

Socio-Inspired ICT

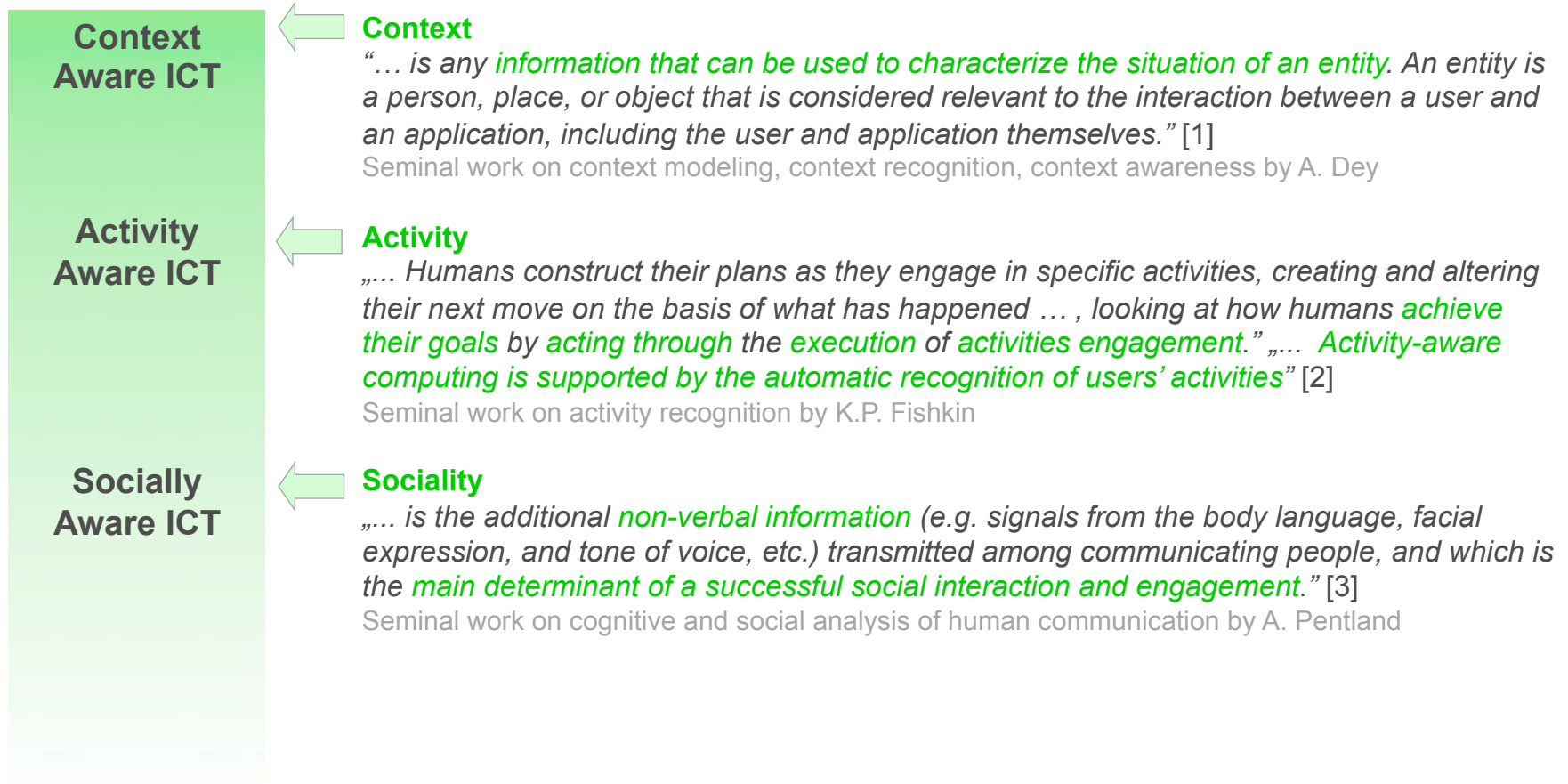
Towards a Pervasive Symbiosis of Society and Technology

IKT der Zukunft - Netzwerke der Information
Aufaktveranstaltung 2. Ausschreibung
Wien, 23. Oktober 2013

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The Evolution of „Aware“ ICT



[1] Dey, A. K.: Understanding and Using Context. Personal and Ubiquitous Computing 2001. Vol. 5, No 1, 4-7.

