“AI comes - Is Finland Ready?”

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Main points of the presentation

AI escapes definitions, but let’s first try outline what we mean with AI

Why AI is coming now?

Is Finland ready?

- Skills and competences
- Technology, research
- Industry, tech providers, ecosystems
- Capital, VC
- Government and public sector
- General attitudes, regulation

National AI action

Note: AI’s societal impacts and ethics not covered in this talk.

Since 2000 we have seen many trends and buzzwords coming.

Mobile work enabled by 3G, 4G, 5G

Cloud and cloud services

Virtual reality, VR, AR

IoT, Industrial internet

Big data

AI

Industrie 4.0

Machine learning

RPA

Blockchain

Data Analytics

Platform economy

What AI is

AI is a collection of technologies and methods – not a single technology.

- Recently, deep learning neural networks have given great results e.g. for image recognition
- Other technologies and methods include machine learning, natural language processing, machine vision, robotics, as well as problem solving & searching, logic & planning & ontologies, probabilistic reasoning, fuzzy logic

AI Paradox
(odd paradox, AI effect):

”AI is whatever hasn't been done yet.“

Douglas Hofstadter

AI methods

AI methods				
Data based: classification, prediction			**Model and rule based**	**Classical methods**
Other	Machine Learning			
Genetetic Evolution	**Supervised learnig**	**Unsupervised Learning**	Expert systems	Search
	Linear regression	PCA, LCA		Logic (first and second order)
	Logistic regression	SOM	”handmade” rules	Semantic methods
	Neural networks a.k.a. deep learning	**Anomaly detection**	Decision trees	Agents
	Support Vector Machines			Common sense reasoning

NARROW, WEAK AI

Very good in recognizing faces in images or playing chess or optimizing a complicated system. Totally useless in everything else.

STRONG, GENERAL AI

AI with broad understanding and human-like consciousness.

SUPER AI

AI superseding human intellect in all respects. Related to the concept of singularity. Popular in sci-fi.

Today, *we do not have* Artificial Intelligence in the sense that machines would have consciousness or will of their own.

Someday we may have – and therefore we can see radically different futures.

Why is AI a hot topic now?

Business needs and benefits

Data

Lot's of data available at reasonable cost due to internet, digitalization, IoT, SOME, and cheap cloud storage.

Computing power

Affordable, available and scalable computing power. Hadoop, SPARK GPU, NVIDIA.

Algorithms and tools

Basically, algorithms were there in 90'ies, but now they have been packaged and made available as toolsets by Google and others. Deep learning NN is great for many apps.

Is Finland ready? Skills and competences

- IMD analysis says Finland is #4 of 63 countries in ”Digitalization”
  - “talent” #10,
  - “training and education” #8
  - “adaptive attitudes” #3,
  - ”digital skills” #4.
  - Foreign highly-skilled personnel #42

    https://www.imd.org/globalassets/wcc/docs/release- 2017/world_digital_competitiveness_yearbook_2017.pdf haettu 22.3.2018
- Finland is #2 in EU Digital Economy and Society index 2017.
- Average level of education in Finland is high – but unfortunately the trend is not so good.

Is Finland ready? Technology, Research

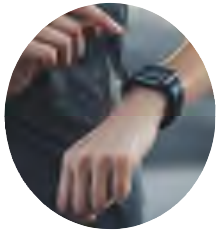
- AI technology and tools are basically available for everyone in the world
- Finnish research in basic AI science is strong (for a small country)
  - The work of Profs. Teuvo Kohonen, Erkki Oja and others is widely known, also now we have highly valued scientists
  - Aalto, Helsinki University, Jyväskylä University, University of Oulu, Tampere3, VTT
- Even though Tekes / Business Finland funding for applied research has declined 30%, AI field has been promised significant research funding
  - Finnish Academy and BF (Science …. Application)

Is Finland ready? Industry, tech providers, ecosystems

- Leading Finnish industrial firms are digitalization aware, but how about others?
- In the service sector situation is more divergent
- Some 200+ companies say they are AI tech providers
- IMD rankings (again among 63)
  - Digital/Technological skills #4
  - Innovative firms #13
  - Agility of companies #32
  - Use of big data and analytics #12
  - Knowledge transfer #8

