

Market, Space and Infrastructure



Dr. Kumar Aniket

18 October 2023

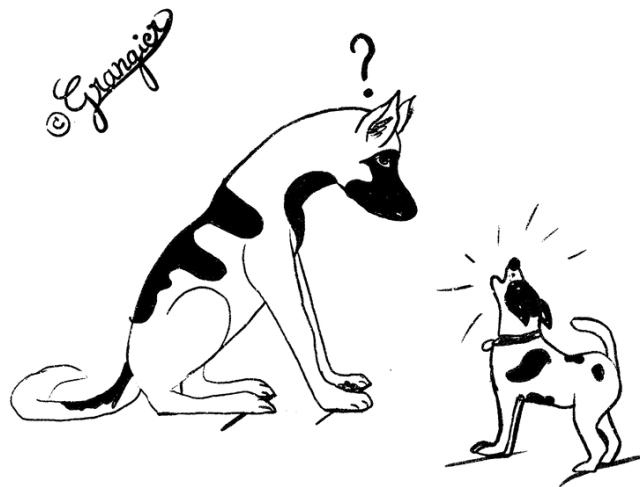
econversation.github.io

Space

Markets

Infrastructure

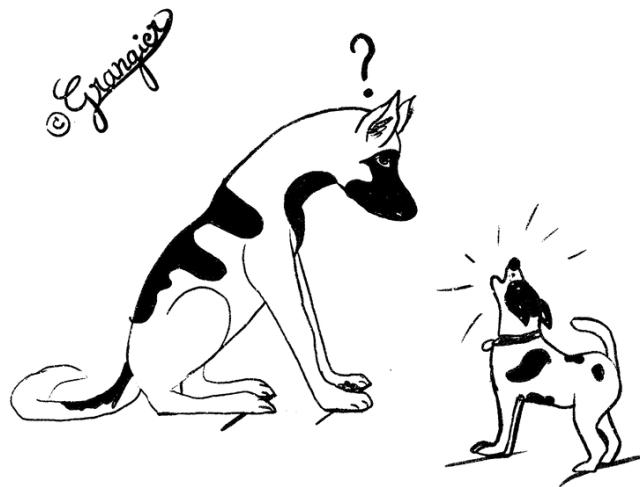
Michel Serres (1995)



If you take a handkerchief and spread it out in order to iron it, you can see in it certain fixed distances and proximities. If you sketch a circle in one area, you can mark out nearby points and measure far-off distances. Then take the same handkerchief and crumple it, by putting it in your pocket. Two distant points suddenly are close, even superimposed. If, further, you tear it in certain places, two points that were close can become very distant.

M. Serres with B. Latour, *Conversations on Science, Culture, and Time*, trans. Roxanne Lapidus. Ann Arbor: University of Michigan Press, 1995, pp. 60–61.

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linking places through

high speed railway line

Expressways

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Enclosure movement

Political borders

high speed railway line

Expressways

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London Millennium Footbridge



London Millennium Footbridge

London Millennium Footbridge in 2000

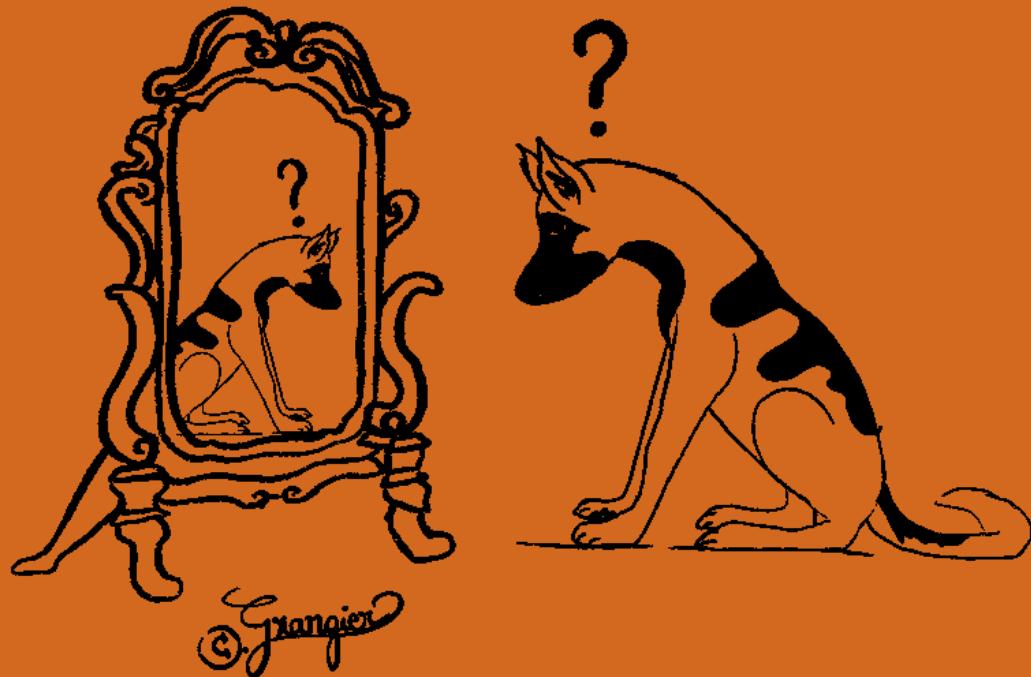


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Rope Bridge



Space



Conceptual Framework

Lefebvre (1974)

Humans produce **space** & the **humans** in turn are produced by **space**.

