Manufacturing 4.0

April 2020

Introduction

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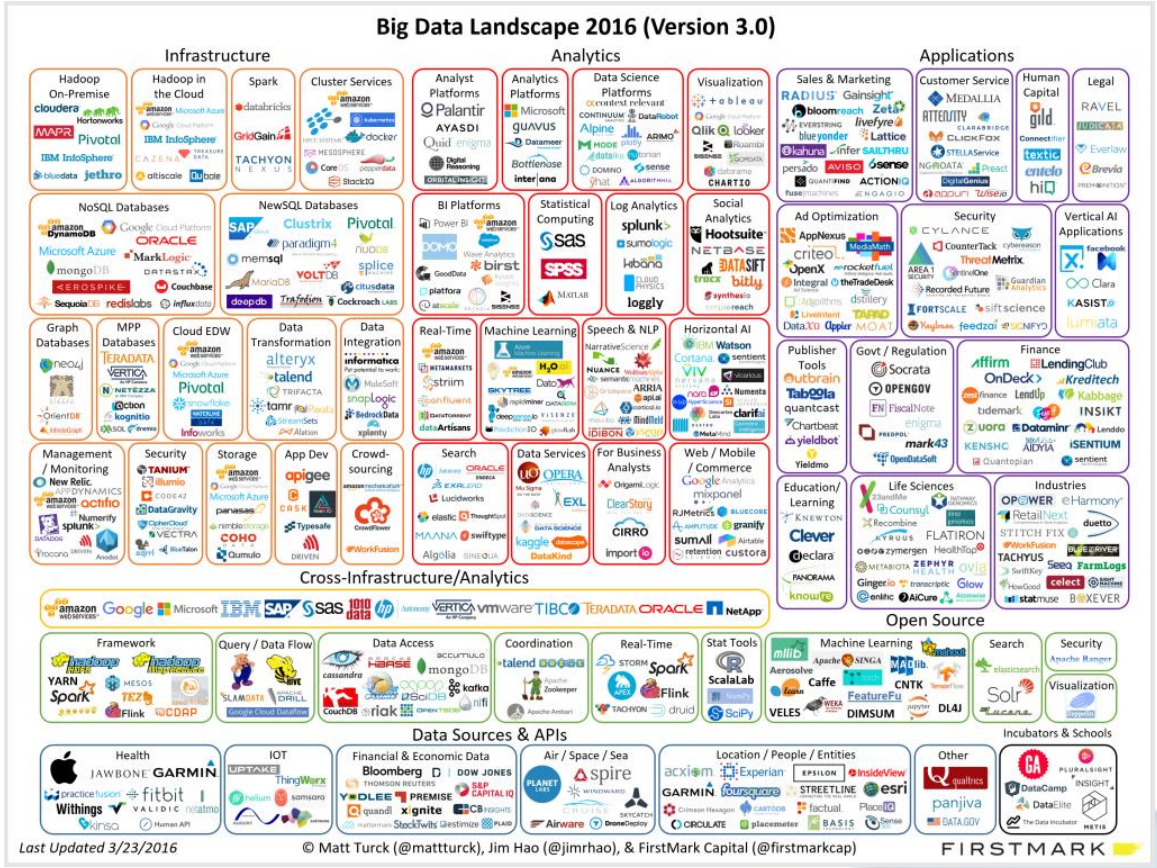
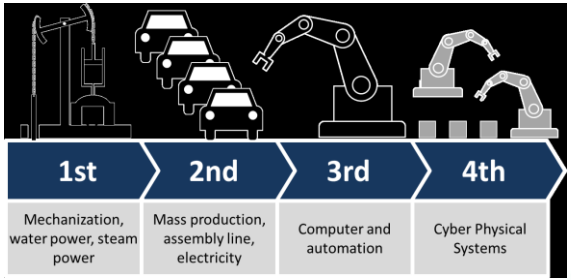
CHANGE AHEAD

