

NetHood: The Neighbourhood Game

from behavioural economics to urban planning

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ETH Zurich

1st ICIS conference, April 10-11th, Brussels



A neighbourhood at Liverpool, UK

I don't know them!

Facebook helps you connect and share with the people in your life.



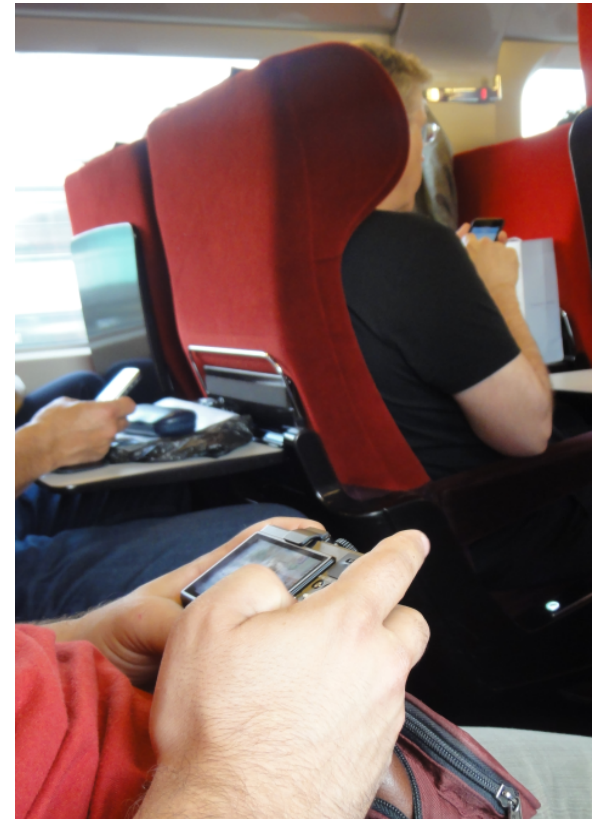
NetHood helps you connect and share with the people in physical proximity

High-speed neighbourhoods too

No need for immediate physical contact



Plenty of free time



Attention and device availability

Why care about our neighbours anyway?



Photo by [bekathwia@flickr](#)

Why care about our neighbours anyway?

John Dewey: *Democracy must begin at home, and its home is the neighborly community*

- Social reasons
 - Face-to-face contact is important
 - Psychological support and service exchange
 - Location-based social interactions
 - **Dealing with diversity!**

ICT can help!

- Political reasons
 - Information
 - Deliberation
 - Civic engagement
 - **Dealing with diversity!**

But also damage!
(e.g., selective exposure)

Socialization and common interest



Welcome to i-neighbors!

The free service that brings you and your neighbors together!

- ✉ Correspond with your neighbors via a neighborhood email list.
- 📁 Introduce yourself and learn about your neighbors through the neighborhood directory.
- 📅 Organize and learn about neighborhood events.
- 📷 Share photos of you and your neighbors.
- ★☆☆ See what others have to say about local businesses and add your own opinions.
- ☑ Poll your neighbors about important issues.
- 🏛 Send free faxes to your local government officials.
- 📄 Share documents of interest to your neighborhood.

Get started.

Search for i-neighborhoods in your area.

Enter your ZIP or Postal Code

Browse: [USA/Canada](#)

Or [Sign up now](#)

EveryBlock New York

e.g., 175 Fifth Ave., Manhattan, 10001, Williamsburg

HOW IT WORKS

- Follow your favorite places**
Pick a neighborhood, block or ZIP — or create a personalized area. Sign up for one or many.
- Learn what's happening**
Read nearby news from and hundreds of sources. Get updates via e-mail or your custom homepage.
- Share with neighbors**
Start a discussion, share an announcement, ask your neighbors a question, or answer one of theirs.
- Your block gets better**
Exchange ideas. Gain recognition. Solve problems. Make your block a better place.

[Sign up / Log in](#)

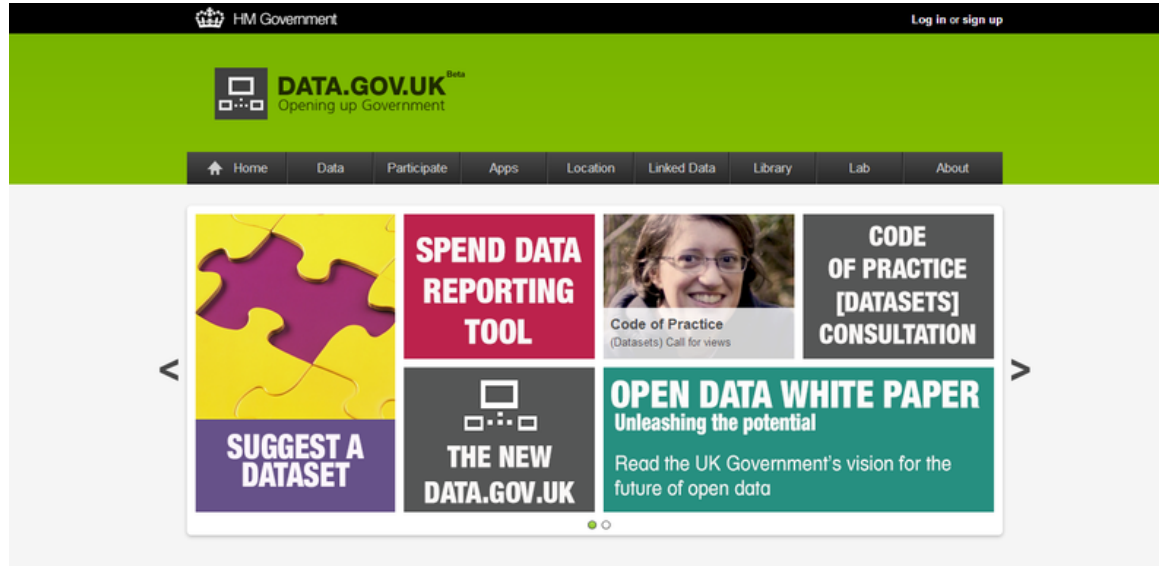


Whatever your interest.
Wherever you are.

Welcome

- Home
- Meetups by Topic
- Meetups by City
- Start a Meetup

Political life: information flows



From governments to citizens

From citizens to governments



Can facebook do the job?

