

1

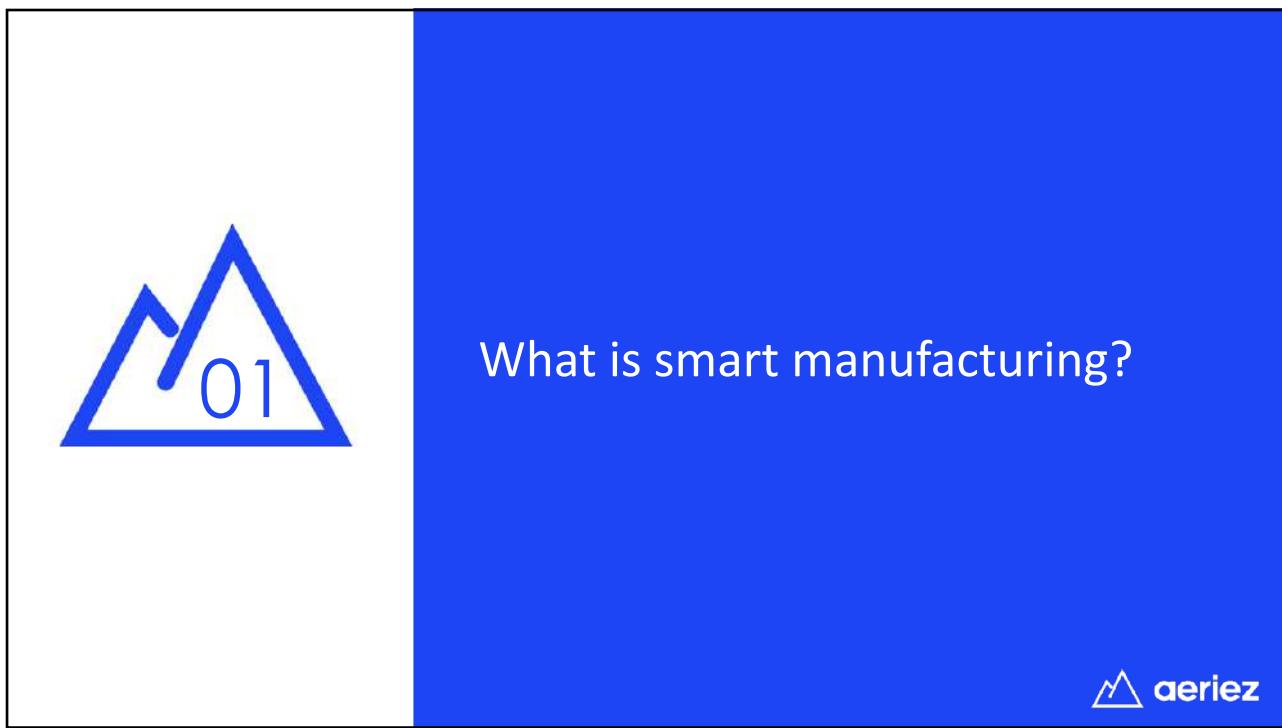
TODAY'S AGENDA	
<b>1</b>	What is Industry 4.0 ?
<b>2</b>	Drivers of smart manufacturing
<b>3</b>	Smart Manufacturing?
<b>4</b>	Case: How to decrease scrap
<b>5</b>	Language determines how we think
<b>6</b>	Linking the causes. Define sensors
<b>7</b>	5 key take aways



2



3



4



5

### Smart manufacturing (Manu-tech)

Collecting information about the end-to-end processes including the **production** & **administrative** processes. This means they are maximal **digital, connected** to bring the level of knowledge from “gut feeling” to “semi-scientific” thinking, resulting in **added value for the customer** and other stakeholders.

SMART PRODUCTION MASTERCLASS keynote  
2022

6



## Types of techno domains

Techtype	Description
Ed-tech	Represents the overview of educational technologies.
Fin-tech	Is the abbreviation of financial technologies
Health-tech	Is the abbreviation of technologies helping health of people
HR-tech	Is the summary of human resources technologies
Learn-tech	Is dealing with learning
Mad-tech	Is the confluence of Marketing, Advertising and Technology
Man(u)-tech	Is the summary of manufacturing technologies

SMART PRODUCTION MASTERCLASS keynote  
2022

7



## Why now ? Age of digitalization



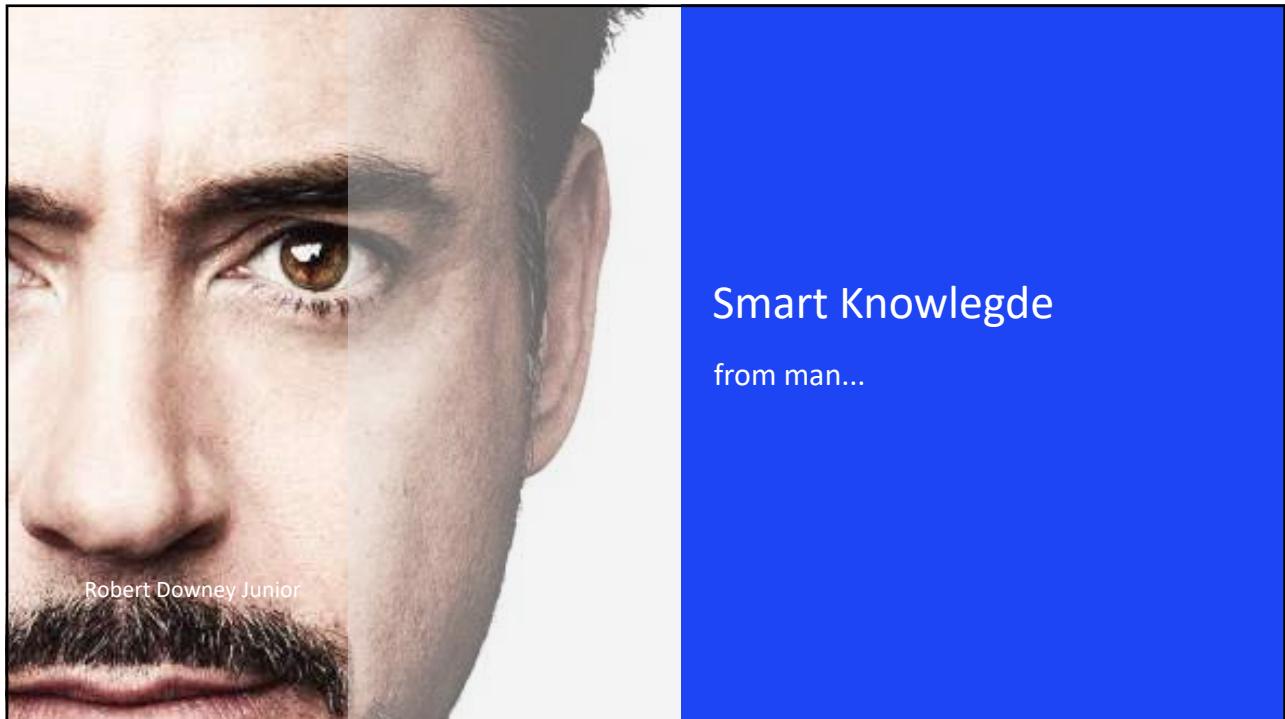
- △ Massive amount of data
- △ Exponential growth  
(Moore's law, sensors,..)
- △ Easily replicate and replace machines  
(and people!)

### Prices have drastically dropped!

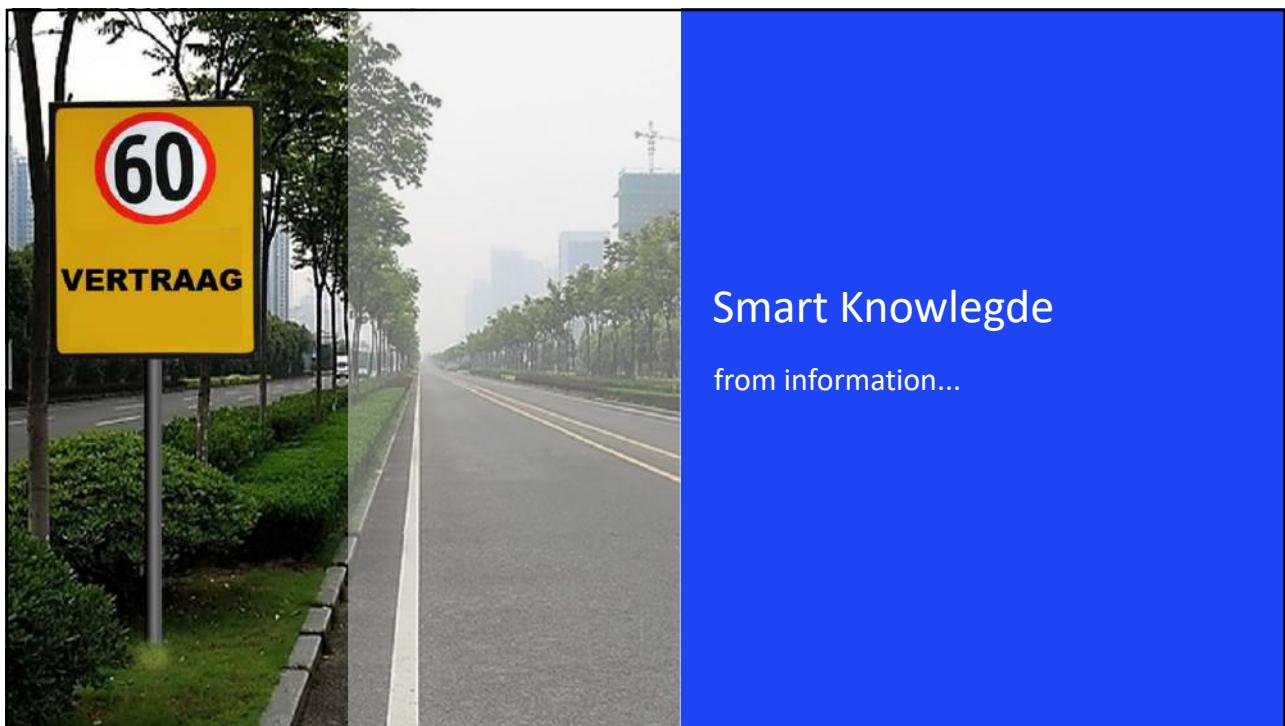
And thus analyze, compare, predict, simulate,...  
→ present, narrate, visualize quickly

SMART PRODUCTION MASTERCLASS keynote  
2022

8



9



10



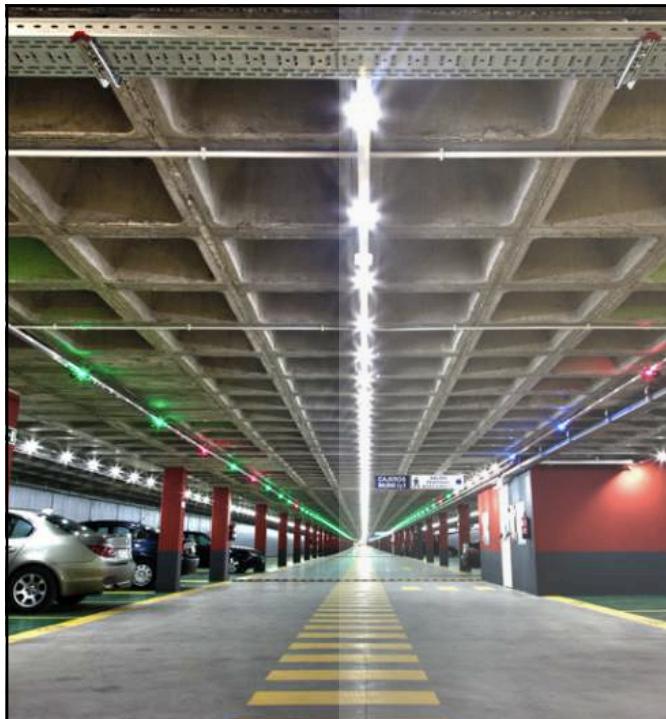
Smart Technology  
from driving to self-driving cars

11



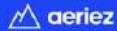
Smart Technology  
car wash  
with zero change over time

12



Smart organisation  
real time check of availability

13

 aeriez

Daily life examples: iRobot

Is this smart manufacturing?