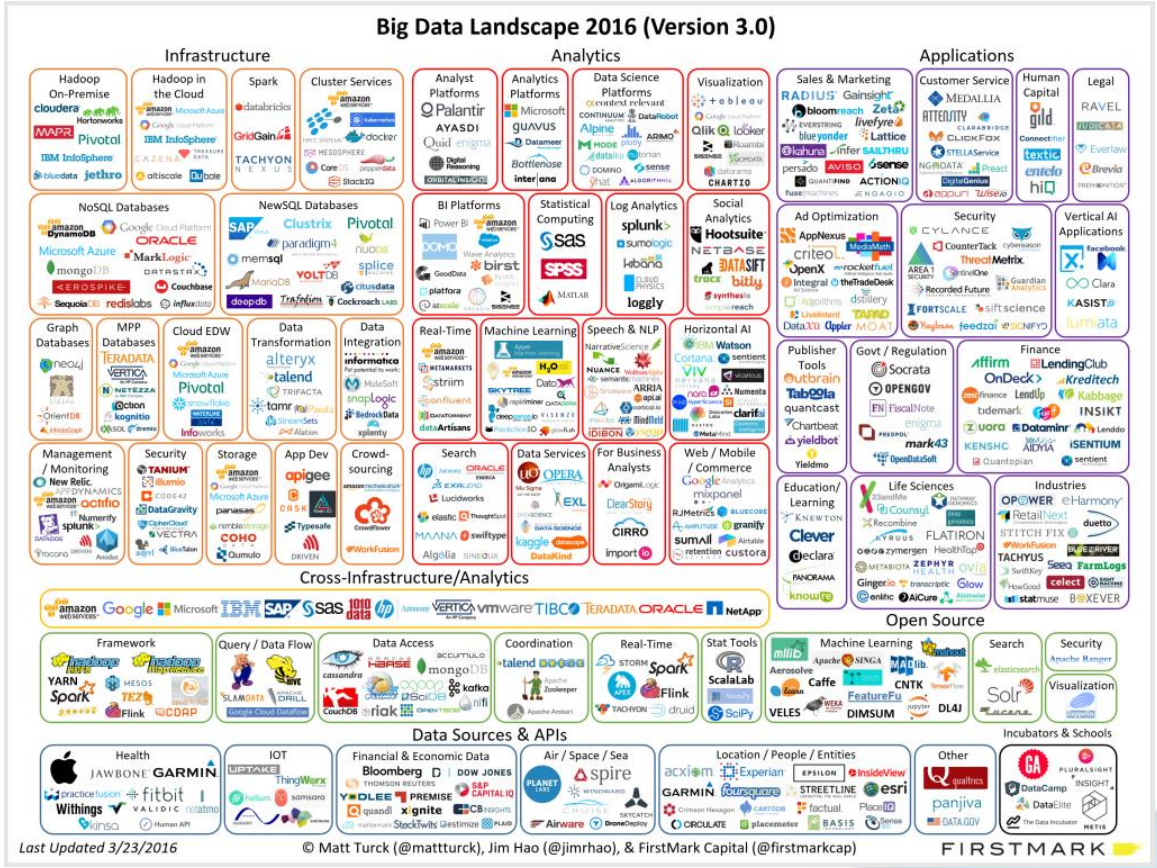


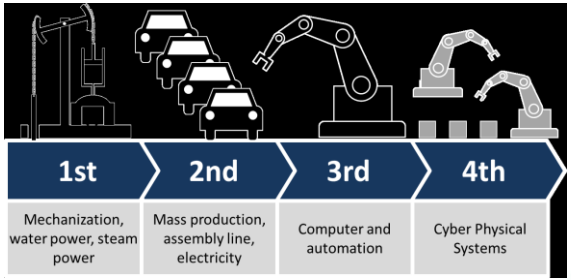


ONDERZOEKSRAAD VOOR VEILIGHEID

OCI NITROGEN

CHANGE AHEAD





