EcoSystems and Technology Enterpraunership

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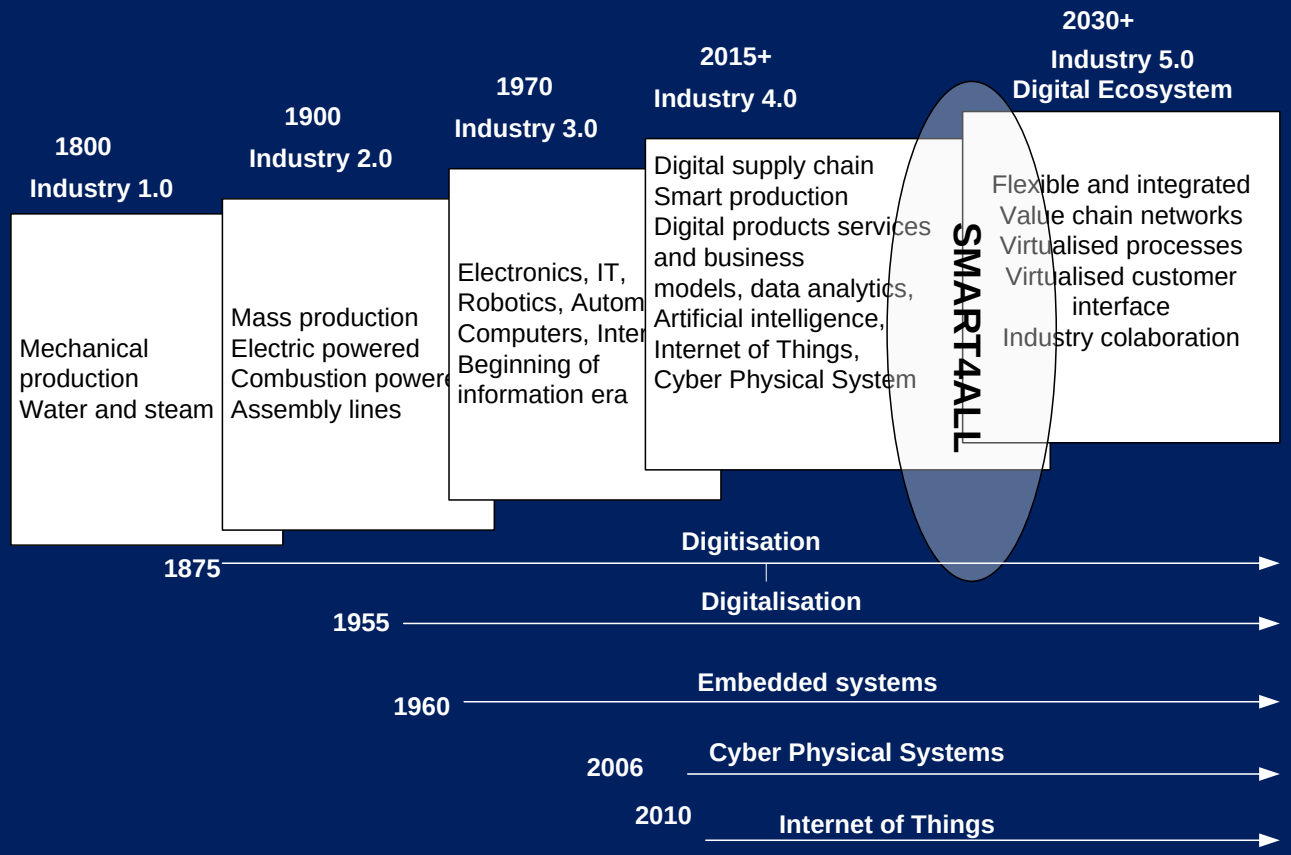
www.mant.me

Overview

- Industry 4.0-5.0 Ecosystem
- Digital economy in SEE
- DIH as an solution
- Technology enterpraunership
- Conclussion

