PILOT REPORT

Deliverable D.T3.3.3

Pilot report about the implementation of the Digital Innovation Hub on "Business Intelligence & Innovation"

02/2022

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Executive Summary/Management Summary

The Digital Innovation Hub "Business Intelligence & Innovation" is a regional innovation hub within the Federal State of Vorarlberg / Austria. It is a service center of FHV and its appearance -currently- is mainly cyber-physical. This Hub on "Business Intelligence & Innovation" is an output of the Interreg Central Europe project "4Steps" (Towards the application of Industry 4.0 in SMEs): this project is addressing the main challenge of Industry 4.0 (I4.0) as a tool towards a new, digital industrial revolution holding the promise of increased flexibility in manufacturing, mass customization, increased speed, better quality and improved productivity and its development is supporting the RIS3 in the target regions in the different sectors.
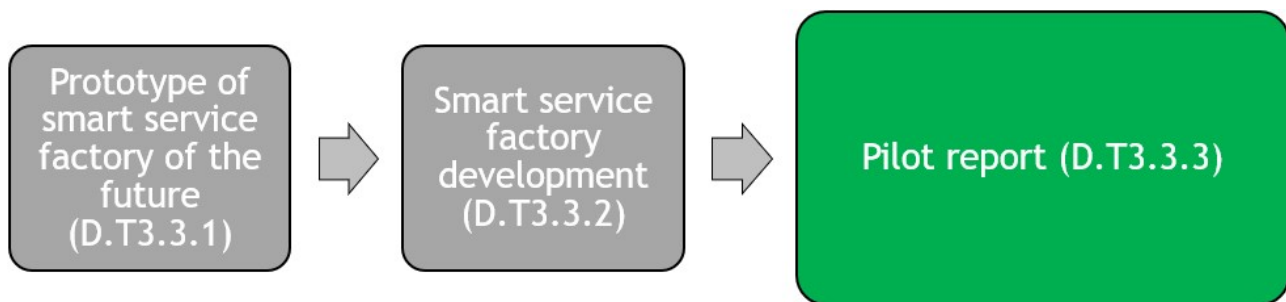

Fig 1: Design & development process of the DIH on Business Intelligence & Innovation

As depicted in figure 1, the development of the Digital Innovation Hub "Business Intelligence & Innovation" occurred in three successive phases and deliverables. Phase 1 is about the "Prototype of smart service factory of the future" (deliverable WP3, D.T3.3.1) and includes the definition of the resource base for the Hub. Phase 2 is about the "Smart service factory development" (deliverable WP3, D.T3.3.2) and presents the actions and activities undertaken within the pilot phase. Phase 3 is about the presentation of the pilot report (deliverable WP3, D.T3.3.3), including a SWOT analysis conducted with FHV internal scholars and external managers from business and industry.

This deliverable is about phase 3 and presents the pilot report. It extends the deliverable D.T3.3.1 Prototype of Smart Service Factory of the Future and deliverable D.T3.3.2 Smart service factory development and presents a successful introduction and implementation of the Hub into the region of Vorarlberg (*and beyond*).

The deliverable at hand consists of XXX chapters. Chapter 1 is about the introduction to smart service factory development. Chapter 2 presents the theoretical embeddedness of the Hub on "Business Intelligence & Innovation" and its contextual underpinning. Chapter 3 presents the Hub Ontology and responds to the questions of how the Hub's resources contribute to the prototype of a smart service factory of the future. Chapter 4 and chapter 5 present the available resource stock of the Hub on

"Business Intelligence & Innovation". These two chapters are about the presentation of internal and external resources available for the Hub. Chapter 6 presents the Hub's Service Portfolio. Chapter 7 provides the closing remarks of the deliverable at hand.

