Interreg CENTRAL EUROPE
European Union
European Regional Development Fund
4STEPS

# PROTOTYPE OF SMART SERVICE FACTORY OF THE FUTURE

Deliverable D.T3.3.1

Deliverable report

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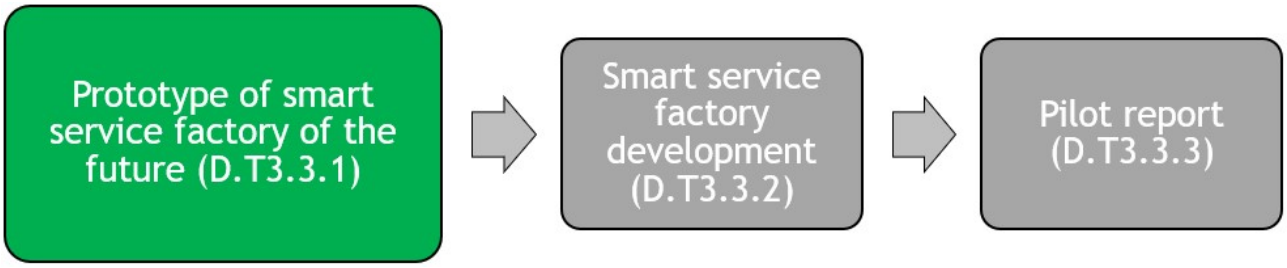
## Contents

# Executive Summary/Management Summary

The Digital Innovation Hub (DIH) “Business Intelligence & Innovation” is a regional innovation hub within the Federal State of Vorarlberg / Austria. It is a service centre of the FHV which appears -currently- 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 customisation, increased speed, better quality and improved productivity and its development is supporting the RIS3 in the target regions in the different sectors.




As depicted in figure XXX, 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.

This deliverable is about phase 1 and summarizes the resource-base of the Digital Innovation Hub on “Business Intelligence & Innovation” and how these resources contribute to the prototype of smart service factory of the future. In doing so, it presents the Hub resources of customers, people (quadruple helix participants, employees), information and technology and considers their particular needs and requirements to set-up and to simulate an automated smart service factory of the future.

This document at hand consists of 7 chapters. Chapter 1 is about the introduction of the business needs and requirements. It presents the economic background and innovation capacity of the region of the Federal State of Vorarlberg and the smart specialization strategies addressed by the Hub. 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 question how the Hub's resources contribute to the prototype of smart service factory of the future. Chapter 4 and chapter 5 present the available resource stock of the Hub "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,

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# 1. Introduction (incl. business needs and requirements)

The Digital Innovation Hub "Business Intelligence & Innovation" is a regional innovation hub within the Federal State of Vorarlberg / Austria. It is a service centre of the Vorarlberg University of Applied Sciences and its appearance is -*currently*- mainly virtual.

## 1.1. The Federal State of Vorarlberg: Economic background

The Federal State of Vorarlberg/Austria is embedded in the international region of the Lake of Constance. It is surrounded by the countries Liechtenstein and Switzerland in the West, Germany (Baden-Württemberg, Bavaria) in the North and Tyrol (Austria) in the East. At the cut-off date of 31st March 2020, Vorarlberg was home to 427.758 citizens (398.657 main residences, 29.101 second residences). Vorarlberg counts 161.629 dependent employees and 16.915 commuters to Liechtenstein and Switzerland. Vorarlberg is one of the strongest economic regions in Europe. The basis of the economic power is an above-average level of industrialization, coupled with competitive trade and export, numerous innovative enterprises and a strong tourism industry. The export/import quota is positive – Vorarlberg exports more than it imports (10.691 Mio Euro export vs. 7.930 Mio EUR import). Main trade partners are Germany, Switzerland, Italy and France. [1]

## 1.2. The Federal State of Vorarlberg: Innovation capacity

Vorarlberg is a highly active region in the field of innovation. For example, in 2019, 116 regionally developed patents have been filed to the Austrian Patent Office. The Government of the Federal State of Vorarlberg committed itself to five smart specialization strategies that are Smart Textiles, Energy- and Energy Efficiency, Human and Technology, Education and Health and Intelligent Production. In doing so, the Government released several lighthouse and innovation projects. Based on a survey about digital transformation in enterprises, 93% of interviewed managers[2] within Vorarlberg expect impacts caused by technological change and digital transformation.[3]

## 1.3. Smart Specialization within the Federal State of Vorarlberg[4]

Smart specialization strategies are captured in the economic mission statement Vorarlberg Wirtschaftsleitbild 2010+ (Update 2014) and the science and research strategy Wissenschafts- und Forschungsstrategie Vorarlberg 2020+ (WiFo 2020+). The

[1] A preliminary version of this section was presented as

[2] Source: …

[3] A preliminary version of this section was presented as

[4] A-Ring (von Hanno Kalkhofer)

WiFo 2020+ is developed in order to establish a groundwork for the targeted further development of the science and research landscape in Vorarlberg, particularly regarding applied science and research as well as providing guidelines for policymakers to create suitable framework conditions. The central points of the strategy are the expansion of the currently low developed science and research structures, the continuous increase of the regional R&D rate to build on the existing potential of inter-company research through even more targeted promotion.

Six different goals with 16 concrete fields of action and 50 measures were defined that aim to (1) further increase awareness of the importance for the future of science, (2) research and innovation for Vorarlberg as a business location, further development of the science and research location Vorarlberg (at strategic level), (3) increase spending on research and development in Vorarlberg, (4) development of human potential and qualification for society and economy, (5) further stimulation of the research and innovation potential in Vorarlberg's companies and (6) further internationalisation of science, research and innovation activities.

The Smart Specialisation Strategy is particularly relevant in the second objective, especially in the field of action that involves the demand-driven development of existing inter-company and non-university research facilities. A concrete measure relates to the selective expansion of these facilities through the expansion of existing, and the establishment of new R&D focal points in line with Vorarlberg's needs, particularly in the areas of Smart Specialization. By elaborating a Smart Specialization Strategy, development priorities are to be set and investments bundled in those areas where existing knowledge and technologies in the region are to be found and have the potential to be develop further. Existing synergies are to be used more intensively and redundancies avoided, and a critical mass is to be achieved in the field of strength, i.e. going beyond successful individual players. The Smart Specialisation Areas are Smart Textiles, Energy and Energy Efficiency, Education and Health, Humans and Technology and Intelligent Production. The endeavours of the DIH on Business Intelligence & Innovation relates to the Smart Specialisation Area Intelligent Production.

# 2. Theoretical embeddment & contextual underpinning: Factory of the Future & *(European)* Digital Innovation Hub

Within this chapter, the theoretical embedment and contextual underpinning of the Digital Innovation Hub on Business Intelligence & Innovation is presented. As presented, these are the Factory of the Future paradigms and the Digital Innovation Hub initiative of the European Commission.

