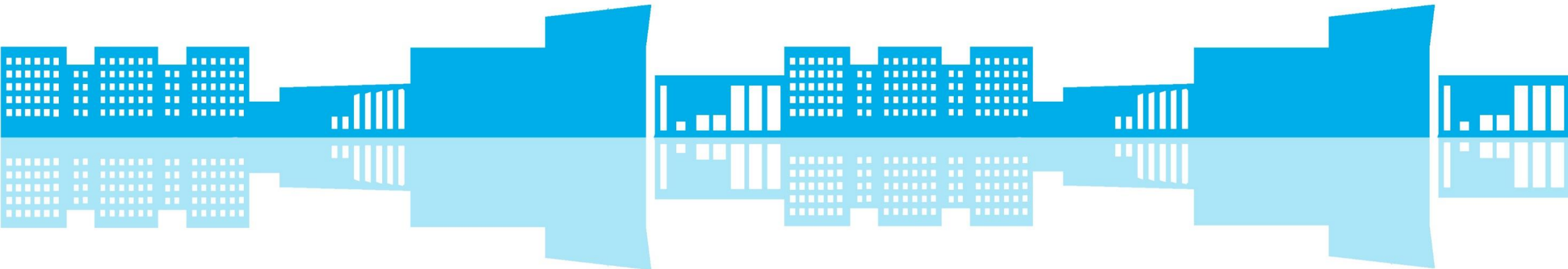




Kilpailukykyä tekoälyllä ja alustataloudella

Tekoälyä SeAMK Tekniikassa 25.3.2019

Hannu Reinilä
Principal Lecturer
Seinäjoki University of Applied Sciences



SeAMK on keskisuuri ammattikorkeakoulu

- Noin 4700 opiskelijaa, joista noin 1300 tekniikan opiskelijoita
- Päiväopiskelijoita noin 3500
- Monimuoto-opiskelijoita noin 950
- YAMK-opiskelijoita noin 350



Tekniikan yksikön tutkinto-ohjelmat

Insinööriohjelmat

Automaatiotekniikka

Konetekniikka

Rakennustekniikka

Tietotekniikka

Ylempi AMK

Automaatiotekniikka

Rakentaminen

Teknologiaosaamisen johtaminen



Diplomi-insinööri yhteistyössä TY:n kanssa

Konetekniikka

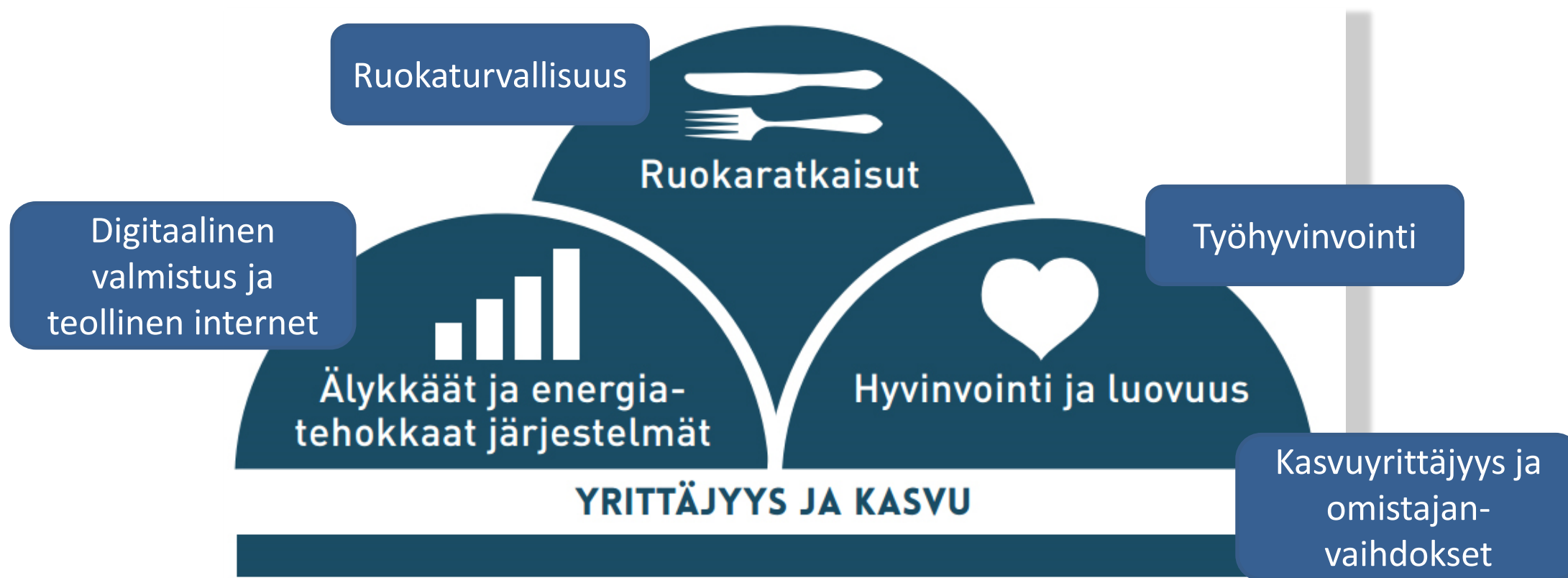
Kaksoistutkinto Aschaffenburg AMK

Automaatiotekniikka

Tietotekniikka

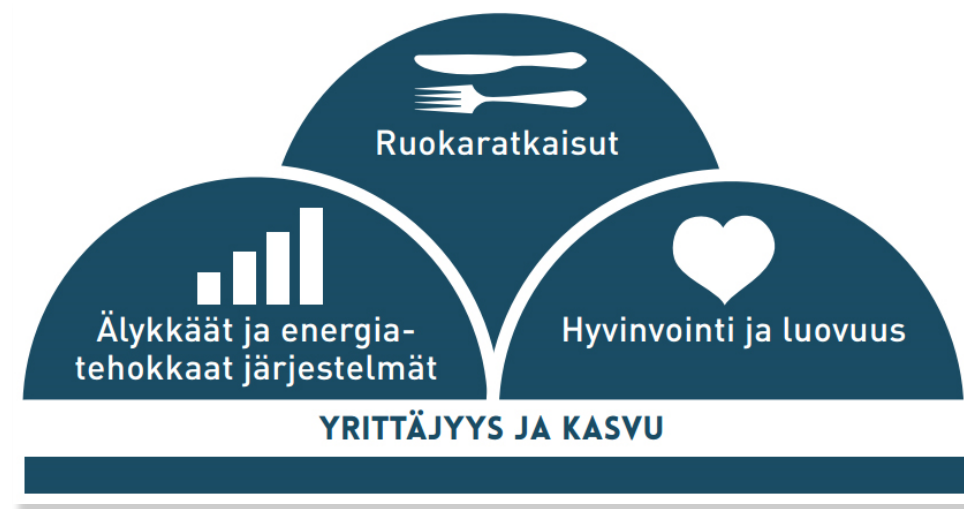


SeAMKin TKI-toiminnan painoalat



TKI-tunnusluvut vuosittain

- 100 TKI-hanketta
- 600 yrityksen ja yhteisön kanssa TKI-yhteistyötä
- 3,5-4,5 M€ ulkopuolista TKI-rahoitusta
- 0,8 M€ maksullisen palvelutoiminnan volyymi
- 500 julkaisua