Endogeneity

feedback loop

Lefebvre, H. (1974). La production de l'espace. Paris: Anthropos.

Conley (2012)

Place is simply **there**, while space is **produced** or **invented**.

Conley, V. A. (2012). Spatial ecologies: Urban sites, state and world-space in french cultural theory (Vol. 21). Liverpool University Press.

Cartesian space

René Descartes

Cartesian coordinate system

Empty three-dimensional space

Physical space that can be occupied by animate and inanimate objects.

People who occupy space can't change it

Social Space

Space as **experienced by humans**

Includes **social relationships**

Embeds **power relationships**

What is the relationship between **Cartesian space** and **Social space**?

Social Space

Lefebvre (1974)

Physical space is **vacuum**

Physical space and social space are
entangled

More complex the place, the more
the **signs** are needed

Humans develop **formal** and
informal representation of space
in their minds¹

[1] Norman's conceptual model seems relevant here.

Conceptual Model

Norman (1998)

Computer sciences

Coined the term **conceptual model** to describe the bare bones knowledge a person needs to know to use something.

The **rules of usage** should be **congruent** with the object in use.

People know the **conceptual model** of the **rope bridge** but not the **Millennium Footbridge**.

Norman, D. A. (1998). *The invisible computer: Why good products can fail, the personal computer is so complex, and information appliances are the solution*. MIT press.

Formal Representation: Maps



London's actual tube map



London's simplified tube map

Informal Representation: Social Rules



Roundabout



Traffic in Barcelona

Ezekiel (1976)

IRANI RIESTAURANT INSTRUCTIONS

Please
Do not spit
Do not sit more
Pay promptly, time is valuable
Do not write letter
without order refreshment
Do not comb,
hair is spoiling floor
Do not make mischiefs in cabin
our waiter is reporting
Come again
All are welcome whatever caste
If not satisfied tell us
otherwise tell others
GOD IS GREAT

Ezekiel (1976)

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Ezekiel, N. (1976). Irani restaurant instructions. *Journal of South Asian Literature*, 11(3/4), 106–106.