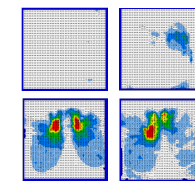
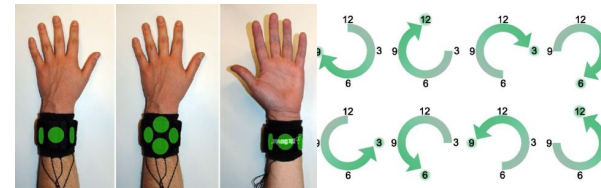
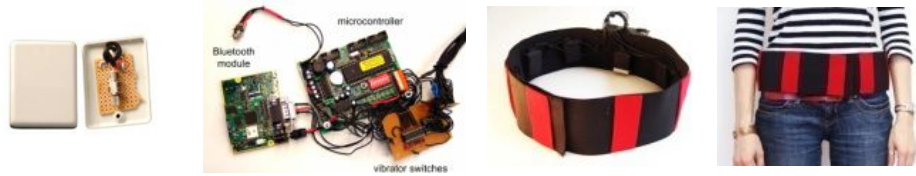
[2] Philipose, M., Fishkin, K.P. and Perkowi, M.: “Inferring Activities from Interactions with Objects,” IEEE Pervasive Computing, Vol. 3, No. 4, 2004, pp. 50–57.

[3] Pentland, A.: Socially Aware Computation and Communication. IEEE Computer Volume 38, Issue 3, March 2005, 33–40.