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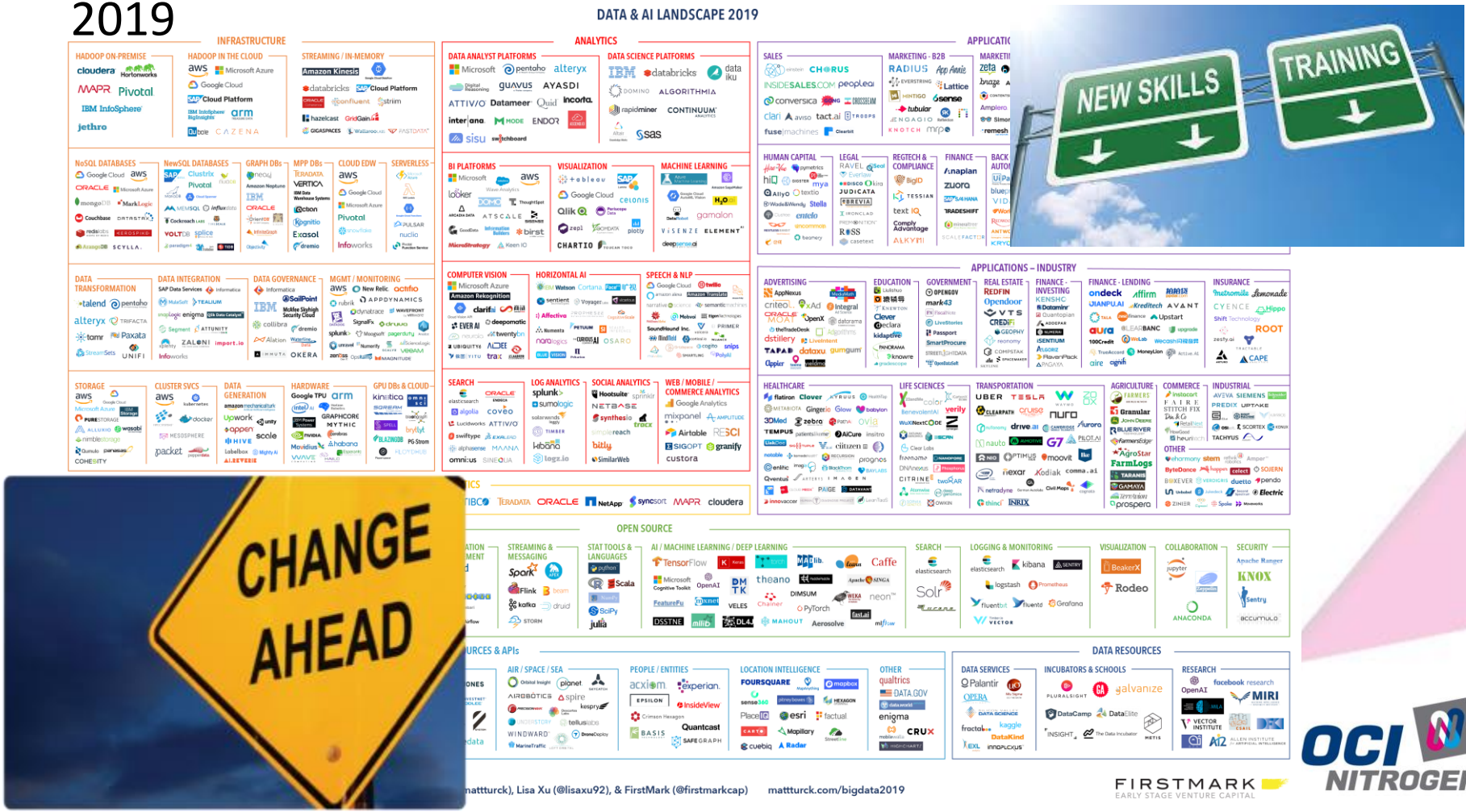
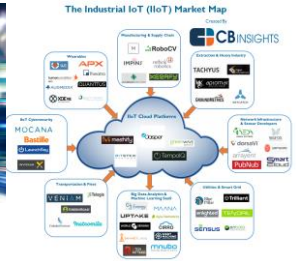
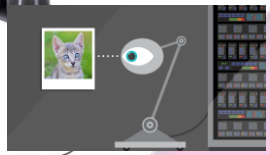
2019


