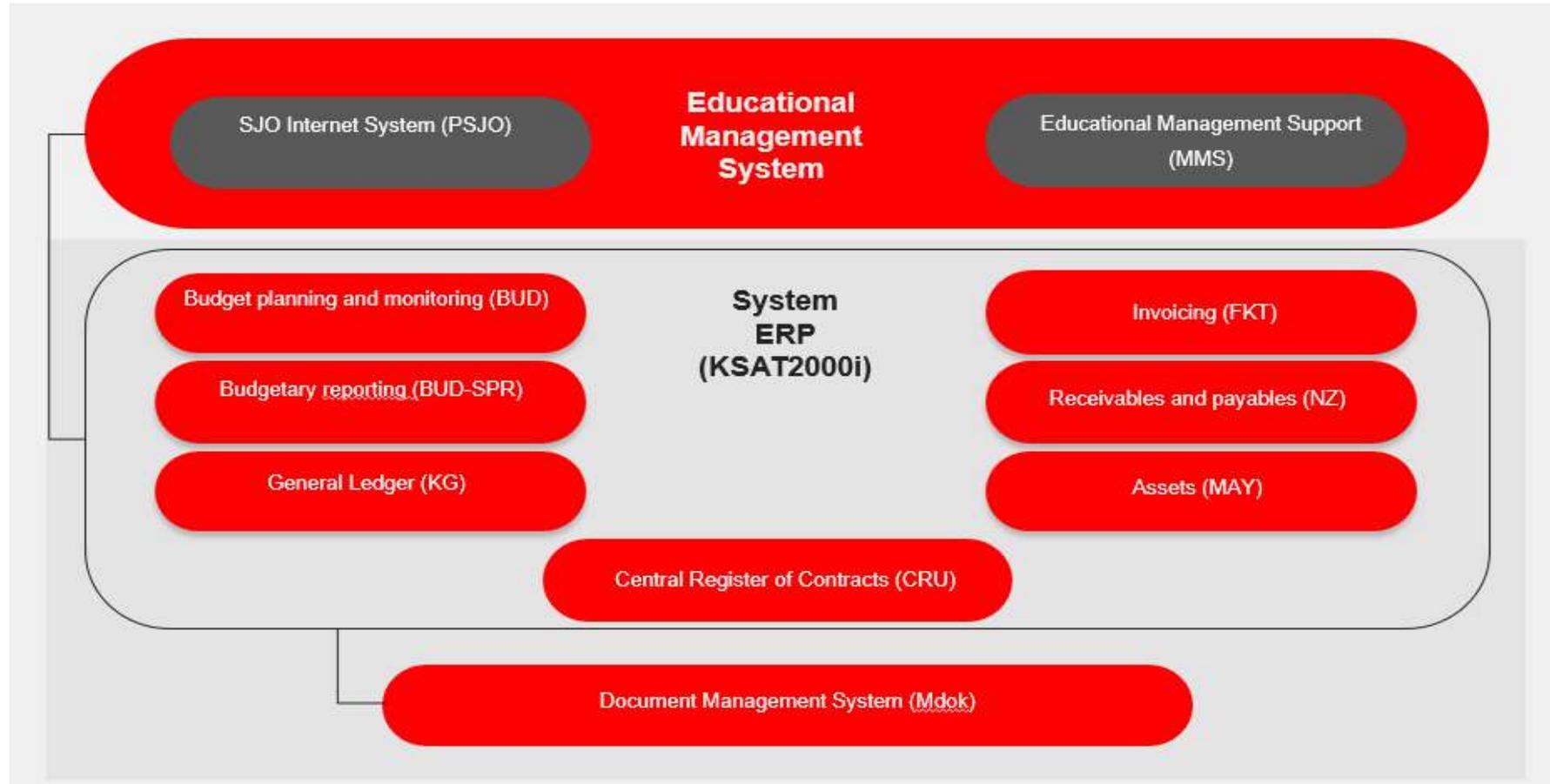


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Central ERP system in the Lublin Municipality as practical example of the SSC implementation



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Overall Equipment Effectiveness (OEE) Platform

