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Smart City Infrastructures: use what you already have

VALUING THE INFRASTRUCTURE OF CITIES CONFERENCE, LEEDS, 26-27 APRIL 2017
DR. C.H.M. NIEUWENHUIS,
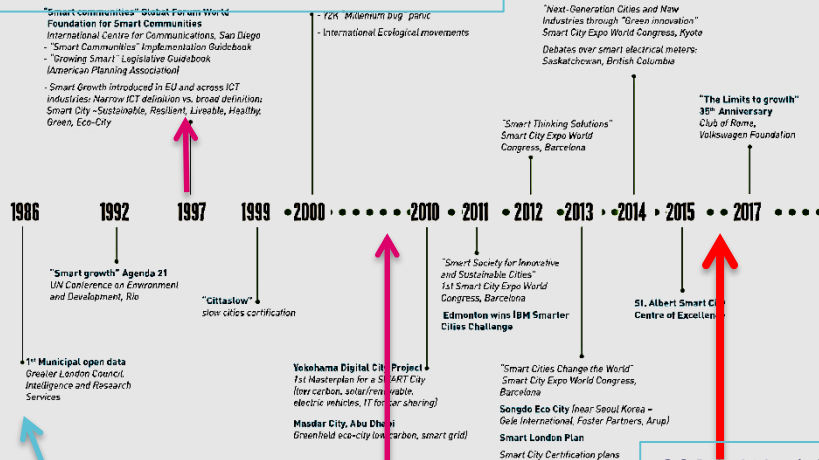**CTO-OFFICE THALES NEDERLAND & VISITING PROF. @ LUBS**

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https://www.ualberta.ca/~rshields/f/SMARTcitiestimeline.pdf

SMART Cities Timeline

1997: World Forum on Smart Communities

"Smart communities" Global Forum World
Foundation for Smart Communities
International Centre for Communications, San Diego
- *"Smart Communities" Implementation Guidebook*
- *"Growing Smart" Legislative Guidebook*
  (American Planning Association)

- *Smart Growth introduced in EU and across ICT*
  industries. Narrow ICT definition vs. broad definition:
  Smart City ~Sustainable, Resilient, Liveable, Healthy,
  Green, Eco-City

- Y2K "Millenium bug" panic
- International Ecological movements

"Next-Generation Cities and New
Industries through "Green innovation"
Smart City Expo World Congress, Kyoto

Debates over smart electrical meters:
Saskatchewan, British Columbia

"Smart Thinking Solutions"
Smart City Expo World
Congress, Barcelona

"The Limits to growth"
35th Anniversary
Club of Rome,
Volkswagen Foundation

1986   1992   1997   1999   •2000 • • • • • •2010 • 2011 • 2012 •2013 • •2014 • 2015 • • 2017 • • • •

"Smart growth" Agenda 21
UN Conference on Environment
and Development, Rio

"Cittaslow"
slow cities certification

"Smart Society for Innovative
and Sustainable Cities"
1st Smart City Expo World
Congress, Barcelona

Edmonton wins IBM Smarter
Cities Challenge

St. Albert Smart City
Centre of Excellence

• 1st Municipal open data
Greater London Council
Intelligence and Research
Services

Yokohama Digital City Project •
1st Masterplan for a SMART City
(low carbon, solar/renewable,
electric vehicles, IT for car sharing)

Masdar City, Abu Dhabi
Greenfield eco-city low carbon, smart grid)

"Smart Cities Change the World"
Smart City Expo World Congress,
Barcelona

Songdo Eco City *(near Seoul Korea ~*
Gale International, Foster Partners, Arup)

Smart London Plan

Smart City Certification plans

2016: World Economic Forum 2016
4 ways in which smart cities will
make our urban life better

1986 Beniger: Information Society,
Knowledge Economy

2008: IBM (Sam Palmisano, former CEO) introduced 'smarter cities' as
part of his 'A smarter planet' speech (a marketing campaign,
promoting ICT as solution for urban problems → **3 B$** *smart consulting*
revenues (= 25% of IBM ann. rev.!!))

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What do we know about SMART….

▌ ….SMART Is about…… using the 'abundant' digital information that is available 'everywhere'…..

▌ ….SMART is about…… improving processes, creating new products and services and constructing new businesses…..

▌ But also:

▌ ….SMART is …..NOT yet measurable by any recognised and uniformly used metrics!!
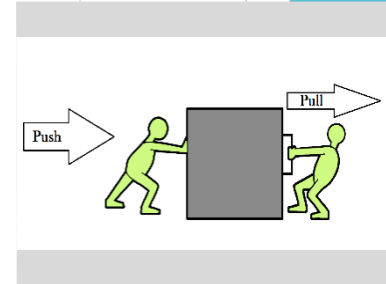
▌ So, the actual situation is this:

