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Author	(LEAD) Yevheniya Kralyuk
Contributors	Yevheniya Kralyuk (MOEZ), George Nikolakopoulos (LTU)
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Abstract	The aim of this deliverable is to plan and to implement a series of commercialization and product development workshops, live demonstrations, media shows

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**List of Acronyms**

IIT	Interactive Innovation Toolkit
IPO	Intellectual Property Office
CA	Consortium Agreement
IMO	Innovation Management Office

# 1 Introduction

## 1.1 Summary

The main objective of the Task 9.4 (Innovation and Knowledge Management) includes both internal and external dimensions:

- The Intellectual Property Office (IPO) deals with the internal dimension and addresses all activities aiming at protection of the project's innovative outcomes and continuous update of the consortium Agreement (CA), such as access to the background knowledge, joint use and transfer of the foreground knowledge, access rights and rules related to dissemination activities.
- Within the framework of the Innovation Management Office (IMO) it is planned the organization a series of training activities in order to address specific challenges of research commercialization, such as time to market, quality and functionality, manufacturability, cost efficiency and value proposition. The main methodology for the workshop and training activities will be based on the Interactive Innovation Toolkit, "business models generation canvas" and "value proposition canvas" by Alexander Osterwalder.<sup>1</sup>

## 1.2 Purpose of document

The purpose of this document is to describe the specific outcomes from the first joint commercialization workshop on the 2nd DISIRE consortium meeting and business model development discussion during the first industrial meeting in Poland. The report will follow the structure of the tools used during the meeting and will list the inputs provided by the partners. The report further delineates all achievements regarding the improvement of communication and knowledge management within the project consortium by using the approach of the Innovation Management Office.

The document also includes preliminary planning for future activities, such as the next product development workshop on value proposition and it provides information about the chosen workshop methodology and workshop target groups.

The background goal of the first workshop on Innovation and Exploitation on 8-9 September 2015 at Tarragona, Spain, was to introduce the online-based "Interactive Innovation

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<sup>1</sup> Alexander Osterwalder, Yves Pigneur: *Business Modell Generation*, John Wiley & Sons, Hoboken NJ 2010.

Toolkit” (D9.8), which was developed to provide guidance and support to the DISIRE partners in order to unlock the innovation potential and to reinforce the impact of the DISIRE technological platform. The Fraunhofer Innovation Management Team presented selected tools and methodologies by directly applying them in form of an interactive session aiming at generating ideas and inputs for the DISIRE Technology Exploitation Strategy (D9.5) and other activities planned for the next 6 months within WP9.

### **1.3 Partners involved**

The DISIRE Workshop on Innovation and Exploitation has been developed by the Fraunhofer Center Leipzig experts and the DISIRE management team, which was involved into the feedback loops related to this deliverable. The Innovation and Exploitation Workshop was organized in parallel to the 2nd consortium meeting and during this event, all partners had the opportunity to participate on the discussion, to work together in teams without dividing into the WP groups. The workshop’s strategy to use the IIT helped to build a communication bridge between research institutions, technology end users and technology suppliers in order to identify new tools for generating the necessary data for the research commercialization of the DISIRE concept. Based on the gained experience during the execution of the first workshop/discussion and the feedback generated by the partners, the Interactive Innovation Toolkit will be constantly further improved and optimized.

## 2 Achievements

### 2.1 Workshop on Innovation and Exploitation, Tarragona (September 8th – 9th, 2015, Spain)

During the first workshop session the Fraunhofer expert team demonstrated the online IIT platform, which can be accessed on: <http://iit.moez.fraunhofer.de/>. The team further showed some practical examples of selected tools. Following the discussion with partners it was decided to create a separate exploitation plan for each of the partners with the objective of using this for the internal discussion and next WP-meetings.

In the second workshop session the moderators from Fraunhofer presented the main workshop methodology WAYS-TO-GROW FRAMEWORK (Figure 1) combined with elements of the Business Model Canvas by Alexander Osterwalder as well as the People & Connections map. The selected multiple methodologies should help to stimulate intensive business-oriented discussions and to clarify the business environment (market forces, stakeholder, trends) for the DISIRE technological platform. The Ways-To-Grow-Framework methodology was chosen since their structured approach offers a verifiable trajectory towards a certain objective, with clear milestones for the workshop discussion.



**Figure 1: WAYS-TO-GROW FRAMEWORK**

## 2.2 Overview of the workshop's methodology and introduction to the Ways-to-Grow-Framework

The moderator placed a list with goals specifications on the moderation wall/board and presented Ways-to-Grow circle as agenda for the workshop. Application of the Ways-to-Grow-Framework circle made it easy to design and explain the three workshops slots: Reality (Assess), Options (Brainstorm value proposition) and What's next.

The following Goals were listed on the moderation wall/board:

### 1.1. Long Term Goals

- a) Improve efficiency and competitiveness of the European energy intensive industries.
- b) Maximize the impact for the industrial partners.
- c) Explore cross-sectorial impact of the DISIRE components.

### 1.2. Performance Goals

SPIRE goals: reduction in fossil energy intensity and in non-renewable, primary raw material intensity in terms of:

- a) 10% reduction in fossil energy intensity by 2030.
- b) 15% reduction of primary raw material intensity by 2030.
- c) 15% reduction of greenhouse gas emissions by 2030.
- d) Increased efficiency in terms of energy, costs etc. amongst the industries of focus with 5%.

### 1.3. Session Goals

- a) Access the current reality from three perspectives and discuss the feasibility of the predefined goals based on the technical specifications from WP1. (D1.2)
- b) Brainstorm the value propositions and activities, which will be needed to strengthen the impact of the DISIRE technological platform and shorten its time to market.