Pervasive Computing

LifeBelt

Smart CarKey

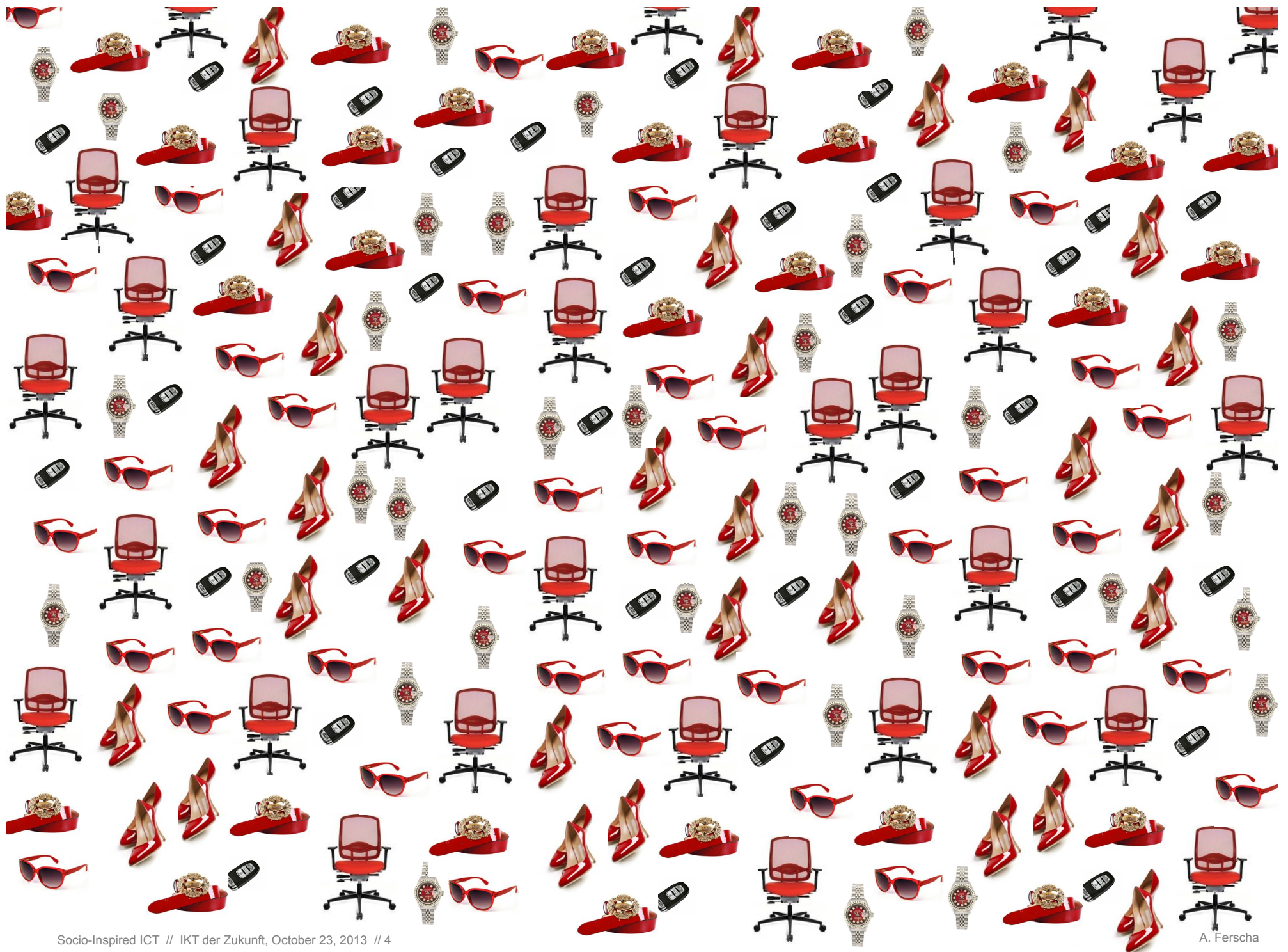


SPECTACLES

PowerSaver

Vibristlet

SensorSeat



How Many Things?

Connected Devices

500 million
(1/10th of a connected
device per person)



35 billion
(5 connected
devices
per person)

Source: Forrester
Research, Cisco analysis
—forecast of 2013
assuming consistent
growth trends

Applications

3000
total mobile
applications
worldwide



265,000
total mobile
applications
worldwide



Source: Windows
Mobile, Morgan Stanley,
Cisco analysis—forecast
of 2013 assuming
consistent growth trends

1,500,000
total mobile
applications
worldwide

1 Trillion
(140 connected
devices per person)

2007

2010

2013

Cisco 2010 Mid-Year Security Report

Observable Deficiencies of Socially Incapable ICT



"We need to understand that **traffic is not just a line of cars: It is a web of connections**. A real solution will look at **relationships across** the entire road network and all the **other systems that are touched by it**: our supply chains, our environment, our companies, the way people and communities live and work..."

IBM Global Commuter Pain Study, 2010

Number of cars worldwide surpass 1 Billion in Oct 2011

**working "in the small", but
severe deficiencies "in the large"...**



Personal Communication (email, social network software, ...)

Personal ICT (notebooks, smartphones, appliances, gadgets, ...)



Mobility (automotive vehicles, public transportation, ...)

Logistics (transportation of goods, energy, ...)

