

---

# **Innovative Cities and Regions – the (research and policy) challenges**

**Wolfgang Polt**

Joanneum Research / POLICIES – Centre for Economic and Innovation Research

[wolfgang.polt@joanneum.at](mailto:wolfgang.polt@joanneum.at)

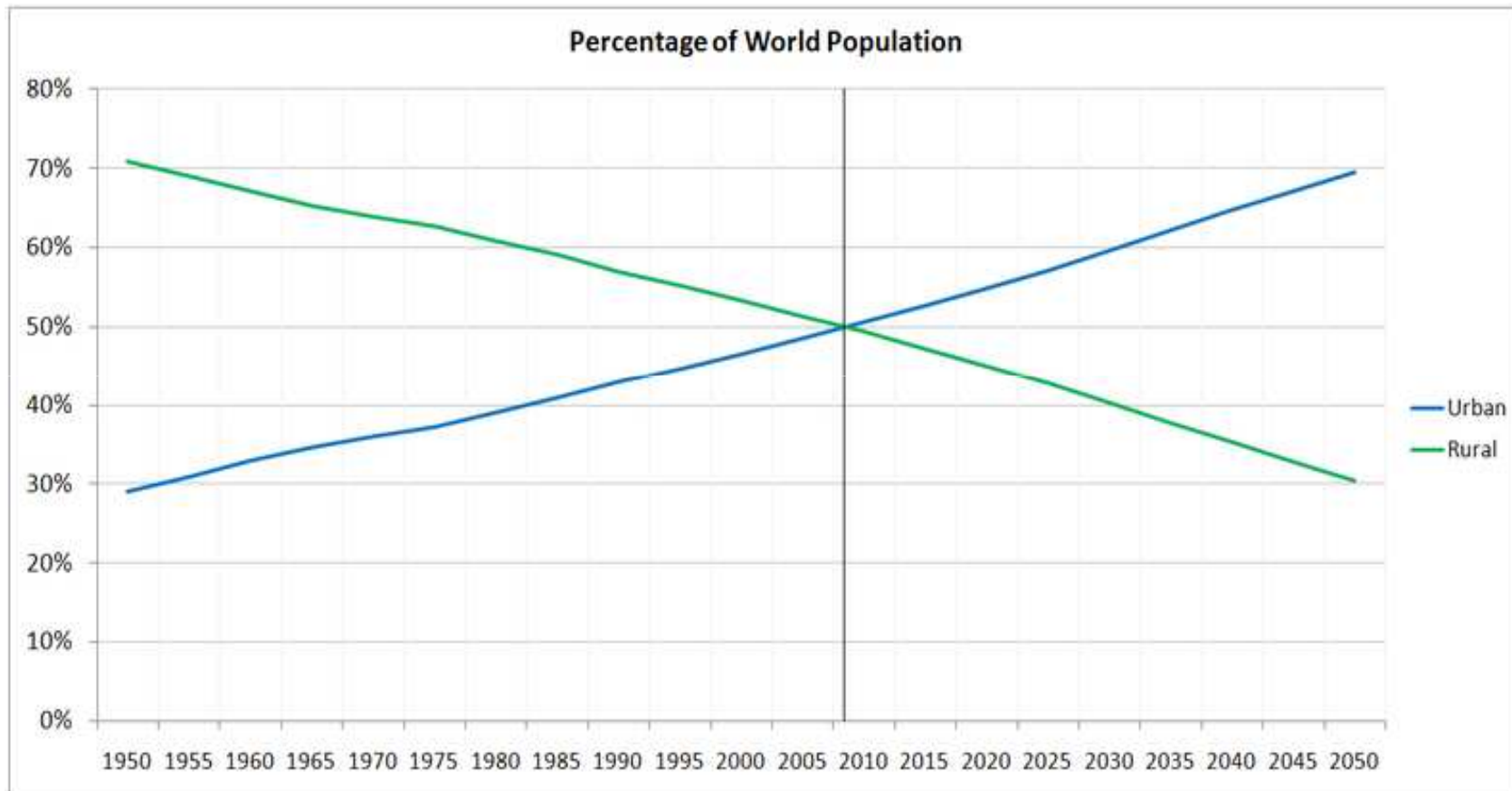
with inputs from Helmut Gassler and Susanne Meyer (JR-POLICIES)