## 2.1. *Theoretical embedment:* Factory of the Future

Since the emergence of the fourth industrial revolution, stakeholders within the fields of supply chain management and manufacturing experience increased innovation activities towards internally and externally interconnected Factories of the Future (FoF). FoF is a vision that blurs traditional boundaries in organizations: it is a "new industrial revolution" and requires a re-design of organizational and operational structures, incl. the increased integration of all supply chain stakeholders equally into supply chain services and processes.[5]

The "Factory of the Future" (FoF) paradigm is an initiative of the European Commission and was launched first in the year of 2008. The FoF paradigm aims to develop a sustainable and competitive EU manufacturing industry. In its first iteration, the European Commission's initiative included the development of high added value manufacturing technologies that are also clean, highly performing, environmentally friendly and socially sustainable. Due to ongoing digital transformation of the manufacturing industry, the FoF paradigm nowadays describes the manufacturing facilities as digital, fully integrated plants evolving to smart-service cyber-physical systems.[6] Objectives of FoFs are not only to be smart and technologically mature but highly performing, environmentally friendly and clean as well as socially sustainable. In our approach, FoFs are considered as service systems that again consist of a variety of heterogeneous service systems (network of independent but interrelated service systems).[7]

Especially in the German speaking countries (but also in neighbouring countries and beyond), FoF is highly associated with the Industry 4.0 (I4.0) approach.[8] As the Association of German Engineers in collaboration with the American Society of Mechanical Engineers highlights, FoF is a "product" of continued adoption of advanced manufacturing technologies into industrial processes. FoFs base upon the extended enterprise approach wherein business stakeholders (suppliers, customers, and other business partners) are pro-actively involved. This approach towards the collaborative creation of value is a major principle in the discipline of Service Science.[9]

FoF is a global trend[10] and an emergent field of organizational investment. As, for example, McKinsey&Company identifies, FoF captures investment opportunities in new materials, product design, manufacturing technologies, IT, and business models. These categories cover a broad range of innovative technologies, such as advanced robotics, additive manufacturing, digital manufacturing, big data, internet of things, etc.

[5] A preliminary version of this section was presented as Würzburg
[6] A preliminary version of this section was presented as Bled
[7] A preliminary version of this section was presented as Würzburg
[8] A preliminary version of this section was presented as Bled
[9] A preliminary version of this section was presented as Würzburg
[10] Initiatives identified, e.g. USA (Advanced Manufacturing Program), European Union (European Factories of the Future Research Association), Germany & German speaking countries (Industry 4.0), Great Britain (Factory 2050), Japan (Science & Technology roadmap), South Korea (Vision 2025).

Additionally, FoF aims to implement flatter management structures accompanied with highly skilled and IT-liberate workforce.[11]

## 2.2. *Contextual underpinning:* Digital Innovation Hub

The European Digital Innovation Hub (EDIH) is a research, innovation and investment programme of the European Commission. It can be considered as the supplement of the "Factory of the Future". The EDIH program was launched by the European Commission with the objective to support European businesses, industry, and regions to succeed the Digital Transformation. It is an instrument and tool from the European Commission's Smart Specialization Strategy to digitise European organizations (considered as service systems within this article) as well as to boost investment through strategic partnerships and networks within. The EDIH program provides a broad range of services towards digital challenges and organizational innovation that support the design and development of heterogenous Digital Innovation Hubs within the European regions.[12]

Related to the Draft Working Programme of the European Commission (2019), EDIHs are one-stop shops and shall provide access to technical expertise and experimentation. It is a concept that builds upon previous experiences and organisations to digitalize business, industry and the regional ecosystem. Their aim is to support companies *-especially small and medium sized organizations-* to become more competitive with regard to their business/production processes, products, or services using digital technologies. Doing so, organizations should be able to "test before invest" within the facilities of DIHs. Further services assigned to EDIHs are, for example, provision of innovation services, incl. to better organise the innovation support system in the region, start-up support (assist start-ups who are based on digital technologies) and innovation in more established companies (support more mature companies with the development of new products and services that are not fully exploiting the digital opportunities yet), matchmaking and connection of actors and stakeholders, financing advice and training, and skills development that are needed for a successful Digital Transformation of the business, industry and/or the region. Actors and stakeholders of Digital Innovation Hubs are, for example, RTOs, universities, technology companies, governmental institutions, etc. and their main service is to support the Digital Transformation of businesses, industry and the regional ecosystem.[13]

[11] A preliminary version of this section was presented as Würzburg

[12] A preliminary version of this section was presented at the ICORES conference

[13] A preliminary version of this section was presented at the ICORES conference

# 3. Digital Innovation Hub "Business Intelligence & Innovation"

The Digital Innovation Hub "Business Intelligence & Innovation" is organized as a virtual service centre of the Vorarlberg University of Applied Sciences and shall be the main innovation anchor between economics and academia in Vorarlberg. It acts as an intermediate between business, academia and government and aims to support the region of the Federal State of Vorarlberg in the advancement of the Smart Specialization Strategy "Intelligent Production". The centre of the Business Intelligence & Innovation Hub is to boost research, technology and innovation for a sustainable, competitive and profitable regional development (within society, business and industry) and thus the introduction of the paradigm of Smart Service Factories of the Future in the region of Vorarlberg/supra-region Alpine-Rhine – Lake of Constance.

The Business Intelligence & Innovation Hub is a supportive, cross-organizational and non-profit organization for regional stakeholders (and beyond: the neighbouring regions of the Federal State of Vorarlberg). By being part, the Hub-stakeholders (transregionally) cooperate and collaborate to expand existing R&D focuses and to establish new R&D areas and priorities that are emergent to the stakeholders of the region. Core services assigned to the Business Intelligence & Innovation Hub are Artificial Intelligence, System/Ecosystem Collaboration, Resilience Engineering, Innovation Research & Disruptive Innovation, Methods & Tools and Co-Creation/Networking. The services provided by the Hub stakeholders are in alignment with the research strategy of the Government of the Federal State of Vorarlberg and are about:

- Awareness creation of the future importance of research, technology and innovation within the region and its international cooperation
- Awareness creation for high-class research, technology and innovation within business, industry and society
- (Further) Development of the Federal State of Vorarlberg as an important research, technology and innovation location within the European Union and beyond
- Strengthening of organizational innovation competences and capabilities
- (Further) Development of human resources and its qualification for business and industry
- Promoting research, technology and innovation potentials in business, industry and society
- Promotion of a regional research, technology and innovation "environment" – test before invest
- (Further) Development of inter-organizational research, development and innovation infrastructure and the co-creation of the stakeholders

- Promotion of knowledge- and technology-oriented start-up foundations
- Intensification of the international cooperation of the Vorarlberg science and research institution
- Expansion of cooperation with economically relevant R&D facilities around Vorarlberg
- The Digital Innovation Hub "Business Intelligence & Innovation" is organized by the Vorarlberg University of Applied Sciences, Department Business Informatics

The DIH "Business Intelligence & Innovation" is a virtual organization and is composed of transdisciplinary researchers from the field of business administration and economics, business informatics and information systems, informatics, mathematics, and industrial engineering.

## 3.1. Hub Ontology

The DIH "Business Intelligence & Innovation" is organized and managed by the Vorarlberg University of Applied Sciences research department Business Informatics. As depicted in figure 1, the Hub is composed of a broad variety of internal and external stakeholders and business partners to co-create value and (service) innovation.