ECOSYSTEMS

Process industry



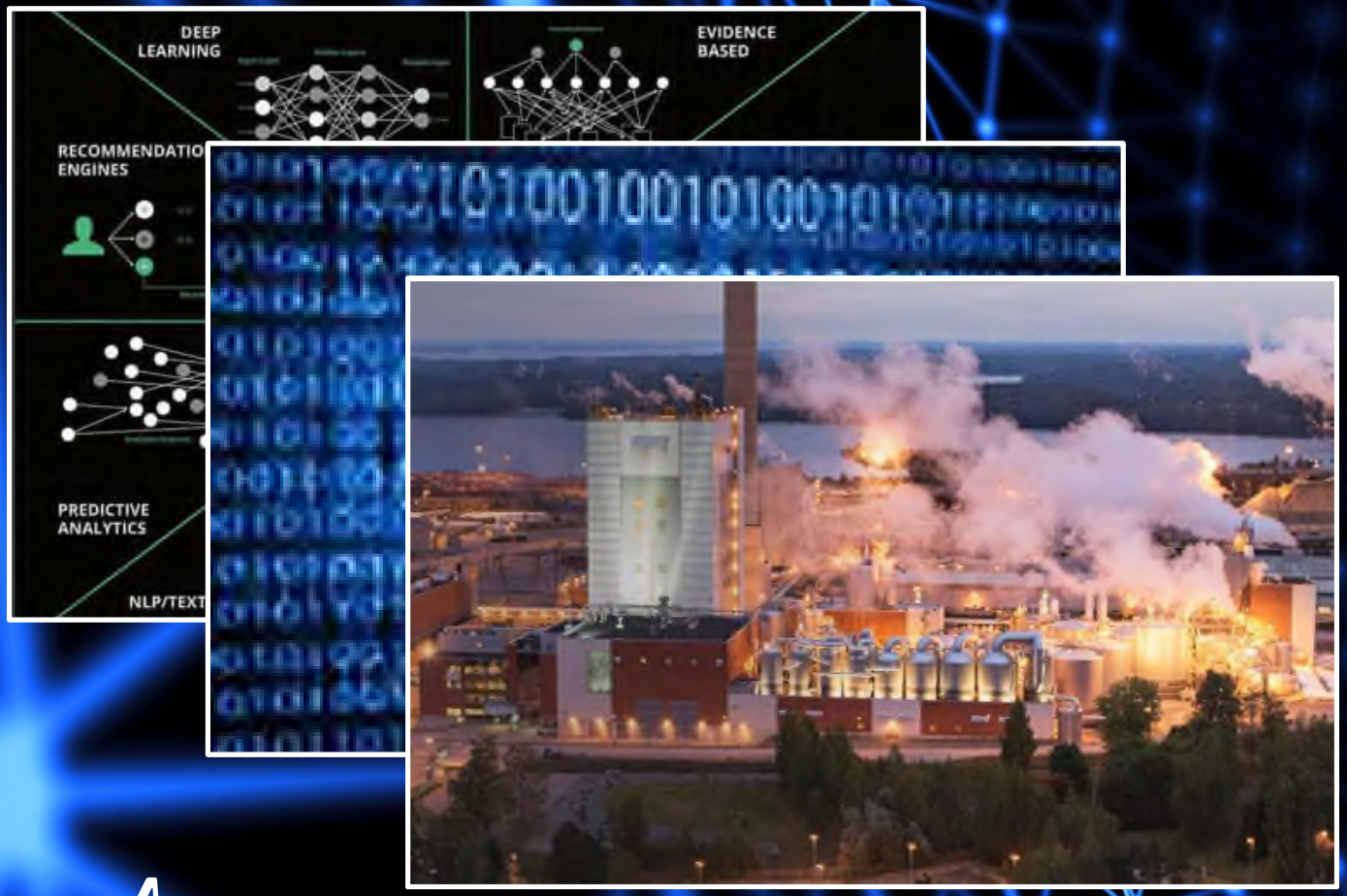
Health and wellness

Energy

Manufacturing

Telecommunications

Case: A pulp mill optimisation



A real-time pulp quality control

Yearly saving of ~700 truck load

I.e. significant competitive edge and sustainability impact

Is Finland ready: Capital, VC

- VC funding is growing rapidly, but the valuation of Finnish startups is modest compared to top countries, (no unicorns, no big acquisitions)
- Government program for AI promising for growth companies
- IMD
    - Venture capital #8
    - Funding for technological development #5

Government and public sector
General attitudes, regulation

Current government has embraced AI (and opposition does not oppose)

- A task force led by minister of industry and employment
- 100 M€ funding promised for 4 y through BF for RDI
- Initiatives on all fields of government