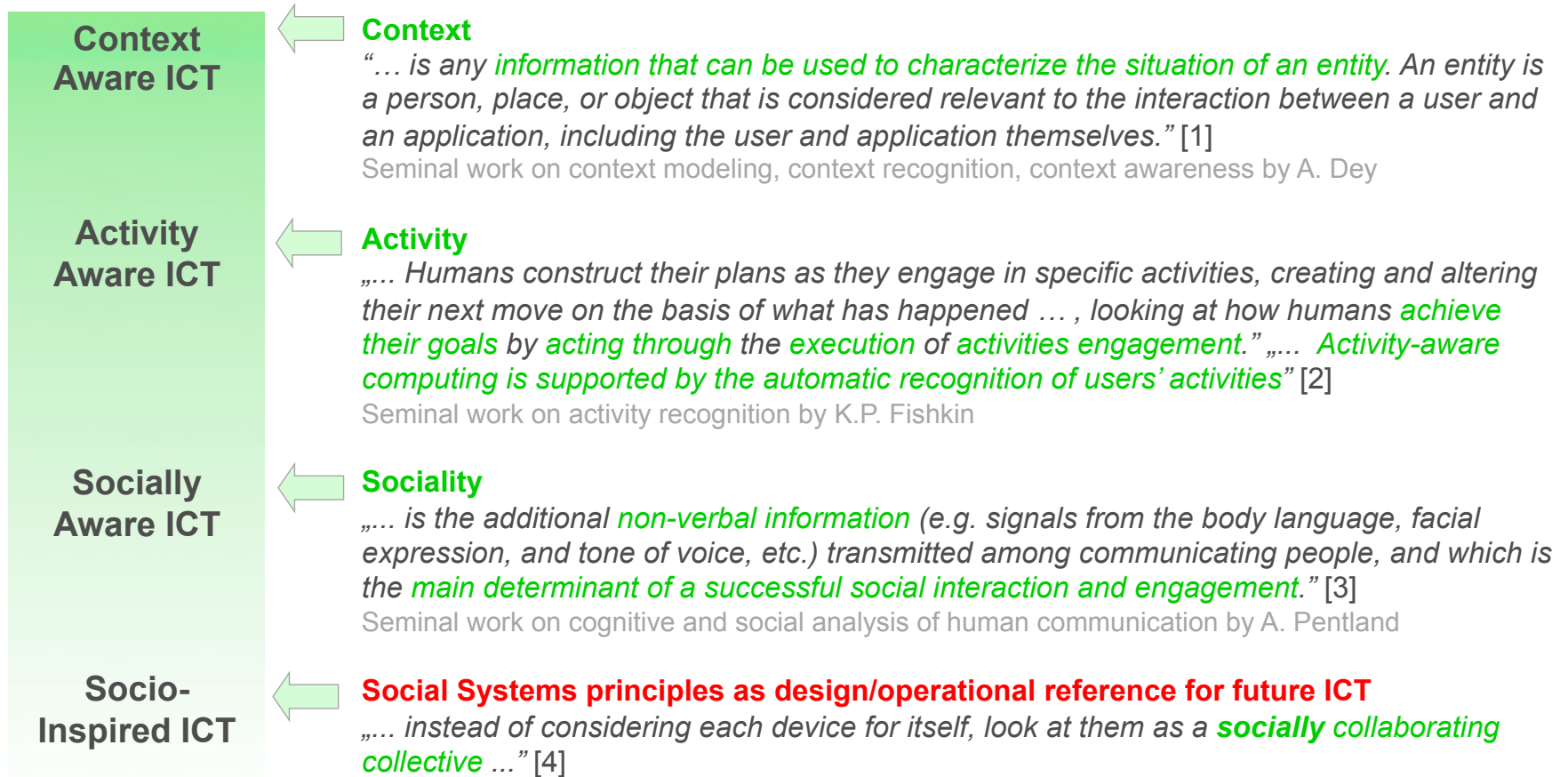
Mass Media (print, TV, e-paper, digital video, ...)



Mass Events/Panic (Jan 2006, Mekka, Sep 2005, Bagdad, May 2001, Accra, Apr 2001, Johannesburg, Jun 2000, Roskilde, Dec 1999, Innsbruck, Jul 1990, Mekka, Apr 1989, Sheffield, Duisburg Loveparade, 2010)



The Evolution of „Aware“ ICT



[1] Dey, A. K.: Understanding and Using Context. Personal and Ubiquitous Computing 2001. Vol. 5, No 1, 4-7.

[2] Philipose, M., Fishkin, K.P. and Perkowi, M.: “Inferring Activities from Interactions with Objects,” IEEE Pervasive Computing, Vol. 3, No. 4, 2004, pp. 50–57.

[3] Pentland, A.: Socially Aware Computation and Communication. IEEE Computer Volume 38, Issue 3, March 2005, 33–40.

[4] Lukowicz, P., Pentland, A. and Ferscha, A.: From Context Awareness to Socially Interactive Computing, IEEE Pervasive, Vol. 11, No 1. 2012.

