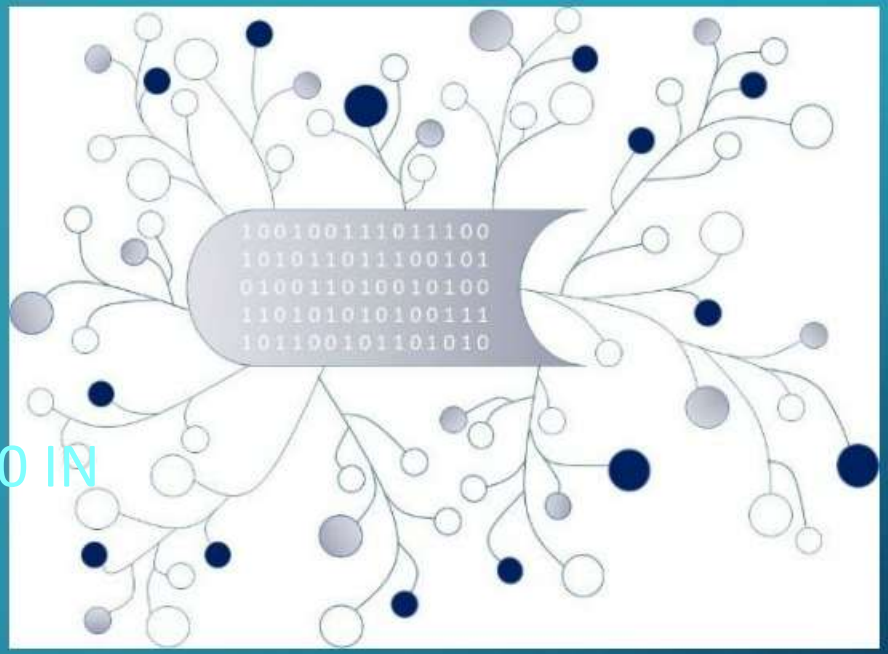
DigI-VET
Project number: 2018-1-DE02-KA202-005145



DigI-VET

FOSTERING DIGITISATION AND INDUSTRY 4.0 IN VOCATIONAL EDUCATION AND TRAINING

Training Modules for the Learner

Module B: Industry 4.0 Terms and history

A.O.A. Arges – Dr. Ing. Daniel CRISAN

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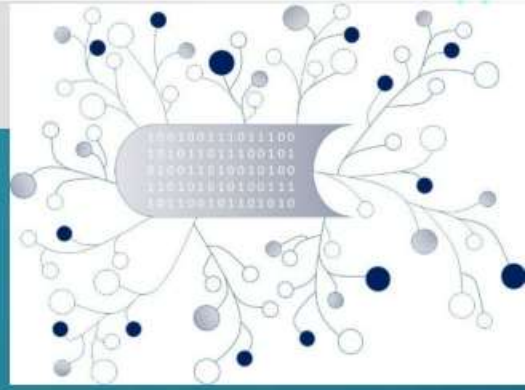

Agenda of Module B:
Industry 4.0 – Terms and history

1. **The technologies's evolution from the first industrial revolution until today**

2. Industry 4.0

2.1 History and Terms

2.2 Task – Video

2.3 Tasks – Multiple choices

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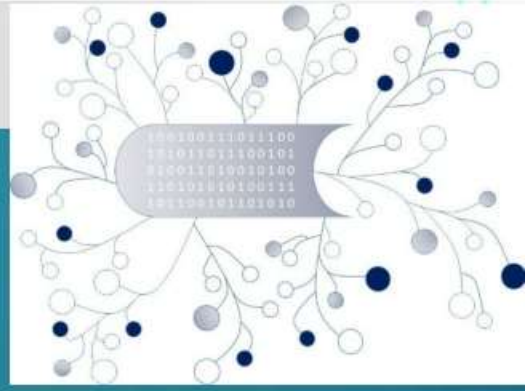
1. The technologies's evolution from the first industrial revolution until today



Industrial Revolution

1. Industrial Revolution	2. Industrial Revolution	3. Industrial Revolution	4. Industrial Revolution
• End of 18th • Mechanization	• Start of 20th Century • Electrification	• Start of 70ies • Digitization	• today • Conectivity

Own figure, followed Banabic, D. (2016), p. 195.

