

# **Policies for urban innovation - draft**

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**SMART CITIES: CONTEXT, POLICY AND GOVERNMENT: LECTURE 7**

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# What we will cover today

- **Lecture 7 – strategy + policy tools** for urban innovation
  - **Part 1: overview:** innovation policy rationales, links to smart cities
  - **Part 2: policy toolkit for cities**, case studies + evidence
  - **Part 3: evaluation** basics
  - **Seminar:** urban accelerators and incubators
- **Lecture 8 – challenges** for smart cities, innovation policies

# Part 1: overview

# Recap of Lecture 6

- **Schumpeterian** – innovation drives growth through creative destruction and entrepreneurship
- **Endogenous growth** – innovation drives growth through generation and diffusion of new ideas
- **Urban economics** – cities amplify growth forces, by helping firms form + scale, and helping ideas generation + diffusion
- **Innovation systems** – it's the linkages between firms, entrepreneurs, universities and govt that shape innovation. Often that happens at the urban scale

# What should policy do?

- **Schumpeterian** – Innovation is disruptive. Support entrepreneurship, promote competition, compensate losers
- **Endogenous growth** – markets underinvest in innovation. Support education; fund research + knowledge diffusion
- **Urban economics** – tackle market failures => skills; research + knowledge diffusion; infrastructure; finance
- **Innovation systems** – build capabilities, active co-ordination => tackle market failures AND link public-private actors together; support long term / strategic missions