Citizens have positive attitudes

- IMD ranking
    - Adaptive attitudes #3

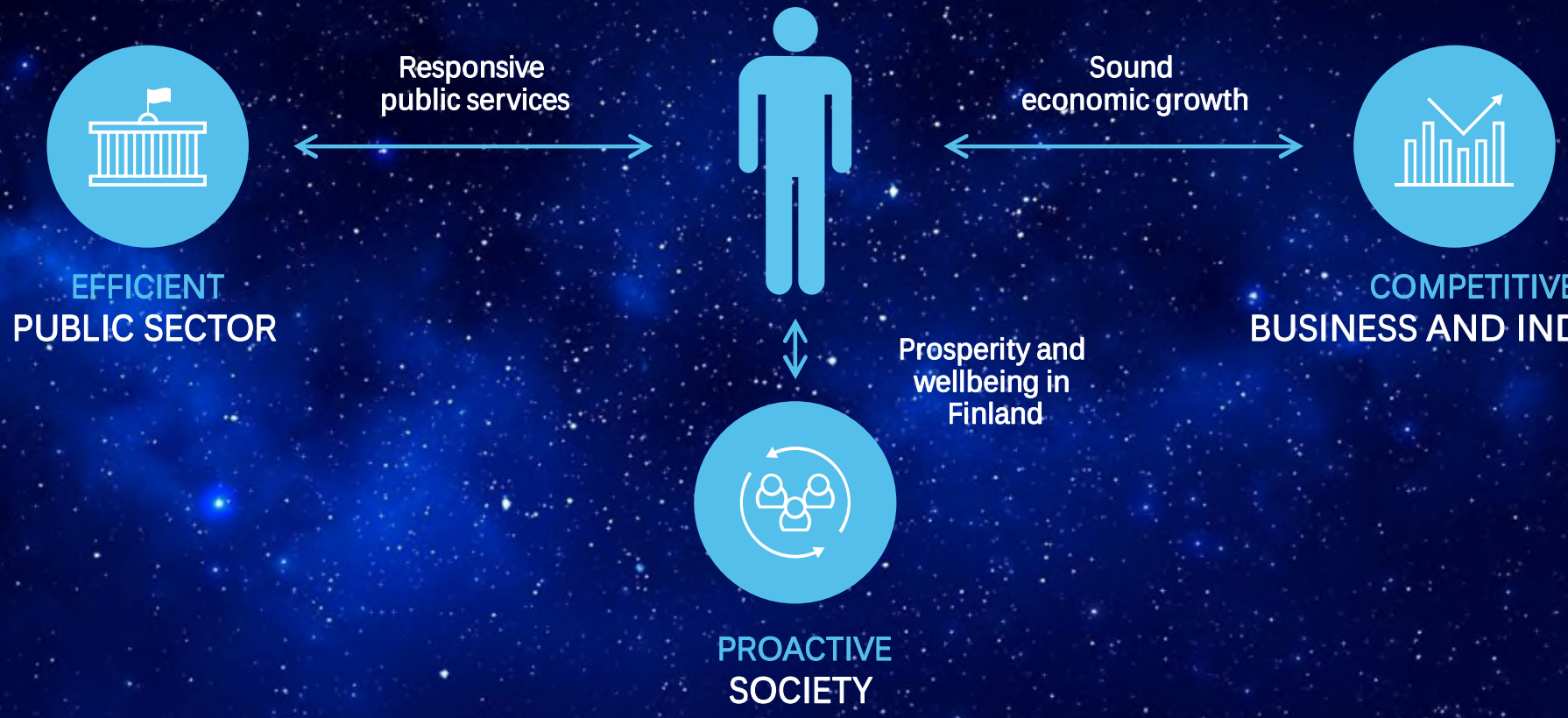
Regulation is rather permissive

- E.g. autonomous vehicle and vessel test areas
    - Intelligent road 21 in Lapland
    - Jaakonmeri autonomous ship test area
- IMD rankings
    - Regulatory framework #2

8 key actions for taking Finland towards the age of AI

1. Enhancement of business competitiveness through the use of AI
2. Effective utilisation of data in all sectors
3. Ensure AI can be adopted more quickly and easily
4. Ensure top-level expertise and attract top experts
5. Make bold decisions and investments
6. Build the world’s best public services
7. Establish new models for collaboration
8. Make Finland a frontrunner in the age of AI

Artificial intelligence is the new electricity



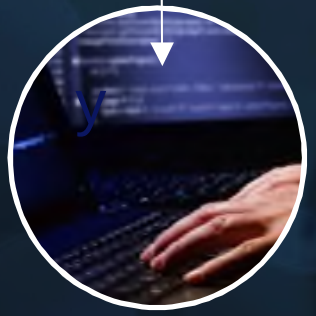
AI applications require multidisciplinary competences

AI tools expertise

ICT system expertise

Business and domain expertise

Users



Effective Innovation network and expertise

Conclusion

Is Finland ready: Yes…partly			
Skills and competences	**Yes**	Partly	No
Technology, research	**Yes**	Partly	No
Industry, tech providers, ecosystems	Yes	**Partly**	No
Capital, VC	Yes	**Partly**	No
Government and public sector	**Yes**	Partly	No
General attitudes, regulation	**Yes**	Partly	No


TECHNOLOGY FOR BUSINESS