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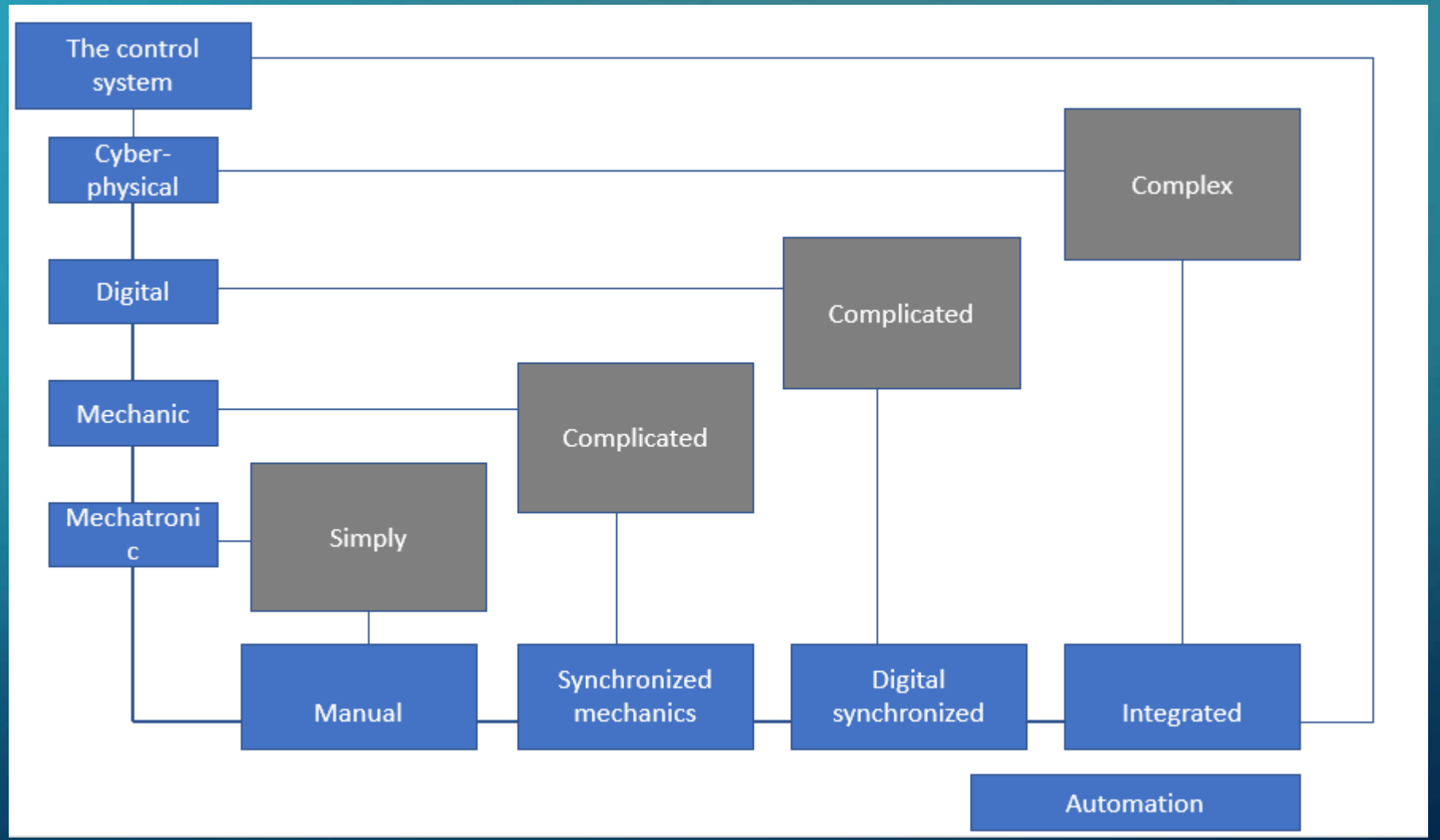
1. The technologies's evolution from the first industrial revolution until today



Own figure, followed Banabic, D. (2016), p. 196.

The automation process evolution in the field of plastic deformation technologies