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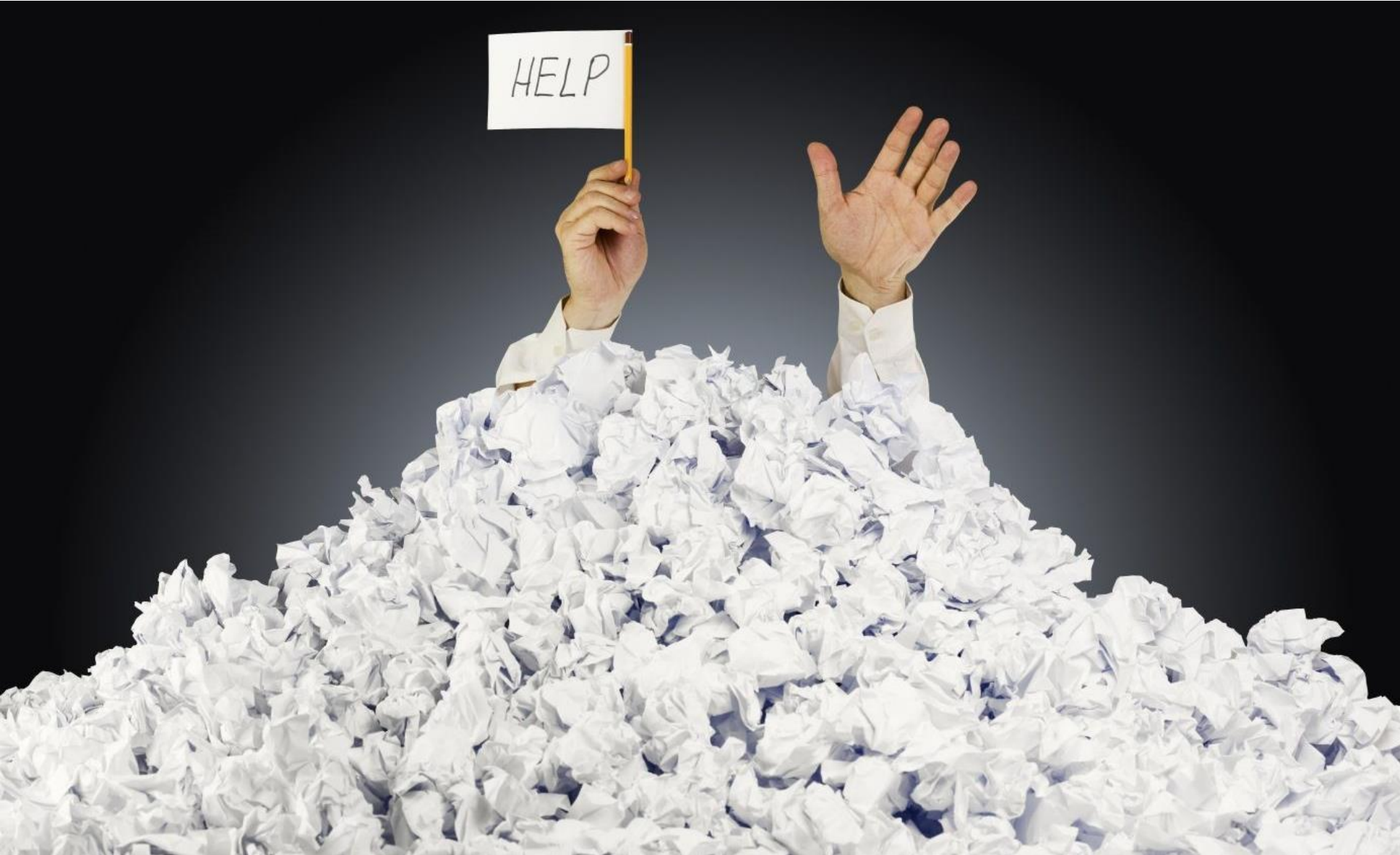
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Two forces:

> Pull: Urbanisation
> Push: Digital Transformation

The 'engineering' problem:

> How and Where to **apply Science**, to enable a transformation from 'as is' to 'smarter'

> How and Where to **apply IT**, to enable the transformation from 'normal' to 'smart'

> How do we measure & control?

Search terms: Smart City(ies), & urban planning.

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The Push (since 2008 - …..)

IBM, Siemens, Cisco, Thales: Rio, Singapore, Mexico-City, but also greenfield solutions like Songdo (SouthK) and Masdar (UAE) – full scale contracting

Cities all over the world – calling themselves Smart and presenting Smart-agendas and Smart-projects

> Smart parking, smart public transport, smart energy grids, smart traffic systems, ………

> More servers, networks, data centers……

> The more 'digital infra' the smarter…???

> No consensus, no metrics, no tangible goals!!

> *Thales Group, GapGemini, Accenture, Hitachi, Schneider Electronics, Toshiba, General Electric, Microsift, Oracle, SAP… all do the same: Trying to sell more existing products with a shiny 'smart city' skin!!*

Most current projects are 'solutionist' projects,

delivering a solution for a single phenomenon, without considering secondary effects.

Example: PredPol tool (CA) for smart policing.

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And what about the pull?