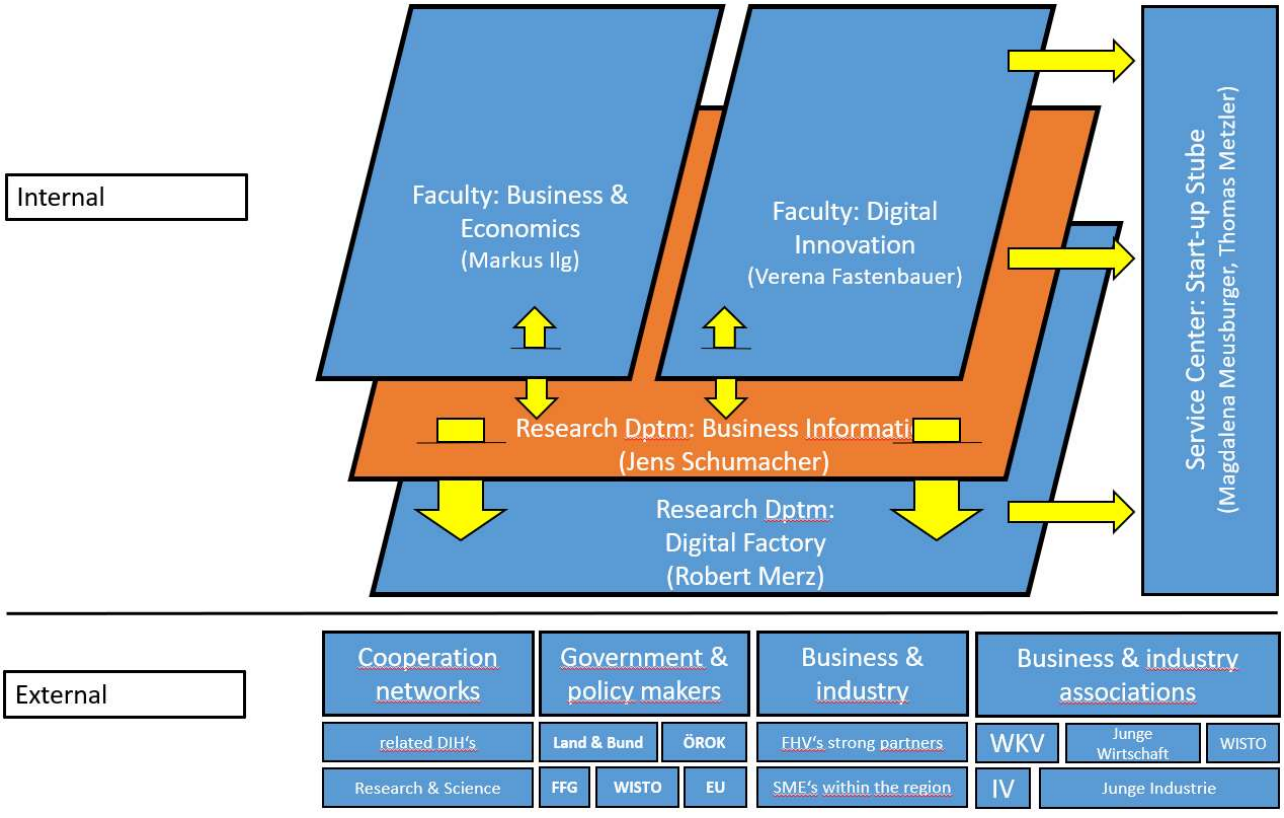


Figure 1: System ontology of the DIH on Business Intelligence & Innovation

## 3.2. Stakeholder Network & Business Partners

Within this section the core stakeholders of the DIH on Business Intelligence & Innovation are presented.

### 3.2.1. Internal Stakeholders & Co-Creators

Internal Stakeholders and co-creators of the Hub are the Faculty of Business & Economics, startupstube and research centre Digital Factory.

- The Faculty of Business & Economics is organized as a competence centre of the Vorarlberg University of Applied Sciences. The tasks of the competence centre include:

    - teaching in the business administration degree programs,
    - the cooperation with companies in the region,
    - the transfer of technical, social and methodological competencies to the region,
    - and the application-related further development of business management knowledge.

- The service centre startupstube of the Vorarlberg University of Applied Sciences brings students from different disciplines together and supports them during the start-up process. The employees of the startupstube act as supervisors and offer start-up enthusiasts and innovators entrepreneurial development space and inspiration, create proximity to the regional and international innovation ecosystem and promote exchange with like-minded people. They perform two main activities:

    - Awakening entrepreneurial spirit: With targeted activities and innovation scouting, the entrepreneurial spirit is promoted and anchored in the minds and hearts of students and employees. The startupstube is a meeting place, both in the virtual and physical space.
    - Supporting those interested in starting a business: Through collaborative offerings, the legal, conceptual, design, and communication hurdles of starting a business are overcome together.

    These services are offer through matchmaking and provision of resource access. The employees establish the connection to regional and international partners for concrete start-up projects. For example, through access to industrial partners, venture capital companies, legal advice or funding; as well as participation in regional and international meetings and competitions. Depending on the maturity of the project, employees of the startupstube

support start-ups with individual mentoring, IT infrastructure and access to the labs and workshops at Vorarlberg University of Applied Sciences.

- The research centre Digital Factory acts as the operational unit of the DIH "Business Intelligence & Innovation" and addresses various aspects of digital transformation and digitization in the production of goods. The vision towards the smart factory of the future is data-based, agile, intelligent and transparent. Their machines, and control and planning systems are highly interconnected internally as well as across companies. Information technology has become the most important and decisive factor for successful companies. The complexity, the enormous variety of topics and the lack of human resources present companies with great challenges in the development and introduction of digital strategies. Services and field of research include: Factory and production control, data analyses for status reporting (dashboards), predictive maintenance or production and quality optimization, automation of production sequences and networked business processes, IT security aspects, collaboration of humans and machines, methods for the digital twins, use of virtual and augmented reality, networking of machines and plants as well as a variety of topics relevant to the digitalization and digital transformation of "ordinary" manufacturers to a smart factory of the future.

### 3.2.2. Network collaborators and co-creators from business & industry

From the field of business & industry, the Hub is mainly engaged in associations for business and industry that are: the Wirtschaftsstandort Vorarlberg GmbH (WISTO), Chancenland Vorarlberg, the Vorarlberg Chamber of Commerce and its youth organization (Junge Wirtschaft Vorarlberg) as well as the Vorarlberg Federation of Industries (IV) and its youth organization (Junge Industrie Vorarlberg). WISTO supports and grants industrial and entrepreneurial innovation projects as well as organizes Chancenland Vorarlberg: a platform to recruit knowledge workers for the Vorarlberg labour market. The Vorarlberg Chamber of Commerce represents the interests of businesses and entrepreneurs within the region. The Vorarlberg Federation of Industries represents the interests of the industry. The Junge Wirtschaft and the Junge Industrie – the youth organizations of the Vorarlberg Chamber of Commerce and the Vorarlberg Federation of Industries – represent the interest of young entrepreneurs and start-up organizations within business and industry. For example, an initiative of the Junge Wirtschaft that could be relevant for the Hub is Startupland. It provides a platform for entrepreneurs and start-ups and is active in networking and interest representation. The Business Association Vorarlberg, the Vorarlberger Trade Association, the Export Club Vorarlberg and the Marketing Club Vorarlberg could be identified as further stakeholders from business and industry. These organizations support and to lobby for the economic objectives of businesses.

Further network collaborators and value co-creators are thematic associations, e.g., the Logistic Research Austria, the Verein Netzwerk Logistik, its regional branch Verein Netzwerk Logistik Region West and the platform Industrie 4.0. Logistic Research Austria is an association composed of universities (of applied sciences) within Austria that investigate into the fields of logistics and supply chain management. The Verein Netzwerk Logistik is Austria's largest industrial business network in the field of logistics and supply chain management. It has several branches within Austria (incl. Vorarlberg: Verein Netzwerk Logistik Region West) and beyond (e.g. Switzerland).