Sincerely yours,

Prof. (FH) Dr-Ing. Jens Schumacher

Head of Research Department Business Informatics

Research Professor

Dr. Florian Maurer

Head DIH "Business Intelligence & Innovation"

1. Introduction

This report/deliverable is about the implementation of the Digital Innovation Hub on Business Intelligence & Innovation. By conduction of a SWOT-analysis with internal and external Hub stakeholders, the deliverable at hand reports on the strengths, weaknesses, opportunities and threats about the design, development and implementation of the Digital Innovation Hub on Business Intelligence & Innovation of the Vorarlberg University of Applied Sciences. Internal scholars and external managers from business and industry have been invited to participate within the SWOT-analysis and to evaluate the pilot implementation.

2. Applied methodology

The methodology used to elaborate this deliverable is the SWOT analysis. The SWOT analysis (Strengths, Weaknesses, Opportunities and Threats analysis) is a strategic planning technique developed by the Harvard Business School in the 1960s. It is used to analyze the competitiveness of businesses and organizations. Nowadays, SWOT-Analysis is not only used to evaluate businesses, but also the competitiveness for example of cities, regions, nations, and public sector organizations.

Within this deliverable, the SWOT analysis is used to name and highlight the strengths, weaknesses, opportunities, and threats of the Digital Innovation Hub on Business Intelligence for, for example

a) the regional innovation system within the region of Vorarlberg
b) Business, industry, and economy within the region of Vorarlberg
c) Research and academia
d) Politics and government

The SWOT analysis is applied to the outputs, outcomes, and impacts of the Digital Innovation Hub on Business Intelligence & Innovation. The perspective of this SWOT analysis is:

- Internal: How can the DIH on Business Intelligence & Innovation increase the strengths and decrease the weaknesses of the …
- External: How can the DIH on Business Intelligence & Innovation boost the acceptance of opportunities (and challenges) and decrease and minimize the treats on the …

… [Regional Innovation Eco-System], [Business & Industry], [Society], [Research & Academia], [Politics & Government] and [Environment].

The SWOT-Analysis method is part of the DIH's service portfolio: Methods & tools (https://biih.labs.fhv.at/2021/02/24/methods-tools/)

2.1. Sample size (participants) and process applied

Two groups of interests have participated to give their opinion on the DIH on Business Intelligence & Innovation and to elaborate the deliverable about the Hub implementation: 1. FHV internal researchers and 2. external managers from business and industry (and part-time students at the Vorarlberg University of Applied Sciences). Both groups provide valuable input and contribute to announce the strengths, weaknesses, opportunities and threats about the implemented Digital Innovation Hub on Business Intelligence & Innovation. While the scholars were invited by e-mail and to fill-out a predefined Microsoft Word template, the managers were invited into an interactive session/online workshop. As depicted in the below roadmap/agenda, this interactive session was conceptualized into two chapters – 1. 4Steps project information and 2. Interactive session on the DIH on Business Intelligence & Innovation – Pilot Implementation.

Date: 28th Jan 2022

Time: 13:00 – 19:00h

Place & venue: Dornbirn, online MS TEAMS

Chapter 1: 4Steps project information consisted on:

1) Introduction into the 4Steps project and the project paradigm: Industry 4.0/advanced manufacturing
2) 4Steps consortium & the heterogeneous and interlinked DIH's in the regions
3) Digital Innovation Hubs: definition, objective, initiatives

Chapter 2: Interactive session on the DIH on Business Intelligence & Innovation – Pilot Implementation consisted on:

1) **Introduction**
2) **Origin, Mission & Vision of the DIH on Business Intelligence & Innovation**
   Impulse presentation
   SWOT by the usage of the methods: brain thinking & brainwriting (5min)
3) **Hub ontology/implementation**
   Impulse presentation
   SWOT by the usage of the methods: brain thinking & brainwriting (5min)

4) Business & industry needs – the Hub's services
   a. Impulse presentation: Artificial intelligence
      SWOT by the usage of the methods: brain thinking & brainwriting (5min)
   b. Impulse presentation: Innovation research & management