SMART PRODUCTION MASTERCLASS keynote  
2022

14



Daily life examples: Pascal Coppens' DVD story

SMART PRODUCTION MASTERCLASS keynote  
2022

15



Schoenenfabrikant Adidas sluit onverwacht zijn snelle robotfabrieken

## Mens versus robot: 1-0

Ze moesten tot negentig keer sneller dan mensen sportsschoenen maken. Maar dat was voor Adidas nog niet snel genoeg. De robotfabrieken in de VS en Duitsland gaan weer dicht. Een onverwachte beslissing.

Een miljoen paar sportsschoenen per jaar, snel moet maken: da was voor veel mensen in Duitsland en de VS tegen sinds 2017 predstevende. En dat met de hulp van de gepatenteerde, automatische schoenmaakmachines, waarin robots die plastic naalden en 3D-printers die speciale soorten inkt gebruiken om een wereldwijd netwerk van robotfabrieken te kunnen bedienen.

Het was diezelfde jaar gefeliciteerd groot nieuw. De Amerikaanse markt, dat is de belangrijkste markt voor voetbalschoenen, had een voorval van veroudering, de trend wou niet meer goed lopen (kijken), van de grote fabrieken die lagere arbeidskosten terugbleven naar Europa en de VS. Och al werd wel gezegd dat de eerste resultaten juist zo opvallend voor robots niet voor mensen.

**Praktische obstakels**

De ontwikkeling naar robots was volgens Adidas niet alleen om de arbeidsmarkt te vangen, ook om de hoge transportkosten en de lange levertijden te concurreren. Consumenten zat het

Weten wilken steeds smaller dan de eindproducten produceren. Dan is het mogelijk dat fabrieken niet meer kunnen blijven staan, want er gaan maar heel weinig producten op het vakkundige en duurzame arbeidsmarktpot. Daarom moet worden op het vakkundige arbeidsmarktpot gebouwd. Zeker als er ook maar één kleine leidende fabriek een goed voorbeeld kan geven.

**Mensen kunnen snel leren om met hetzelfde gereedschap een nieuw product te maken, de meeste robots nog altijd niet**

Groot was gisteren dan ook de verwarring toen duidelijk werd dat Adidas nu een ander plan had. De binafeld gezamenlijke fabriek in de Amerikaanse stad Indianapolis is nu gesloten. Net als de politieke en permanente roetbedrijf in het Amerikaanse Atlanta.

Wat nu? Adidas die U-bocht maakt moet wel een andere weg gaan. De wereldwijde economie en machine mag de mens dan 1-0 verslaan, maar meer ook niet. Interessant, de wereldwijde toekomstvoorspelling.

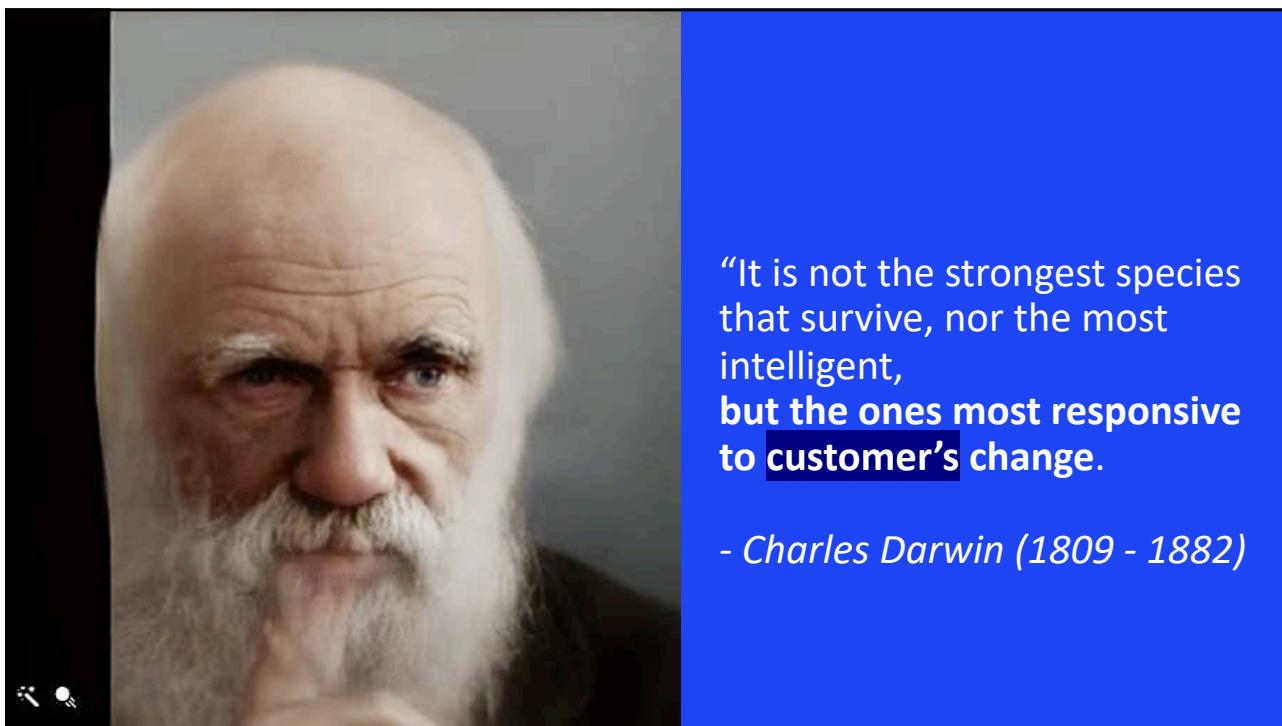
Adidas en goedeplaatse 'herhaal-

SMART PRODUCTION MASTERCLASS keynote  
2022

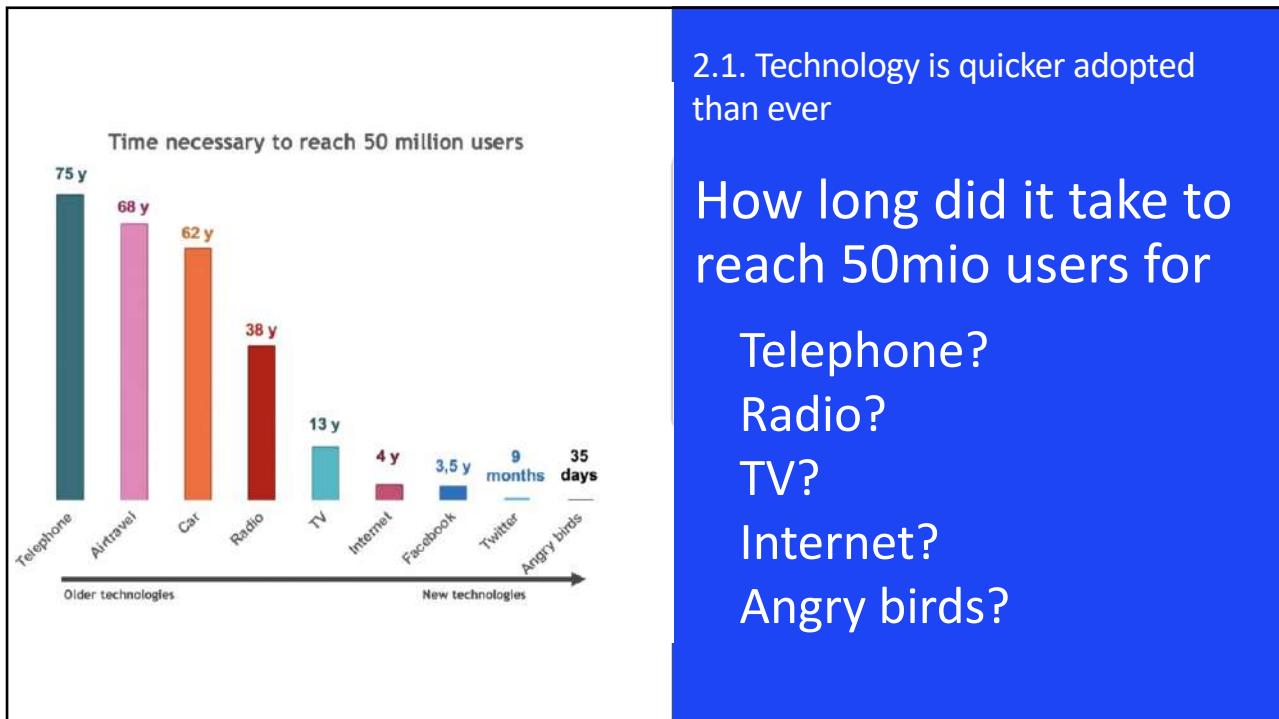
16



17



18



19

## Proximus neemt Umbrio over en versterkt zijn positie op de groeiende markt van IT & Networks en Analytics



Enterprise-klanten ondersteunen bij hun digitale transformatietraject, dat is de hoeksteen van de strategie van Proximus. Omdat de IT-omgeving van ondernemingen almaar complexer wordt, is een goed begrip van wat er gebeurt in de verschillende IT-environments noodzakelijk. Het gaat hierbij onder meer om gebruik van de toestellen, websites, applicatieservers, cloudinfrastructuur, netwerken en IoT-apparaten van de klant. Door alles te monitoren en te analyseren, gaande van clickstreams en transacties tot de klant tot netwerkactiviteit en oproepgegevens, kan Umbrio machinegegevens omzetten tot waardevolle洞ighlights.

van Umbrio past in de Fit for Growth-strategie van Proximus en zijn ambitie om te investeren in strategische domeinen om een leverancier van digitale diensten voor zijn Enterprise-klanten te worden. Het vermogen van Umbrio om end-to-end monitoring van IT-omgevingen te implementeren vult een belangrijke leemte aan in de aanvulling op het gevestigde leiderschap van Proximus inzake netwerkconnectiviteit en data-analyse. Bovendien sluiten de diensten van Umbrio goed aan bij die van Davinci Labs (die door Proximus werd overgenomen), een Splunk Elite Partner in het beveiligingsdomein. Samen kunnen we antwoord bieden op de toenemende vraag naar end-to-end zichtbaarheid op het vlak van network operations.

### 2.1. Technology is quicker adopted than ever

How long did it take to reach 50mio users for  
Telephone?  
Radio?  
TV?  
Internet?  
Angry birds?