### 2.2.1 Workshop slot 1. Assess Current Reality

In order to assess the current reality, the Fraunhofer experts provided the participants with the following data tables, which contain an overview of the key findings of the preliminary research on the Manufacturing Execution System market. (Figures 2 to 4)

Total MES Market: Key Market Findings, Global, 2013

Measurement Name	Measurement	Trend
Market Stage	Growth	—
Market Revenue (2013)	€4,128.3 M	▲
Market Size for Last Year of Study Period (2020)	€7,782.8 M	▲
Base Year Market Growth Rate	8.7%	▲
Base Year Market Growth Rate (CAGR, 2013-2020)	9.5%	—
Customer Price Sensitivity	7	●
Degree of Technical Change (scale of 1 to 10, Low to High)	6	▲
Market Concentration (base year market controlled by top three competitors)	17.9%	▼

TREND

Decreasing	Stable	Increasing
▼	●	▲

**Figure 2:** Total MES Market: Key Findings

The next slide provided the project partners with information about Manufacturing Execution System Market Drivers and Restrain for the next 7 years and created a good basis for the subsequent discussion about the current market reality. The selected information should help partners to understand the market potential for the DISIRE technological solutions. (Figures 3 and 4)

Total MES Market: Key Market Drivers, Global, 2013

Driver	1 – 2 Years	3 – 4 Years	5 – 7 Years
Demand for real-time data acquisition and improved visibility on the shop floor will strengthen MES adoption.	H	H	M
The pressing need to integrate data between individual business units fuels MES growth in the process industry.	H	H	M
More M&As in the discrete and hybrid industries will increase the need for streamlined manufacturing processes globally.	H	H	M
Niche MES solution providers that offer customized, cost-effective solutions encourage investments from small and midsize end users.	H	M	L
The rise of security exploits will drive demand for MES solutions embedded with advanced cybersecurity functionalities.	M	M	H
Global expansion of manufacturing facilities will prompt solution providers to replicate and streamline MES implementations across multiple sites.	M	M	M

**Impact Ratings: H = High; M = Medium; L = Low**

**Figure 3:** Total MES Market: Key Market Drivers

Total MES Market: Key Market Restraints, Global, 2013

Restrain	1 – 2 Years	3 – 4 Years	5 – 7 Years
A conservative mind-set, resistance to change, and difficulty in implementation—particularly in the process industry—hinder market growth.	H	M	L
Existing, in-house MES solutions truncate the penetration of high-cost modular and standardized MES solutions.	H	M	L
Lack of clarity about the return on investment (ROI) discourages end-user adoption.	M	L	L
Increasing functionality of MES solutions and solution convergence hamper adjacent market growth.	M	L	L
Global expansion of manufacturing facilities will prompt solution providers to replicate and streamline MES implementations across multiple sites.	M	M	M

Impact Ratings: H = High; M = Medium; L = Low

Figure 4: Total MES Market: Key Market Restraints

## 2.2.2 Workshop slot 2. Analysis of the business environment (Assess the current reality from project partner's perspective)

With the aim to assess a business environment for DISIRE technological Platform the Fraunhofer experts applied a business model canvas methodology and asked partners (divided into two groups) to list all ideas related to the following topics and respond to the questions:

### Market forces

➔ **Market issues** – identifies key issues driving and transforming our market from customer and offer perspective

#### **Questions:**

- What are the crucial issues affecting the customer landscape?
- Which shifts are underway? Where is the market heading?

### **Outcomes generated during the workshop by project partners**

- **Multiple platforms:** The MES solution must be equipped to easily adapt to multiple operating platforms available in different commercial mobile devices.
- **Cyber security:** Enhanced security and reliability is necessary to provide safe passage of data transfer and more storage in hybrid and private cloud environments.
- **Cost effectiveness:** Small and midsize end users look for MES solutions that fit their budget and provide high ROI quickly.
- **Network infrastructure:** Wi-Fi or mobile networking has not yet evolved to meet industries' reliability requirements. Mobility might be a factor of concern for industries in remote locations.
- Too many regulations spur the entrance of companies with limited resources.

- ➔ **Market segments** – identifies the major market segments, describes their attractiveness, and seeks to spot new segments

**Questions:**

- a) What are the most important target segments?
- b) Where is the biggest growth potential? Which segments are declining?

- ➔ **Substitute products and services** – describes potential substitutes for our offer including those from other markets and industries

**Questions:**

- a) Which products or services can replace ours?
- b) How easy it is for customers to switch to these substitutes?

**Outcomes generated during the workshop by project partners**

- New type of controllers for the process industry
- New traceability sensors
- Ultra wide band localization
- Noise free sensors

