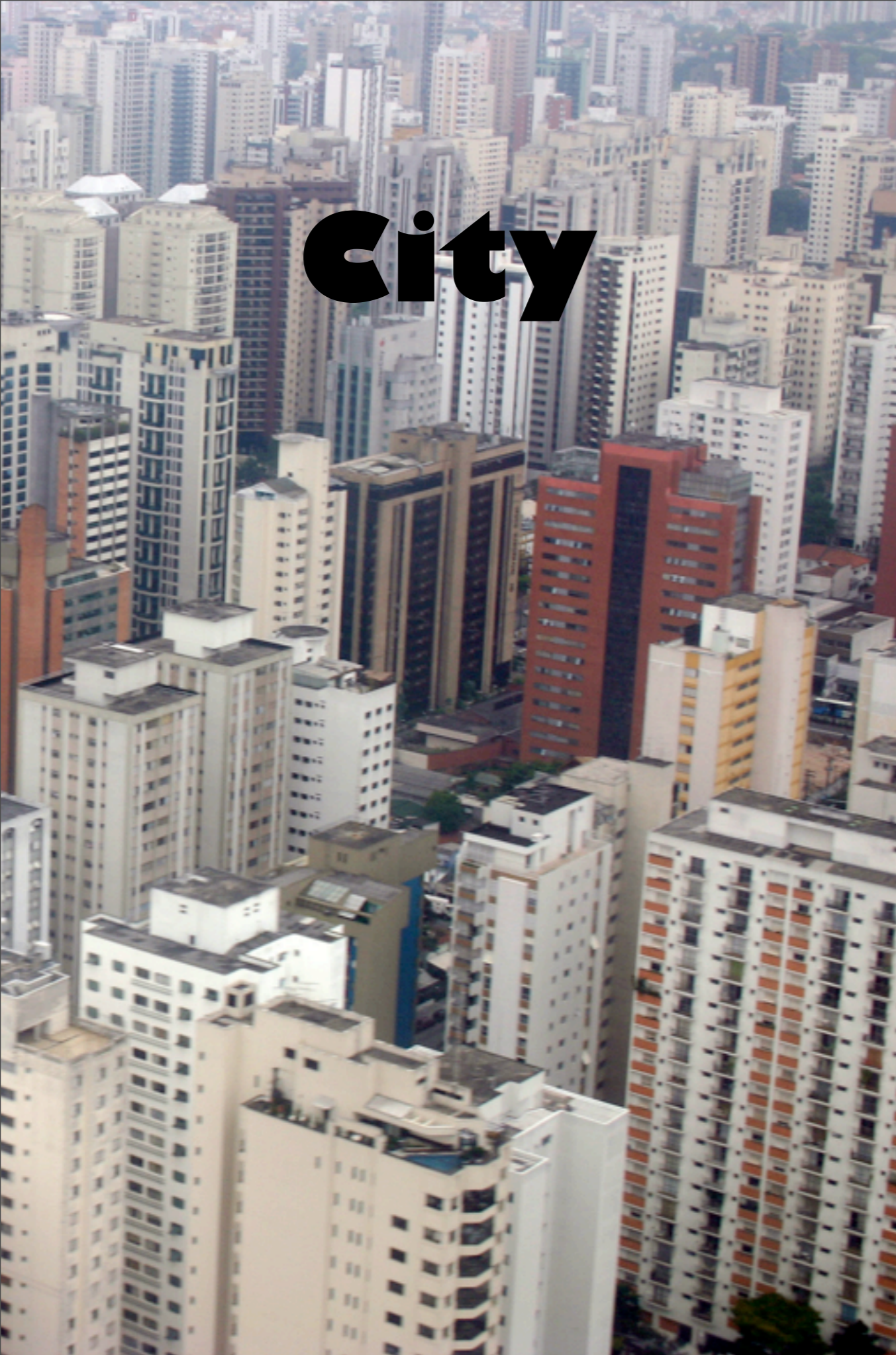


Smart Cities Analytics

M. Dascalu, F. Scaccia, C. Giovannella

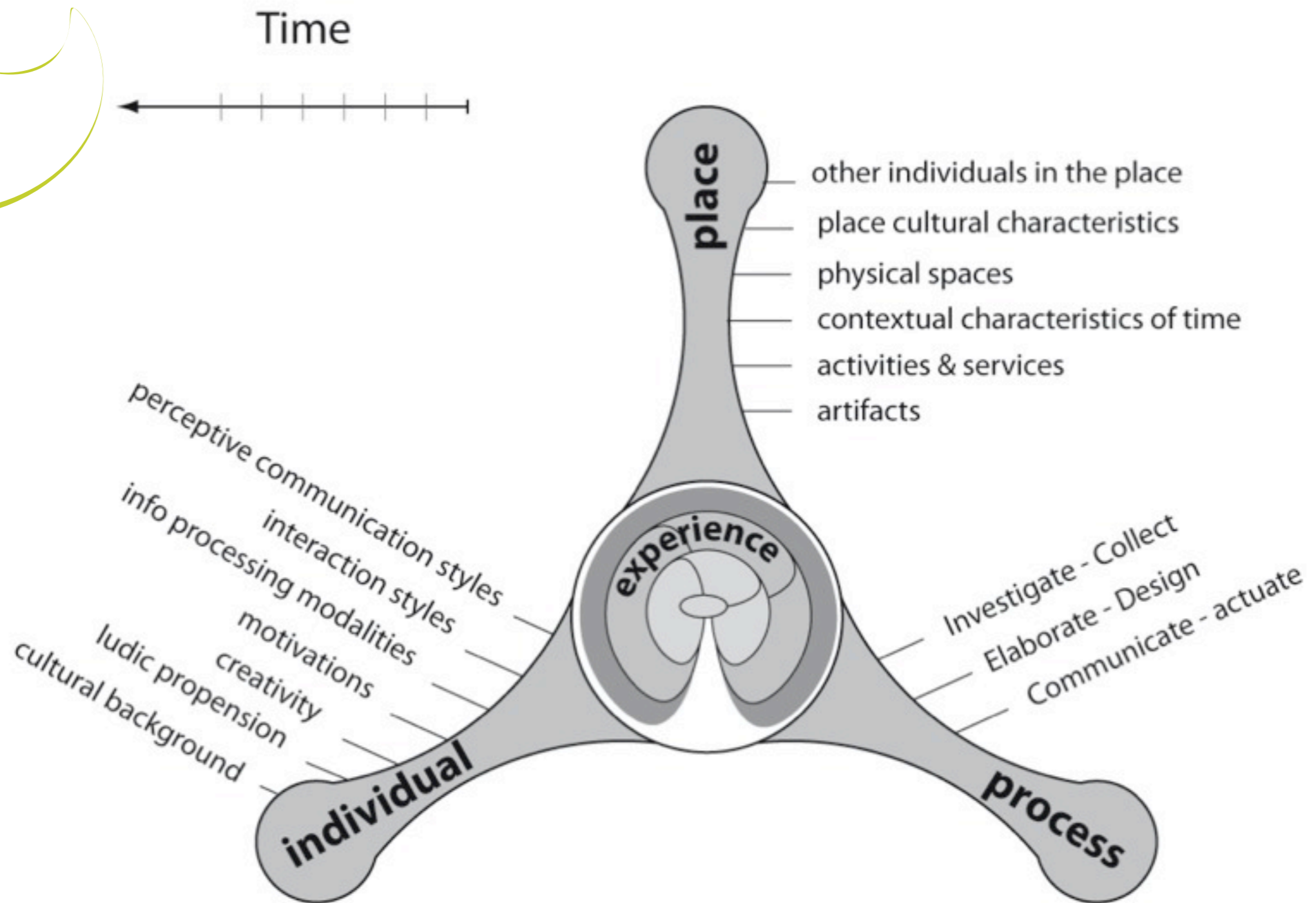


City



People

experience's model





WHERE THE SMARTENESS OF A CITY ?

HOW TO DEFINE IT ?