(Private) Initiatives: there exists a variety of (private) initiatives within the region of Vorarlberg. These are, for example, Platform V and the Platform for Digital Initiatives. Platform V aims to provide an industrial platform for collaborative design and engineering of disruptive and digital business models. The Platform for Digital Initiatives is an association for (young) innovators and provides a makerspace for business, industry, and society. Another relevant stakeholder could be Interactive West. This is the largest conference on digital transformation within the region of the Lake of Constance. The platform Industrie 4.0 is a national initiative to bring together business, industry, politics and academia and to discuss the emergent trends and technologies within the field of the digital transformation.

### 3.2.3. Network collaborators and co-creators form government & public administration

The Government of the Federal State of Vorarlberg is a primary stakeholder from the field of politics and government for the DIH "Business Intelligence & Innovation". The government is the owner of the Vorarlberg University of Applied Sciences. Based on the "Verordnung des Landeshauptmannes über die Geschäftseinteilung des Amtes der Vorarlberger Landesregierung (ALReg-GE)", departments of special interest are the departments for European Affairs (§2 ALReg-GE Art. c)), Science and Education (§4 ALReg-GE Art. b), Gruppe II) and General Economic Affairs (§8 ALReg-GE Art. a), Gruppe VI). Further important stakeholders on a governmental level are the Federal Ministries of the Republic Austria for (1) Education, Science and Research, (2) Digital and Economic Affairs and (3) Climate Action, Environment, Energy, Mobility, Innovation and Technology. These ministries enable the connection to a broad variety of accompanied stakeholders from Austria, Europe and global.

### 3.2.4. Network collaborators and co-creators from civil society & users

Newspapers and journals that are relevant to disseminate the news and progress for the Hub on Business Intelligence & Innovation are Wirtschaftszeit, Die Wirtschaft and Thema Vorarlberg. These are tailored newspaper for managers, decision makers and accompanied stakeholders from the field of executive management, marketing, controlling, manufacturing, HR, etc. Furthermore, Die Wirtschaft and Thema

Vorarlberg are newspapers of the Vorarlberg Chamber of Commerce and deal with topics from business, industry and economy – at both: operational and visionary/philosophical level. NEUE Tageszeitung and Vorarlberg Nachrichten are daily newspapers within the region and supply the citizens in Vorarlberg with current news from politics, economy, technology, environment, social affairs, legislative topics, culture, etc. Taken together, NEUE and Vorarlberg Nachrichten maintain a market coverage of almost 95%. Also relevant for the Hub on Business Intelligence & Innovation are Der Standard and Die Presse. These are national newspapers and maintain a large section for science and innovation.

Beyond the region of Vorarlberg: relevant stakeholders, already identified, are the consortiums of the Interreg Central Europe projects 4Steps, CEUP, Chain Reactions and ECOS4IN. The consortiums complement the Hub with additional, tailored knowledge, expertise and services. A further important initiative is DIHNET.eu, a project that aims to create a pan-European network of Digital Innovation Hubs. A stakeholder from the European Commission's level is the Smart Specialization Platform. This platform captures the tools and instruments to boost smart specialization in the Union's region, incl. the (European) Digital Innovation Hubs.

### 3.2.5. Network collaborators and co-creators from research & education

At regional level, the Vorarlberg University of Applied Science (FHV) and its heterogenous departments and institutions, Schloss Hofen and V-Research as well as WIFI Vorarlberg and the Volkshochschule could be identified. The Vorarlberg University of Applied Science is composed of heterogenous research departments and faculties. These are, for example, the research department Business Informatics (that is the operator of the Hub), the research department Digital Factory and the faculty Business & Economics as well as the study courses on Digital Innovation (Bachelor), Informatics (Bachelor, Master) and International Business Management (Bachelor, Master) as well as the formats of Blickpunkt Wirtschaft and Business Summit. Additional stakeholder is FHV's startupstube and FHV's Alumni network. The startupstube is a support organization for students, scholars, young entrepreneurs, and innovators to bring innovation to the market. The Alumni network consists of people that graduated at the FHV and are now successfully working in business and industry. Schloss Hofen is an education- and training centre at academic level. It provides several academic courses for further qualification and specialization (e.g. business and law, human sciences, health, social affairs, etc.). V-Research is a non-university centre of excellence for applied research, development and innovation. WIFI Vorarlberg and the Volkshochschule Vorarlberg are providers for vocational education and training. For example, WIFI Vorarlberg offers more than 1.800 courses and seminars within a variety of fields related to management, leadership, business, trade, traffic, etc.

Scholarly networks and conferences: a primary stakeholder out of the field of scholarly networks within the region of Vorarlberg is the International Bodensee-Hochschule. This is an international network of universities (of applied sciences) in the regions Alpine-Rhine and the Lake of Constance. It enables scientific exchange among the networking universities. Another relevant stakeholder is the Long Night of Research. The Long Night of Research is a tailored event to connect science with stakeholders from politics, society, industry and business.

### 3.3. Board members

To keep the contact with regional businesses and industries and its needs and challenges, the DIH "Business Intelligence & Innovation" has invited the Vorarlberg Chamber of Commerce, the Vorarlberg Industry Association and WISTO – the Innovation Agency of Vorarlberg to compose the industrial board of the Digital Innovation Hub on Business Intelligence & Innovation.

In doing so, these parties signed a Memorandum of Understanding/Letter of Support for increased cooperation and collaboration in the Federal State of Vorarlberg.

## 4. Resources: Laboratory infrastructures

The Digital Innovation Hub "Business Intelligence & Innovation" can make use of and also offer several facilities and infrastructures, such as laboratories, showgrounds, libraries, manufacturing as well as its machineries, tools and equipment.

### 4.1. Internal infrastructure: Technical equipment

This section gives an overview about the internal infrastructure and technical equipment to be used within the DIH on Business Intelligence & Innovation.

#### 4.1.1. Laboratory: Automation Lab

The Automation Lab is a learning and research laboratory at Vorarlberg University of Applied Science and is used for development of prototypes in the area of Robotics/Industrial Robotics, (Industrial) Image Processing and Control/Control Engineering.

As highlighted in table below, the Automation Lab offers unique machineries and tools for Robotics, Laser Tracking, Industrial Cameras and Illumination to be used in the DIH on Business Intelligence & Innovation.

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| Robotics:<br>• Cobot Universal Robots UR5<br>• 6-axis jointed-arm robot ABB IRB 4600<br>• 6-axis jointed-arm robot ABB IRB 120<br>• SCARA robot Epson G6<br>• Simulation software ABB RobotStudio<br>• Simulation software Matlab Robotics Toolbox<br>• Robot Trossen Robotics WidowX 200<br>• Autonomous mobile Robot MiR 100 | Laser Tracking<br>• Laser tracker API Radian<br>• Image processing software<br>• Halcon (MVTec)<br>• Matlab Image Processing Toolbox (Mathworks)<br>• NI Vision Builder for Automated Inspection (National Instruments) |
| Industrial Cameras<br>• Smart camera Omron MicroHAWK F430<br>• Area scan camera Basler A1<br>• Line scan camera FWL 120 | Illumination<br>• Kaiser eVision reflected/transmitted-light/stand combination<br>• Halogen cold light source, line light illumination with fibre optic cable<br>• LED-dark field illumination CCS LDR-206LA-1-BL |

### 4.1.2. Laboratory: Electronic Lab

The Electronics Lab is mainly used for applied research and training/education purposes. The Electronics Lab is specialized in the areas of electrical engineering, measurement engineering, signal processing, control engineering and power electronics.