**2011 JIIP Symposium: “Making cities and regional fit for  
innovation: Research needs and policy perspectives”**

## B. Friedman: „*The world is flat*“

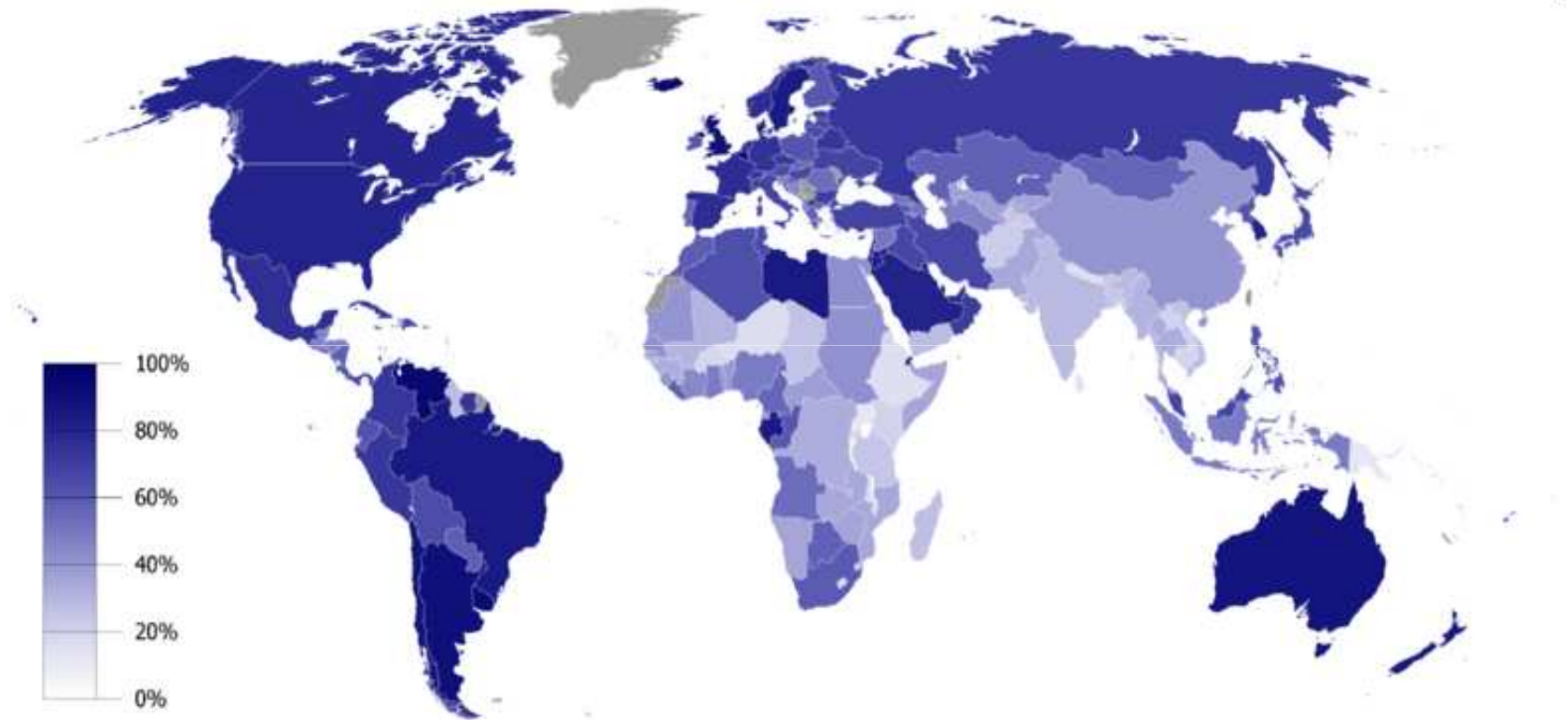
- Some observations: the world is **spiky** – and **paved**: cities are the hubs of economic and innovation activities
- The questions: What factors make for innovative cities?
- Major Challenges and Opportunities for Urban Development (and related research and policy)