PROBLEM 1: INDICATORS

ARE TAKEN FROM MANY SOURCES BUT ALMOST NEVER FROM INDIVIDUALS ... AND USUALLY CONCERN INFRASTRUCTURE OR PRODUCTS OF A PROCESS

Ex.: LEARNING & EDUCATION

6 PILLARS

LIVING 7: EDUCATION FACILITIES (STUDENTS PER INH + SATISFACTION WITH ACCESS AND QUALITY IN 2004 ?? - 14%)

DOUBLE-TRIPLE ELIX

LABOUR FORCE WITH ISCED 5 & 6 EDUCATION LEVEL

OTHERS

(SMART CITY INDEX - 9)

PENETRATION OF COMPUTERS & SMARTBOARDS + CLASSROOMS CONNECTED TO INTERNET

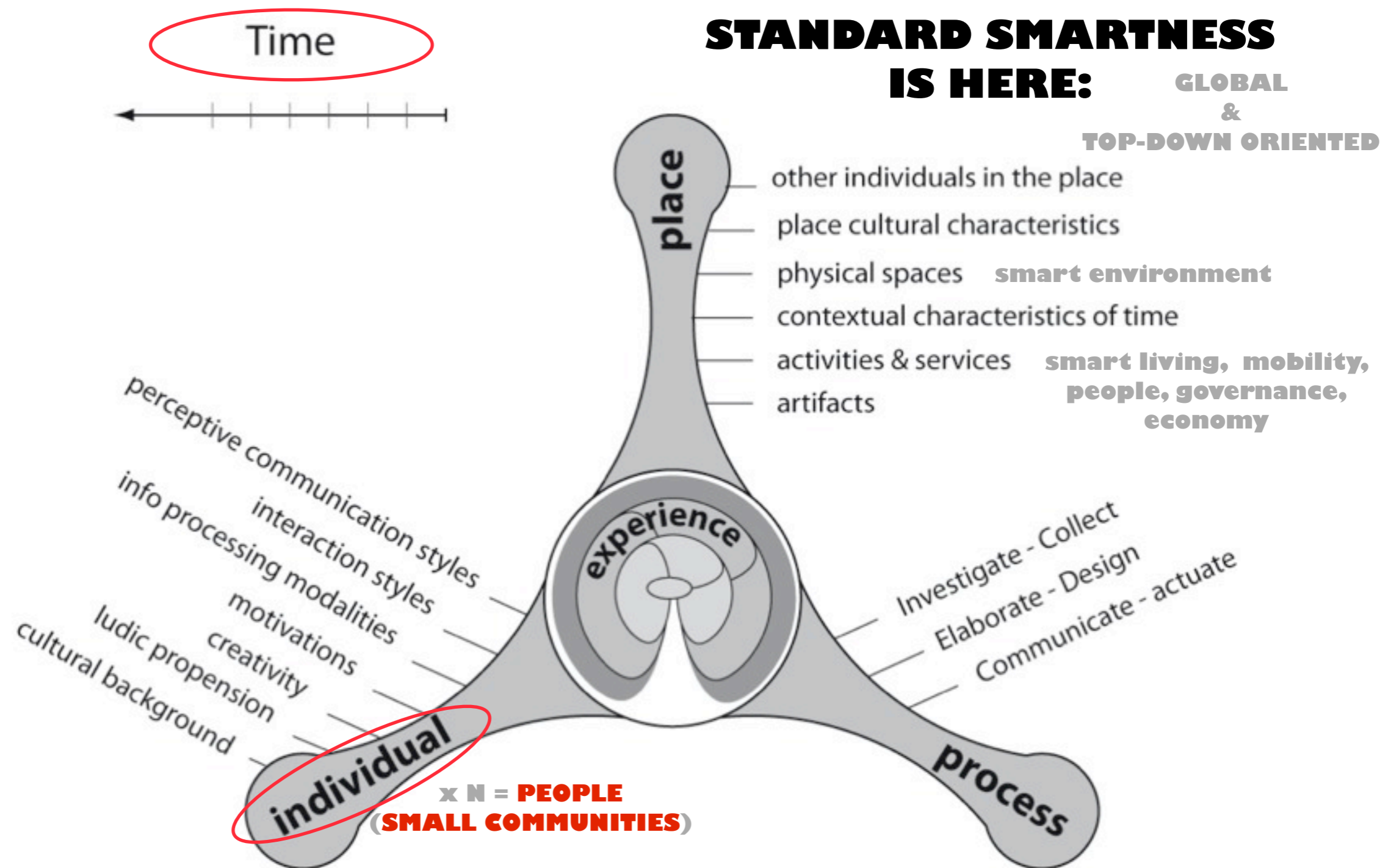
(ICITY RATE - ITALIAN 6 PILLARS)

PEOPLE 16: PENETRATION OF COMPUTERS + CLASSROOMS CONNECTED TO INTERNET + NUMBER OF FOREIGNER STUDENTS + ISCED 5 PER 1,000 AGED 25-30

(SMART CITY WHEEL - 6 PILLARS)

PEOPLE 3: 2 1st EDUCATION -> ISCED 5 PER 1,000 INH

NO TIME AND DYNAMICS



NO INDIVIDUALS

+ NO FLEXIBLE SPACE OF REPRESENTATION

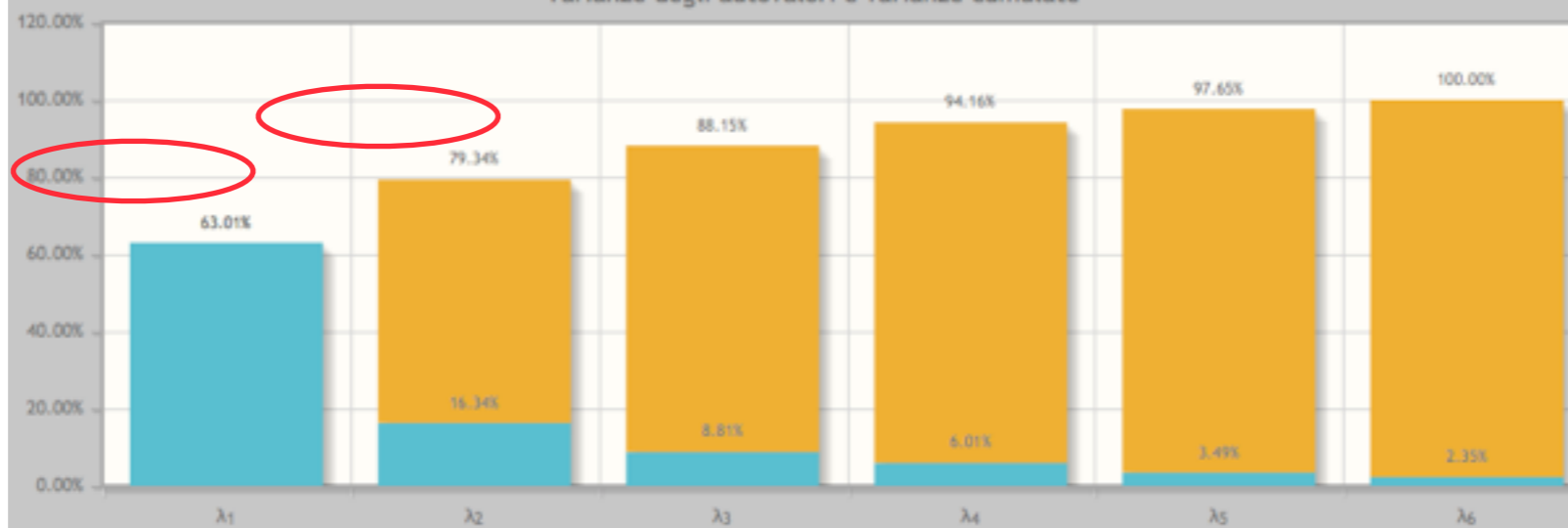
PROBLEM 2: CORRELATIONS

Legenda

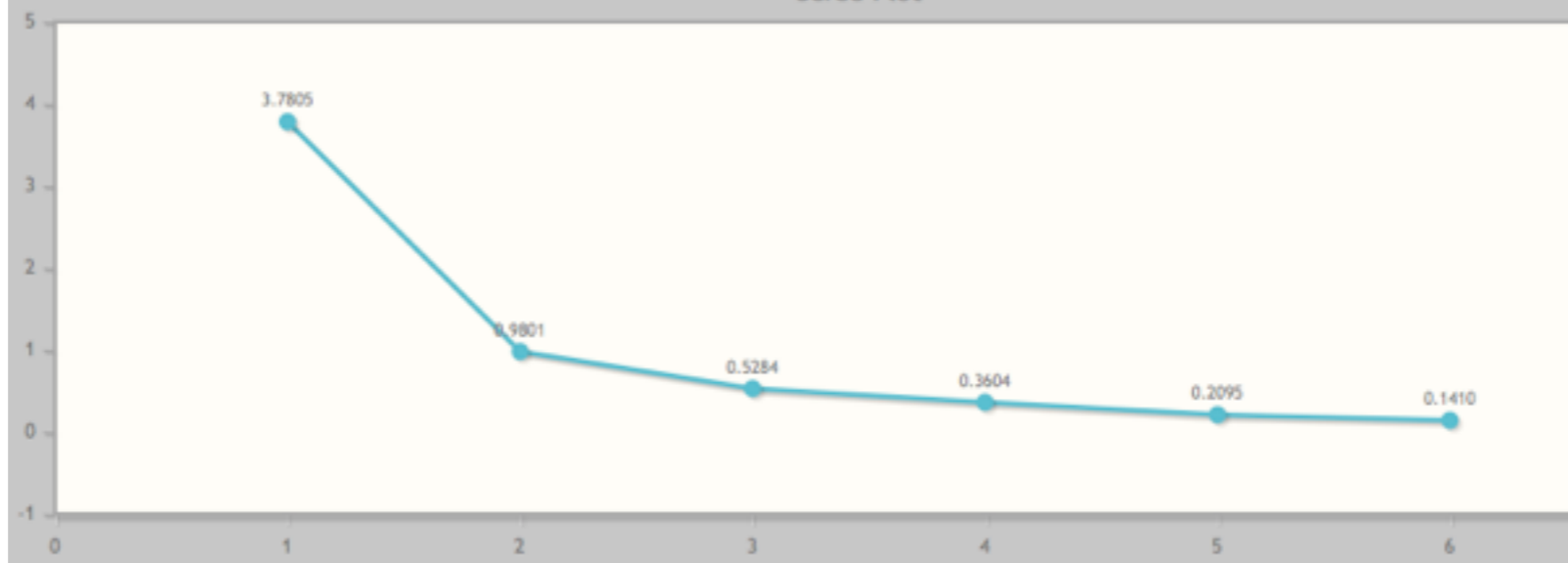
- Par_2 Eco
- Par_3 Peo
- Par_4 Gov
- Par_5 Mob
- Par_6 Env
- Par_7 Liv

