

SPT-E8010 Smart and Liveable City Studio

WELCOME!

Today

lecture

course program

readings + mini lecture schedule

working teams

Assignment 1a

Smart cities and smart city planning

3.3.2021 Smart and Liveable City Studio

Dr. Aija Staffans

Aalto University

WHAT IS A SMART CITY?





EPISTEME



KNOWLEDGE, SCIENCE

ENNOIA



MEANING, CONCEPTION

SOFIA



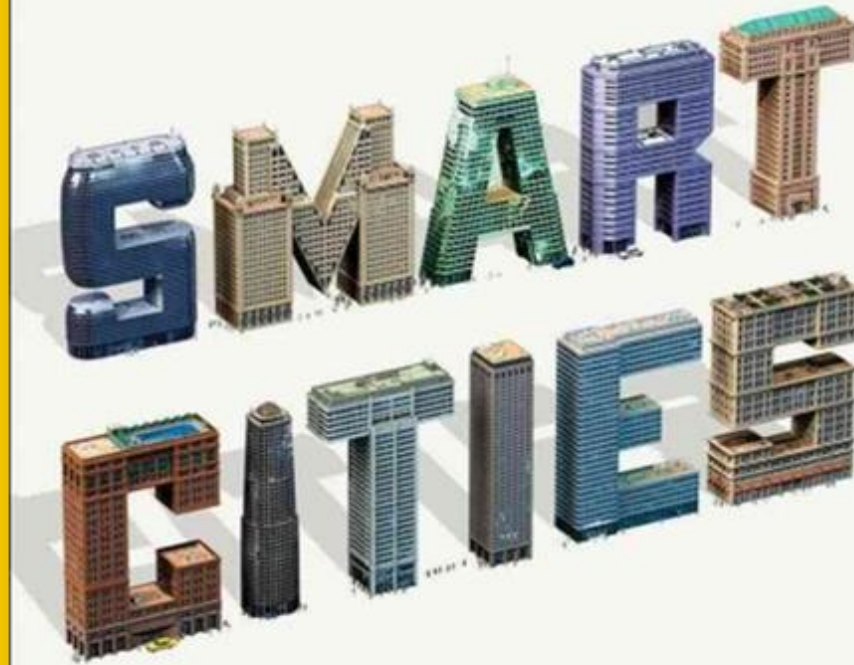
WISDOM

ARETÉ



EXCELLENCE, MORAL VIRTUE

BIG DATA, CIVIC HACKERS, AND THE
QUEST FOR A NEW UTOPIA



ANTHONY M. TOWNSEND
2014

Corporate smart city

In the IBM vision three 'I's are the hard core of any smart city: instrumented, interconnected and intelligent:

Instrumented refers to the capability of capturing live real-world data through the use of sensors, meters, appliances, personal devices, and other similar sensors.

Interconnected refers to the integration of these data into a computing platform that allows the communication of such information among the various city services.

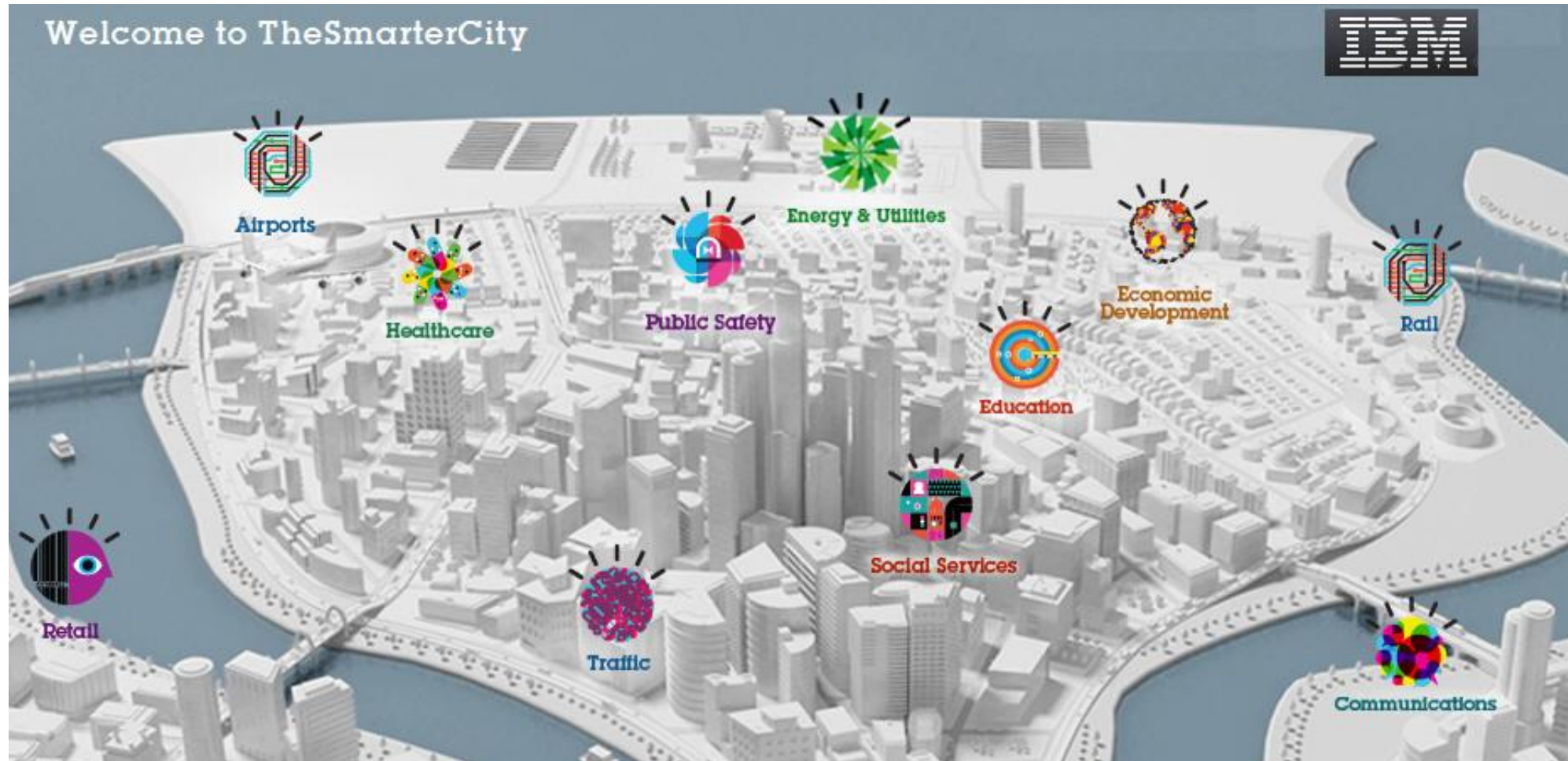
Intelligent refers to the inclusion of complex analytics, modeling, optimization, visualization services and artificial intelligence to make better operational decisions.

<https://smartcityhub.com/governance-economy/smart-city-smart-story/>

Technological advances [now] allow cities to be “instrumented”, facilitating the collection of more data points than ever before, which enables cities to measure and influence more aspects of their operations. Cities are increasingly “interconnected”, allowing the free flow of information from one discrete system to another, which increases the efficiency of the overall infrastructure. . . . To [meet] these challenges and provide sustainable prosperity for citizens and businesses, cities must become “smarter” and use new technologies to transform their systems to optimize the use of finite resources.”

IBM Smarter Cities web page (no longer)

IBM Smarter City “trademark” 2011





DIGITAL NEWS ASIA
Your Eye on the Tech Ecosystem

Digital Economy
powered by 'MDEC'

Insights

'Software Testing is'
Business

Personal
Tech

Local governments urged to apply for IBM Smarter Cities grant

By Digital News Asia October 17, 2013

- **Local govts can get assistance from IBM pro bono problem-solving teams**
- **Applications may be submitted from now until Nov 8, 2013**

IBM said it is extending the Smarter Cities Challenge competitive grants programme, which funds the deployment of IBM's top talent to perform pro bono problem-solving in municipalities worldwide.

The company is encouraging regional governing bodies, not only cities, to also apply for grants that will fund consultative engagements with IBM experts in 2014.

According to IBM, Malaysia's first recipient of the 2013 grant was the state of Negeri Sembilan, where a project was concluded on Oct 17.

The Smarter Cities Challenge began in 2011, and since then, IBM has deployed 600 experts on six-person teams who have provided strategic and practical advice to 100 municipalities, the company said in a statement.

These three-week engagements, each valued at US\$400,000, have helped cities address key challenges in the areas of economic development; water, energy and environment; health and social services; transportation; and public safety, IBM said.

During engagements, IBM teams spend three weeks in the winning region gathering and analysing all available data, then meeting in person with dozens of members of the government, citizen, business, and not-for-profit communities.



<https://www.digitalnewsasia.com/digital-economy/local-governments-urged-to-apply-for-ibm-smarter-cities-grant>



Cutting edge intelligence for smart city leaders



Connect with smart city leaders worldwide



Governance and economy / 2017-11-29

Smart city: smart story?



Connect with smart city leaders worldwide



Recent Posts

Helsinki aims to use personal data on citizens' terms

North American organizations invest in healthier buildings

Smart city initiatives will push 5G chipsets market

City of Hamburg searching for most innovative startups

<https://smartcityhub.com/governance-economy/smart-city-smart-story/>

Corporate storytelling

Ola Söderström, Till Paasche and Francisco Klauser 2014

“IBM’s influential story about smart cities is far from novel but rather mobilizes and revisits two long-standing tropes: **systems thinking and utopianism.**”

“Two critical questions raised by this discourse:

- technocratic reductionism and
- the introduction of new moral imperatives in urban management.”

“Calling for the crafting of **alternative smart city stories**”

Reductionism is an approach to understanding the nature of complex things by reducing them to the interactions of their parts, or to simpler or more fundamental things.

Smart cities as corporate storytelling

Ola Söderström, Till Paasche & Francisco Klauser, 2014

“from technology to the people”

Democracy, participation, urban design, ICT, and telecommunication are all components of the new strategic vision for cities. The problem of choosing the correct approach involves the culture and idea of the city for tomorrow. **Which city do we want for tomorrow?** For answering this question, the necessary approach is to shift the focus **from technology to the people**.

Zubizarretta et al 2016

Smart City Concept: What It Is and What It Should Be
Iker Zubizarreta, Alessandro Seravalli and Saioa Arrizabalaga, 2016

Building smart city solutions

By Mazlan Abbas | 5 minute read | October 28, 2016



The main theme of many Smart Cities conferences nowadays is people. The reason is that the millions of people who live in cities have different perspectives and priorities, meaning that offering new Smart City solutions to suit these diverse needs can be very tricky. A successful Smart City implementation in one country does not necessarily mean it can be easily replicated in another city.

Read More



<https://www.ibm.com/blogs/internet-of-things/building-smart-city-solutions/>

Disruptive movement?

Michael Batty 2016

“Classic disruption, as Christensen (1997) argues, comes from bottom-up, non-established, small initiatives that somehow innovate first under the radar and suddenly pose a threat to established ways of doing things.”

“...the emergence of smart phones to reach the point where communications between customer and suppliers in cities have become possible without the kind of elaborate organisation that has been developed over many years for such services.”