DATA & AI LANDSCAPE 2019
INFRASTRUCTURE
HADOOP ON-PREMISE
HADOOP IN THE CLOUD
STREAMING / IN-MEMORY
NoSQL DATABASES
NewSQL DATABASES
GRAPH DBs
MPP DBs
CLOUD EDW
SERVERLESS
DATA TRANSFORMATION
DATA INTEGRATION
DATA GOVERNANCE
MGMT / MONITORING
STORAGE
CLUSTER SVCS
DATA GENERATION
HARDWARE
GPU DBs & CLOUD
ANALYTICS
DATA ANALYST PLATFORMS
DATA SCIENCE PLATFORMS
BI PLATFORMS
VISUALIZATION
MACHINE LEARNING
COMPUTER VISION
HORIZONTAL AI
SPEECH & NLP
SEARCH
LOG ANALYTICS
SOCIAL ANALYTICS
WEB / MOBILE / COMMERCE ANALYTICS
APPLICATIONS
SALES
MARKETING - B2B
HUMAN CAPITAL
LEGAL
REGTECH & COMPLIANCE
FINANCE
APPLICATIONS – INDUSTRY
ADVERTISING
EDUCATION
GOVERNMENT
REAL ESTATE
FINANCE - INVESTING
FINANCE - LENDING
INSURANCE
HEALTHCARE
LIFE SCIENCES
TRANSPORTATION
AGRICULTURE
COMMERCE
INDUSTRIAL
OTHER
OPEN SOURCE
STREAMING & MESSAGING
STAT TOOLS & LANGUAGES
AI / MACHINE LEARNING / DEEP LEARNING
SEARCH
LOGGING & MONITORING
VISUALIZATION
COLLABORATION
SECURITY
DATA SOURCES & APIs
AIR / SPACE / SEA
PEOPLE / ENTITIES
LOCATION INTELLIGENCE
OTHER
DATA RESOURCES
DATA SERVICES
INCUBATORS & SCHOOLS
RESEARCH
NEW SKILLS
TRAINING
CHANGE AHEAD
mattturck), Lisa Xu (@lisaxu92), & FirstMark (@firstmarkcap)
mattturck.com/bigdata2019
FIRSTMARK
EARLY STAGE VENTURE CAPITAL
OCI
NITROGEN

OVERVIEW EMERGING TECHNOLOGIES

- IIoT
- Mobile devices
- Edge computing
- Virtual reality
- Augmented reality
- Mobile devices
- Wearables
- 3D imaging
- 3D printing
- Smart sensors
- Predictive analytics
- Data interoperability
- Robotics
- Industrial drones
- Digital twin





Operations in the future ? (Youtube link): [FUTURE]

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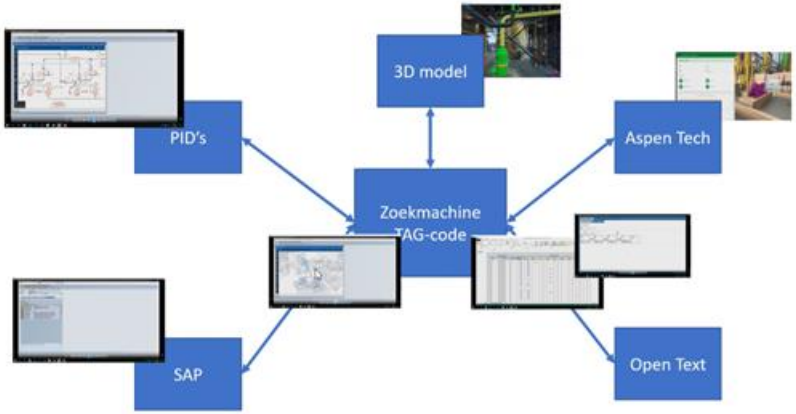
BUSINESS OPPORTUNITIES

- Maintenance : Predictive maintenance (sensoring dashboard) incl. TA (drones confined space)
- Proces Optimalization: smart APC, digital twin, data mining.
- HSE: integrity monitoring, barrière management tools, LOPC tools
- Education: more training facilities , training in the field and VR rooms
- Efficiency Tools: master companion systems with camera , information search machines, workflow
- Etc.

