

# Industry challenge to resilience in the factory of the future

CF#1 Webinar, April 28, 2021 Sauli Eloranta, Professor of Practice VTT Technical Research Centre of Finland

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- VTT in brief
- Covid-19
- Resilience
- Situational awareness
- System dynamic model supporting decision making
- Resilience in manufacturing
- Cyberfactory issues
- Smart resilience actions are profitable



VIII

# VTT today



149 M€ Turnover
8 M€ Other operating income
87 M€ Government grant

2,129

employees

27%

of Finnish innovations have links with VTT's competences

45%

of turnover from abroad



patent families

VTT

is under the state ownership steering of the Ministry of Economic Affairs and Employment of Finland

# VTT creates solutions in three business areas





**Knowledge-intensive** products and services



Solutions for natural

resources and environment



Smart industry and energy systems

# CYBER FACTORY NO.1

# Resilience – Covid-19

- Low probability / high consequence event
- Black Swan event?
- Unanticipated consequences (not just health)
- Unknown consequences (how will it change everything?)
- Has raised interest on resilience (ability to withstand & recover)
- Not over with it yet
- What is the new normal?
  - "Recovery" means getting back to the original state not an option!





Why Being Resilient During A Crisis Is Vital For Manufacturers The Wall Street Journal

Ford to pause production at some plants due to chip shortage

#### Harvard Business Review for Coronavirus

# accenture **COVID-19: Adapting manufacturing** operations to new normal





Speed and agility are essential for the future. The next disruption is closer than any one of us would believe.

— Nando Malmelin

Welcome to the "ResilienceTool"\* of SmartResilience project

Confederation of Finnish Industries



Finland's leading corporations respond to the COVID-19 crisis: preparations for billion-euro investments in digitalization and green transition

# **Situational Awareness**

- Following direct market indicators
- Understanding which indirect indicators impact your business
- Creating a view (cognition)
- Anticipating (projection)
- Act before the others





#### CYBER FACTORY NO.1 CF#1

# **Decision Making under Uncertainties**

- Impact Assessment of Decisions
  - Strategic decisions with long term impacts have to be made in a rapidly changing environment with significant disruptive uncertainties taking place. Decision makers are increasingly held accountable for the impacts of their decisions.



# **Decision Making under Uncertainties**

Data analytics



Quantitative data based methods

Qualitative narrative methods

GYBE

# **Decision Making under Uncertainties**

System dynamic model elements



CYBER

Design and Assembly Schedule



### BUILDING RESILIENCE FOR SUSTAINABLE MANUFACTURING

CYBER FACTOR

HOW TO IMPROVE RESILIENCE AND GROW YOUR BUSINESS SUSTAINABLY

https://www.businessfinland.fi/en/for-finnish-

**#FINLAND**WORKS

customers/services/international-growth/tasmatoimet-valmistavan-teollisuuden-viennin-vauhdittamiseksi/make-your-company-resilient



#### MITIGATE SUPPLY RISKS BY DIVERSIFYING YOUR VALUE CHAIN AND ENGAGING SUPPLIERS TO COVER CRITICAL POINTS

 Monitor suppliers 24/7, ensure their Monitor suppliers 24/7, ensure they have manufacturing, distribution and warehouses comprehensive risk-management programs are not in the same region also for sub-tier suppliers, know where they build and store your materials Diversify sole-supplier risk by purchasing from 2 suppliers rather than 1 Identify sub-tier suppliers and mitigate sole-supplier risk through diversification or Identify sub-tier suppliers that direct requesting them to stock parts in multiple suppliers use for critical materials locations Obtain insurance to cover for profits lost Obtain insurance to cover for profits lost from from risks you can't mitigate risks you can't mitigate Monitor suppliers for changes that might Monitor suppliers 24/7, know where they increase their risk significantly, such as poor manufacture and store critical parts financial performance, restructuring, lawsuits If not possible to diversify supplier base. Identify suppliers that rely on the same ask suppliers to store parts at multiple sites sub-tier suppliers for critical materials Ensure that direct suppliers have comprehen- Seek geographic diversity between suppliers' sive risk-management programs in place manufacturing and warehouse sites Identify sub-tier suppliers and logistics paths

LOW – TWO OR MORE SUPPLIERS SUPPLY CHAIN RISK HIGH – ONLY ONE SUPPLIER

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# Cyberfactory issues

- Interconnected factories and wide IoT implementation
- Joint development even with competitors to manage technology
- "Single points of failure" and critical component / data identification
- Network complexity analysis
- Self-generated cyber risks (Boeing 737 MAX)
- External cyber risks (Maersk)
- Economic block technology wars East vs West tech?
- Back-up plans
- Agility in changing environment (e.g. grocery delivery shortages opening up business opportunities for new players)



Smart resilience actions are profitable

- A wider market and customer base with company synergies creates more support legs for the company
- Distributed supply chain reduces country risk and improves agility and responsiveness
- Designing systems and products from commonly available standard (COTS) components reduces cost
- Multi-talented personnel and resource management guarantee organizational flexibility
- Remote customer service, maintenance and operations based on digital technologies are cost-effective
- Minimizing disruptions keeps the customer happy



# beyond the obvious

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