As highlighted in the table below, the Electronics Lab offers unique machineries and tools for measurement and (product) testing as well as equipment for manufacturing and software to be used in the DIH on Business Intelligence & Innovation.

| Measurement and test equipment | |
|---|---|
| • 4 channel oscilloscope, 1GHz with the following options<br>• Digital analysis 16bit<br>• Serial bus analysis (e.g. SPI, I2C, UART)<br>• Power analysis<br>• I/Q signal analysis<br>• Logic analyzer, 200MHz<br>• Mobile spectral analyzer, 3GHz<br>• AC power supply, 1kW<br>• DC power supply, 1,5kW<br>• DC load, 1kW<br>• Electrical installation and safeguard tester<br>• High voltage tester<br>• Sound level meter (also usable for mechanical oscillations)<br>• Luxmeter | • Gaussmeter<br>• Rotation speed meter<br>• Stroboscope<br>• Multichannel oscillation meter (24bit)<br>• Universal measurement amplifier (HBM)<br>• 4 channel power meter<br>• Thermal imaging camera to 1200°C<br>• HF signal amplifier for I/Q modulation to 6GHz<br>• 2 channel vector signal analyser to 6GHz<br>• Spectral analyser to 6GHz<br>• High impedance meter<br>• Femtoampere meter<br>• Milliohm meter |

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| Software, e.g.<br>• National Instruments: Electronic Workbench (schematic design / simulation / layout)<br>• Different special compiler (PLC, microcontroller, ...)<br>• Matlab & Simulink (control engineering)<br>• Microchip MPLab Studio<br>• Diptrace schematic designer | Equipment for manufacturing printed circuit boards<br>• Camera based circuit board plotter for manufacturing printed circuit boards and front panels<br>• Semi-automatic, camera based mounting support for SMD parts<br>• Automatic placement machine for SMD parts down to 0402<br>• Reflow soldering oven with pin chain |

### 4.1.3. Laboratory: Mechanical lab

The contributions of the Mechanical Lab towards the DIH Business Intelligence & Innovation cover the areas of measurement and production technology as well as materials testing. One focus is on the machining of complicated turned and milled parts. A serial and a parallel kinematic CNC milling centre as well as a turning and milling centre with driven tools are available for 5-axis machining. Programming of the machines by means of CAM is just as much a part of the laboratory work as reverse engineering by means of 3D digitizing.

The Mechanical Lab at the Vorarlberg University of Applied Science is equipped with and contributes to the DIH Business Intelligence & Innovation with tools and technologies for …

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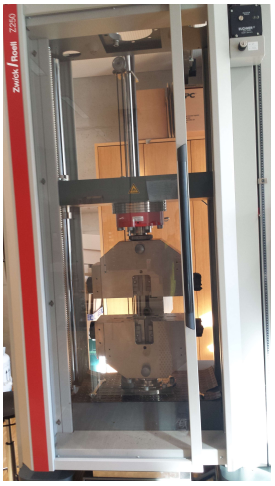
| Materials Testing<br>• Tensile-compression testing machines: Zwick/Roell Z250<br>• Microhardness testing machine: Qness Q10M<br>• CCD spectrometer for metal analysis: SPECTRO SPECTROMAXx<br>• Measuring microscope: OLYMPUS STM-UM<br>• Stereomicroscope: WILD M3Z<br>• Photomacroscope: WILD M400<br>• Surface measuring instrument: Mahr MarSurf M 300 C + RD 18 C<br>• Surface measuring instrument: Mitutoyo SURFTEST SJ-410 | Measuring complicated workpieces<br>• measuring 3D coordinate measuring machine: ZEISS CONTURA HTG 7/10/6 RDS<br>• optical 3D digitizer: GOM ATOS II Triple Scan<br>• Form and position measuring machine: Mitutoyo Roundtest RA-2100DH<br>• Contour measuring device: Mitutoyo Contracer CV-3200H4<br>• 2D height measuring device: Mitutoyo Linear Height LH-600E<br>• Surface measuring device: Mahr MarSurf M 300 C + RD 18 C<br>• Surface roughness tester: Mitutoyo SJ-410 (reference plane touch probe)<br>• Multisensor coordinate measuring machine: Werth ScopeCheck 300/S/Z/ |
| Measuring of small and very small parts<br>• Profile projector: TESASCOPE 300V<br>• Measuring microscope: OLYMPUS STM-UM | Exact length measurement on machine tools, vibration measurement<br>• Laser interferometer Renishaw XL80 |
| CAM milling path creation and turning contour programming | Laser engraving, marking and cutting<br>• 2-axis flatbed laser: Speedy 300 from trotec |

| | |
|---|---|
| • CIMCO Edit<br>• hyperMILL<br>• OKUMA Advanced One-Touch Turning | • 5-axis laser processing system: microSTRUCTvario from 3DMICROMAC |
| **Welding and cutting**<br>• mobile oxyacetylene welding machine<br>• MIG/MAG welder: Fronius TPS 500i PULSE<br>• TIG welder: Fronius MagicWace 3000 Comfort<br>• mobile E-hand power source: Fronius TransPocket 2500<br>• Plasma cutting unit: Hypertherm Powermax85 | **Work preparation**<br>• Column drilling machine: STRANDS S28<br>• Bench drill: ALZMETALL AX 2-T/S<br>• Bench drill: MAXION ECOMAX 14<br>• Band saw: KASTOcutE 2<br>• Circular saw: METORA MKS 100 P |
| **Sheet metal working**<br>• Plate shear: HESSE MTS 1100x4<br>• swing bending machine: SCHRÖDER ASK II 1000<br>• Profile bending machine: GRESSEL HB 14 | **Conventional machine tools**<br>• Lathe: WEILER Praktikant VCPlus WTS<br>• Lathe: WEILER Condor VS 1<br>• Milling machine: FPS DECKEL FP4M<br>• Milling machine: DECKEL FP2 |
| **Grinding**<br>• grinding stand: WASU BS 65 | **Tool preparation**<br>• Tool presetter: ZOLLER smile 400 |
| **5-axis simultaneous milling**<br>• 5-axis milling center: HERMLE C 40 U | **Complete machining turning**<br>• cycle turning machine: KERN CD 402M<br>• turning machining center: OKUMA MULTUS B200-W 750 |
| **CAM simulation**<br>• hyperMILL | **Surface reconstruction of recorded point clouds**<br>• Geomagic Design X |
| **CAD-Konstruktion**<br>• SolidWorks<br>• Siemens NX | **Digitizing of freeform surfaces**<br>• optical 3D digitizer: GOM ATOS II Triple Scan |



### 4.1.4. Laboratory: microtechnology

The laboratory microtechnology measures 240 $m^2$ of floor space and 150 $m^2$ of laboratory floor space with flow boxes. As depicted, this laboratory is equipped with several tools to pursue the aim to build products and its individual components as small as humanly possible. The core areas of investigation and collaboration are:

- the development and production of micro systems
- the development of processes for micro-technical manufacturing
- the research and development for industrial applications
- the fabrication of prototypes and studies on feasibility
- scanning electron microscopy and the analysis of materials

As depicted in table XXX, this laboratory is equipped with and offers following tools and technologies to the DIH on 'Business Intelligence & Innovation':

| | |
|---|---|
| **Lithography**<br>• EVG 101 resist processing system (lacquer unit, 2 hotplates, spray developer)<br>• Süss MA6 / BA6 mask and bond aligner with 365 nm and 193 nm light source<br>• Various ovens and hotplates | **Laser Ablation**<br>• Laser Structuring System: microSTRUCTvario von 3DMICROMAC<br>• Lambda Physik LPF 220 excimer laser for 193 nm<br>• Spirit - High Q Laser / Newport femtosecond laser<br>• 2 Newport xyz precision positioning instruments (100 nm)<br>• Scanlab scanner<br>• Vacuum chamber with spectrometer |
| **Sputter units**<br>• Oerlikon LLS EVO | **Etching**<br>• Adixen AMS 100 DSE plasma etching unit<br>• Wet etching bench with 4 etching basins |
| **Thermal Oxidation**<br>• Programmable diffusion oven - model PEO 604 (ATV Technologie GmbH, Germany) | **Analytics**<br>• Scanning Electron Microscope: JEOL JSM-7100F<br>• X-ray fluorescence analysis: EDAX TEAM Enhanced<br>• White light interferometry: VEECO Wyko NT1100 |
| **Sample preparation**<br>• Manual wet cut-off machine: Struers Labotom-3<br>• Automatic hot-mounting press: Struers LaboPress-3 | • Grinding and polishing machine: Struers LaboPol-5<br>• Lapping and polishing machine: Logitech PM5<br>• Linear precision saw: Buehler Isomet 4000 |

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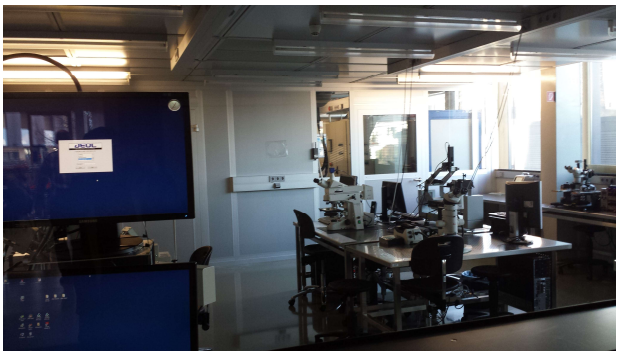
|  |  |

## 4.2. Internal: Design laboratories

The Design Lab (DLab) is a modern laboratory, which is used for teaching and research purposes in all engineering degree programmes. The Design Lab focuses on construction methodologies and is equipped with fully developed 3D-CAD and CAE-technologies, which support and improve the development process.

### 4.2.1. Analogue Lab

Within the Analogue Lab, stakeholders gain experience in the fundamentals of drawing and sketching, using a wide range of techniques (e.g. pencil, graphite, charcoal, chalk, India ink, ink, watercolour, …) and materials (e.g. drawing paper, transparent paper, watercolour paper, grey board, cardboard, canvas, …). Summary introductions and exercises provide the necessary input to allow stakeholders to then discover a graphic/experimental approach for their own study topic.

### 4.2.2. Digital Lab

In the Digital Lab, stakeholders work in the areas of type, form, colour and pattern. Background knowledge in the field of typology, such as the history of writing, measurement systems, legibility, record types and proofreading characters form core elements. When it comes to form, everything from point to surface area is relevant. The topic of colour considers both digital and analogue aspects. Students work with colour from associative, emotional, factual and rational points of view. The topic of pattern presents what the term truly refers to, how it can be used and how to use it effectively.

### 4.2.3. Photo Studio

In the Photo Studio, stakeholders get trained and educated to enact, document or relativize a subject. In this lab, basic skills of photography, such as time and blends, are taught alongside the technical aspects of studio photography and photography as a mean for expression of moods and emotions.

### 4.2.4. Interactive Media Lab

This lab offers stakeholders the opportunity to learn the basics of programming for designers and establishes the bridge between design and technology. In addition, the lab provides students with the opportunity to design and build prototypes. Milling and grinding machines, soldering stations, 3D printers and laser printers are available for this process.

### 4.2.5. Text and Theory Lab

The Text and Theory Lab offers one-on-one coaching providing a foundation in basic epistemology. In doing so, employees offer the opportunity to learn "play" with words professionally. Methods of creative and reflective writing are also subject that are presented and tried out.

### 4.2.6. Audio Lab

In the Audio Lab lectures, exercises and group discussions the fundamentals of sound design and audio engineering are taught. The lab offers a broad range of audio services, incl. the recording of sound and music in a studio context to experiment with instruments (drums, guitars, base, synthesizers).

### 4.2.7. Video Lab

Motivational lectures and exercises in a variety of disciplines in the field of moving images to discover graphic/practical approaches are offered in the Video Lab.

### 4.2.8. Virtual Reality Lab

The Virtual Reality Lab focuses on 3D worlds and virtual reality. 3D computer graphics and animation open the doors to endless creative opportunities, from visualising ideas and products, to animating virtual objects or characters, and to developing digital designs using 3D printing. This lab allows stakeholders to try out and experiment in the wide world of 3D graphics.

## 4.3. Internal: IT laboratories

The IT labs are equipped with the most innovative technology and equipment and are open for students and engineers from the local industry.

### 4.3.1. Networking Lab

The networking lab offers space for experiencing and experimenting with modern technology, e.g. operation systems, routers, switches, hyphenation, the development of modern and open source software. etc. This approach enables students to experience real life situations in an economic environment which may result in an intellectual output for a bachelor or master thesis.

### 4.3.2. Data Base Lab

Modern economy is highly dependent on data and its processing; modes of modelling, organising, approaching and securing data are essential focal points that can be experienced in the Data Base Lab. The visualisation of data and its storage in cloud systems is vital in today's work life. FH Vorarlberg offers a variety of up-to-date virtual server and cloud provider.

### 4.3.3. Software Engineering Lab

The Software Engineering Lab is tailored for the needs of software designers and engineers. It offers modern workspaces, screens, laptop workspaces, a wide range of software installations, virtual data bank servers and workstation computers for their training and qualification.

### 4.3.4. Embedded Systems Lab

The Embedded Systems Lab is about the interconnection of, incl. various testboards of microprocessors (Beagle Board, AVR, ARM, etc.) and mobile devices (smartphones and tablets) that are connected via gateways (WLAN, Bluetooth, ZigBee, DMX, etc.) to sensors, actuators and other input devices. The main objective of potential projects in the Embedded Systems Lab is to elicit and establish methods of software engineering that can be successfully implemented in hardware.

### 4.3.5. Virtual Reality Lab

The Virtual Reality (VR) Lab is equipped with hardware and software for the development of virtual scenes. The laboratory contains the latest technological devices and tools: input devices (Microsoft Kinect, Myo Wristband, haptic devices, Leap Motion,

Eyetracker, magnetic and optical motion capture systems, etc.). Equipment for creative output is also provided, e.g.: (auto-)stereoscopic displays, Head Mounted Displays (Oculus Rift) and 3D printers. The development of these features is based on Game- and VR Engines (e.g. unity) and 3D computer animation systems (e.g. Autodesk Maya).