# Global Trend of Urbanisation



Data Source: United Nations, <http://esa.un.org/unup/p2k0data.asp>

# Degree of Urbanisation worldwide



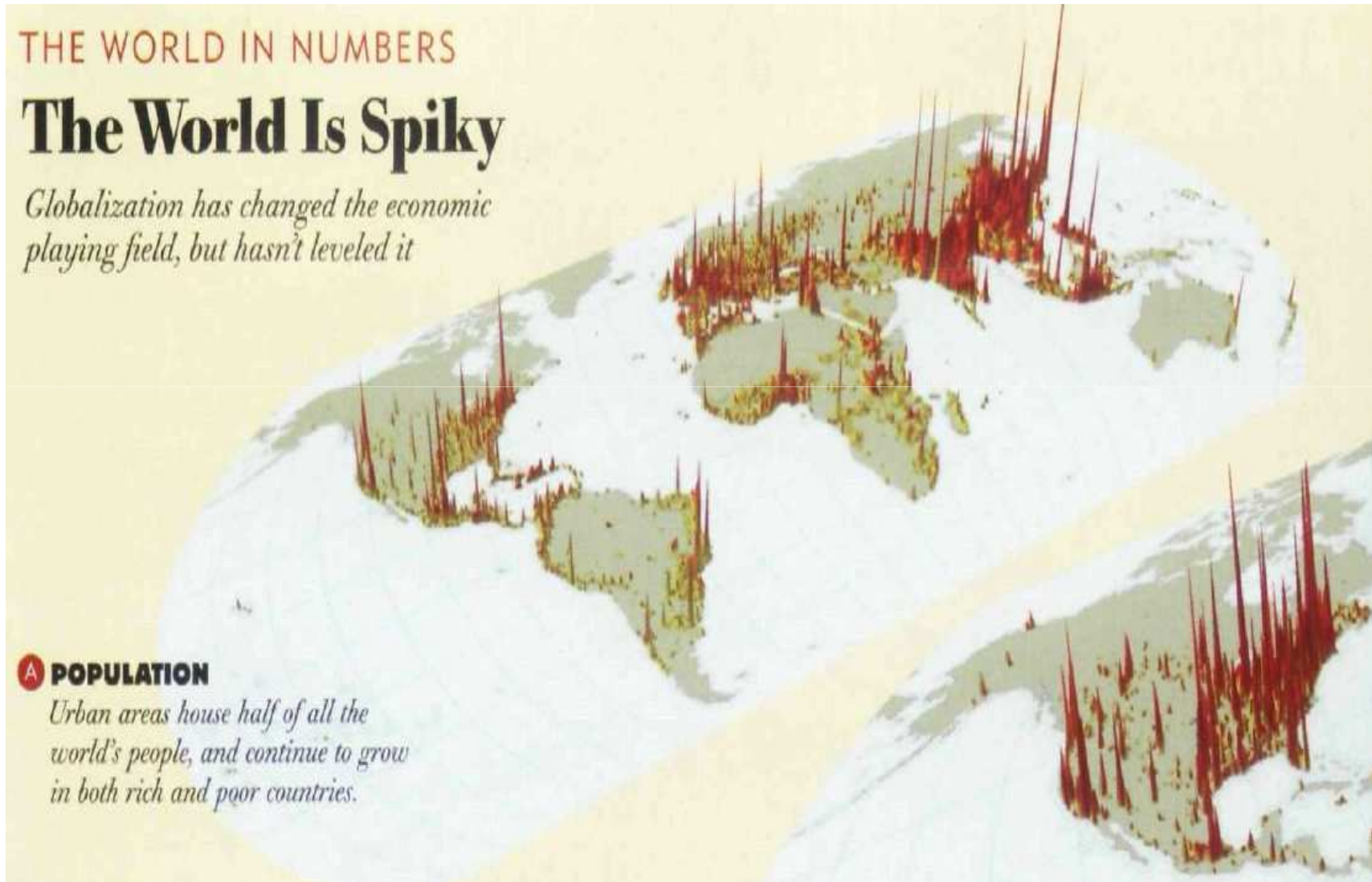
Source: UN

# Cities as hubs of innovation

---

- **Knowledge production:** Cities as centres of science & research
- **Innovativeness:** Cities as hubs of invention and innovation
- Cities as **test beds** for generic solutions
- Cities as **lead markets** for innovation
- Cities as ground for **large scale applications**
- Specific European dimension: “**uniqueness**” of the European city, specific urban patterns and policy environment