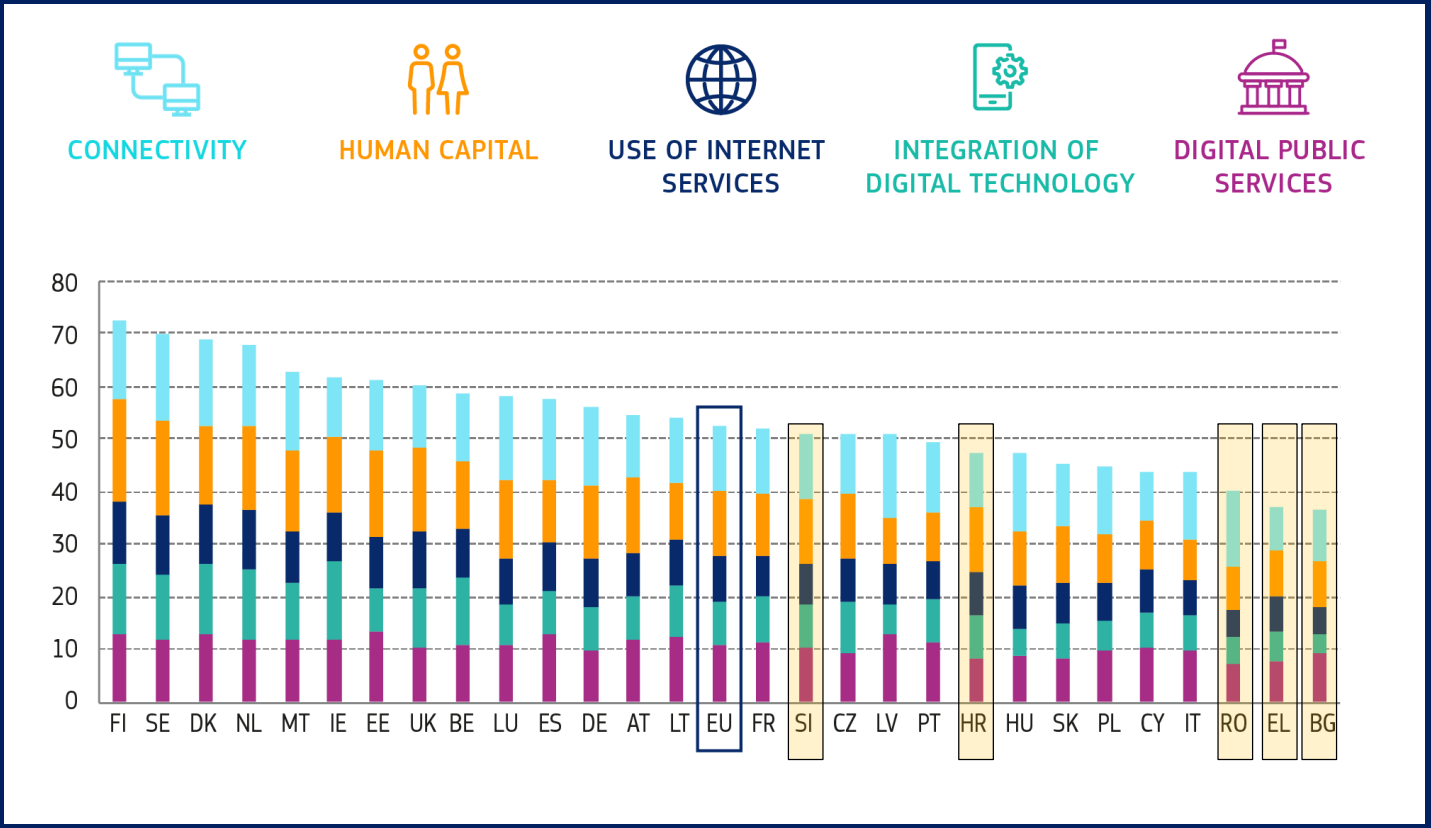
SMART4ALL ECOSYSTEM

- We are between Industry 4.0 and Industry 5.0



Digital economy in SEE

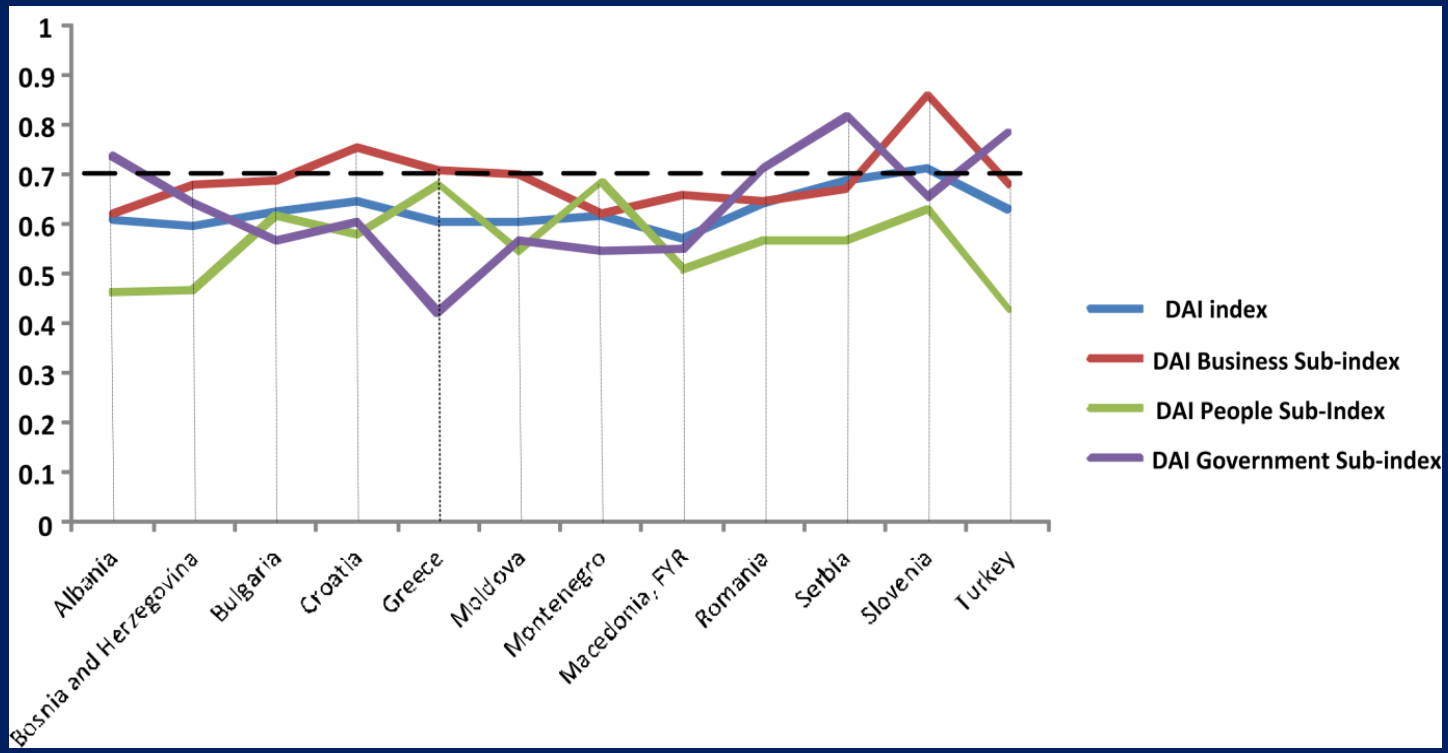
- DESI index for EU countries with EU average and position of 5 EU SEE countries



Digital Economy and Society Index (**DESI**)

Digital economy in SEE…

- DAI index for SEE Countries



Digital Adoption Index - DAI

Digital economy in SEE…

The Strengths

- Although below average of EU 28 the ecosystem scene in SEE is developed in the following countries: Slovenia, Croatia, Bulgaria, Romania, Greece and, in some respect, Serbia.
- The ICT broadcasting infrastructure is developed enough with predictions of further investments in this area.
- Almost most of the population is connected by some of communication means be it internet, mobile phone or other.
- The use of the internet is satisfactory in young generation and in stakeholders dealing with startups and ecosystems.
- Some countries like Montenegro already have good legislative in this area, North Macedonia and Serbia have as well stimulating laws for entrepreneurs in this area.
- Majority of SMEs and already existing start-ups have good indexes in relation to Business technology integration dimension performances, especially in Electronics Information Sharing, Business connectivity, Social Media, Selling online cross border.