Digitaalisen muutoksen trendit valmistuksessa

Top Digital Transformation Trends in Manufacturing

Like the Industrial Revolution impacted manufacturing, digital transformation is now responsible for changing the industry. *Now, manufacturing companies are using technology to move from mass production to customized production, and it's happening at a rapid pace.*

IoT and Industry 4.0

At the center of industrial transformation is IoT, accounting for more than \$178 billion in 2016 and proving critical to providing companies with a competitive edge.

Improved speed and efficiency

Robots and other automated technology are also integral in improving speed and efficiency, allowing manufacturing companies to "optimize production workflows, inventory, Work in Progress, and value chain decisions."

AI and machine learning

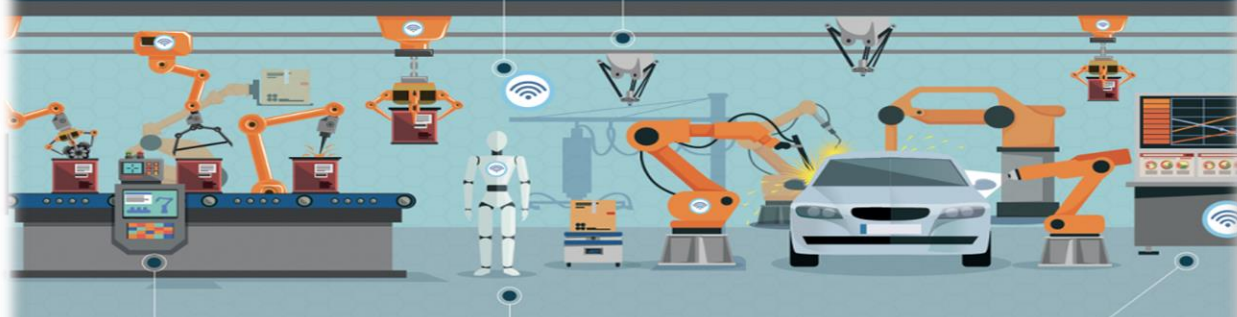
Smart factories with integrated IT systems provide relevant data to both sides of the supply chain more easily, increasing production capacity by 20 percent.

Robots

Today, however, robots are capable of mimicking more human traits such as dexterity and memory, which makes them more useful in industries like manufacturing.

Data and analytics

It is predicted that by 2020, there will be 50 times the digital content compared to what exists today.



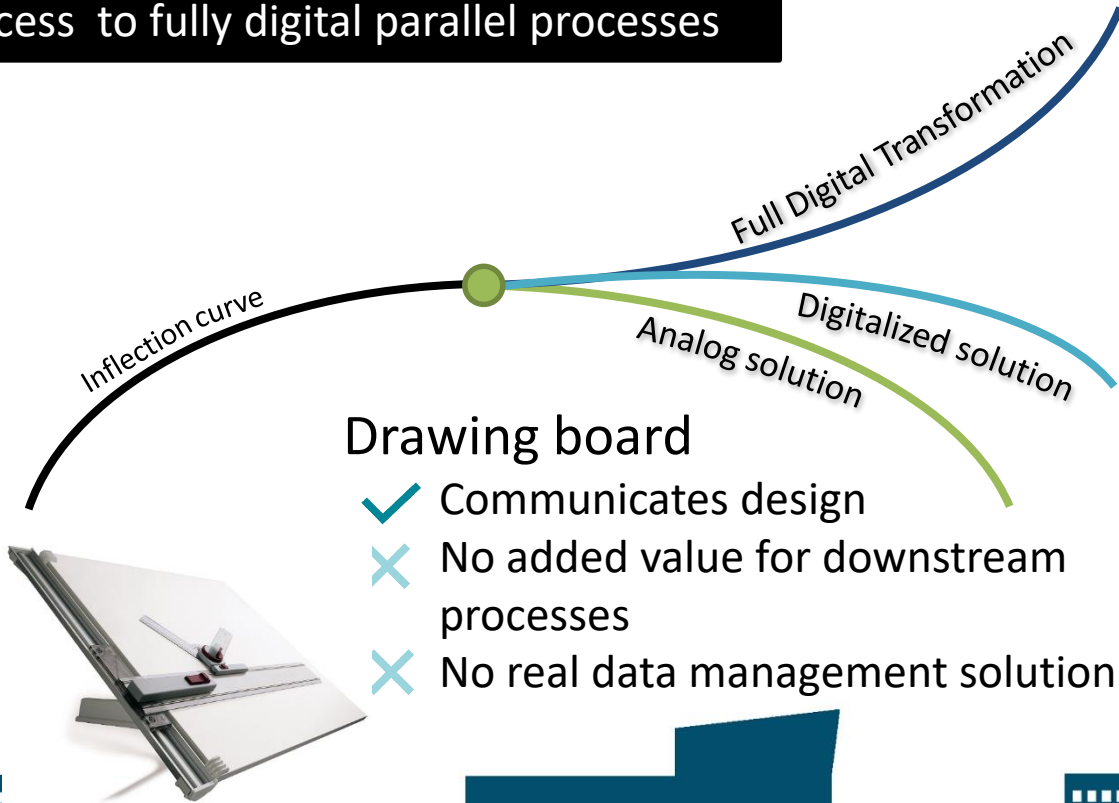
FUTURUM. TECHNOLOGY INSIGHTS FOR BUSINESS LEADERS
@danielnewman17

<https://www.forbes.com/sites/danielnewman/2017/08/08/top-5-digital-transformation-trends-in-manufacturing/#46a77630249f>



Kaikki muuttuu

Convert a traditional analog serial business process to fully digital parallel processes



Drawing board

- ✓ Communicates design
- ✗ No added value for downstream processes
- ✗ No real data management solution

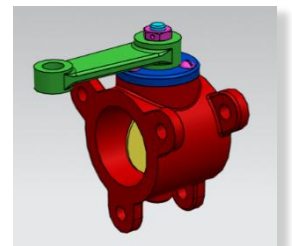
PLM & Digital Twin

- ✓ Complete real time product and production performance understanding
- ✓ Parallel simulation of product, production and service
- ✓ Enabler for superior products, production and business performance