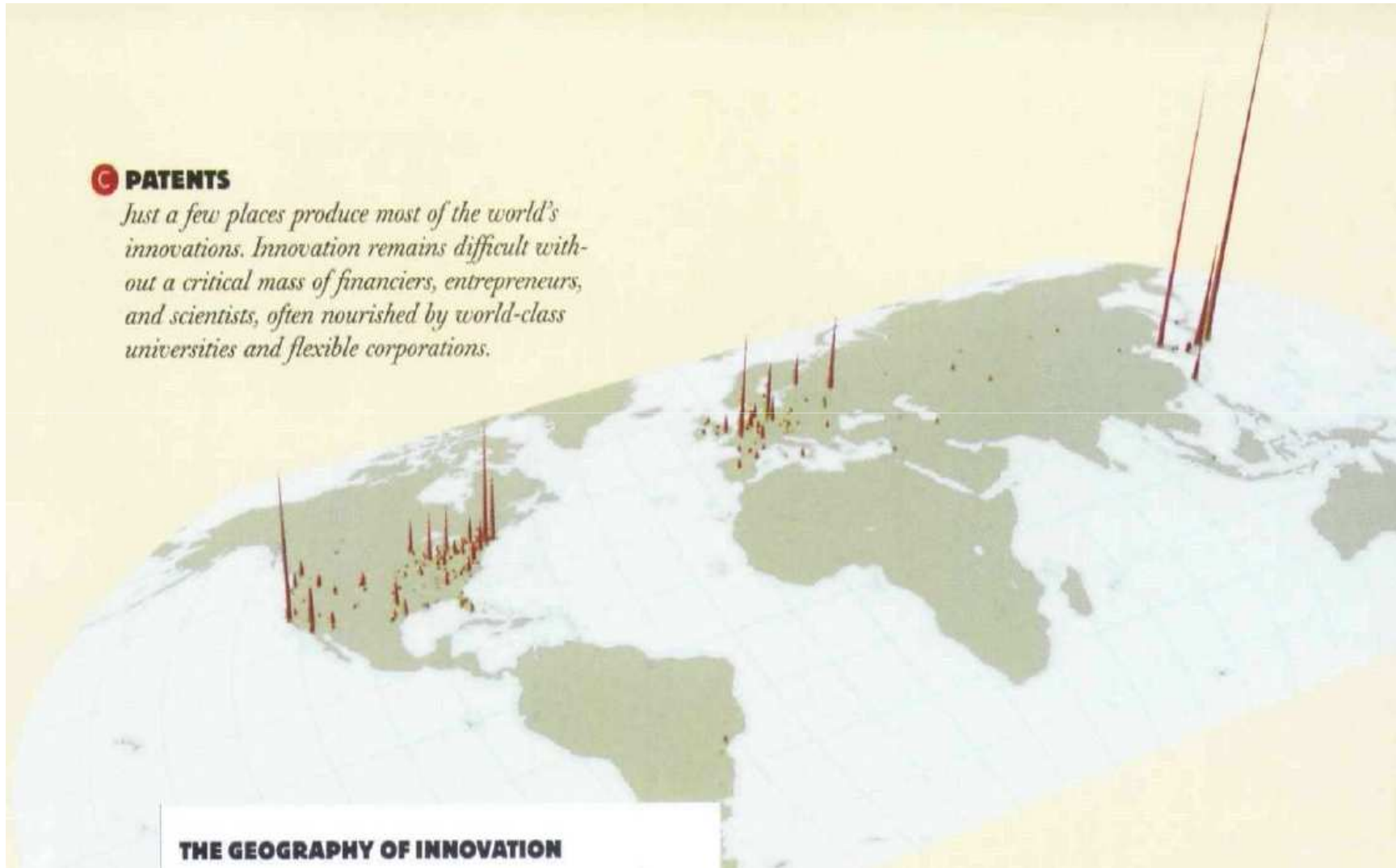
# The Spiky World: Population



# The Spiky World of Innovative Activity: Patents

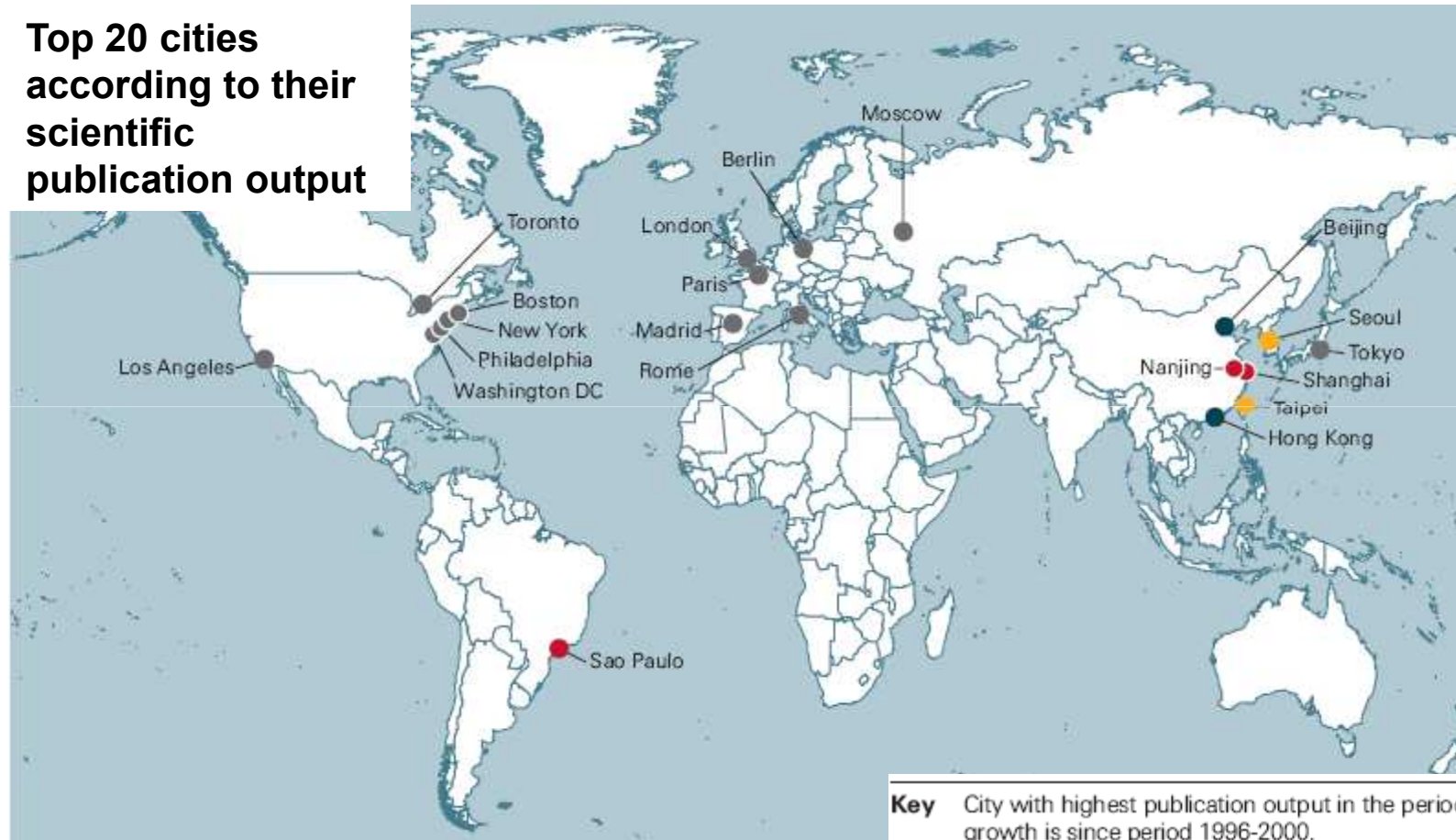
## **P**ATENTS

*Just a few places produce most of the world's innovations. Innovation remains difficult without a critical mass of financiers, entrepreneurs, and scientists, often nourished by world-class universities and flexible corporations.*



# Spiky World: Cities as knowledge production centres:

Top 20 cities  
according to their  
scientific  
publication output



# The Spiky World of Innovative Activity: Citations



Source: Florida, 2005

## Did recent technological change alter the playing field?

---

- Premium for face-to-face contacts
- Spatial Transaction costs for standardised activities have fallen while spatial transaction costs for non-standardised knowledge intensive activities have risen !

# Accessibility to Major Cities

## Travel time to major cities

Travel time map and accessibility model by Andrea Bernini. Aggregation Index by Francesco Galardi (The World Bank, JRC) and Andrea Nelson. Land cover data from the Global Land Cover 2000 Project, <http://www.glm.jrc.it/annex/ai/glc2000/>. Urban population data from the United Nations World Urbanization Prospects, <http://esa.un.org/urp/>.