## 4.4. Library & writing centre

With close to 75.500 media (incl. books, journals, newspapers, … in physical and digital format), the library at Vorarlberg University of Applied Sciences is a knowledge hub for scientific knowledge and expertise. In addition to books, periodicals, CDs and DVDs, the library provide access to thousands of e-books and e-journals as well as countless specialist databases. The collection focuses on the contents of the programmes offered to students at Vorarlberg University of Applied Sciences and includes the fields of economics, technology, design and social sciences. The library also provides a (co-) creation working space for communication and academic work.

## 4.5. startupstube

The service centre startupstube of the Vorarlberg University of Applied Sciences brings students from different disciplines together and supports them during the start-up process. The employees of the startupstube act as supervisors and offer start-up enthusiasts and innovators entrepreneurial development space and inspiration, create proximity to the regional and international innovation ecosystem and promote exchange with like-minded people. They perform two main activities:

Awakening entrepreneurial spirit: With targeted activities and innovation scouting, the entrepreneurial spirit is promoted and anchored in the minds and hearts of students and employees. The startupstube is a meeting place, both in the virtual and physical space.

Supporting those interested in starting a business: Through collaborative offerings, the legal, conceptual, design, and communication hurdles of starting a business are overcome together.

The services are offer through matchmaking and provision of resource access. The employees establish the connection to regional and international partners for concrete start-up projects. For example, through access to industrial partners, venture capital companies, legal advice or funding; as well as participation in regional and international meetings and competitions. Depending on the maturity of the project, employees of the startupstube support start-ups by means of individual mentoring, IT infrastructure and access to the labs and workshops at Vorarlberg University of Applied Sciences.

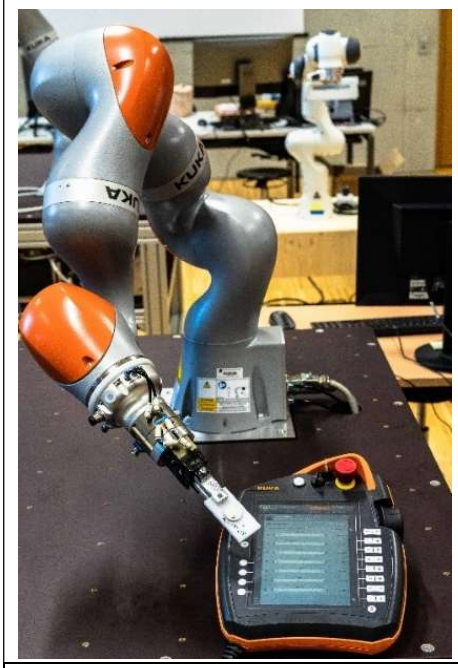
# 5. Resources: Joint Ventures

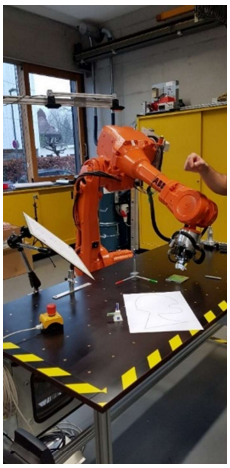
The Hub on Business Intelligence & Innovation can make use and cooperate and collaborate with several joint ventures of the Vorarlberg University of Applied Sciences.

## 5.1. Austrian Institute of Technology (AIT) & Digital Factory (FHV)

Since 2021, the Austrian Institute of Technology and the Vorarlberg University of Applied Sciences are pooling their expertise in the form of a joint venture. Since 2018, employees of the Vorarlberg University of Applied Sciences have already been researching digital technologies for the manufacturing plants of the future at the Digital Factory. Austria's largest non-university research center, the AIT Austrian Institute of Technology, has been one of the strategic partners since mid-2019. On this basis, an interdisciplinary project team consisting of the Vorarlberg University of Applied Sciences and the AIT, coordinated by Wirtschafts-Standort Vorarlberg GmbH (WISTO), designed a jointly supported research center for the location Vorarlberg. Linking the regional university with the competencies of Austria's largest non-university research center opens up access to international research networks, creates inter-company research capacity and expertise and makes this accessible to companies in Vorarlberg. The aim of this joint venture is to make the results of basic research available to the regional economy in the form of products, processes, or services in an application-oriented manner.

- Factory and production control
- Data analyses for status reporting (dashboards)
- Predictive maintenance or production and quality optimization
- Automation of production processes and of interlinked business processes
- IT security aspects
- Collaboration of humans and machines
- Methods of digital twins
- Use of virtual and augmented reality
- Networking of machines and plants
- As well as a number of other topics dealing with digitization



## 5.2. Postgraduate education & training partner: Schloss Hofen

Schloss Hofen is an organization for post-graduate education and training. It provides higher education and master programmes on an academic level in cooperation with universities and universities of applied sciences in Austria and abroad. The programmes in the fields of “Business and Law”, “Health”, “Social Studies” and “Technology and Design” are offered on a part-time basis. Schloss Hofen thus allows managers and employees of the DIH stakeholders to engage in targeted and practical education, training, qualification and further development without interrupting the ongoing careers in business, industry and governance.

### 5.3. Industrial research partner: V-Research

V-Research is a non-university centre of excellence for applied research, development and innovation in the technological-industrial field. V-Research is property of the Government of the Federal State of Vorarlberg (49%) and the Vorarlberg University of Applied Sciences (51%). V-Research' activities aim to meet complex challenges of the economy as well as to ensure the contribution to social development in a non-profit way. V-Research is characterized by the use of innovative methods from the fields of data science and computer-aided optimization, as well as sophisticated methodological approaches in the areas of digital engineering, photonics and tribo design.

### 5.4. European University - RUN-EU: Workpackage 2 - European Innovation Hubs

This collaboration focuses on the creation and growth of sustainable cutting-edge knowledge networks to drive innovation and collaboration in targeted areas, through the development of advanced, pan-European Innovation Hubs which are thematically aligned and have shared teams and infrastructures. The creation of these European Innovation Hubs (EIH) is one of the key strategic drivers of the overall network and key to the future development of RUN-EU. This network of like-minded and regionally focused HEIs considers the existing regional innovation clusters and the new pan-European Innovation Hubs constitute one of the central pillars of sustainable regional development and will, therefore, underpin the collaborative activities to be developed within the framework of this European University.

## 6. Service portfolio

The Hub on Business Intelligence & Innovation offers five core services that are Artificial Intelligence, Innovation Research & Management, Innovation Methods & Tools, Resilience Engineering and System Collaboration. These services are presented in the following sub-sections.

### 6.1. Artificial Intelligence, incl. Evolutinary Algorithms

Within the field of Artificial Intelligence, the DIH on Business Intelligence & Innovation develops, analyses, and investigates into algorithms for data-driven problems and machine learning. The endeavours include modelling, simulation and optimisation for Evolutionary Algorithms Design, Computational Intelligence, Remaining Useful Life, Natural Language Processing and Machine Learning. The algorithms build models, in most cases without pre-specifying the model structure, which in turn is used for predictions or for finding certain structures within the data. Use cases come from all application fields. There are currently projects in the area of predictive maintenance,

the financial industry, and natural language processing. In further consequence, the aim is to focus on the use of new algorithms based on neural networks (like Auto Encoder or Generative Adversarial Networks), investigations with respect to the robustness of these algorithms in case of missing or noisy data, the application of these algorithms for data-driven problems with only a few training examples, and the explainability and interpretability of the found solutions (especially in combination with decision making). High performance computing is capable of solving complex mathematical relationships involving large sets of variables. A very valuable application thereby is system modelling, simulation, and optimization for the development of machine learning capabilities and evolutionary algorithms.

