EEN HUIS BESTUREN ALS EEN FABRIEK,

HOE DOE JE DAT?

KIVI Engineering Society

Afdeling Elektrotechniek

Henk Akkermans

World Class Maintenance
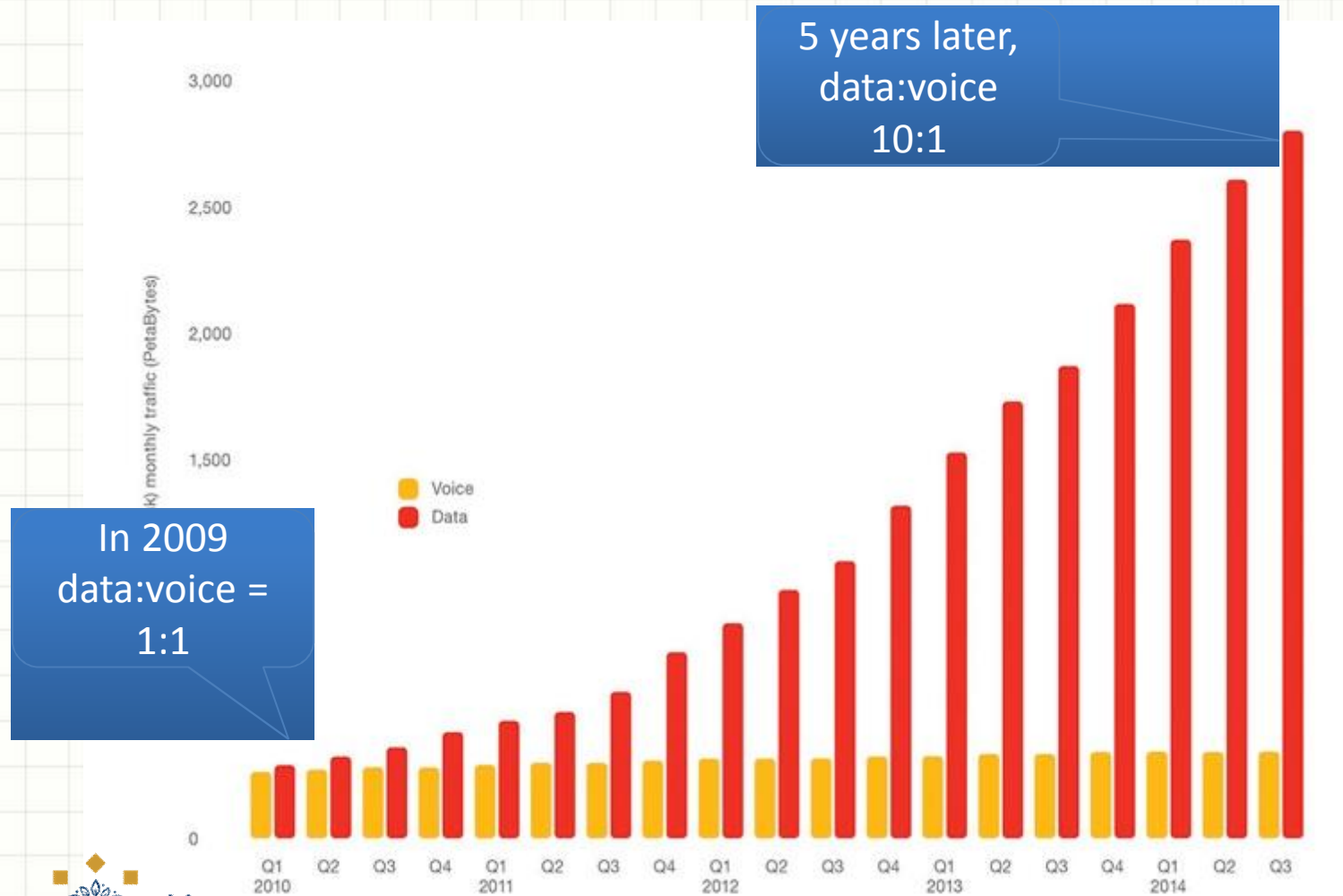& Tilburg University

Lezing HomeLab 2050, KIVI, 6 oktober, 2015

TILBURG UNIVERSITY

The opportunity: an industrial revolution is happening because multiple new technologies converge