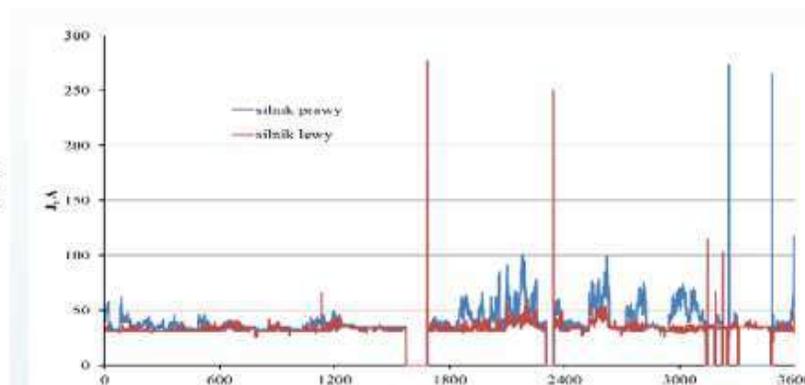
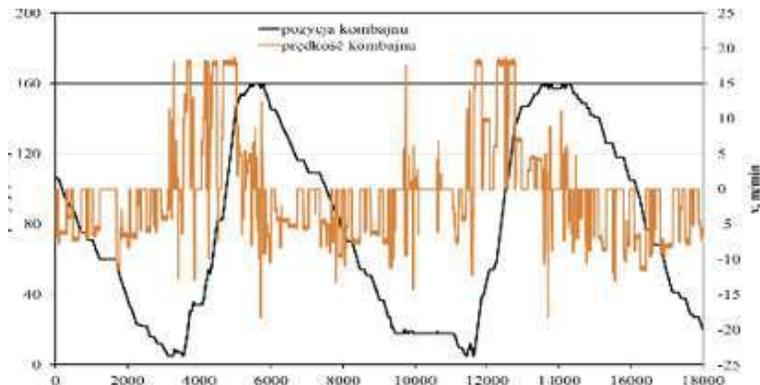


Practical implementation:

- ✓ by tools to support the improvement of mining machinery utilisation efficiency
- ✓ as a project implemented by the SUT and COIG (Central Mining Information Technology Centre) S.A.

Origin of the idea:

- ✓ needs for innovative solutions to improve production efficiency expressed by mining companies
- ✓ use of methodologies that give a possible, objective-focused picture of machine, equipment and complexed operations



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idea

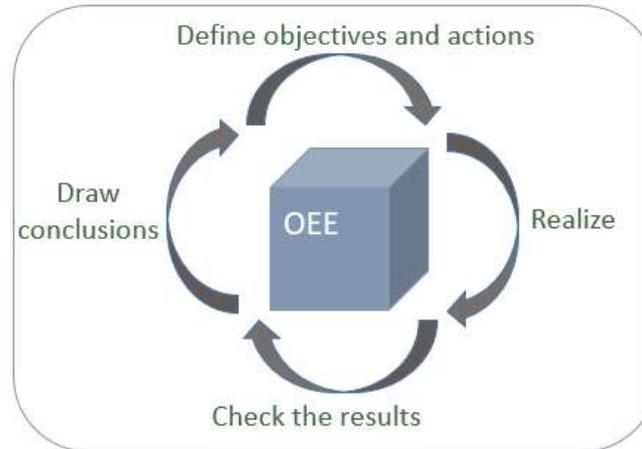
• Management objective

- Support of the management objective by P_OEE

P_OEE. Set expectations:

- OEE indicators,
- acceptable levels of loss,
- production results

P_OEE. Conduct "what if" projections and identify recommendations



P_OEE. Collect and recycle:

- industrial automation data,
- dispatching data (working time, breakdowns, extraction)

P_OEE. Compare expectations with results (indicators, losses, outcomes):