Par_1	Par_2	Par_3	Par_4	Par_5	Par_6
1	0.4701	0.6662	0.5867	0.0728	0.6607
0.4701	1	0.6963	0.6362	0.1417	0.6727
0.6662	0.6963	1	0.7091	0.3648	0.8211
0.5867	0.6362	0.7091	1	0.1723	0.8093
0.0728	0.1417	0.3648	0.1723	1	0.2345
0.6607	0.6727	0.8211	0.8093	0.2345	1

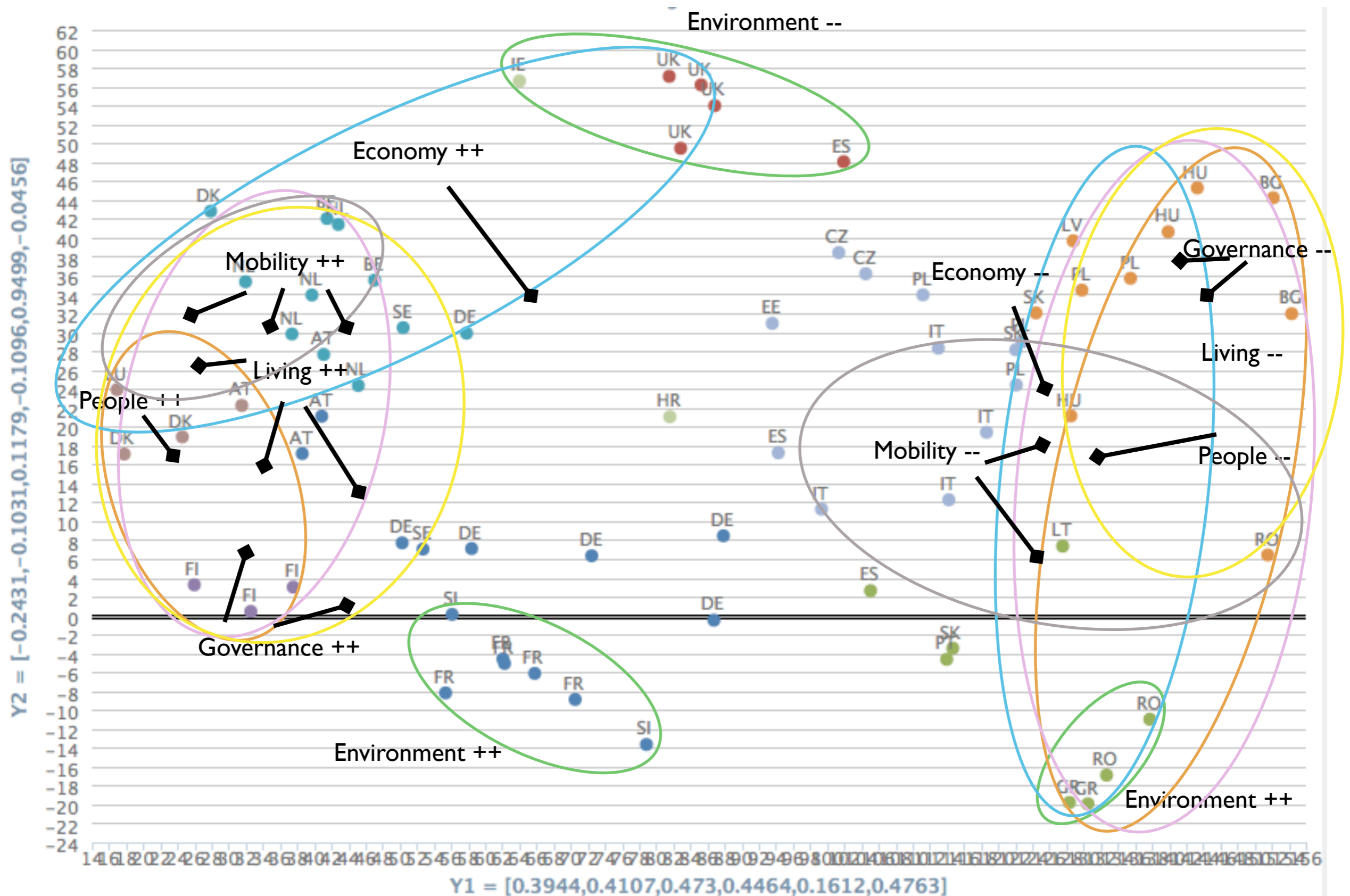
Varianze degli autovalori e varianze cumulate



Scree Plot



PRINCIPAL COMPONENT ANALYSIS (70 medium European Cities)





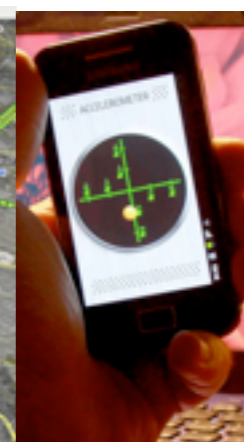
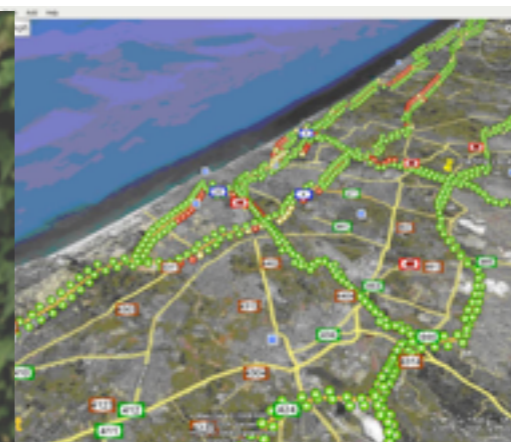
PROBLEM 3:
DYNAMICS

**How to realize
a bottom-up
people centered
analytics
of smart cities and
territories ?**

Focus on traces



DATA PRODUCTION AND COLLECTION ?