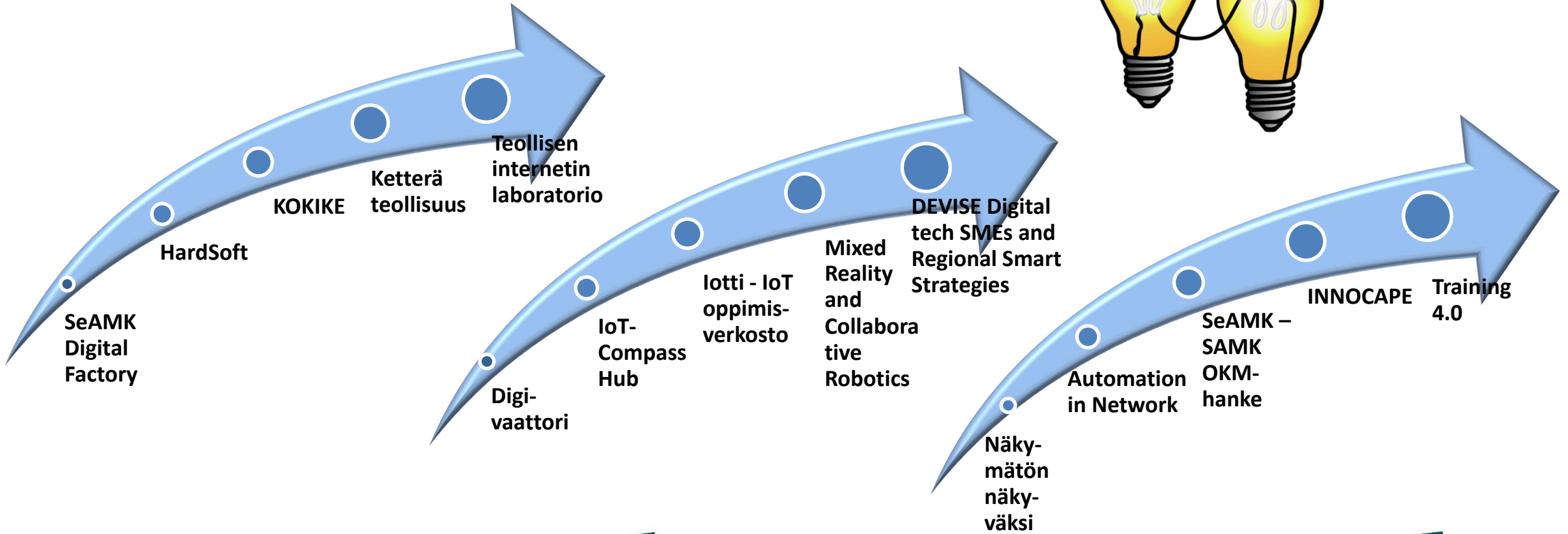
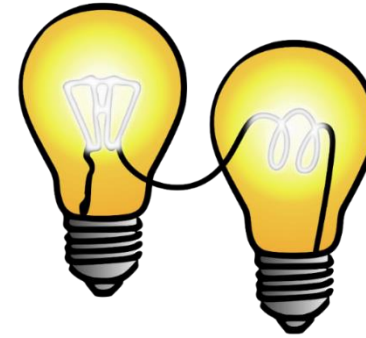


PDM & CAD

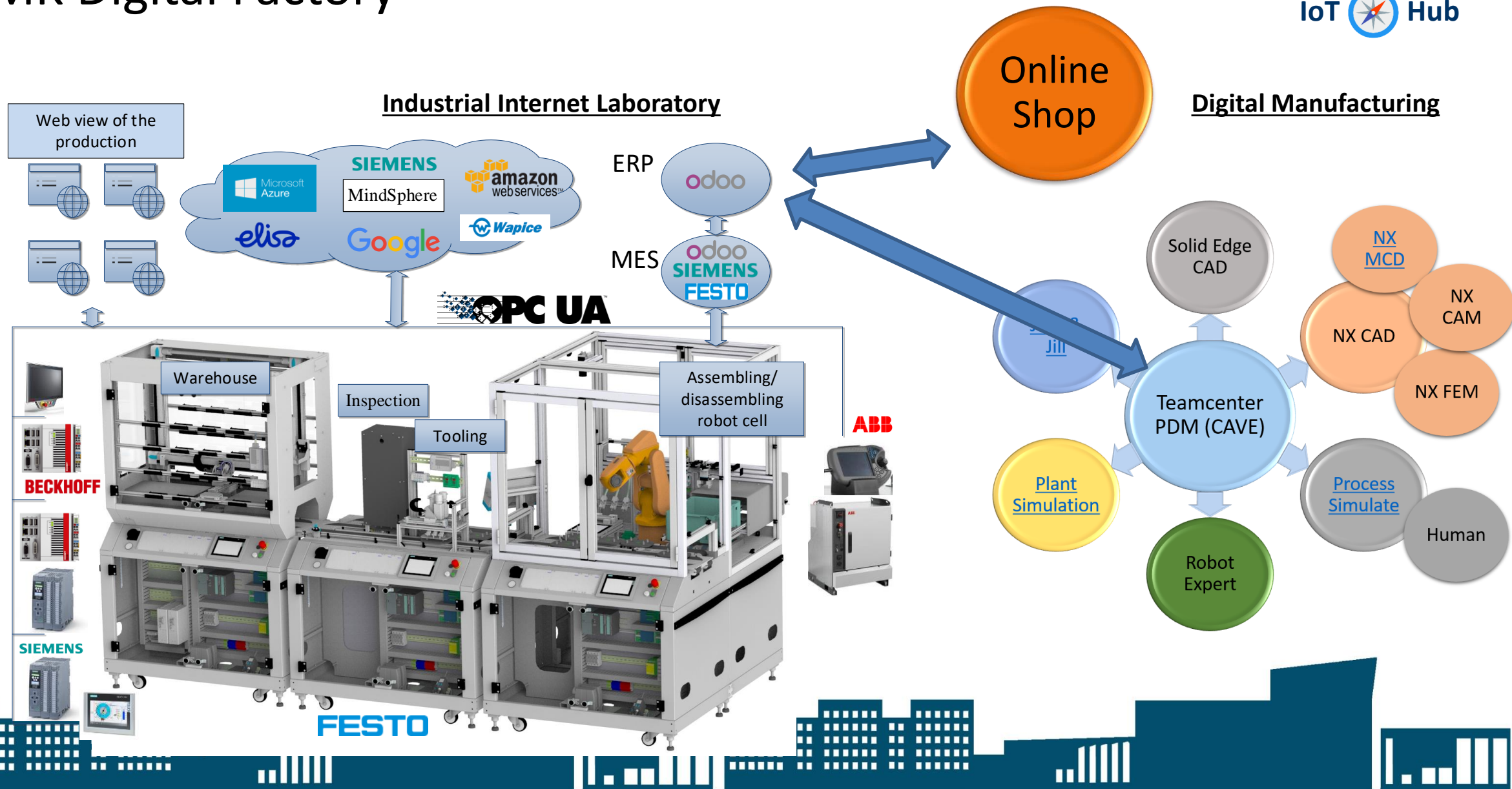
- ✓ Communicates design
- ✗ Some value for downstream
- ✓ Limited simulation possibilities
- ✗ No understanding of product performance