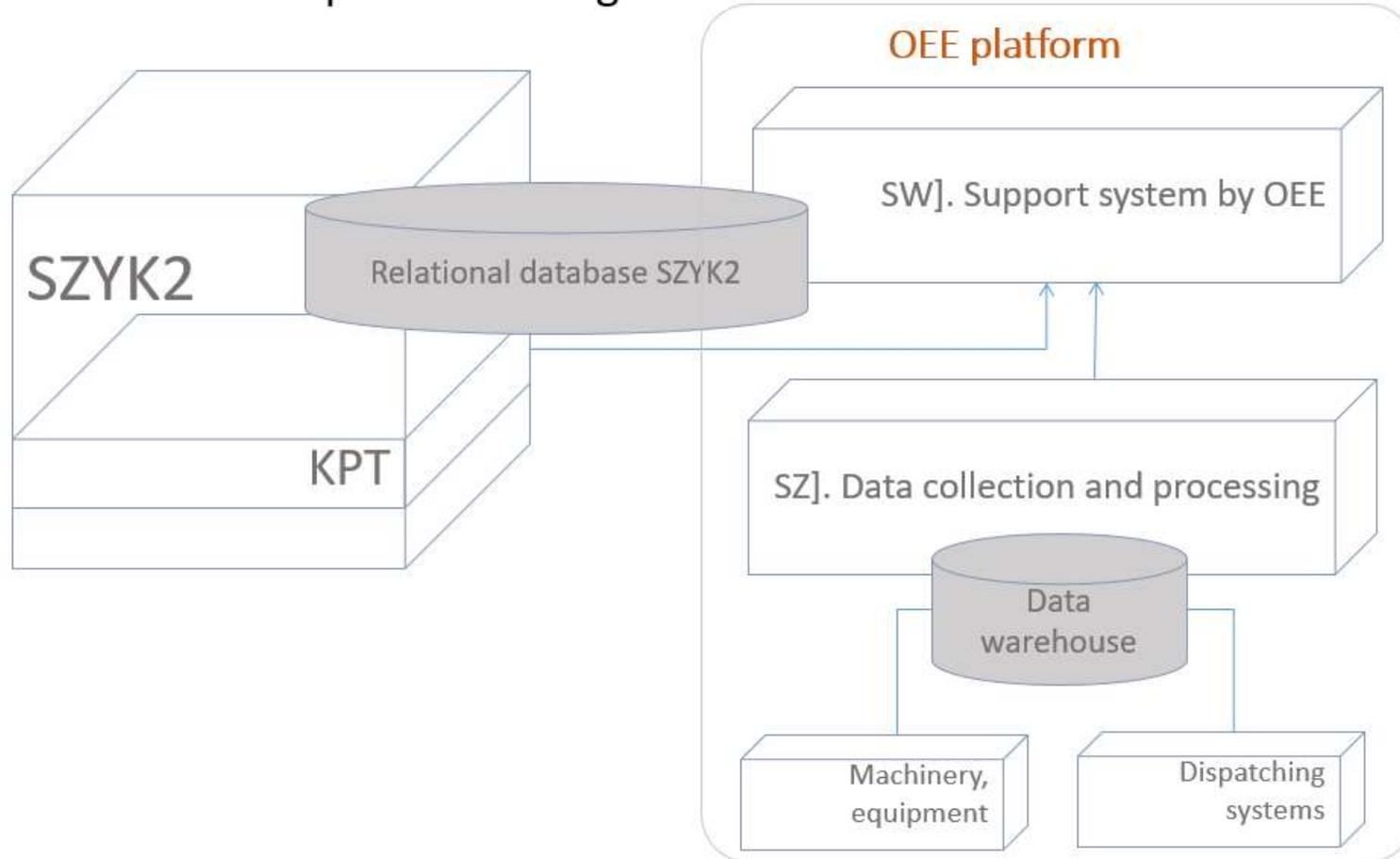
- comparative analyses

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Current available platform design