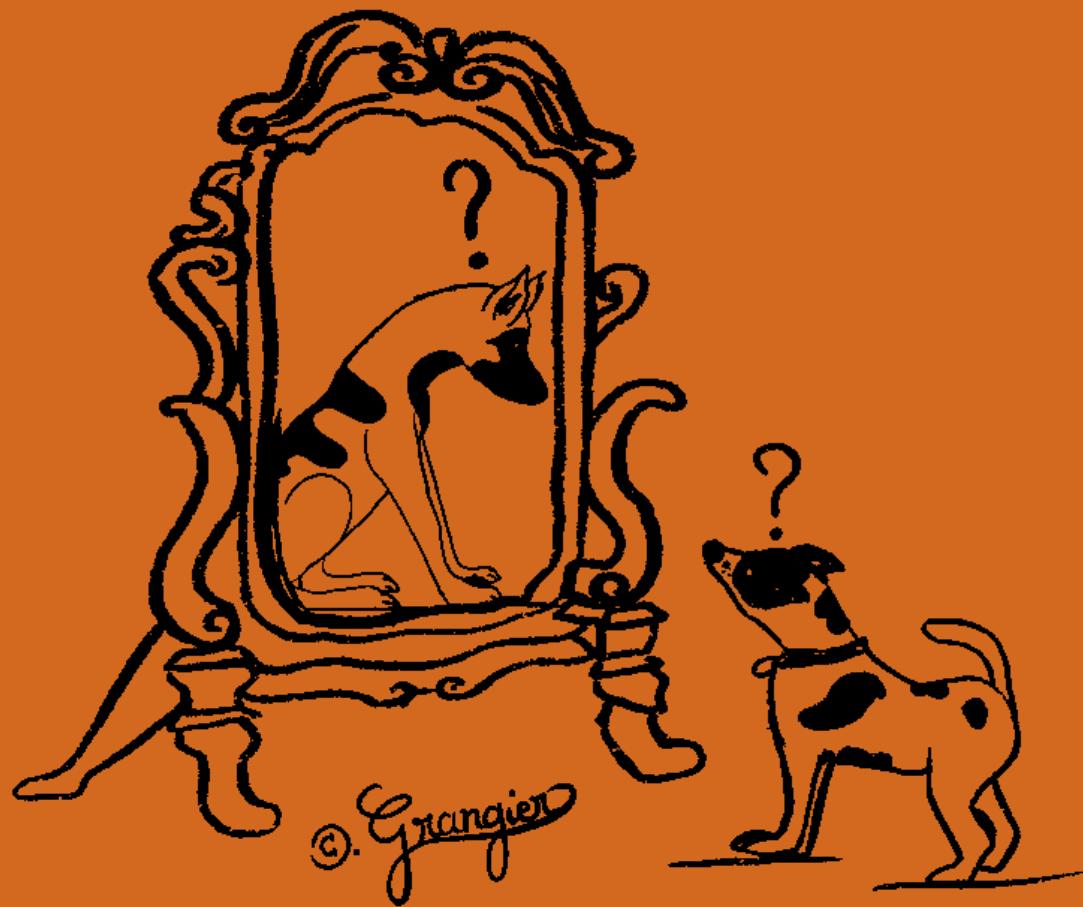
Informal Representation: Social Rules

A road is a **social space**

A restaurant is a **social space**

Impossible to disentangle the intangible "**rules of the space**" from the tangible space itself

Social Space = Cartesian Space + Social Rules



Market

Kerala Fish Market

Coastal Fish Market in Kerala

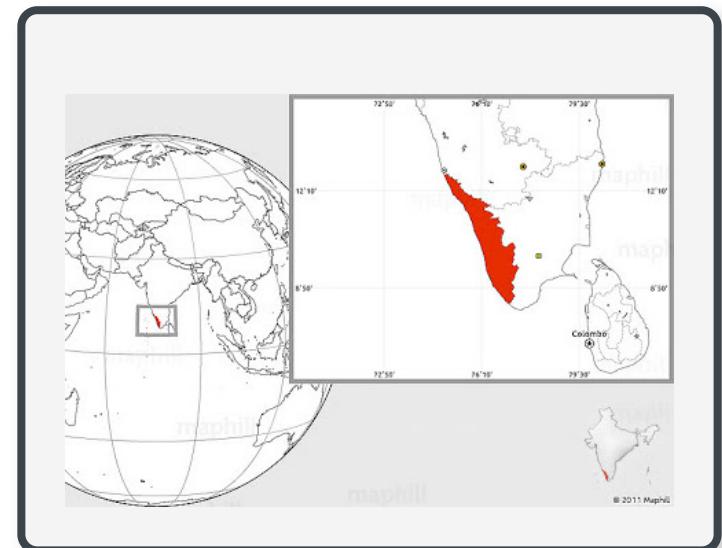
Fish is the staple diet in Kerala, India

Kerala has a long coastline with fish markets dotted along the coast

Fisherman have a **choice** of which fish market they land their fish in

Information problem after the
fisherman catch their fish

They do not **know** the **price of fish**
in each market on a particular day



Kerala Fish Market

Jenson (2007) studied of **15 fish markets** along the 225 km **Northern coast of Kerala** to understand whether the market for fish was working.

Jensen, Robert (2007). The digital provide: Information (technology), market performance, and welfare in the South Indian fisheries sector." The quarterly journal of economics.

Kerala Fish Market

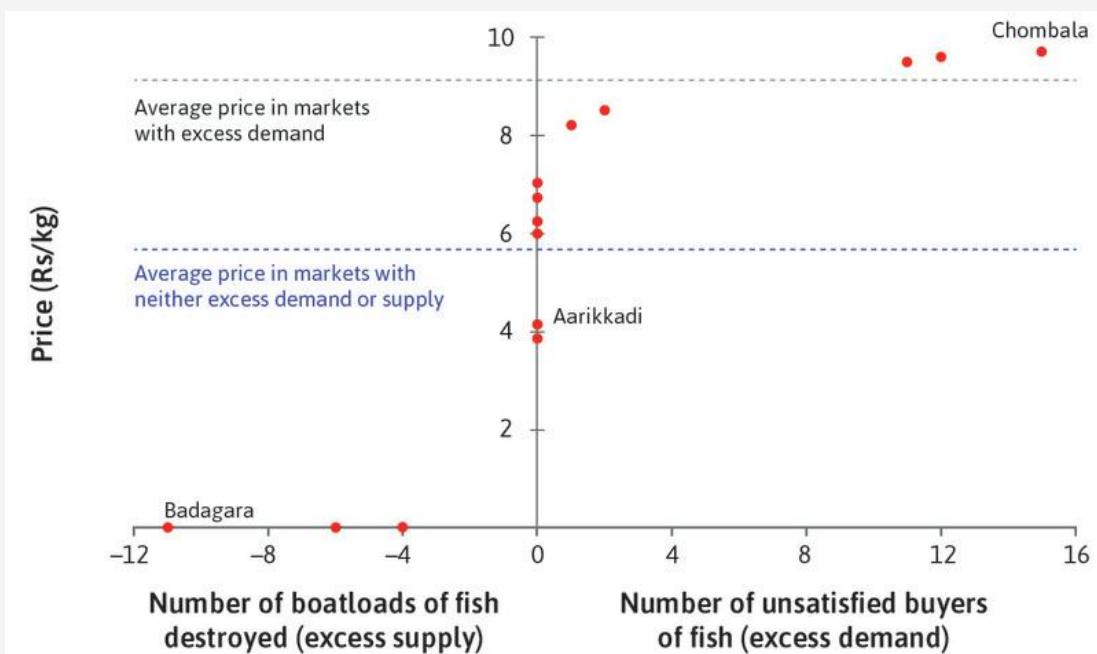
Jenson (2007) studied of 15 fish markets along the 225 km Northern coast of Kerala to understand whether the market for fish was working.