## 6.2. Innovation Management

Innovation research within the Hub on Business Intelligence & Innovation is addressing the challenge to make the regional systems in business, industry, society, and government more innovative and competitive, especially by maximizing their innovation potential. One central role in the applied innovation research approach is the extensive linkage of actors within innovation ecosystems through establishments of quadruple helix clusters/networks. This interconnection allows the development and implementation of new participatory methods and tools to engage end-users – as well as citizens – in innovation processes. The services offered within the Hub focus on Open Innovation & Living Labs, Creative Destruction, Technology Impact Assessment and Urban & Rural Innovation Research. In all cases, innovation is a participative process and involves the actors from society, business/industry, government and academia. The digital innovation hub on Business Intelligence & Intelligence fosters the active dialogue with and among these groups. On regular intervals, we organize and conduct workshops and stakeholder dialogues about technology and digitalization to discuss the impacts for society, business/industry and environment.

## 6.3. Methods and tools

The application of (scientific) methods and tools for management, engineering and design is core to the Hub's system innovation engineering approach. Methods and tools enable the conduction of structured innovation workshops and events with the pro-active inclusion of all stakeholders. Methods and tools applied are, for example:

- Grounded Theory
- Action Research & Action Design Research
- Benchmarking & Scorecard techniques
- Business Model Canvas
- Case Study Research
- Design Thinking

- Open Innovation & Living Labs
- SWOT Analysis
- PESTEL Analysis
- Systems Thinking

## 6.4. Resilience Engineering

The approach towards the engineering of robust and resilient (service) systems of the Hub on Business Intelligence & Innovation originates in the Resource-Based View and the Capability-Based View. Taken together, these synergetic views support systems to adapt and change innovation and emerge to the system's environment and service ecology. Centre of our engineering of robust and resilient system is the Strategic Management Framework to Engineer Organizational Robustness and Resilience (Maurer, 2020). The heart of this strategic management framework is about the Resource-Based View thinking and adopts Alter's (2013) Work System Framework. The Work System Framework supports us to structurally analyse and evaluate "ordinary" resources as well as to design, develop and (re-) engineer them to VRIN resources – resources that are valuable, rare, inimitable and non-substitutable. Objective is to increase the robustness and resilience of the system on resource level and to develop organizational capabilities.

## 6.5. System Collaboration

The Hub employee's thinking in systems is influenced by the academic discipline of Service Science. Within this approach, systems are defined as social entities that transform resources into valuable, rare, inimitable and non-substitutable resources and to develop increased capabilities. System interaction and service value co-creation – the cooperation and collaboration of independent system stakeholders – within and among heterogenous systems and ecosystems is core to launch innovation. Additionally, service interaction and value co-creation enable to gain and share mutual knowledge and expertise towards the benefits of all system stakeholders. In our approach we differentiate between service systems, ecosystems and – as a special form – autonomous systems.

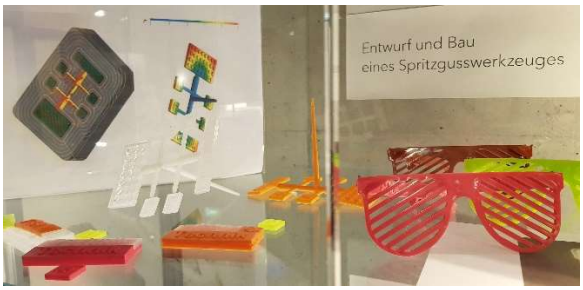
Service Science is an interdisciplinary field of research of service, service systems and service ecosystems as well as how service (eco-) systems interact and co-create value (service). Considered from an engineering perspective on Service Science, major emphasis is on service (eco-) system innovation – the (1) dynamically configuration (transformation) of people, technology, organizations and shared information, (2) computation and calculation of value from a multi stakeholder perspective, (3) reconfiguration of access rights to resources by mutually agreed to value propositions (resp. the access rights associated with entity resources are reconfigured by mutually

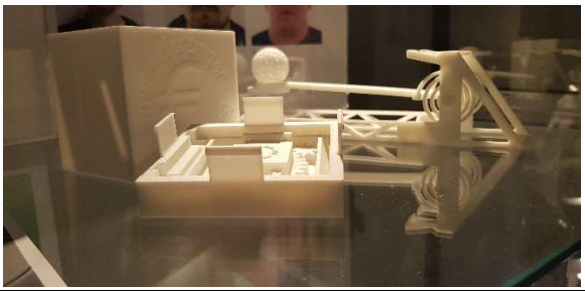
agreed-to value propositions) and (4) computation and coordination of actions with others through symbolic processes of valuing and symbolic processes of communicating (Spohrer et al.,2012; Maglio & Spohrer, 2013).

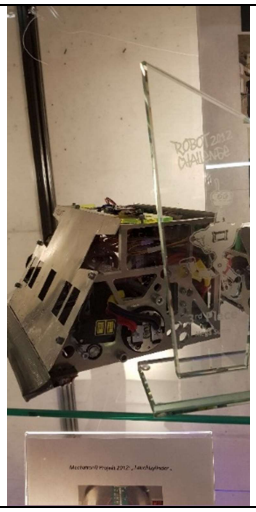
A special form of systems are autonomous systems. Autonomous systems are capable of solving complex tasks independently. They are based on specialized algorithms and methods of artificial intelligence on the basis of machine learning and deep learning. They are learning from data and can largely act without any human interaction even in unknown situations and environments. Examples of autonomous systems are not only classic robots and networks, but also production facilities, vehicles, drones and software systems. The different challenges for creating an autonomous system are the sensing of the environment (e.g. computer vision), interpreting the gathered information automatically, decision-making based on these information and automatically carried out actions to solve the tasks of the system. An additional challenge for creating and working with autonomous systems is the development of an infrastructure and communication methods that allow the different parts.

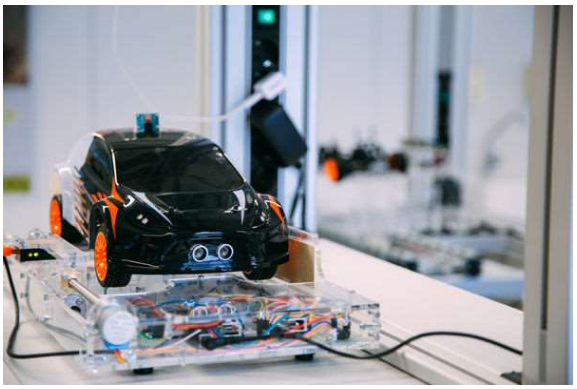
## 6.6. Competitions

On a continuous basis, the FHV encourages and supervises its students to take part in academic competitions. Examples are shown in the figures below. Areas of interest are, for example, the FFG – the Austrian Research and Promotion Agency and EUSALP – EU Strategy for the Alpine Region, youth completion.





# 7. Closing remarks

This deliverable at hand is about the Prototype of Smart Service Factory of the Future: the resource definition of the Digital Innovation Hub on Business Intelligence & Innovation. It is the first out of three process and implementation steps about the design and development of the Digital Innovation Hub. This Digital Innovation Hub 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.