The pull has to come, of course, from the Cities

> Where are you in 20xx

> What do you want to do differently

> Where do you want to make the changes

> How much money, effort, people do you want to spent

> Do you really want to measure if there is some ROI

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Where are you in 20xx
What do you want to to differently
Where do you want to make the changes
How much money, effort, people do you want to spent
Do you really want to measure if there is some ROI

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Exisitng methods & tools

Model a city as a Cyber Physical System (CPS)

> Origin: Cybernatics - mechatronics & embedded systems (closed loop) – designing or building a digital replica

> Today: complex systems, execution of hybrid models (discrete, analogue, behavioral,…)

> Multi-disciplinary by nature; on both the science & engineering sides. And including the modeling of human (group) behaviors

Tools:

> Ptolemy II (heterogeneous modeling & design)
> INTO-CPS (designed for closed loop)
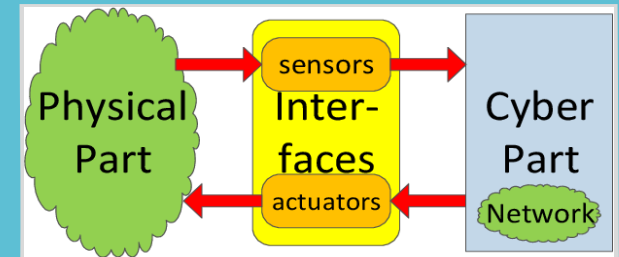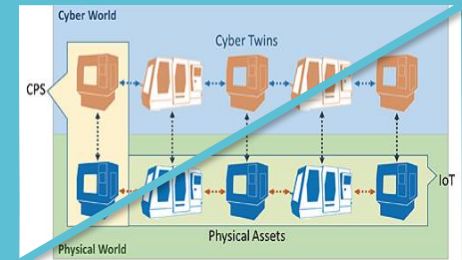
www.cyberphysical systems.org

http://research.ncl. ac.uk/cplab

EU-network of CPSE Labs

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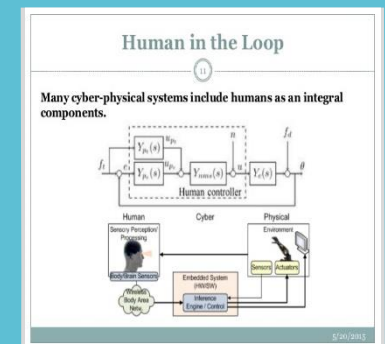
More methods & Tools

## BPML (Business Process Modeling Language), 1960'ties

> Today: BPEL4WS and BPDM (based on BPMN, OMG standard)

> Capture workflows, processes (management, operational, support), actors, information flows, decision points…..

Combine with other methods: Activity Diagrams, CogNIAM, EPC, ARIS, IDEF, etc.

Tools:

> ARIS Express, Signavio, ARCWAY Cockpit, BizzDesign Architect, IBM Rational, …….many more

https://en.wikipedia.org/wiki/Comparison_of_Business_Process_Modeling_Notation_tools
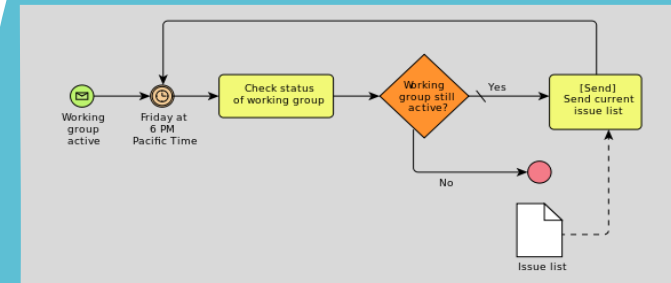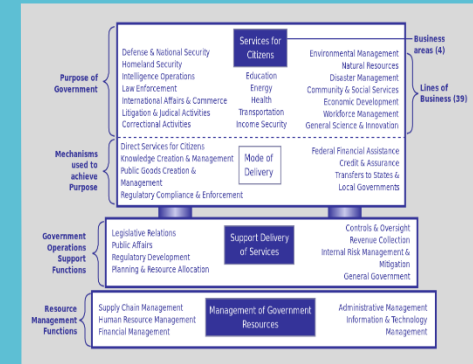
Williams, S. (1967) "Business Process Modeling Improves Administrative Control," In: *Automation*. December, 1967

https://en.wikipedia.org/wiki/Business_process_modeling

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An small example: Integral Gemeente Risk Detection (In-GRiD)

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"Municipal Information Workers in Charge of Citizen's Satisfaction"

> **"we have information, we have know-how, we have heuristics, but we manage on incidents and too late and inconsistent"**

> **Quick wins: map on existing organisation and work practices, but share data and insights and enable learning-from-doing**

> **Translation to an IT-solution: A Double Dashboard (DD)**

> Observe and Be Aware
> Analyse, Decide and Act

> **Result:**

➢ Just re-using what is available already
➢ Work: faster, cheaper, less work
➢ Effect: more collaboration, more understanding, more learning

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In-GRiD

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END

QUESTIONS?

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