



# Workshop

# WS5 INDUSTRY, INNOVATION AND E&T 4.0

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ysao

# Kari Puumalainen

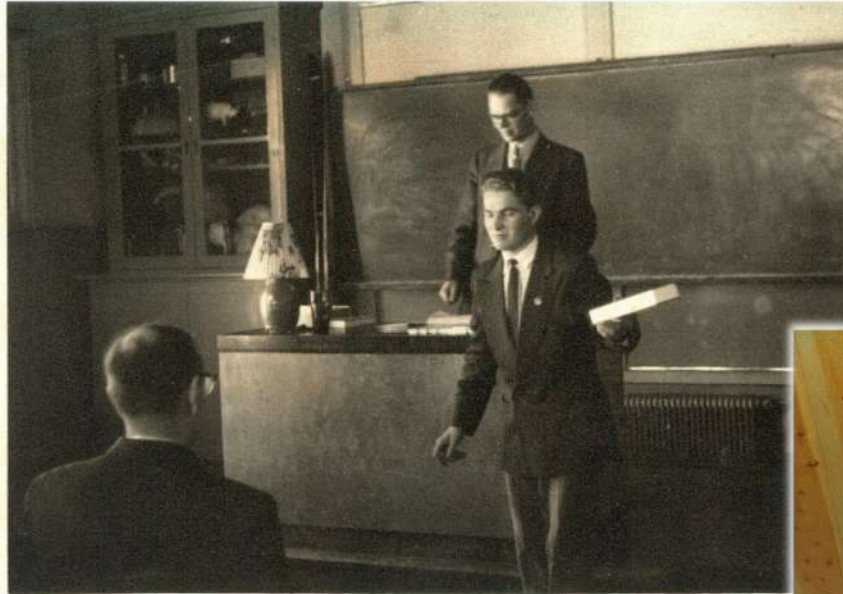
- Director of Ylä-Savo Municipal Federation of Education/ Principal of Ylä-Savo Vocational College
- <http://www.ysao.fi>
- <https://www.youtube.com/watch?v=3LPa-NYWcrM>
- 50 years old (young)
- McS in Computer Sciences, vocational teacher, several other trainings/diplomas
- Career:
  - director or manager positions in several fields in Vocational education,
  - Regional and national development tasks in public administration and business life.
- Member of several boards and workgroups
- Interested in project management, quality management, knowledge management, anticipation and anticipation models and organization development
- Hobbies: Golf, music, travelling

# WS5: INDUSTRY, INNOVATION AND E&T 4.0

- The world is changing, and it's changing faster than we may notice
- New technology and new innovations are bringing new needs for education and training systems
  - How we can stay “updated” all the time
  - How we can guarantee that the skills we teach in colleges are still valid after our students will graduate
  - How we can develop our national or school curricula so that goals, content and ways of teaching are still valid when our students will
    - start their studies and when they
    - will finish their studies ?
  - How we develop our own skills in order to respond of the rapidly changing needs of working life?