How disruptive is the smart cities movement?

Michael Batty 2016

Smart City /EU

Smart people

(Social and Human Capital)

- Level of qualification
- Affinity to life long learning
- Social and ethnic plurality
- Flexibility
- Creativity
- Cosmopolitanism/Open mindedness
- Participation in public life

Smart environment

(Natural resources)

- Attractivity of natural conditions
- Pollution
- Environmental protection
- Sustainable resource management

Smart mobility

(Transport and ICT)

- Local accessibility
- (Inter-)national accessibility
- Availability of ICT-infrastructure
- Sustainable, innovative and safe transport systems

Smart economy

(Competitiveness)

- Innovative spirit
- Entrepreneurship
- Economic image & trademarks
- Productivity
- Flexibility of labour market
- International embeddedness
- *Ability to transform*

Smart living

(Quality of Life)

- Cultural facilities
- Health conditions
- Individual safety
- Housing quality
- Education facilities
- Social cohesion
- Touristic attractivity

Smart governance

(Participation)

- Participation in decision-making
- Public and social services
- Transparent governance
- *Political strategies & perspectives*

Integration needed, but...

“The difficulty to translate the integrated approach to Smart City, widely shared in recent scientific literature, from the theoretical level into practice is clearly demonstrated not only by **the sectorial approach that still characterizes European initiatives** but also by the results up to now achieved by cities in the different sectors mentioned above.”

“The most interesting aspect arising from such a classification is that none of the European and the Italian cities is at the top of the ranking in all sectors identified as crucial for a Smart City: most of them has high values in one or in two of the mentioned sectors.”

R. Papa, C. Gargiulo, A. Galderisi 2013

Towards an Urban Planners' Perspective on Smart City
Rocco Papa, Carmela Gargiulo, Adriana Galderisi, 2013

Barcelona

SMARTCITY

LIVE 2020

BY SMART CITY EXPO WORLD CONGRESS

A UNIQUE EVENT & A GREAT SUCCESS

With 80+ sessions and hundreds of inspiring speakers, Smart City Live 2020 was an amazing event. You can still experience this global celebration of creativity by viewing the best of the sessions on demand

Watch #SCLive2020 on demand

<https://www.smartcityexpo.com/>

Amsterdam Smart City



**Let's create
better streets,
neighbourhoods
and cities**

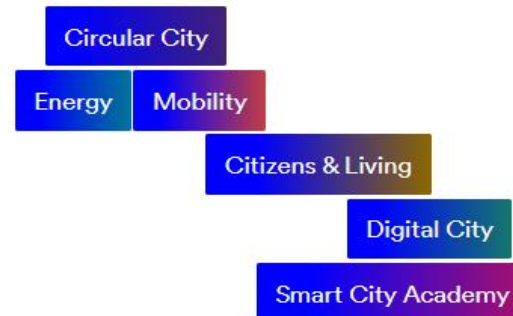
To ensure a liveable urban future, we need smart solutions and collaboration. Our innovation platform connects the people who build the cities of tomorrow.

[More about us](#)

[Join the community →](#)

Channels

For each important theme in the city you can follow a lively channel.





Urban planning and building / 2017-05-31

Songdo, model of the smart and sustainable city of the future

<https://smartcityhub.com/urban-planning-and-building/songdo-model-of-the-smart-and-sustainable-city-of-the-future/>



 **SMART CITY HUB**

Connect with smart city leaders worldwide



Recent Posts

[Helsinki aims to use personal data on citizens' terms](#)

[North American organizations invest in healthier buildings](#)

[Smart city initiatives will push 5G chipsets market](#)

[City of Hamburg searching for most innovative startups](#)

[Cities pledge to adapt to climate change](#)

SHARE THIS:

 Tweet
  Share 2
  Share
  WhatsApp

Songdo International Business District in South Korea is a prime example of a new city that brings together the world's best technologies, building design and eco-friendly practices to create the ultimate lifestyle and work experience. Built from the ground up on reclaimed land near the Yellow Sea, the \$35-billion-dollar Songdo project is a model for smart cities around the

FINEST TWINS KICK-OFF

16

9

Estonian Government (Ministry of
no. 856602).



FINEST KICK-OFF

This project has received funding from the Estonian Government and European Commission (H2020 grant no. 856602).

FINEST Twins

EU Teaming Grant of 32m€

Center of Excellence for Smart Cities

Taltech-Aalto 2019-2026

<http://www.finesttwins.eu/>

Planning and design in/for the
smart city:

Smart city planning?

Computational city, City science

Computers in urban planning and urban management (CUPUM)

“scholarly community”: spatial analysis, urban modelling, simulation, public participation GIS, visualization, quantitative analysis of urban phenomena (i.e. migration, energy consumption, traffic...) *Stan Geertman 2015*

<https://www.cupum2021.org/>

“In a recent survey of ‘big data and urban science’, Batty defined the scope of “centres which have an established presence” as “ a cluster of 4 or more significant individuals working in **the domain of computer applications to cities**”. He identified the following categories of centers:

- established and emerging centers identified with **urban informatics** and science,
- **GIS** labs (geographic information systems) with a strong urban science component,
- centers focusing on **urban simulation**,
- **digital media centers** that focus on the urban realm,
- computer science labs that focus on **urban mobility**,
- **complexity research centers** with a focus on urban science.”

Anthony Townsend 2015

”Expanded urban planning”

Staffans & Horelli 2014
Eräranta & Staffans 2015

practice

presumption



EXPANDED URBAN PLANNING An integrative practice

Multi-dimensional

Systemic integration of institutional planning silos and local practices of everyday life

Multi-scalar

Continuously scaling learning process, from political agendas to ex-post evaluations, from global to local

Multi-vocal

Multiple participations, balancing the formal, semiformal and informal activities, processes, partnerships, discourses, spaces and spheres

normative goal

SMART CITY VISION

SUSTAINABLE AND LIVEABLE COMMUNITY

Smart people
Smart living
Smart environment
Smart mobility
Smart governance
Smart economy