**“VOLUNTARY”
ACTIONS**

**LOCALIZED
DETECTORS**

**MOBILITY
DETECTORS**

**PERSONAL
DEVICES**

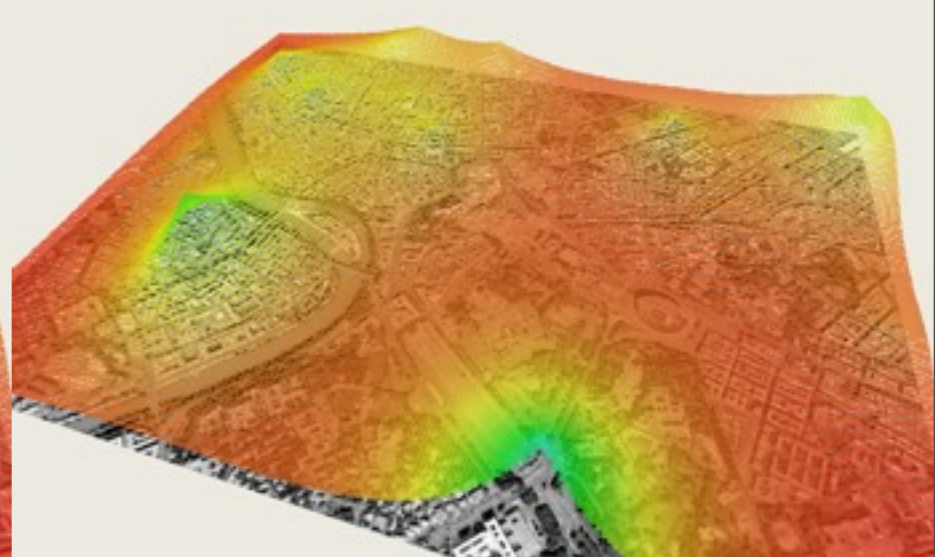
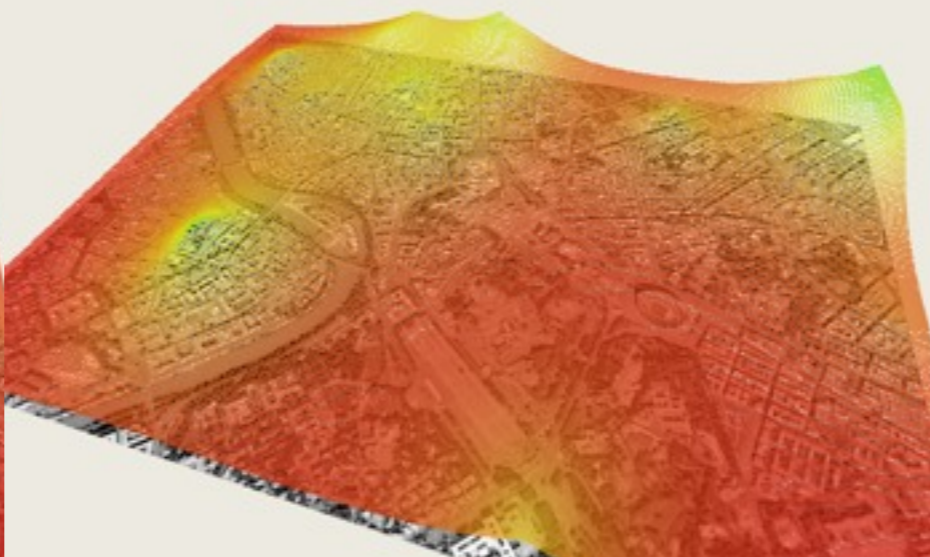
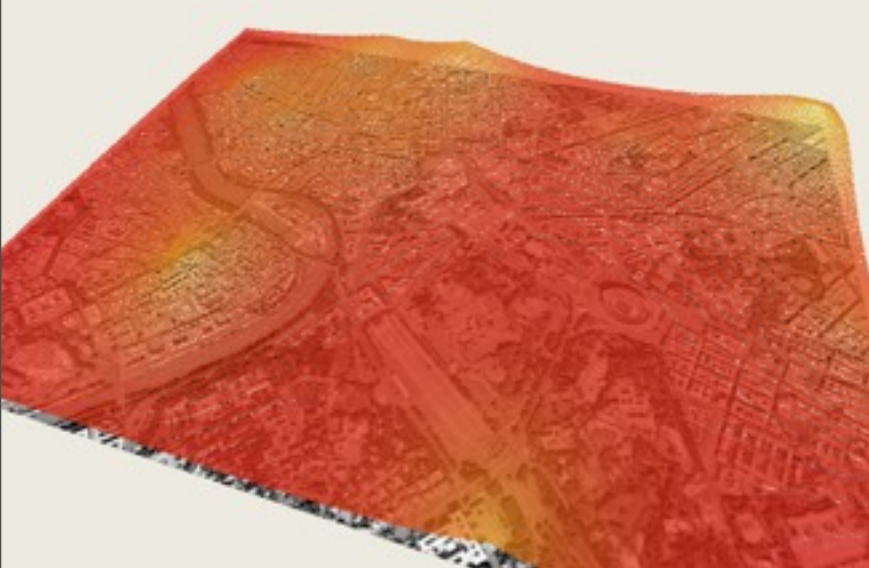
BIG DATA BUT USUALLY NOT OPEN ... AND NOT USED TO BENCHMARK

Dynamics

2006-7-9 16:30

2006-7-10 9:15

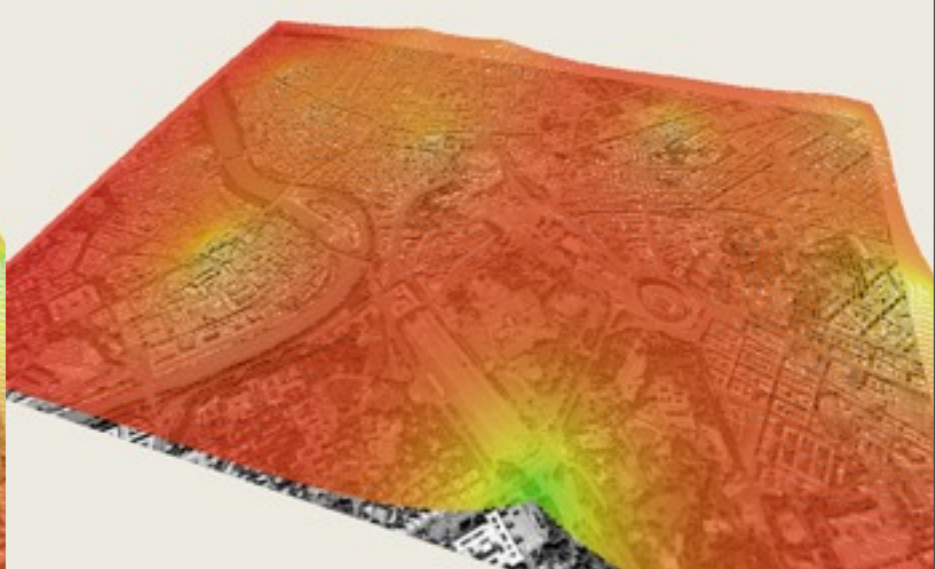
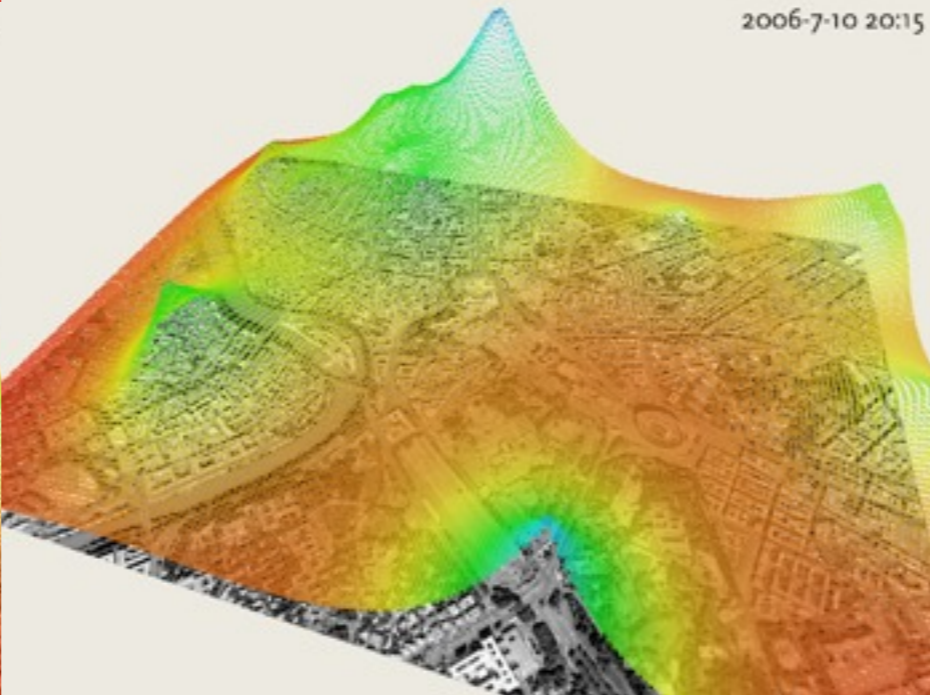
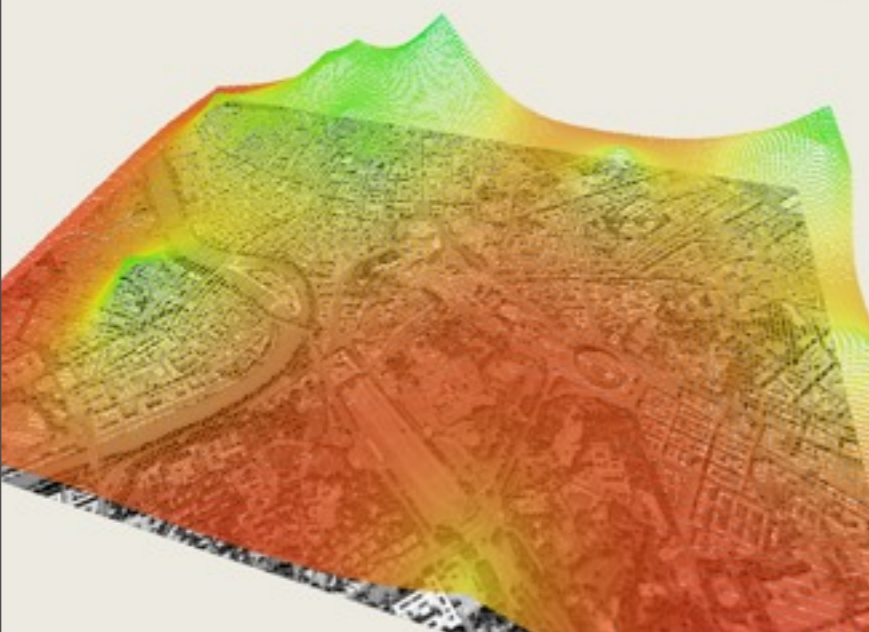
2006-7-9 23:0