- Fisherman had to **choose** the port/market where they would get the best price for their catch
- Fish merchants **bought** the fish from the fisherman and sold it to the consumers
- If fish merchants already had enough fish on the port they landed, the fisherman would just **jettison** their catch

Fish **prices** were **volatile** and
fisherman's **profits low**

due to **wastage** and **ex-post bargaining power** of fish
merchants who bought from the
fisherman and sold to the
consumers

Market Conditions on 14th January 1997 in the Fish Markets

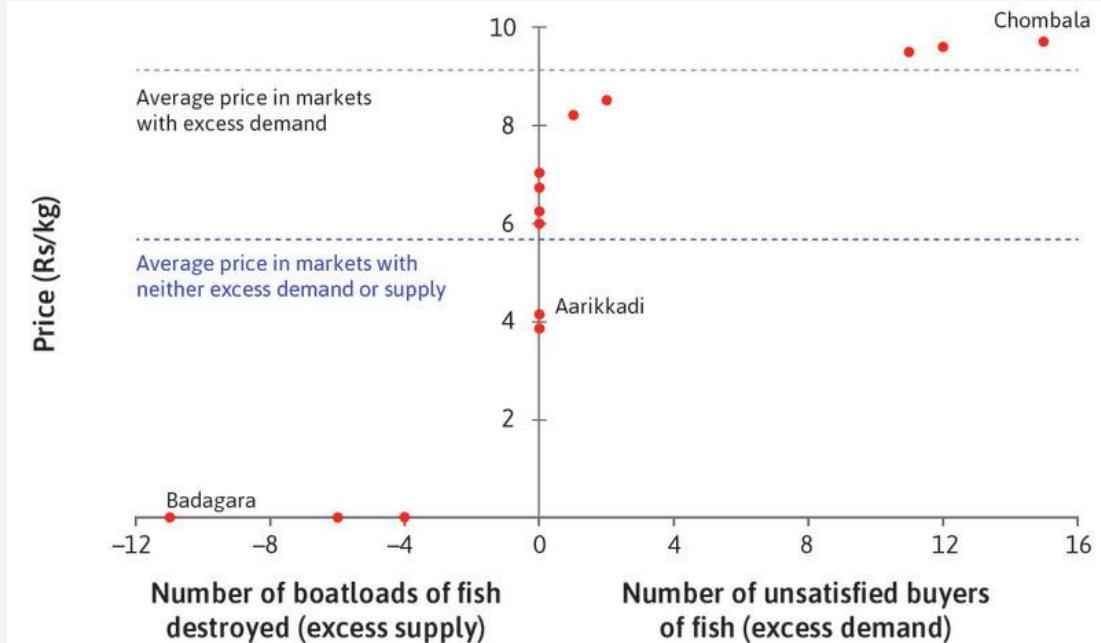


Badagara: 11 boats jettisoned their catch due to excess supply

Chombala: 15 buyers left unable to purchase fish at any price

Average market price across markets

Excess supply	Market Clearing	Excess demand
₹ 0	₹ 5.9	₹ 9.3



Efficiency

Vilfredo Pareto

Italian polymath (1848 – 1923)

Civil engineer

Sociologist

Economist,

Political scientist

Philosopher



Pareto Efficiency

Pareto efficiency situations are one where you cannot make anyone better-off without making anyone worse off.