1. Briljant factories
2. Extreme Machines
3. Energy Everywhere
4. Mapped minds
5. Super materials
6. Industrial internet

Forces shaping the Industrial Internet

1 Internet of things	2	Analytics
A living network of machines, data, and people	Incre intelli throu embe softw	Generating data-driven insights and enhancing asset performance

Harvard Business Review

NOVEMBER 2014

47 The Big Idea
The HBR List of
Best-Performing CEOs
2014 edition

100 Spotlight
The New Deal on Data
An interview with
Alex "Sandy" Pentland

133 Case Study
Do Business and
Politics Mix?
Brian K. Richter

THE INTERNET OF EVERYTHING
Smart, connected products will transform your business PAGE 64

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Don't underestimate exponential growth of new technology adoption

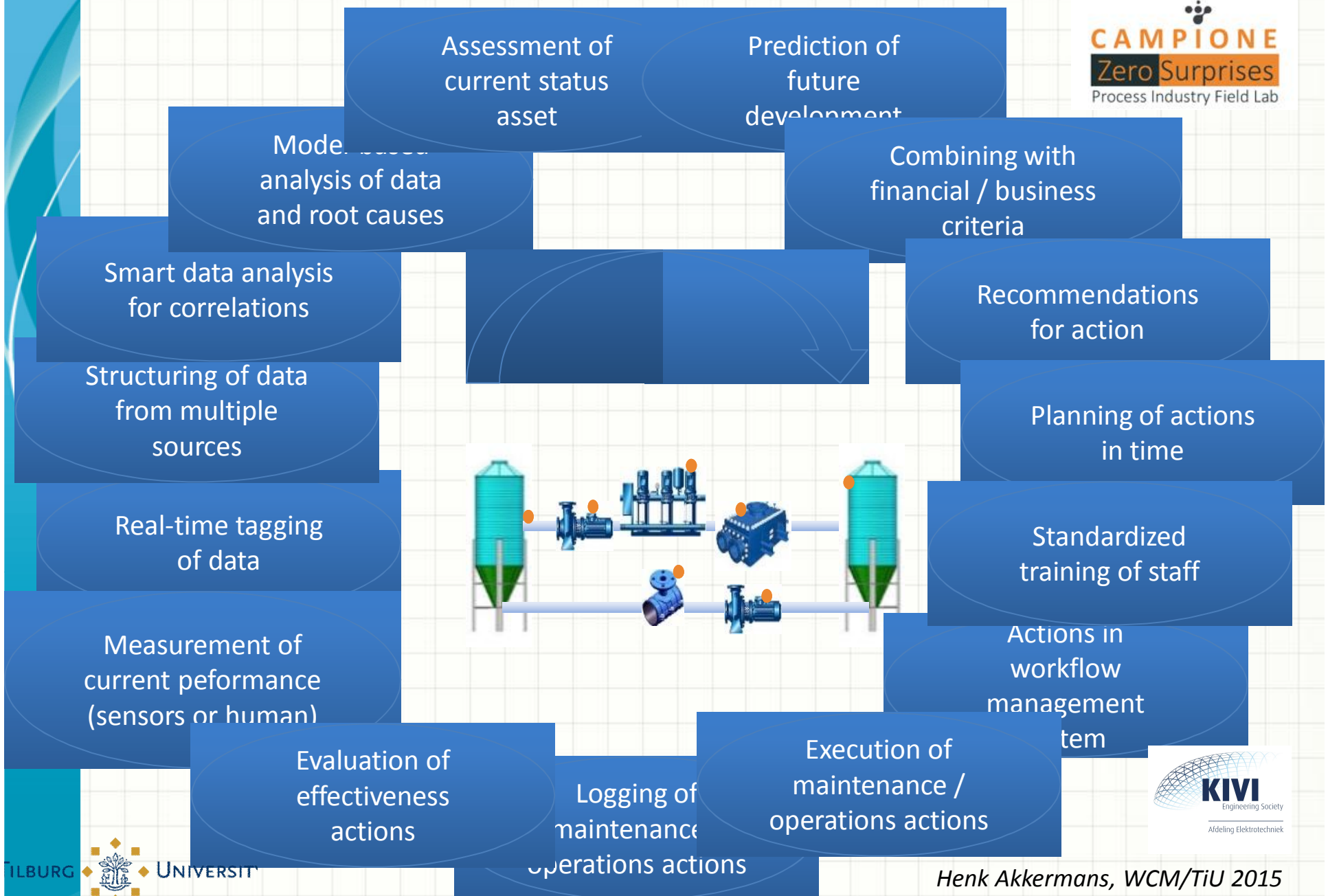5 years later, data:voice 10:1

In 2009 data:voice = 1:1

Voice
Data

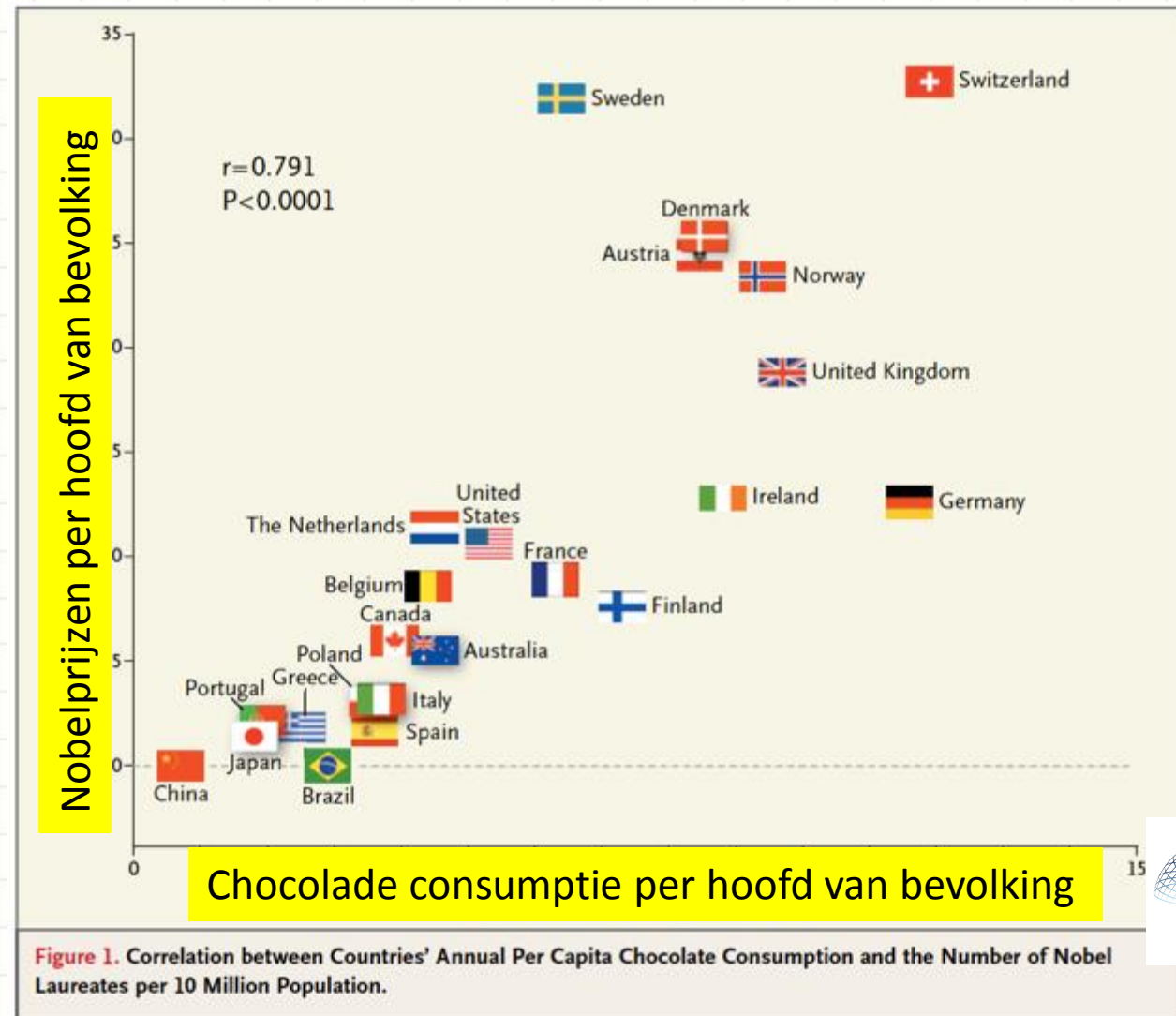# From corrective and scheduled to Condition-Based maintenance

″ **Condition-Based Maintenance (CBM)** is paradigm shift for the process industry where mainenance is mostly planned or corrective: een heuse paradigm shift.