2006-7-10 16:30

2006-7-10 20:15

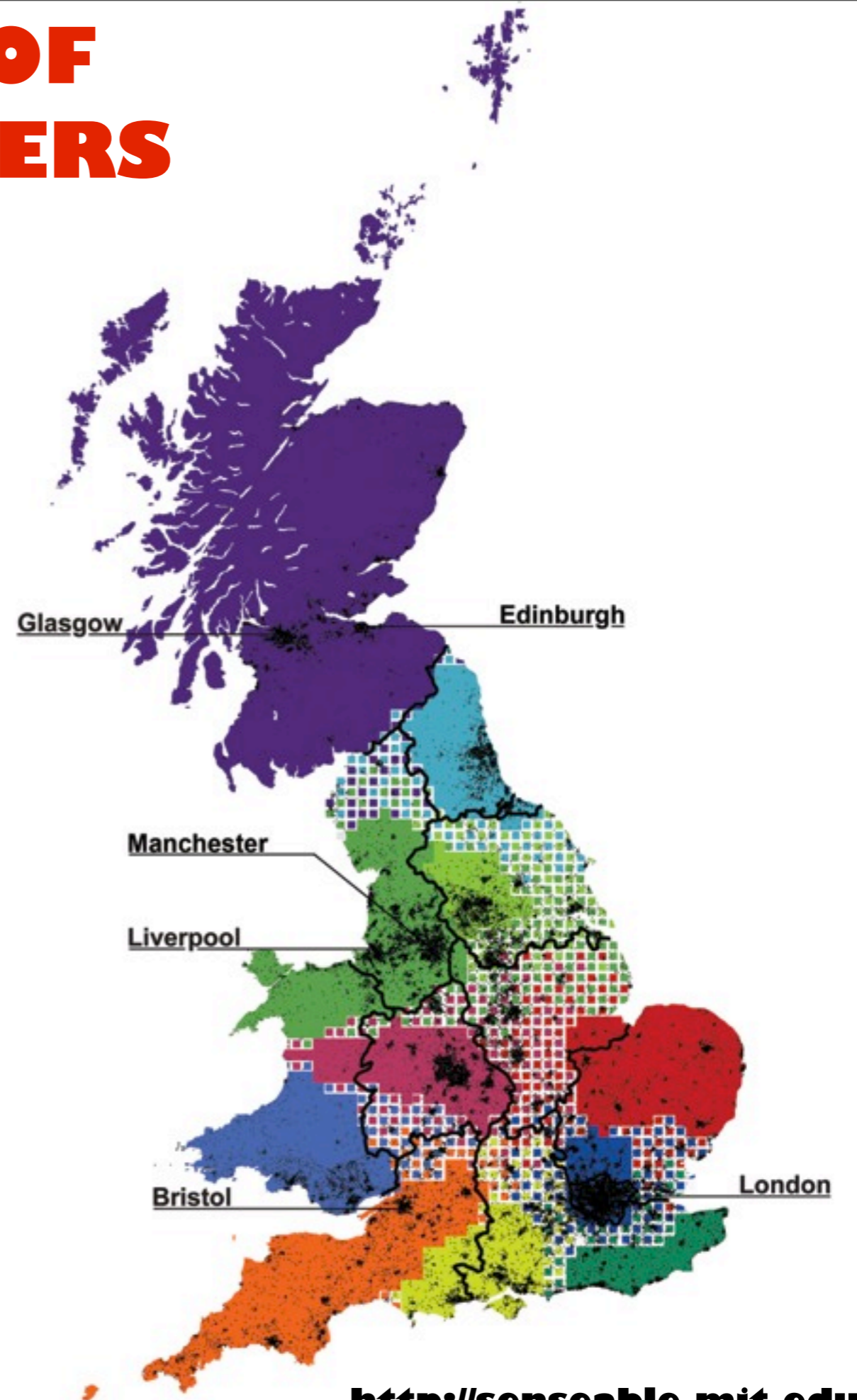
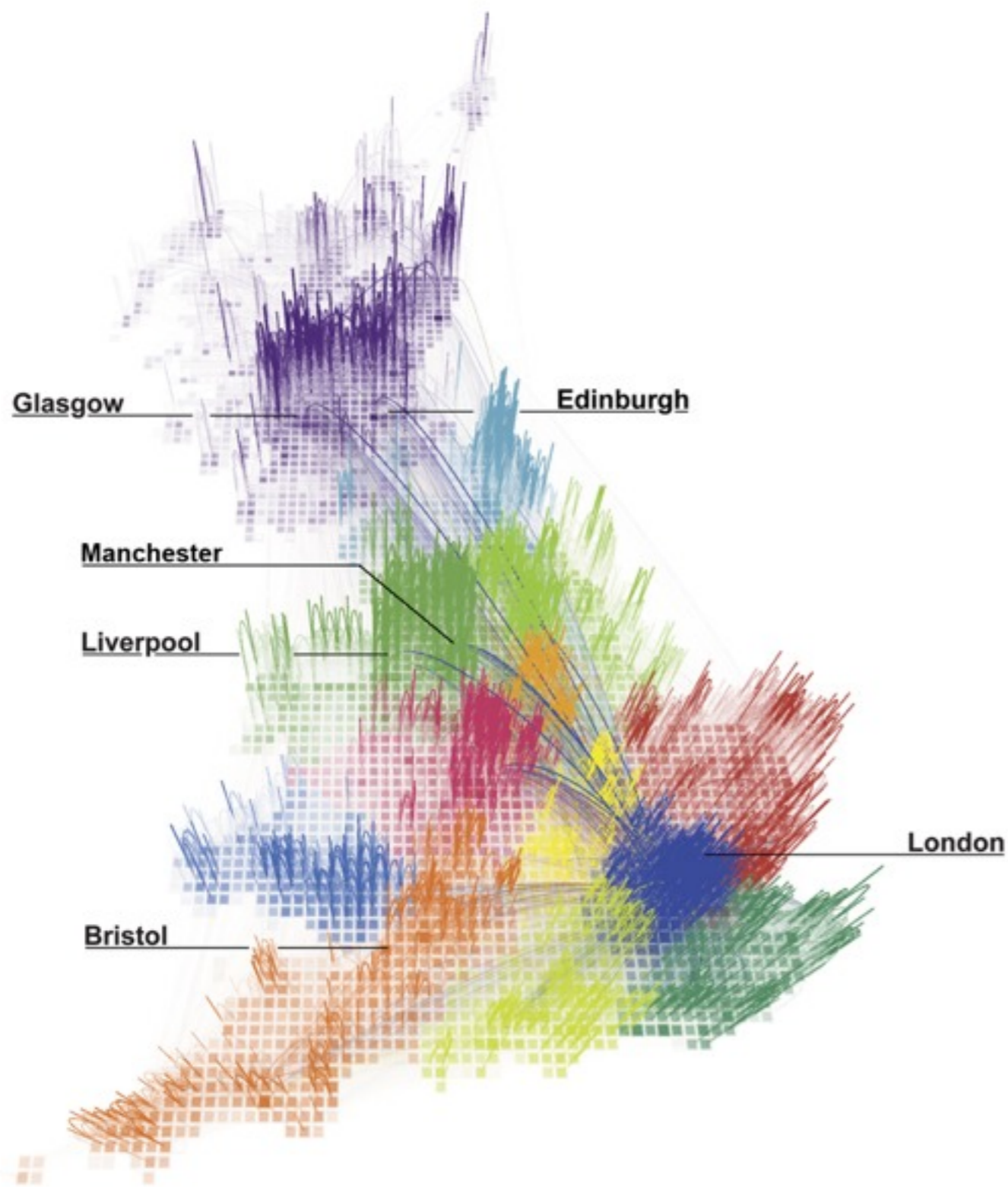
2006-7-11 0:15