**Identification of key Stakeholders**

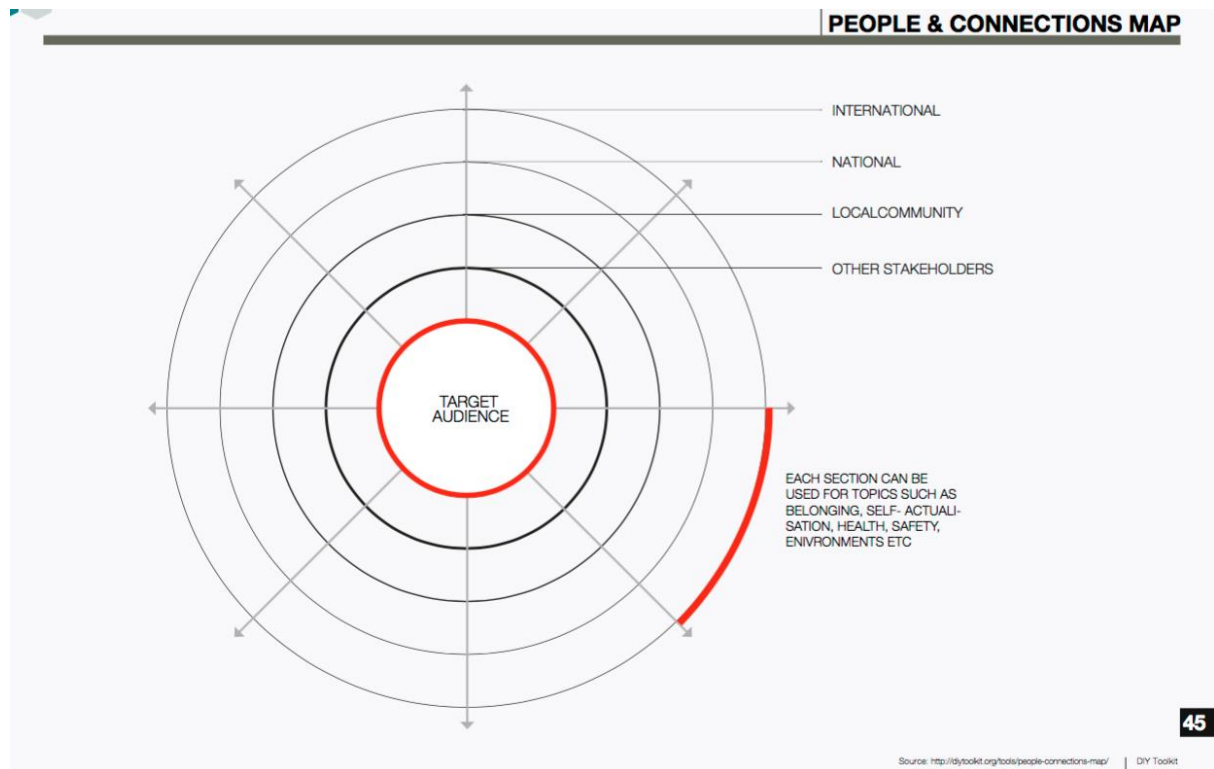
In the next step the participant (divided into two groups) were asked to specify which actors/Stakeholders can influence our future business model and how they co-relate (Figure 5). The IIT Template helped partners to categorize the stakeholder as international, national and others.

**Questions:**

- a) Which stakeholders might influence our future business model?
- b) How influential are stakeholders? Workers? Government? Lobbyists?

**Examples generated during the workshop:**

- R&D Organisation - LTU
- System Integrators - ABB
- End users – KGHM, DOW, CSIRO, LKAB



**Figure 5:** People and Connections map

## Trends

In order to develop the successful business model for DISIRE, a technological platform is advisable to know major technology, regulatory, societal and culture trends that can influence our future business model or can help it evolve and improve. Working in two groups, the workshop participant observed the most important trends for the future DISIRE business model.

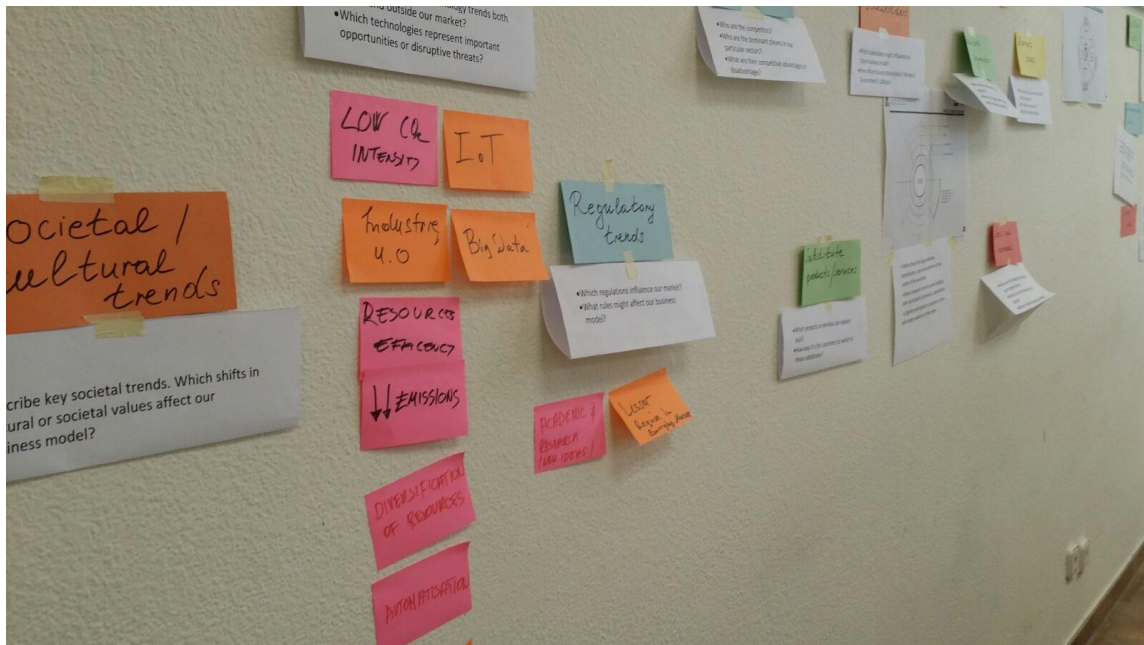
### ➔ Technology trends

#### **Questions:**

- a) What are the major technology trends both inside and outside our market?
- b) Which technologies represent important opportunities or disruptive threats?

### **Outcomes generated during the workshop by project partners**

- Industry 4.0
- Shift towards modular plants in the chemicals sector
- Wireless intelligence
- Innovating to zero
- Smart clouds



**Figure 6:** Technology trends affecting the business environment

➔ Regulatory trends

**Questions:**

- a) Which regulations influence our market?
- b) What rules might affect our business model?