″ CBM has so far not taken off in the process industry mostly because of non-technical reasons (safety risks, conservatism, organisational impediments, financing, divergent incentives

″ **Less than 5% of data** is being tagged and only a fraction of that is being used for CBM

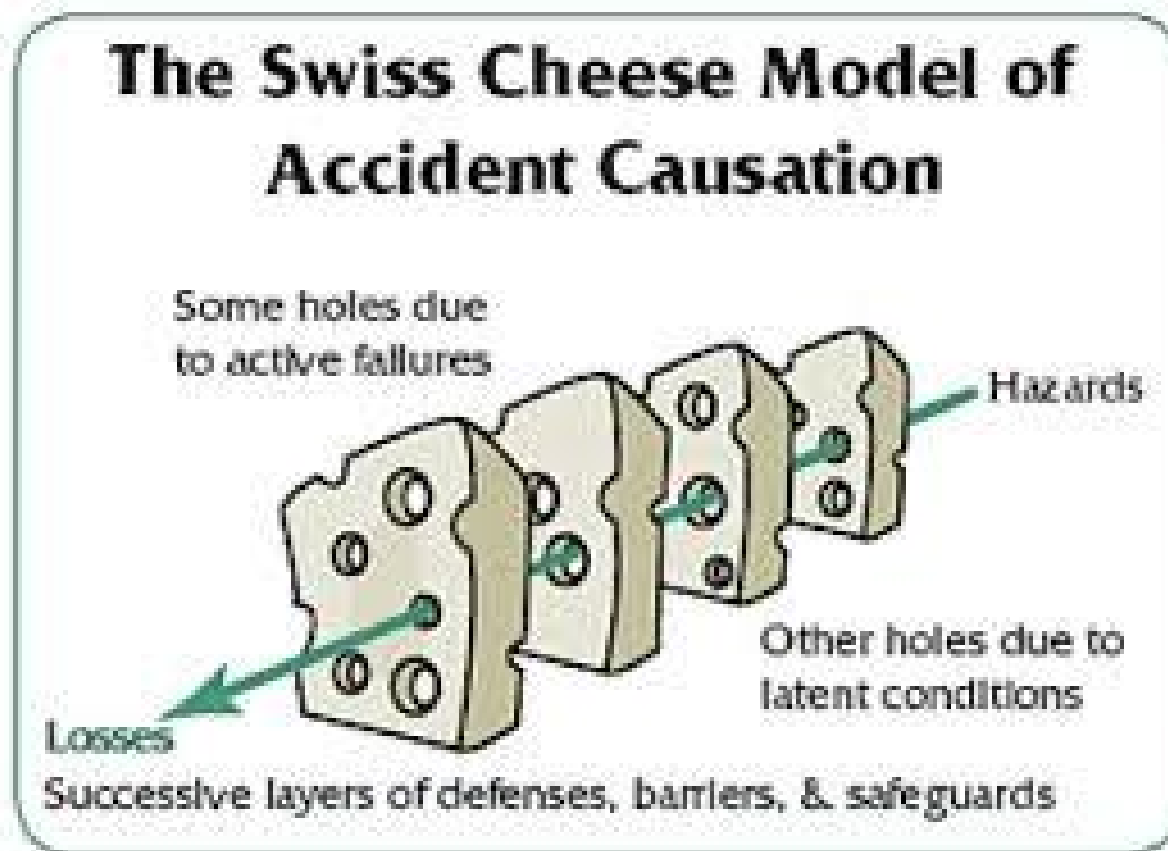# The data-enrichment cycle in Condition-Based Maintenance

Assessment of current status asset

Prediction of future development

Model-based analysis of data and root causes

Combining with financial / business criteria

Smart data analysis for correlations

Recommendations for action

Structuring of data from multiple sources

Planning of actions in time

Real-time tagging of data

Standardized training of staff

Measurement of current peformance (sensors or human)

Actions in workflow management system

Evaluation of effectiveness actions

Logging of maintenance operations actions

Execution of maintenance / operations actions

CAMPIONE
ZeroSurprises
Process Industry Field Lab

KIVI
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Henk Akkermans, WCM/TiU 2015

Probleem 1: wat zijn de echte verbanden?