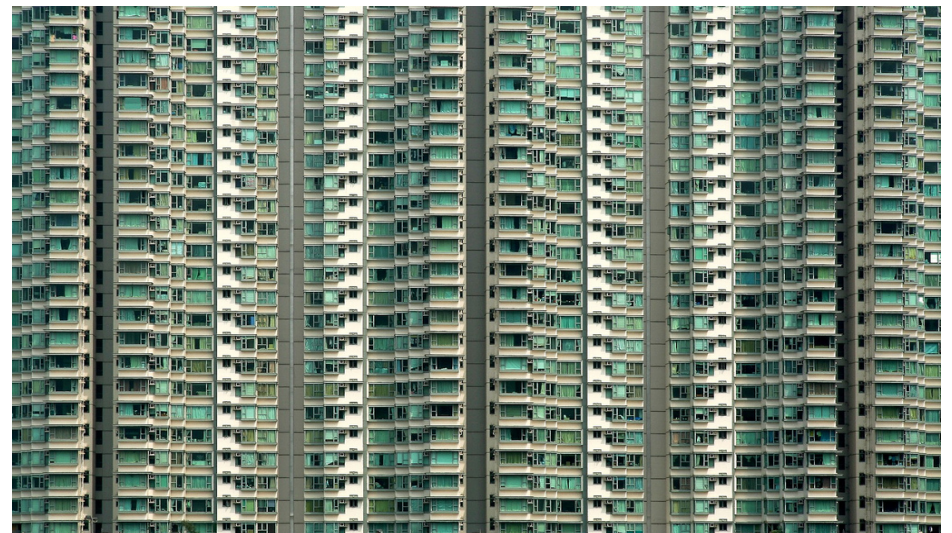


Photo by Tridib Banerjee

Can facebook do the job? **NO!**

- Why facebook is a bad idea
 - Ownership (privacy, the right to forget)
 - Control (filtering, social software rules)
 - Strong identities (excludes anonymous interactions)

One size does not fit all!



Assumption 1:

Hybrid communities need informed design

- Challenges
 - Expensive for local authorities to build and maintain customized solutions
 - Threats for the anonymity enjoyed in the city
 - People might trust more Google than their government!
 - Highly interdisciplinary problem
- Important requirements
 - Open source software
 - Concentrated efforts
 - Usability
 - Marketing
 - A killer application :-)

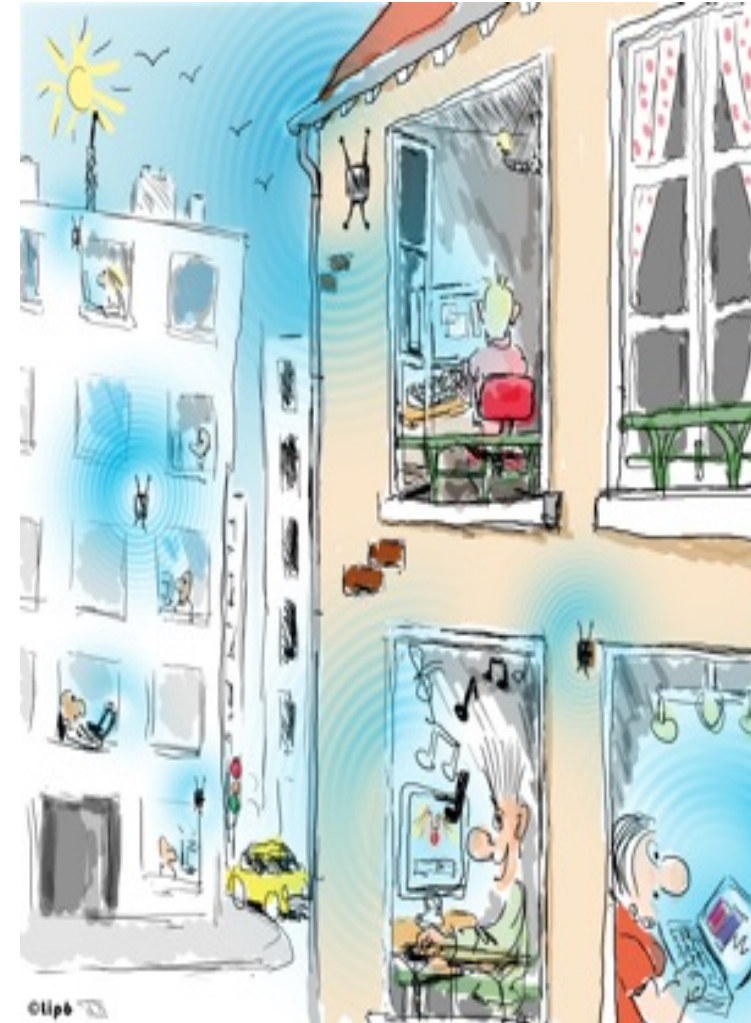
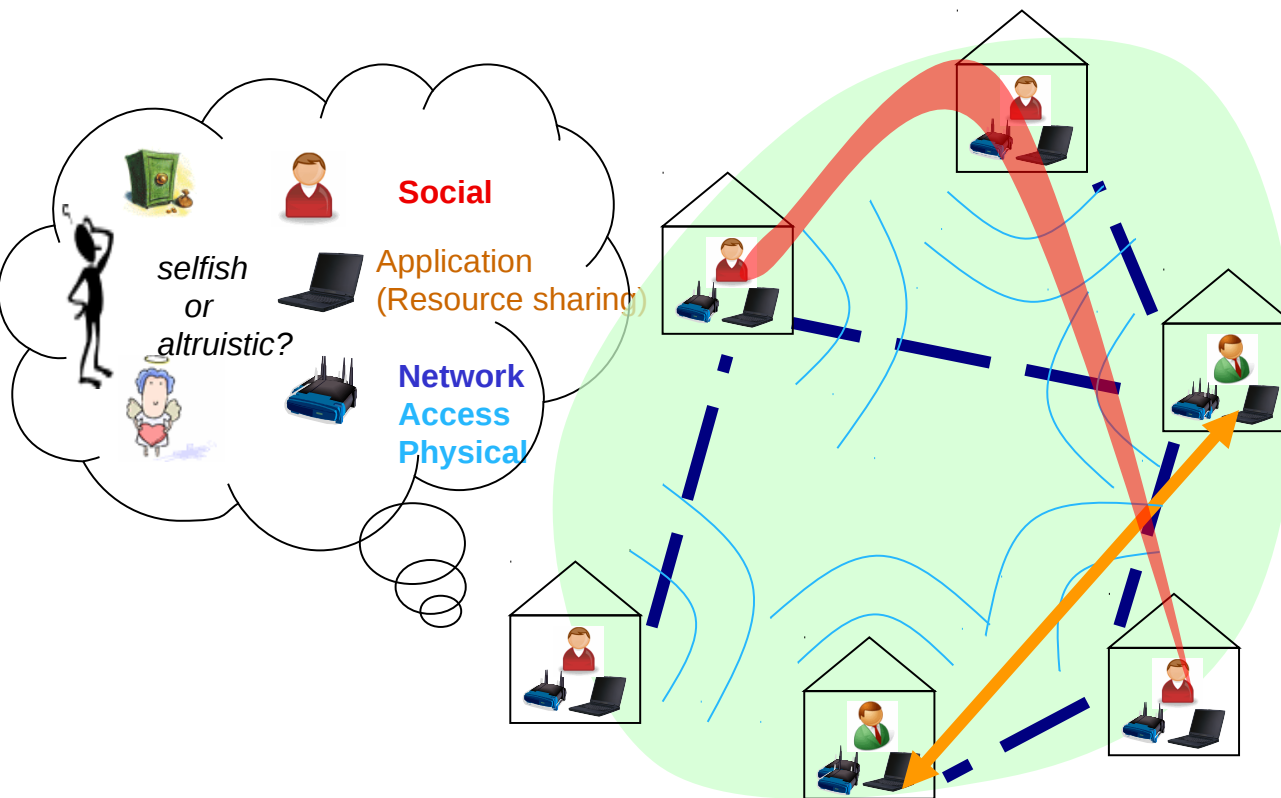
The details matter!