**Outcomes generated during the workshop by project partners**

- Stricter requirements for CO2 emission

➔ Societal and cultural trends

**Questions:**

- a) Describe key societal trends. Which shifts in cultural or societal values affect our business model?

**Outcomes generated during the workshop by project partners:**

- Lesser requirements in the emerging markets

### 2.2.3 Workshop Slot 3: Brainstorm the DISIRE Value Proposition

During the third slot of the workshops participants were asked to assess the value proposition of the technology based on the knowledge they have accumulated during their interaction within the technical work packages as well as the inputs, which have been provided within the workshop.

The moderator asked partners (two groups) to “grade” our DISIRE future products / services ex. on a scale of 1 – 5 for each of these categories. (Figure 7).

**Questions:**

- a) What value are we delivering to our customer?
- b) What bundles / sets of product / services / process / components of the DISIRE Technological Platform can we offer to each of our target groups?

- c) Will there be expensive switching costs for end-users associated with buying the standards-compliant products?
- d) If so, will analysts and integrators be urging end-users to incur these costs? Which existing standards have an impact on our value proposition? Which standards still need to be developed?

### Outcomes generated during the workshop by project partners

- Improved knowledge of the processes
- Improved production and logistic planning
- Lower production costs
- Face to flotation material tracking
- Energy loss reduction
- Continuous improvement of processes
- Lower environmental footprint
- Process safety
- Low cost feedstock from non-renewable sources
- Waste revitalization



Figure 7: Assessing the value proposition of the DISIRE technology

### 2.2.4 Workshop Slot 4: Next Steps

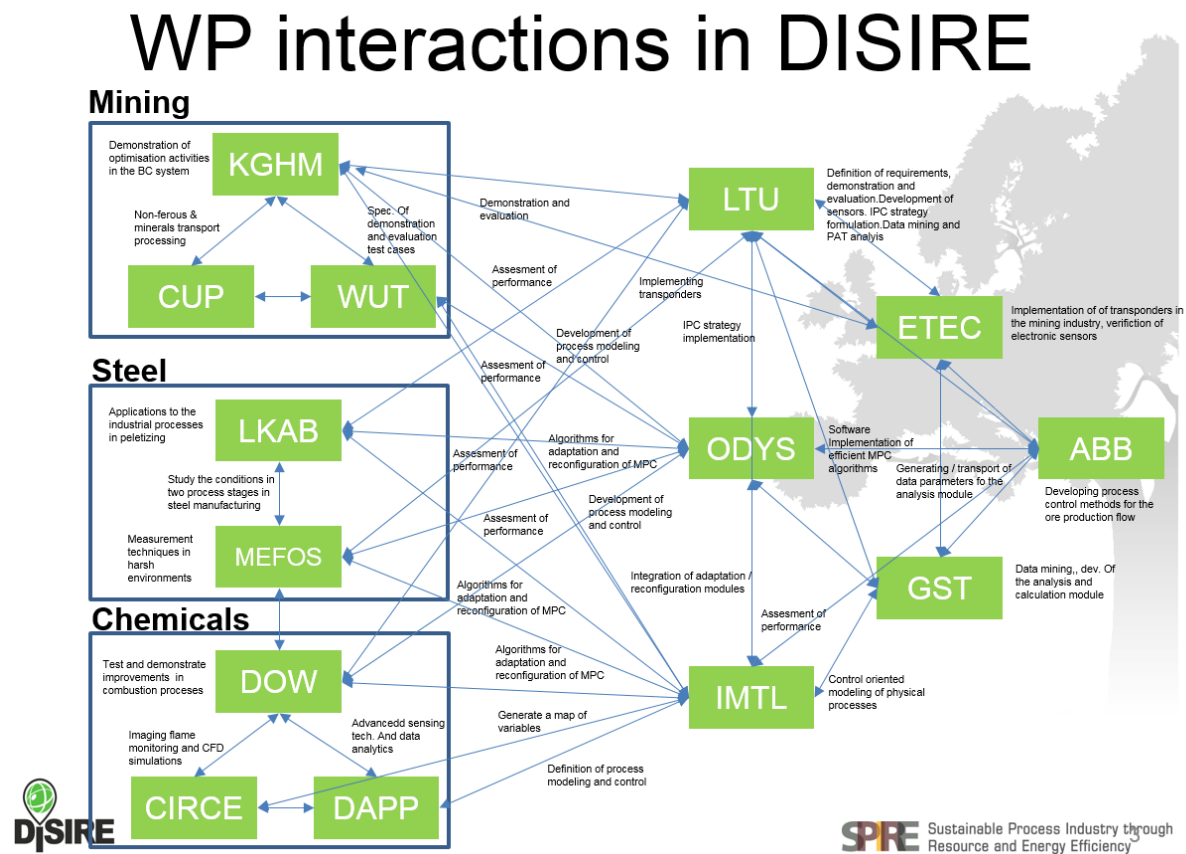
After examination of the current situation and exploring the options for value proposition, the team has a good idea of how we can achieve better results in the next workshops and discussions for the development of a business model for the DISIRE technological platform. The project partners decided to expand the IIT with adding of new elements and it has been also recommended to make the IIT application plan tailored for individual project partners. The Fraunhofer team will furthermore develop an individual questionnaire for the gen-

eration of business cases from technology suppliers and will make interviews with partners using the questionnaire.

**2.3 Business model development discussion on the first industrial meeting on 11th - 13th of October 2016 – Wroclaw, Poland (related to the 1<sup>st</sup> Workshop on Innovation and Exploitation)**

During the 1<sup>st</sup> industrial meeting on the premises of KGHM the partners from LTU, Fraunhofer Center Leipzig, KGHM, and WUT engaged in a discussion for the identification of the business cases, value propositions, and impacts of the DISIRE technology in the mining industry.