Figure 1. Correlation between Countries' Annual Per Capita Chocolate Consumption and the Number of Nobel Laureates per 10 Million Population.

Probleem 2:
Fouten zullen we blijven maken
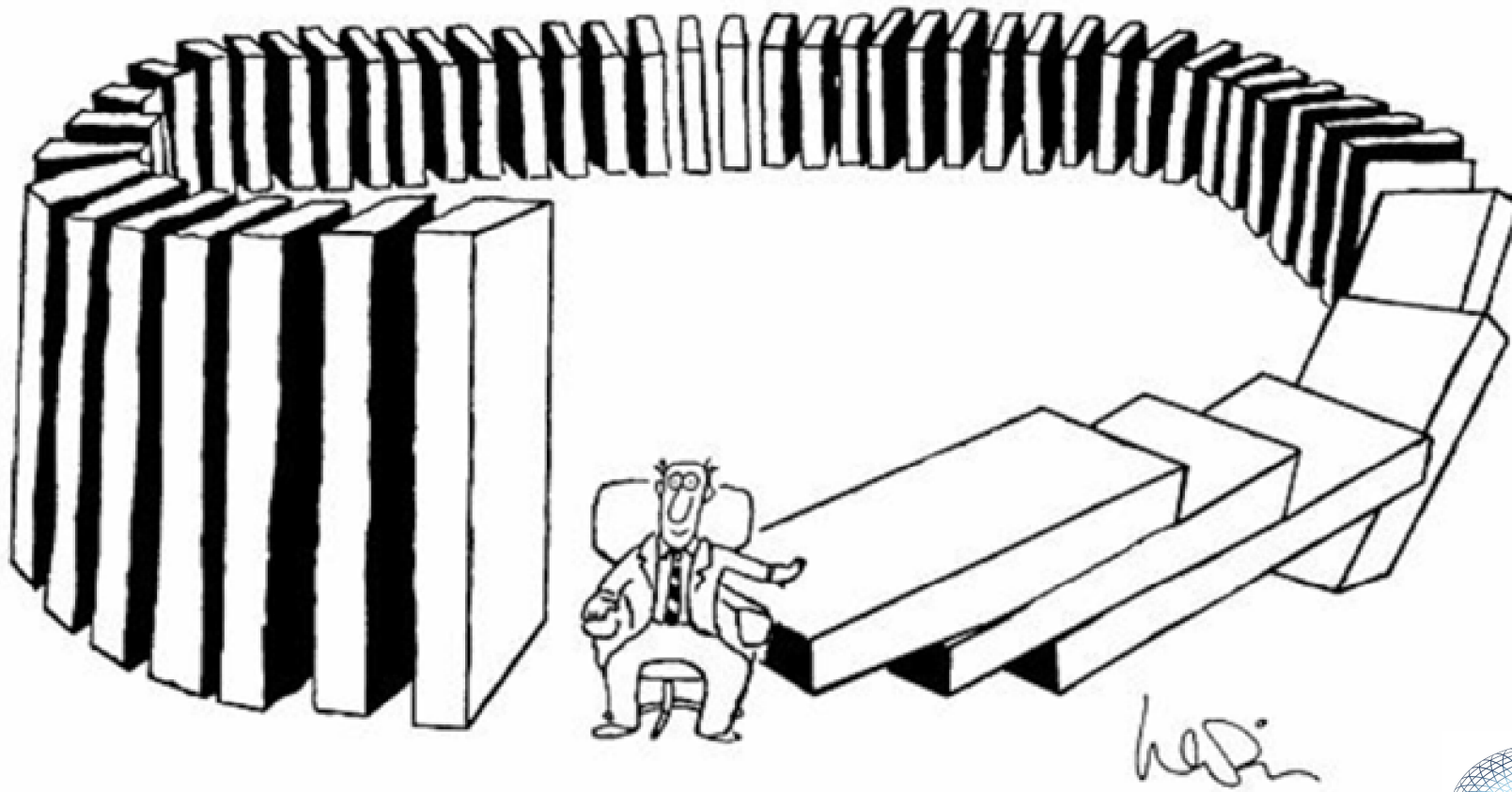