# Studying/teaching (VET)



1930 - 1940  
or 2019



1950  
or 2019



1989  
or 2019





1989



2019



2019

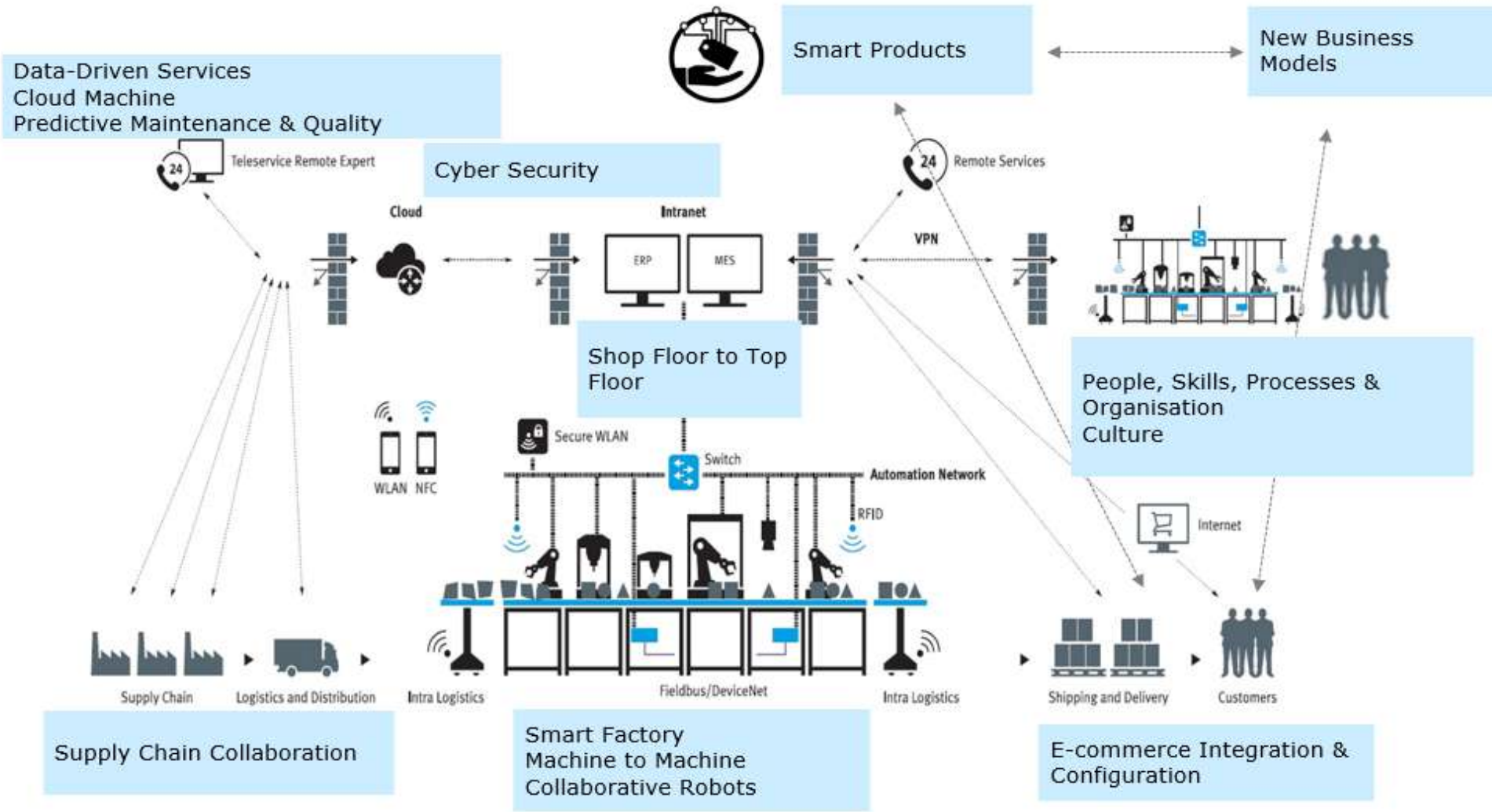
# What next?