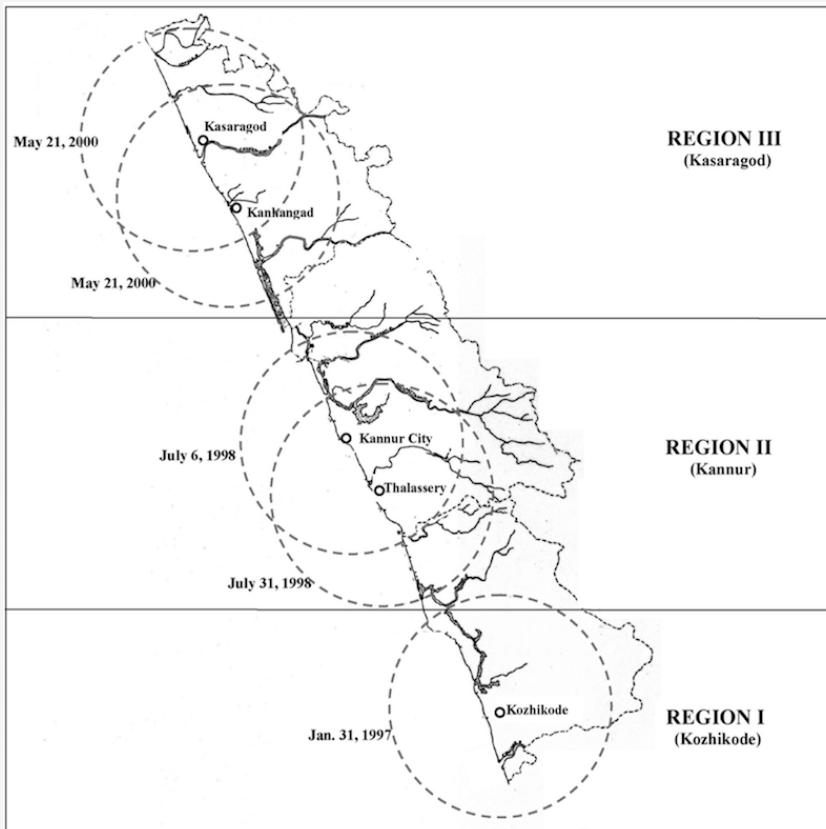
Winners and **losers** in the society

Pareto Improvement

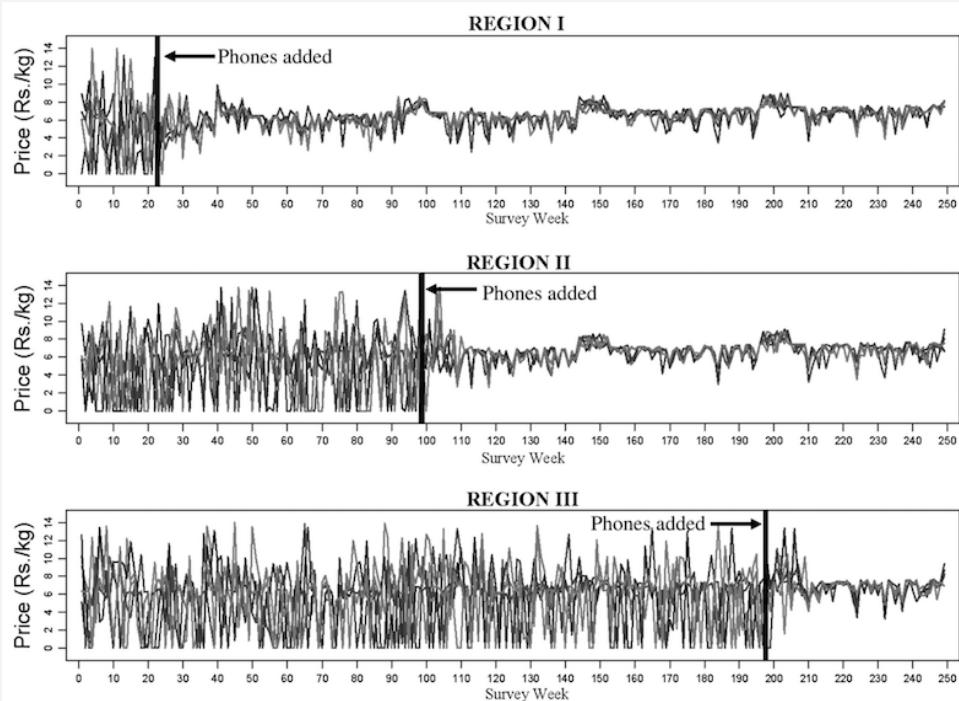
An intervention that makes some people better off without making anyone worse off is called a **Pareto improvement**.

Winners but **no losers** in the society

Sequential roll out of mobile phone coverage



Introduction of mobile phones



Sharp decrease in **price** volatility.
Reduced **waste** & elimination.