Global Environment Monitoring Unit  
Institute for Environment and Sustainability  
Joint Research Centre of the European Commission  
Via Enea 217A, I-20090 Sesto San Giovanni, Italy

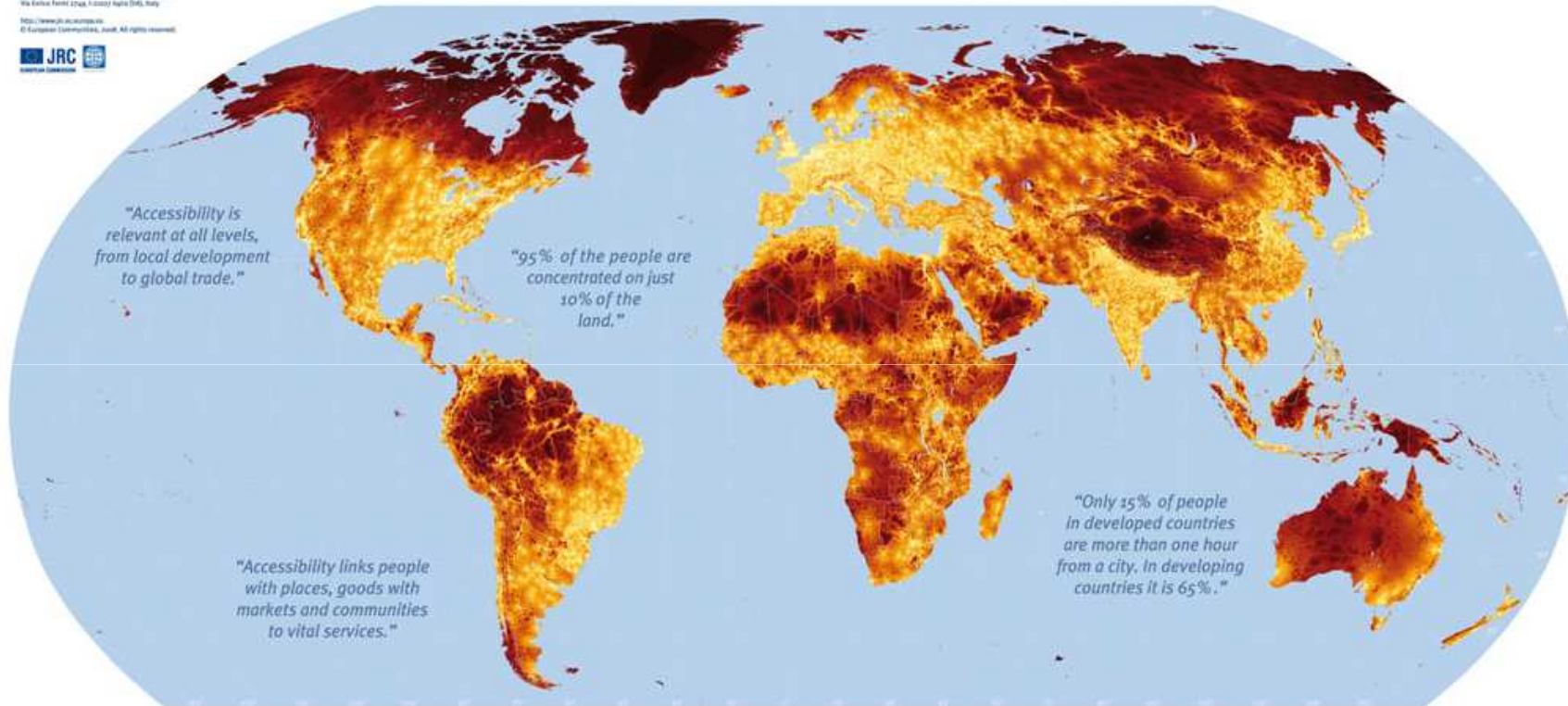
EUROPEAN COMMISSION  
© European Communities, Joint. All rights reserved.



Working title: Travel time to major cities. A global map of Accessibility

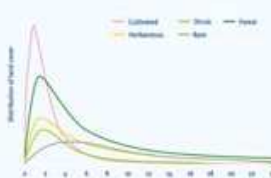
JRC27751  
1004 2010-01-01/12-31  
Catalogue number: IS-2010-01-01

Language: EN  
DOI: 10.2790/14782



### Land cover patterns around cities

Travel time zones around a city can be used to define regions where particular economic activities are likely to take place. Almost 60% of all cultivated land is within two hours of a city. As urban areas expand, there is huge pressure to convert agricultural land to urban uses, and to convert more distant forests, grasslands and shrublands to agriculture. These patterns of land use around urban areas mirror one of the most important models of economic geography, Johann Heinrich von Thünen's model of the Isolated State, which links transport costs to land value.



### Travel time in hours and days to the nearest city of 50,000 or more people



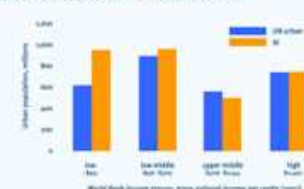
### Travel time to major cities: A global map of Accessibility

Developed by the European Commission's Joint Research Centre for the World Bank's World Development Report 2009 "Reshaping Economic Geography".