**SMART
CITY
PLANNING**

methodological frame

Data aquisition

Smart people

Smart living

Smart mobility

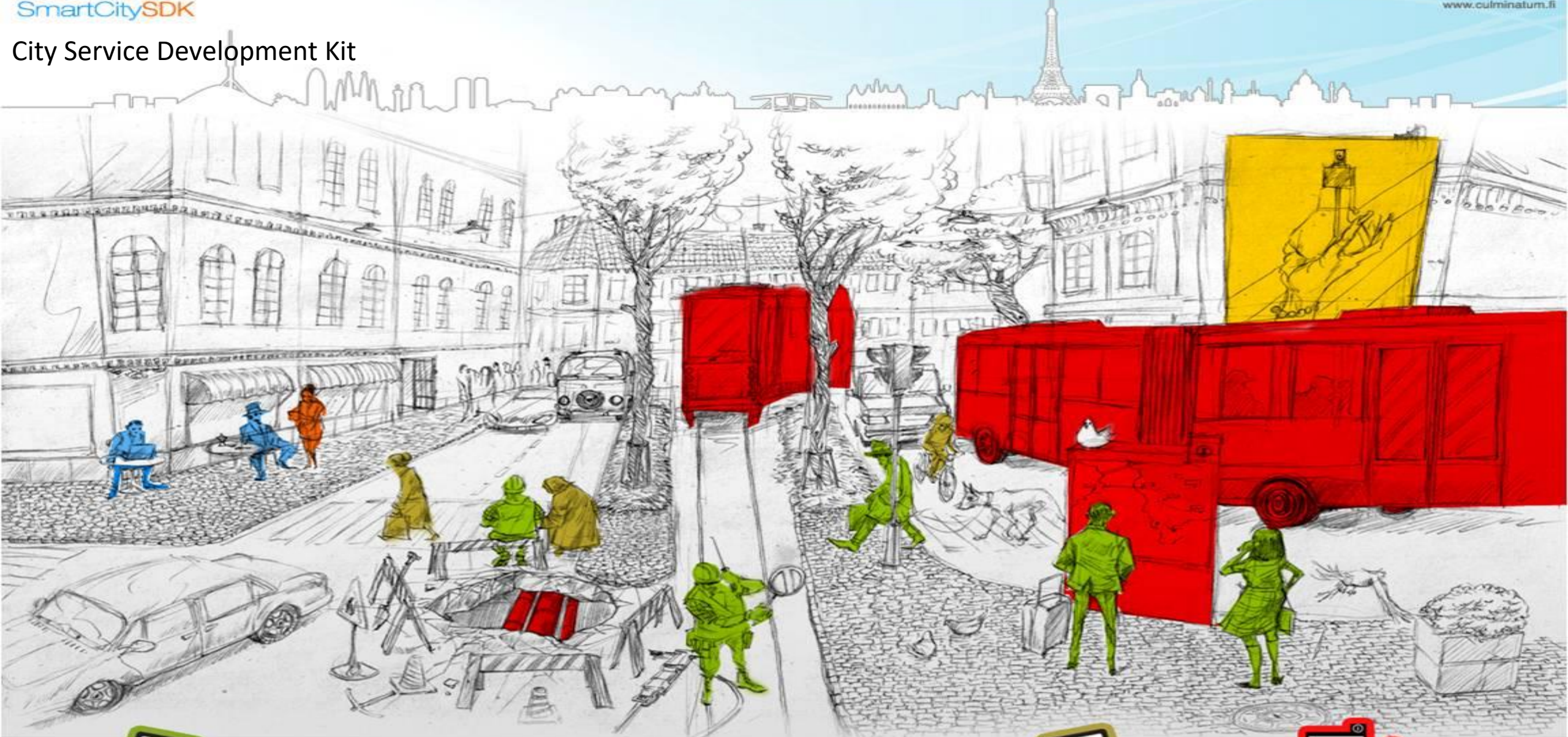
Smart environment

Smart economy

Smart governance

10.3.2021

City Service Development Kit



10.3.2021
Smartphones



NFC/RFID



Aija Staffans / Department of Built Environment
Web



Open Data



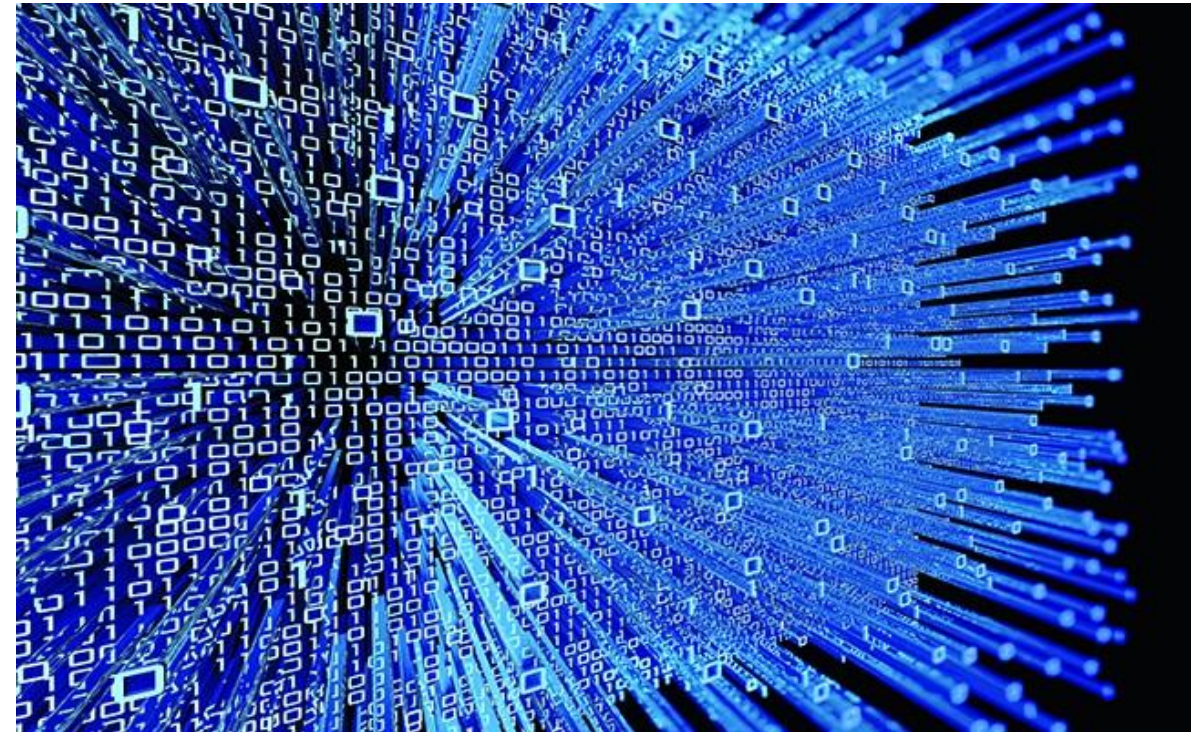
SMS



Public Digital Displays

BIG DATA – urban informatics

See: Thakuria et al. 2016. Big data and urban informatics



SOCIAL MEDIA

The Facebook logo, consisting of the word "facebook." in white lowercase letters on a dark blue background.

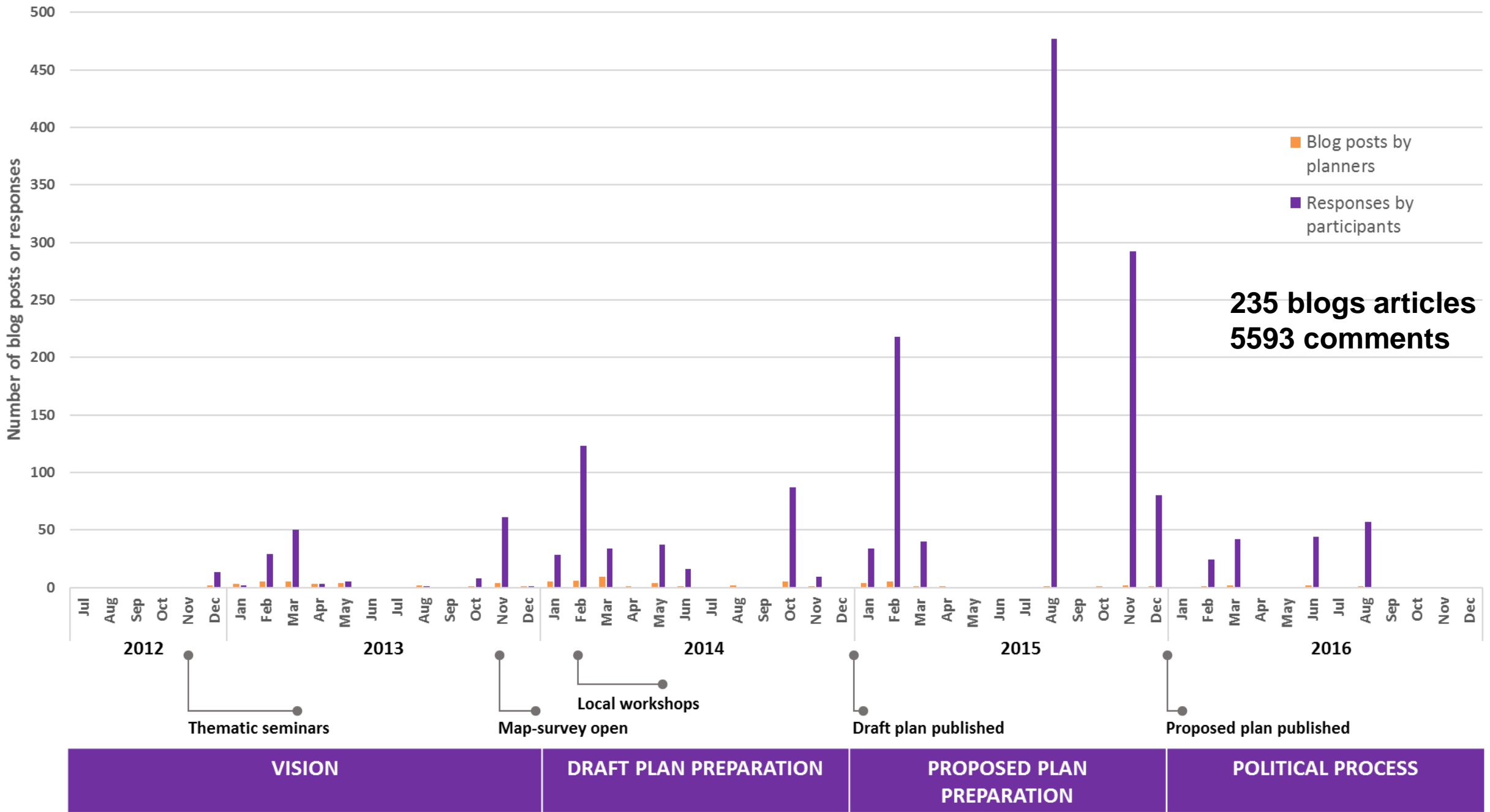
Instagram



Institutional data gathering (Case Helsinki Master Plan)



3745 respondents
ca 33 000 place markings



Participation in the Helsinki Master Plan process 2012-2016:

Ca 1500 participants in seminars and workshops

Ca 3700 respondents in the map survey

235 blogs articles, ca 5600 comments

Ca 2600 opinions and objections in the draft and proposal phases

4 interaction reports

50 appeals to Helsinki Administrative Court

20 appeals to Supreme Administrative Court

After all this: several key elements of the Helsinki City Plan were stated as illegal

So, how should we work with all this data?