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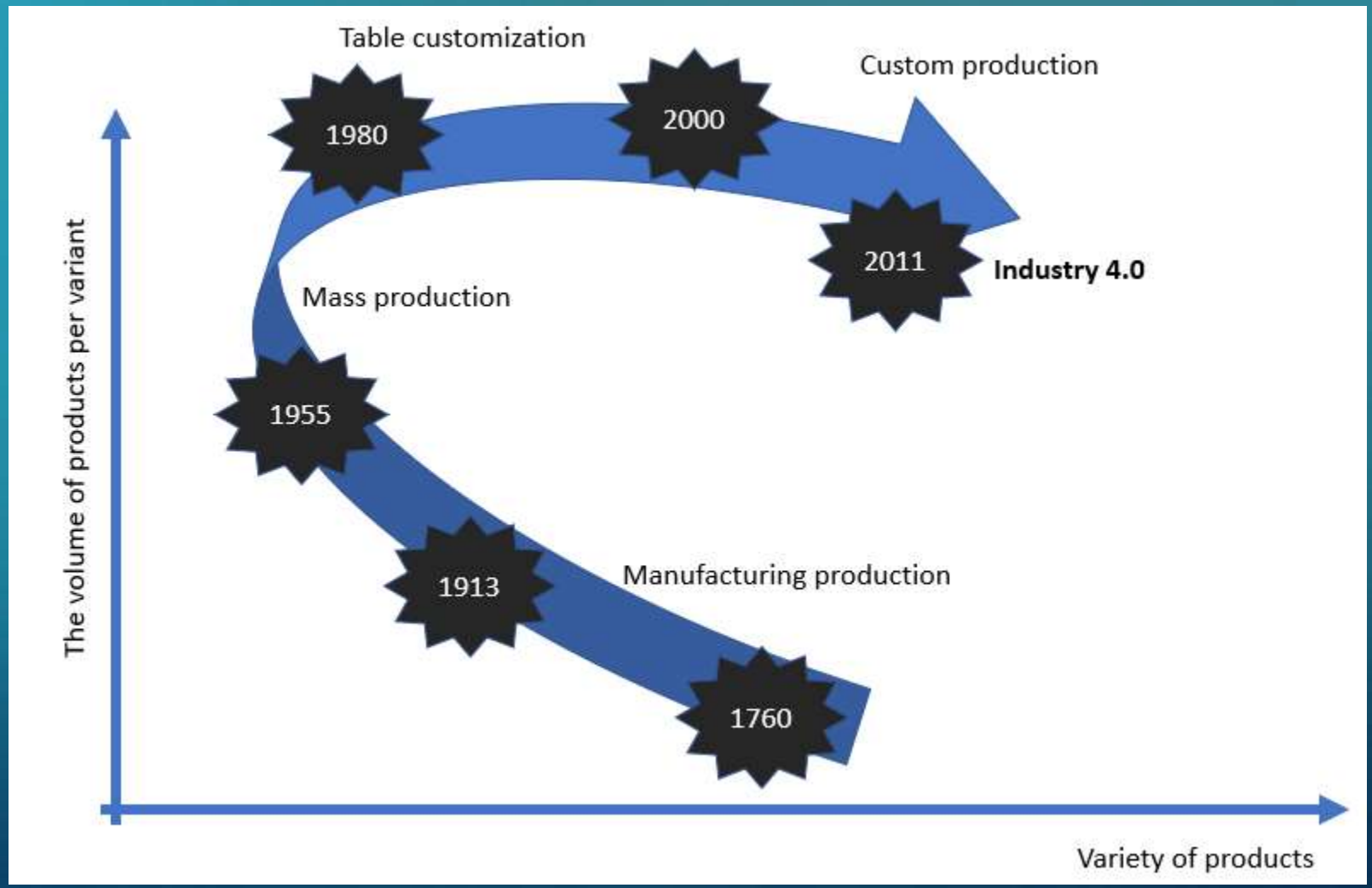
1. The technologies's evolution from the first industrial revolution until today



Own figure, followed Banabic, D. (2018), S. 8.

The cyclical evolution of manufacturing from the first to the fourth industrial revolution.

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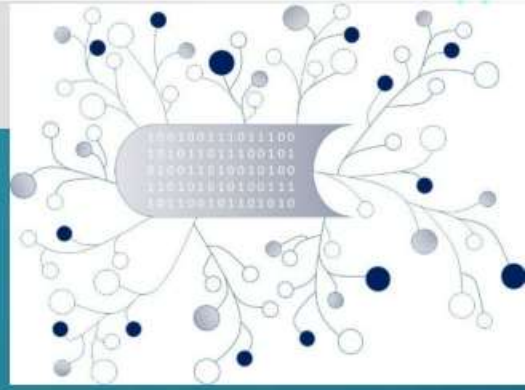
2. Industry 4.0



2.1 Short history

The Industry 4.0 initiative was introduced by the German government in 2011 at the Hanover trade fair (3)

Other states followed:
Factory of the Future (Franţa şi Italia),
Catapult (UK),
Smart Manufacturing in US
Made in China - 2025 in China
Innovation 2025 in Japan.

The term remain final within the debate on this topic organized by the founder Klaus Schwab, at the World Economic Forum, in Davos in January 2016

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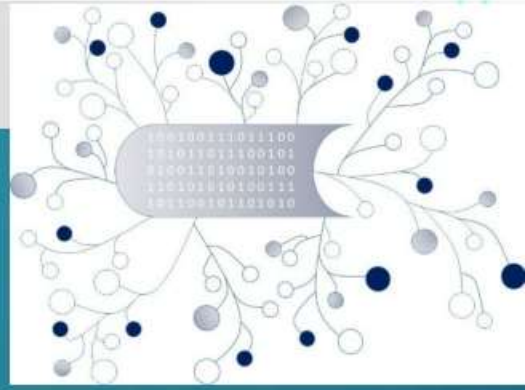
2. Industry 4.0



2.1 Short history and terms

Industry 4.0 is characterized by the automation, digitization and interconnection of all components in the production processes.