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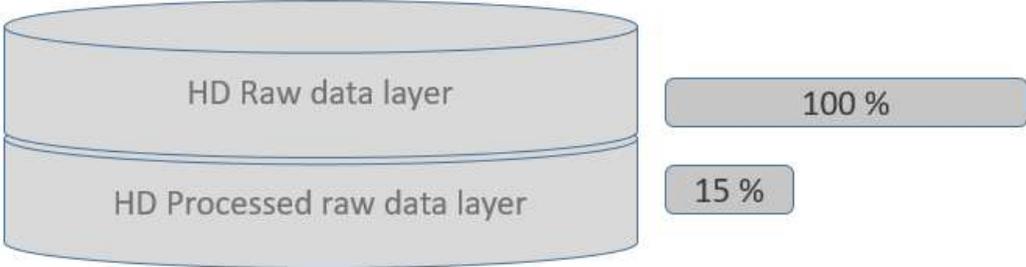
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Industrial automation data collection and processing system

- ▶ Machine parameters
 - ▶ Longwall shearer
 - ▶ Conveyors
 - ▶ Mechanised housing
 - ▶ Crushers
 - ▶ Machine supply parameters
 - ▶

Number of parameters: several hundred
 Signals: continuous sampling; 0/1
 Sampling rate: 0.2 - 1 sec.
 Sourcing time: 280 - 350 days; 16 h / day



- ▶ Processing procedures
 - ▶ Faulty and uninterpretable measurements
 - ▶ Standardisation of data
 - ▶ Elimination of redundancy

Big Data techniques
 +
 Statistical methods
 +
 Expert knowledge

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COIG OEE platform

Support system

- Definitions
- Means of production - machinery parameters
- Workplaces - wall parameters
- Wall production characteristics, results obtained
- **Register of unplanned interruptions (failures)**
- Control parameters of processing algorithms
- Data processing [automation, identification of cycles, phases, losses, indicators]
- Reports [OEE indicators, losses, production results]



Examples of good practice in product commercialization: from idea to implementation - Shared Services Centre and the OEE Platform

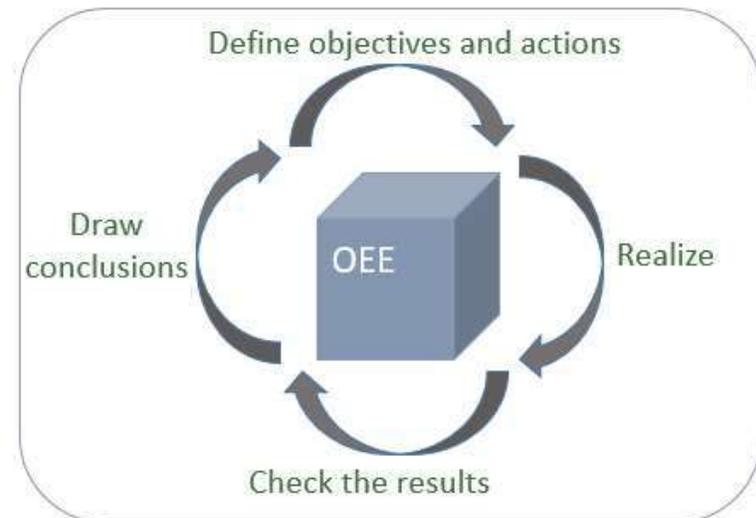
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Development
Idea

- ▶ OEE information [basic scope completed - for further extensions]
 - ▶ Analyses of the wall
 - ▶ Comparative analyses
 - ▶ Projections
 - ▶ Recommendations (brigades at the face, SUR)

- ▶ OEE continued [potential developments]
 - ▶ Economic dimension (lost profits)
 - ▶ Incentive scheme
 - ▶ Improvement of work organisation
 - ▶ Improving production efficiency
 - ▶



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KNOWLEDGE TRANSFER FROM TECHNICAL UNIVERSITY TO INDUSTRY:

AN EXAMPLE of the WASKO CAPITAL GROUP originating from the SUT:

<https://drive.google.com/file/d/1ZqNL6GfbSETcIHrJZbZJEIpfCYcy15gf/view?usp=sharing>



You are welcome to cooperate with us!

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supported by

• Visegrad Fund



Thank you!

The project is co-financed by the Governments of Czechia, Hungary, Poland and Slovakia through Visegrad Grants from International Visegrad Fund. The mission of the fund is to advance ideas for sustainable regional cooperation in Central Europe.