Urban informatics

Data – information – knowledge

Modeling – simulation

Visualisation

Planning and decision support systems

Data acquisition

Smart people

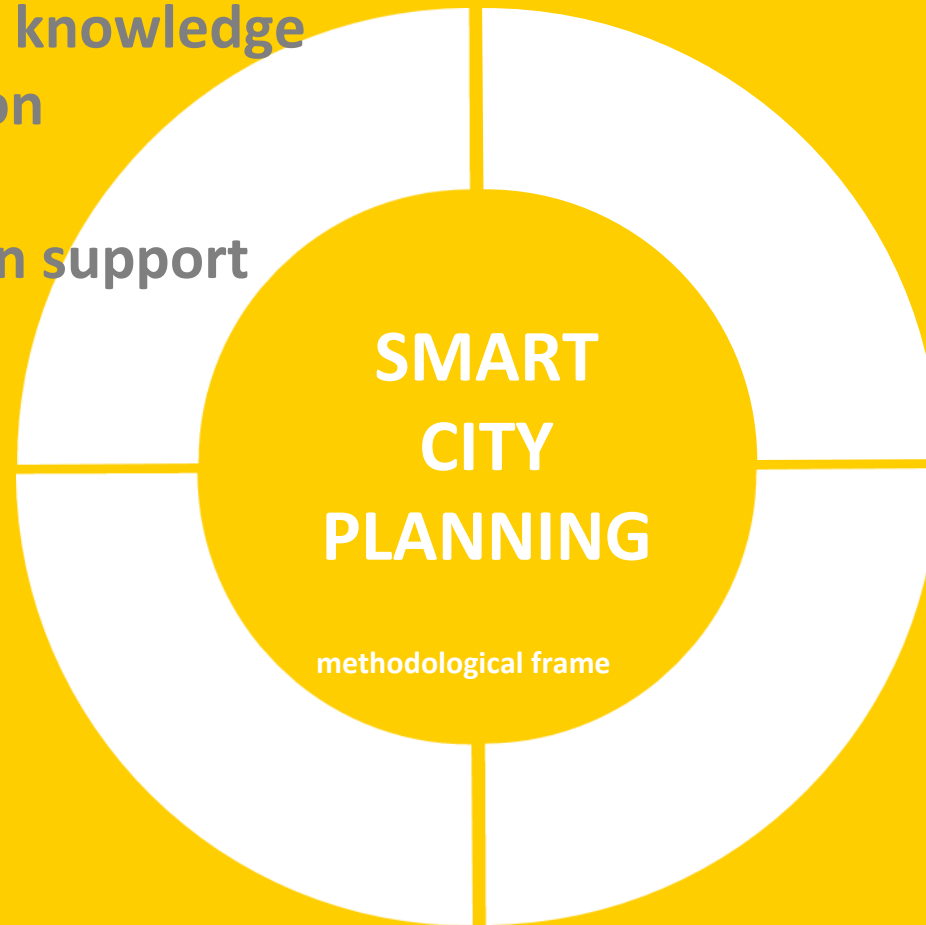
Smart living

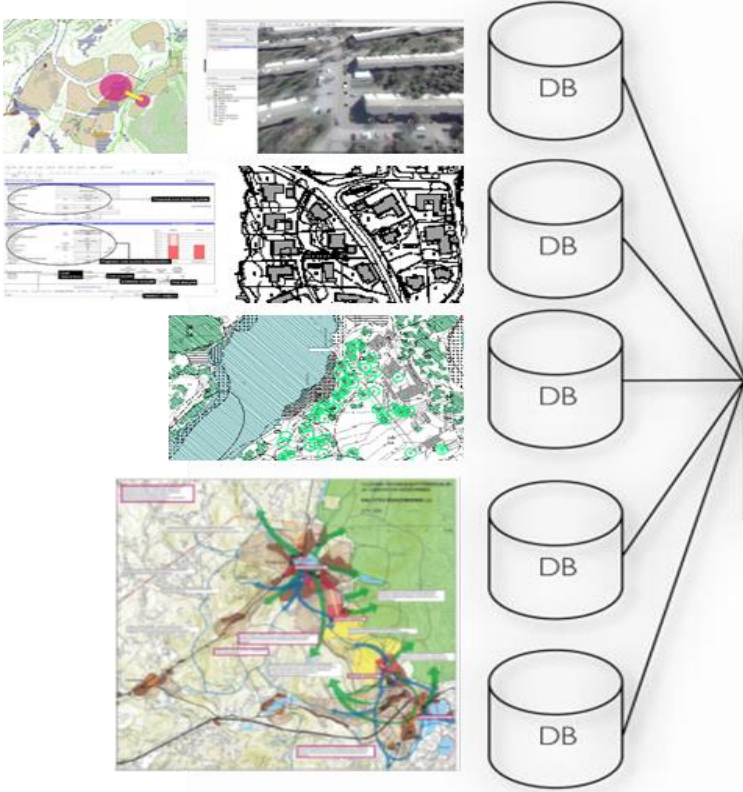
Smart mobility

Smart environment

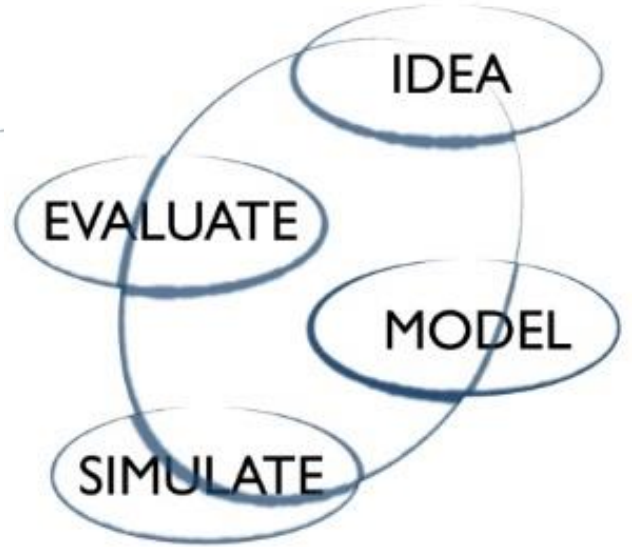
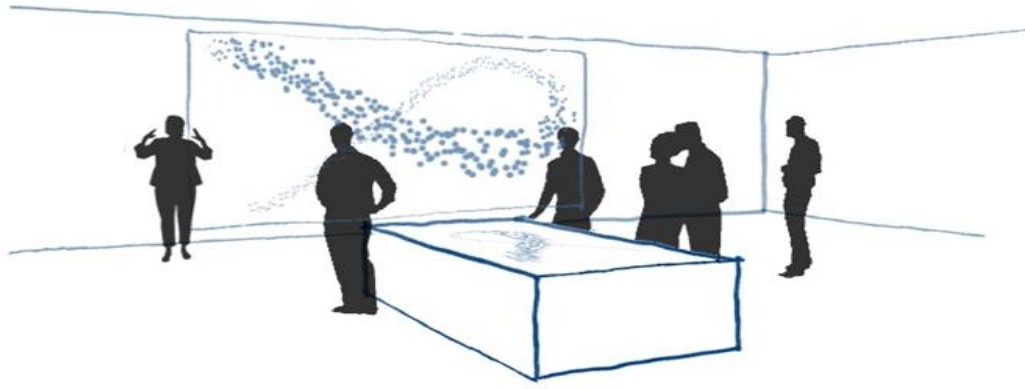
Smart economy

Smart governance

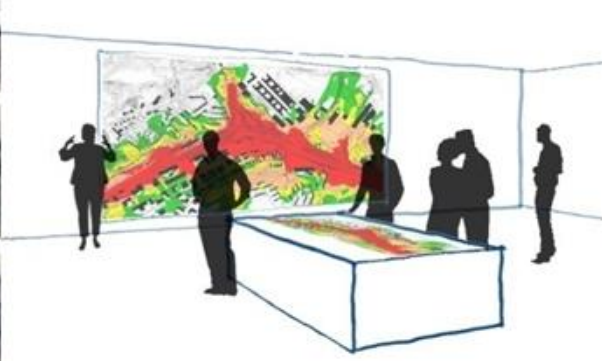
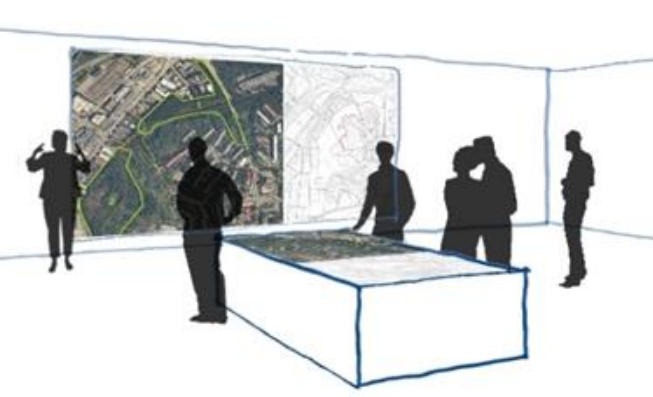




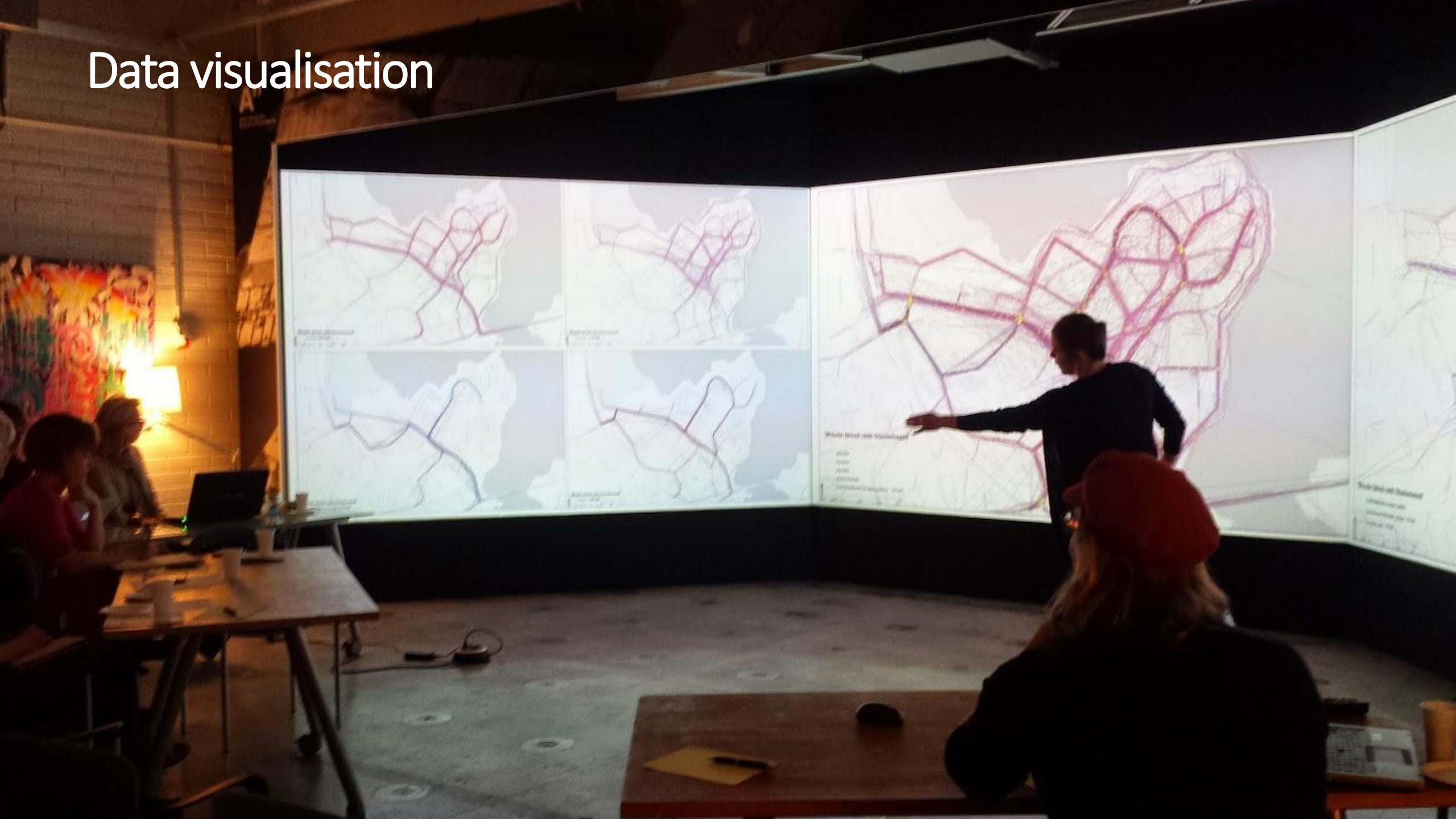
First visions in 2010



New collaborative planning and design environments are needed



Data visualisation



Data visualisation



Few remarks & questions

- Adaptability and flexibility between
 - *Offices*
 - *Education*
 - *Research?*
- Shared use inside Aalto (ENG and c...)
- External users and partner companies
Industrial Internet Campus?

Space experience



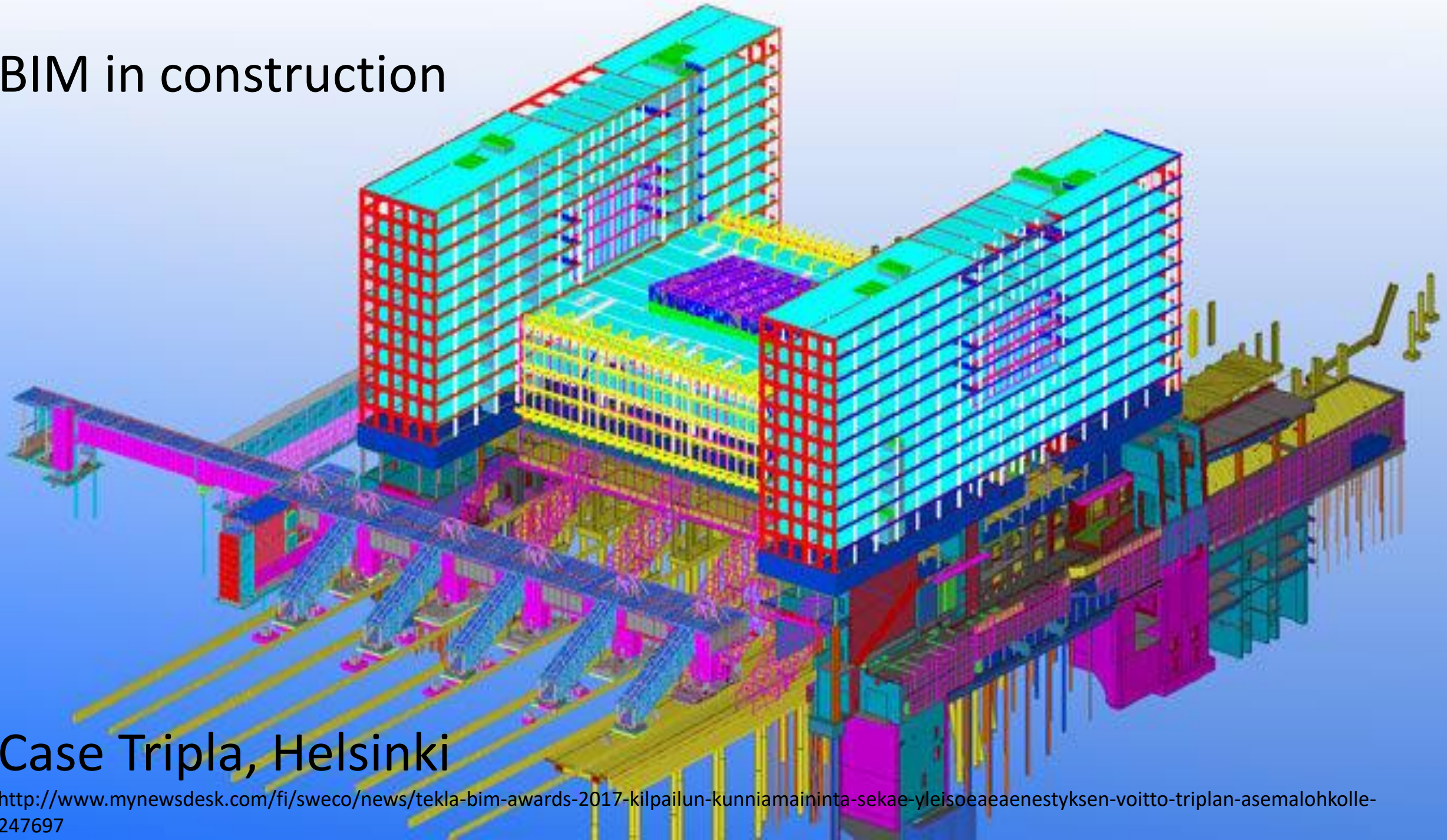
Space experience

Master thesis of Elisa Andretti 2014



Aija Staffans / Department of Built Environment

BIM in construction



Case Tripla, Helsinki

<http://www.mynewsdesk.com/fi/sweco/news/tekla-bim-awards-2017-kilpailun-kunniaininta-sekae-yleisoeaaenestyksen-voitto-triplan-asemalohkolle-247697>



CITY INFORMATION MODELS

Need for more interactive planning tools!