And they are case specific!

Different levels of ownership and control

- No ownership and no control
 - Facebook, other private generic frameworks
- Predefined customization options
 - Ning, and other “build your own social network” providers
- Custom solutions on web hosting providers
 - Costly to produce and maintain
- P2P online social networks over the public Internet
 - Performance issues, complexity
- Custom solutions over user-owned networks
 - Wireless mesh
 - Ad hoc networks
 - Captive portals (your laptop as a local web server)

Neighbourhood wireless mesh networks



It works!

TidePools Social WiFi

Home About Internet

Red Hook Radio WiFi Spot

Welcome to the Red Hook Initiative & Red Hook Radio WiFi project

Community Announcements

RHI Health
LGBTQ Meeting: Thursday Jan. 19th 7:30pm-9:00pm @Red Hook Initiative

Shoutbox

Your Name (or nickname)

What do you think of the project?

June
want to know more about the actual initiative

deadmule
interesting

jordan
You need to fix the problem cuz it keeps kicking everyone off grrr

victoria
Listen, thanks for the internet and all, but this site fucking sucks! Im constantly losing work im doing online because of this project and its really fucking annoying. Fix it please!!

Landmarks Chat Feed

Thesis Show Announcement
This version of the TidePools Community Internet Project in Red Hook, Brooklyn is hosted locally at the thesis show itself. More info: <http://tidepools.co>

1. asdf
2. Welcome to Red Hook!
Hello, Design + Technology Thesis Show viewer :)
3. Red Hook West Houses
55 Dwight Street (718) 522-3880
4. Red Hook East Houses
62 Mill Street (718) 852-6771
5. South Brooklyn Health Center
120 Richards Street (718) 834-6202



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<http://www.jrbaldwin.com/tidepoolswifi/>

Captive portal



Assumption 2:

User-owned networks can make a difference

- De facto physical proximity
- Low cost
- Feelings of ownership and independence
- Anonymity (if desirable)
- Ubiquitous access (no credentials needed)
- Opportunities for hybrid space design

But what can we do with our neighbours?

- **Get to know them!**



- Application: **information sharing** in the neighbourhood
 - Formulated as a *game*
 - Open source social software
 - Configure it, played it *in real life*, and share the data
 - Involve the scientific community + institutional support
 - Build better theories, better tools, and better neighbourhoods