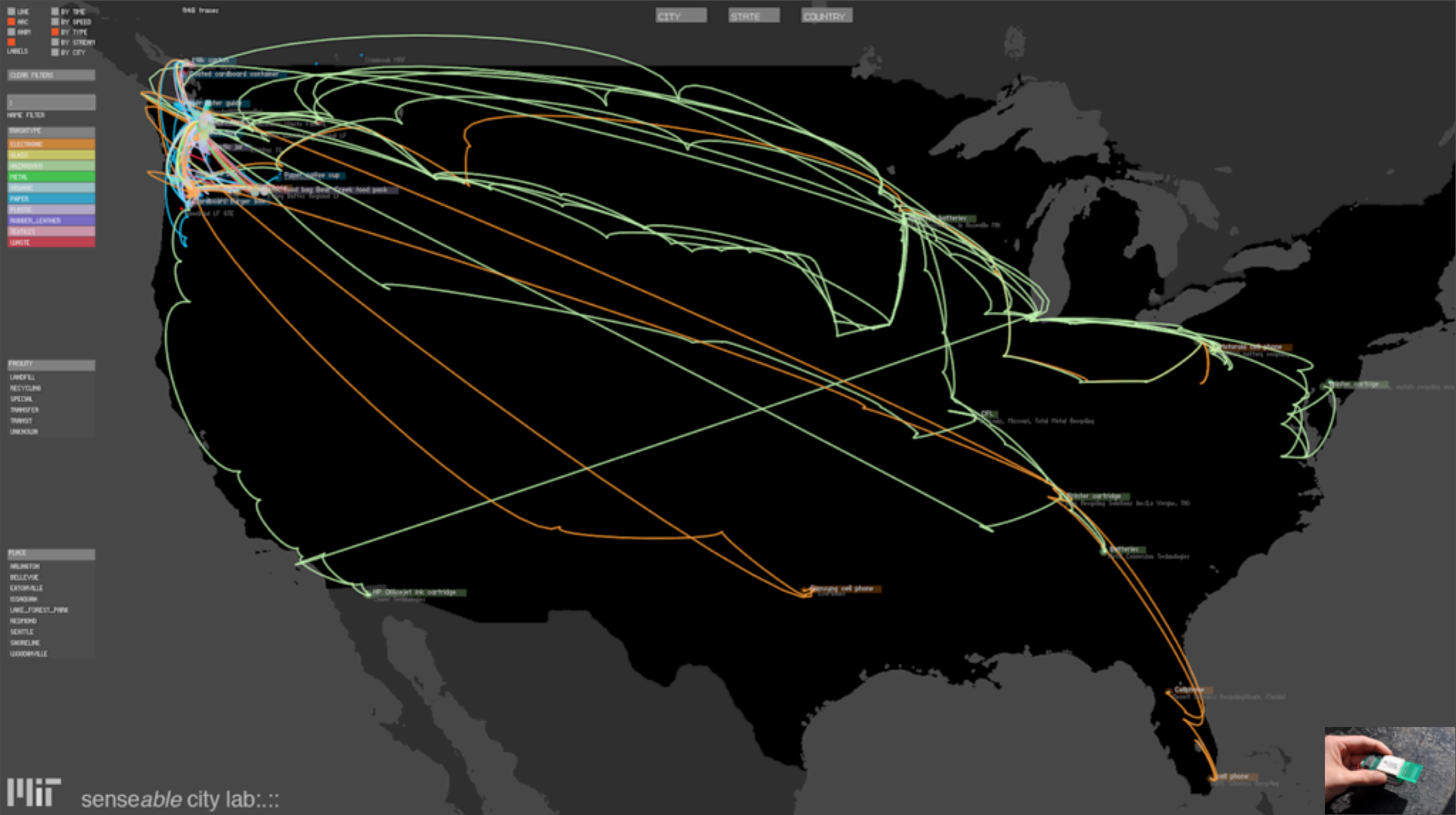
“PULSE” OF THE CITY

<http://senseable.mit.edu>

REDEFINITION OF REGIONAL BORDERS



<http://senseable.mit.edu>



“Nobody wonders where, each day, they carry their load of refuse. Outside the city, surely; but each year the city expands, and the street cleaners have to fall farther back.

The bulk of the outflow increases and the piles rise higher, become stratified, extend over a wider perimeter”