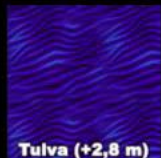


Ortokuva



Rakennettavuus

valkoinen tausta



Tulva (+2,8 m)



500 metriä



pistetalo



pikanäppäin: 1

lamellitalo



pikanäppäin: 2

pienkerrostalo



pikanäppäin: 3

konttitalo



pikanäppäin: 4

puu



pikanäppäin: 9



PLAN-P prototype

by ABE/Petri Kangassalo

Aija Staffans / Department of Built Environment

MITTAA

10.10.2015
10.3.2021
klo 12

Uusi kerrosala (kem²)

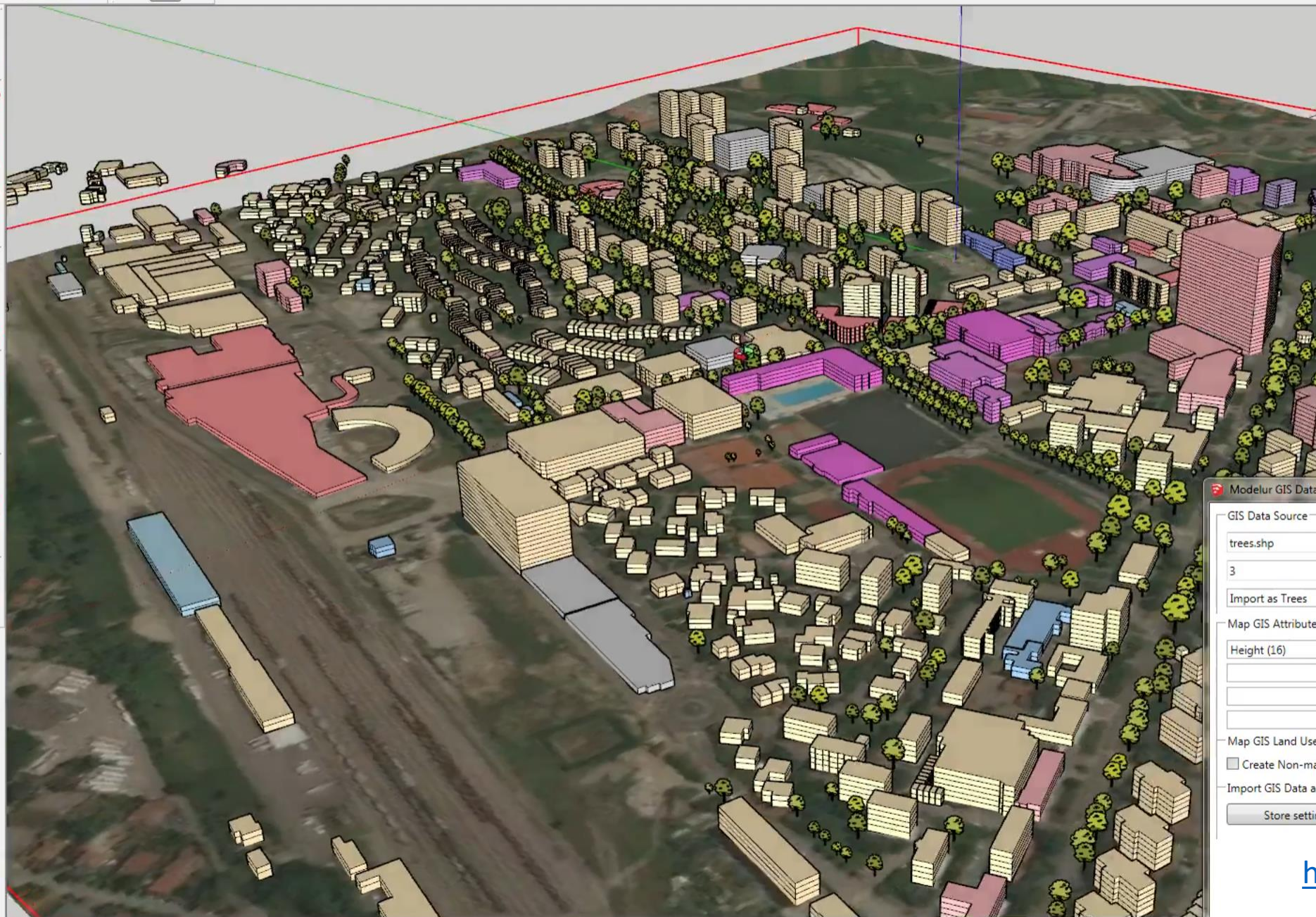
rakennukset: 0
alueet: 0
tavoite: 300000





CITIES SKYLINES®

<https://www.origin.com/fin/en-us/store/cities-skylines/cities-skylines>



Modelur 2018.3.0 (GIS Alpha 1) - Professional

File Tools Options Help

Whole Plot City Block Land Use Building Survey

LAND USE REQUIREMENTS

Add Remove Edit

Land Use: Residential

Color: #ffeabb

Add this Land Use values to the sum total
 Add only Parking values to the sum total

UNITS

Primary Unit: Apartment
 Secondary Unit: Resident

NET FLOOR AREA (NFA) CALCULATION

NFA Factor Internal:	70 %
NFA Factor Terrace:	25 %
NFA Factor Loggia:	75 %

UNITS CALCULATION

GFA per Apartment: 75.00 m²
 NFA per Apartment: m²
 Residents per Apartment: 3.00

PARKING SPACE (PS) CALCULATION

Modelur GIS Data Importer

GIS Data Source

trees.shp SET GIS DATAFILE

3 9 Offset X and Y

Import as Trees

Map GIS Attributes to Modelur Parameters

Height (16)	=> Tree Height
	=> ? Tree Species
	=> ? Trunk Diameter
	=> GIS UUID

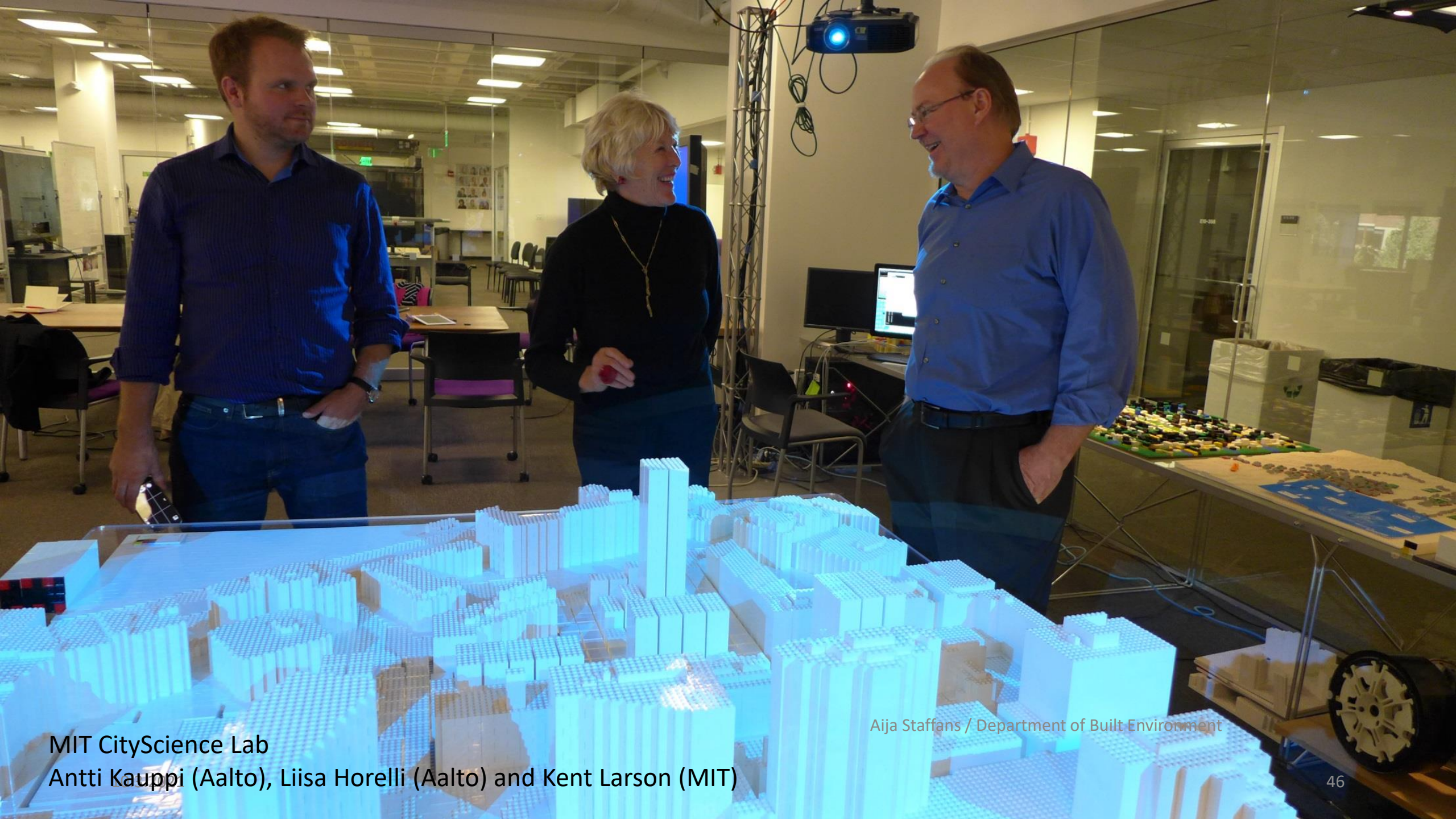
Map GIS Land Uses to Modelur Land Uses

Create Non-mapped Land Uses

Import GIS Data and Store Settings

Store settings... Import settings... IMPORT GIS DATA

<https://modelur.eu/>



MIT CityScience Lab
Antti Kauppi (Aalto), Liisa Horelli (Aalto) and Kent Larson (MIT)

Aija Staffans / Department of Built Environment





How do we understand what is happening in our urban environment?