Fisherman's **profits** went up by 8%.
Consumer **prices** decreased by 4%

Market Efficiency

Introduction of mobile phones made the fish market more efficient

i.e., **a Pareto Improvement**

- Reduced waste & elimination
- Sharp decrease in price volatility
- Fisherman's profits went up by 8%
- Consumer prices decreased by 4%

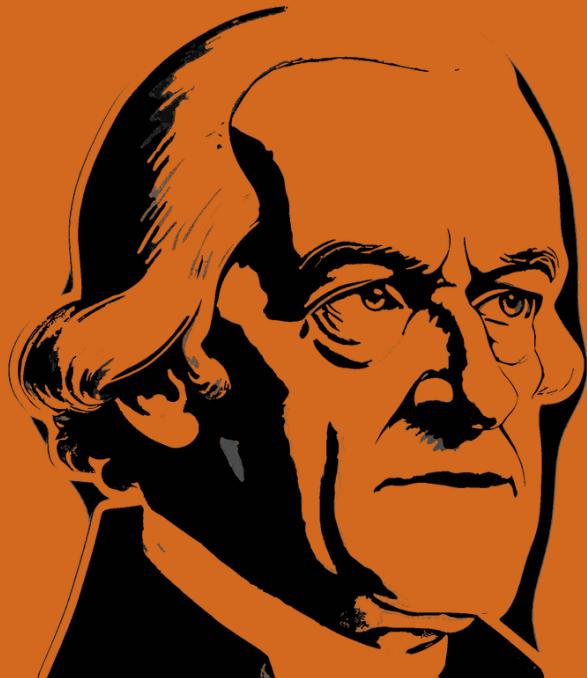
Adam Smith

Influential thinker (1723 -- 1790)

Economist

Philosopher

Key figure in
Scottish Enlightenment



Adam Smith's insight

Well-functioning **markets** are Pareto **efficient**.

That is *all mutually beneficial trades are undertaken* and no trades than can make someone better off without making anyone worse off are left unexploited.

Unanswered question

How do the buyers and seller **find** each other?

Who **owns** the space where the buyers and sellers meet?

Co-incidence of location

Before mobile phones

Price information previously flowed the through the physical space which

it required co-incidence of location to exchange price information

After mobile phones

price information flowed through a different space

freed individuals from co-incidence of location

Co-incidence of location

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Payment systems free people from co-incidence of location

Co-incidence of location remains for **goods**

Markets unlikely to become aspatial

The Four Spatial flows

The **flow of information** from the sellers to the buyers about the quality of goods available in the market.

The **flow of information** about the market price of the goods

The **flow of the actual good** from the seller to the buyer

The **flow of money** from the buyer to the seller

Kerala Fish Market

Market

Space

Infrastructure

Market-space

contiguous space between all potential buyers and sellers through which **price information, goods** and **money flow.**

Market-place

location where the **exchange** of goods and money occurs.