NetHood

An interdisciplinary **social learning** approach for

bridging the **virtual** with the **physical**

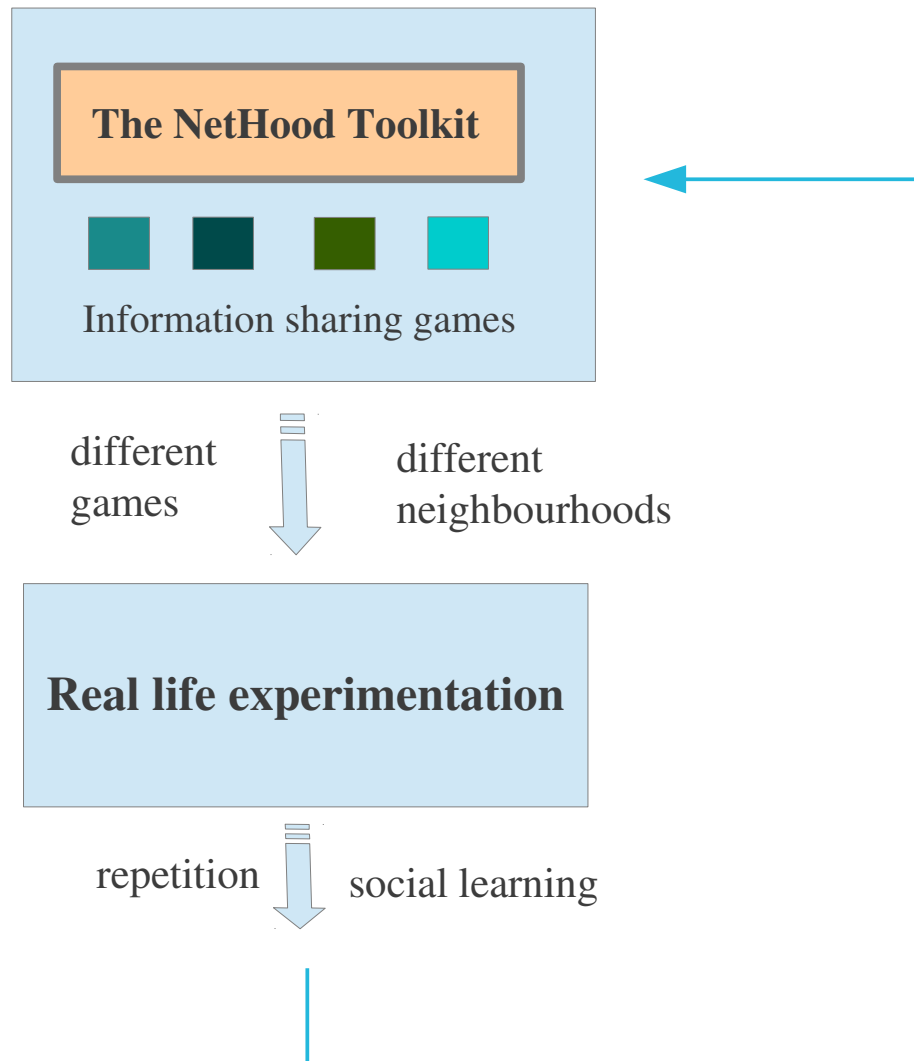
combining

theory and **practice**

scientific and **social** objectives

Key idea

- Build an ICT framework for local information sharing that is
 - **Customizable**
 - Allow a rich set of configuration variables and functionality
 - **User-owned**
 - From infrastructure to software
 - **Open source**
 - Enable transparency, low cost, social learning process
 - **Hybrid**
 - Exploit the fact that the users are in physical proximity
- Design different **information sharing games**
 - Either framed as scientific experiments or social applications
- Trial and error ...



Bring in some more disciplines

- Behavioural economics
 - Neighbourhoods are an ideal real life experimentation environment
 - Scientific perspective offers a rigorous framework for informed design
 - Triangulation
- Urban planning
 - More information, more conviviality, more participation
 - Institutional support, public legitimacy
- ... and in the middle computer science
 - Networking and P2P systems
 - Human-Computer Interaction (HCI)
 - Data mining and analysis

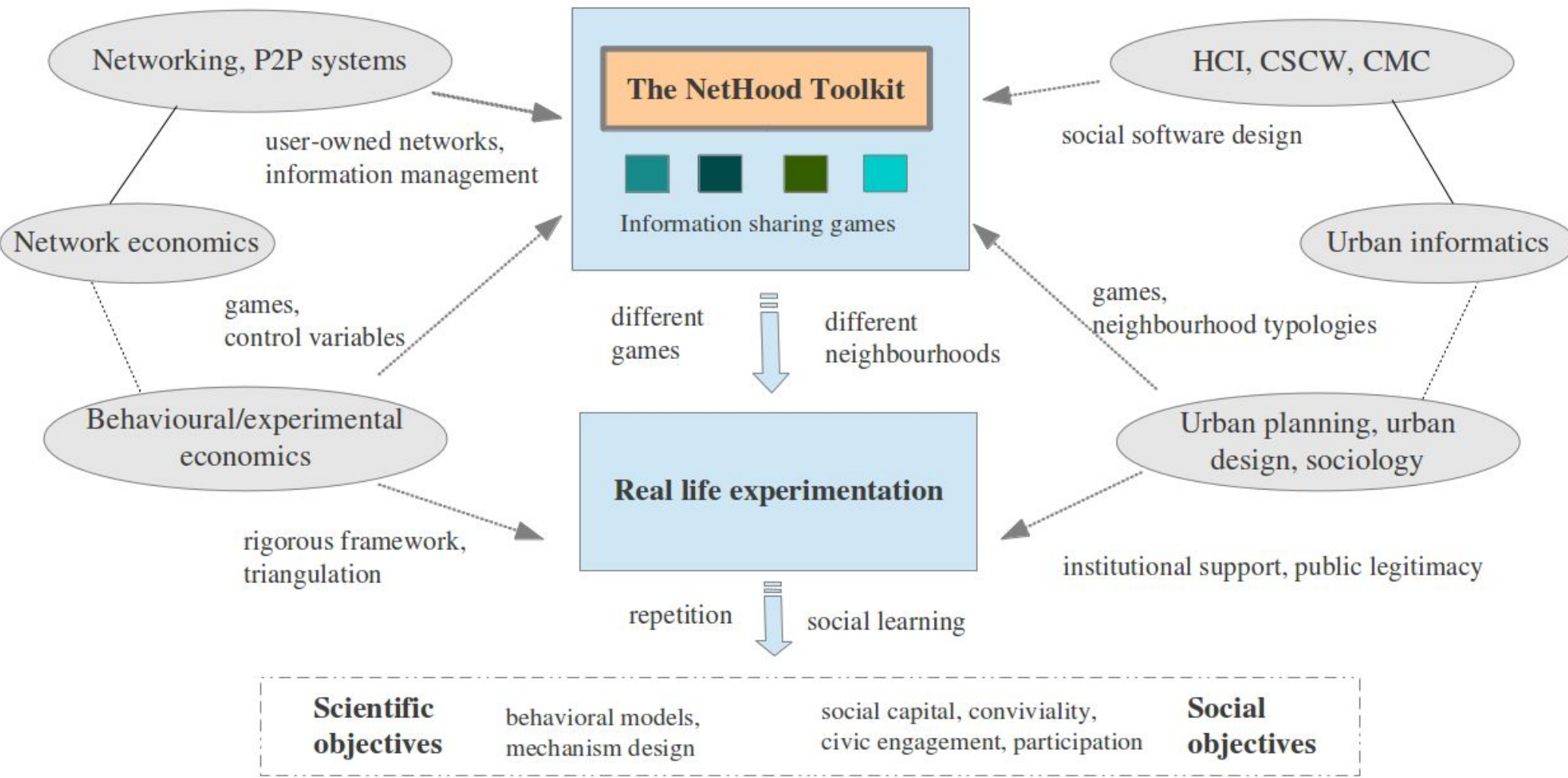


Figure 1. The NetHood interdisciplinary research framework (simplified view)

Novel elements of our approach

- Combination of scientific and social objectives
 - Behavioural economics + urban planning
- Empowerment of users: from subjects to experimenters
 - Start your own neighbourhood game
 - Share the results to an open database
- Start simple
 - Just get to know your neighbours
 - Anonymity + physical contact = independence + trust

Internet science without the Internet ... and without scientists :-)

Many valid questions

- Why should we care about our neighbours?
- Why not just use facebook?
- How about other existing alternatives?
- Why should scientists get involved?
- In any case it will not work, because they will not come

The answer is that it is indeed very difficult.

But the stakes are high and we should give it a try!

