

# Manufacturing 4.0 Workshop

## 1.-2.11.2018

Helsingin Yliopisto

Research Director, Dr, Adjunct Prof. **Jari Kaivo-oja**, Project researcher M.Sc. **Mikkel Stein Knudsen**, Ph.D. **Theresa Lauraéus**  
Finland Futures Research Centre, Turku School of Economics,  
University of Turku



# Manufacturing 4.0: The work of Finland Futures Research Centre



- We create *tools for identifying those rising fields* that have potential for revolutionary new products. We shall pay *special attention to radical innovation potential and economic value-added potential* of revolutionary new products.
- We will find the ways for *systematic screening* of the rising fields by combining existing information. We will *evaluate* which of those fields which are *suitable for a small country*.
- We will use *Delphi STI expert panels* leading us to *analytical strategy map of futures STIs*. This *selection and smart specialization process* is of great importance for a small country that has limited resources for research, education and product development.





### Manufacturing in Finland

- Kaivo-oja, Knudsen & Lauraeus (2018): Reimagining Finland as a Manufacturing Base: The Nearshoring Potential of Finland in an Industry 4.0 Perspective. *Business, Management and Education*
- Kaivo-oja, Knudsen & Lauraeus (2018): Manufacturing Baseline Scenarios for Finland and Regional Economies. *Maatiiteen Päivät 2018*.

### Emerging technologies

- Kaivo-oja & Lauraeus. Picking the ICT Technology Winners – 21<sup>st</sup> Century Technologies Analysis on the Basis of Gartner HC Year Database 2008-2018, Observed Trends, Tendencies and Weak Technology Signals. *Ready for submission*.
- Kaivo-Oja, Ahlqvist, Kuusi, Linturi & Roth (2018). New industrial platforms and radical technology foresight: The case of 3D-printing in Finland and Europe. *International Journal of Manufacturing Technology and Management (IJTM)*

### Trends and megatrends

- Kaivo-Oja & Knudsen (2018): Bridging industry 4.0 and Circular Economy: A new research agenda for Finland? *FFRC Blog*
- Kaivo-oja & Lauraeus (2018): The VUCA approach as a solution concept to corporate foresight challenges and global technological disruption. *Foresight*
- Kaivo-oja (2018): Next Steps to the Future – Key Expected Changes and Challenges in the Business Environment of SSAB. *Company presentation, april 2018*.

### New markets

- Kaivo-oja, Lauraeus & Luukkanen (2018): Economic Growth and Gross Domestic Expenditure on in G7 countries with Some Benchmarking with BRICS Countries: Long-Run Comparative Synergy Analyses. *KMO 2018, Proceedings*.
- Kaivo-Oja (2018). Chair of session at Finland-ASEAN Research Seminar at Ministry of Education, Science and Culture 25.9.2018

### New products

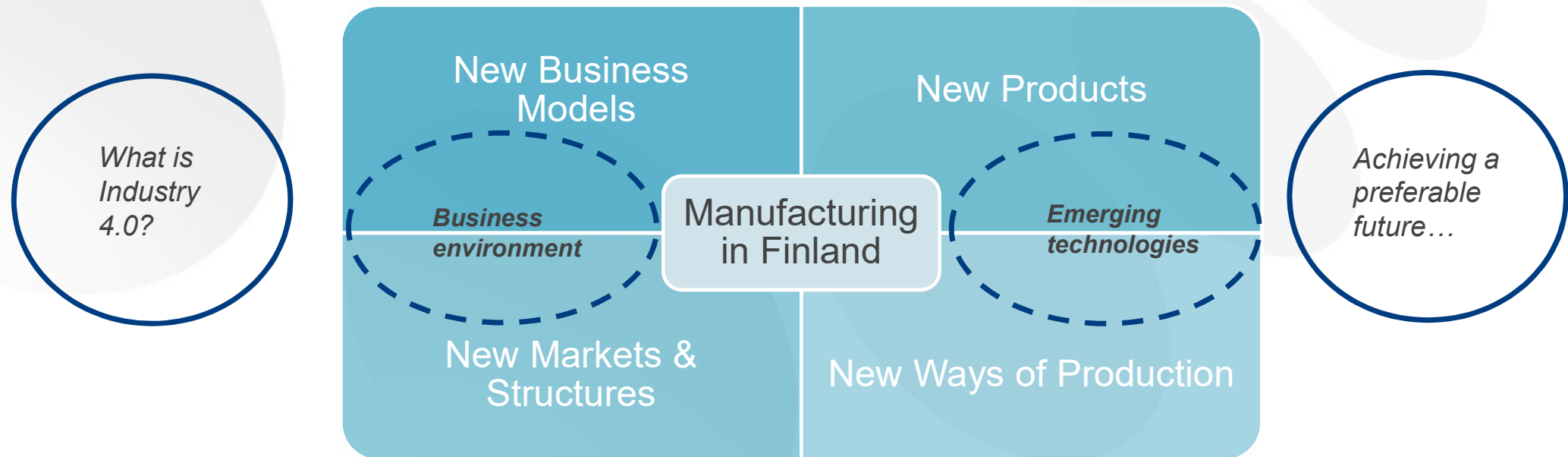
- Knudsen & Kaivo-oja (2018). Cobalt: What the price of a mineral can make us inquire about the future. *FFRC Blog*.
- Lauraeus & Kaivo-oja (2018): Finnish Long Run Product and Service Innovation Patent Portfolio Analysis. *Forthcoming*.
- Kaivo-oja, Lauraeus & Tinnilä (2018): The most important Technology Innovations for Consumers in Finland. *Forthcoming*.