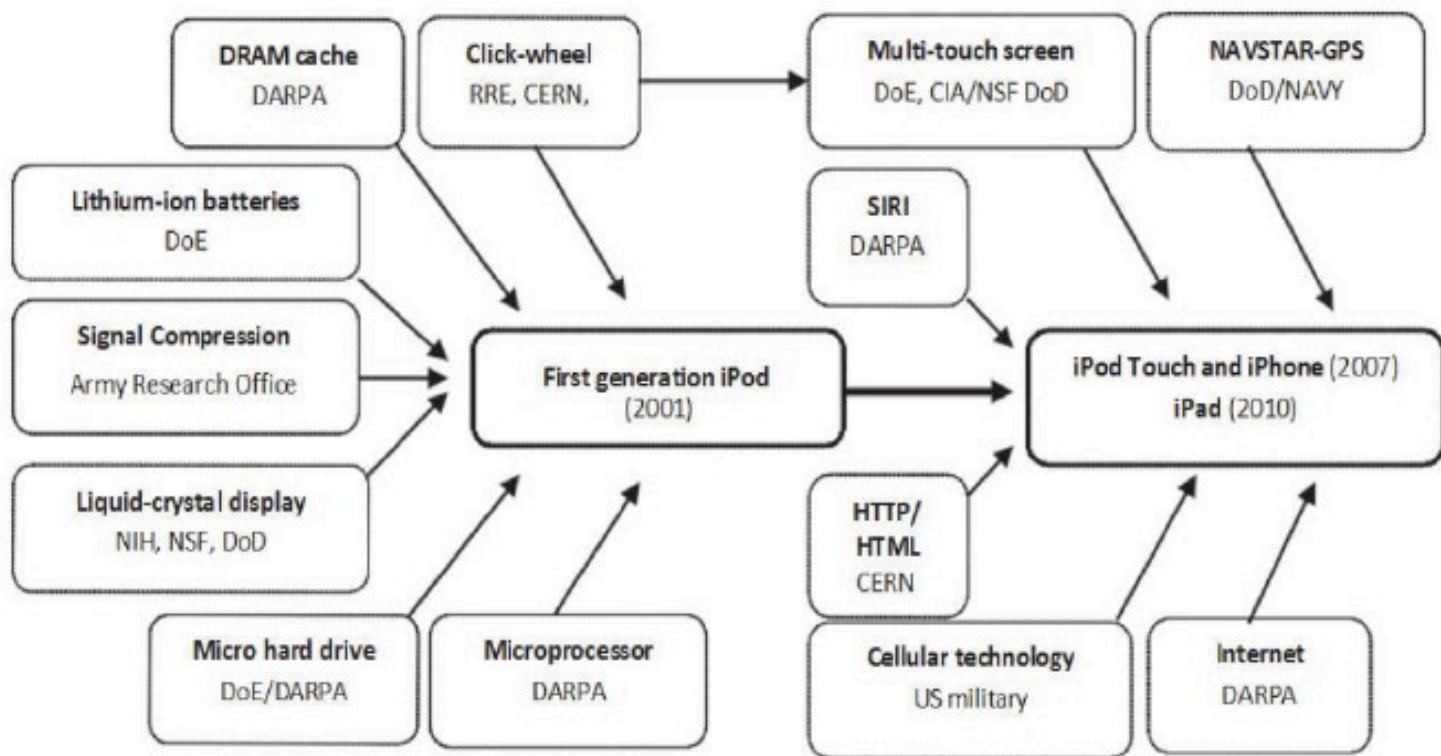
# The rock garden

*Building a capacity for advanced technology is not like planning production in a socialist economy, but more like growing a rock garden.*

*Planting, watering and weeding are more appropriate than five-year plans.*

*(Arthur 2009, p.163)*

# The iPhone



**Figure 13 from *The Entrepreneurial State: debunking public vs. private sector myths* (2015, p. 116)**

# Are these *urban* policies?

- **They're examples of innovation / industrial policy**
- Market forces + govt action => economic development:

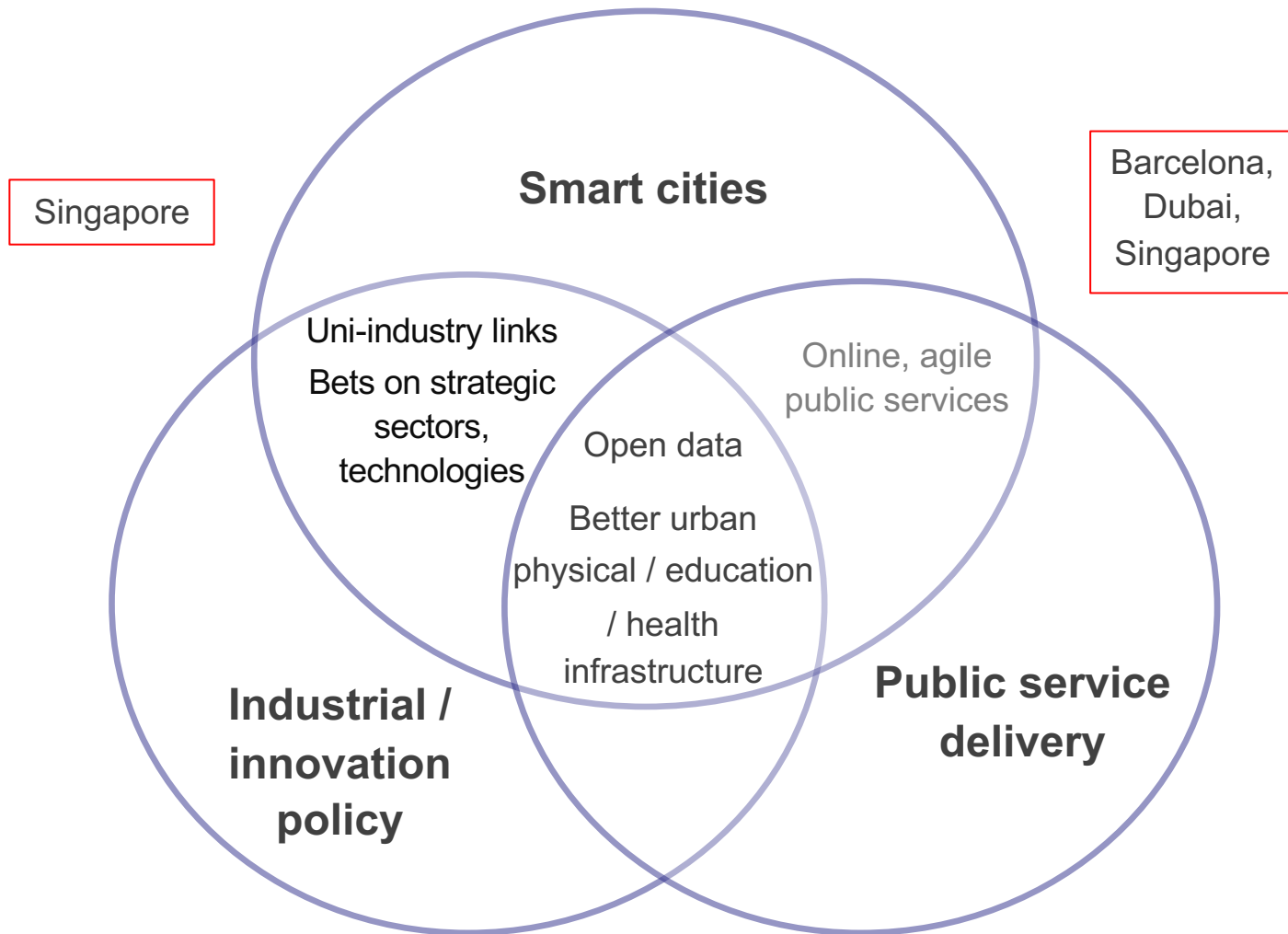
*Industrial policy is ... strategic collaboration between the private sector and the government with the aim of uncovering where the most significant obstacles to restructuring lie and what type of interventions are most likely to remove them.*