Map colours represent travel time to the nearest city (8,518 cities with 50,000 or more people in the year 2000). Modes of travel are land and water based. The data resolution is 30 arc seconds. The map projection is Robinson. Digital datasets, the accessibility model, input data and more information at <http://www.tem.jrc.ec.europa.eu/accessibility>. The World Development Report is available at <http://econ.worldbank.org>. The delineation of national boundaries must not be considered authoritative.

### Agglomeration Index (AI): A new measure of urban concentration and a more urbanised world

There is no standard definition of 'urban'. A new Agglomeration Index (World Bank & JRC), based on this Accessibility map, suggests that the global urban population in 2000 was 3.21 billion compared to the UN's total of 2.85 billion (53%, compared to 47% of the world). Most of the difference is in the developing world. This alternative definition of urbanisation suggests that the world may have passed the urbanisation tipping point – more people living in urban areas than in rural areas – much earlier than the 2007/8 estimate.



## Main Results of Global Accessibility Model

---

- Modeling Travel Time to 8,500 Major Cities
- More than half of the world's population lives less than one hour from a major city, but the breakdown is 85% of the developed world and only 35% of the developing world;
- 95% of the world's population is concentrated on just 10% of the world's land; but
- Only 10% of the world's land area is classified as "remote" or more than 48 hours from a large city.

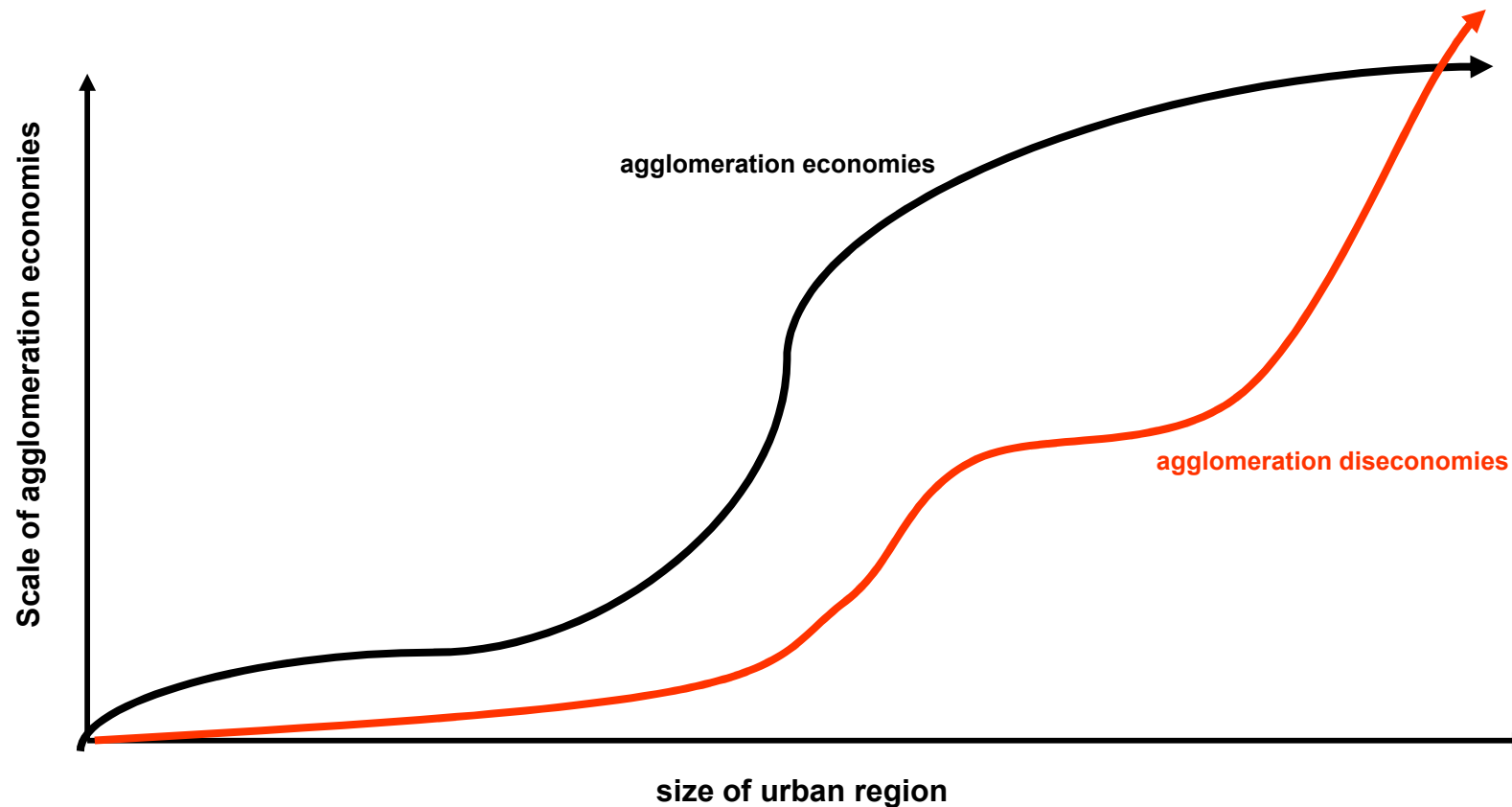
# The role of cities in modern society

---

- **Historically, urbanisation was a necessary prerequisite for economic development, today ALL rich countries are (highly) urbanised countries**
  