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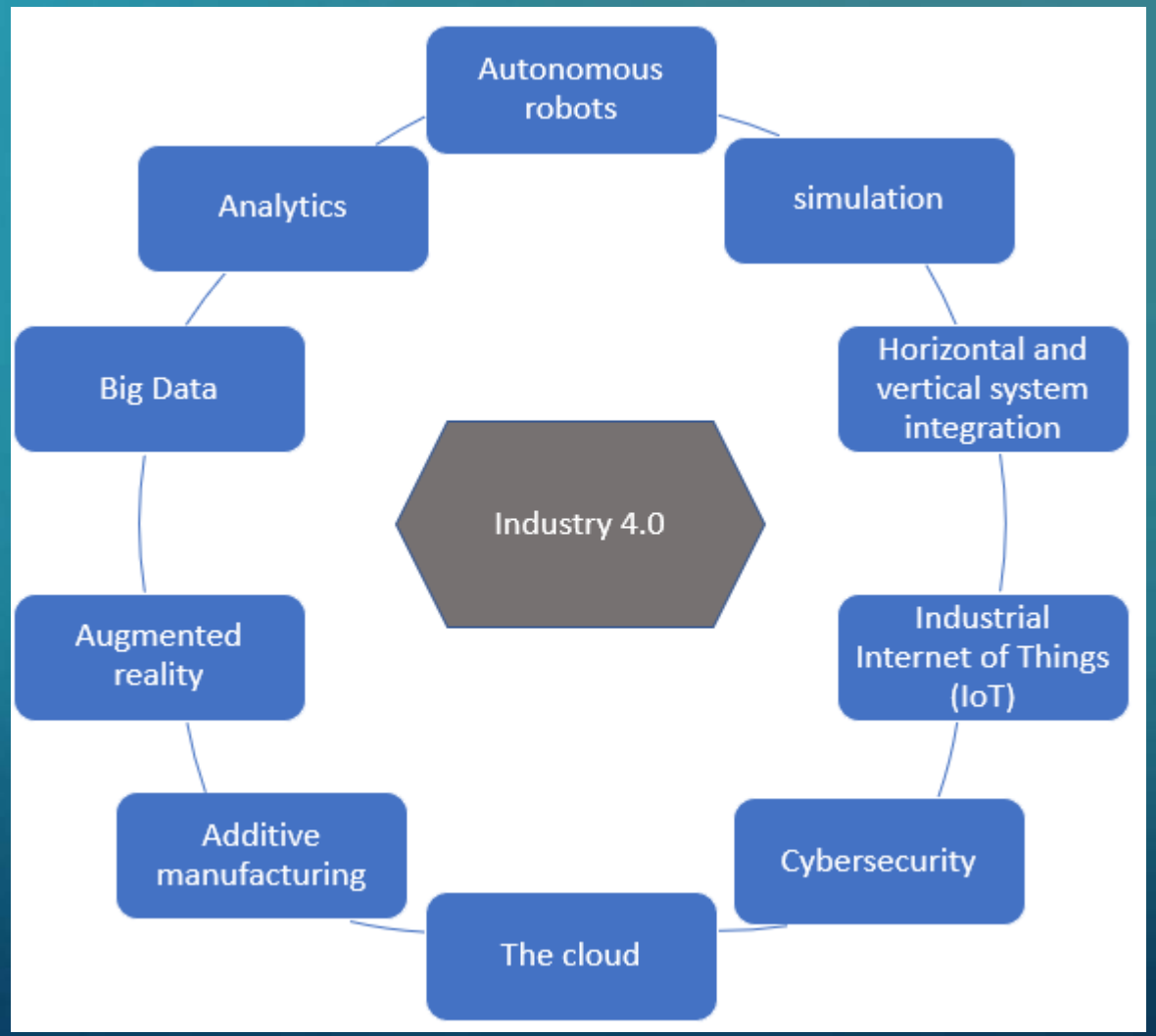
2. Industry 4.0

2.1 Short history and terms



Own figure, followed Banabic, D. (2016), p. 198.

The specific technologies of the fourth industrial revolution, Industry 4.0.

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2. Industry 4.0

2.1 Short history and terms

Process chain structure

In the classical system, the production process takes place in a well-defined manufacturing flow, between independent work cells.
In the new Industry 4.0 concept there is a flow of both products and data, integrated between them.