The Socio-Inspired ICT Vision

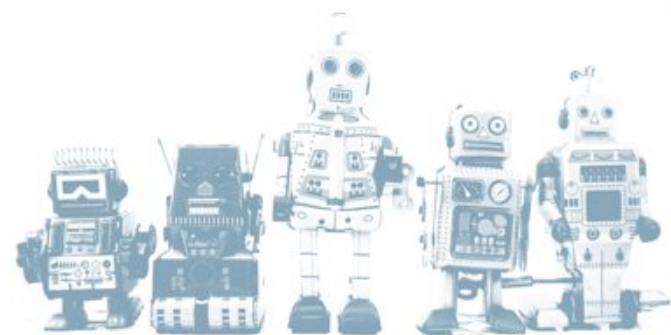
Understanding the **hidden laws** and **processes** of **society**

- Ethics, Moral Norm
- Social Awareness, Behaviour
- Self-Organization
- Cooperation, Competition
- Conflict Resolution
- Negotiation, Decision Making
- Reputation
- Trust

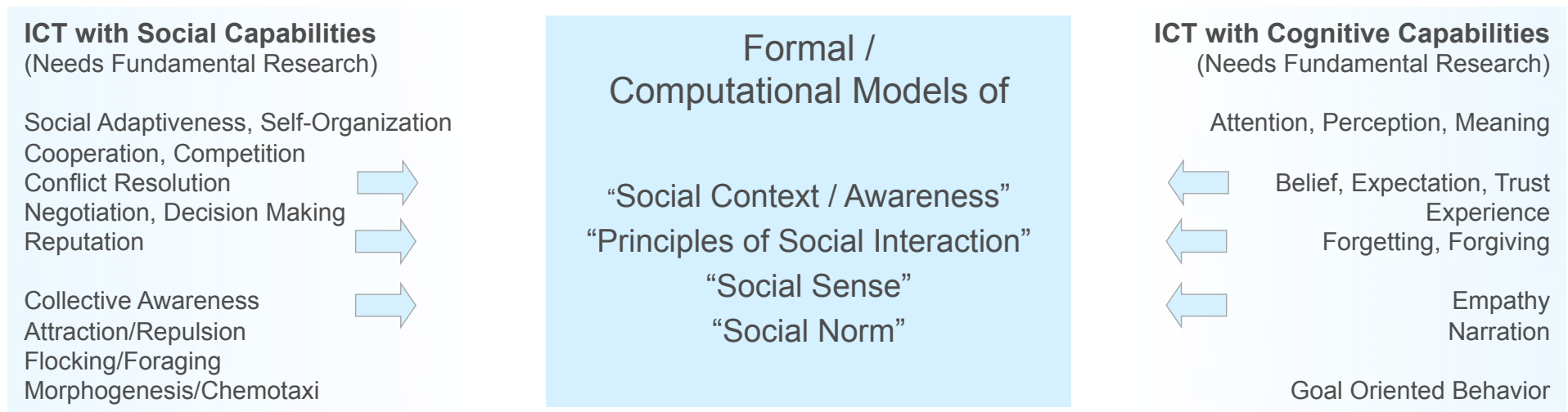
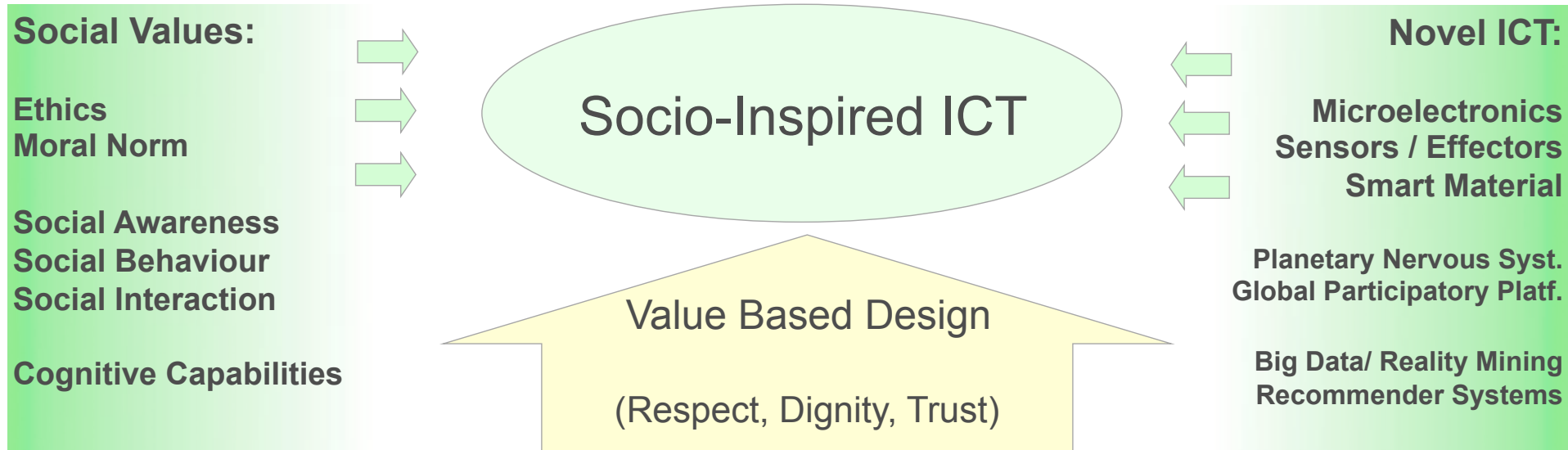