2030



# The main areas in which to take action with Industry 4.0 solutions



## New business models:

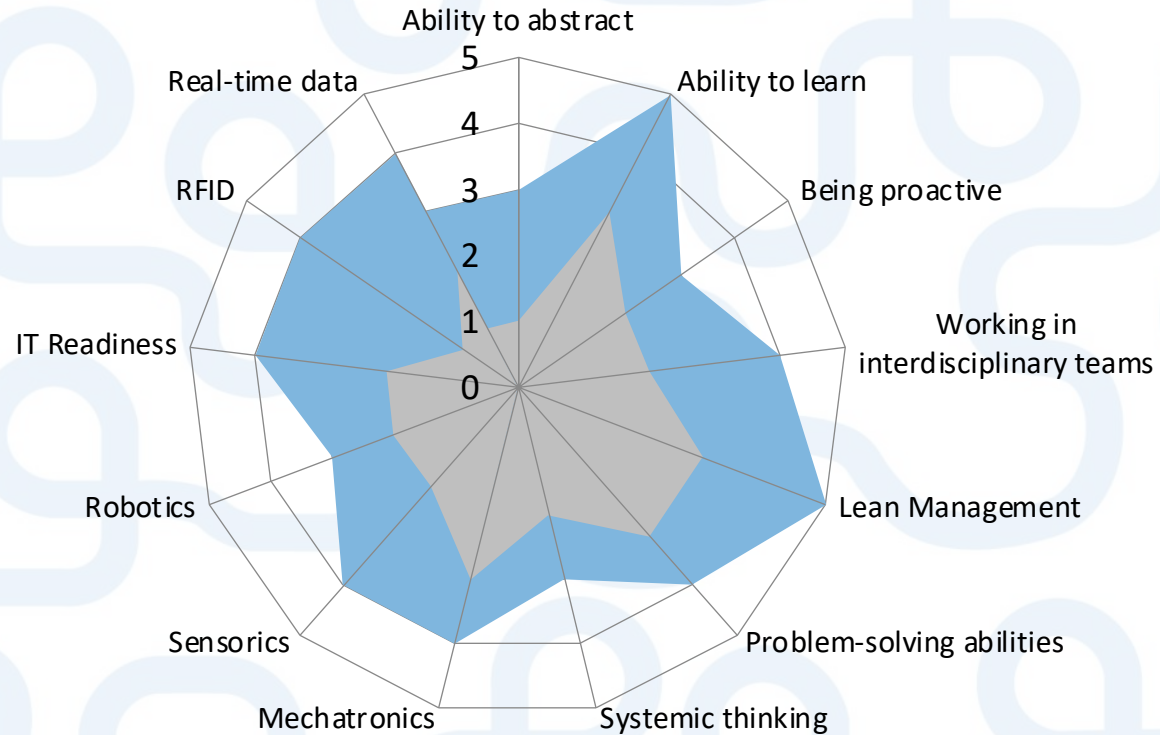
- Products are ordered via internet
- Orders are handled by AI-applications
- Productions is managed by people and AI-applications
- Products are produced mainly by robots and intelligent production lines
- Products are packed by robots
- Products are transferred by intelligent transfer systems (with help of people)

**Change of professions and work !!**

Example:

# Changing needs of knowledge – Industry 4.0

FESTO



Grey = today's competencies of a maintenance technician

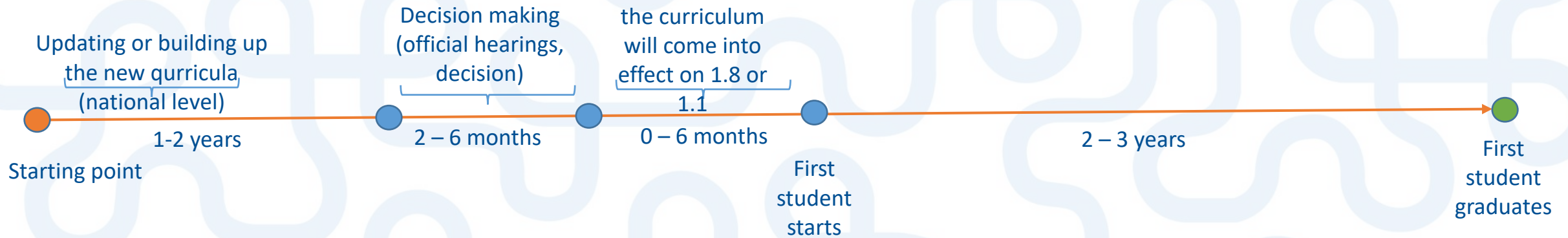
Blue = future competencies in industry 4.0



# Question for audience

- If the industry requires employees to be able to operate according to Lean models →
- How many VET Colleges are teaching Lean ideology to their students?
- How many VET Colleges are using Lean models in their own daily management/operations/activities?
- Should we do something?

# Time problem (in some countries :-)



Total time from start to finish from little **over 3 years to 6 years**  
**Normally total time is from 5 – 6 years**

# More problems

## When a new profession enters to labour market

- By technology innovation
- By new business innovation
- By some other reason

It takes normally several years after the official education system can produce people who have an official diplomas of that sector.