(Rodrik 2004. My emphasis)

- **Urban / regional level is central to industrial policy**
- Why? innovative activity is urbanised; big economic disparities between places ~ need new sources of growth



# Are these *smart city* policies?



# Missions

- **Rationale – failure of traditional policies to tackle big challenges, especially climate change**
  - Complex, unstructured issues ~ big co-ordination problems
  - Missions involve ‘fixing directional failures’ through new technologies, institutional and political action (Mazzucato 2018)
  - Revival of 1960s idea: technology missions, e.g. Moon Landing
- Missions today are not just about technology. How to move thro the ‘problem-solution space’? (Wanzenbock et al 2020)
  - In some countries, political challenges / tensions behind societal challenges may be intractable (Lane 2021)
  - Need to build on existing institutions, assets, policy tools

# Missions and (smart) cities

- **What role can cities and regions play in missions?**
- No-one has thought much about this in detail (Flanagan et al 2022). But we can sketch an outline:
  - Innovative activity is very uneven across space; new ideas diffuse slowly; cities develop new industries out of old ones
  - So, missions will involve 'path development', building on cities' existing local innovation systems (Bugge et al 2021)
  - There are huge variations in local capacity. Some places will be much better at this than others (Coenen et al 2015)
  - The process of implementation also needs to draw together a) public and private actors and b) existing policy tools.

## Part 2: the policy toolkit

# What tools do we have?

- **Many possible tools for cities to promote innovation in the urban / smart city context. We'll discuss a few today:**
  - R&D grants, loans, tax breaks
  - Networks and hubs / 'one-stop shops'
  - Cluster policies
  - Accelerators and incubators
  - Skills training
  - Open data
- For more on policy tools and evidence on effectiveness, see [www.whatworksgrowth.org](http://www.whatworksgrowth.org)

# R&D grants, loans, tax breaks

- **Rationale – knowledge spillovers mean innovators don't capture full return on an invention**
  - Social value > private value [this is what powers overall growth!]
  - Also, research is expensive, risk, often fails
  - So, government should subsidise it
- Lots of evidence these tools work, especially for small firms:
  - In UK, 1% drop in tax on R&D generates 3.6% more patents over the following seven years (Dechezleprêtre et al 2020)
  - Cross-country: 10% increase in Government R&D spend => 3.4% rise in business R&D spend (Moretti et al 2021)

- **Majority of R&D grants come from national / international bodies, and goes to universities**