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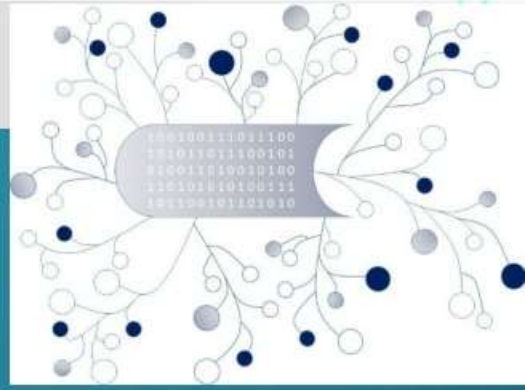
2. Industry 4.0



2.1 Short history and terms

Specific features of the new manufacturing concept **Industry 4.0**:

- an integrated communication throughout the entire work cycle ;
- a high degree of automation, which will lead to the replacement of operators performing low-skilled work with robots;
- increasing the number of highly qualified people for monitoring and managing the manufacturing flow;
- a high degree of communication between Machines (Machine to Machine-M2M) and respectively between Machine and Human (Machine to Human-M2H);
- optimizing the entire process chain using artificial intelligence programs in each structure of the technology chain.

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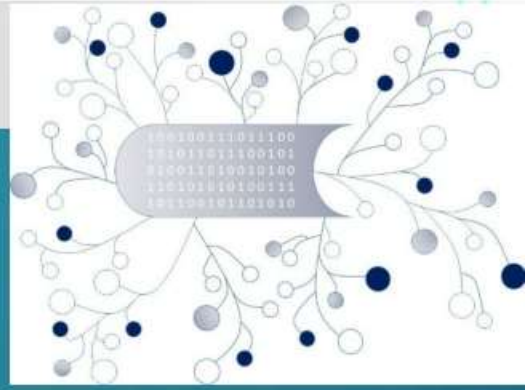
2. Industry 4.0

2.1 Short history and terms



Conclusions

The main expectations following the transition to the fourth phase of development - Industry 4.0:

- more flexibility and adaptability;
- transformation of rigid structures into network type structures;
- vertical integration of flexible and reconfigurable production systems;
- modularization and autonomy of production systems;
- the use of production systems with fractal structure;
- optimization of resources by connecting equipment in the network;
- the use of artificial intelligence in the production systems control, in order to make quick and optimal decisions;
- development and use of new business models;
- the use of “app-store” and “cloud” applications as new concepts in knowledge management, etc.

Ingenious Knowledge
WP PADERBORN Department Wirtschaftspädagogik Business and Human Resource Education Chair Wirtschaftspädagogik II
Emphasys CENTRE
AOA ARGES
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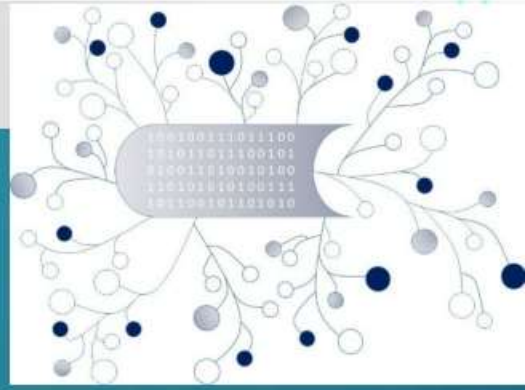

Task

2.2. Task

Please watch the following video about the **history of Industry 4.0.**

Please take some notes!

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2.2. Task

TASK

https://www.youtube.com/watch?v=v9rZOa3CUC8

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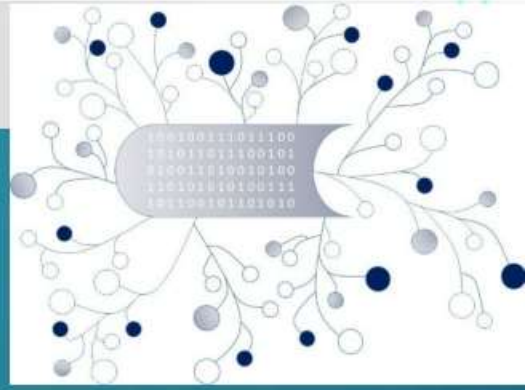

Task

2.3 Task

Please answer the next H5P.org tasks!