Of course people who wants to work on the new sector will get their training somewhere (learn by themselves, are taught by companies, etc..) → will this effect on "official" training systems?

Official training systems are mostly financed by public funding →  
Public funding is usually connected to official curricula and official diplomas.

→ Public education systems are in many cases too slow to fullfill the new needs for the new professions.



**If the world is changing faster than traditional VET systems and training organizations can change  
→ who will train the people?**

**Should we do something?**



# A report on the future of work by the World Economic Forum

[http://www3.weforum.org/docs/WEF\\_Future\\_of\\_Jobs\\_2018.pdf](http://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf)

- A report on the future of work by the World Economic Forum underlines that anticipating and managing expertise needs are becoming increasingly important.
  - They estimate that up to 65 % of children starting their school this year will end up working in occupations and tasks that do not yet exist today
- The core of many academic degrees is rapidly changing. For example, by the time of graduation, up to 50 % of information received in the first year of a four-year technical degree may have become outdated.
- The report also states that up to a third of the core competencies linked to most occupations may change by the year 2020.

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# A report on the future of work by the World Economic Forum: Impacts

- Rapid changes in professions and industries mean that **degrees no longer match the skill requirements of the work** markets and cannot ensure a successful professional career or even full-time employment.
- Degree **curricula need to be radically renewed increasingly often**, if the goal of degrees is to meet the needs of societies, organisations, and individuals.
- If supply and demand do not genuinely meet, **completing outdated and unnecessary degrees may prove expensive** for societies and individuals alike.
- **In case degrees are replaced by certificates and practically proven qualifications, what happens to educational institutions, the teaching profession, university research, and academic general knowledge?**





The phenomenon to study  
Industry 4.0 (or Technology & Industry  
4.0 or i4.0 or...)

Impact assessment  
from different  
perspectives

Findings

Proposals:  
Effects on Vocational  
Education

Discussion

The result of the  
studies

**One definition** of Industry 4.0 (KPMG):  
Industry 4.0 (Industry 4.0, i4.0) is a term used globally to describe an ever-expanding entity of objects, Internet of Things (IoT) -based technologies, artificial intelligence, augmented reality, advanced analytics, and advanced automation.

**Industry 4.0 is not just about a particular technology. It is about doing business and its performance, catching up with and gaining competitive advantage.** The next challenge is how to find pragmatic and effective ways to make products and deliver services even better, faster and safer, and more responsibly, and how we can develop completely new products and services - and thus generate broad added value for your investment and create a sustainable competitive edge.

This opens up opportunities for organizations to reflect on key challenges such as:

Is our operational model appropriate?  
How can we increase our market shares?

How can we improve productivity without increasing costs?

What new services can we develop?

The Fourth Industrial Revolution is now underway and nobody knows exactly what it really means and how far its impact will extend.

Subgroup 1:  
Organisational change

Subgroup 2:  
Tehcnological change

Subgroup 3:  
Global Change

Subgroup 4:  
Societal Change

Subgroup 5:  
Industry change



What are the main trends concerning leadership, management, workmodels, etc→ How they change the way we should work in the colleges



What are the major changes in technology and what are the effects in Vocational ...



What is happening in global scale and how change will change teaching (big things)



What are the main changes in society and how they change learning → how they change colleges and VET.



What are the main changes in industry and how they change VET

**All together**

How the profession of the teacher will/should change How we ensure quality of trainers? ? How it affects to our workmodels and our colleges / VET system.

Combining the proposals and findings.  
Discussion about the findings and proposals → **common understanding!**

EfVET policy paper:

“Vocational College 4.0”

Azores conference 2019

EfVET conference 2020

# Working in groups (3 groups)

- Task 1:
  - What are the main steps we need to take "to survive" in rapidly changing world?
    - What must be changed in VET system
    - What must be changed in VET colleges
    - What must be changed in individual level (teachers, managers, etc..)
- Task 2
  - What is needed to take those steps?
    - How we change the things which must be changed?
- 45 minutes time for discussions
- Presentations to others
- Common discussion
  - All aspects
  - 1 key message



# Thank you!

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