What do we know about the ongoing processes?

Impacts of planning and design?

Urban informatics

Data – information – knowledge
Modeling – simulation
Visualisation
Planning and decision support systems

Data acquisition

Smart people
Smart living
Smart mobility
Smart environment
Smart economy
Smart governance

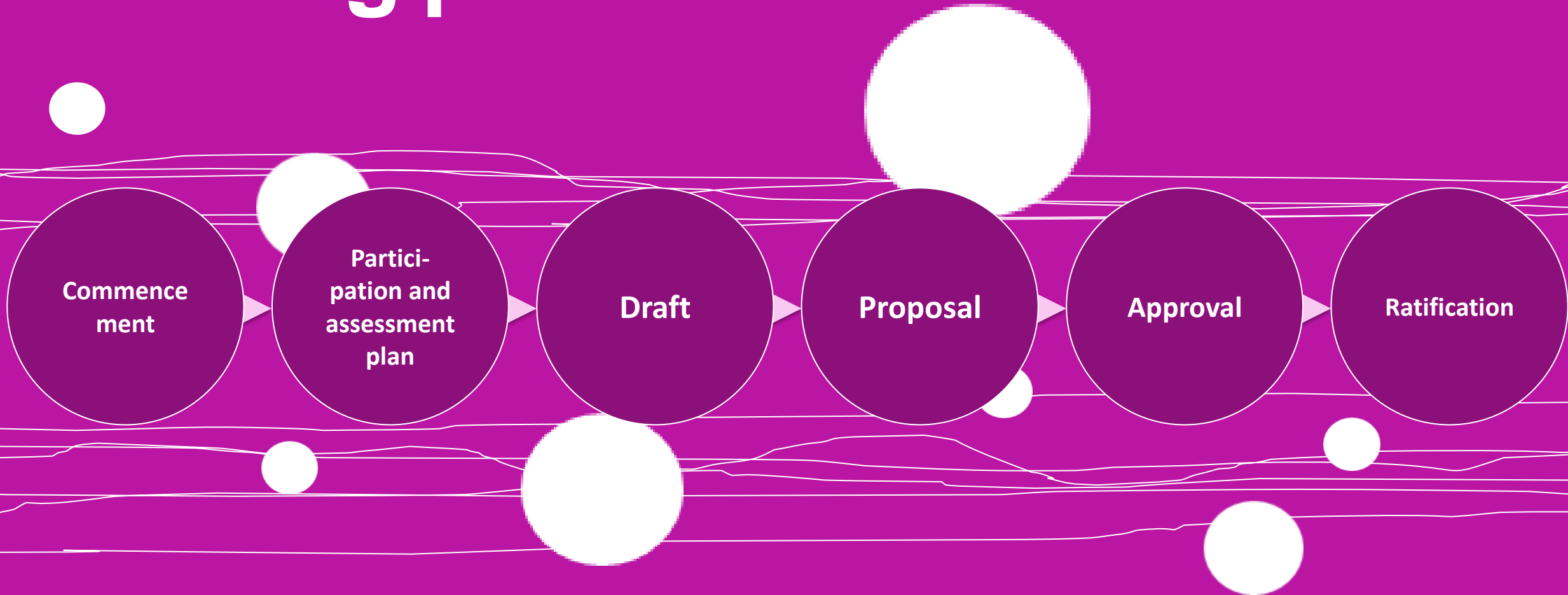
10.3.2021



Process

Process memory
Process documentation
Diverging & converging
Situation awareness
Systems thinking

Planning process in Finland

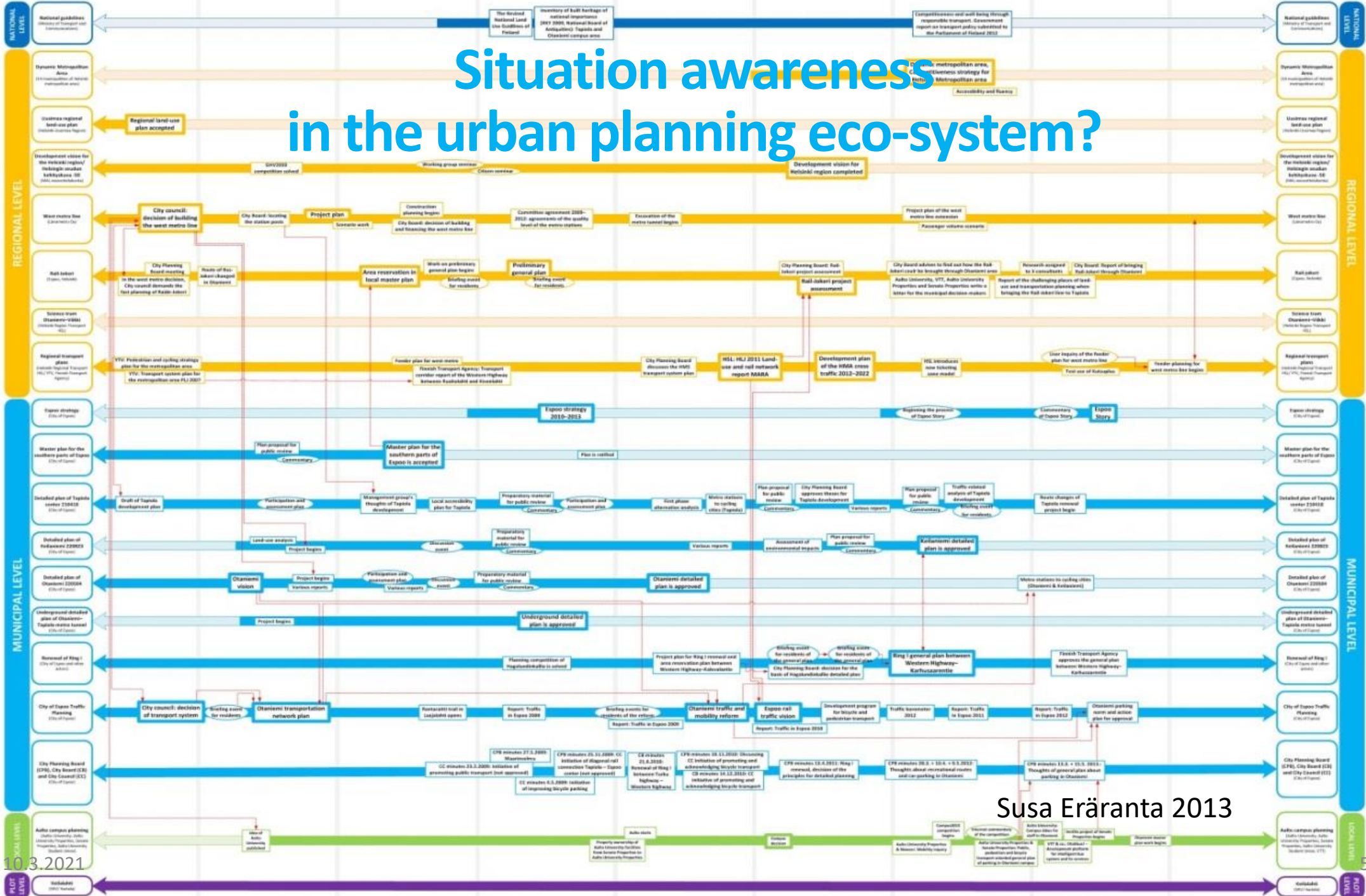


Land Use and Building Act 2000

Situation awareness in the urban planning eco-system?