### New business models

- Roth, Melkonyan, Kaivo-oja, Manke & Dana (2018). Interfunctional Business Models: Map grid for a uncharted quadrant of the blue ocean. *International Journal of Entrepreneurial Venturing (IJEV)*.



# FFRC are working with the **research questions** and with **surrounding themes**





# Several ways of achieving impact

- Academic publications
- Publication of non-academic texts
- Academic conferences (Finland / abroad)
- Presentation for Finnish businesses
- Participation in relevant events (Finland / abroad)
- Collaboration with partners (Finnish / foreign)
- Engaging decision-makers
- Teaching opportunities





# Actions / themes (at this point)

- Changing global value producing networks
- Examining technological disruptions and new digital solutions
- "Baseline" for Finnish manufacturing in the future
- Filtering information to create maps of opportunities
- Connection between Industry 4.0 and Nearshoring
- Interlinks between circular economy and Industry 4.0
- Smart Specialization
- Generating insights from Big Data
- **Piloting a Real-Time Delphi (key next step)**





# Examples of recent work

*ASEAN-Finland Research Seminar,  
Ministry of Education, Science and Culture of  
Finland, Helsinki 25.9.2018*



*Conference: Complexities of Systems:  
Risk and Uncertainty, Kaunas, Lithuania,  
4-5.10.2018*



*Annual meeting of Finnish  
Geographers, Helsinki 25-26.10.2018*



*New report from Panel of Futures Competences  
11.10.2018*

Osaamisen tulevaisuuspaneeli:  
**Jatkuvan oppimisen rahoitusmallin uudistaminen  
tarpeen**

Opetus- ja kulttuuriministeriö 11.10.2018 15:00

TIEDOTE



# Upcoming papers (next 6 months)

- Kaivo-oja & Lauraeus (2018): Picking the ICT Technology Winners – 21st Century Analysis on the Basis of Gartner HC Year Database 2008-2017 - Observed Trends, Tendencies and Weak Technology Signals. *Journal of Technovation*, ready for submission.
- Roth, Leydesdorff, Kaivo-oja: Open Co-opetition – a research update. *Industrial Marketing Management*, In review.
- Kaivo-oja, Lauraeus & Knudsen: Finland's Manufacturing Future: Calculating baselines through input-output data and long-term growth forecasts. *In Progress*.
- Knudsen, Lauraeus & Kaivo-oja. Technology Waves of Manufacturing 4.0 and Industry 4.0 – Empirical Study of the Web of Science Database. *To be submitted for KMO2019-conference, in progress*.
- Kaivo-Oja, Lauraeus & Knudsen: Global Value Producing Networks, Smart Specialization and Manufacturing 4.0 Strategy in Finland. *In Progress*.
- Dana, Roth, Kaivo-oja, Lauraeus & Tinnilä: Systemic Thinking and Reinventing the Ways to Innovate New Business Models. *In Progress*.
- Kaivo-oja, Knudsen & Lauraeus: Real-time Delphi Study of Manufacturing 4.0 Pilot Framework. *In Progress*.
- Knudsen & Kaivo-oja. Market Competition and Market Concentration in the EU-28: Trends and Observations. *In Progress*.
- Kaivo-oja, Lauraeus, Tinnilä: The Most Important Technology Innovations for Consumers in Finland. *In Progress*.







Turun yliopisto  
University of Turku

# Internal team and external collaborators



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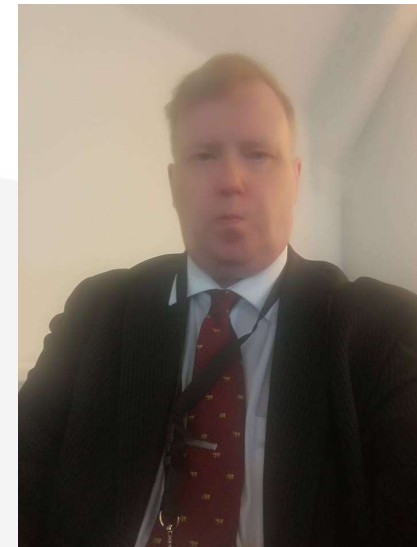
# Manufacturing 4.0 – Strategies for technological, economic, educational and social policy adoption: **FFRC Research Team**