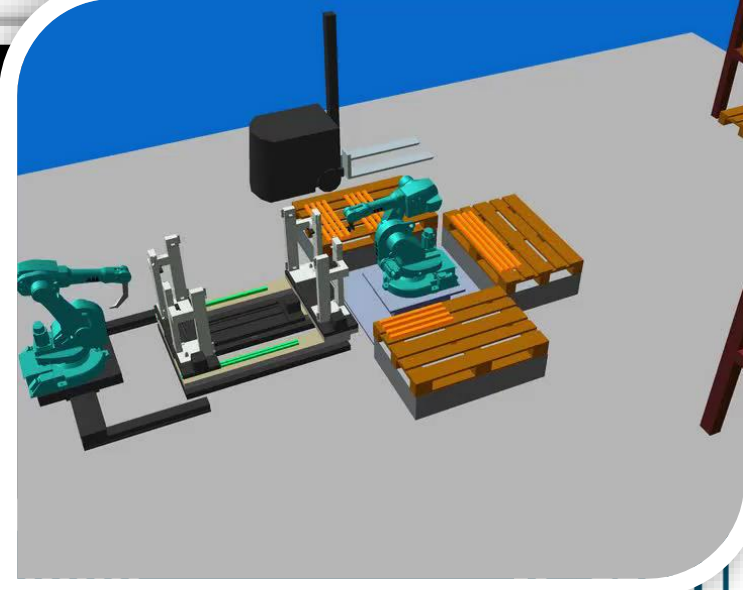
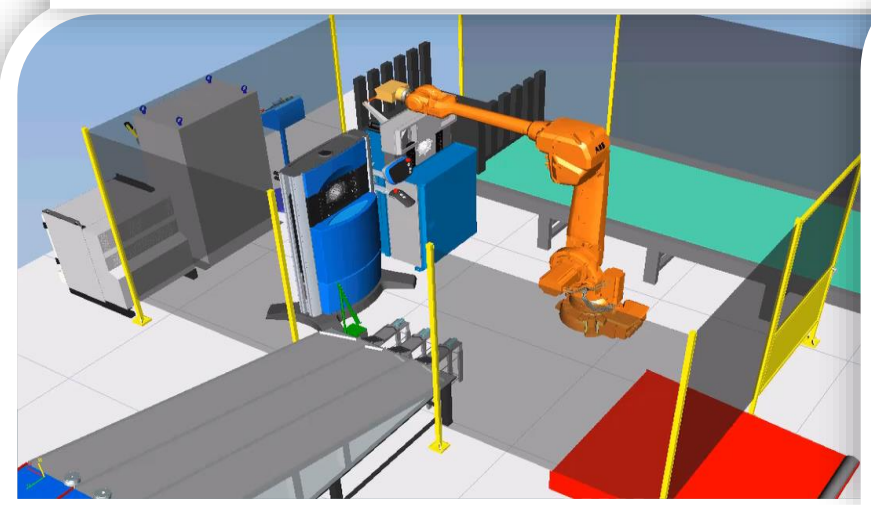
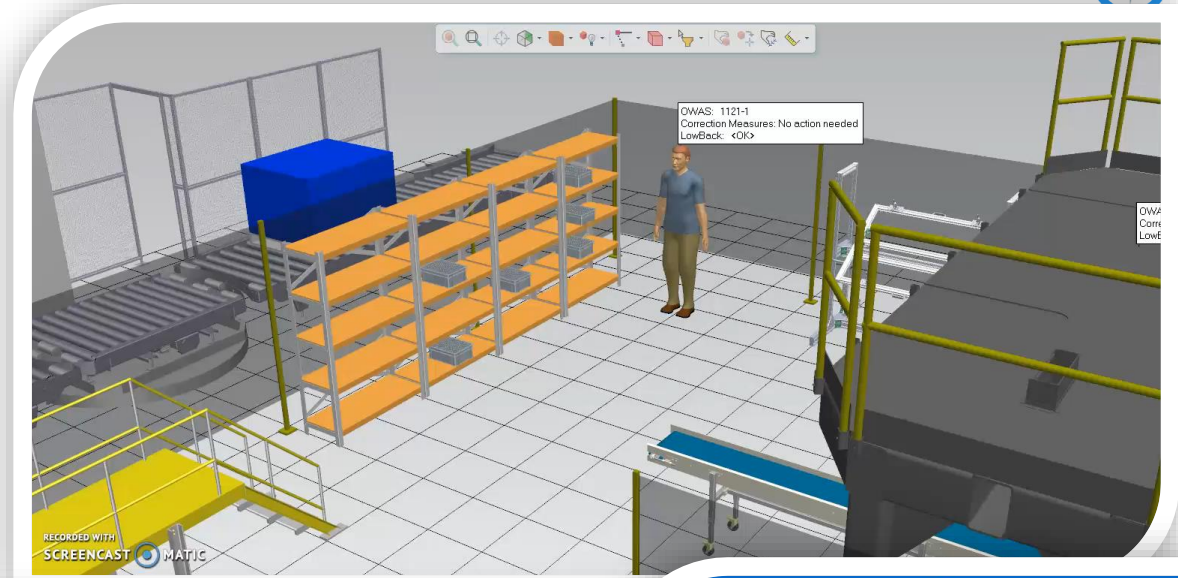
SeAMK Tekniikan digitalisaation hankkeet