- UK Research and Innovation: £3bn/year
- InnovateUK: £400m/year to firms

- **Tax breaks for firms, funders**

- Firms  $\leq 250$  staff can deduct up to 50% of R&D spend from profits, above a threshold  
=> incentive to do more
- Incentives to fund early-stage ideas: Seed Enterprise Investment Scheme gives 50% tax relief up to £50k investment, EIS gives 30% relief up to £300k



**Innovate  
UK**



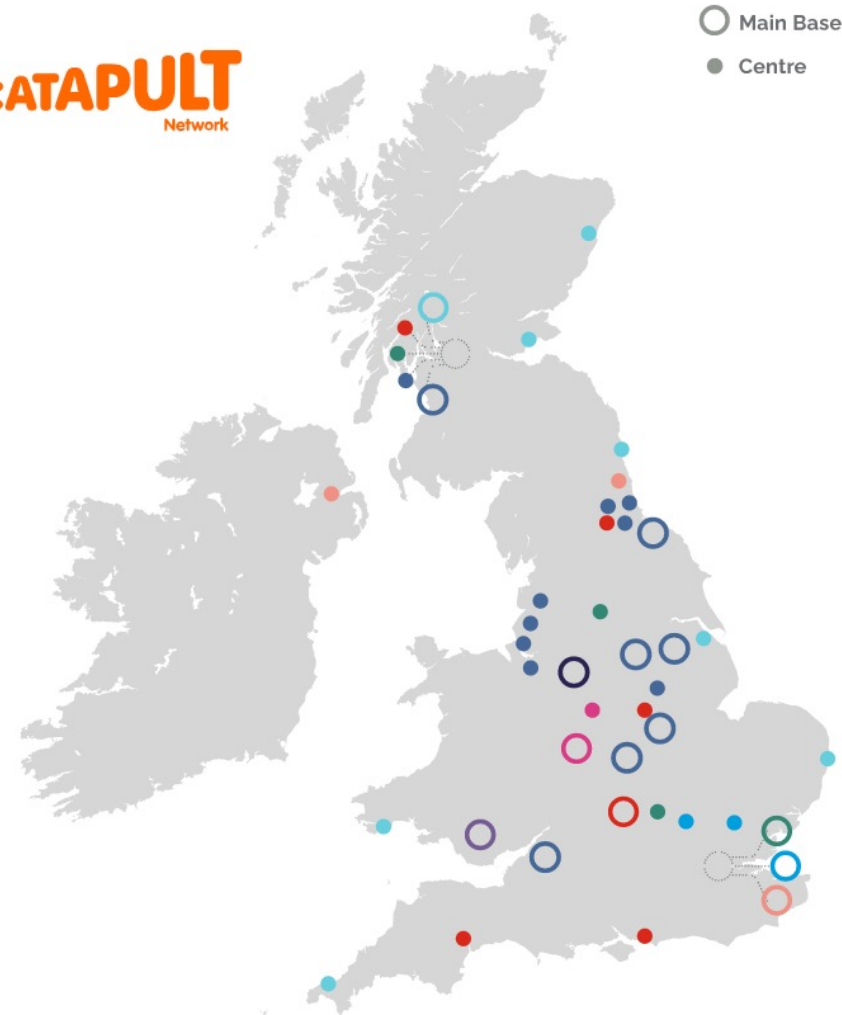
<https://www.ukri.org/>  
<https://www.gov.uk/government/organisations/innovate-uk>  
<https://www.seis.co.uk/>

# Networks and hubs

- **Rationale – new ideas may need co-ordination to take off, and to diffuse effectively**
  - Cross-disciplinary innovation
  - Long time-frames, e.g. defence / aerospace procurement
  - Importance of public-private collaboration, e.g. in ‘catapults’ or ‘living labs’ as well as the Triple Helix model (Keith and Headlam 2017)
- **Intuitive case for doing this, but much harder to prove causal impacts on innovation, growth (BEIS/IUK, 2017)**
- Why? Systemic interventions that touch many parts of a system at the same time. Often no counterfactual
- Process evaluation, or isolate + test specific projects?