Inspire the development of a new wave of **robust**, **trustworthy** and **adaptive ICT** based on the **principles of social interactions**

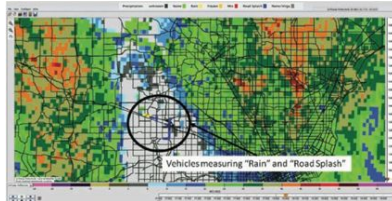
- Dignity
- Respect
- Sovereignty
- Privacy
- Autonomy
- Collective Behaviour



Social Systems Principles as Design/Operational Reference for ICT



Socio-Inspired ICT “Cases”



(e-)Mobility/Transport/Traffic

Massive collection of vehicles-
planetary nervous system of socially interacting
knowledge cells



Money/Currency

Unit of account
Store of value
Medium of exchange



Non-Monetary Currency

Social Capital
Cultural Capital
Symbolic Capital
(Pierre Bourdieu 1983)



Governance of Commons - Liquid Democracy

Overruling, Enforced Governance
Mechanisms of conflict resolution that are cheap and of
easy access
Self-determination of the community recognized by higher-
level authorities
Stable local common pool resource management
(Elinor Ostrom 1990)



Information Eco-systems (Networks of Interactions)

Information Overload
Attention Economics
Value Sensitive Recommenders

Research Agenda

Empowering Humans

Crossing the “Limits” of Individual Capabilities

Shortcomings / Obstacles / Caveats of current ICT

>> Analysis of Needs

How can Soc-ICT mitigate for a better life ?

>> Potentials Analysis

Empowering Human Human Relationships

>> Trustworthiness, Privacy, Reputation, Intimacy, Free Will

Shaping the „fabric of ICT empowered societies“

>> Scenario Analysis

Respectful Technologies

Designing ICT from “Social Grounds”

Social Norm: Dignity, Respect, Sovereignty, Privacy, Autonomy, Togetherness,

>> Value Sensitive Design

Empowering to Influence

>> Democratizing Decisions

Social Contracts

>> Modality, Space-Time Context, Preservation, Contingency

Reversing Interaction

>> Attention Economics

Online vs Offline Worlds

>> Identity management

Formal Models

Computational Models Design/Build/Deploy ICT

Formal Models of Cognitive Capabilities

>> Attention, Perception, Intent, Belief, Trust, Experience, Expectation

Formal Models of Affective State

>> Mood, Arousal, Distress

Formal Models of Social Capabilities

>> Social Sense, Social Nets, Collective Remeberance, Social Forgetfulness / Forgiving

Social Architectures

Implementing Socio-Inspired ICT

Sensing Social Interactions (Long Term, Large Scale)

>> Planetary Nervous / Sensing Systems

Detection / Recognition / Forecasting

>> Activity-, Mobility-, Opinion-, Novelty, Critical Mass-, Social Force-, Crisis-, ...Detection

Socio-Technical Fabric

>> Resilient, Opportunistic, Goal-Oriented System Architectures

Social Emergence

>> Socially-Self-organizing

Position Paper

A. Ferscha, K. Farrahi, J. van den Hoven, D. Hales, A. Nowak, P. Lukowicz, D. Helbing

Socio-inspired ICT

The European Physical Journal Special Topics, Springer, Vol. 214, No. 1, pp. 401-434, 34 pages, DOI: 10.1140/epjst/e2012-01700-6, November 2012.

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