The Swiss Cheese Model of Accident Causation

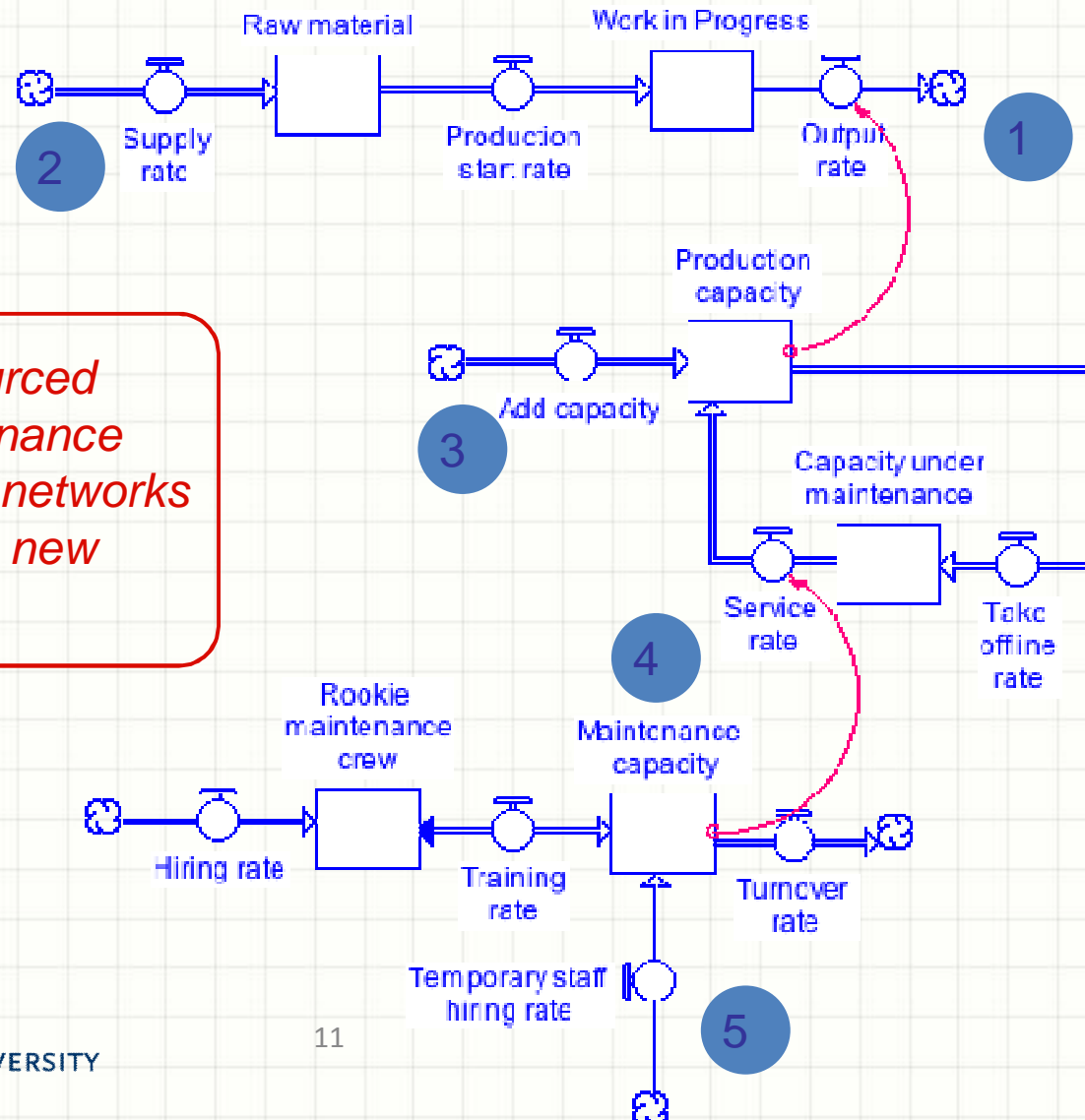# Hoe complexer de user interface...
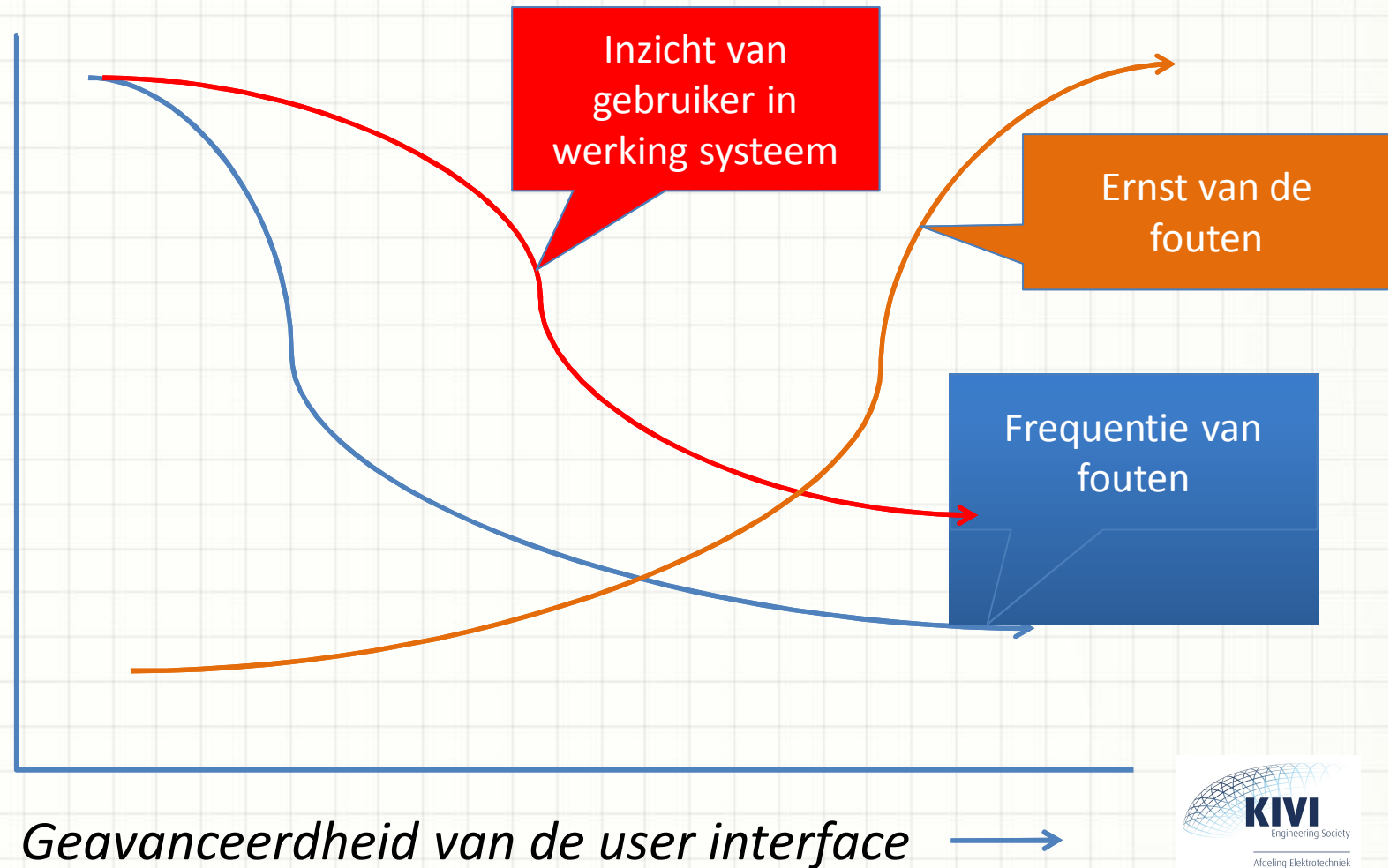