T3 MOBILITY PLANNING ECOSYSTEM

T3 MOBILITY PLANNING ECOSYSTEM



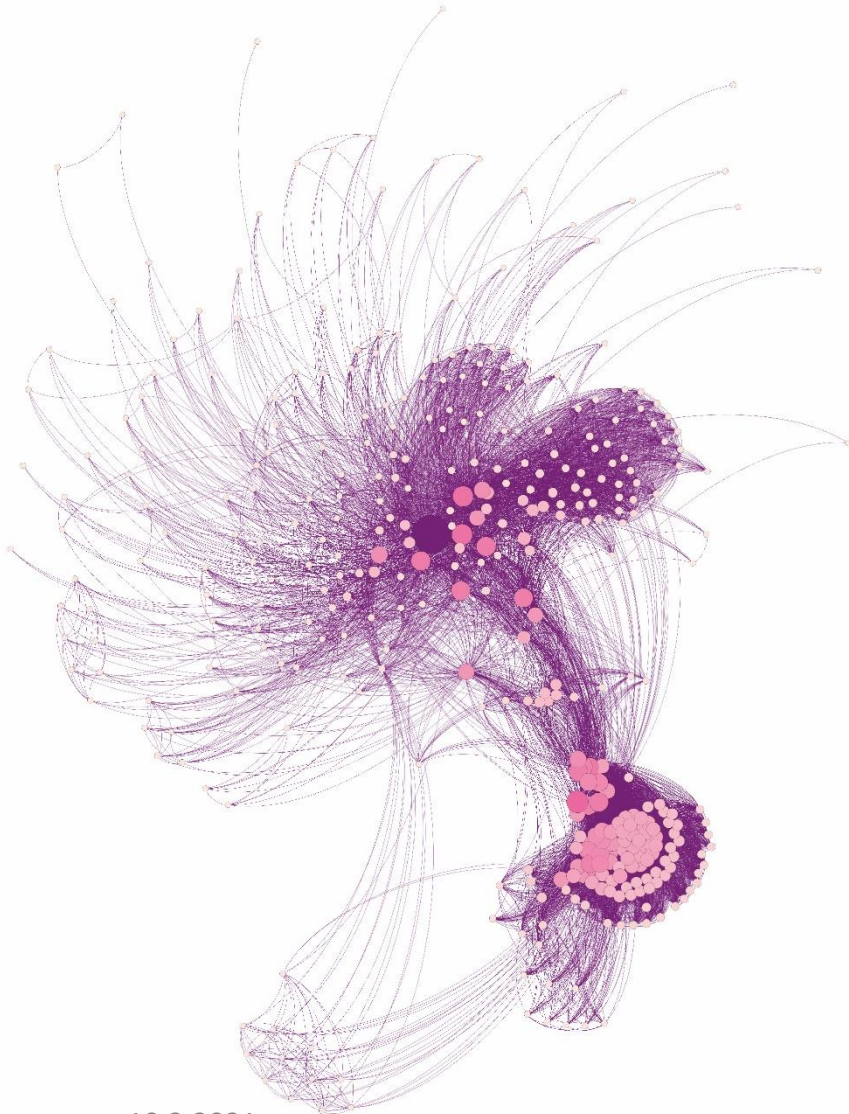
Susa Eräranta 2013

10.3.2021

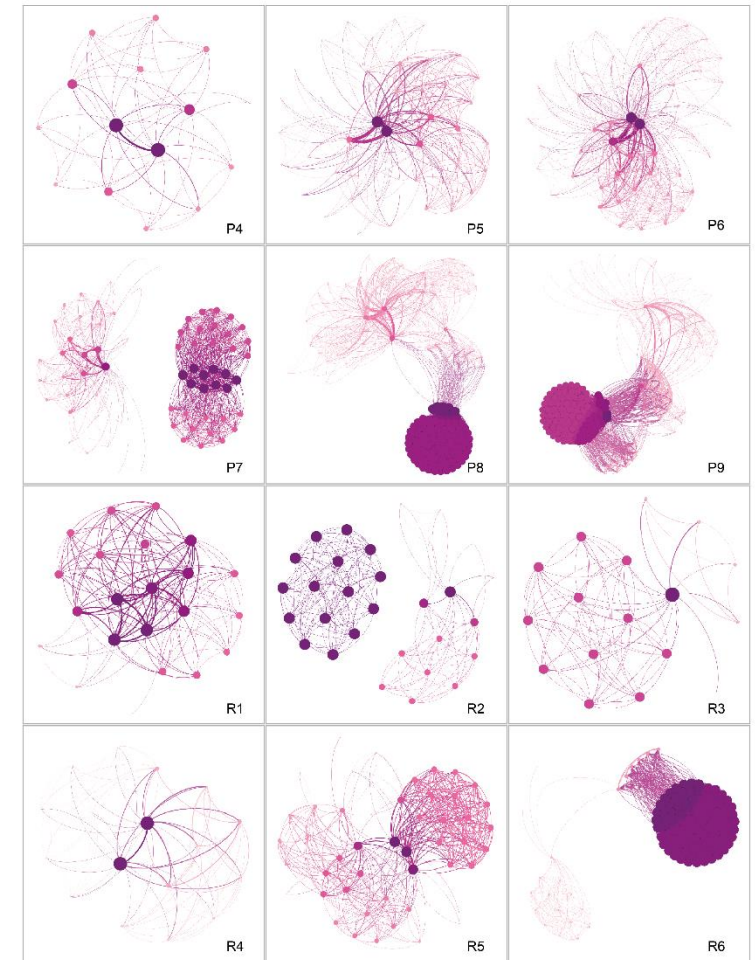
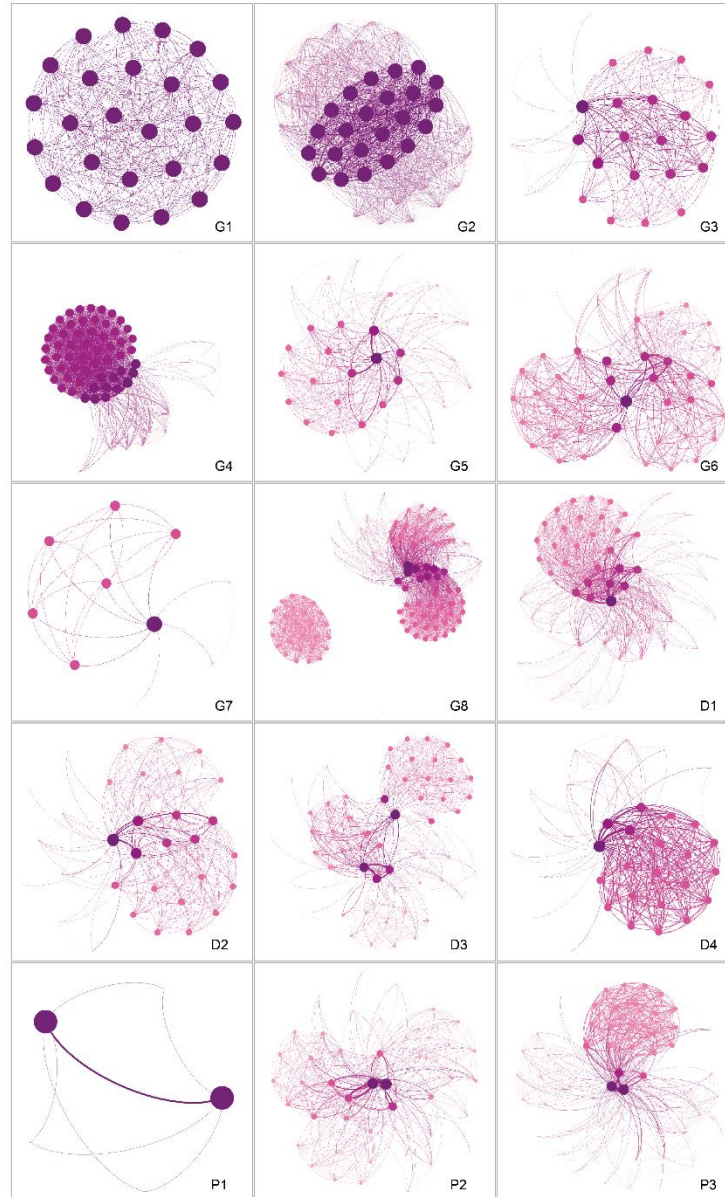
53

Knowing the process

Susa Eräranta 2019



10.3.2021



**Social network analysis of a planning process
by Susa Eräranta 2019 (doctoral thesis)**

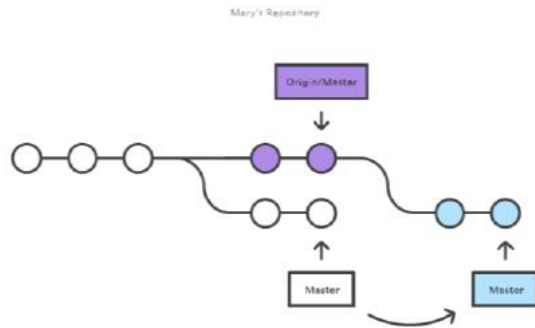
<https://aaltodoc.aalto.fi/handle/123456789/36177>

Knowing the process

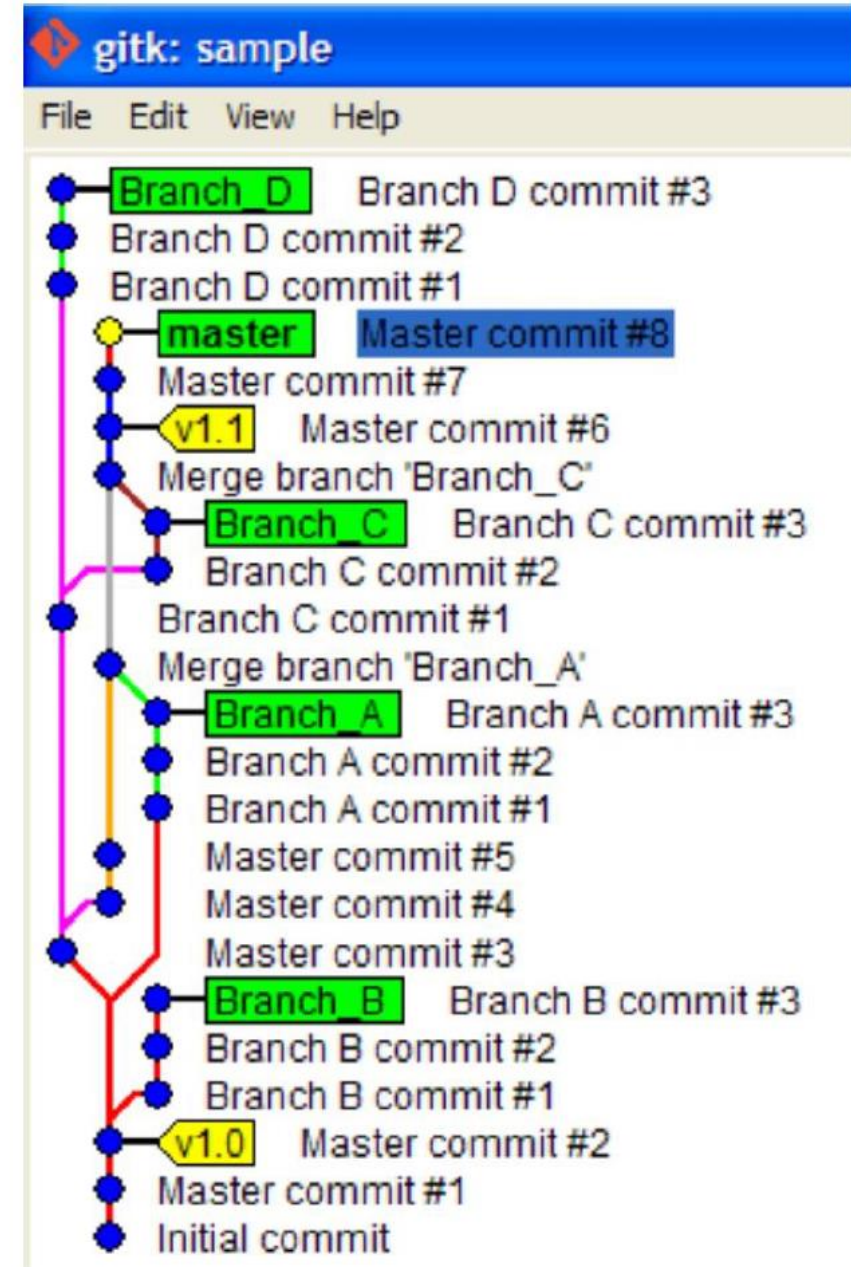
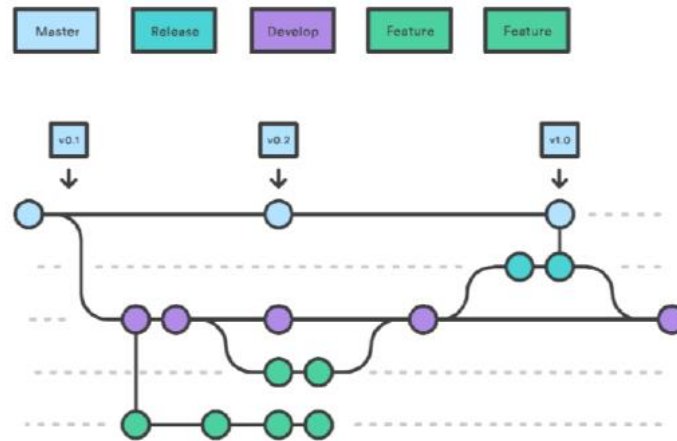
Otso Helenius 2020 (ongoing doctoral study)

Examples of version control

Centralized workflow



Git workflow





Towards Communication-Oriented and Process-Sensitive Planning Support
 Staffans, Kahila-Tani, Geertman, Sillanpää & Horelli, 2020

How do we work together with all this?