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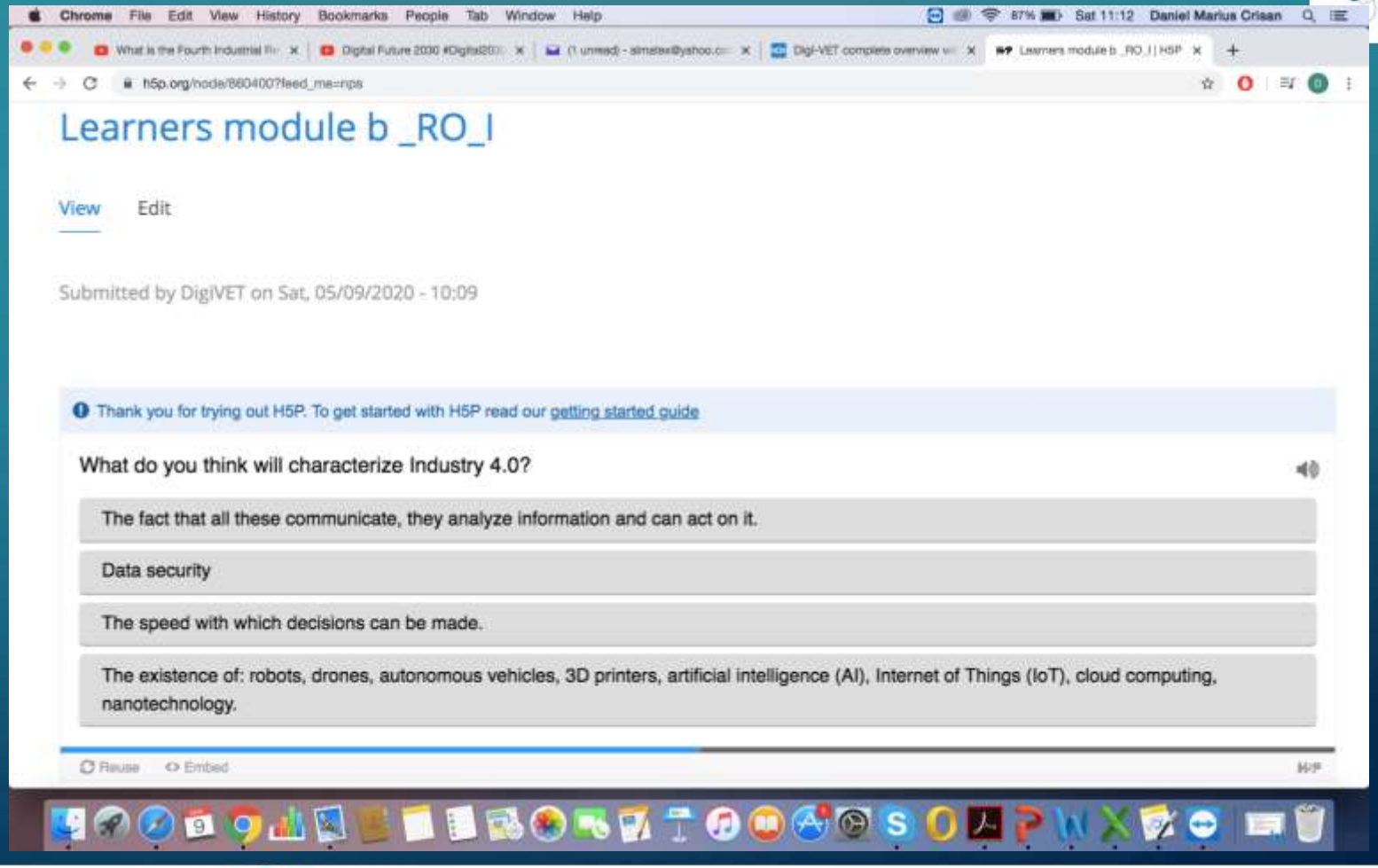
2.3. Task