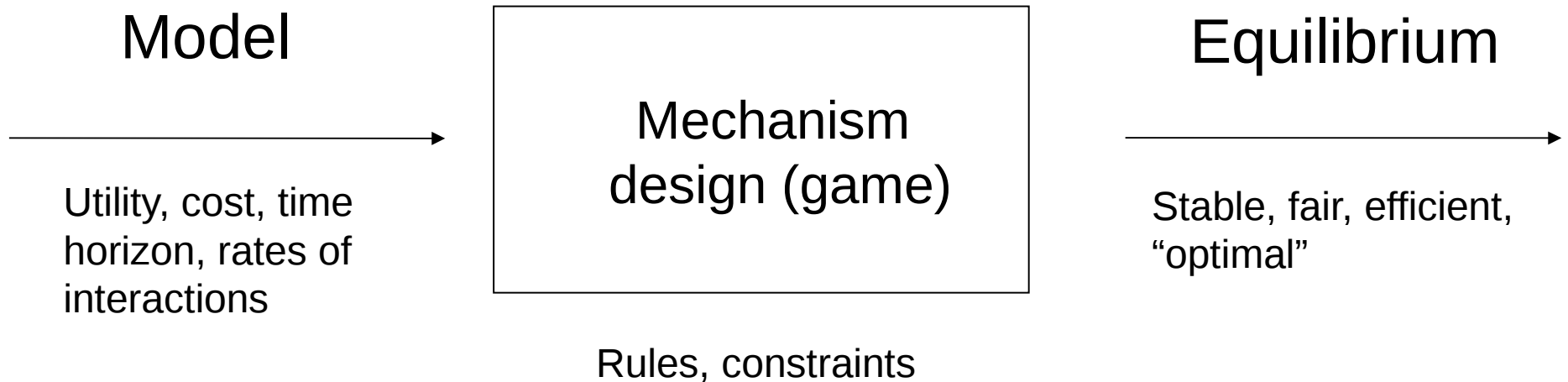
The interdisciplinarity game

Basic concepts in behavioural economics and urban planning

(they are already both highly interdisciplinary fields)

Getting to know each other :-)

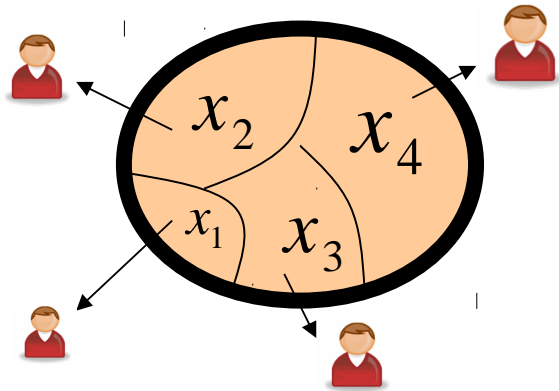
A simplified view of (micro)economics



Sometimes we can just predict the equilibrium, others we can perhaps design the "best" game

Resource allocation

Fixed capacity C

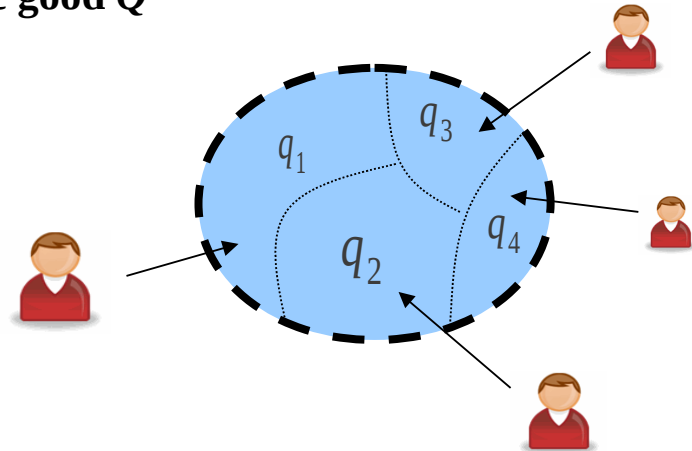


$u_i(x_i)$: utility from consuming x_i

$$\max_x \sum_i u_i(x_i) \quad \text{s.t.} \quad \sum_i x_i \leq C$$

Resource provision

Public good Q



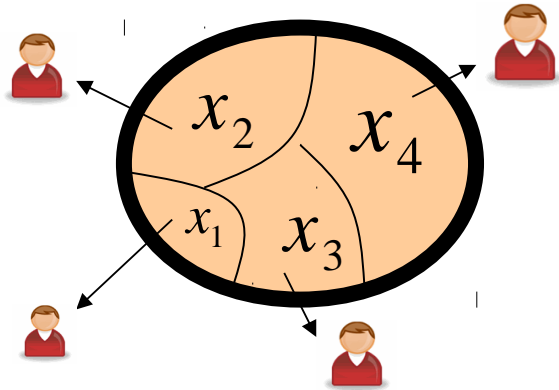
$c_i(q_i)$: cost for contributing q_i

$u_i(Q)$: utility from enjoying good Q

$$\max_{Q, q} \sum_i [u_i(Q) - c_i(q_i)] \quad \text{s.t.} \quad \sum_i q_i = Q$$

Resource allocation

Fixed capacity C



$u_i(x_i)$: utility from consuming x_i

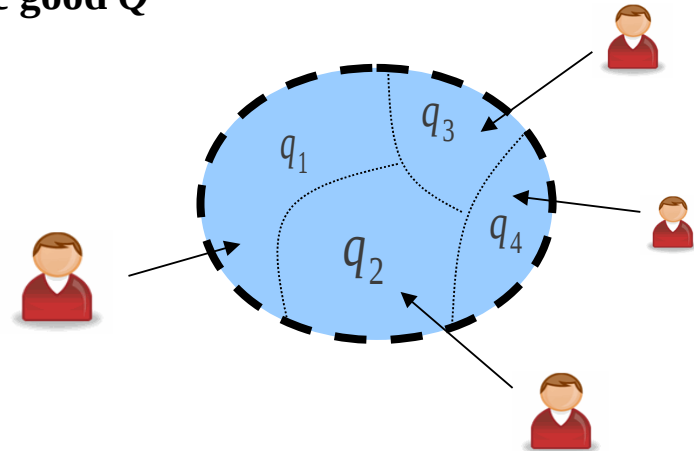
$$\max_x \sum_i u_i(x_i) \quad \text{s.t.} \quad \sum_i x_i \leq C$$

Mechanism: **auctions**



Resource provision

Public good Q



$c_i(q_i)$: cost for contributing q_i

$u_i(Q)$: utility from enjoying good Q

$$\max_{Q, q} \sum_i [u_i(Q) - c_i(q_i)] \quad \text{s.t.} \quad \sum_i q_i = Q$$

