

CHAPTER 3: Trends for More Effective LMD Logistics

UNIT 2: Information management: the key to success

Capsule 3.2.1

New technologies' impact on society

To be done prior to this capsule:

1.1.1, 1.1.2

Capsule linked with:

2.3.4, 3.1.1, 3.2.2, 3.2.3, 3.2.4, 3.4.4

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Objectives of the Capsule

The objective is to introduce students to basic general concepts of new technologies, forming together the process called 4th industrial revolution and outline the main positive and negative impacts that it has on society.

Category	E-learning	EQF		
		4	5	6
		X	X	X

Exercises included	YES
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Effort for the capsule	Content 20 Min.	Exercises 20 Min.	Extra material 4 Min.
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Contents

1. Introduction to the topic
2. Historical context
3. Specifics of current developments
4. Main current trends:
 - a) Interconnectivity & Internet of things
 - b) Artificial Intelligence
 - c) Autonomous mobility
5. Impacts on society:
 - a) Positive (benefits/opportunities)
 - b) Negative (risks/challenges)

1. Introduction to the topic

The logistics and LMD have always been closely embedded in the context of the whole society and especially interlinked with technology developments.

The technology developments shape not only the behaviour and expectations of customers (see capsule 2.3.2), but also urban environment with for example the so called „smart city“ concept, which means that various data are collected and regulations set accordingly (see e.g. Capsule 2.3.3).

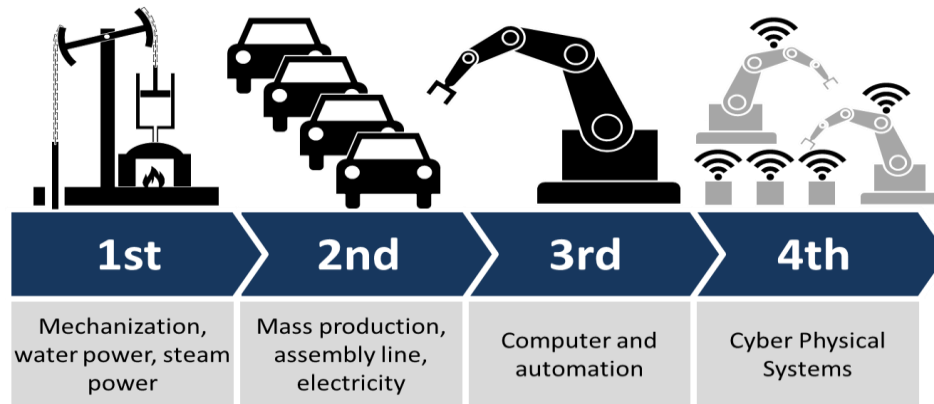
In the environment of high business competitiveness, the LMD operators strive to make best use of the new technologies to their advantage.

In the following slides we will show the main concept of stages of technology development and how and why the current phase that we see on our very eyes is specific and how it impacts the society and LMD within it. The main technologies having the potential to shape the current and future LMD will be outlined. In the end the positive and negative impacts of the technologies on the society will be suggested and a discussion among students encouraged as they have lives emerged in the new technologies and may well have the positive as well as negative influences experienced themselves.

2. Historical context

Have you ever heard the term „**4th industrial revolution**“ or Industry 4.0?

It is a term used for a complex of technology developments that are deeply transforming industry, business and the whole society in the 21st century, and are based mainly on **connectivity and automation**.



Picture source:

https://upload.wikimedia.org/wikipedia/commons/c/c8/Industry_4.0.png

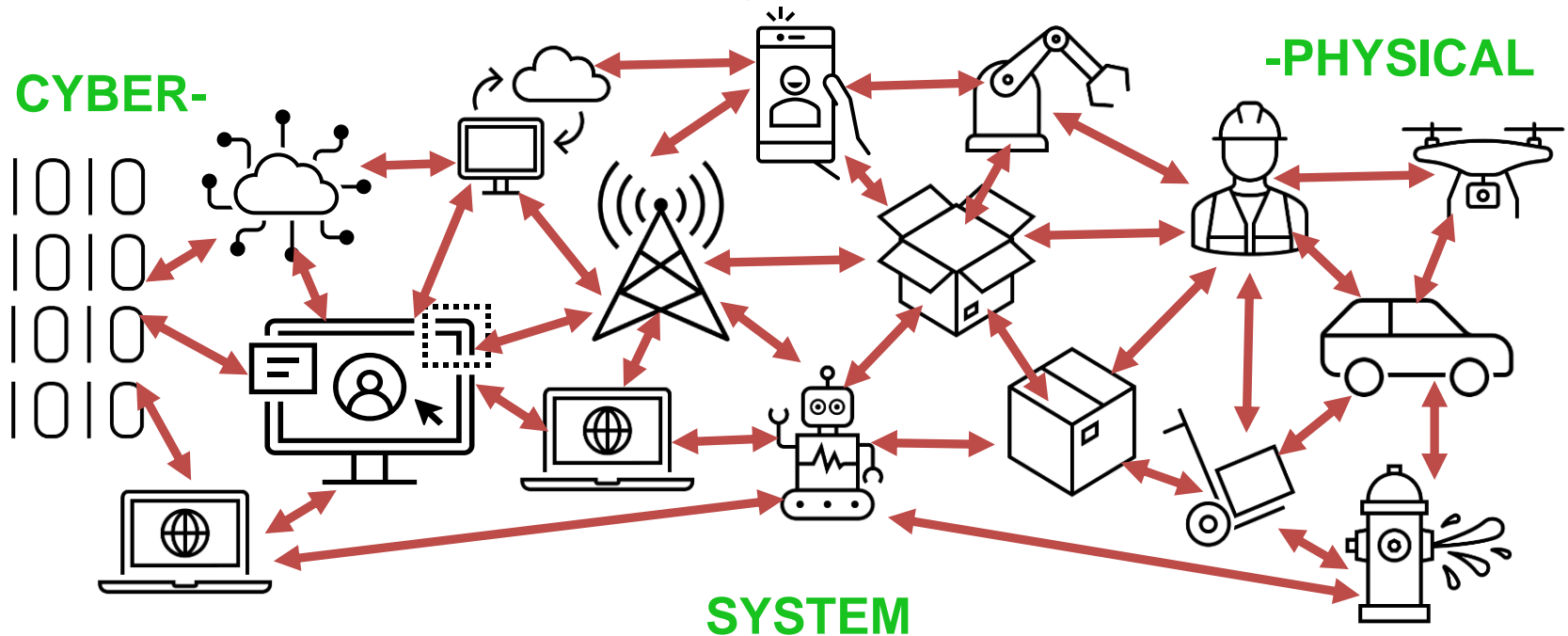
Why is the 4th industrial revolution different than the previous technology developments?

Because the interconnectedness and automation bring about
Cyber-Physical Systems...

3. Specifics of current developments

What are cyber-physical systems?

Systems where software and physical world are deeply intertwined.



That's what sets apart the current 4th industrial revolution from the previous phases of technology development.

3. Specifics of current developments

Some experts are now talking even about **5th industrial revolution or Industry 5.0**, **when people and technologies cooperate naturally to common benefit of the society.** European Commission describes Industry 5.0 as an „*industry that aims beyond efficiency and productivity as the sole goals, and reinforces the role and the contribution of industry to society. It places the wellbeing of the worker at the centre of the production process and uses new technologies to provide prosperity beyond jobs and growth while respecting the production limits of the planet.*“



Source: https://research-and-innovation.ec.europa.eu/research-area/industry/industry-50_en

To summarize it, it includes:



...well being and development of the worker...

...as well as the society and...

...sustainability...



In this context a concept of **Corporate Social Responsibility (CSR)** is gaining importance. See capsule 2.4.4

Picture source:
https://commons.wikimedia.org/wiki/File:Db_tuda_jes2899_a.jpg

3. Specifics of current developments - videos

To get a better picture of 4th and 5th industrial revolution, you can watch one of the following Youtube videos (or both 😊):



Simple illustrative video (1 min),
no commentary:



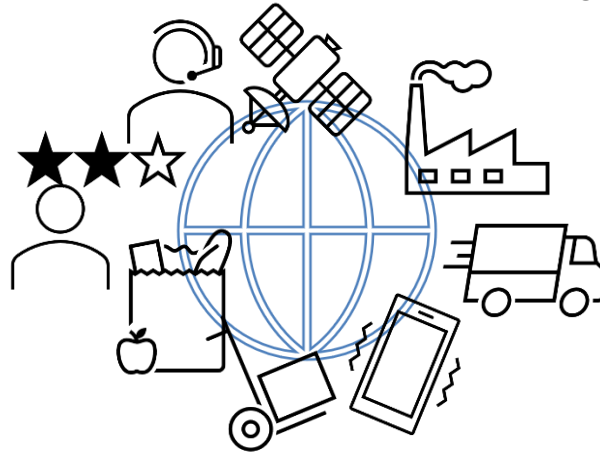
A little more advanced video with a
commentary in EN (4 mins). You can
switch on the subtitles in another
language by selecting Settings –
Subtitles – Auto Translate:



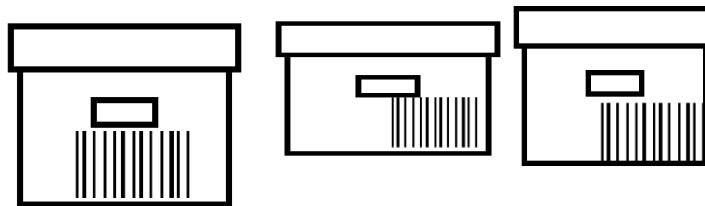
4. Main current trends – Interconnectivity & Internet of things

Interconnectivity:

- everything is connected through the technologies – processes, devices, products, organizations, people...
- the information (data) is shared instantly, in the real time
- It shapes the communication between suppliers, logistics operators, customers (businesses or individuals) and even the „third parties“ (e.g. the city)



Closely related term is also **Internet of Things** that enables real-time following of deliveries/packages



4. Main current trends – Artificial intelligence

Artificial Intelligence enables automatic analysing of data and optimizing of processes...

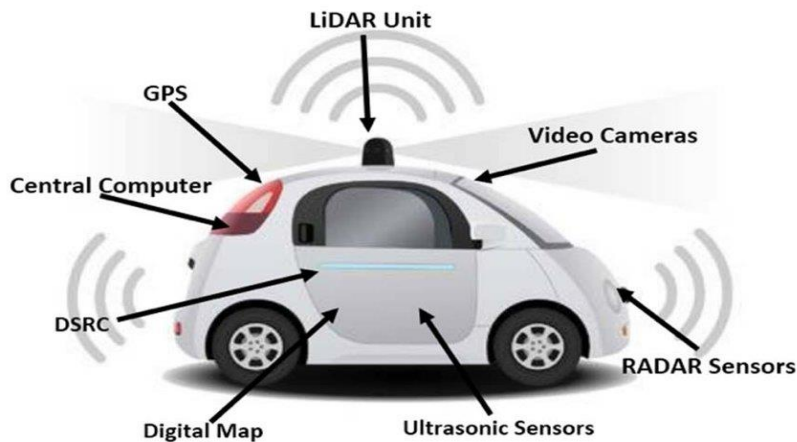
- enormous amount of data are collected all the time (that's where the term „big data“ is coming from)
- Artificial Intelligence means that the software analyses and processes the data, in a way that it „learns“ from it and is able to improve the processes – for example:
 - ☐ to increase back-office efficiency by automatization of some repetitive data-related tasks
 - ☐ to increase the efficiency of warehousing (e.g. demand predictions, modify orders, and re-route products in transit...)
 - ☐ to offer algorithms that can predict the number of goods and supplies that will be needed
 - ☐ to ensure better customer experience through personalization and product suggestions based on customers' buying habits and personal preferences

And of course – Artificial intelligence is also what's driving the autonomous vehicles...

4. Main current trends – Autonomous mobility

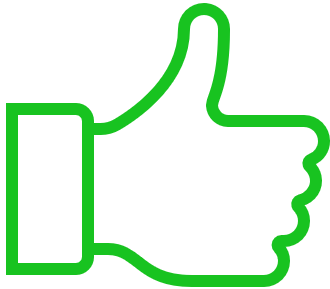
The technology trends are changing the way how we live and interact in our everyday lives (how we communicate/work/enjoy leisure time/learn/shop/do business...)
...and are profoundly changing **the presence and future of the LMD – especially the following:**

Autonomous mobility: autonomous vehicles – self-driving cars – delivery robots....