Proximus' transformatie

Digitalisering van:

- de interactie met de klant
- de medewerkers van het bedrijf
- het eigenlijke bedrijfsmodel

“Van B2B naar B2P-aanpak: business-to-people. De digitale strategie hangt ervan af of je alle gebruikers – medewerkers, partners en klanten – kunt meekrijgen. Dit is dus niet iets wat je van hogerhand moet opleggen. In de toekomst hopen we samen met onze klanten in een ecosysteem te zitten waarin we niet alleen diensten leveren, maar ook met elkaar een naadloze waardeketen vormen.”

20



21



2.2. New organisation forms are the new normal. Managers shouldn't break down what has been created by former manager.

22



23

2017 EUROPEAN SCALE UP REPORT EUROPEAN VENTURE CAPITAL

**EMERGING CATEGORY: INDUSTRY 4.0**

COUNTRIES	BIGGEST DEALS
1. Sweden (36%)	1. Hydroline
2. Finland (18%)	2. Konux
3. Germany (14%)	3. Bioservo Technologies
4. Belgium (11%)	4. XMReality
5. France (7%)	5. Acosense
6. UK (7%)	6. Elmodis
7. Netherlands (4%)	7. Senseye
8. Poland (3%)	8. FocalSpec
	9. Specim
	10. The Curious AI Company

**sirris**

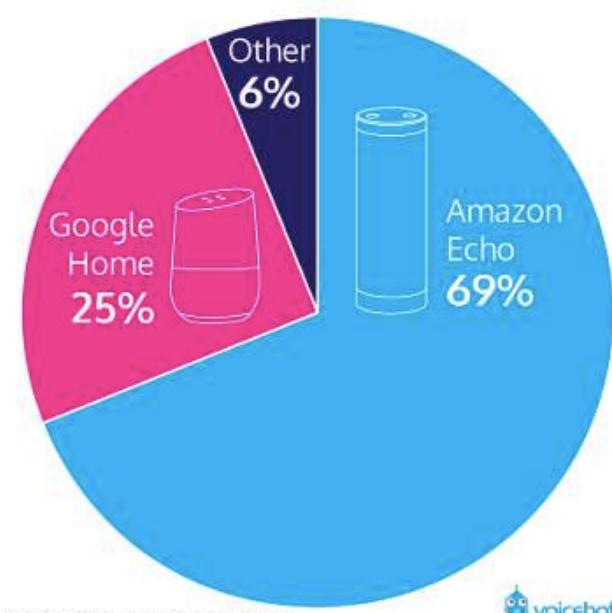
**2.3. Start ups rule the business world**

**Who knows these companies?**

24

### U.S. Smart Speaker Market Share

December 2017



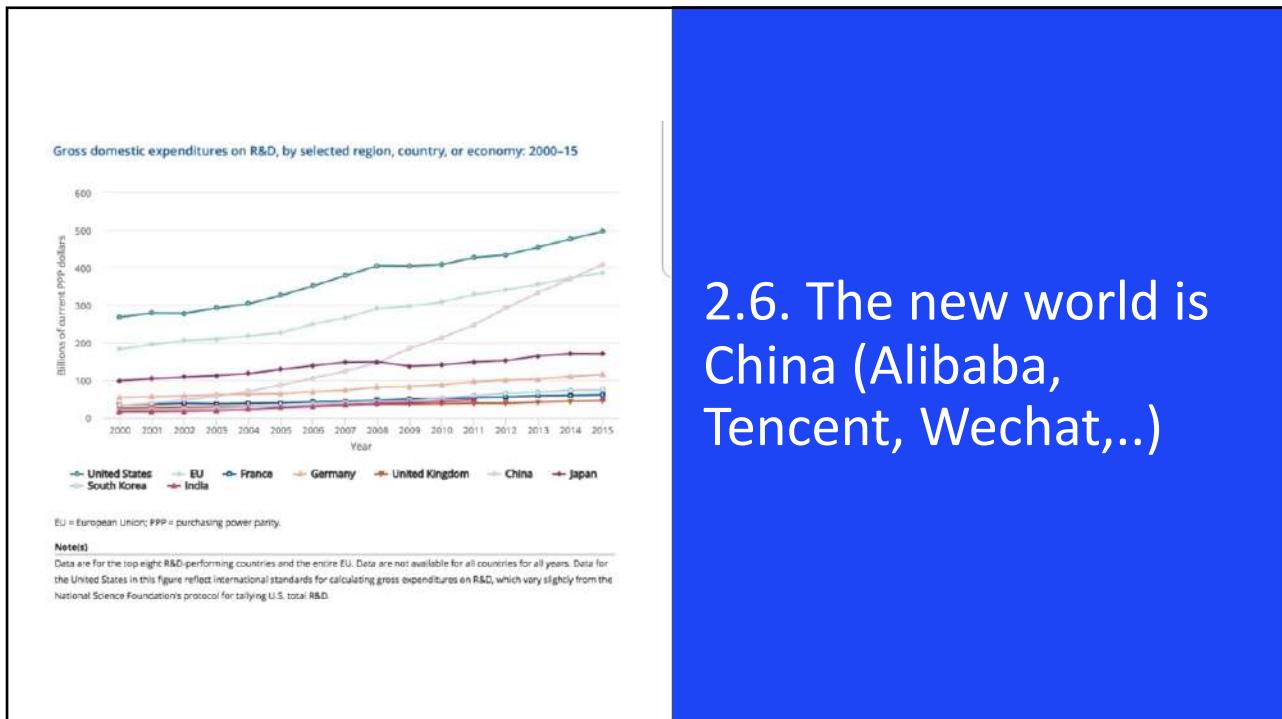
2.4. 90% market leader is new normal

25



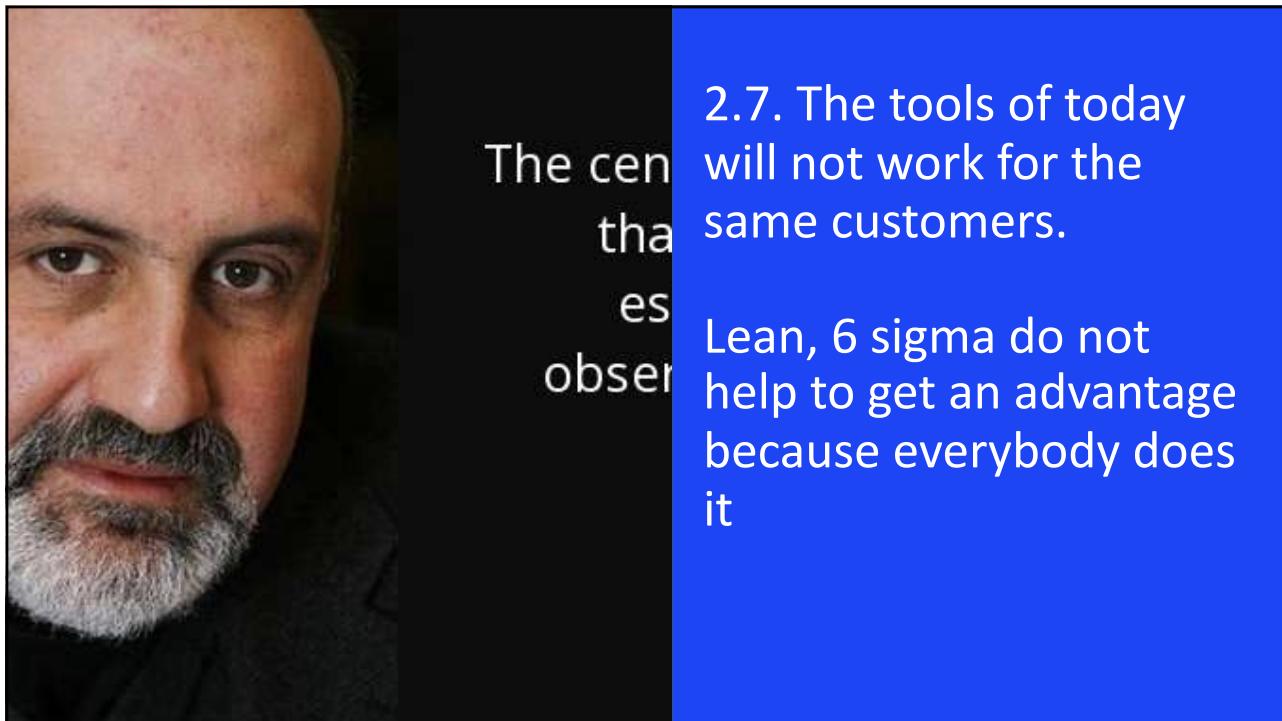
2.5. Data is new oil

26

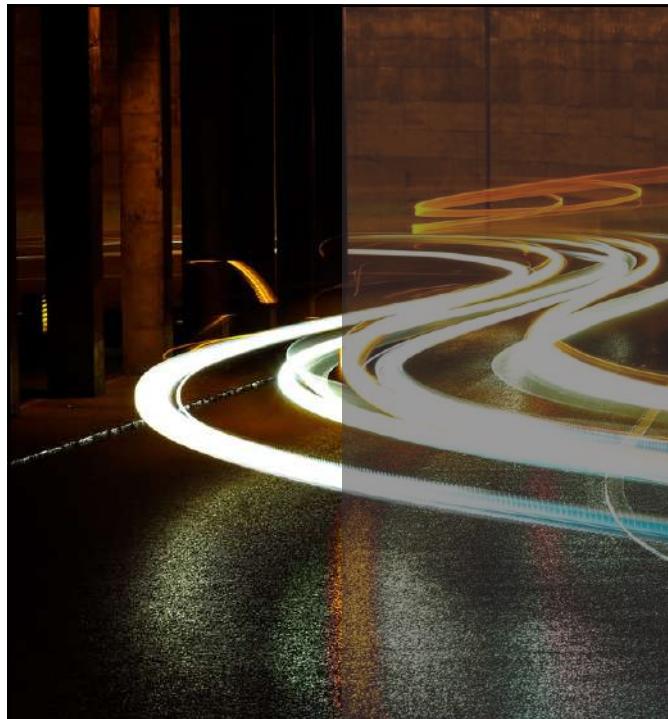


27

## 2.6. The new world is China (Alibaba, Tencent, Wechat,...)



28



## 2.8. Speed is the new normal

Anticipation  
Harmonisation  
Balancing

29

**Who has time? But then, if we do not ever take time, how can we ever have time?**

30

## BASIC NEEDS WE SHARE



From “customer demand”  
to  
“needs of people”

31



2.9 Age of digitalisation.

Where did the money go?

32



Nothing has changed  
however!

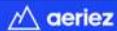
33



AI gets  
in...

On the left, Robert De Niro's original performance in *The Irishman*. On the right, his de-aged face as it appears in the film.