– Italo Calvino, Invisible Cities

SPACE OF FLUXES

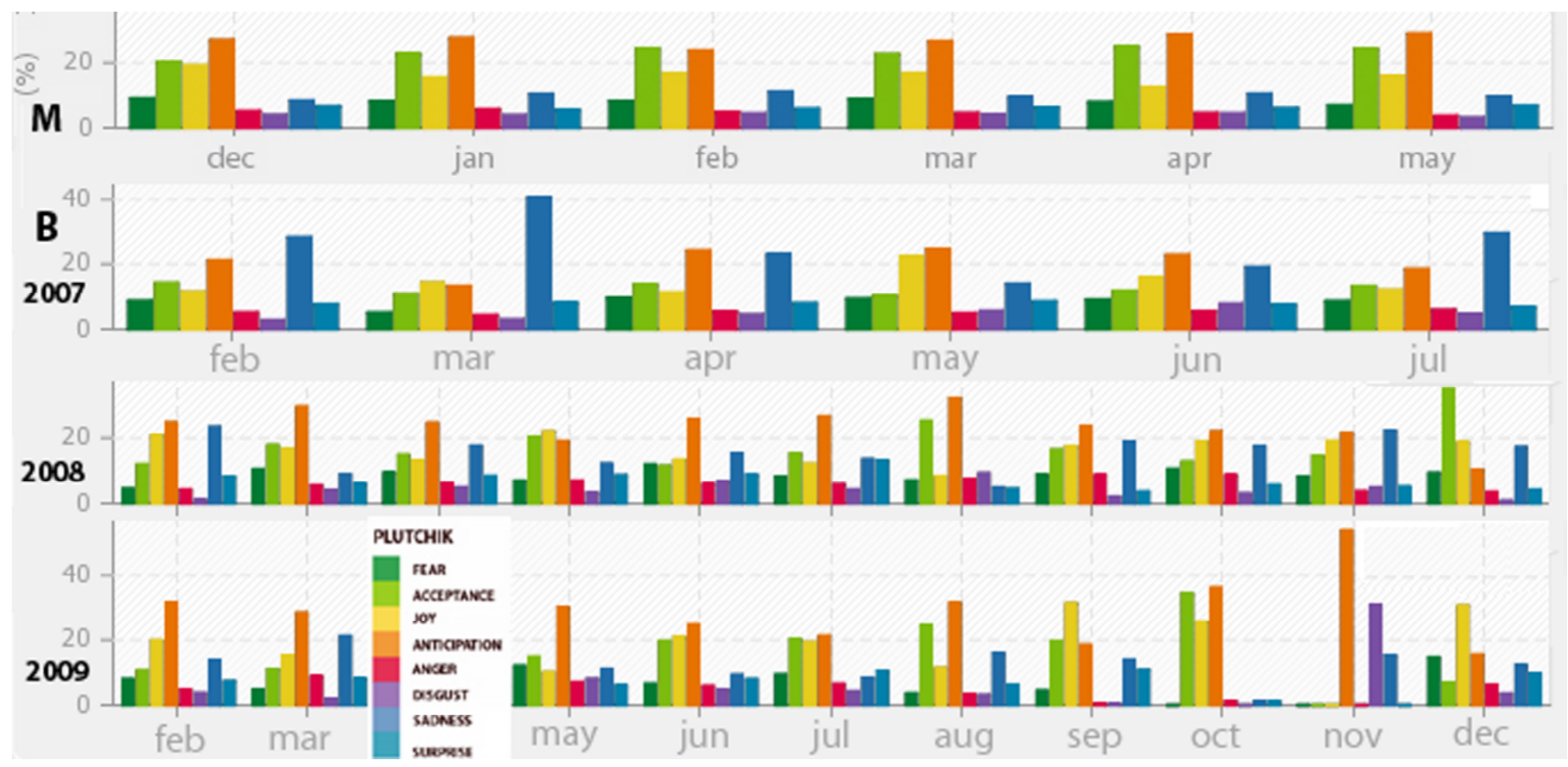
<http://senseable.mit.edu>

Texts

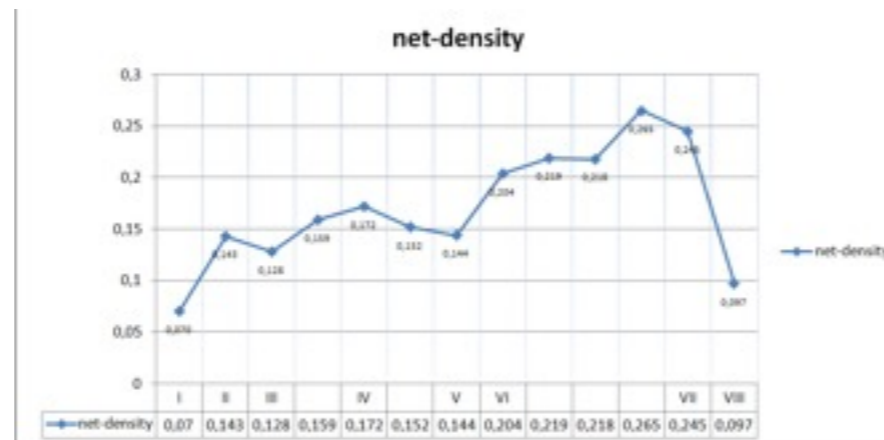
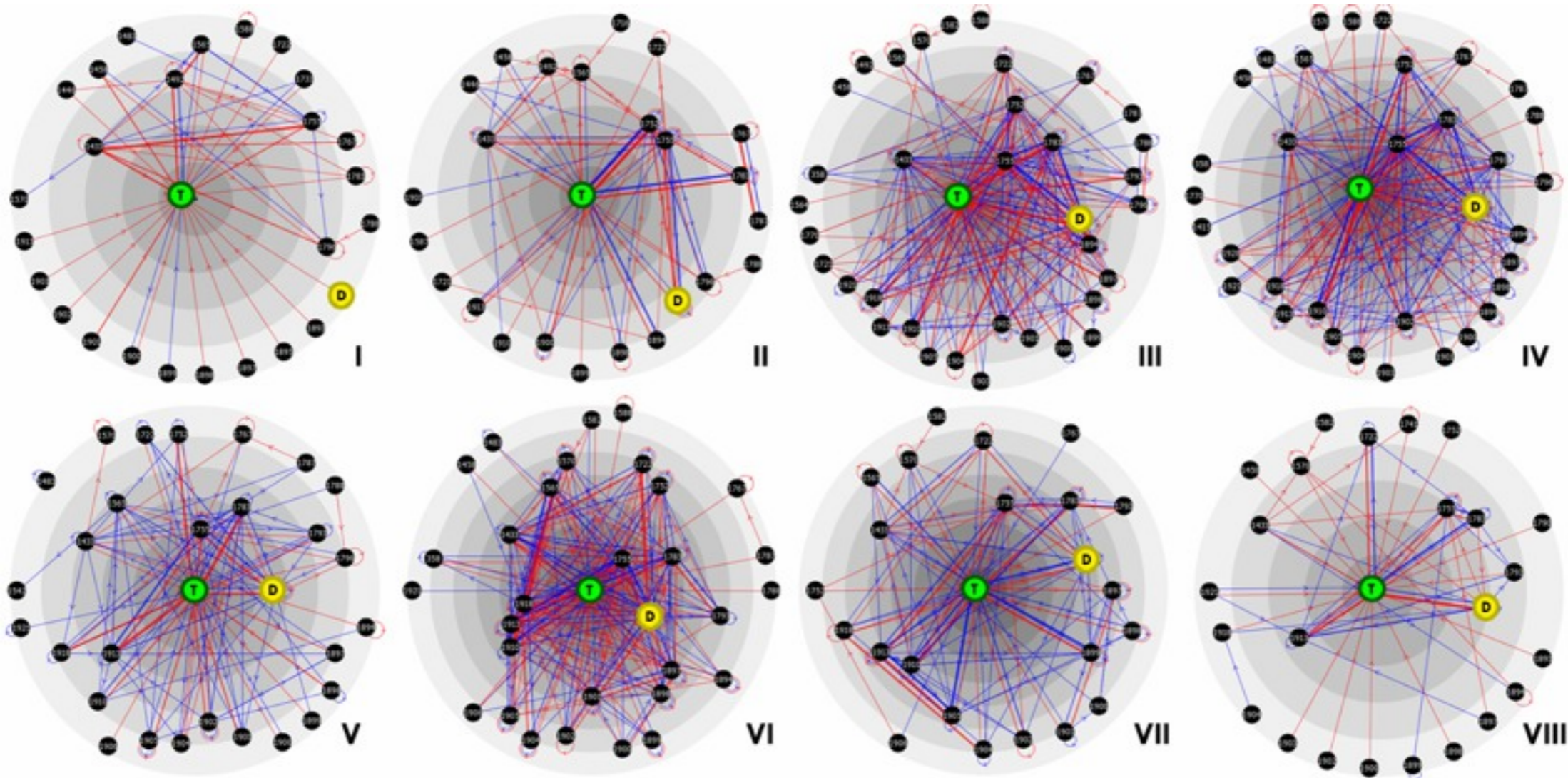
Ex. 1: BOTTOM-UP EMOTIONAL MARKERS



PROCESS EVOLUTION

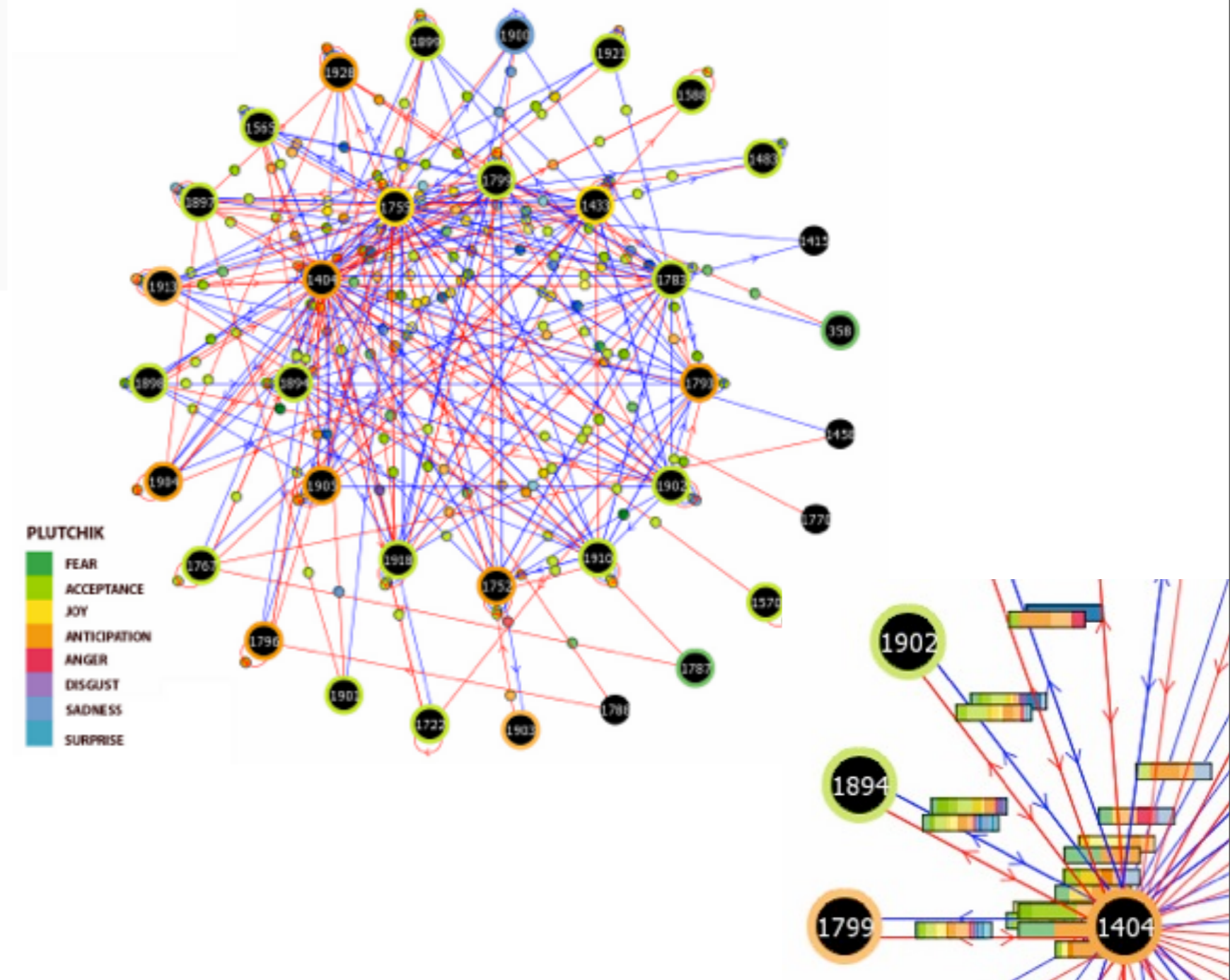
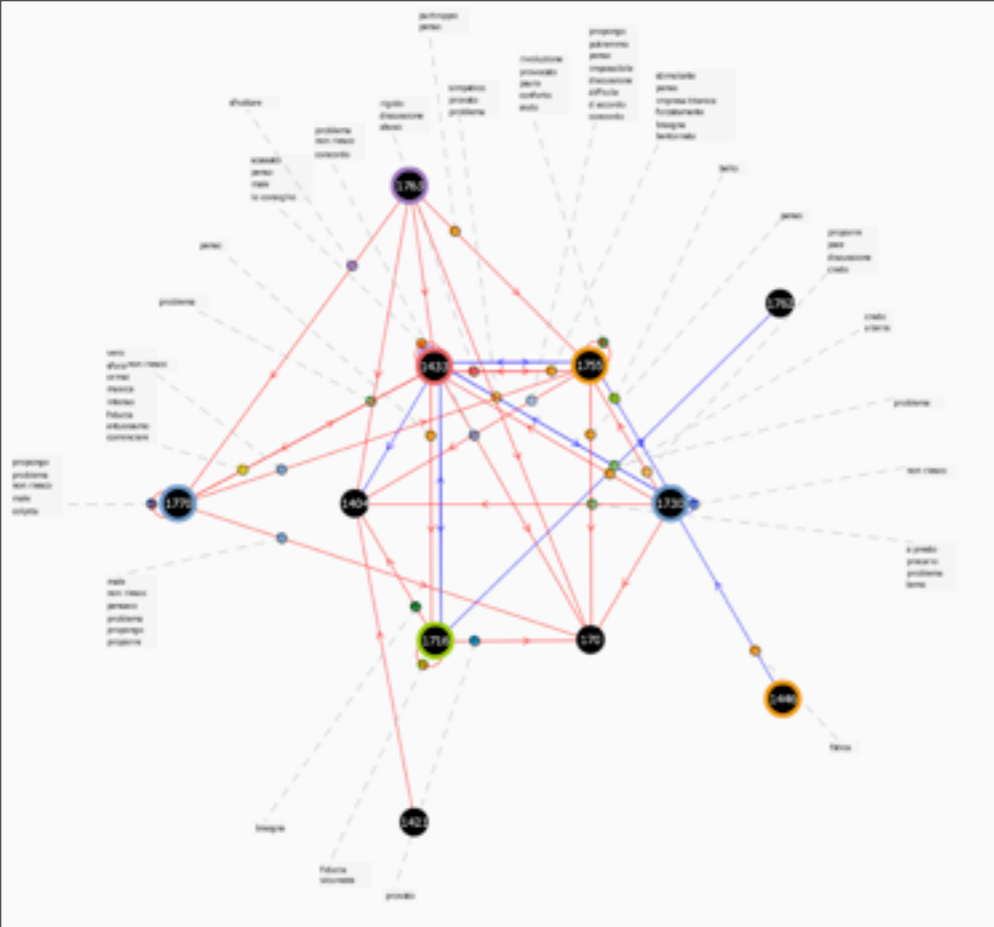