Task



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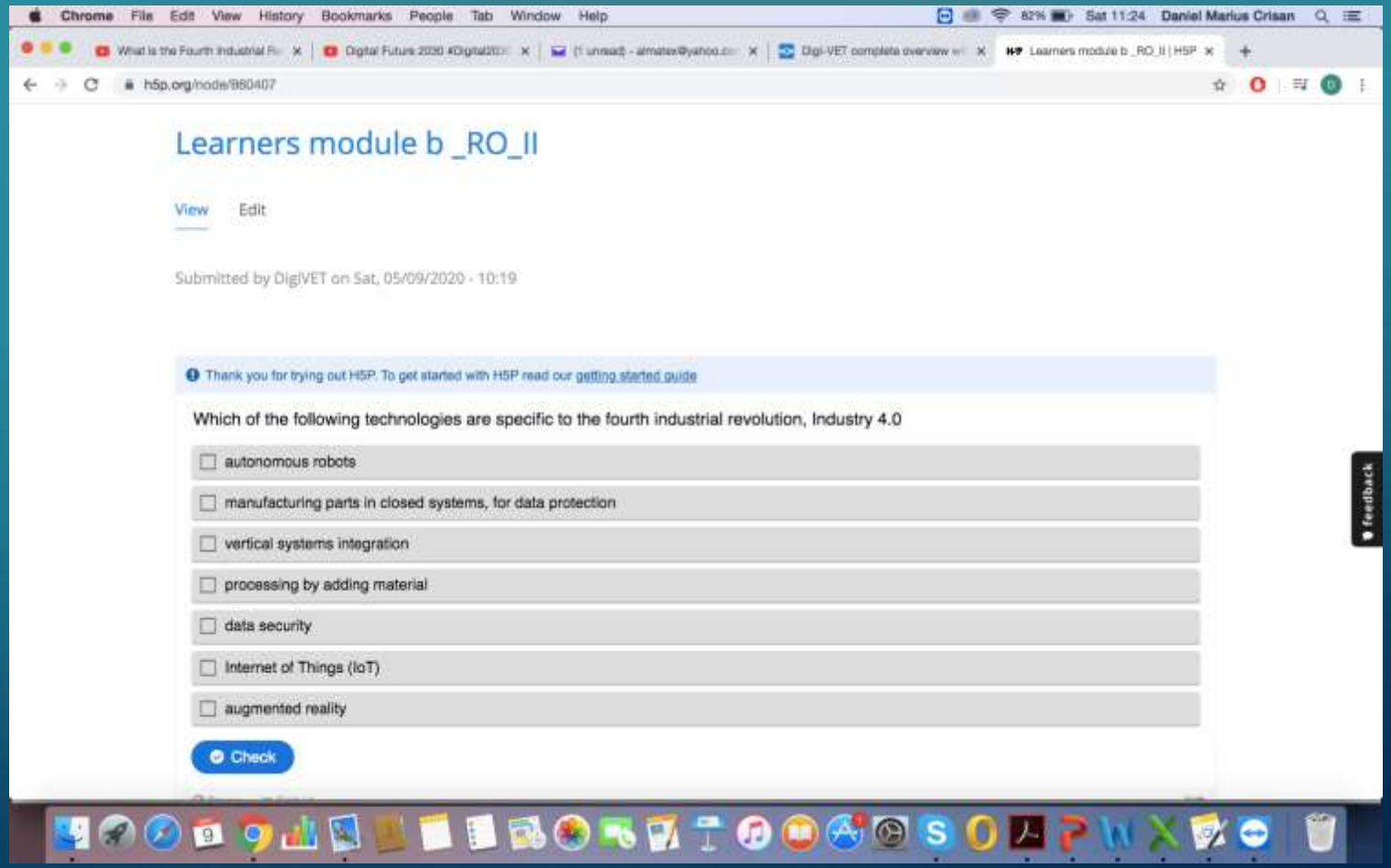
2.3 Task

Task



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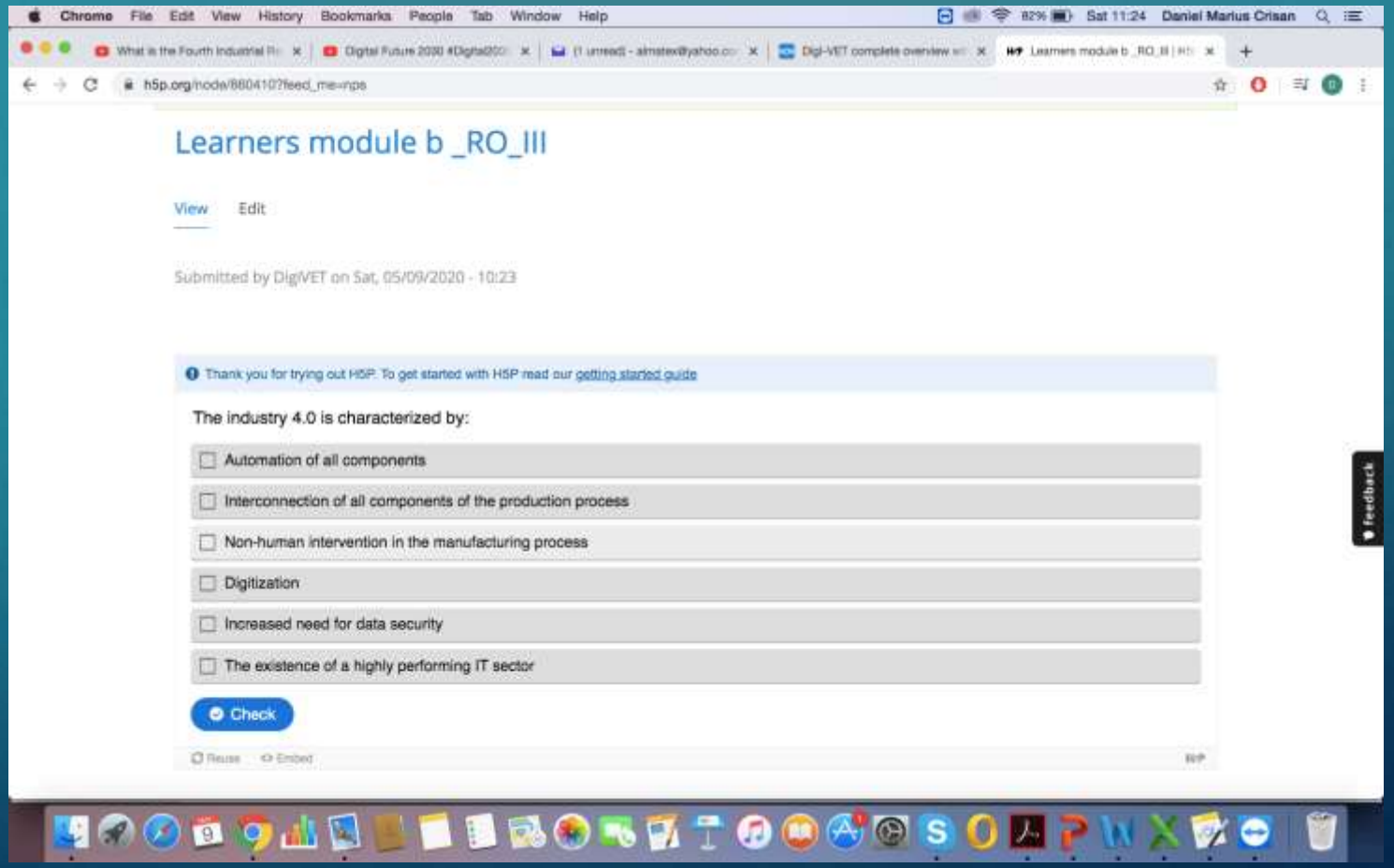
2.3 Task