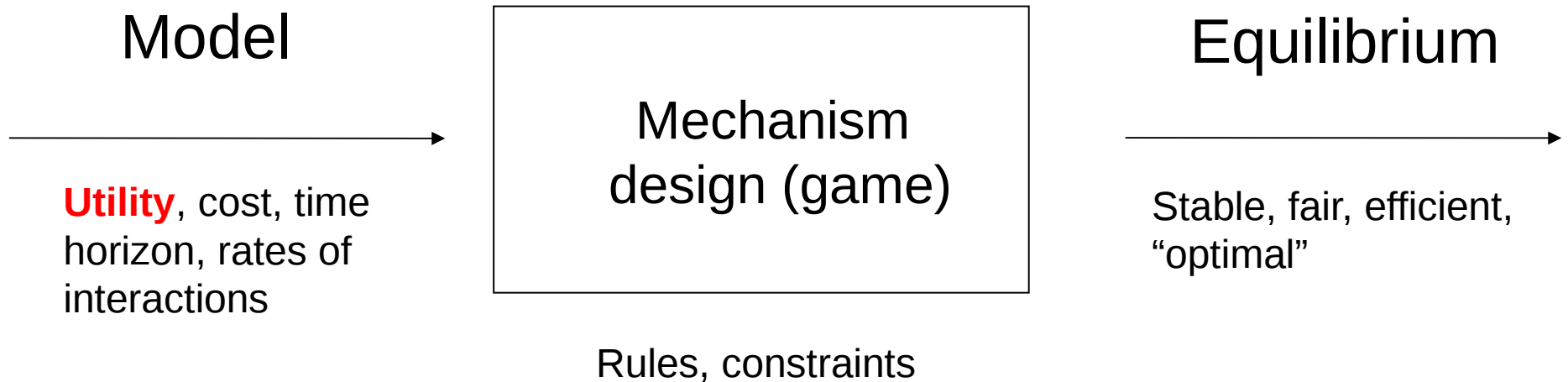
Mechanism: **fixed entry fee**



Network economics

- Resource allocation
 - Bandwidth
 - Spectrum
- Resource provision
 - P2P file sharing
 - Ad hoc networking

Behavioural/experimental economics



Behavioral economics aim to identify **more realistic** utility functions **through experimentation** ... beyond self-interest

Beyond self-interest

Homo economicus

$$u_i = u_i(x_i, Q)$$

Altruism

$$u_i = u_i(x_i, Q, u_{-i})$$

Warm glow

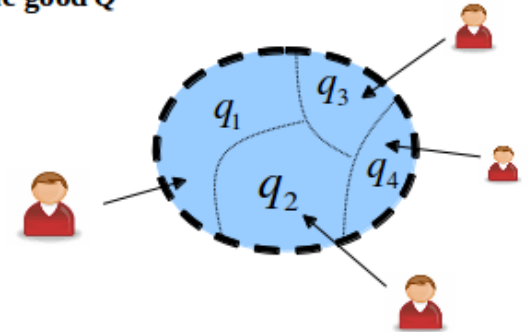
$$u_i = u_i(x_i, Q, q_i)$$

Social norms

$$u_i = u_x(x_i) + u_Q(Q) + u_q(g_i)$$

$$\text{where } g_i = a(q_i - \text{avg}(q)).$$

Public good Q



$c_i(q_i)$: cost for contributing q_i

$u_i(Q)$: utility from enjoying good Q

Other non-standard utility functions

- Inequity aversion
 - Fehr and Schmidt 1999
- Loss aversion
 - Tversky and Kahneman 1991
 - Camerer 2000
- Crowding-out
 - Benabu and Tirole 1999 (economics)
 - Deci and Ryan 1985 (psychology)



Not all people are the same!

And each individual can change over time and based on context!

Extrinsic vs. intrinsic motivations

- Direct benefits
 - **Payments**, resource exchange
- Long-term benefits
 - Feedback, expected reciprocity, socializing
- Self-image
 - Sense of efficacy, pride, **status**, popularity
- Community
 - Community spirit, belonging, norms
- Intrinsic
 - Interest, **fun**, inherent satisfaction



Related disciplines: Social psychology, organizational behavior

Important contextual factors

- Framing (the wall-street game vs. the cooperation game)
- Social norms
- Stakes
- Communication
- Eye contact
- ... even just the eyes!
 - Haley and Fessler 2005



But the experimental methodology has limitations

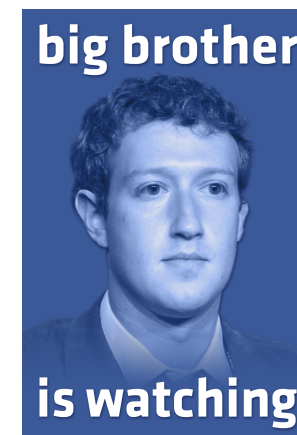
- Mainly students
- Laboratory feeling
- Low stakes
- Artificial games



You can try it: <https://www.uast.uzh.ch/enroll>

The Internet is changing the game

- Amazon's Mechanical Turk
 - More “subjects”, less control
- Custom web sites built to study behavior
 - E.g., MovieLens
 - Need critical mass
- Facebook, Google, Twitter
 - Invaluable sources of information
 - ... but knowledge stays private!
 - ... and power too!