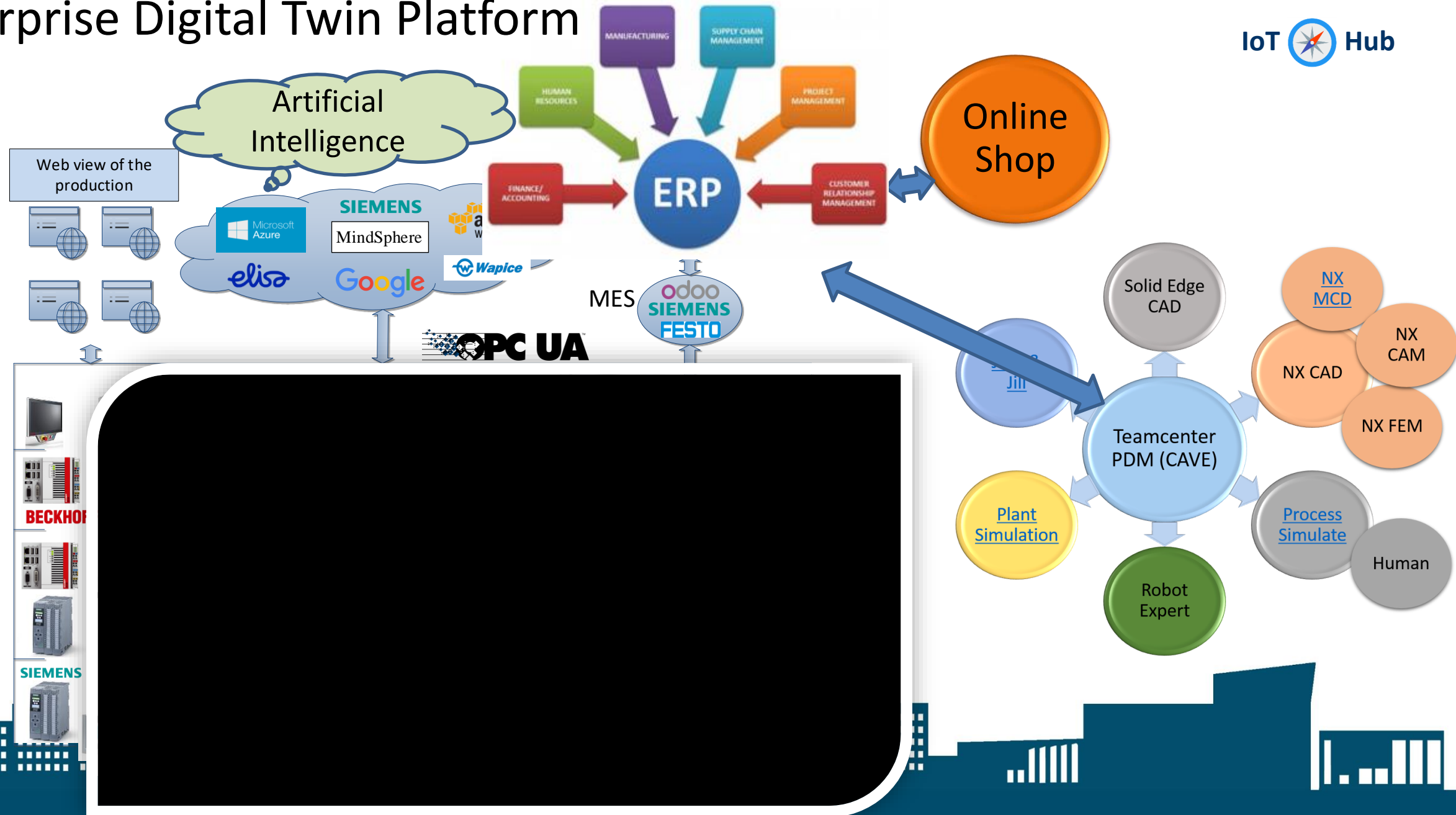
SeAMK Digital Factory



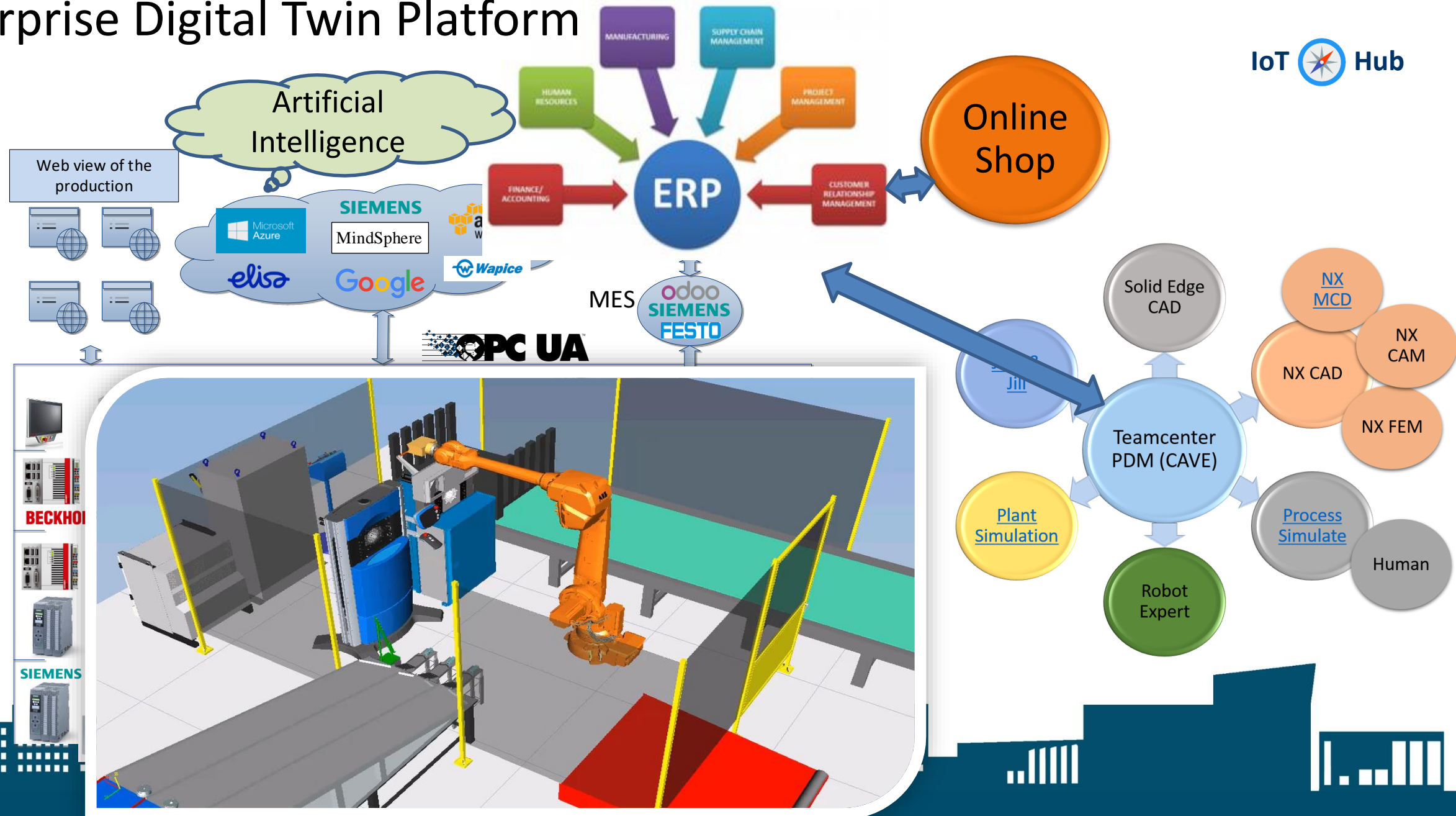
Pilottiesimerkkejä



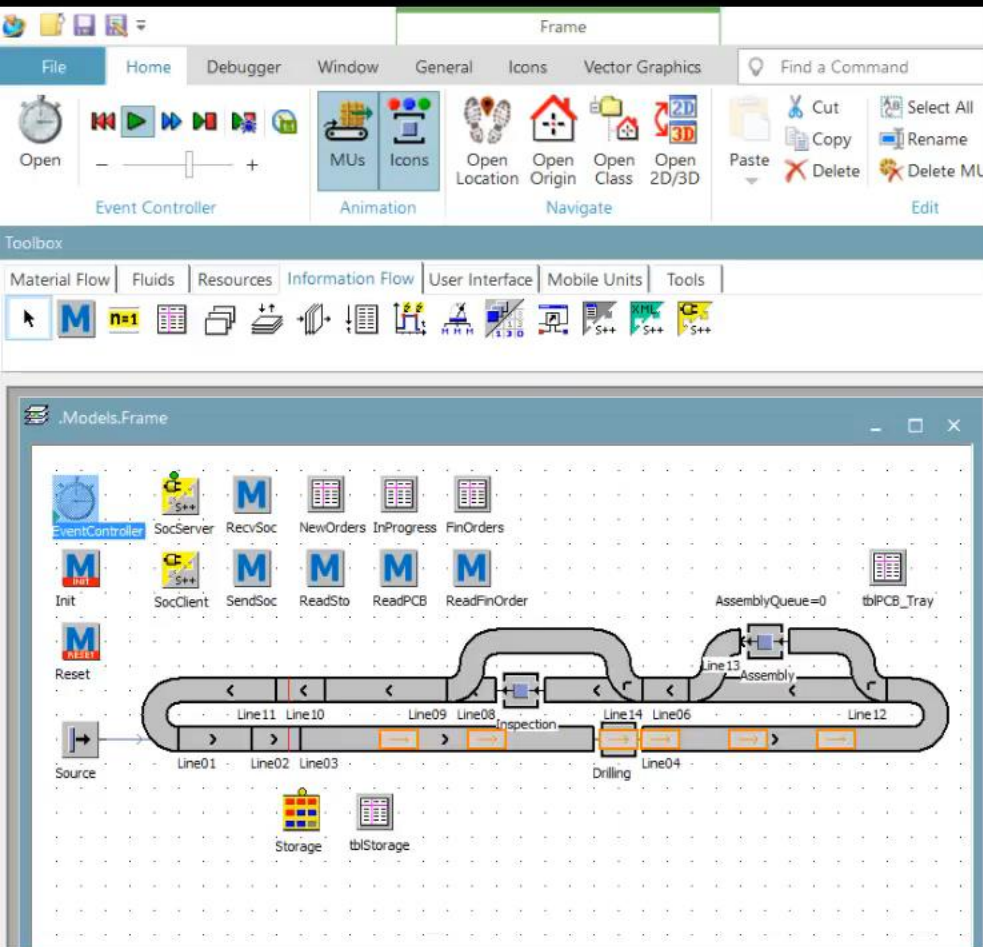
Enterprise Digital Twin Platform



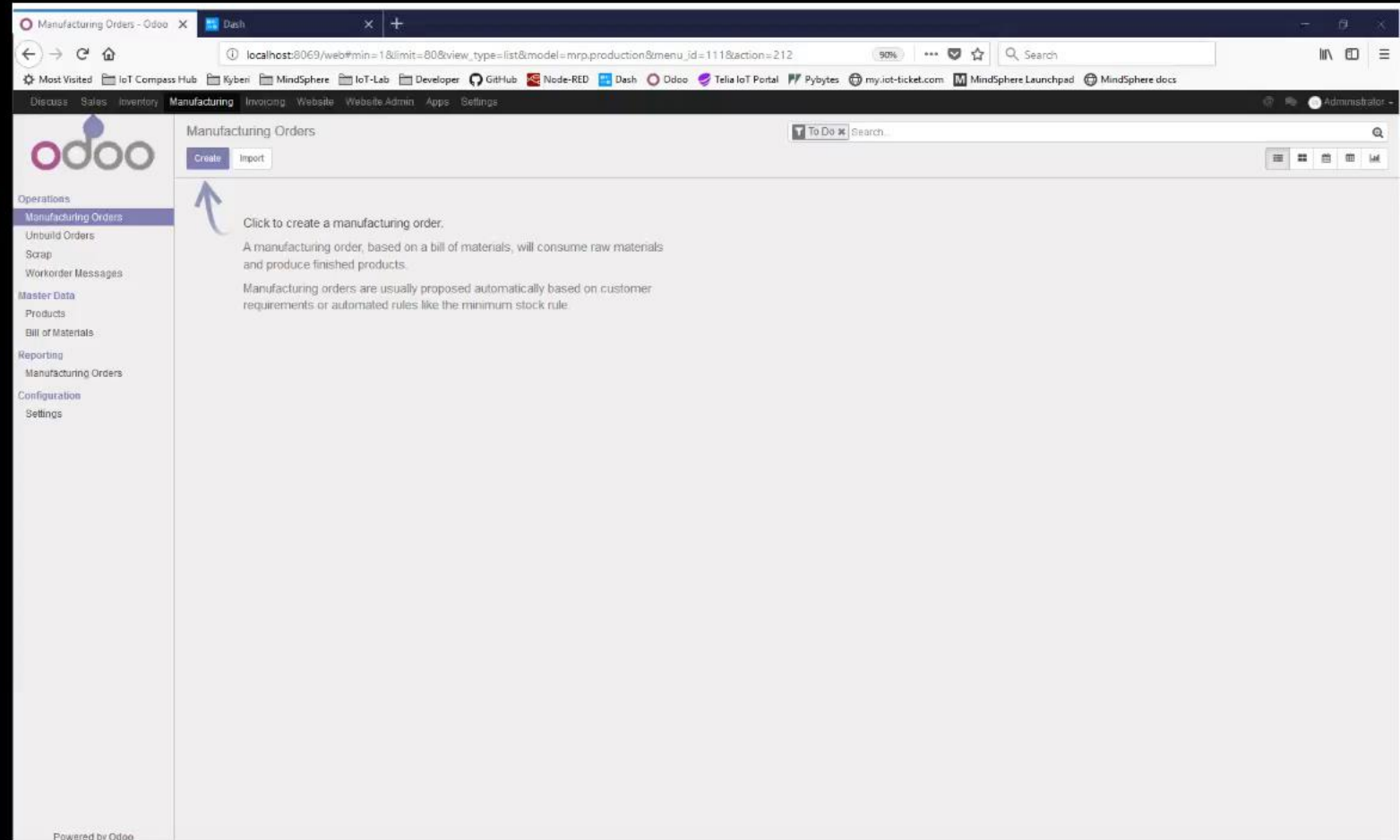
Enterprise Digital Twin Platform



Online Shop-ERP-MES-Simulation Model-MindSphere

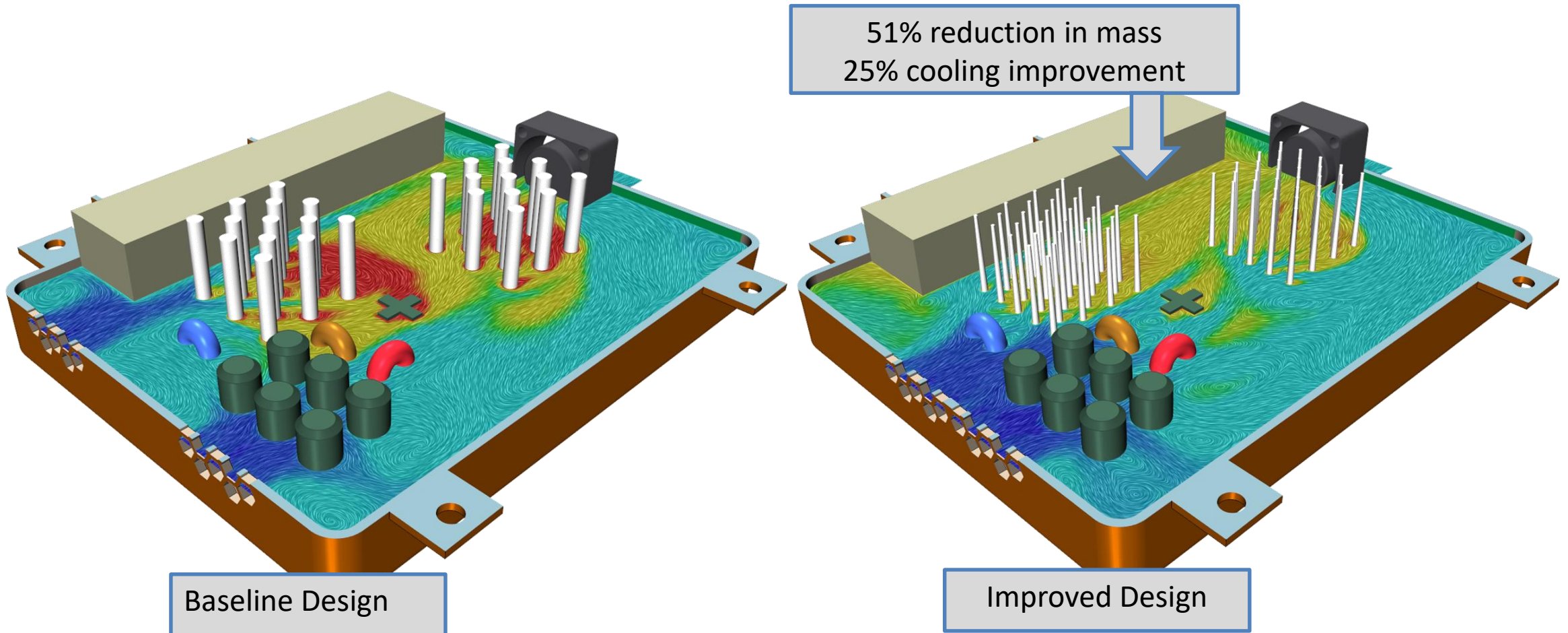


The screenshot shows the MindSphere simulation software interface. At the top, there is a menu bar with options: File, Home, Debugger, Window, General, Icons, Vector Graphics, and Find a Command. Below the menu is a toolbar with various icons for actions like Open, Event Controller, Animation, Navigate, and Edit. A 'Toolbox' section is visible, containing categories like Material