Characteristics of Market-space

Contiguity

non-rival

non-excludable

Characteristics of Market-space

Market-space is a **public good**

Contiguity

non-rival

non-excludable

Coda

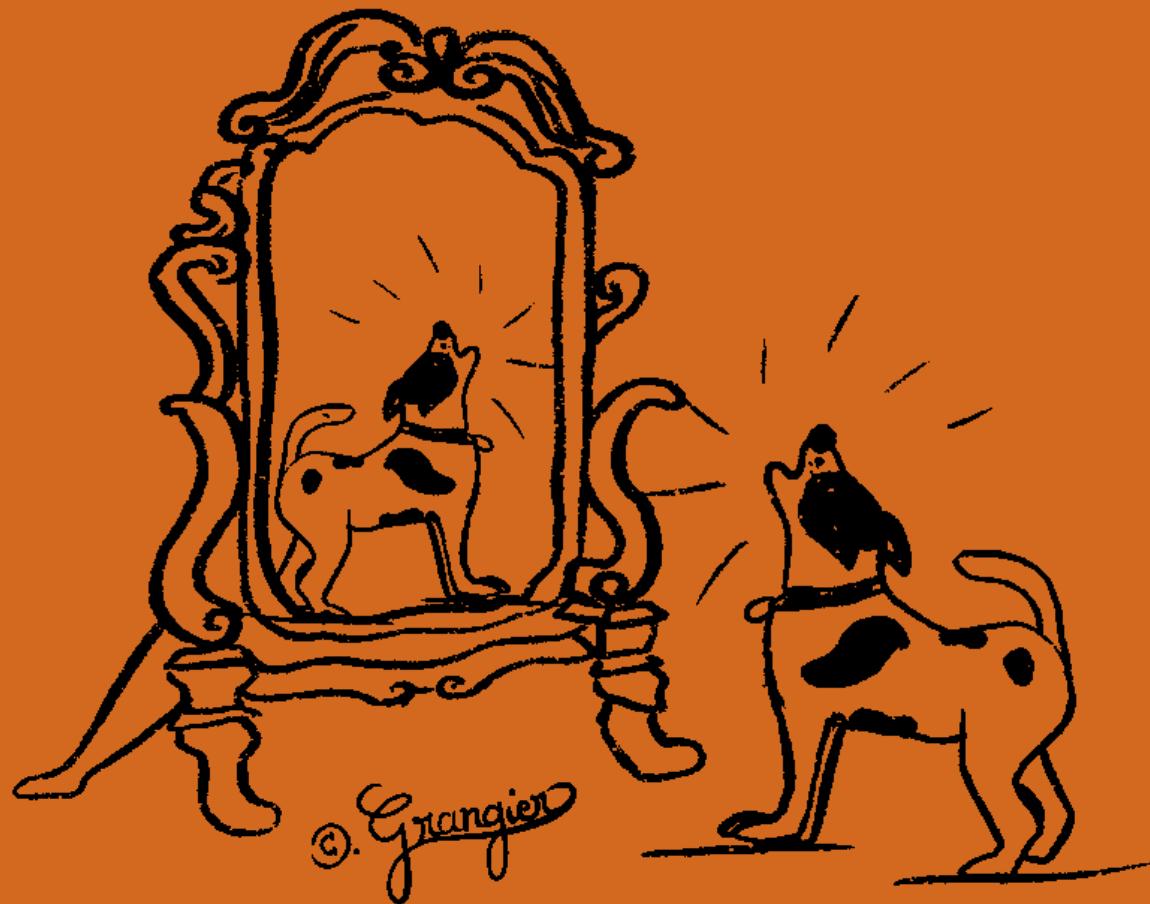
Kerala Fish Markets

Atypical example because most places are landlocked.

Buyer's ability to move across space is determined by the **transport network**

Numerous options in **urban areas**

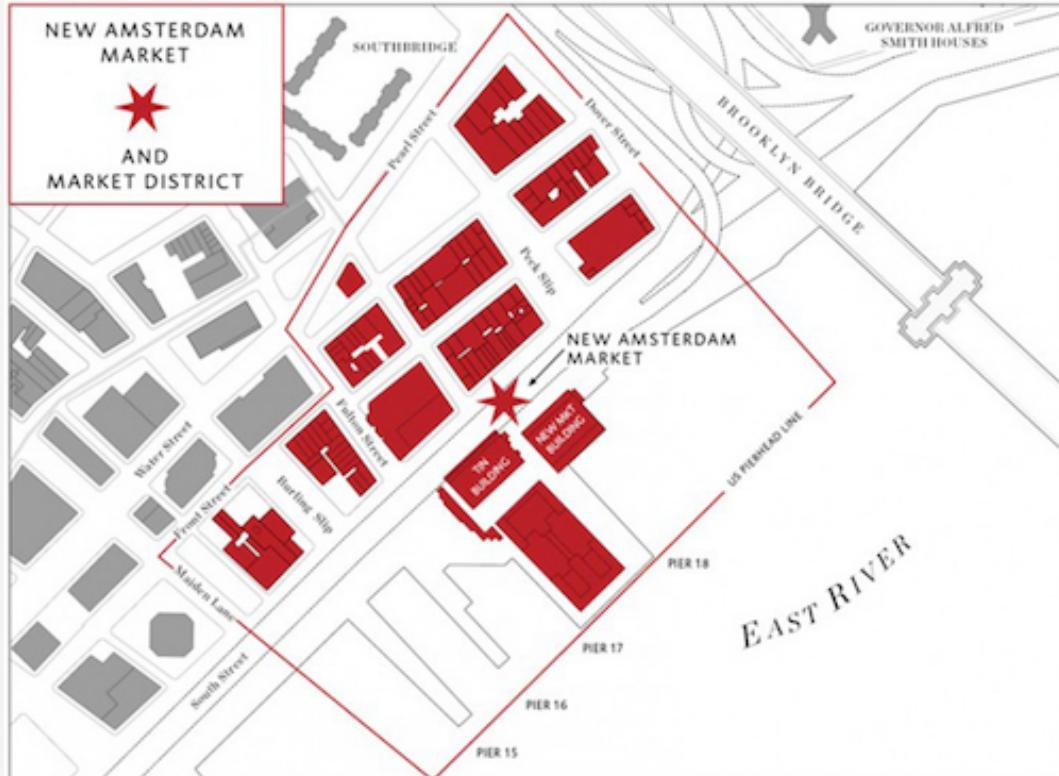
Limited options in **rural areas**



Market

Fulton Fish Market
New York City

Fulton Fish Market



Wholesale fish markets in New York where restaurateurs buy fish in large quantities

Fulton Fish Market



Unloading the fish from the boats



Fish stalls in the Fulton Market

Graddy (2006)

Studied the transactions for
whiting in Fulton Fish Market
in 1995.

Found that **Asian buyers paid 10% less**
for the same quality of fish as compared
to other white buyers.

Graddy, K. (2006). Markets: The fulton fish market. Journal of Economic Perspectives, 20(2), 207–220.

Power relationships in the Fulton Fish Market

Asians buyers were **socially organised** and could **boycott** the sellers that cheated them

Why couldn't new sellers **enter** the market and **compete** with the old sellers

Mafia controlled the **parking** in the streets around the market

It controlled the **loading** and **unloading** of the fish

Only **sellers** that had a **relationship** with the local **mafia** could sell in the Fulton fish Market

Market

Power

Infrastructure

Space

Market

The **market-space** in a **competitive market** is a **public good**, i.e., it is non-rival and non-excludable for market participants.