- **The city as *incubator* & *producer* of innovation**
  - Overwhelming bulk of innovation relevant infrastructures is concentrated in urban areas (universities, R&D facilities etc.)
  - Skilled Human capital is concentrated in urban areas
  - Innovative milieus
  - Cities are the 'birth-places' of the future(s)
  
- **The city as *user* of innovation**
  - Early adoption of innovation in urban areas
  - Urban areas as diffusion nodes
  - New technologies often explicitly express needs of cities (infrastructure) or urban societies

# What makes urban regions special?

- Agglomeration economies: increasing rates of return (new economic geography: centralisation and localisation (specialisation) as dominant features)
- Agglomeration diseconomies: costs, pollution, social tension
- Overall Urban 'Productivity': Size increases efficiency but only up to a point
- Slopes are changing over time due to technological change
- Urban Policy: Maximizing agglomeration economies and reducing agglomeration diseconomies



## The role of Cities / Urban Areas in economic activity and Innovation – some stylized facts

---

- Concentration (of economic and innovative activity) is:
  - fastest locally,
  - steadier nationally and
  - (s)lower internationally
  - ...but reaches saturation in some countries
- Patterns spread from local → national → international
- ...and they change over life-cycles, and re-define the role of cities:
  - Medium-sized cities → agglomeration economies → **specialisation**:
  - Large cities → urbanisation economies → **diversity**
  - Increased connectivity: **blurring of urban-rural distinctions** (especially in Europe!)

## Some peculiarities of the European Urban System

---

- **Urban share of EU GDP is now hardly changing (at a high level) - close to 'saturation level'**
- **Small and medium sized cities perform best within EU (better than very large cities!)**
- **Complex polycentric EU-wide network structure, but different between member states:**
  - 'Primate cities' in UK, F, PL, CZ
  - Polycentric in NL, Northern IT, GER
- **Connectivity, rather than urban scale, is critical for national scale or regional scale specialization or diversity**
- **Urban ↔ urban is the dominant form of migration in rich EU countries**
- **Rural ↔ urban migration in Mediterranean and CEECs**

## The role of Cities / Urban Areas in economic activity and Innovation – some stylized facts

---

- **Concentration** (of economic and innovative activity) is:
  - fastest locally,
  - steadier nationally and
  - (s)lower internationally
  - ...but reaches saturation in some countries
- **Patterns** spread from local → national → international
- ...and they change over life-cycles, and re-define the role of cities:
  - Medium-sized cities → agglomeration economies → **specialisation**:
  - Large cities → urbanisation economies → **diversity**
  - Increased connectivity: **blurring of urban-rural distinctions** (especially in Europe!)

# Understanding the (Possible) Futures of the City: Different Scenarios

---

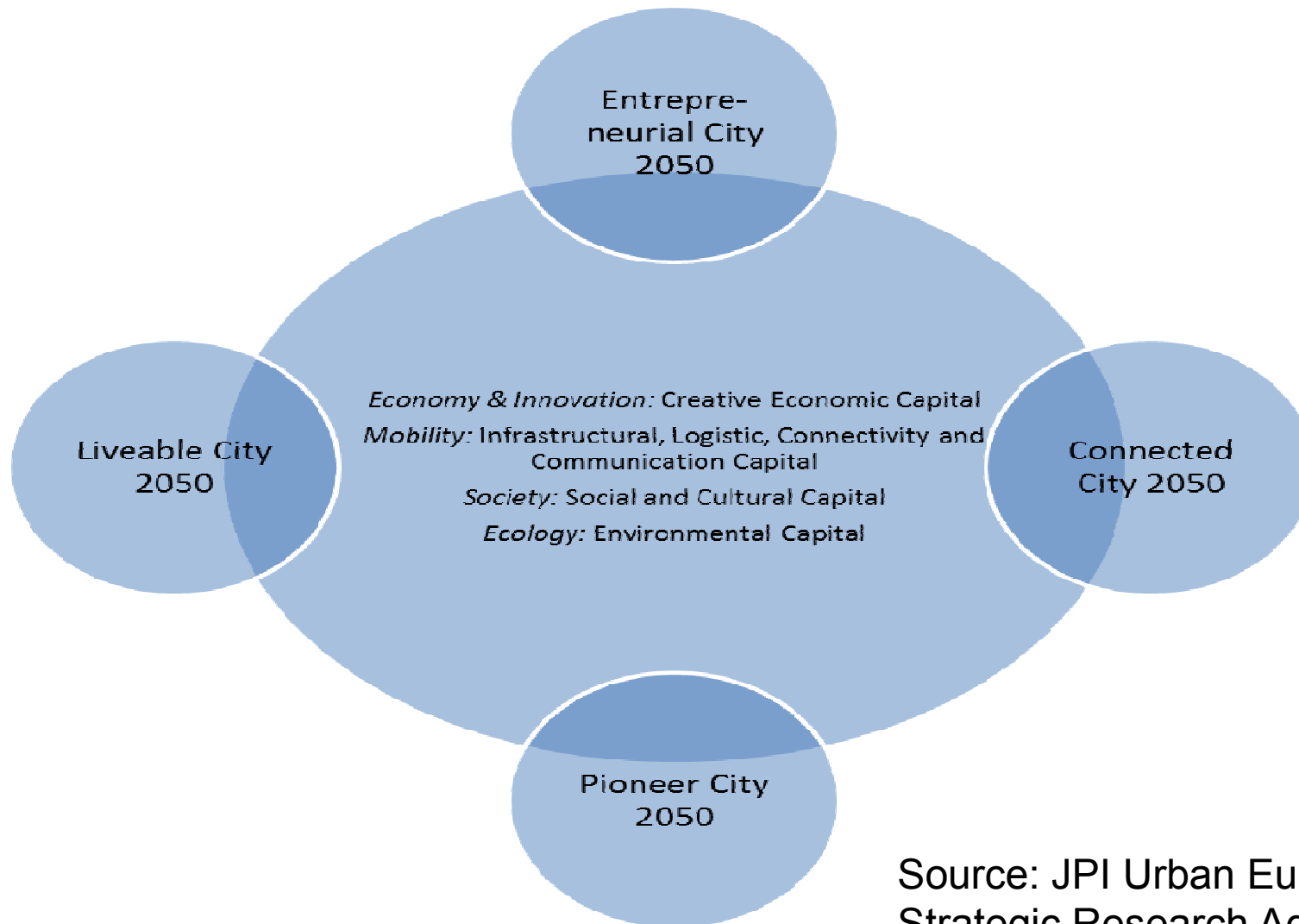
- **Urban Future: Dystopia or Utopia?**
- **Convergence of City types to a world “role model” based on the U.S. type?**
  - Distinct CBDs, pronounced functional segregation (housing, retail, services, production...)
  - Urban sprawl, car-based traffic system, ...
- **Will there still be a place for a unique European-type city?**
  - Heritage city, lesser role for market forces in shaping urban landscapes
- **Urban spaces (Megalopolis with various city centres, suburbias and exurbias) versus distinct cities?**
- ...

