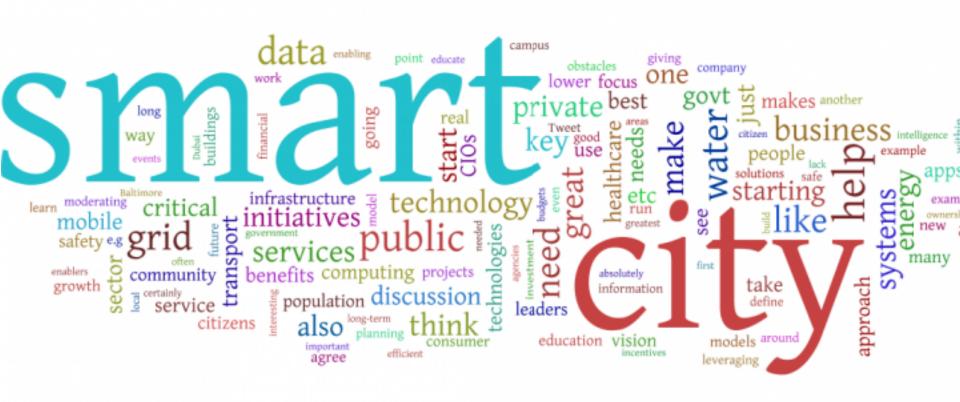# How will our cities be remembered a thousand years from now?

Roberto Saracco Trento Node Director

Tweet: @EITICTLabs #RDULM14 - @rsaracco

Smart City … what is it?

Happy citizens with Minimun Resources

Cities have always been smart

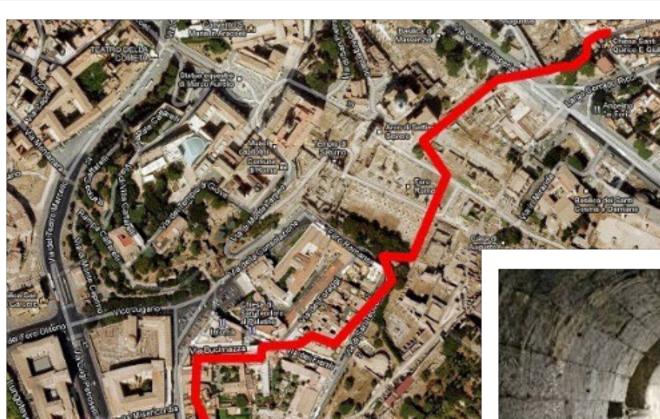| City	Year	Pop
Mureybet	8000 BC	500
Çatalhöyük	7000 BC	1,000
Uruk	4000 BC	5,000
Eridu	3500 BC	10,000
Uruk	2500 BC	50,000
Ur	2000 BC	100,000
Carthage	2000 BC	500,000
Rome	0 AD	1,000,000
Hangzhou	1300 AD	1,500,000

Paris 1850 - 1 million

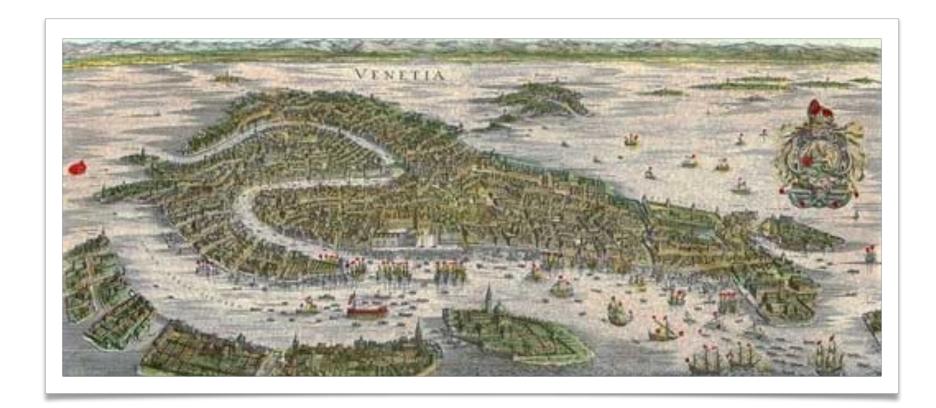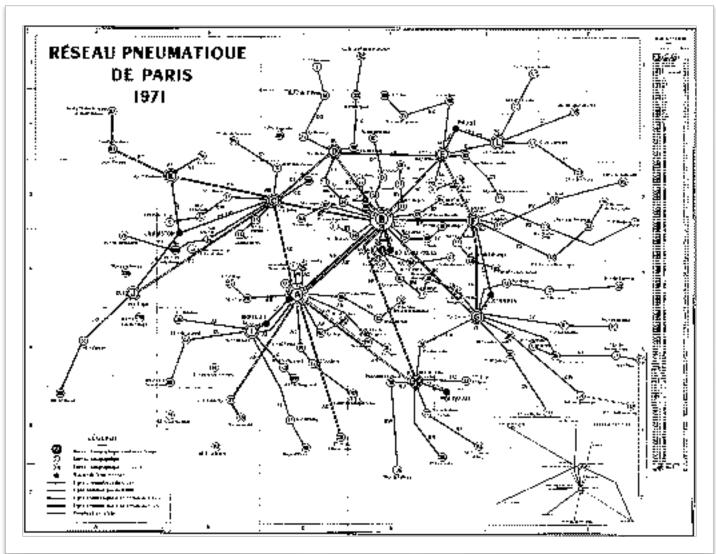# Cities are sustained by "hard" infrastructures