- **UK Catapult programme supports business / gov / university interaction. Nine catapults, multiple locations**
- Organises / hosts networks
- Labs, testbeds, assembly
- Demonstrator projects
- Data analysis and viz
- Business support, including scaling / export advice
- Co-working space



Cell and Gene Therapy	Digital	Medicines Discovery
Connected Places	Energy Systems	Satellite Applications
Compound Semiconductor Applications	High Value Manufacturing	Offshore Renewable Energy

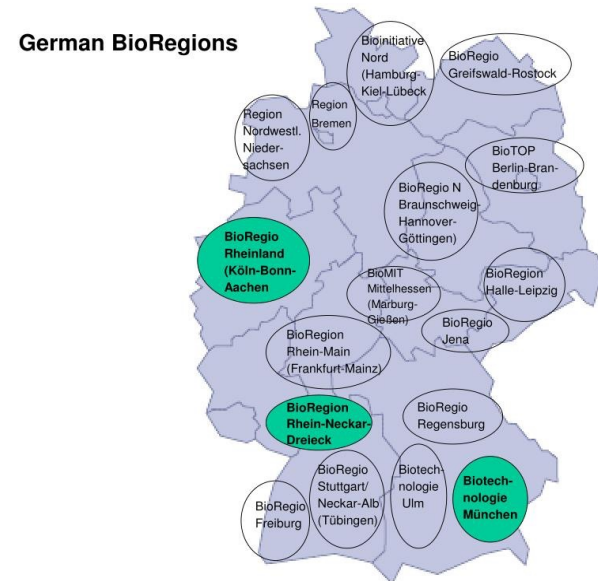
<https://catapult.org.uk/about-us/why-the-catapult-network/>

# Cluster policy

- **Rationale – clusters don't always grow organically**
  - Limited or unsuitable physical / transport / tech infrastructure
  - Workspace may be limited and/or expensive for startups
  - Firms may not know about a cluster, or about each other
  - Young firms need help to scale [advice, finance, training etc]
- **However ... clusters are extremely complex systems, which don't usually have clear boundaries.** So it's hard to figure out and implement policy ... and to evaluate impact
- That said, reviews of cluster programmes don't find many successes (Duranton 2011, Uyarra and Ramlogan 2013)

# In practice, three types of cluster programme (Nathan 2020)

- 1) **Formal partnerships** – members get grants / subsidies and are encouraged to collaborate
  - METI, Japan
  - BioRegio, Germany
- 2) **Physical re-development** – rezoning or land reclamation, new infrastructure, incentives for firms
  - 22@, Barcelona
  - Songdo, Seoul
  - Sidewalk, Toronto (as was)
- 3) **Light touch** – mapping existing activity, fixing constraints on growth, promotion and branding
  - Tech City, London