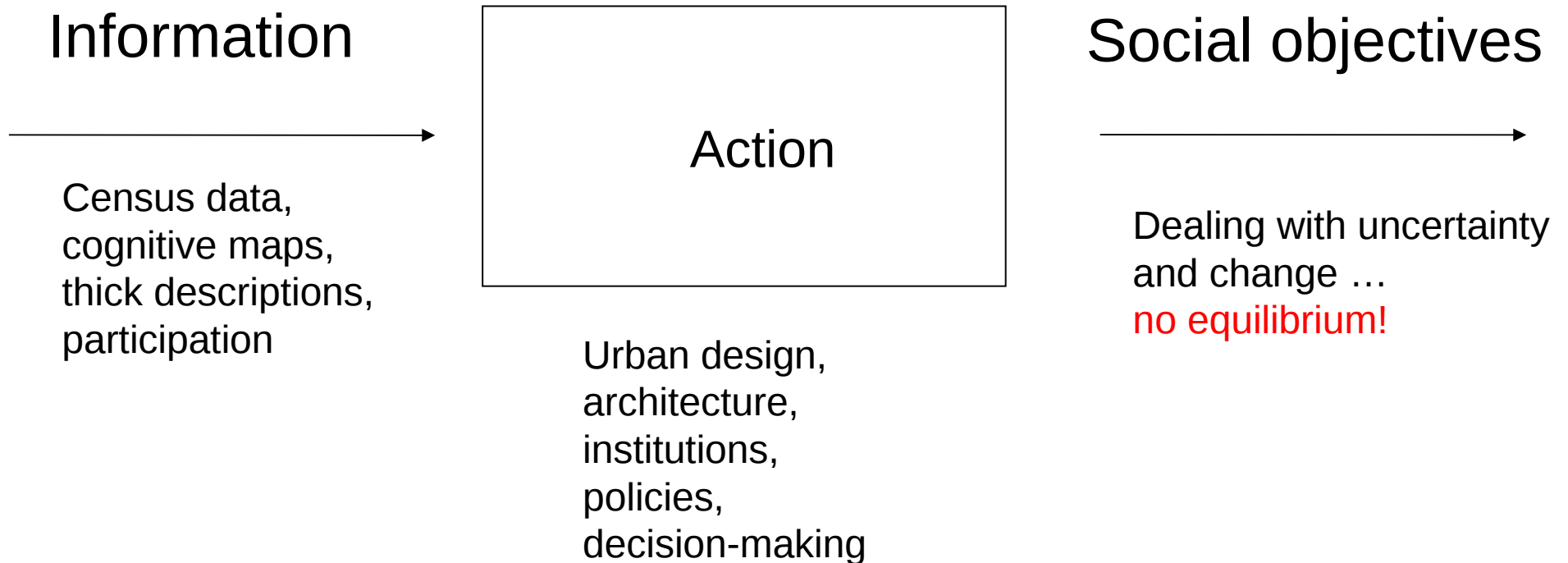


The Neighbourhood Game

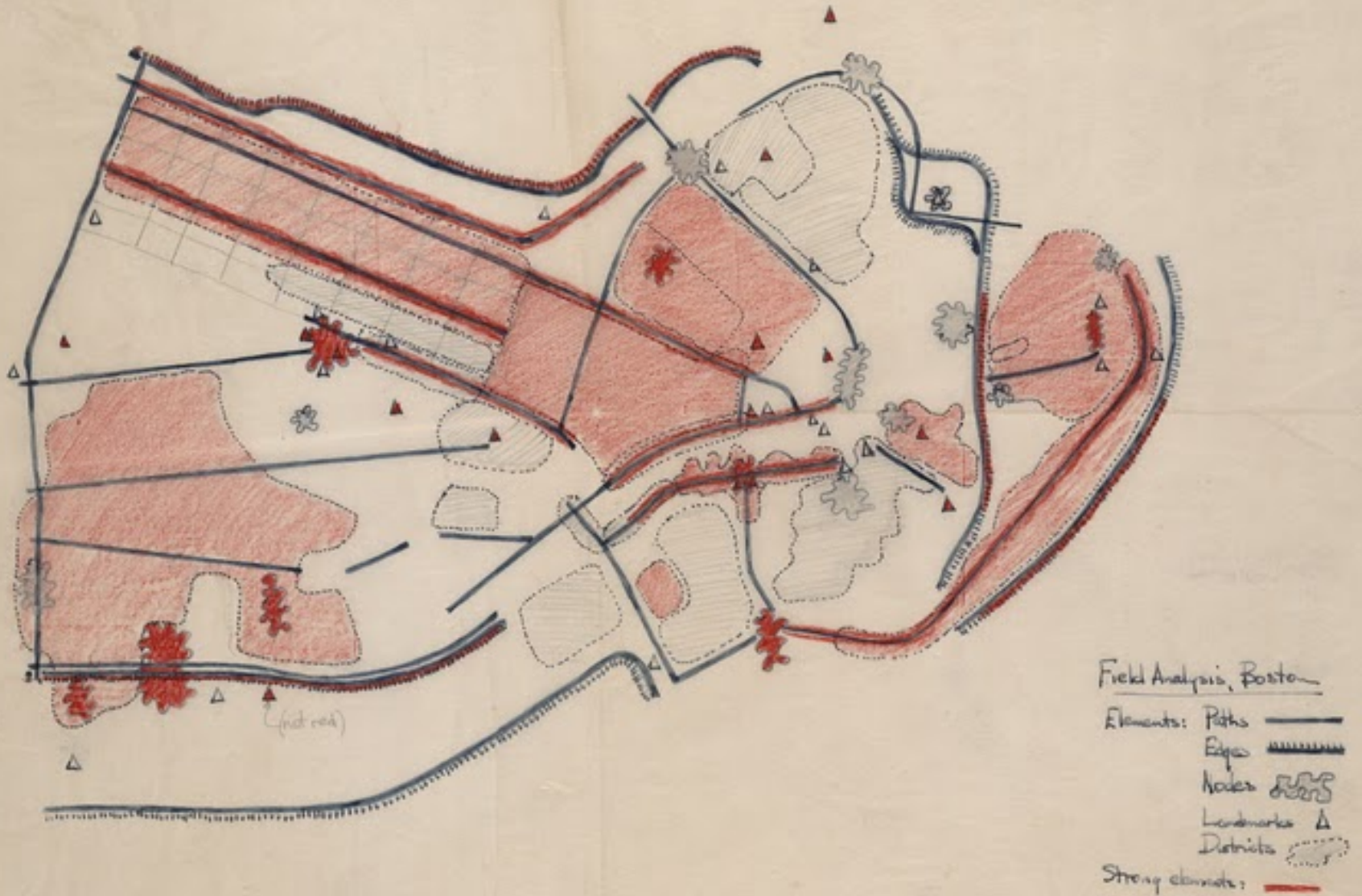
- Start simple: information sharing as a public good
 - Not strategic information revelation
 - No network effects
 - **Utility:** available information
 - **Cost:** effort + exposure
- Real life experimentation!
 - Numerous “small data” = “big data”
- Concentrate efforts
 - open source development
 - scientific and institutional support



A simplified view of urban planning



Example: Kevin Lynch 1960 Taxonomy of Images



- landmarks, nodes, edges, paths, districts

Landmarks



Interesting analogies with cyberspace:

I. Apostol, P. Antoniadis, and T. Banerjee, "Cyberspace design: A new challenge for planners", ICE Journal of Urban Design and Planning, in print

Paths and edges



Sign in to Yahoo!



Are you protected?
Create your sign-in seal.
(Why?)