The discussion started with a short overview of the WP interactions between partners (Figure 8) in order to establish a common understanding of the roles and responsibilities of consortium members in respect to the technical side of the project.



**Figure 8:** WP Interaction between partners from technology development perspective

The innovation experts from Fraunhofer Center Leipzig then presented their methodology for developing a business model for the DISIRE technology in order to show the link between the technical side and the business side of the project. The methodology can be summarized in the following three focal points:

- Providing a framework to consortium partners (represented by the technology providers and research institutions) for describing, designing, inventing, and aligning their business model for their individual contribution in the project.

- Identifying the concrete needs, benefits, costs, and trade-offs of the industrial partners in the DISIRE consortium.
- Analysing the collected data and identification of opportunity / risk areas which can then be exploited / avoided through changes in the technical requirements, updates in the consortium agreement, establishment of individual agreements between partners etc.

Based on this methodology, the following discussion was focused on the specific case of KGHM and, in particular, e-pellet based tracing of the system.

### **Outcomes of the discussion:**

After the interaction with consortium partners the following conclusions were made in the case of KGHM:

- **Needs:** the industrial partner from the mining industry needs to have the ability to acquire and process information about the concrete production area from which a particular batch of ore is coming from. Such information furthermore needs to be received 2-3 hours before the processing of the materials in the milling station in order to be able to implement the required optimisation mechanisms.
- **Benefits:** the concrete benefits from having this information relates to increased energy efficiency, increase of the volume and speed of the processed ore at the milling station, and lowering the wear off of the milling balls – from business perspective using this information we can estimate the concrete economic impact of deploying the DISIRE technology in the mining industry by approximating the value of the energy savings that can be achieved as well as the decrease in maintenance costs for the milling stations. As a result of this particular insight it was decided to develop a so called “operational excellence table” in order to reflect the relationships between increase in volume / speed of throughput and energy efficiency.
- **Costs:** the costs of deployment of the DISIRE technology were separated into the following cost pools: production and implementation of e-pellets, reading gates using RFID technology, software and maintenance costs.
- **Trade-offs:** the trade-offs that need to be taken into consideration from technical and business perspective is the inverse ratio between volume/speed and energy efficiency /wear off of milling stations as well as the ratio between the amount of pellets used and the quality of information received. Once again an “operational excellence table” would be able to calculate the concrete amount of the trade off and pin point to optimal value for each parameter.

## **2.4 Upcoming Commercialization and Product Development Workshop.**

The next planned workshop (to be held during the upcoming consortium meeting in February 2016) on value proposition (based on the methodology by Alexander Osterwalder) will provide the consortium partners with a framework for a meaningful discussion between technology providers, research institutions and end users for the assessment of the concrete needs of the involved process industries. It will further describe the solutions, which the DISIRE project will offer based on the current knowledge gain within the project. The goal of the workshop is to help consortium partners to design, test, and build the value proposition of the DISIRE technological platform in a structured and systematic way.

In particular, the value proposition workshop will focus on the following areas:



- **Jobs:** gathers all the end user needs, the problems they are trying to solve and the tasks they are trying to perform or complete.
- **Pains:** gathers all the negative emotions and undesired costs, situations and risks which the end user could experience before, during and after getting the job done.
- **Gains:** gather all the end users' benefits and desires; this block for example includes functional requirements, or specific cost savings.
- **Product & Services:** lists all the products and services which the value proposition is built around.
- **Pain Relievers:** describes how the products and services address the challenges needs and the pains of the end user, how to eliminate, undesired costs or avoidable situations.
- **Gain Creators:** describes how the products and services create gain, how it offers an added value to the end user.

The Value Proposition Design workshop will be led by the innovation and commercialization expert Mr. Jnr. Prof. Dr. Tobias Dauth. He studied Business Administration at the University of Applied Sciences in Pforzheim and at the Kelley School of Business, USA. Following his studies he spent two years at a marketing-oriented management consultancy in Munich (BBDO Consulting, today Batten & Company). Tobias Dauth completed his doctorate in 2012 after which he was promoted to a post-doc position PhD at the Chair of International Management and Strategic Management at ESCP Europe. In January 2013, Mr. Dauth accepted a professorship at the Rouen Business School in France. During April 2013 he took up an appointment at the Leipzig Graduate School of Management (HHL) and has since then worked there as an assistant professor of International Management.

### 3 Conclusion and recommendations

The main outcome of the Workshop on Innovation and Exploitation and business model development discussion was to understand our business environment, the value proposition, concrete needs, benefits, costs, and trade-offs. These outcomes can help the consortium to find a better positioning strategy for the future. All results achieved from the workshop and discussion will be used to conceptualize the Technology Exploitation Strategy and Business plans, while more workshops in the following assemblies as well as with the industrial partners will be performed.

The Innovation and Exploitation workshop was very helpful in finding a common business language outside the technical specifications. Dividing the partners into two groups during the workshop challenged the competitiveness and gave the opportunity to make a comparative analysis. The new methodology uses the perspective of partner groups (technology suppliers, end users and research institutes) within the consortium and will prepare tailored innovation and commercialization solution based on specific needs for the project partners groups. The workshops and commercialization events will furthermore help to improve the internal communication between partners, will show the business connections inside consortium and promote the DISIRE Project to external target groups.

During the interactive workshop session, the selected tools helped consortium partners to define an environmental framework for their business model and to identify the value proposition of the DISIRE technological platform. The possibility to structure the internal communication of the consortium as well as to collect and analyse large amounts of information, within a short period of time, were recognised as main advantages of the Interactive Innovation Toolkit.

The implementation of the first workshops and discussion showed that DISIRE is on a successful path towards unlocking the commercialization potential of the DISIRE technological platform. We are, however, reliant on the active contribution and regularly participation in the planned events from all the consortium partners.