Digital economy in SEE…

The Weaknesses

- Balkans economies and Turkey are generally well behind EU28 Member States in advanced digital skills – with Serbia being closest to the EU average. The lack of human capital can be especially noted in the areas related to IoT and Industry 4.0 (Practically, only few actors are present in this area for all WB countries).
- The influence of politics to startups and ecosystem community is not very simulative, in many segments it has the discouraging role of a trend-breaker.
- Utilization of transaction services for banking and shopping has risen modestly in Western Balkans economies and Turkey over the past four years, but they still remain far behind the EU28 average.
- Cloud computing is in the beginning phases of development, especially in Albania, Macedonia, Montenegro, Kosovo and Albania.
- The limited data provided reveals that Western Balkans economies are generally performing below EU28 averages
- E-Government is not developed enough and it can be considered as one of the critical points

Digital economy in SEE…

The Weaknesses…

- All countries are lacking in subventions in tax polices (VAT, tax exemptions, reduced tax rates for innovative products and services, subventions for employees in this sector, ect.
- etc) for the innovative products.
- Customs don’t have the understanding for the trade of innovative goods or services.
- Cross-border communication for ecosystems doesn’t exist.
- Brain drain is still dominant.
- Although they have had good education during the Socialist Era, and have since then implemented the Bologna reforms, the practical oriented education is in fact very poor over all the Region, it produces non-competent IT profiles, especially in Bosnia, Montenegro, Kosovo and Albania.
- Big companies such as electricity or telecommunication-providers support startup community or ecosystems, but with dishonest intentions, since they foremost in order to present themselves as a social-responsible actors and thus advertise their brands.

Digital economy in SEE…

The Weaknesses…

- E-Commerce within WBC countries is not commonly used. Some of the countries do not have access to PayPal and similar services.
- State grants for innovations and startups does not exist only for the means of “propaganda” in an overall symbolic level.
- No Private funds in any form like finance angels or venture capitals.
- There is no research or development activities in the industry, while the academia rests on hyper-publishing with no real results.
- Low entrepreneurial culture and lack of education, especially in field of technological entrepreneurship.
- A weak sense of team work especially in the WB countries.
- No many startups in Montenegro, Bosnia, Albania and Kosovo implementing EC agenda in this field.
- The hardware industry that needs to support CPS or IoT.
- Open Data usage is on a symbolic level.
- E- Health services are undeveloped over all SEE countries, especially in regards of using e-health based on wearables.

Digital economy in SEE…

The Opportunities

- There is a political and social desire in all SEE countries to achieve progress in start-ups and ecosystems, especially in Bosnia and Herzegovina, Montenegro, Albania, Kosovo and North Macedonia.
- The young people are relatively willing to find their chance in start-up business.
- Still, those countries have low salaries (Bosnia and Herzegovina, Montenegro, Albania, Kosovo and North Macedonia, Bulgaria and Romani) that are thus a good terrain for foreign investments and outsourcing.
- Accessibility to international funds is better than in others countries (there are many available donor programmes and agencies and less competition to gain projects).
- Most of the countries are relatively small in geographical which is an opportunity for easy, even physical, communication.
- Diaspora is willing to invest in countries.
- Tourism is one of the chances and most of countries in this region are attractive for tourists.
- Friendly and neighbourhood countries in the region (like Slovenia, Croatia and Greece) want to help WBC countries on their way to join EU.
- An overall good geographical position, especially in the means of transport and so on