34



## The power of AI: snip

$x^4 + 2x^3y + 6x^2y^2 + 7xy^3 + y^5 = 0$

35

CATEGORY	BUILDERS	BABY BOOMERS	GENERATION X	GENERATION Y	GENERATION Z	GEN ALPHA
Slang terms	 "We prefer proper English if you please" Born: c.1946 Age: 78+	 "Be cool Peace Groovy Way out" Born: 1946-1964 Age: 55-72	 "Dude Ace Rad As if Wicked" Born: 1965-1979 Age: 10-34	 "Bling Dah Fashizz Whassup?" Born: 1980-1994 Age: 26-39	 "Fam GOAT Slay Yassquier" Born: 1995-2009 Age: 10-24	 "IE yest hundo m idrc" Born: 2010-2024 Age: under 10
Social markers	World War II 1939-1945	Moon landing 1969	Stock market crash 1987	September 11 2001	GFC 2008	Trump / Brexit 2016
Iconic cars	 Model T Ford Final, 1927	 Ford Mustang 1964	 Holden Commodore 1978	 Toyota Prius 1997	 Tesla Model S 2012	 Autonomous vehicles 2020s
Iconic toys	 Roller skates	 Frisbee	 Rubix cube	 BMX bike	 Folding scooter	2.10 Try Evaluate Drop Strategy
Music devices	 Record player LP, 1948	 Audio cassette 1962	 Walkman 1979	 iPod 2001	 Spotify 2008	
Leadership style	 L - Leader I - New leaders Centrally controlled	 Directing	 Coordinating	 Guiding	 Collaborative	
Ideal leader	Commander	Thinker	Doer	Supporter	Multi-modal	
Learning style	Formal	Structured	Participative	Interactive		
Influence/advice	Officials	Experts	Practitioners	Peers	Forums	Chatbots
Marketing	Print (traditional)	Broadcast (mass)	Direct (targeted)	Online (linked)	Digital (social)	In situ (real-time)

36



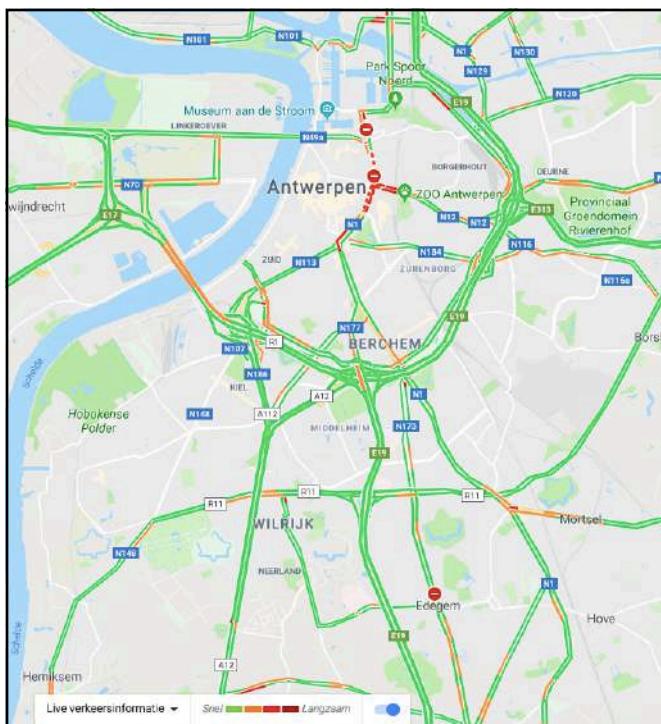
## 2.10. Try, evaluate, drop strategy

Being persistent in driving through technologies generation Z tries, evaluates after short period and drops to something entirely new.

Delete emails?

Deciding and persisting have changed to quicker paces

37



## 2.11. X as a service

New business models emerge.

38



## How to deal with i4.0 to get speed?



A photograph of a meeting room. Several people are seated around a long wooden conference table, looking towards the right side of the frame where a person is standing and pointing at a whiteboard. The room has large windows and a modern interior.

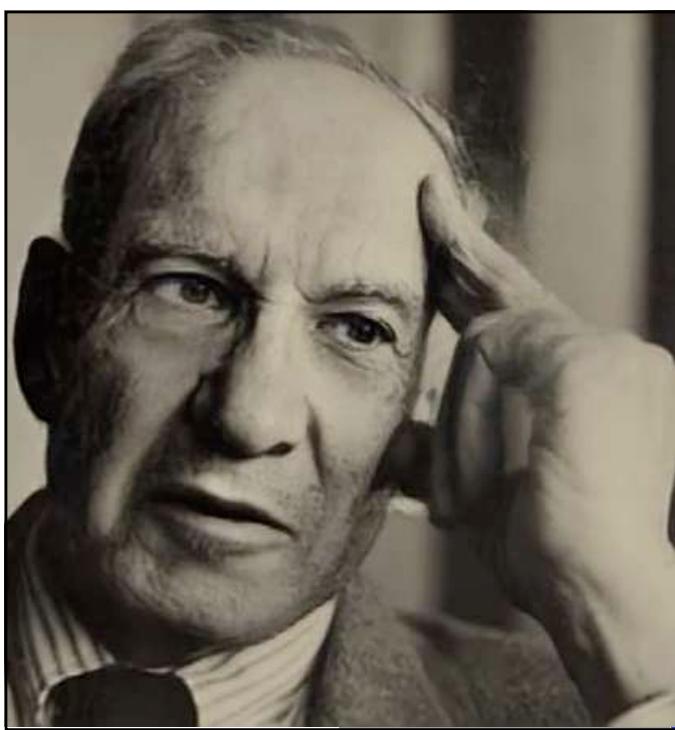
If responsibility lies with

- HR Manager for explaining
- IT Manager for implementation
- Q Manager for parameterization
- Production Manager for support
- Technical Manager for technical advice

And the Plant Manager is hoping everybody will agree...

Ives De Saeger - CEO Aeriez

39



Challenges of Industry 4.0: The impact of culture

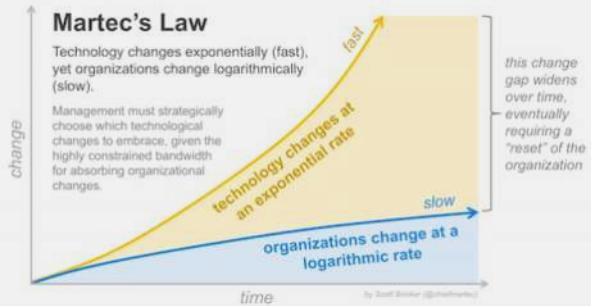
*“Culture eats strategy for breakfast.”*

- Peter Drucker

40



## Challenges of Industry 4.0: Martec's Law: Choose i40 technology wisely!



Maybe we should focus more on the technology that can assist in organizational design

② “Psyche and group patterns”

41



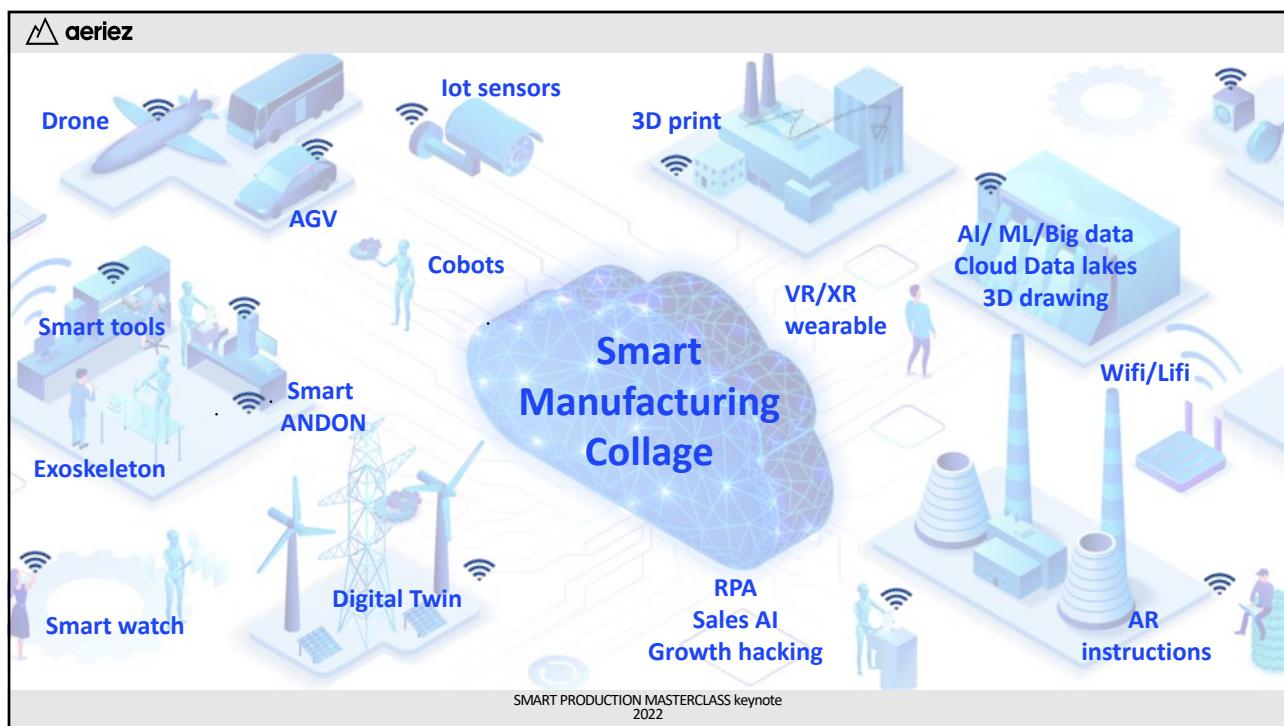
Smart Manufacturing  
Collage of applications