Flow, Fluids, Resources, Information Flow, User Interface, Mobile Units, and Tools. The main workspace, titled '.Models.Frame', displays a complex manufacturing simulation model. The model consists of a series of interconnected lines (Line01 to Line13) and various components like 'Source', 'Storage', 'tblStorage', 'Drilling', 'Inspection', 'Assembly', and 'tbPCB_Tray'. The lines are connected in a loop, with arrows indicating the flow direction.



The screenshot shows the Odoo Manufacturing Orders web interface. The browser address bar displays the URL: localhost:8069/web#min=1&limit=80&view_type=list&model=mrp.production&menu_id=111&action=212. The page title is 'Manufacturing Orders - Odoo'. The main content area features a 'Manufacturing Orders' section with 'Create' and 'Import' buttons. A blue arrow points to the 'Create' button. Below this, there is a description: 'Click to create a manufacturing order. A manufacturing order, based on a bill of materials, will consume raw materials and produce finished products. Manufacturing orders are usually proposed automatically based on customer requirements or automated rules like the minimum stock rule.' The left sidebar contains a navigation menu with categories: Operations, Master Data, Reporting, Configuration, and Settings. The 'Manufacturing Orders' item is highlighted under the 'Operations' category. The footer of the page reads 'Powered by Odoo'.

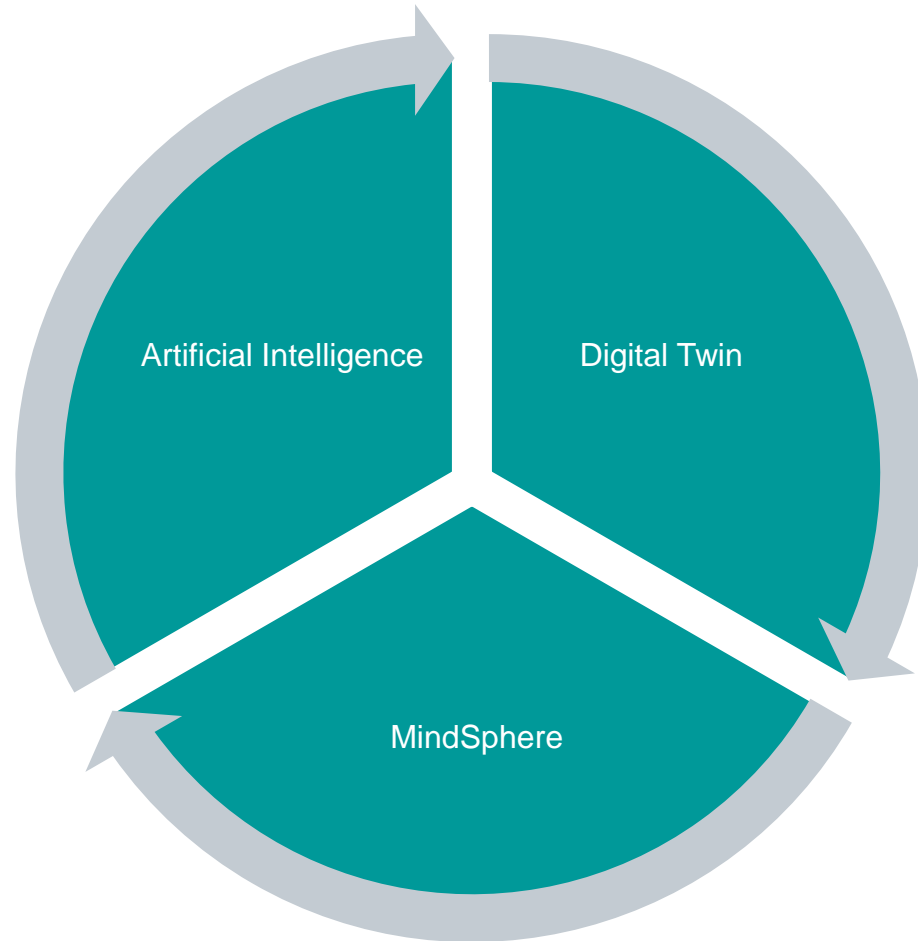
HEEDS: Tilan optimointi virtausdynamiikassa