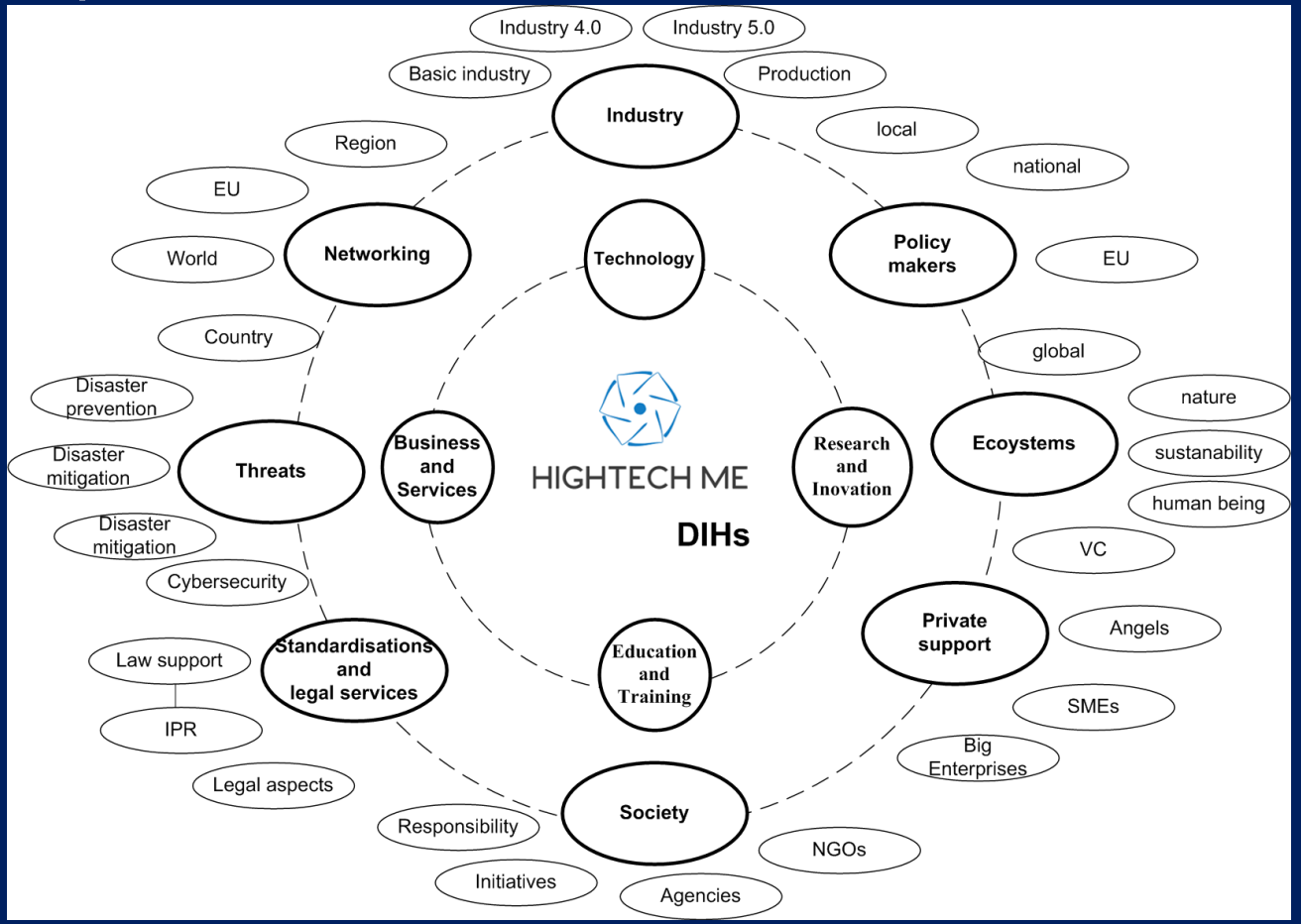
Digital economy in SEE…

The Threats

- Administrative obstacles for start-ups and e-communities.
- Financial risk and no legal protection in case of non-success.
- Mentality problems, especially fear of failure.
- Non-competent manpower, especially in high technologies (foremost in Montenegro, Bosnia , Kosovo and Albania)
- Low entrepreneurial culture, save for the cases of Slovenia, Croatia and partly Greece and Turkey.

DIH as all in one

- Digital Innovation Hub - DIHs are fusion of advanced digital products and services.



DIH verticales

DIHs VERTICALS

DIGITIZED TRANSPORT	DIGITIZED ENVIRONMENT	DIGITIZED AGRICULTURE	DIGITIZED ANYTHING
Green transport	Smart buildings	Smart laming	Human-machine Interaction
Smart mobility	Smart home	Al inspired agriculture	Digital Education
Shared mobility	Critical infrastructure monitoring	Information based site specific applications	Industrial Automation
Robotics	Smart hospitals	Demand driven, sustainable agriculture	Machine Learning
New platforms for efficient supply-demand matchmaking	Water pollution monitoring	Mobile plant, soil and environment sensors	Market Intelligence
Automotive electronics	Smart grids	Sensor networks - EU wide - cross-border	Medical and Health Applications
Autonomous vehicles	Energy management	Field robotics and automation systems	Active & Healthy Ageing
Connected vehicles	Environment monitoring	UAV based agriculture and plant monitoring	Support for disabled persons
Streamlining transport using big data	Rural areas -> Monitoring attractions such as lakes and rivers (both water and wet area).	Selective plant protection	Cybersecurity
Aeronautics and space applications	Urban areas -> indoor and outdoor pollution and noise monitoring.	Closed nutrient cycles	Data Mining and Big Data
Transport and Logistics	Bio-diversity	Agricultural decision support systems	Personal security
City Transport Mapping	Wild/migratory animals monitoring	Zero-energy food systems	Additive Manufacturing (3D printing)
	Smart industry	Circular economy	Augmented and Virtual Reality
	Data processing & data visualization:	Water, Energy and Food (WEF) efficiency	Audio/Video Processing
	Processed data are visualized for monitoring by the interested parties .	Revalorization of agricultural waste	Location-based Technologies
	The data will be used to build models for future prediction.		Web and Mobile Applications
			Wireless Sensor Networks
			Disaster management (including pandemic response like COVID 19)
			Digital heritage
			Telemedicine
			Rehabilitation, wellness, fitness
			E-commerce