#### 4 Commercialization and product development training platform

Within the Deliverable 9.3. the Fraunhofer Innovation Management Office (IMO) plans to include the following activities in the next project phase:

<b>M12-M13</b>	<b>#2 Workshop - Value Proposition Design</b>
M18	#3 Media show / Industrial Exhibition
M24	#4 Workshop - Business Model Development
M30	#5 Workshop - Commercialization
M36	#6 Media show / Demonstration of the DISIRE technological platform

## 4 Annex A

### **Identified business cases**

11th - 13th of October 2016 – Wrocław, Poland

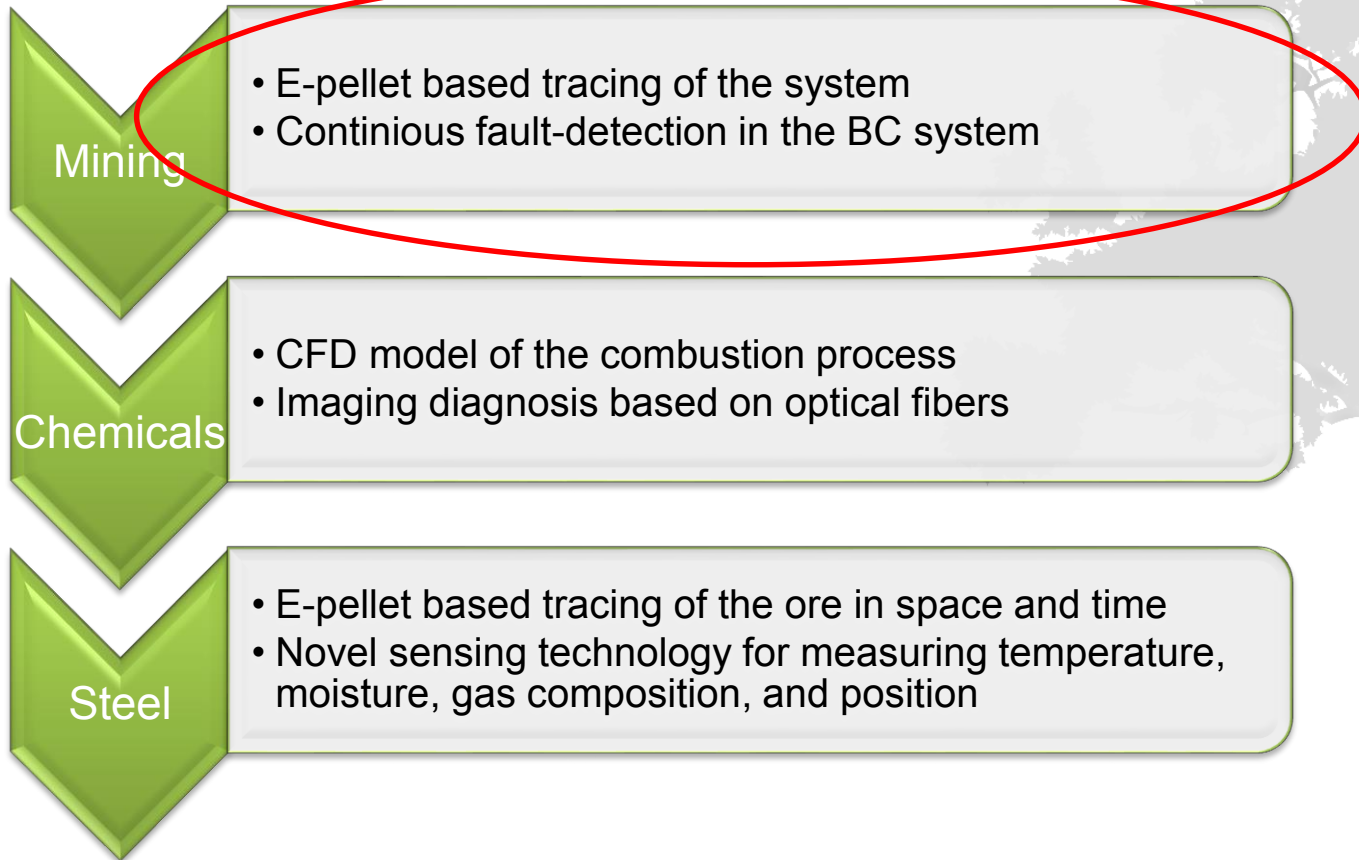


## KGHM INDUSTRIAL MEETING

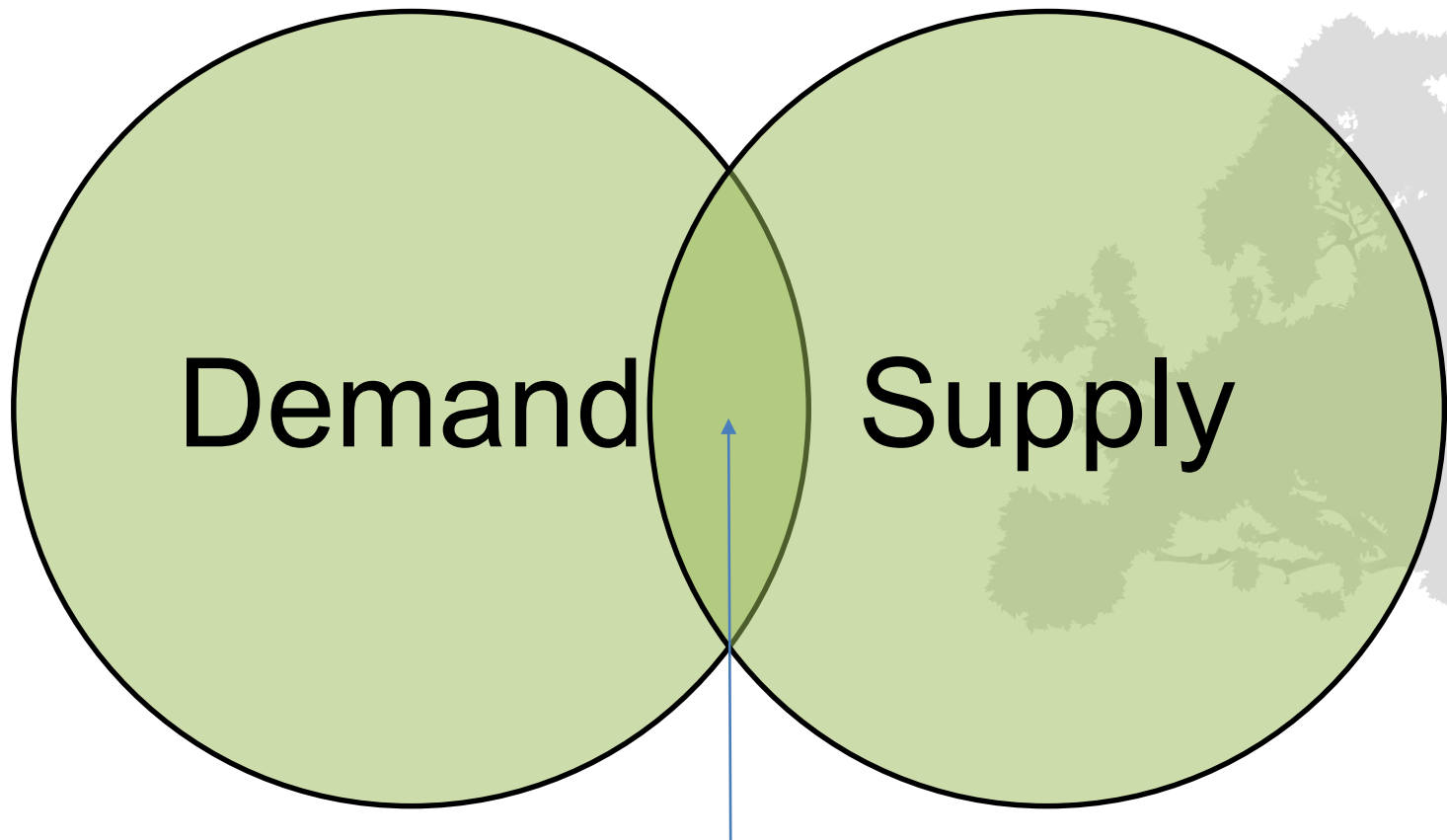
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# Identified business cases