SHE



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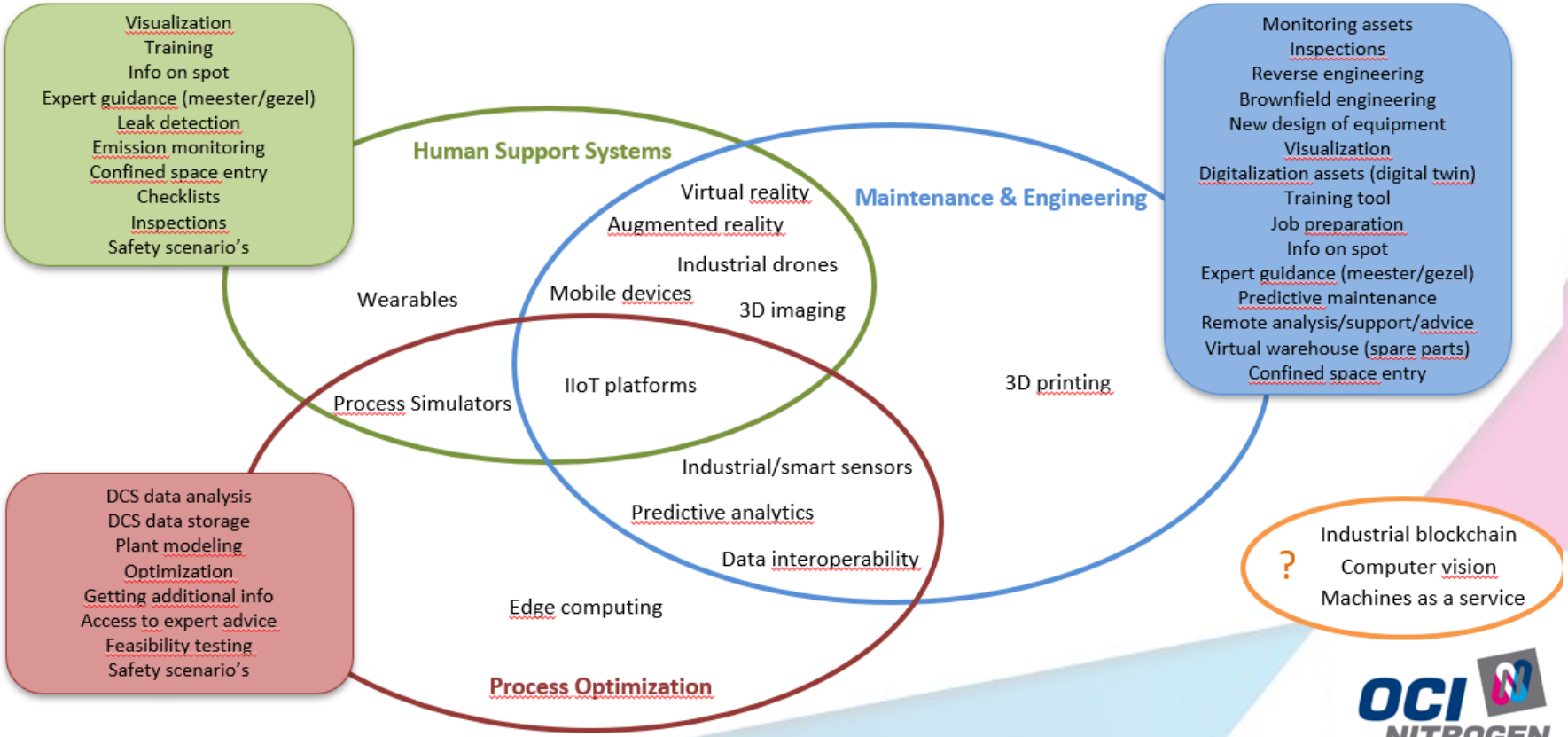
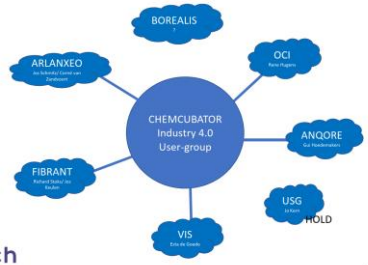
IR 4.0 OVERVIEW FOCUS