DIH's verticales and portofolio

Core Activities	Technologies	Tools and methods	Application fields	Services
Education and Training **Research and Development** **Networking and Social** **Prototyping and Commercialisation** **Disasters managment** **Legal aspects** **Sustainability**	Internet of Things (IoT). Cyber Physical Systems (CPS). Vertical and horizontal integration systems. Rapid prototyping. Data Analytics. Cybersecurity Cloud and edge computing. Artificial Intelligence, Virtual and Simulation Autonomous robots and vehicles	Effective and modern organisation and management Sustainable business Business compliant with the international and local legislatives law IPR protection Social responsibility and interaction	Smart logistics Smart utilities Smart mobility and transport Smart environment Smart cities and buildings Smart governance and institutions Block Chain Smart health Smart business Smart education Smart health Smart objects Smart appliances Smart disaster mitigation Smart tools Smart commerce Others	Training Mentoring Events organisations Projects development and assistance Incubation Funding Opportunities Innovation and Business support Internationalization Branding Labelling IPR services Other services related to the core activities, technologies, tools and application fields.

Technology Enterpraunership

- Complementary activity to digital economy
- Goals of TE education.
- To bring together all interested in this field with strategies, techniques and skills for the commercialization of academic and scientific knowledge in the real economy and services. We should to understand the concept of technological entrepreneurship, models and tools that can be used to transfer technology from academy to industry. Also, we should learn from case studies and good practices in TE and understand the pre - conditions for successful technological entrepreneurship, as well as the most common mistakes, which someone can make.

TE issues

- Everyone who want to be technological entrepaneur should to deal with following issues:
  - Entrepreneurship and technological entrepreneurship, similarities and differences. Principles of entrepreneurship vs principles of technological entrepreneurship.
  - TE considers an innovative approach to entrepreneurship.
  - Transferable skills and soft skills are very important for TE (analysis and problem solving, leadership skills, organizational skills, research management, self-management, work habits, the concept of usable excellence, written and oral communication, perception of individual, group, market ..).
  - There are no algorithm for TE. Approaches-models of technological entrepreneurship (Stanford Technology Ventures Program (STVP), ETECH Projects at the University of Cambridge, The Berkeley Method of Entrepreneurship (BMoE), Dan Shechtman model, Japanian-east models).
  - Analysis and development of technology entrepreneurship market and technological mapping.
  - Open discussion on different topics related to entrepreneurship , "brainstorming" within the team

TE learning outcomes

- Identify and assess the market opportunities of academic / university / scientific technology.
- Develop a comprehensive offer and design an appropriate business model for the transfer of academic / university / scientific technology.
- Formulate a strategy for the development of the local high-tech market and customer formation, based on pushed needs and customer needs.
- Identify key sources for short-term and long-term sustainability of the solution.
- Select and define the IPR model
- Define short-term and long-term business plan.
- Define the main elements of maintaining innovative solutions.
- Develop a teamwork model.
- Identify the basic mistakes in technological entrepreneurship.

TE Case Study

- MANT->Embeddedcomputing.me->MECOnet.me
- Montenegrin High Tech Cluster
- High Tech in Embedded Computing, Cyber Physical Systems, Internet of Things and Related Fields
- Activities:
  - HighTech transfer do developing countries
  - Support high tech education and science
- Products:
  - MECO
  - ECYPS
  - CPS&IoT
  - SSonCPSand IoT
  - WiPiEC
  - MATA
  - HighTech.ME
- Key Persons:
  - Radovan Stojanovic
  - Dmitry Tarasov
  - Lech Jozwiak
  - Veljko Milutinovic