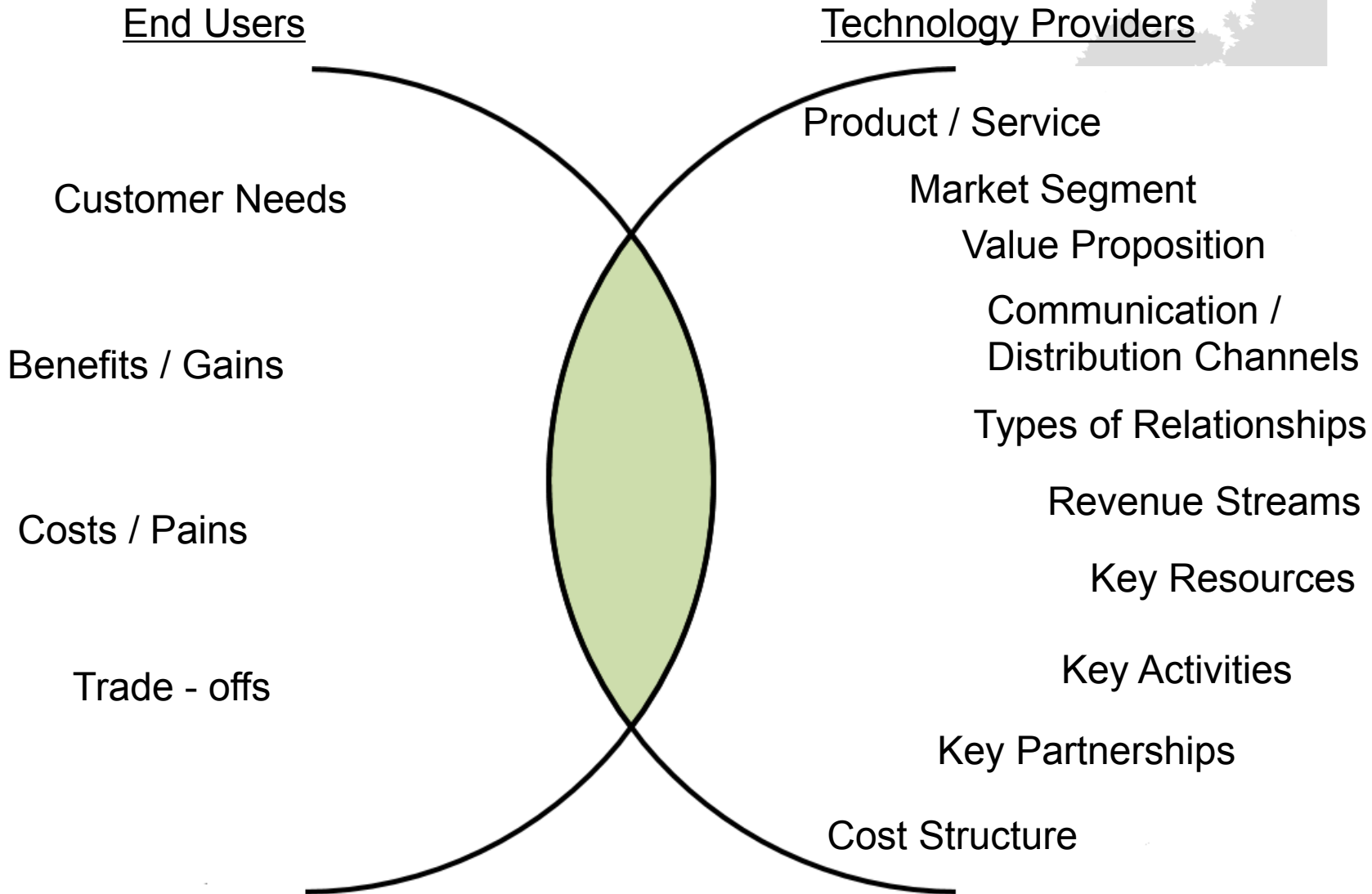


Demand

Supply

Business /  
Commercialisation  
Potential



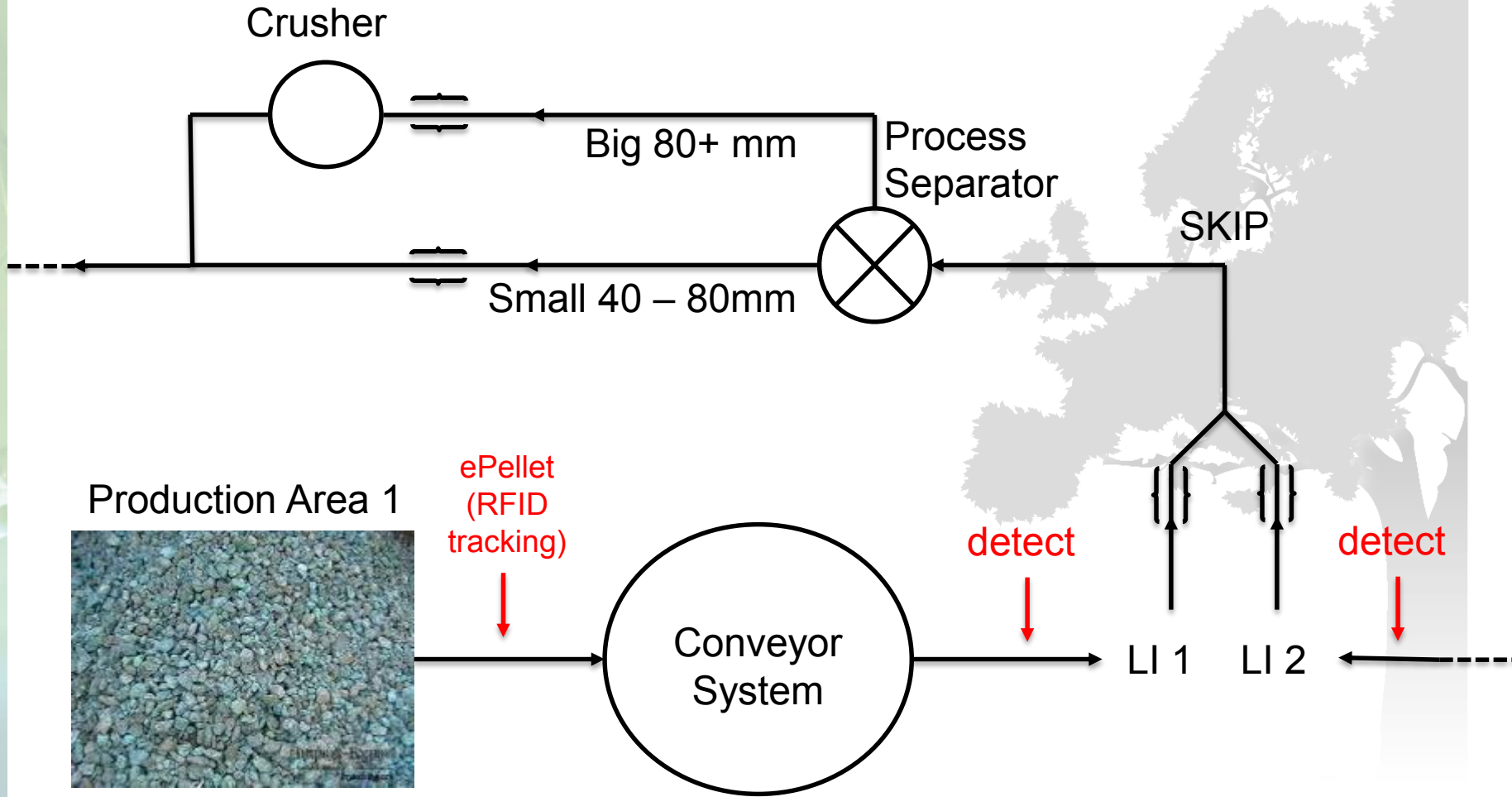


# KGHM – Business Cases

1. E-pellet based tracing of the system
2. Continuous fault detection in the BC system
3. ...

# E-pellet based tracing of the system

1. Needs
  - Information about which process area the ore is coming from
2. Benefits
  - Energy efficiency
  - Volume / Speed increase at the milling station impacting the quality of the milling products
  - Zmniejszenie zużycia młotek / Lowering the wearoff of milling balls
3. Costs
  - Production and implementation of e-pellet (amount of pellets per 1000t etc.)
  - Reading gate (production and instalation)
  - Software (compatible with current systems)
  - Maintenance cost
4. Trade-offs
  - Volume / Speed increase vs Energy Efficiency and Milling ball wearoff
  - More pellets better information vs Cost of pellets



# Continuous fault detection in the BC

1. Needs
  - ...
  - ...
2. Benefits
  - ...
  - ...
3. Costs
  - ...
  - ...
4. Trade-offs
  - ...
  - ...