Task



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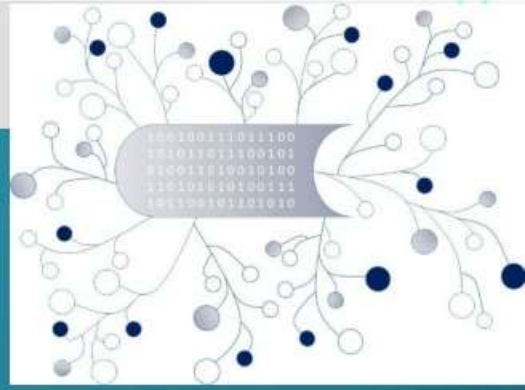
References of Module B: Industry 4.0 –Terms and history



- Recommendations for implementing the strategic initiative Industrie 4.0, Final report of the Industrie 4.0 Working Group, ACATECH National Academy of Science and Engineering, Germany, April 2013 Geisberger E, Broy M (2012) agenda CPS: Integrierte Forschungsagenda Cyber-Physical Systems. acatech, München
- K. Schwab (2016): The Fourth Industrial Revolution, World Economic Forum, Geneve.
- W. Wahlster (2012): Das Internet der Dinge als Innovationstreiber: Vernetzte Produktions-, Mobilitäts- und Energiesysteme, 6 Innovation –Unternehmergipfel 2012, Hannover.
- D. Banabic (2018): Evoluţia tehniciişi tehnologiilor de la prima la a patra revoluţie industrială şi impactul lorsocial. 4.0 in Metal Forming, Int. Conf. on Advanced Manufacturing as the Foundation for a Successful Society, 31st May – 2nd June 2016, Belgrade, Serbia. Retrieved from the Internet: https://academiaromana.ro/sectii/sectia08_tehnica/doc2018/2018-0926-Banabic-DiscursReceptie.pdf, access date: 15.07.2021.
- D. Banabic (2016): A patra revoluţie industrială a început. Este pregătităRomânia pentru a face faţă sfidărilor acestei noi revoluţii? (Industry 4.0 started. Is it ready Romania for the challenges of this new revolution?). Retrieved from the Internet: file:///C:/Users/jsc/AppData/Local/Temp/a-patra-revolutie-industriala-a-inceput-este-pregatita-romania-pentru-a-face-fata-sfidarilor-acestei-noi-revolutii.pdf. Access date: 15.07.2021.
- M. Ruessmann et al. (2015): Industry 4.0: The Future of Productivity and Growth in Manufacturing Industries, The Boston Consulting Group.

- Romanian Academy, Bucharest (2016): The fifth international workshop on cyberphysicalsystems-IWoCPS-5,

Online Quelle:

YouTube: https://www.youtube.com/watch?v=RPC7yo99Nxs

http://www.siemens.com/innovation/en/home/ pictures-of-the-future/industry-andautomation/ digtial-factory-trends-industrie-4- 0.html

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