       SWOT by the usage of the methods: brain thinking & brainwriting (5min)
- c. Impulse presentation: Methods & tools
       SWOT by the usage of the methods: brain thinking & brainwriting (5min)
- d. Impulse presentation: Resilience engineering
       SWOT by the usage of the methods: brain thinking & brainwriting (5min)
- e. Impulse presentation: System/Eco-System collaboration
       SWOT by the usage of the methods: brain thinking & brainwriting (5min)

5) The Hub as a Living System
- a. Organized events
- b. Organized and participated in academic conferences
- c. Organized and participated in industrial conferences
- d. (national & international) cooperation
- e. Announced and participated in calls
- f. Awards
- g. SWOT by the usage of the methods: brain thinking & brainwriting (5min)

Both, the scholars and managers faced three additional questions: How is and what is the Digital Innovation Hub on Business Intelligence & Innovation contributing to …

- Sustainability? (including environmental, economic, and social sustainability aspects)
- Human-centricity? (including workers' health, wellbeing, and empowerment, as well as re-skilling and up-skilling activities)
- The resilience of industry? (including technological and process/supply chain/organizational aspects)

In this regard, the participants (managers) were invited for 15min of brainstorming and brainwriting to respond to the questions.

2.2. Documentation

While the business and industry managers worked in a team -*thus were able to discuss their opinion and complement each other*- the scholars worked individually. They received a prepared template to get filled out. The managers worked in the shared template on Google Docs.

3. SWOT analysis about the pilot implementation

In this chapter, the strengths, weaknesses, opportunities, and threats about the design, development, and implementation of the Digital Innovation Hub on Business Intelligence & Innovation are presented.

To better present this SWOT-Analyses, similar statements are clustered to a general statement.

3.1. Strengths

The participants announced to following strengths about the design, development, and implementation of the Digital Innovation Hub on Business Intelligence & Innovation.

- Collaborates and cooperates with other Digital Innovation Hubs, Knowledge Centres and Knowledge Clusters among the European Regions (and beyond)
- Interconnects the region with other regions
- Brings external knowledge and expertise into the region
- Provides infrastructure to players of the regional innovation system
- Acquiring of new knowledge; importing of knowledge into the region
- Simplified cooperation between Science, Research and Industry, Economy
- Shared standards and quality measures to raise the overall quality of projects
- Easier project discoverability
- Centralized networking for easier access to potential partners
- Handling changes in manufacturing processes, outcomes, and business models easier
- collective use of resources
- easier networking
- access to shared knowledge for each individual
- collaborative planning for future projects
- easier access to state-of-the-art technologies/methods
- tying together technology and innovation agendas
- Close link to international Knowledge-Network
- Access to local/regional experts in several topic areas
- The pool of current/previous projects/research as unique use-cases
- Experts in knowledge transfer available for workshop/expert groups/interest groups
- The network can activate/includes almost any type of stakeholder (research institutions, service providers, federations, consulting, …)
- Infrastructure allows test-before-invest

Origin, vision & mission

- - international cooperation between research and technology companies
- - Cooperation with external

Hub ontology & implementation

- Knowledge point to faculties
- external networks (cooperations)
- direct support
- exchange of services
- strong networks

Services: Business & industry needs

- Tests at customers in the actual field of application
- Tool for persuasion available
- Wide range of algorithms
- Well structured methods
- Experience from other projects
- Strong team
- The error rate can be kept low through analysis
- Reach through EU-wide lectures

3.2. Weaknesses

The participants announced to following weaknesses about the design, development, and implementation of the Digital Innovation Hub on Business Intelligence & Innovation.