Yahoo! ID:

(e.g. free2rhyme@yahoo.com)

Password:

Keep me signed in
for 2 weeks unless I sign out. [Info](#)
[Uncheck if on a shared computer]

Sign In

Friends Inbox **1**

What's on your mind?

Attach

Kenneth Hung 哈哈~~~逃走了 :)



Kenneth在綁
Kenneth成功

about an hour ago · Comment · Like

Nodes and districts



flickr

Signed in as ileanaa [Help](#) [Sign Out](#)

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Flânerie@flickr

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Group Pool (1,602 items | [Add photos or video](#) | [Open this group in Organizer](#))



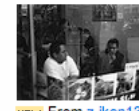
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ileanaa (a group admin) says:

01 Sep 08 - Flânerie comes from the French verb flâner that means to stroll, to take a walk...The verb flâner and the nouns flâneur and flânerie became part of the French language in the nineteenth century. Initially the term flâneur referred to the reflective stroller in the streets of Paris – a new social type generated by the Haussmannian reconstruction of the modern city. Yet changes of the modern metropolis generate new forms of flânerie...

...Read more in the discussions below.

Discussion (7 posts | [Post a new topic](#))

Title	Author	Replies	Latest Post
Being a flâneur	Sibad	13	3 months ago
photo flanerie experiment	univartaki	2	4 months ago

Example2: William H. Whyte 1980

The social life of small urban spaces

- Key design choices
 - Access and linkages
 - Image and comfort
 - Uses and activities
 - Sociability

What makes a successful place?



Design example 1: triangulation



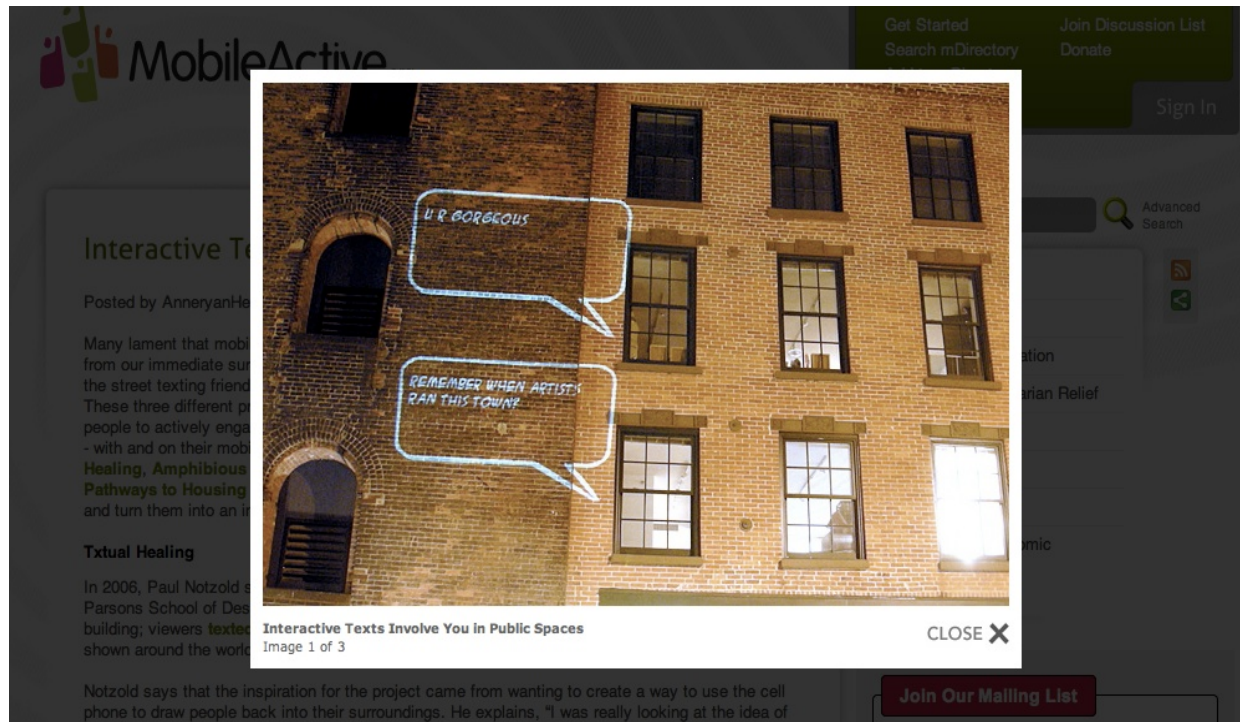
Source: <http://www.pps.org>

Scientific experiments on information sharing as triangulation elements?

Design example 2: appropriation



Designing the hybrid space



- Urban informatics (Foth et al. 2012)
- Ubiquitous computing (Dourish and Bell 2011)

We need more disciplines ...

Future work (1): Interdisciplinarity

- NetHood: A social learning approach for hybrid space design (with I. Apostol)
 - The **urban planning perspective**
 - To be presented at the joint AESOP/ASCP planning congress
- The Neighbourhood Game: an information sharing experiment in real life
 - The **behavioral economics perspective**
 - To be presented at the 15th International Conference on Social Dilemmas (ICSP)
- ICT ownership and the right to the hybrid city
 - The role of **open source software and user-owned networks** for reaching the vision of civic engagement and e-participation
 - To be presented at the Using ICT, Social Media and Mobile Technologies... conference
- ICT-mediated information sharing in public spaces: dealing with privacy, diversity, and time (with S. Trifunovic)
 - The **social perspective**: using the ICT Toolkit in real life
 - Submitted to the World Social Science Forum 2013

Future work (2): Experimentation

- **Different places**

- Random neighbourhoods
- In the train (with or without collaboration with train operator)
- In the city (with or without collaboration with local authorities)

- **Different framing**

- Vanilla version
 - “Know your neighbour” (no promises, no expectations)
- Scientific framing
 - Ask communities to voluntarily participate in a scientific experiment on information sharing between strangers
- Participation framing
 - Make such a game part of a participatory planning process with a concrete incentive
- Service exchange
 - Information sharing as incentive (e.g., PAWS)

Let's start simple



- From Personal Computer to Personal Network
 - your laptop as a captive portal!
- We are building a plug&play and customizable social software
 - Where you are? What type of application do you want to host?
 - Choose the rules, data collection and aggregation options
 - Press “start my personal network”

Join <http://nethood.local> WAP



Thank you for your attention!

- We are searching for
 - Collaborators
 - For research, development, experimentation
 - Volunteers
 - For running local nethoods in their free time
 - Critics
 - For good questions :-)

<http://nethood.org>