Lessen uit de aerospace
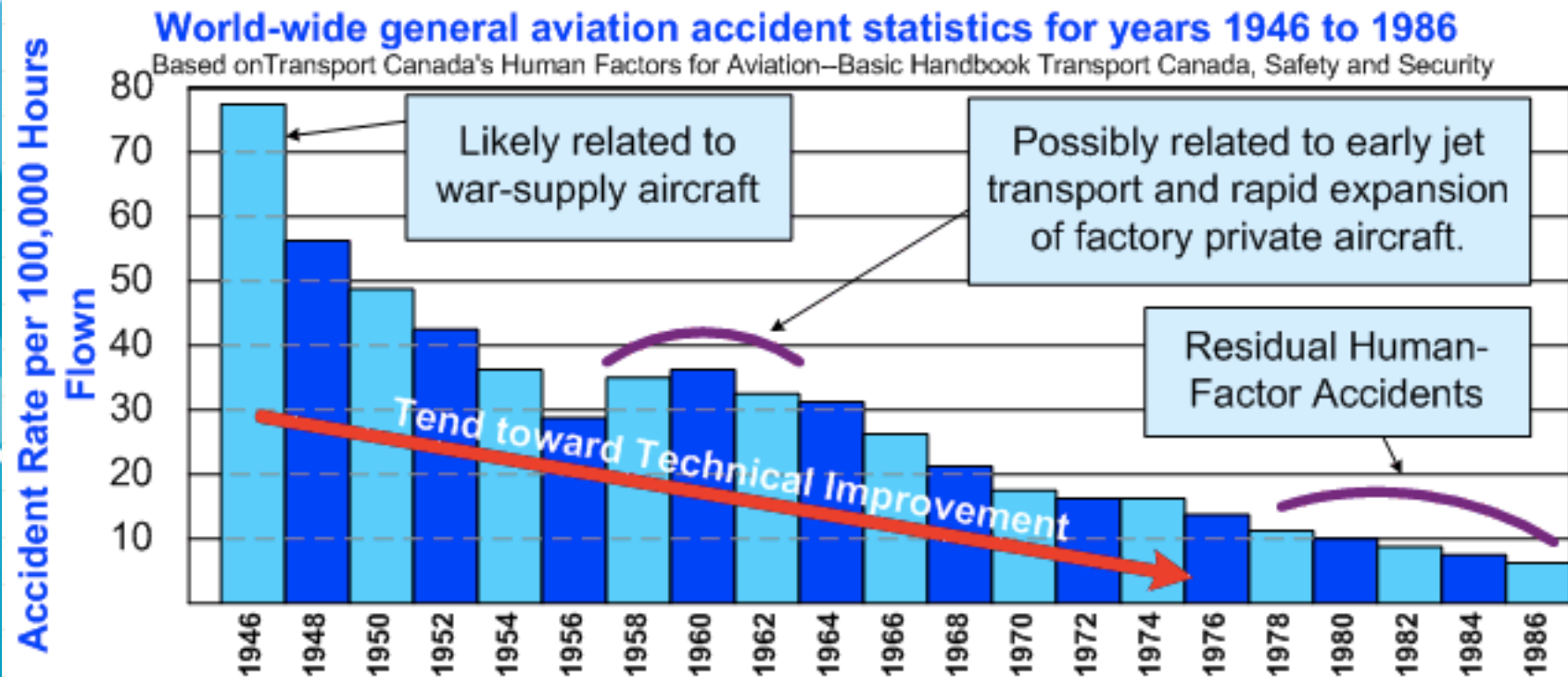
Probleem 3: Prestatiecontracten zijn zo makkelijk nog niet