- Repeated efforts for establishing new projects can be reduced
- Reduced efforts for individual partners to research best practices
- Shared knowledge about existing and previously conducted projects to reduce project redundancy in the region
- Struggles to identify the right use case for the needs can be reduced
- - involved stakeholders need to be kept motivated to participate
- - dependency on contributions of others
- - slower planning through more involved parties
- - overhead in planning for coordination
- Several competing service providers may make similar offers -> industry is "confused"
- BIIH is smaller in size than its competitors
- Companies require access to innovation networks

Hub ontology & implementation

- up to 100 research positions / overview - additional expenditure

Services: Business & industry needs

- Requires high computing power or good infrastructure to run the algorithms.
- The complexity of the processes
- Customers are difficult to convince, as there are no precedents yet
- Quality must be maintained
- Lack of feedback

3.3. Opportunities

The participants announced to following opportunities about the design, development, and implementation of the Digital Innovation Hub on Business Intelligence & Innovation.

- Advanced innovation engineering with stakeholders (S3 stakeholders)
- Technology- and Innovation exchange (which minimize the transactions costs)
- Supplement missing expertise of individuals
- Collaborative research for up-and-coming topics
- Establishing new collaborations between individuals
- Generating new project ideas through networking
- Minimizing possible risks through shared responsibility
- New project collaborations
- New project ideas through inter-disciplinary collaboration
- Enabling shared quality standards
- Coordination of R&D efforts
- Easier access to new technologies
- Combination and usage of different approaches
- Bringing together competing participants to achieve collaborative solutions
- Increase digital maturity in the region
- Develop awareness of "lagging" digital champions (from other regions)
- Data and data analysis have shown weakness in pandemic -> companies might be interested in solutions fitting their specific needs -> requires a better understanding of situation/threads
- Increase in interregional cooperations/collaborations/knowledge transfer
- Creation of opportunities for involved partners beyond BIIH scope
- Increase in regional robustness due to better/stronger regional cross-industry network (established through BIIH)

Origin, Vision & Mission

- Location Vorarlberg

- DACH Region (Germany, Austria, Switzerland + *Liechtenstein*)
- Quantity of companies and partners

Hub Ontology & Implementation

- Funding through cooperation with federal ministries and state institutions
- Getting knowledge through feedback

Services: Business & Industry needs

- AI will become increasingly important
- Spectrum still expandable
- Little competition
- Enough potential customers on the market
- Use existing key figures and learn from them
- The network will be extended by word of mouth
- Collaboration of companies can bring together the best from all companies.
- Science Contest

3.4. Threats

The participants announced to following threats about the design, development, and implementation of the Digital Innovation Hub on Business Intelligence & Innovation.

- Reduced effort to keep up with state-of-the-art technologies and methods
- Creation of new possibilities and inter-connected projects to drive innovation
- Easier collaboration with partners across the country borders
- If no one commits to a shared effort first, others may also just wait
- One-sided projects can lead to taking more effort than without partners
- Limited awareness of the topic
- Low research commitments by local industry
- Stakeholders have specific interests that can not be provided/realized by BIIH
- Industry seeks specific solutions instead of knowledge transfers (BIIH seen as solution provider)

Hub Ontology & Implementation

- Companies and institutions often just want to passively participate and pull information but don't like to share.

Services: Business & industry needs

- Already existing companies that improve machine optimizations/diagnoses
- Conservative companies will not participate
- Very specific, not adaptable in other companies
- Focus on the right network

4. Additional evaluation based upon

This chapter presents the participants' responses to the questions on how is and what is the Digital Innovation Hub on Business Intelligence & Innovation contributing to …

- Sustainability? (including environmental, economic, and social sustainability aspects)
- Human-centricity? (including workers' health, wellbeing, and empowerment, as well as re-skilling and up-skilling activities)
- The resilience of industry? (including technological and process/supply chain/organizational aspects)

4.1. Sustainability? (including environmental, economic, and social sustainability aspects)

Tying together technology and sustainability agendas is an opportunity for discovering how to effectively connect the technology with the needs of the people by constantly decreasing climate change. However, this requires leaders as well as the right environment to help drive change toward measuring and tracking value from sustainability, connecting it tangibly to people, and factoring that value in technology, innovation, and environment investment decision-making.