… as well as "soft" infrastructures

Carrying "time" in pipes

Did you know?
Paris …

* has 3,000 km of streets

* has 2,417 km of sewers

* has 30,000 rubbish bins

* has 60,000 businesses

* 110,000 Velib journeys per day

* energy requirement rose from 19 to 276 GJ from 1730 to 2010 pp py

The Context ...

- 1960
  >> 34%

- 2014
  >> 54%

Cities are Reaching Their Limits

Cities must become smarter about using existing capacity and resources

80%
Cities produce nearly 80 percent of the world's carbon emissions.

1 billion
Today there are more than 1 billion cars on the road. That number will double by 2020.

2012 1 Billion   2020 2 Billion

1 second
Every second, the urban population grows by 2 people. Almost 180,000 people move into cities each day.

50%
Cities lose as much as 50 percent of their water supply to leaky infrastructure.

1/3
Commercial and residential buildings consume 1/3 of the world's energy.

IBM

No city will ever be smart …

400B$ the expected market in 2020
to make cities **smarter**

Very few cities can be designed top down…

And even then, success is not a sure thing…
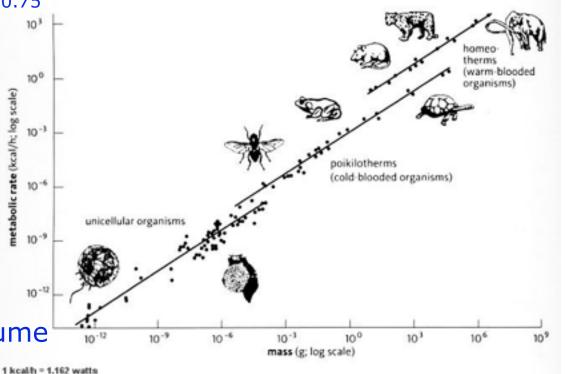
Allometry

- Kleiber Law
  Metabolic Rate = $70M^{0.75}$

- Surface vs Volume

- It should be $M^{0.66}$

- Fractal Infrastructure

- The infrastructure is
  key
  to the increase in volume

1 kcal/h = 1.162 watts

https://www.eitictlabs.eu/news-events/blog/article/
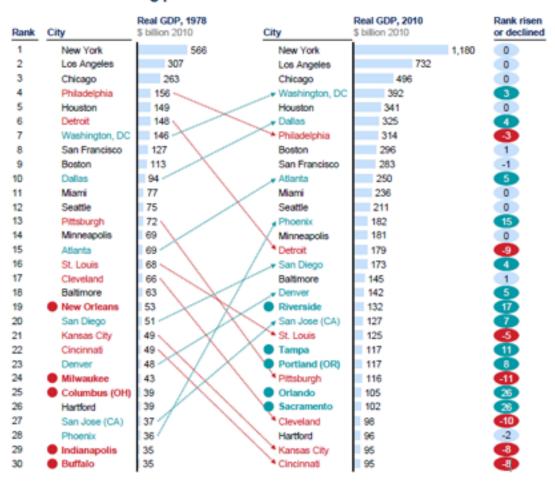allometry-does-it-apply-to-smart-cities/

Allometry

- The Bigger the City the more wealth pro capita produced. Why?

- Higher wealth attracts more people or more people create more wealth?