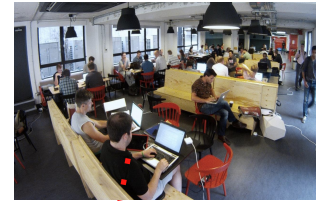


# Accelerators, incubators

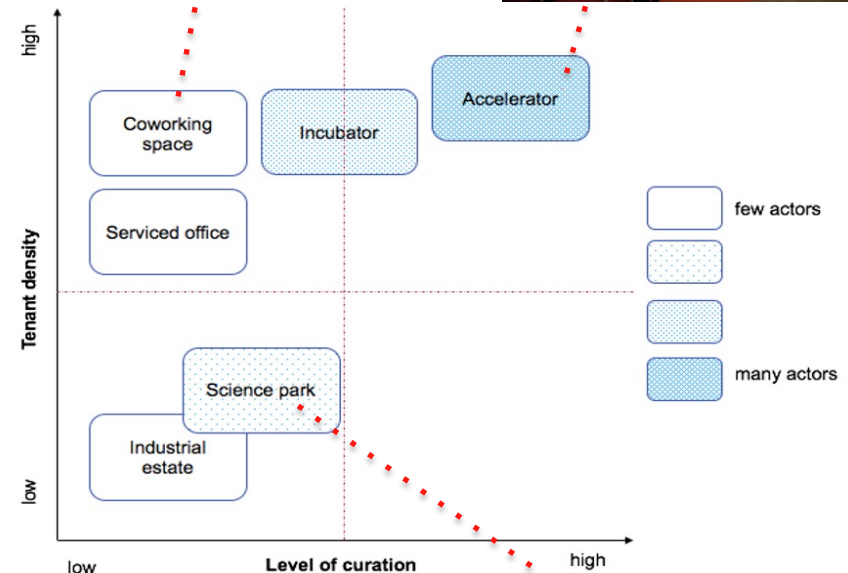
- **Rationale – can we optimise spillovers in smaller spaces?  
Can we optimise entrepreneurial learning?**
  - Input-sharing: cheap space and facilities
  - More intensive and useful interaction and ideas flow
  - Curated participants – specialised vs diverse
  - Structured interaction – accelerate learning, minimise trial and error
- **These programmes are effective, but less clear exactly *how* impacts happen**
  - Cross-country review: programmes raise participant employment; accelerators raise access to finance (Madaleno et al 2021)
  - Ecosystem features also help: uni involvement, local cluster

- Part of a larger, older family of co-location tools
- Incubators found in most UK cities and towns, especially those with universities
- Accelerators very urban; over half in London
- Over half of UK programmes get some public funding (Bone et al 2019)

Google Campus



Y-Combinator



Madaleno et al 2021

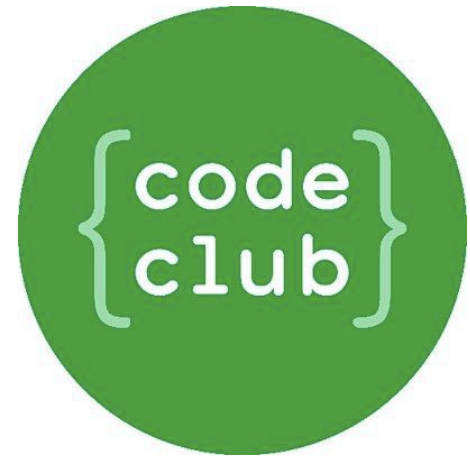


Nottingham Science Park

# Skills

- **Rationale – importance of human capital for innovation**
- City govts want to ensure supply of workers to emerging / fast-growing industries
  - Without incentives, most people under-invest in education
  - Firms also tend to under-invest in upskilling
- Established links between urban skills and urban growth (What Works Centre 2016)
- For smart cities policies, importance of STEM (Science, Technology and Maths) / STEAM subjects

- UK has a strong HE sector, but STEM/STEAM education at primary and high school level can be inconsistent
- Recent attempts to **change curricula**, networked initiatives **CodeClub**, digital apprenticeships through **Ada**
- **UK has some overlaps with US model for HE: fees + education market.** Boosts funding for universities, but conflicts over e.g. student fees



<https://codeclub.org/en>  
<https://www.ada.ac.uk/>

# Open data

- **Rationale – stimulate innovation, create new digital economy services** (Kitchin, 2014)
  - Open data = free to access, use, share with attribution
  - Is data 'the new oil' for the knowledge economy?
  - In practice, means making government / public data open
- **Opening up public data raises many open questions!**
  - A free good for business and public, like funding basic research?
  - Do we recover all the benefits through growth + taxation?
  - Should firms who use open data make \*their\* data open too?
  - Who has access in practice? What about privacy?