CURRENT SITUATION AND CHALLENGES

First step start of User-group CHEMCUBATOR 26-nov-2018



analyze. optim

Fragmented structure
Twilight areas IT/OT
Lack of clear goals
Who is reponsible for innovation?

nr	ONDERWERPEN 9 4 2020	OMA	OMF	OMM	STATUS BIJZONDERHEDEN
1	Robotica (inspecties met drones in aangewezen apparatuur)	x			Mogelijk in TA OMA?
2	Virtual Warehousing – Reversed engineering				Voorbeelden om pad te verkennen
3	3D laserscanning en de toepassingen		x	x	OMF OMM gedeeltelijk, OMA npg niet
4	TAM3D (overleg + werkplekdichtheid TA)		x	x	insteek om met verbeterde viewer te gaan werken bij OMF
5	volume meeting OMF		x		start dec 2019
6	VR room en instructie ism spie		x		1 instructie is klaar
7	VR scripts maken ism goal 043		x		1 instructie aangezet, contacen lopen met GOAL 043 (proefab.)
8	werkplekdichtheid TA				Info heeft Armando , zie ook 4
9	Meester Gezel principe met Augmented Reality				maintenance and TA preparation, meester gezel, checklists
10	Digital Twin + zoekmachine voor data en documenten		x		pilot in voorbereiding mogelijk SZF5
11	Handheld toepassingen voor operators/monteurs		x		Rene is in contact met Arlenxeo
12	Kunstmatige Intelligentie AI-ROBOTS voor repetatieve administratieve handelingen				net gestart binnen Sitech mogelijkhede te verkennen voor productie
13	Wireless hard ultrasoon sensor voor PSV's en Condenspotten			x?	pilot OMM on hold kan ook bij OMF niet TA-gebonden
14	Blind-It voor SD-SU				kort dag voor pilot in TA-2020
15	Lekdetectie tijdens SU met ultrasoon apparatuur ipv afzepen				Info heeft Armando kan in TA-2020
16	snuffel robot lekdetectie met functionele inspecties				afgewezen door AFA info bekend
17	process simulators OTS	x		x?	training tool (inside and outside). ACN nieuwe simulator; wordt gevolgd
18	sensoren via lora netwerk (banden KGF/koelers SZF)		x		
19	data mining proces optimalisatie	x			

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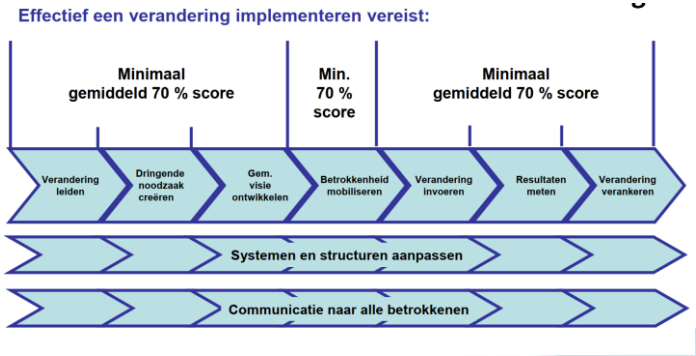
PEOPLE AND CHALLENGES

Vacature

Brightlands
Smart Services Campus



- Technicians should embrace new ways, become accustomed to new technology that is now being developed. Specific training for existing as well as refresher courses for newer employees is and remains a must.
- Everyone from high to low should look at their job in a new way and be willing to learn different behaviors and competences and not feel threatened that new systems are taking over their jobs.
- Organizations need to acquire new competences.
- There is a need to learn how to manage and control new systems.