De realiteit: alles is een netwerk geworden

Outsourced maintenance supply networks are the new reality

Bij een prestatiecontract meet je op de OUTPUTS in plaats van op de inputs

˝ *Inputs* : hours used, material used

˝ *Throughput*: work/process description, Statement of Work

˝ *Output*: uptime, volume produced

˝ *Outcome*: customer satisfaction, market share

Input & throughput specifics: risk lies mainly with asset owner

Output & outcome specifications: risk lies mainly (but not solely) with contractor / service provider

Performance-Bas

Wanneer passen prestatiecontracten bij de klant-leverancierrelatie?

Charasteristics of the setting	Input & process based contract	Performance based contract (output & outcome
INFORMATIONAL		
Much information is available	+	
Tasks are programmable	+	
Output quality/quantity is hard to guarantee	+	-
Output is easily measurable		+
RELATIONAL		
Parties' goals are misaligned		+
Principal (customer) is risk-aversive	-	+
Agent (supplier) is risk-aversive	+	-
Parties have a long-standing relationship	+	

Welke skills, ervaring en attitudes heb je dus nodig nu in de fabriek en straks in je huis?

˝ Customer

- Fair amount of purchasing experience
- Not a strong cost focus for this specific service
- Willingness to "let go" of micromanagement, to specify functionally (no Not-Invented-Here syndrome)
- Ability to specify desired performance
- Long term focus

˝ Supplier

- Insight/knowledge/experience in customer setting (else risk premium becomes prohibitively high)
- Insight/knowledge/experience with the customers of the customer (in *service triads)*

En dus moet je het samen doen

www.wordclassmaintenance.com
http://www.tilburguniversity.edu/nl/webwijs/show/?uid=ha