EVOLUTION OF THE SOCIAL NET



**MASTER ELE
ON-LINE**

SOCIAL EMOTIVITY



Ex. 2: EMERGING MEANING

What, in your opinion, does "smart city" mean ?

How could your city become smarter ?

What the role of technology should be ?

How the smartness of a city may depend on the cultural specificities of the territory ?

Which are the skills that should be acquired to be considered "smart citizen" ?

How the way to learn from and in a smart city will change in the future ?

How the content people is going to learn will change in the future due to the smartness of the city ?

What does "digital literacy" mean for you ?

What, in your opinion, does "smart city" mean ?

development	2
think	2
include	2
support	2
way	2
aspect	2
education	2
field	2
need	2
communicate	2
integration	2
institution	2
company	2
lead	2
infrastructure	2
building	2
insecurity	2
direction	2
moment	2
style	2
respect	2
get	2
provide	2
governance	2
level	2
facility	2
device	2
product	2
problem	2
idea	2

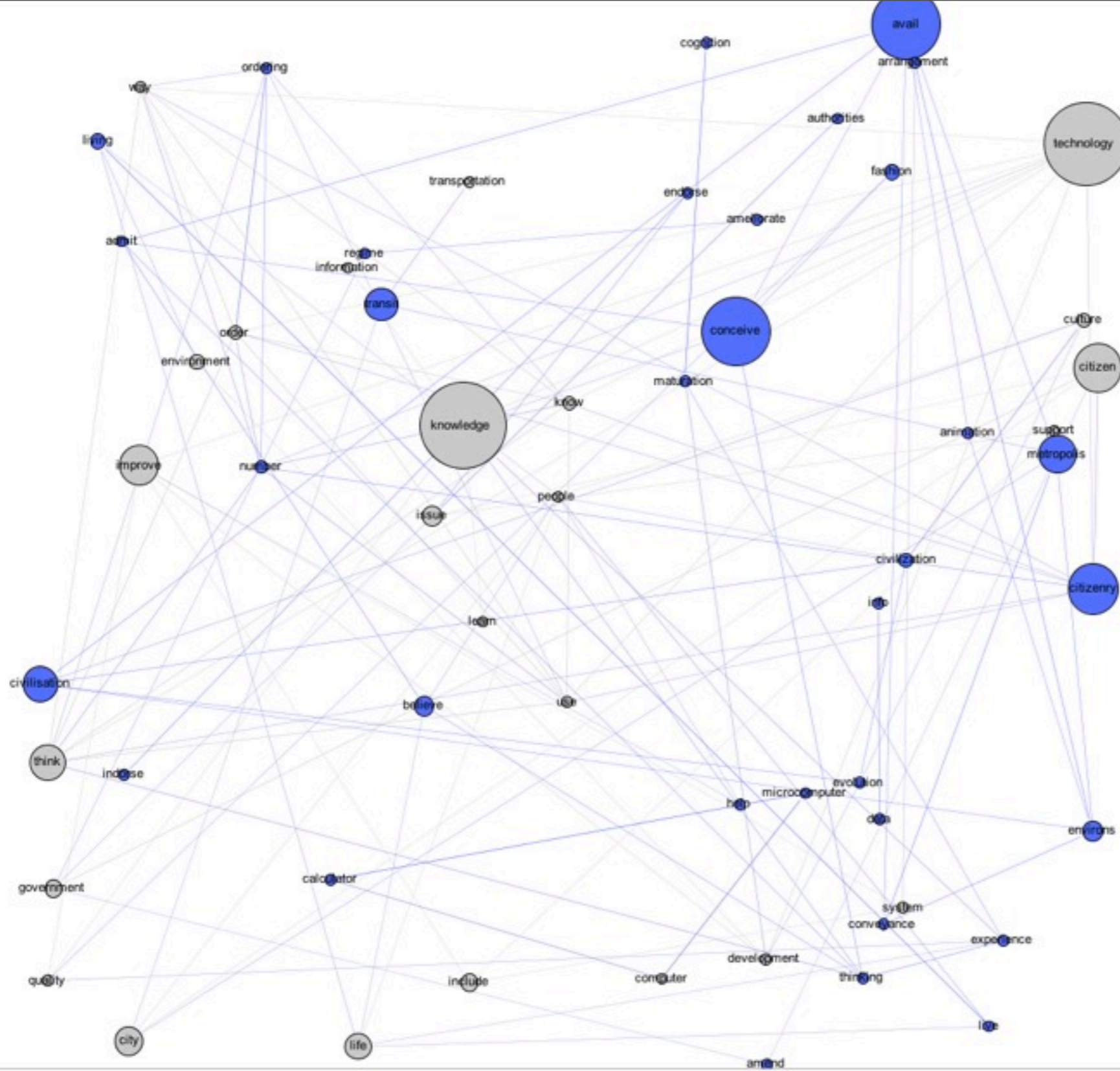
Topics	Relevance
city	17
citizen	5
use	5
information	5
quality	5
life	5
government	4
people	4
service	4
improve	4
technology	4
knowledge	3
know	3
culture	3
order	3
computer	3
system	3
transportation	3
environment	3
issue	3
learn	3

of
with accent on
focus
related to
supported by

	frequency (relevance)
citizen	8+1 (5)
use	5(5)
information	7(5)
quality	4(5)
life	8 (5)
government	3(4)
people	3(4)
service	
improve	4(4)
technology	7+5(4)
knowledge	4(3)
know	a.
culture	3(3)
order	m.m.

etc.

human -> meaning by word clustering



citizenry
civilization
environs
experience
metropolis
transit

and many more

Emergent words & meanings:

citizenry -> citizen, technology, way, know, order, number*, think, use
experience -> quality, life, knowledge, maturation*, thinking* [double meaning]
etc.

RESUMING

NOT BIG DATA BUT SMART DATA

(MEANINGFUL AND NOT STRONGLY CORRELATED)

TO DEFINE THE TERRITORIAL SMARTNESS:

GLOBAL + LOCAL

EMERGENT SPACE OF REPRESENTATION + MODEL

(NOT JUST SINGLE VALUE OR RANKINGS)

**DYNAMICS IS NEEDED, ALSO TO DEFINE
THE BORDER OF A TERRITORY**

**MORE CONSIDERATION FOR THE
PERSON**

IMPLIES BOTTOM-UP APPROACH AND THE

DEVELOPMENT OF A LOT

OF MULTIDIMENSIONAL ANALYTICS AND TOOLS