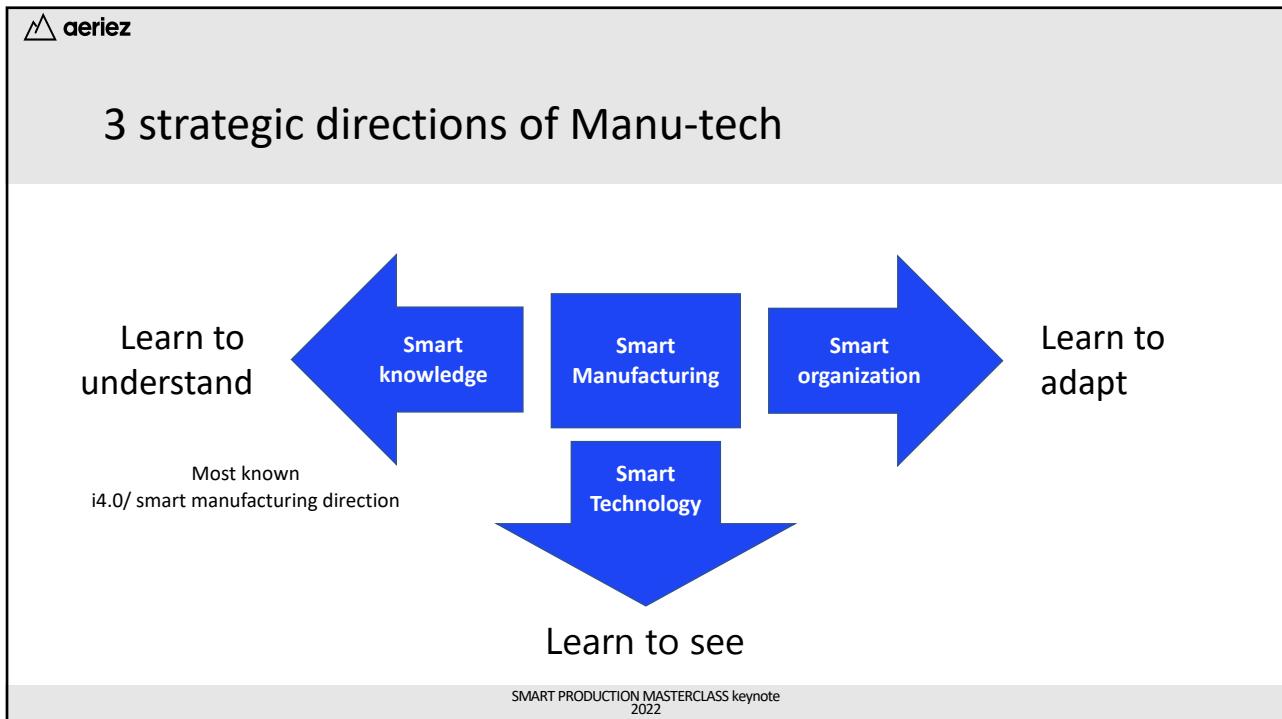
42



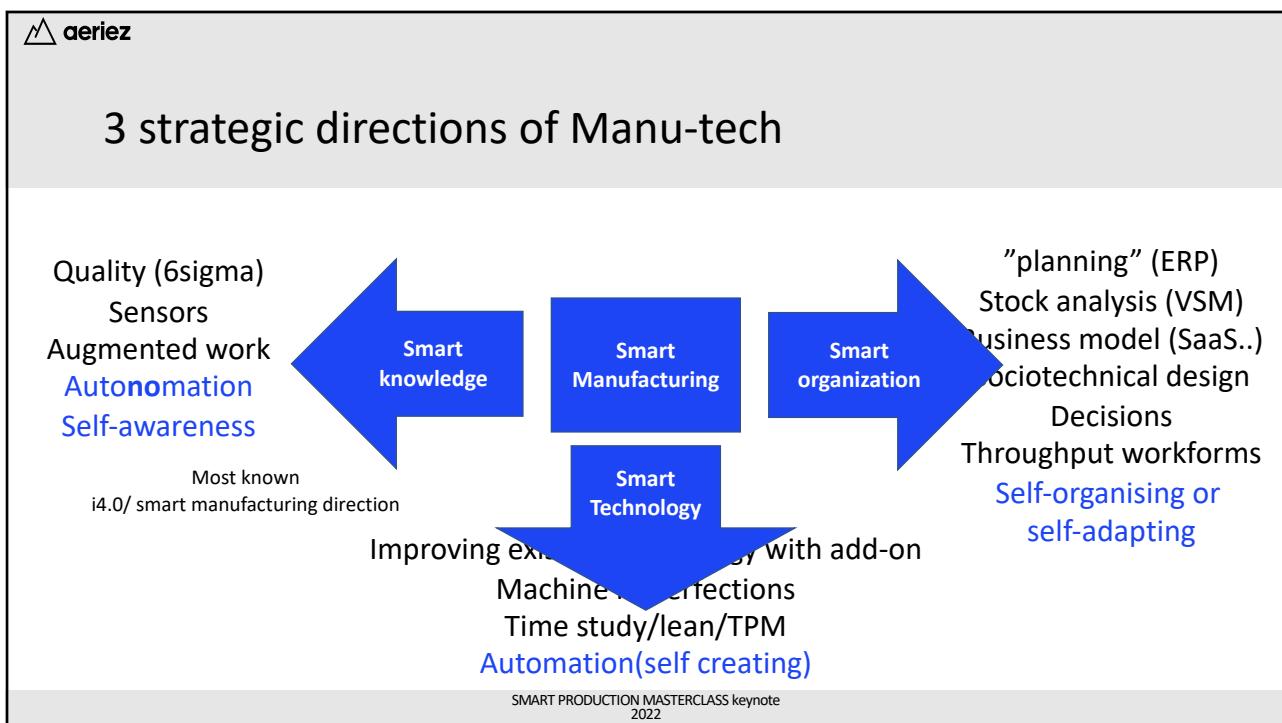
43



44



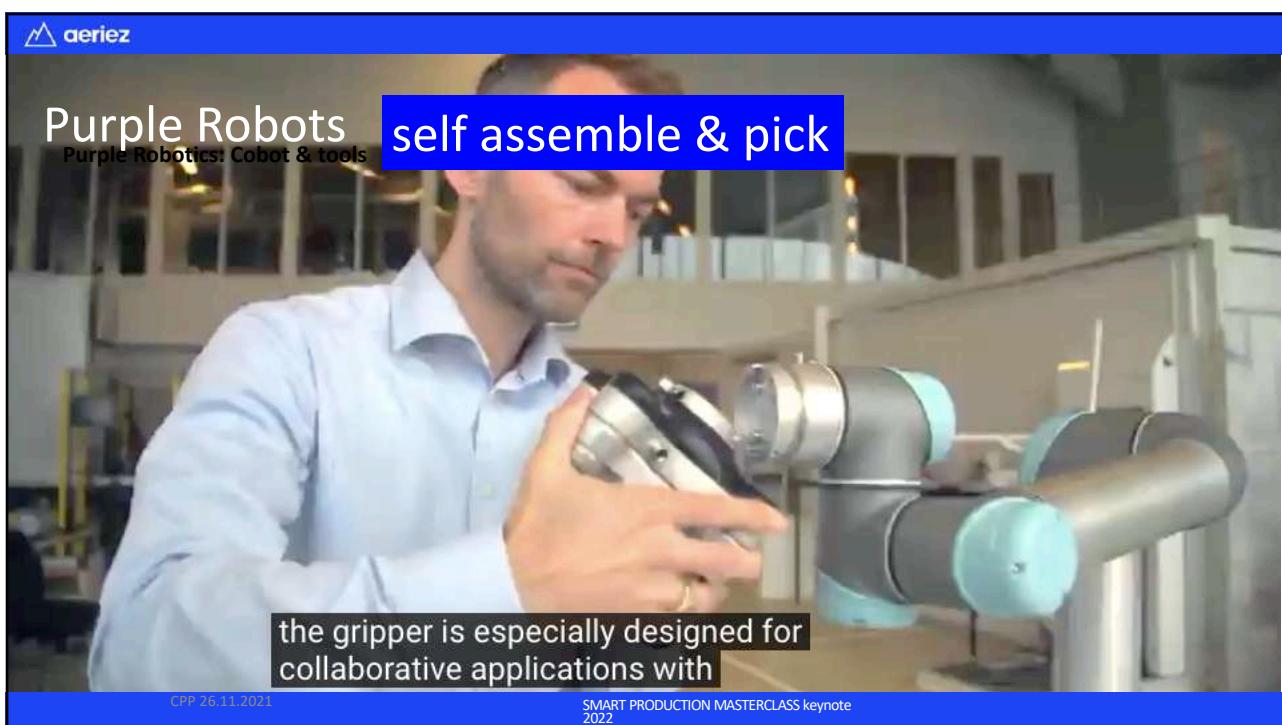
45



46



47



48



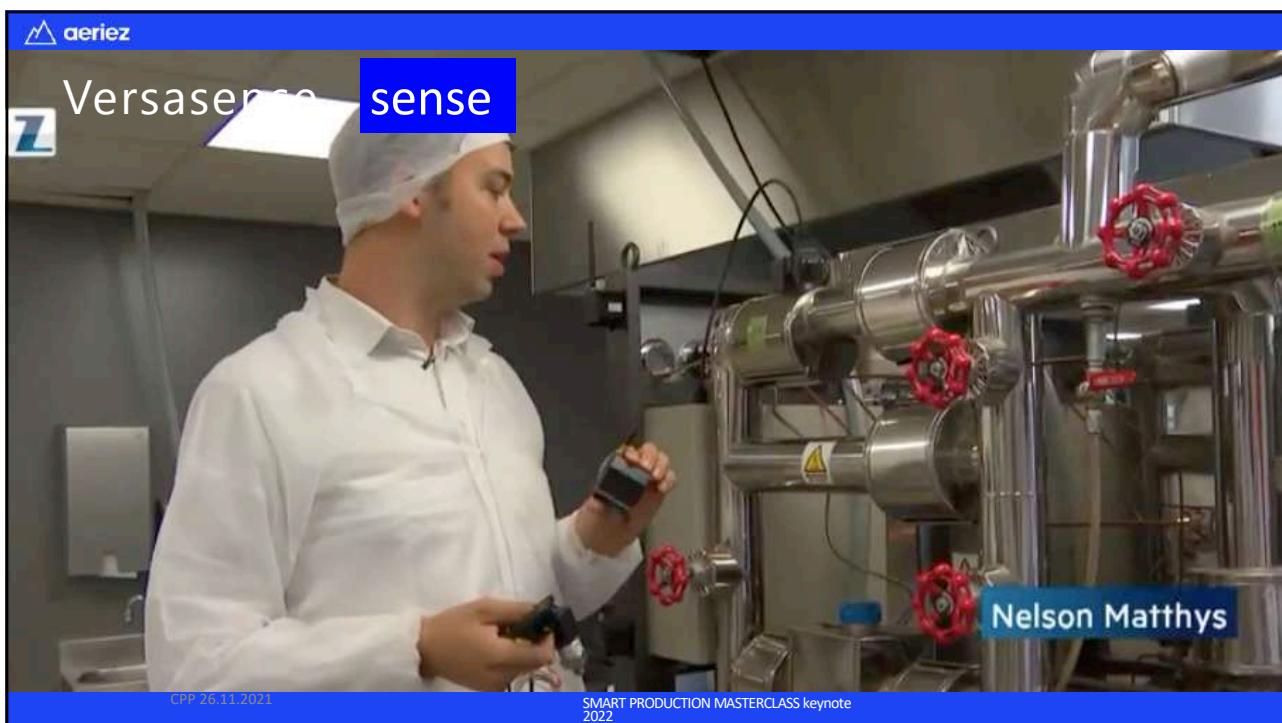
49



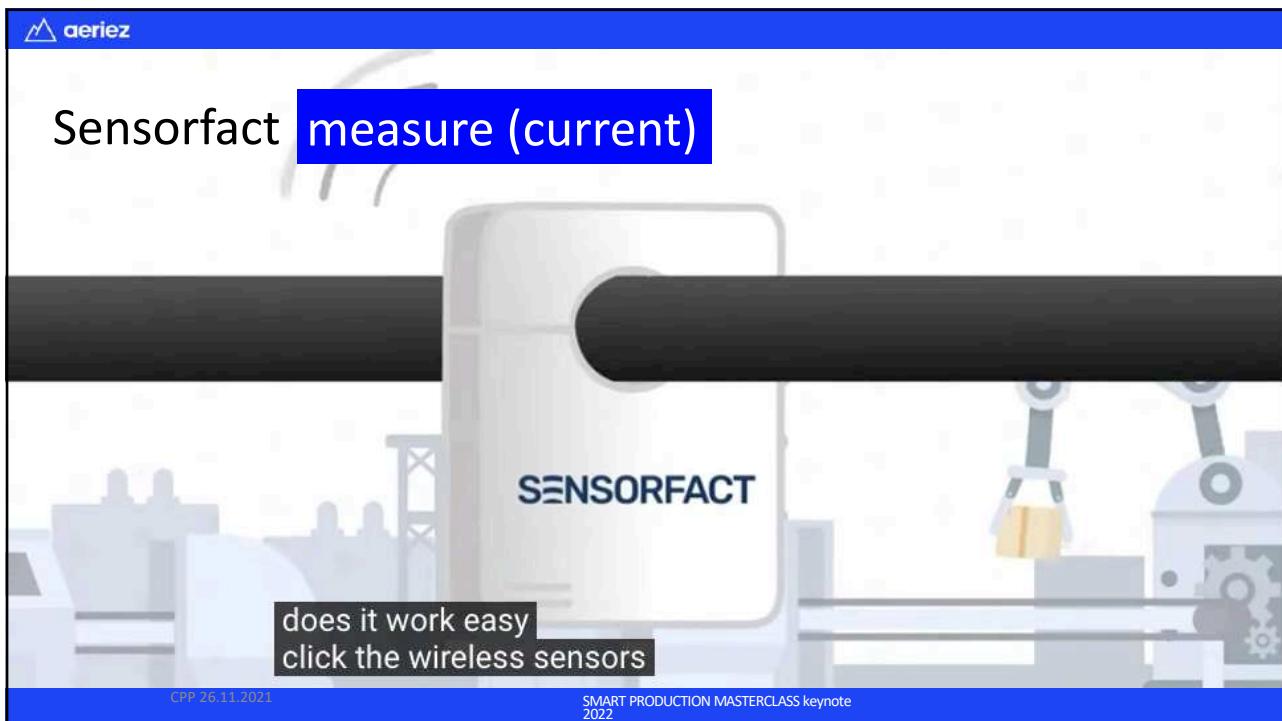
50



51



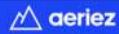
52



53



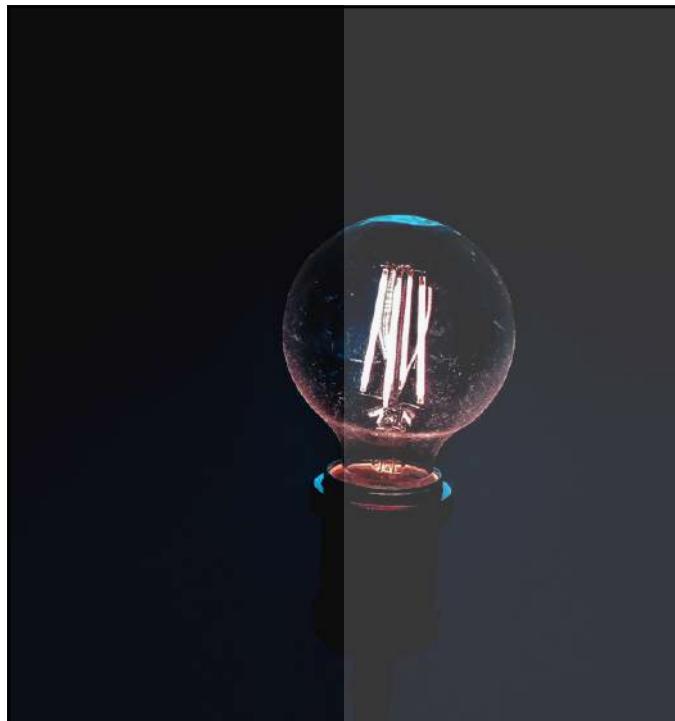
54



## Some other challenges..

- What about Lean?
- Do we have to digitize everything?
- We don't have the time for this?
- How to come to good investments?

55



“The electric light did not come from continuous improvement of candles”

- Oren Harari

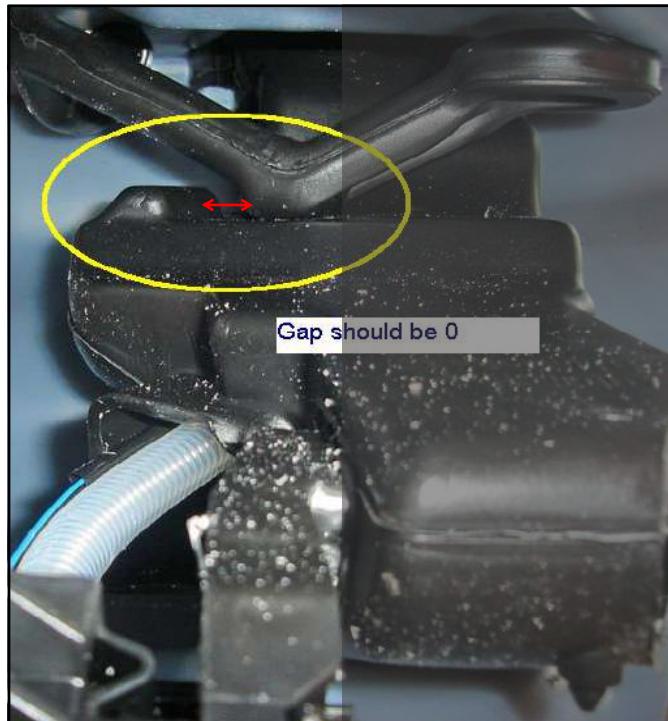
56



57



58



## A specific issue

Case: what also could happen with i4.0

59

 aeriez

### Selection of most important parameters

Issue	Standard Y-N	Actual	Impact	%	Priori
23	yes	stable	Steered & not controlled	75	1
25	Yes on endposition	Non stable	In the past pretty stable (1/setup)	75	1
30	yes	unstable		100%	1
13	no	conflict	critical	75	1
34	yes	stable	Steered not controlled	60	2
32	= same 26	unstable		60	2
26	Derived standard	stable		45	3
6B Flash size end result	Size of flash	stable	Visual and uncontrolled	40	3