# Major Challenges for Urban Policy

---

- **Changing Pattern of Agglomeration Economies:**
  - Desindustrialisation of urban areas (economic change)
  - Footloose industries and increasingly services (technological change)
  - New locational pattern of industries
  - Coping with new competitors
  - Enhancing agglomeration economies
  
- **Reducing Agglomeration Diseconomies**
  - **Infrastructure:**
    - Land use zoning
    - Transportation and traffic system
    - Utilities
  
  - **Social Problems:**
    - Ageing
    - Ethnic Tensions / Segregation
    - Unemployment due to constant economic change (while labor market rigidities prevail)
  
  - **Ecology:**
    - Sustainability
    - Energy
    - Air pollution, waste management
    - Spatial Change: Density versus Urban Sprawl

# City of the Future: some Visions



Source: JPI Urban Europe,  
Strategic Research Agenda

# The Promise of Technology for Urban Policy: Are There Quick Technological Fixes?

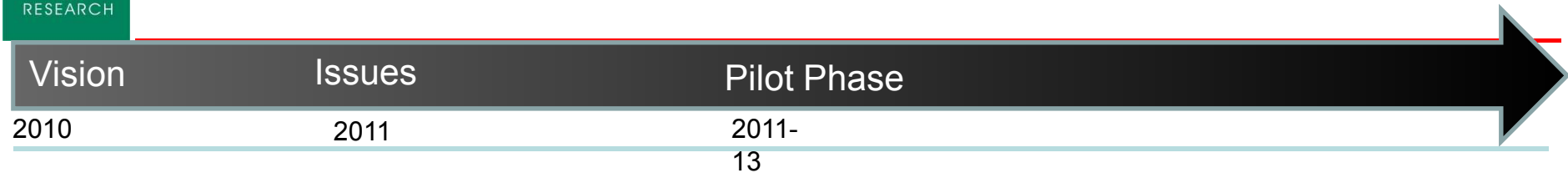
---

No, because there are:

- Lock-in
- Path-dependency
- Network effects
- Sunk costs
- Barriers to diffusion
- Social, institutional and regulatory framework
- Market structures

What is needed is *systemic thinking*, linking the different dimensions of urban development !

# Pilot Phase



Liveable City

Entrepreneurial City

Connected City

Pioneer City

Urban megatrends

City networks and connectivity

Socio-ecological sustainability



Foresight	Foresight Projects (Tender)
New Urban Databases Urban Profile Indicators Integrated Urban Management Concepts	Research Alliance and Joint Call
Sharing Data, Knowledge and Infrastructure	Databases, Workshops, Conferences (COST)
Joint Activities based on variable geometry	National Research Programmes

*INSTRUMENTS & ACTORS*

# Research Activities in RTOs on Urban Development: JIP, JIIP and AERTO

---

- **Joint Programming Initiative Urban Europe (JPI UE): Strategic Research Agenda (April 2011)**
- **AERTO: Towards Sustainable and Resilient Cities. SRA scoping document (February 2011)**
- **JIIP: JPI, AERTO + joint projects**

**Thank you for your attention !**

## Sources

---

- Royal Society (2011): Knowledge, networks and nations. Global scientific collaboration in the 21st century. London.
- JRC/World Bank (2008): Global Map of Travel Time to Major Cities.
- McCann (2011): Urban Perspectives 2020-2050. Presentation held at Urban Europe Meeting, Amsterdam (February, 2011)
- Nijkamp, P., Kourtit, K. (2011): Urban Europe. Global Challenges and Local Responses in the Urban Century.
- World Bank (2009): Reshaping Economic Geography. World Development Report 2009. Washington, DC