- **Central government open data catalogues**

- **City government datastores**

- London, 2010
- San Francisco, 2009
- Portland, 2006

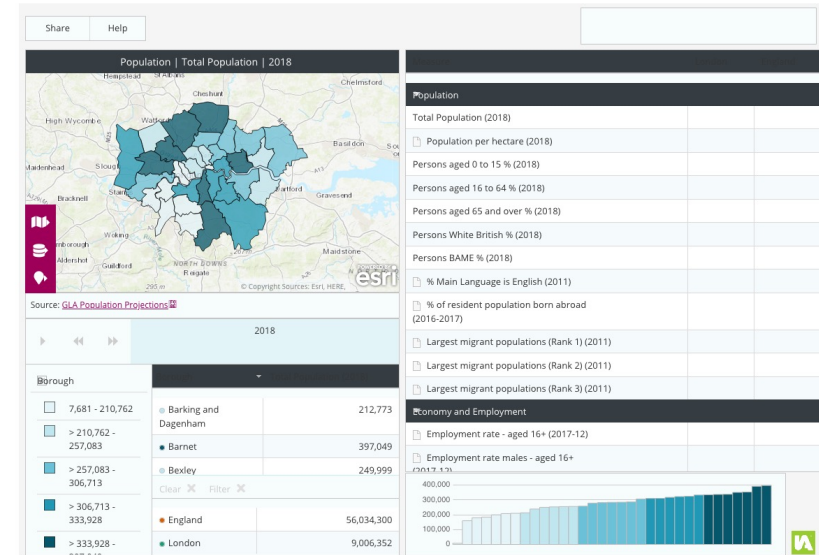
- **Firms running on open data**

- Citymapper [TfL data for journey planning]
- Mapbox [OSM + geo data]
- FixMyStreet [crowdsourced problems, sent to local govt]

## London Area Profiles

The London Area Profiles help paint a general picture of an area allowing you to explore a wealth of local data to better understand the profile of London's communities and the neighbourhoods they live in.

The data is presented in two formats. Firstly, the dashboard view (below) allows you to interact with the data via mapping, charts and data tables. You can also switch between Borough and Ward data using the purple map icon. When you have selected a geographical area, you can click on the "View report" button to generate a custom-made report visualising a range of the latest demographic, economic, social and environmental information available for that area.