- By supporting the companies in the region, the level in the economic area increases
- Theoretical approaches and networks help to avoid expensive and time-consuming mistakes in practice.
- By keeping up with state-of-the-art technologies and sharing the knowledge to all involved individuals the adoption of new, sustainable technologies for the regional industry is more accessible, cheaper, and takes less effort.
- Through shared knowledge with all stakeholders, fewer redundant projects need to be conducted. With less repetitive projects, fewer resources are being consumed.
- Associated projects work in the area of ESG (environmental, social, governance) measurement/analysis
- Digital solutions allow saving raw materials (for too many prototypes, etc.)
- Digital processes are more flexible (specific solutions vs. one-fits-all)
- Data gathering can be used to identify environmental harmful factors and solutions for improvement can be derived

- Data-driven solutions allow better lifecycle management of tools/machines

4.2. Human-centricity? (including workers' health, wellbeing, and empowerment, as well as re-skilling and up-skilling activities)

- Employee quality increases/striving for "New Work
- Through the different methods, all employees can participate/be involved.
- Innovative employees who may not be heard in large companies can make themselves heard in such a network.
- By creating a central collection of quality standards and measures, best practices on how to meet those standards can be created. By following these best practices, the working situations for each worker can be increased with reduced effort for each stakeholder.
- Workers can use BIIH for re- and up-skilling

4.3. Resilience? (including technological and process/supply chain/organizational aspects)

- By means of the Digital Innovation Hub, proven systems from practice can be passed on to the entire industry, thus increasing the overall industry capability.
- Errors from practice can be analyzed and avoided for participating companies and institutions in the network.
- Economic growth is accelerated
- Technological developments are adapted more quickly in an industry.
- Building a broader coalition of sharing and support across business communities and other key stakeholder groups and reinforcing the connection of technology and innovation.
- Resilience can be increased by planning/consideration of rare/external/lasting effects -> digit solutions support here
- Digitization enables data gathering for condition monitoring
- AI allows to support decision makers in complex situations
- Simulation allow to investigate rare and extreme events

5. (*Expected*) Impacts for your tackled business/industry, region, country & Interreg

Within the following section, the (expected) impacts of the Digital Innovation Hub on Business Intelligence &Innovation for the (regional) business and industry are presented. Furthermore,

the (expected) impacts for the region of the Federal State of Vorarlberg, the Republic of Austria, and Interreg Central Europe is presented.

5.1. Regional Business & Industry

Establishment of a knowledge hub within the region

Participative co-working and co-creation of business, industry, society, academia, and government

Withstand global competition – innovation as a capability

Development of a (regional) innovation network; Open Innovation: integration of different perspectives of vertical and horizontal stakeholders and innovation partners

5.2. Federal State of Vorarlberg

Further development of the Smart Specialization Strategy "Intelligent Production"

Capturing of the demand of business and industry within the region

Governance and decision making

Development and re-engineering of targeted innovation funding mechanism

Increase of the economic position and better respond to global challenges

Attract of the region as a liveable workplace

Innovative region

5.3. Interreg Central Europe

Interconnected knowledge sharing and gaining

Harmonization of knowledge gaps

Interregional interaction and cooperation

An increased exchange between regions

6. Closing Remarks

The Digital Innovation Hub on Business Intelligence & Innovation is the main result of the Vorarlberg University of Applied Science (FHV) out of the Interreg Central Europe project 4Steps: Towards the application of Industry 4.0 in SMEs. This deliverable at hand is about the "Pilot Report": the introduction and implementation of the Digital Innovation Hub into the region of the Federal State of Vorarlberg (and beyond; deliverable WP3, D.T3.3.3). It presents the strengths and weaknesses as well as opportunities and threats of the Hub for tackling business/industry, region, country & Interreg. Furthermore, this deliverable presents the expected impacts of the Hub on tackled business/industry, region, country & Interreg. It is the second out of three process and implementation steps.