21b	yes	Not stable		=21a	4
27	no	Not present		=23 ?	4
8	No for Force	F determined by stiffness of part (wall thickness)	Critical	30-35	4
14	yes	Mat param sticky valves	moderate	20	4

60

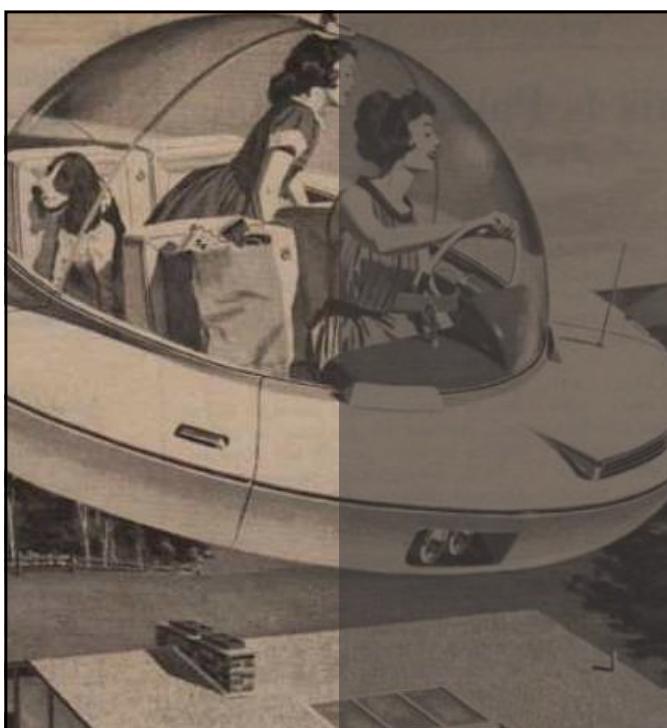
23. Root cause of take over cylinders force balance		
WHY?		Therefore
Carrier position should stay centric to create clearance		
WHY?		Therefore
Pressures are not adjusted equally in each cylinder , manual adjustment of pressure regulator on the mould.		
WHY?		Therefore
No automatic checking / feedback loop build into the system.		
WHY?		Therefore
Not foreseen in initial machine specification.		

copyright p0

61

5XWhy to rootcause

Issue: “all this effort for 1% impact”



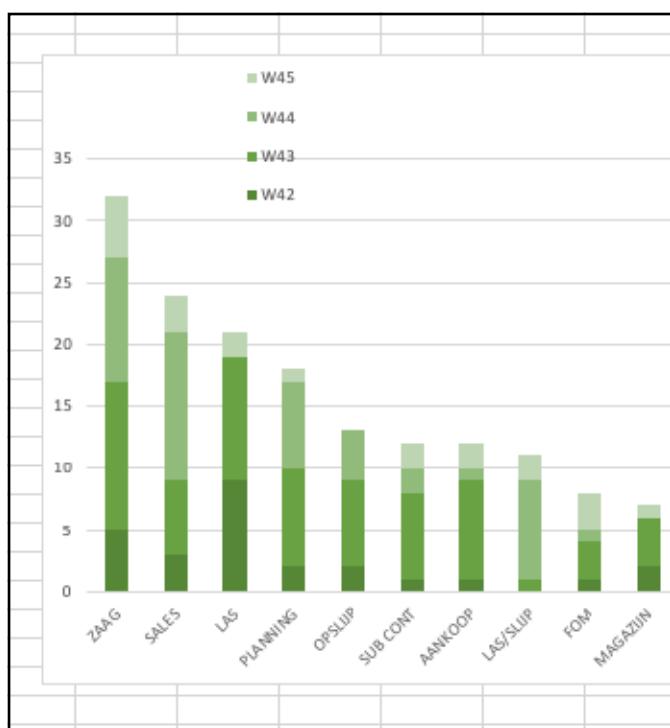
99% of companies follow this “approach”

62



Issue with errors:  
“Wack a mole”  
Uncertainty what will come next?  
Do these errors vary each day, week,...?

63



Issue with errors:  
Department dedicated mistakes  
Departments separately can't solve integral errors  
Departments can push problems to other departments

64



Language determines how we think.