- Wealth=aPop$^{0.75}$

There have been significant shifts in the economic weight of the top US cities over a long period

● Entered top 30   ----→ Rose at least 3 spots
● Dropped from top 30   ----→ Declined at least 3 spots

Rank	City	Real GDP, 1978 $ billion 2010	City	Real GDP, 2010 $ billion 2010	Rank risen or declined
1	New York	566	New York	1,180	0
2	Los Angeles	307	Los Angeles	732	0
3	Chicago	263	Chicago	496	0
4	Philadelphia	156	Washington, DC	392	3
5	Houston	149	Houston	341	0
6	Detroit	148	Dallas	325	4
7	Washington, DC	146	Philadelphia	314	-3
8	San Francisco	127	Boston	296	1
9	Boston	113	San Francisco	283	-1
10	Dallas	94	Atlanta	250	5
11	Miami	77	Miami	236	0
12	Seattle	75	Seattle	211	0
13	Pittsburgh	72	Phoenix	182	15
14	Minneapolis	69	Minneapolis	181	0
15	Atlanta	69	Detroit	179	-9
16	St. Louis	68	San Diego	173	4
17	Cleveland	66	Baltimore	145	1
18	Baltimore	63	Denver	142	5
19	New Orleans	53	Riverside	132	17
20	San Diego	51	San Jose (CA)	127	7
21	Kansas City	49	St. Louis	125	-5
22	Cincinnati	49	Tampa	117	11
23	Denver	48	Portland (OR)	117	8
24	Milwaukee	43	Pittsburgh	116	-11
25	Columbus (OH)	39	Orlando	105	26
26	Hartford	39	Sacramento	102	26
27	San Jose (CA)	37	Cleveland	98	-10
28	Phoenix	36	Hartford	96	-2
29	Indianapolis	35	Kansas City	95	-8
30	Buffalo	35	Cincinnati	95	-8

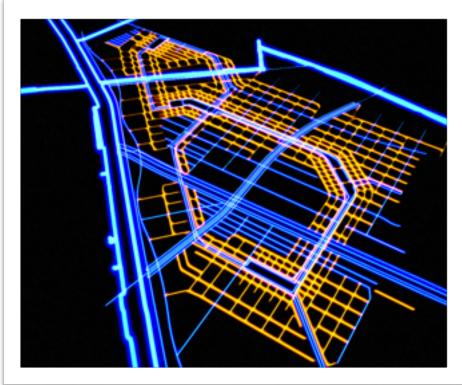SOURCE: Moody's Analytics; McKinsey Global Institute analysis

Allometry

- Can we have infrastructures able to have higher than fractal efficiency?

- Unlikely, but …

- ICT infrastructures can have higher efficiency

- SDN, NFV

- Biz leveraging ICT

Tianjin City Science Tech - fractal
http://urbanizone.wordpress.com/tag/parametric-urbanism-2/

Smarter Cities or   Smarter Citizens?

✸ The chicken **or** the egg?

✸ What is more effective?
 - Transportation
 - Energy saving

✸ Singapore

✸ Amsterdam

Smarter Cities or
Smarter Citizens?

- ✹ Increase Citizen Awareness
  - talk their language
  - create culture
  - leverage on social

- ✹ Create involvement
  - make they see they can make a difference
  - citizens as information sources

- ✹ Are we getting "smarter"?

New Infrastructures
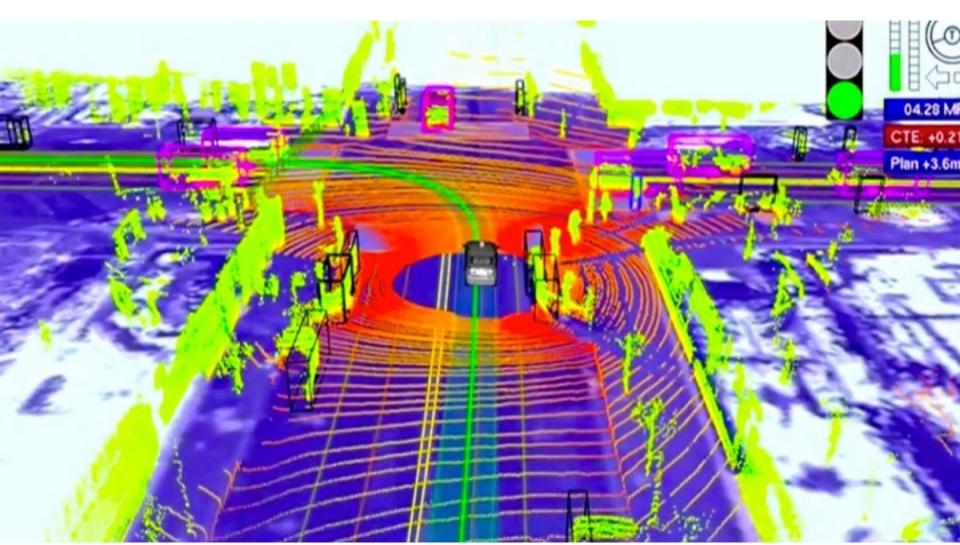
* The dual role of infrastructures