Tilan tutkiminen ja prosessin optimointi



Tekoäly vaativien prosessien ratkaisussa



Create system model structures and interdependencies in the Digital Twin.

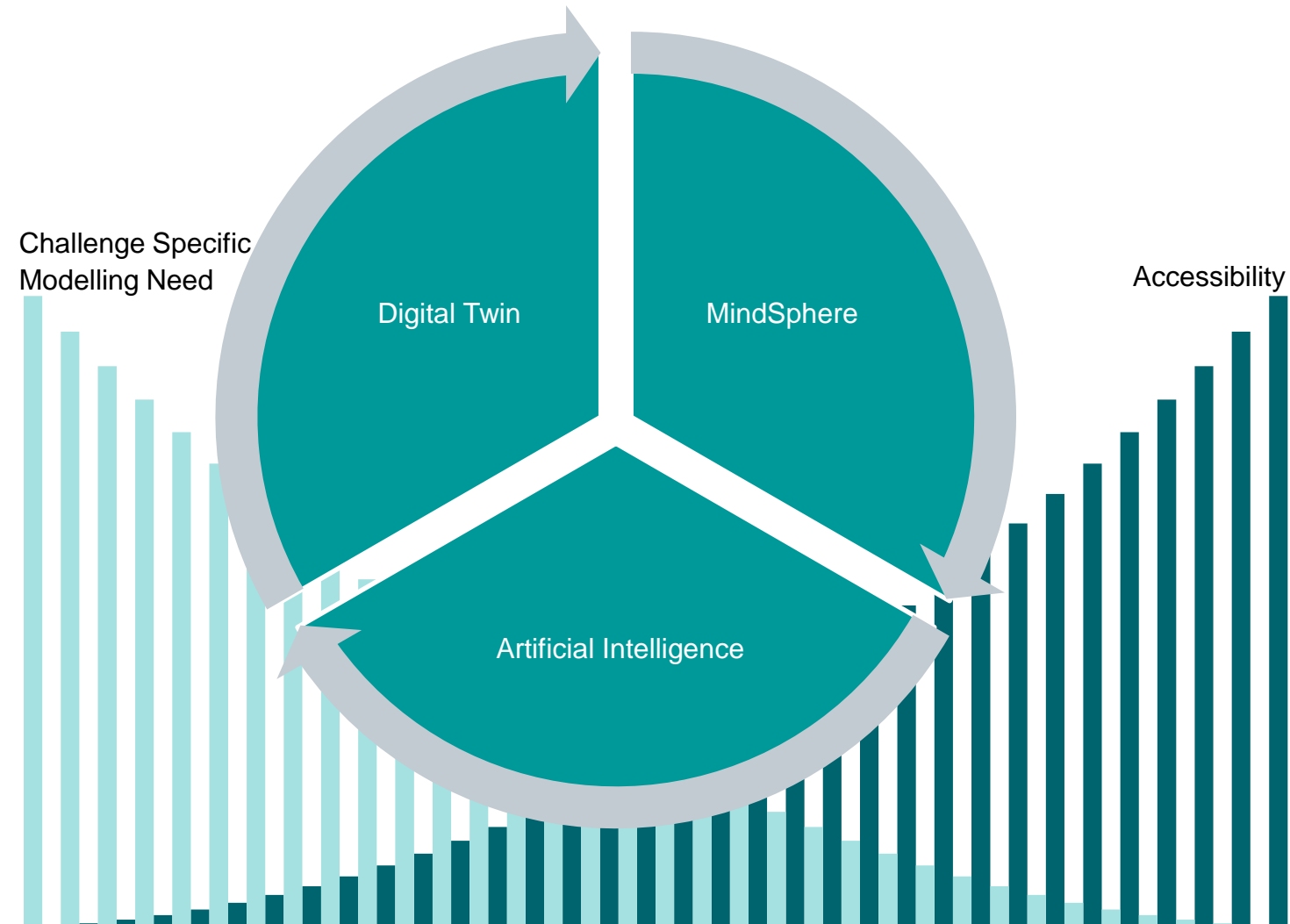
Utilize Artificial Intelligence to optimize system behavior automatically in evolving, general system structures.

Monitor and Analyze system and system agent behavior in MindSphere.

Need for challenge specific system modelling will decrease.

Accessibility to systems and challenge solving process will increase.

Tekoäly vaativien prosessien ratkaisussa



Monitor and Analyze system and system agent behavior MindSphere.

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Robottiikan laboratorio



- UR5 ja UR10 - yhteistyörobotit
- Kaksi- ja kolmisormitarttuja
- Voima- ja momenttianturi
- Konenäkö
- Omron LD90 -mobiilirobotti
- Turvalaserskanneri
- Imukupitarttuja (tulossa)
- Materiaalipursoitin (tulossa)
- Liikuteltavat pöydät
- VR-laseja (HTC Vive Pro/Oculus Rift)

SeAMK 

SEINÄJOEN AMMATTIKORKEAKOULU
SEINÄJOKI UNIVERSITY OF APPLIED SCIENCES

Assembly of circuit breakers on
a DIN-rail with a
Collaborative robot

NASDAQ
CONGRATULATES
SeAMK DIGITAL FACTORY
WINNER OF TUOTTAVA IDEA '16

SeAMK 
SEINÄJOEN AMMATTIKORKEAKOULU
SEINÄJOKI UNIVERSITY OF APPLIED SCIENCES



Kiitos

Hannu Reinilä
Yliopettaja
SeAMK

+358408304160

hannu.reinila@seamk.fi



THIS BUD

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NEW YORK POLICE