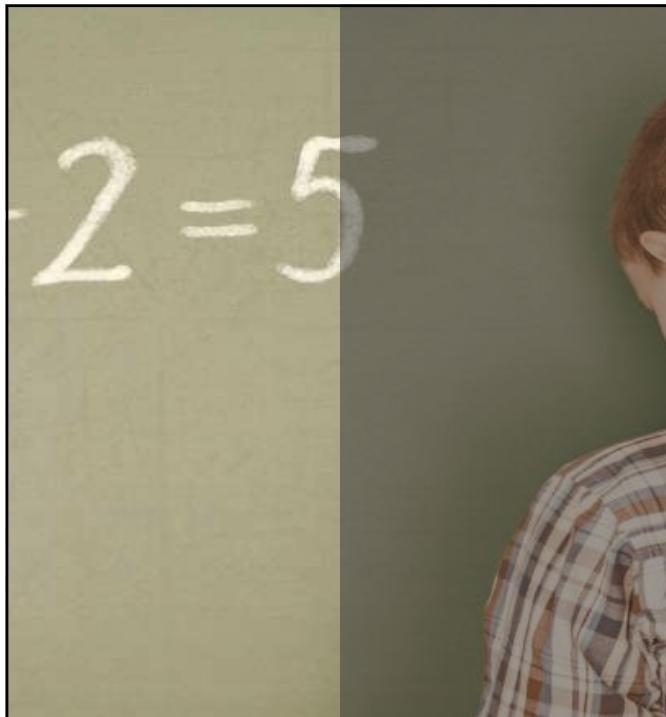
65



Issue with errors:  
language

“glueing error”  
Difference between  
cause- & detection errors

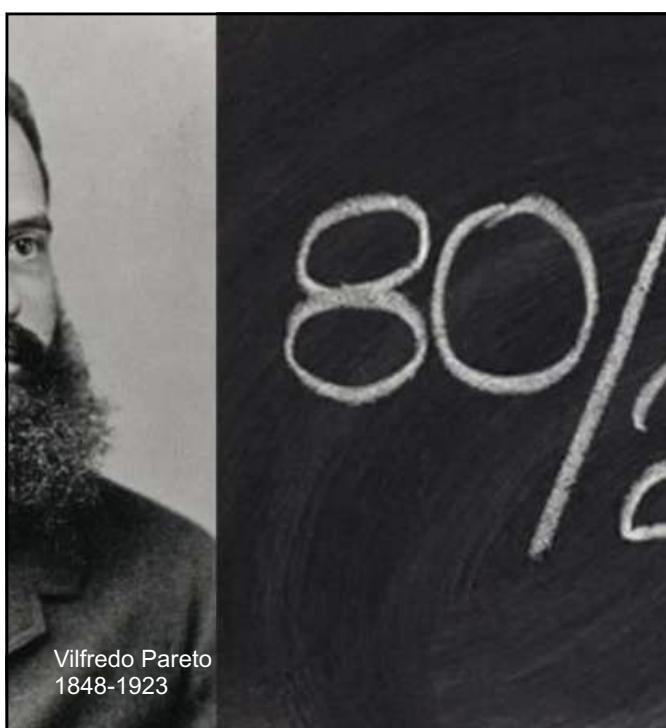
66



## Issue with accuracy of recognition

- 10% error in recognition of errors due to “personal interpretations”
- Problem of overlap detectable errors make linear recognition difficult

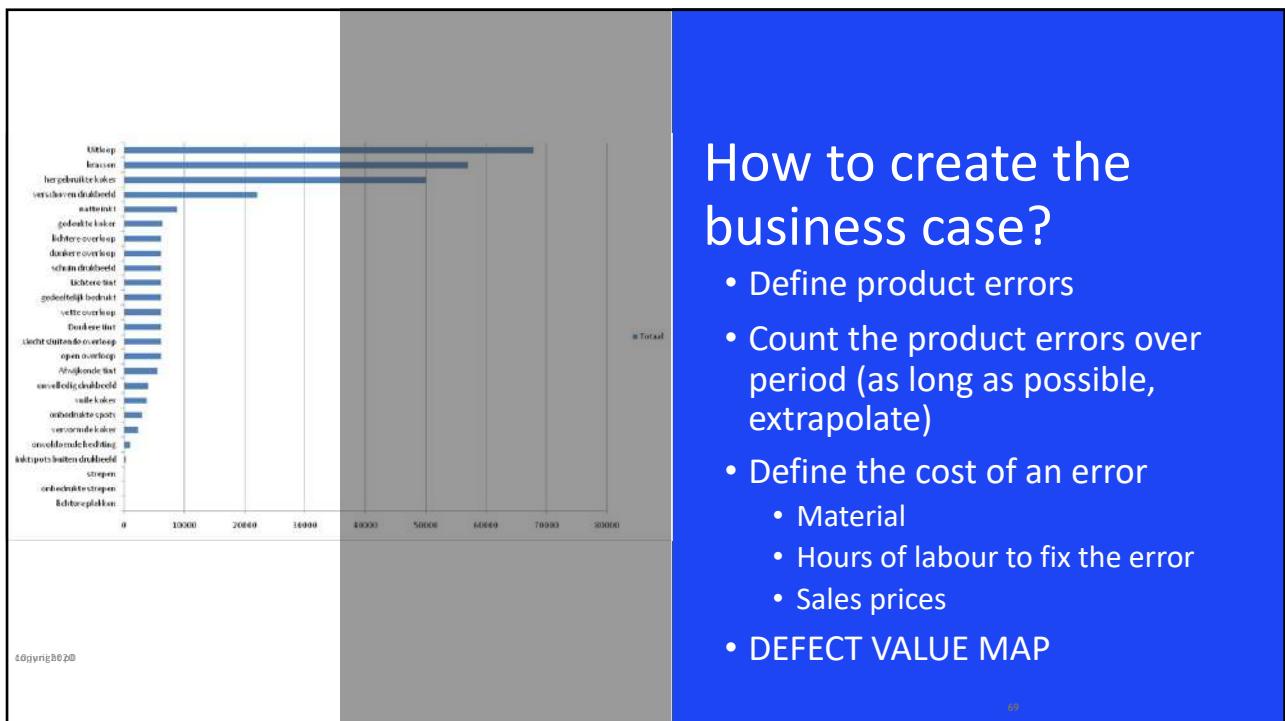
67



It is all about the money, or not?

copyright p0

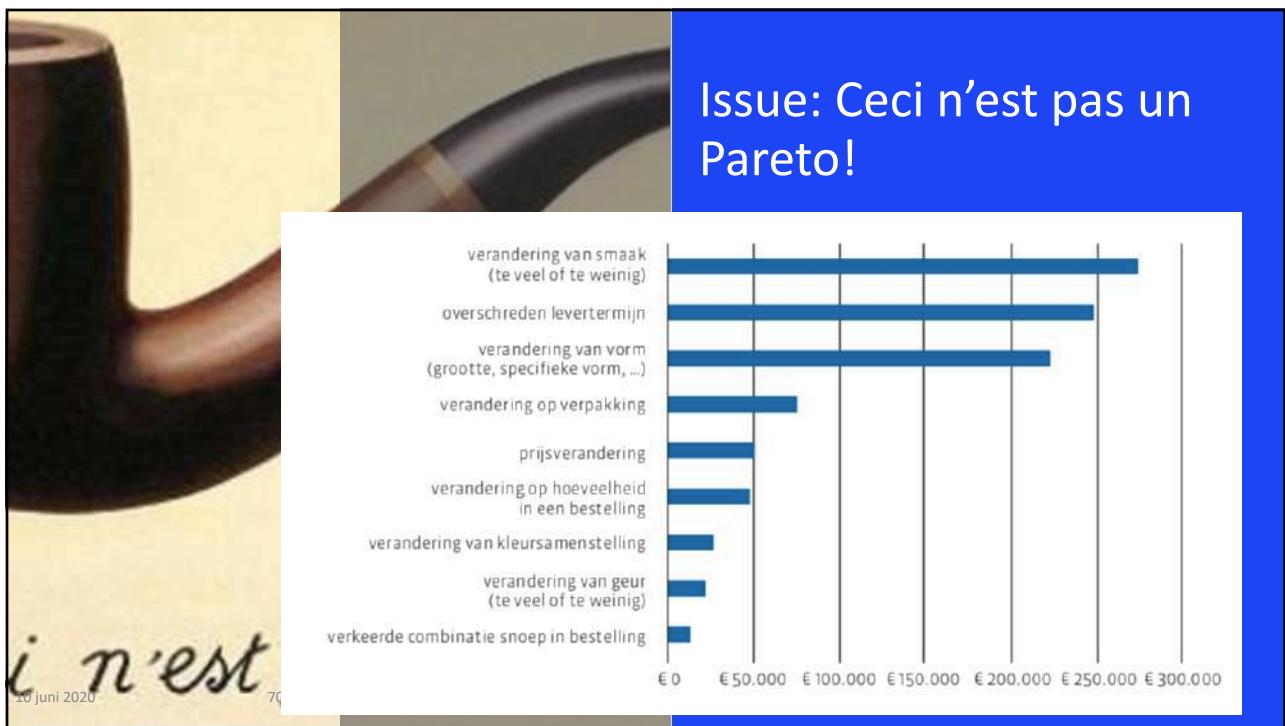
68



## How to create the business case?

- Define product errors
- Count the product errors over period (as long as possible, extrapolate)
- Define the cost of an error
  - Material
  - Hours of labour to fix the error
  - Sales prices
- DEFECT VALUE MAP

69



70

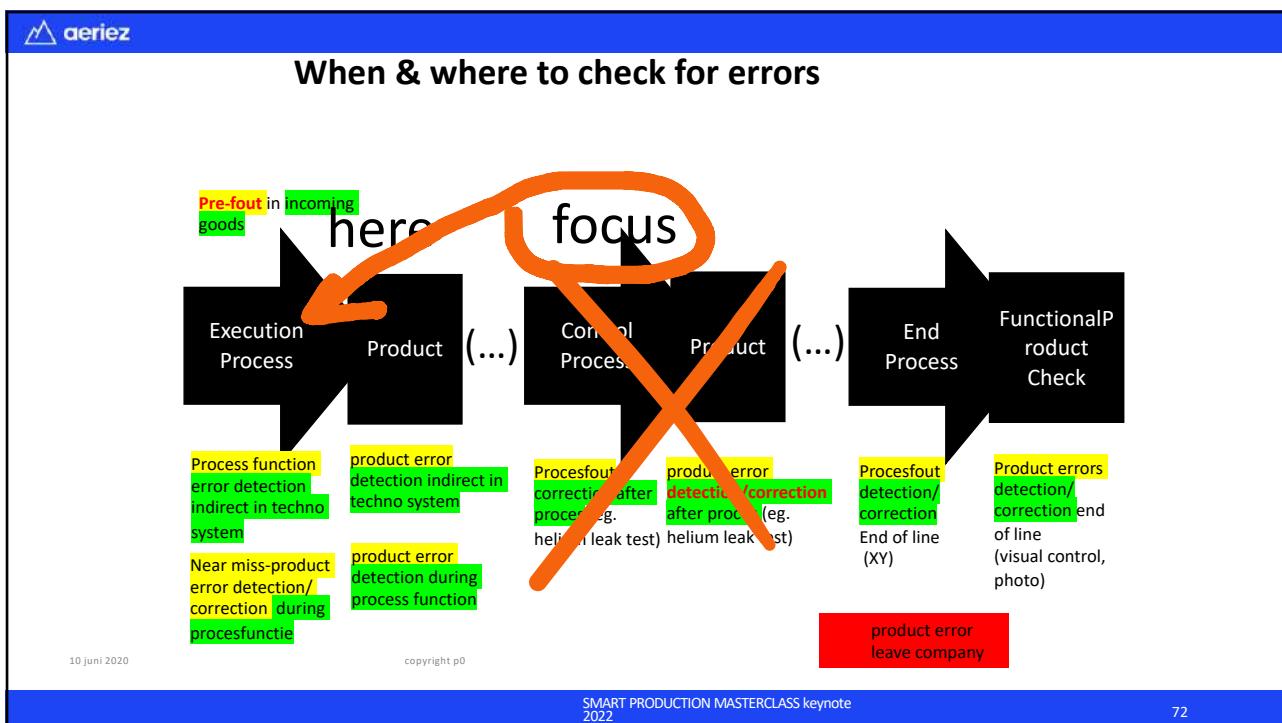


## Finding the real causes...

- How can we solve all mistakes?
- Which have dependencies??
- Overlap in technologies
- Difference process versus technology?