* It is much more than ICT but … ICT is pervasive

* Open Data can be the unifying Infrastructure
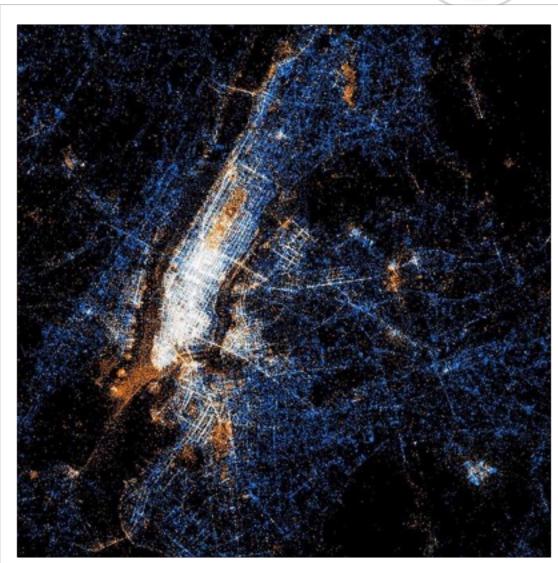

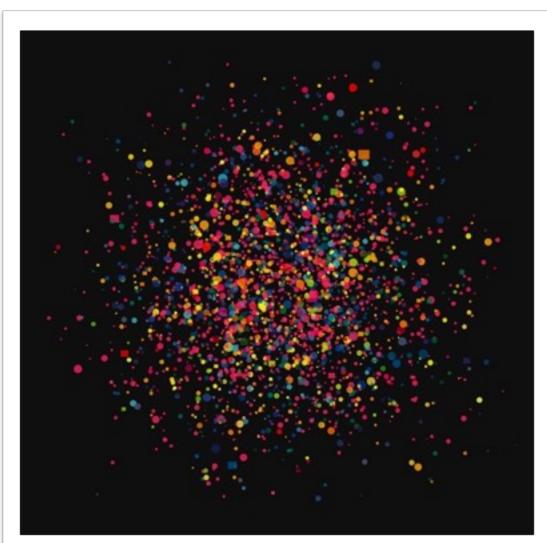http://www.hitachi.com/products/smartcity/vision/concept/it.html

Atoms & Bits: a new infrastructure

* ## Self Driving Cars

Atoms & Bits: a new infrastructure

* Self Driving Cars

* Tweets

Atoms & Bits: a new infrastructure

* Self Driving Cars

* Tweets

* We feel fine

Atoms & Bits: a new infrastructure

* Self Driving Cars

* Tweets

* We feel fine

* Augmented Reality

Atoms & Bits: a new infrastructure

* Self Driving Cars

* Tweets

* We feel fine

* Augmented Reality

* 3cixty

Atoms & Bits: a new infrastructure

* Self Driving Cars

* Tweets

* We feel fine

* Augmented Reality
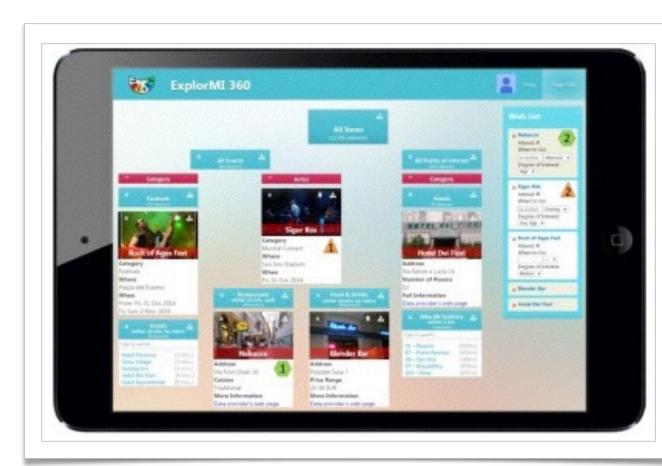
* 3cixty

* Isochronic Singapore

Wrapping up

* Smart City is a way of being, a path into the future

* Infrastructures are the enablers of Cities,
   the smarter they are, the smarter the city

* ICT can enable more efficient infrastructures
   providing better wealth multiplier effect

* ICT can enable **people based infrastructures**
   and can monitor the social "mood"

* Wealth and Well being are not contradictory