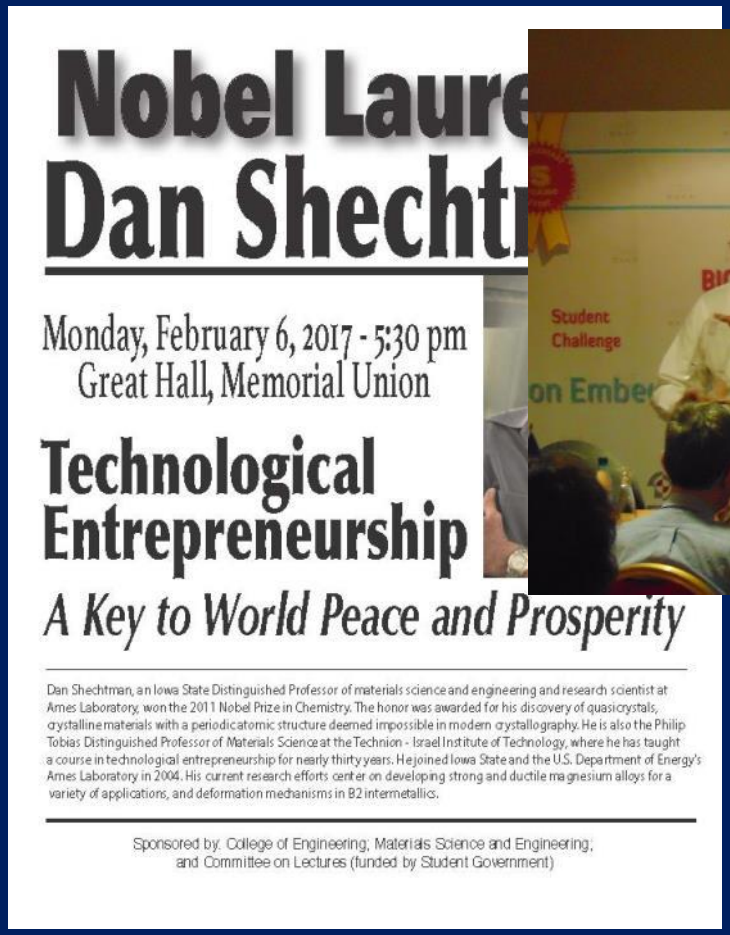
2012

TE Case Study…

- Our recognitions:
  - 3 Nobel participated in our activities
  - 2016, Prof. Dan Shechtman
  - 2018, Prof. Tim Hunt
  - 2019, Prof. Jerome Friedman

TE Case Study…

- Our partners:
  - EU Commission
  - IEEE
  - EuroMicro
  - University of Montenegro
  - Ministry of Science of Montenegro
  - European Network on High Performance and Embedded Architecture and Compilation (HiPEAC)
  - and more than 50 reputable institutions and organisations world wide.



Nobel Laure
Dan Shechtr

Monday, February 6, 2017 - 5:30 pm
Great Hall, Memorial Union

Technological Entrepreneurship

A Key to World Peace and Prosperity

Dan Shechtman, an Iowa State Distinguished Professor of materials science and engineering and research scientist at Ames Laboratory, won the 2011 Nobel Prize in Chemistry. The honor was awarded for his discovery of quasicrystals, crystalline materials with a periodicatomic structure deemed impossible in modern crystallography. He is also the Philip Tobias Distinguished Professor of Materials Science at the Technion - Israel Institute of Technology, where he has taught a course in technological entrepreneurship for nearly thirty years. He joined Iowa State and the U.S. Department of Energy's Ames Laboratory in 2004. His current research efforts center on developing strong and ductile magnesium alloys for a variety of applications, and deformation mechanisms in B2 intermetallics.

Sponsored by: College of Engineering, Materials Science and Engineering, and Committee on Lectures (funded by Student Government)

Our story in
Technology Enterpraunership in MANT
Started with Dan

www.hightech-hub.me

mant
Passion for technology

Conclusion

- An analysis of digital economy that covered ecosystems and related fields has been elaborated taking into consideration standard parameters such as DESI, DAI and others relevant.
- Then SEE countries were discussed in the light of: overview of existing ecosystems, hubs, verticals and industries, trends, key stakeholders and challenges.
- Upon the state of the art elaboration, an independent SWOT analysis was made and it has identified strengths, weaknesses, opportunities and threats in all SEE countries.
- As an answer to improve situation the DIH is proposed, with its mission, vision, setup, portfolio, organization structure and measures to achieve sustainability.
- TE is a key moment for to word peace and prosperity.