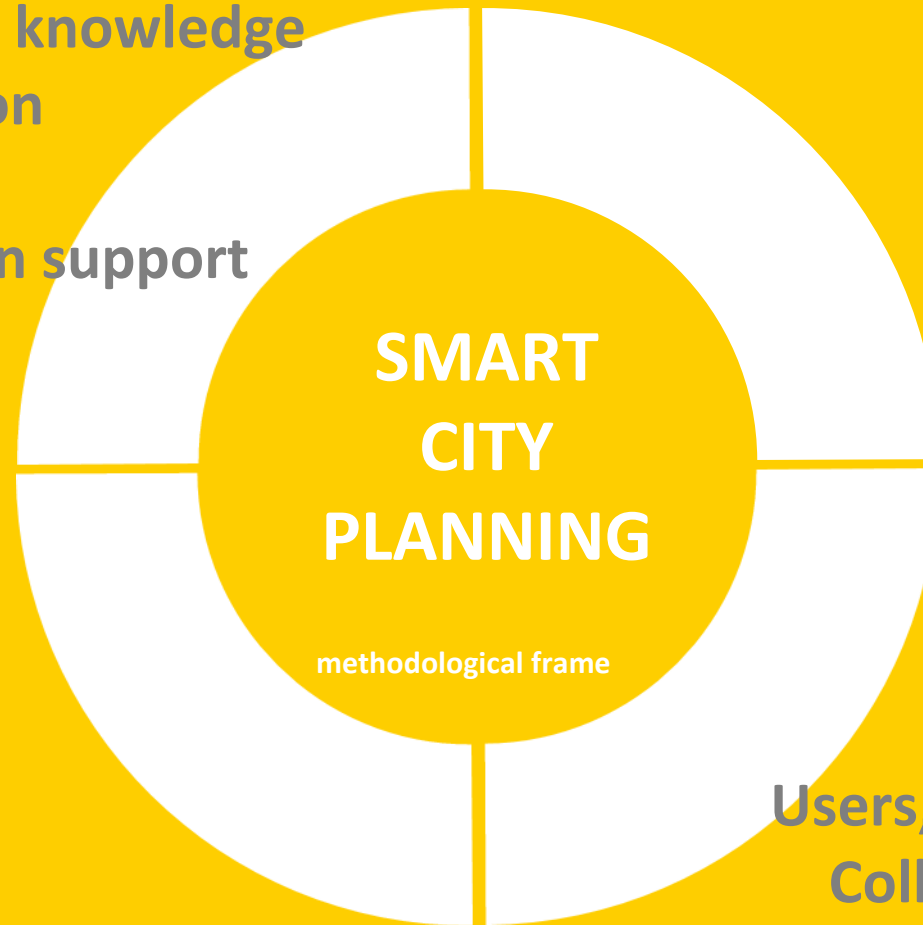
Urban informatics

Data – information – knowledge
Modeling – simulation
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Smart governance

10.3.2021

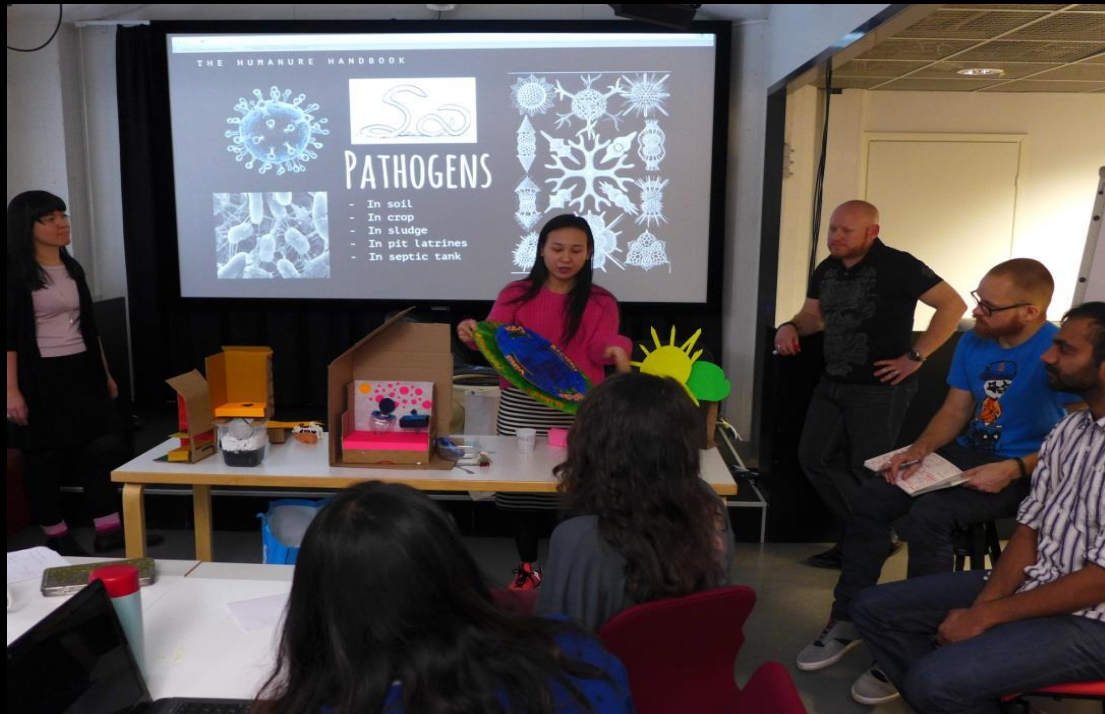


Process

Process memory
Process documentation
Diverging & converging
Situation awareness
Systems thinking

Communication

Human/user-centeredness
Stakeholder involvement
Users, politicians, professionals
Collaboration & participation
Face-to-face discussions
Multiple channels & platforms





MOHAMED

HUSSEIN

YOUNUS

IVEN

D
SNOOPY



Scanning

24:43

Task: ...
Date: ...
Group: ...
Name: ...
Date: ...
Name: ...
Date: ...
Name: ...
Date: ...
Name: ...
Date: ...

The Big Room concept: Using Building Team collocation to ensure project success

Implementing collocation via the Big Room concept will remove silos, promote collaboration, and elevate your chances for success.

SEPTEMBER 30, 2014 | STEPHEN POWELL AND MAGNUS NILSSON, CBRE HEALTHCARE

<https://www.bdcnetwork.com/big-room-concept-using-building-team-collocation-ensure-project-success>



ABE
Aalto Built Environment Lab



ABE

Aalto Built Environment Laboratory



Studio room of 80 m². Display array consisting of a large screen and a high performance PC. Seats and desks for circa 35 persons.

SPACE



Advanced digital tools, information models, interactivity, rich data use.

TOOLS



Face-to-face communication, professional facilitation, knowledge co-creation.

CO-WORKING



Vaihtoehto B (IRR = 13.7%)



Vaihtoehto A (IRR = 2.2%)



2020

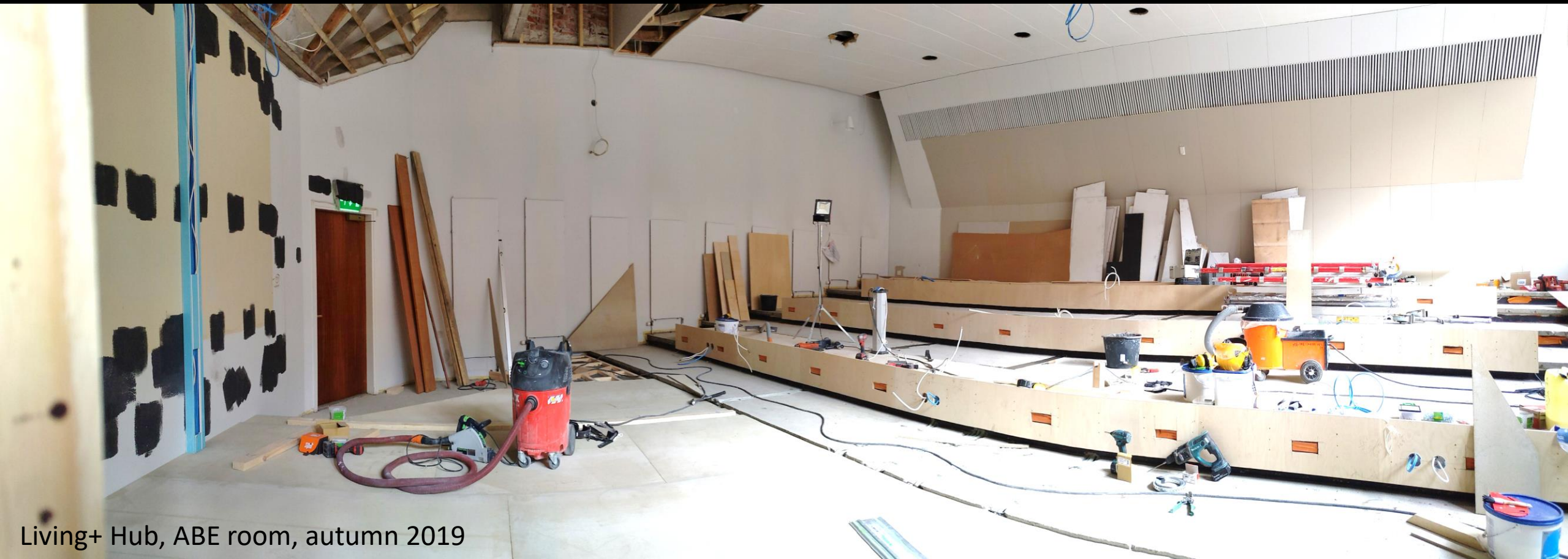
Keskuskorttelit
Rautatieasema

A-INSINÖÖRIT



Co-creation in Skanska cave 1.11.2018





Living+ Hub, ABE room, autumn 2019

Human interaction and collaboration supported by advanced technology



SPT-E8010 Smart and Liveable City Studio
spring 2021
program, readings and teams

Program

	LECTURES	MINI LECTURES	ASSIGNMENTS
WEEK 9, 3.3.2021	Lecture		Assignment 1a, dl 9.3.
WEEK 10, 10.3.2021	Lecture		Assignment 1b, dl 23.3.
WEEK 11, 17.3.2021	Lecture		Tutoring 1b
WEEK 12, 24.3.2021	Lecture		Assignment 2a-c, dl 30.3., 6.4.,9.4.
WEEK 13, 31.3.2021		Four mini lectures	
WEEK 14, 7.4.2021		Four mini lectures	
WEEK 15, 12.-16.4.2021	INTENSIVE WEEK, Assignments 3 and 4a-b		
WEEK 16, 21.4.2021	Lecture		Assignment 5
WEEK 17, 28.4.2021		Three mini lectures	
WEEK 18, 5.5.2021	Lecture		Assignment 6, dl 18.5.
WEEK 19, 12.5.2021		Three mini lectures	Tutoring Ass. 6
WEEK 20, 19.5.2021			Assignment 7, dl 25.5.
WEEK 21, 26.2021	Lecture		
WEEK 22, 2.6.2021	Lecture		

Readings and mini lecture schedule

Smart cities

31.3.

Söderström et al. 2014

Smart Cities and Sustainability Initiative (APA)

Hollands 2014

Sterling 2018

Liveable cities

7.4.

Lowe et al. 2015

Arundel et al. 2017

Kotkin 2009

Liu et al. 2017

Smart city planning (planning & ICT)

28.4.

Kunzmann 2014

Karvonen et al. 2020

Thakuriah et al. 2016

12.5.

Potts 2020

Zellner and Campbell 2015

Assignment teams

1.

Kaisa Piik

Pinja Pirinen

Phong Truong

2.

Nikolay Krupen

Mari Niemelä

Matti Pönkänen

3.

Minttu Iivonen

Valtteri Lammassaari

Ella Uotila

Cheng-Xi Zhan

4.

Antti Kivikko

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