Source of the illustration: El Hamdani, Sara & Benamar, Nabil. (2019). DBDA: Distant Bicycle Detection and Avoidance Protocol based on V2V Communication for Autonomous Vehicle- Bicycle Road Share. 10.1109/WITS.2019.8723866. Online: https://www.researchgate.net/figure/An-illustration-of-Autonomous-Vehicle-equipment_fig2_332539258

5. Impacts of technology developments on society - positive

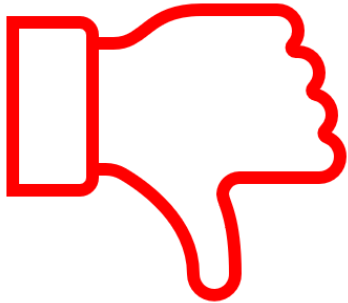


BENEFITS

- Faster and more flexible services, customization
- Higher transparency of processes (e.g. business, delivery...) – instant feedback, higher control
- Opening opportunities to higher participation of individuals (to realize ideas, to engage in shared/gig economy etc.)
- Democratisation of sources (many educational materials, contents, data, computer programmes/applications... are becoming available for free to everybody)

5. Impacts of technology developments on society - negative

RISKS



- Security risks, constant surveillance (not only political, but also in a job – necessity to be always online/available to the employer...)
- Widening social gaps (esp. between people keeping up with the ICT developments or even leading them and people falling behind, getting only lower paying insecure jobs, becoming socially excluded); fragmentation of society (people staying only within their social bubble – higher risks of falling to dezinformation and extremism)
- Mental health risks (dehumanization, communication mainly via ICT, dominance of superficial online relationships...)
- Newly rising ethical problems (e.g. responsibility for accidents caused by autonomous vehicles)

Exercise

Task: Think of your own experience with

- a) Benefits/good impacts of the technologies to your life
- b) Negative impacts/risks in your life

Can you think of some solutions how to prevent the negative impacts?

Discussion of students:

After the students have studied the capsule and thought of the questions above, the teacher arranges a group discussion – either online or in-class. Students bring their own experiences with positive/negative impacts of new technologies on their lives and have an opportunity to share their ideas for solutions. There are no right/wrong answers. The teacher facilitates and moderates the discussion.

Capsule's validation quiz

The following quiz represents 5 questions you will have to answer to confirm your understanding of the present capsule.

Each correct answer is worth 1 point. No point for errors.



Self-evaluation quiz

Question n°1 :

How the current trend of rapid technology development is usually called?

Autonomous mobility

4th industrial revolution, sometimes even 5th

1st industrial revolution

Cyber-physical system

Self-evaluation quiz

Question n°2 :

What makes the current 4th industrial revolution different from the previous developments?

Computers

Environmental responsibility

Nothing, just a number up

Cyber-physical systems

Self-evaluation quiz

Question n°3 :

Which of the following does NOT belong among the current technology trends that newly shape the future of LMD?

Autonomous mobility

Interconnectivity

Mass production

Internet of things

Self-evaluation quiz

Question n°4 :

What of the following does NOT belong among the positive impacts of the new technology developments on society?

Democratisation of sources

Constant surveillance

Higher transparency of processes

More flexible services

Self-evaluation quiz

Question n°5 :

What of the following does NOT belong among the current negative impacts of the new technologies on the society?

Food shortages

Dehumanization

Widening social gaps

Mental health problems



Validate and quit capsule



References

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<https://www.youtube.com/watch?v=v9rZOa3CUC8>.
- (2) Laura Dye (2020, January 27): Industry 4 and 5. [Video] Youtube. <https://www.youtube.com/watch?v=nyrRaK8APa4>.
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- (4) World Economic Forum (2020, November 8): How has technology changed - and changed us - in the past 20 years?
<https://www.weforum.org/agenda/2020/11/heres-how-technology-has-changed-and-changed-us-over-the-past-20-years>.
- (5) Longo, F., Padovano, A., Umbrello, S. (2020, June 18): Value-Oriented and Ethical Technology Engineering in Industry 5.0: A Human-Centric Perspective for the Design of the Factory of the Future. <https://www.mdpi.com/2076-3417/10/12/4182>.
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<https://www.forbes.com/sites/forbestechcouncil/2021/09/20/17-experts-share-technologies-making-a-positive-impact-on-society/?sh=7bb102cc21b3>
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