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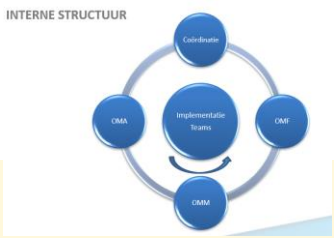
COMPLEXITY

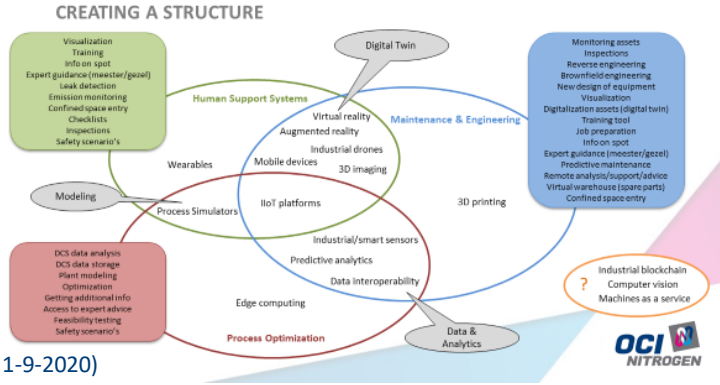


OMA
OMF
OMM
Coördination
Commitment Shop Floor
Trouble issues
Communication
Sharing Succes
Evaluation
Human Support Systems
Maintenance & Engineering
Proces optimization
Implementatie Teams
Influence
Join
Focus
Structure
Support base
Organisation
People
IR 4.0

Knowledge
IT OT

Sharing Knowledge
Getting Knowledge
Import Knowledge
Sitech
Data Storage
Contracting
Seminairs
Presentations
Existing People
New Jobs
Different Competentions
University
Compagnies
Sitech
Cooperation CHEMELOT
Dashboard
External Cloud
Information Management
Vendor management
Source Docs

2020 ACTIONS ON MANUFACTURING. 4.0



1.Create a vision on the 3 clouds and business value (< 1-8-2020)
1. Human Support Systems
2. Maintenance & Engineering
3. Process Optimization

2.Set up a structure to work on IR 4.0
1. Create interaction and sharing of IR 4.0 applications, like seminars, workshops, etc. (> 1-9-2020)
   - Low hanging fruit ?
2. Involve 'IR 4.0 leaders' from plants to create a network in Manufacturing (< 1-6-2020)
3. Coaching and guidance by Technical Managers and IR 4.0 manager (< 1-6-2020)
   - Evaluate list of IR 4.0 initiatives and relate to cloud visions

3.Knowledge and competences (< 1-1-2021)
1. Explore and map IR 4.0 world outside towards the clouds (suppliers, technologies, requirements, …)
2. Identify lacking competences (universities, campus, …)

4.Work on IR 4.0 preconditions (> 1-10-2020)
1. Involve ICT (<1-6-2020)
2. Identify possible issues, like data storage, security, contracting, etc.
3. Document management system, …

5.Set up detailed plan (September 2020)
1. Set ambitions
2. Identify resources needed
3. Input for budget 2021

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CLOSING

Questions?