Project researcher, M.Sc.  
(pol.),  
Mikkel Stein Knudsen



Senior Researcher, PhD  
(Econ.)  
Theresa Lauraéus

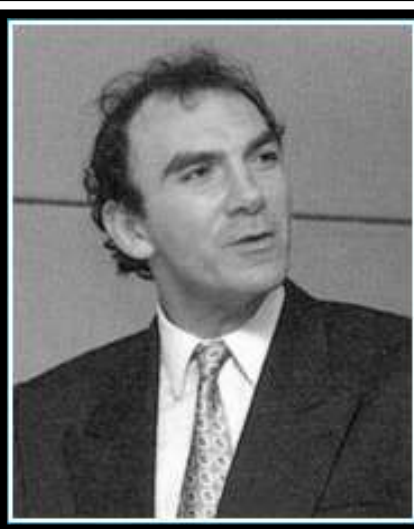


Research Director, Dr, Adjunct  
Prof.  
PhD (Adm.Sc)., MSc (Econ)  
Jari Kaivo-oja

## Manufacturing 4.0 – Some international scientific partners (joint publications)



Associate Research Prof.  
Steffen Roth,  
La Rochelle Business School,  
France



Prof. Leo-Paul Dana,  
Montpellier Business School,  
France



Prof. Louis André (Loet)  
Leydesdorff.  
University of Amsterdam,  
Netherlands



Senior Research Fellow, Dr. Levan  
Bzhalava, Mälardalen University, Sweden,  
Big Data Excellence Center, Lithuania



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## Manufacturing 4.0 – National scientific partners, National Competence Panel, Ministry of Education and Culture

- National Competence Panel (Ministry of Education and Culture), years 2017-2019
- 2 Reports in 2017-2018, latest published in Oct 2018 by Minister Sanni Grahn-Laasonen, more be published in 2019



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## Manufacturing 4.0: Some collaborative co-competition networks: **Smart100Business** – project in Satakunta

- Smart100Business, Pori, Satakuntaliitto, Finland
- Partners: University of Turku, TSE, FFRC, Tampere Unit, Tampere University of Technology, Pori, Rauma Marine Constructions, Pori Offshore Constructions, Satakunta Liitto, Aalborg University/Business Model Suite Toolpackage

## Manufacturing 4.0: Some collaborative co-opetition networks: UTU, TSE, FFRC-Högsholan i Gävle-Åbo Academy

- Cooperation with Prof. Arne Fagerström, Gävle University and his research networks linked to Åbo Akademi
- Themes: **Sustainable business accounting and business research, responsible business, business modeling,** forest industry, Finland-Sweden Industry 4.0 -business collaborations, happiness based business models





## Manufacturing 4.0: Some collaborative co-opetition networks: UTU, TSE, FFRC – Technical University of Riga

- **System Theory in Business Management**
- Scientific journal co-operation: Eastern European Business and Economics Journal
- Erasmus exchange starting with FFRC, TSE-Riga Technical University (RTU)
- Research Professor Valerijs Skribans, Editor in Chief of the EEBEJ





## Manufacturing 4.0: Some collaborative co-opetition networks: **Big Data Foresight Platform –project, Big Data Excellence Center**, Kazimieras Simonavicius University, KSU, Vilnius, Lithuania

- Big Data Foresight research program, 3 years research project, with six Big Data foresight researchers
- Themes: Data based business models, big data and transportation logistics, innovation management, business research
- Algorithm economy and Big Data



Robertas Švabauskas  
Pilot, senior lecturer of theory and flight  
instructor at "Baltic Aviation Academy"

Rūta Vyšniauskienė  
International coordinator  
at KSU

Emmanuel Mesha Magige  
Student

Elmantas Belackas  
Student

## Allied ICT Finland

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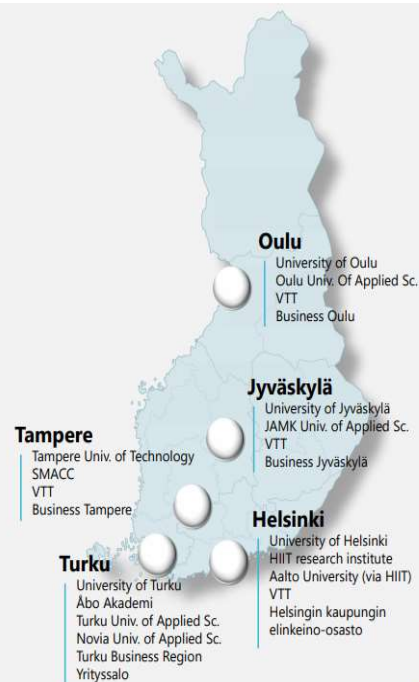
BUSINESS  
JYVÄSKYLÄ

## Allied ICT Finland Growth Mill

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