71

71



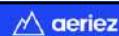
72



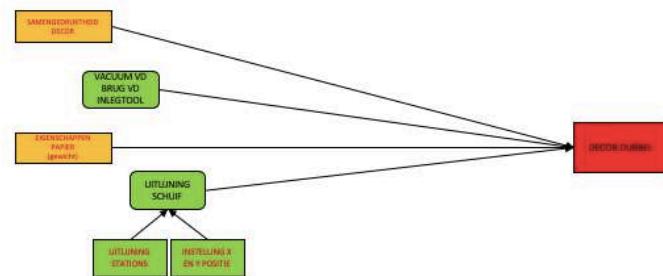
Case  
5S ...to product errors  
Linking the causes.  
Define sensors.



73



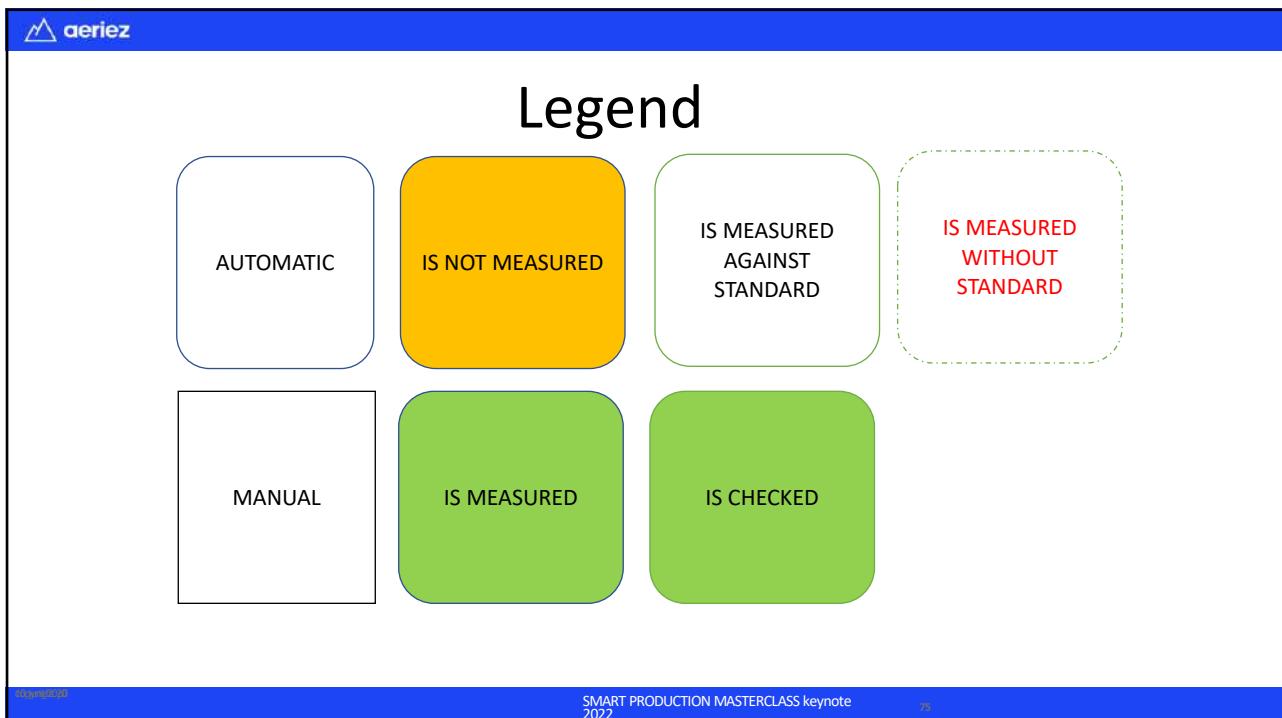
## Pragmatic Parameter model



10 juni 2020

copyright p0  
74

74



75

Paramet er	Standaard ( min – max)	Controle e	Controle d oor ( groen op te starten)	Meting	Actie
Gewicht PYE	+/- 10 g	Per product	Operator Geen registratie	Per product	<ul style="list-style-type: none"> <li>- Alle tafels aanpassen voor auto snijden ( investering)</li> <li>- Integratie gewichtssensor in snijtafel ( te onderzoeken)</li> <li>- Gewichtscontrole van de manuele weging ( beperkt)</li> </ul>
Volume PYE	Neen	Geen	Geen	Geen	<ul style="list-style-type: none"> <li>- Omzetting tabel volume vs gewicht per PYE soort per matrijs</li> <li>- 9 groepen: Smart, Classic, Classic+, decor classic, decor classic+, decor smart, AS classic+, AS classic en AS smart</li> </ul>
Cilinder druk	50 kg/ cm <sup>2</sup> in de matrijs +/- ??	Geen		Geen	<ul style="list-style-type: none"> <li>- Aangeven van druk in de matrijs ( ipv druk op de cilinder)</li> <li>- Afwijking op de standaard bepalen</li> <li>- Tabel druk maken voor pers 3-4</li> <li>- Tabel druk maken voor pers 7-8</li> <li>- Vernieuwen uitlezing druk aan kleine personen. ( investering)</li> <li>- Drukbegrenzing pers 9 &amp; 10 ( investering)</li> </ul>
Omgevin gs-temperat uur bewaring	Max. 25°C	Geen	Geen	Geen	<ul style="list-style-type: none"> <li>- Omgevingstemperatuur meten in productie en GS-magazijn</li> <li>- Koele ruimte voor opslag PYE</li> </ul>
Omgevin gs-temperat uur verwerki ng	Min. 15°C	Geen	Geen	Geen	<ul style="list-style-type: none"> <li>- Omgevingstemperatuur meten in productie en GS-magazijn</li> <li>- Plaatsen versasens sensor</li> </ul>
FIFO	FIFO	Geen	Geen	Geen	<ul style="list-style-type: none"> <li>- Opslag FIFO organiseren ( Filip en Karl)</li> </ul>

## Te controleren parameters en hun frequentie

- Niet alles dient via sensoren meten!
- Éénmalig (huren van technologie)
- Papier eenmalig/dagelijks
- Sensoren

76



Errors are the extremes of customer requirements

- Connect external with internal parameters
- Decide what to measure with IoT and what not

77

77

 aeriez

## What are sensors?

- △ Anything tangible or intangible that provides data that can result in knowledge
- △ E.g. hardware & software sensors



SMART PRODUCTION MASTERCLASS keynote  
2022

78



Humans are already  
present sensors!

79



Iot Sensors bij  
bv. Versasense, Pozyx,  
...  
Linken van sensoren  
en data: CODI

80



## Conclusion

1. Define correct errors
2. Create a Defect Value Map
3. Understand the relations between parameters
4. Search for IoT to get it under control

81

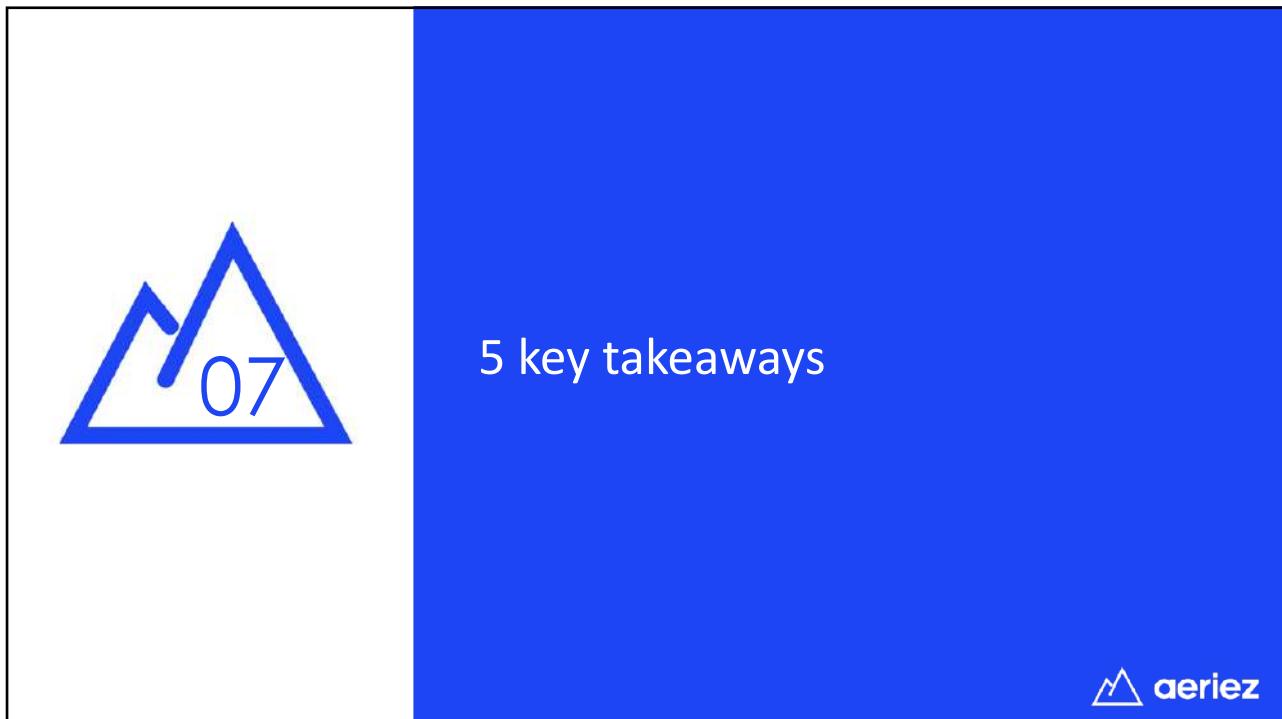


## Learning curve of company

“There is no path,  
the path is made by walking”  
Antonio Machado

82

82



83

The slide features a blue header with the 'aeriez' logo and the title '1. Make your business case!'. Below the header is a photograph showing a person's hands working on a laptop keyboard, with papers and a cup of coffee on a wooden desk. To the right of the image, a list of questions is presented, followed by a bolded callout. At the bottom, there is a blue footer bar with the text 'SMART PRODUCTION MASTERCLASS keynote 2022'.

What does your business need to grow?  
What is your biggest bottleneck?  
What is your biggest challenge?  
How could you double your revenue?  
What process verb is bothering you?  
What parameter do you not have under control?  
**What feature would you need to be 10X better than your known competitor?**

What will bring you the most money, cost reduction or revenue increase?

SMART PRODUCTION MASTERCLASS keynote  
2022

84

 aeriez

## 2 Key Value: Anticipate



Use customers to get **new valuable data**  
Google maps **uses signal of android** to calculate traffic que via acquired app Waze

SMART PRODUCTION MASTERCLASS keynote  
2022

85

 aeriez

## 3. Key Value: Speed



SMART PRODUCTION MASTERCLASS keynote  
2022

86



#### 4. Key Value: Automate internal, autonimate external



Story of logo creative workers

SMART PRODUCTION MASTERCLASS keynote  
2022

87



#### 5. Knowledge is the antidote for risk



- ⦿ Without **knowledge and insight**, i4.0 programs can drastically fail.
- ⦿ Most CEOs understand the i4.0 **concepts** but real knowledge lacks. It is risky to pursue plausible concepts.
- ⦿ Slogan like **Automate, Simplify** and **Standardize** should be **Understand, Improve** and **Spread** to everybody.

SMART PRODUCTION MASTERCLASS keynote  
2022

88

Thank you!



 ives@aeriez.com