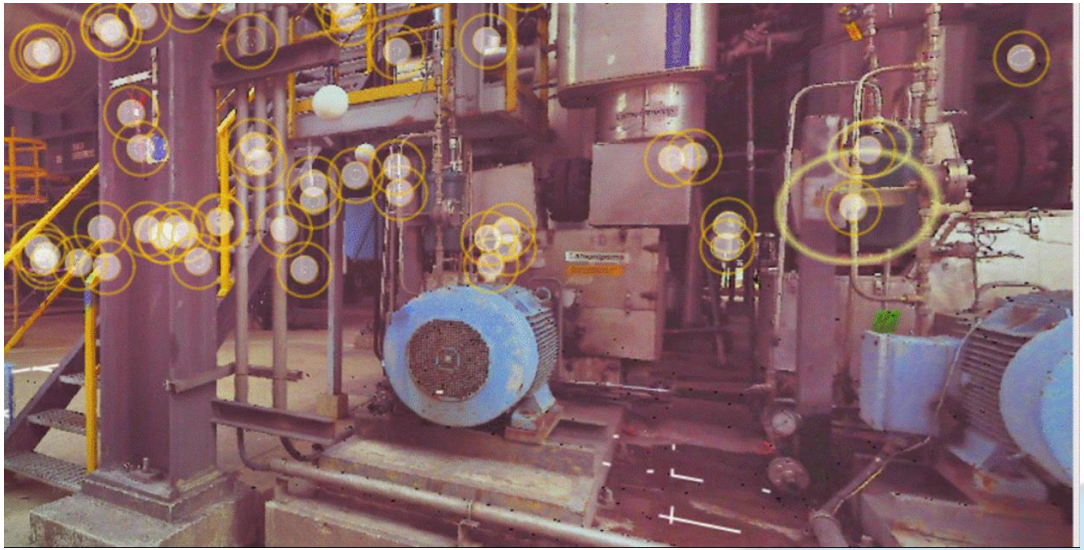
Thanks for your attention

EXAMPLE TOPIC (BUILDING VR TRAINING)

Plants are laser scanned

We used the pictures by programming a scenario that could happen in the plant in to a VR training

Results; a wunderfull training in a vr room but to expensive and a long leadtime



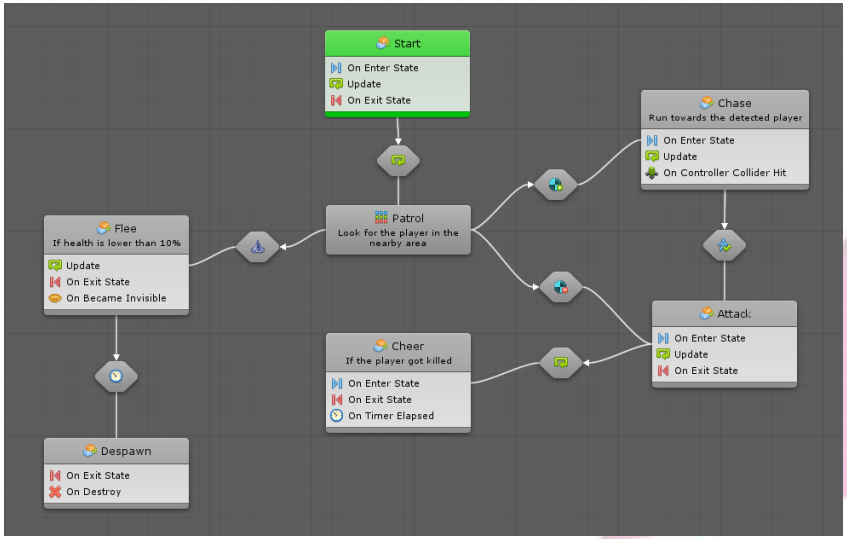
BUILDING VR TRAINING

We are now implementing a vr builder in wich an operator can make his own scripts into the vr application without expensive programming.

In this system the operator has support from a library with special effects :
Closing and opening valves
Starting and stopping pumps
Simulating leaks
Sounds
Etc.

The operator can program the traing by it self by using or, iff or and blocks and droppes effects into the desired location of the available laserscan

On this way we create a system where experiences can be translated to a traing made by and for operators to train situations that could or had been occured in the plant



Result VR training concept