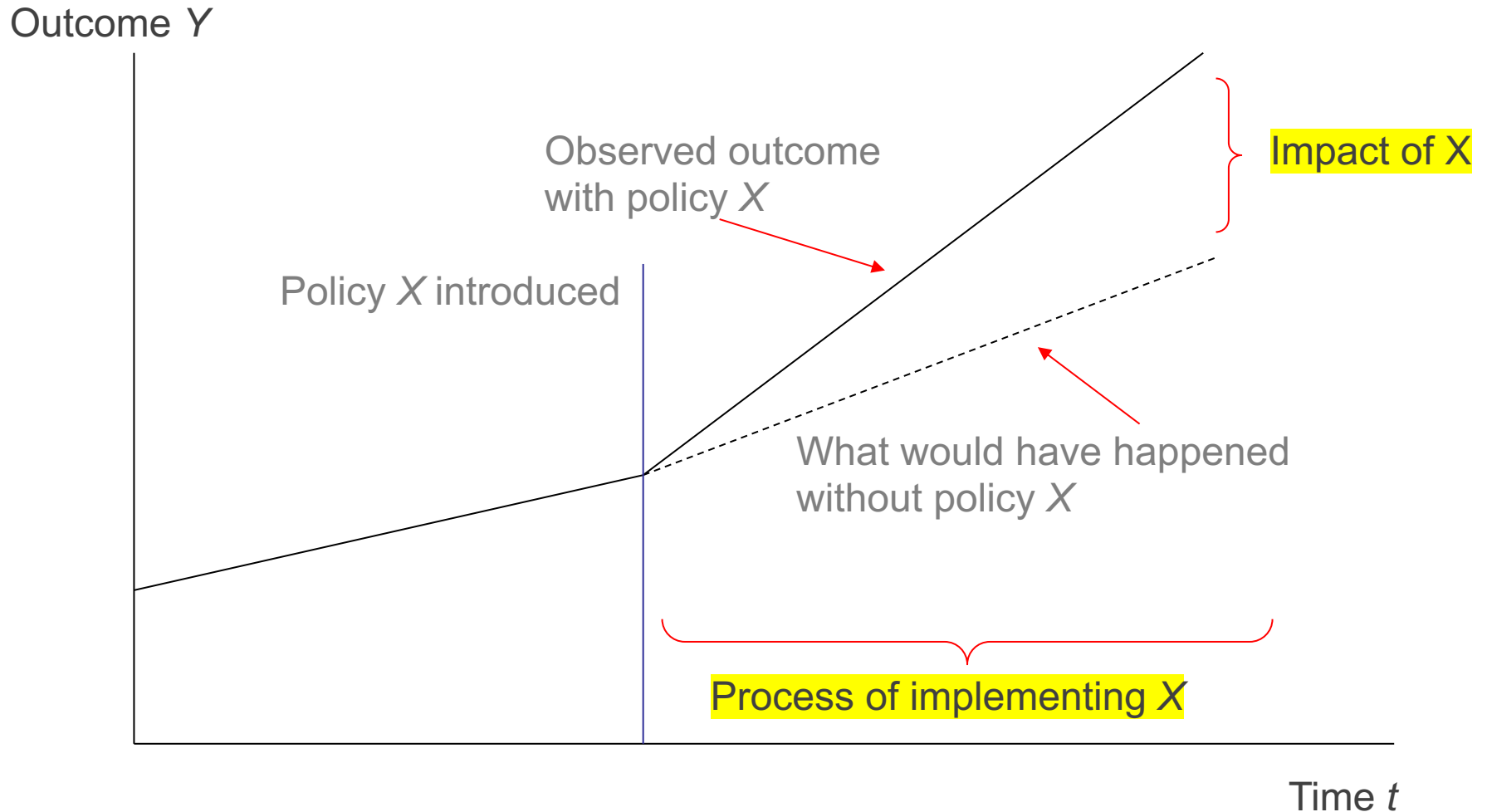
**Citymapper**



<https://data.london.gov.uk/>  
<https://citymapper.com/london>  
<https://www.fixmystreet.com/>

# Part 3: evaluation

# What do we want to know?



# Evaluation basics

- Components of an evaluation:
  - **Ex-ante appraisal** – what effect might policy  $X$  have on outcome  $Y$ ?
  - **Impact evaluation** – what was the effect of policy  $X$  on outcome  $Y$ ?
  - **Process evaluation** – how effective was the implementation of policy  $X$ , for users and for delivery agencies?
  - **Monitoring** – tracking inputs  $X$ , outputs and outcomes  $Y$
- **Complements, not substitutes!**
- **Ex-ante prediction is extremely challenging**, especially for complex programmes like smart cities
- Researchers typically prefer ex-post methods

# Evaluation in context

- **We\* should want to know what works and why:**
  - Policies that don't work shouldn't continue
  - Policies that do work can be improved / scaled up
  - Policymakers and governments look credible!
- **But policymakers don't always want to know this:**
  - If you've publicly committed to something, you may not want to know that it's failed
  - If the impacts are far in the future, 'what works' may not be relevant
  - Ex-post evaluation tools can be complex, so policymakers may lack the capacity to use them
  - For all these reasons, policymakers often prefer prediction to evaluation ... or not evaluation at all!

# Summary 1

- Since cities (still) matter to innovation, how can urban policymakers help to support innovative activity?
- Our four frameworks about innovation, growth and cities also generate different innovation policy prescriptions
- The Rock Garden vs the iPhone: how hands-off / hand-on should Govt be?
- There's a big urban component to innovation policy
- There are important overlaps between innovation policy and smart city policies – our case study cities exemplify this
- Missions as an emerging approach for tackling really big societal challenges
- Cities are likely to be important players in delivering missions

# Summary 2

- In practice, many tools governments can use to promote urban innovation, and to support smart city objectives
  - Good evidence for R&D grants and tax breaks; skills training; accelerators and incubators
  - Good case for doing cluster policies, networks and hubs; but more complex and harder to assess success
  - Open data – many big / open questions!
- 
- Components of an evaluation: ex-ante appraisal, ex-post impact and process testing. Always important to monitor and track inputs and outputs
  - Researchers tend to prefer ex-post evaluation
  - But policymakers tend to prefer ex-ante prediction
  - Be aware of the politics around a policy when evaluating it!

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