Market **decentralisation** creates a **power vacuum**, giving incentive for **entities** to try own or exert control over the the market-space.

The market is only able to **facilitate decentralised transactions** if the market space is **owned** by a benevolent entity, which chooses **not to influence** transactions.



Infrastructure

Definition

Infrastructure

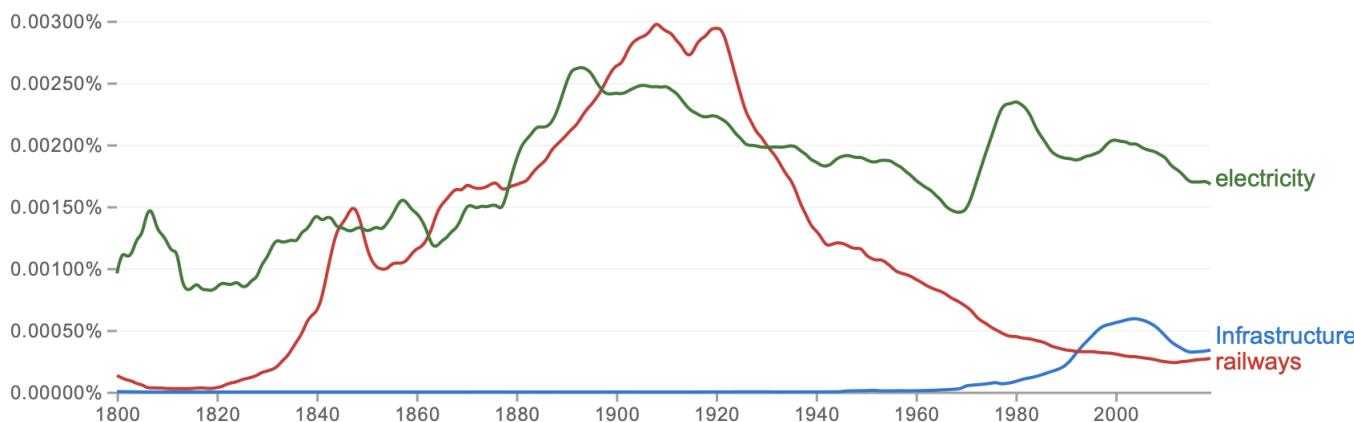
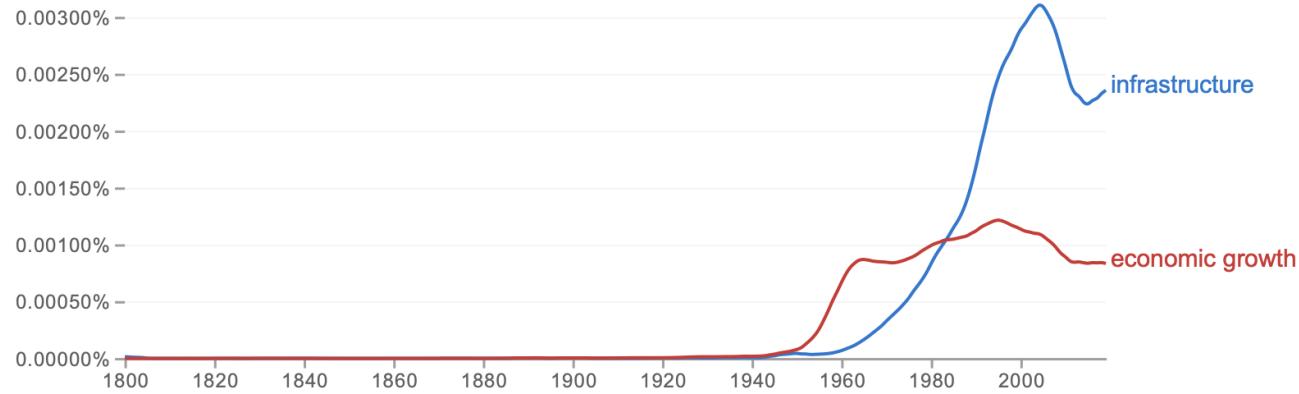
Firm level infrastructure

City level infrastructure

Village level infrastructure

Country level infrastructure

Global infrastructure



There is currently **no universally agreed upon definition of infrastructure** in either the UK's National Accounts, or the international guidance embodied in the System of National Accounts: SNA 2008 and the European System of Accounts: ESA 2010.

- functional definition
- narrowly defined **economic infrastructure**, namely *transport, energy, water* and *waste handling assets, digital communications, mining* and *quarrying*, and other
- Neither *housing* nor *social infrastructure* (such as the *education, health* and *care systems*) are included

ONS (May 2022) Infrastructure in the UK, investment and net stocks. | [Link](#).

The basic physical and organisational structures and facilities (buildings, roads, power supplies) needed for operation of a **society** or enterprise: the social and economic infrastructure of a country.

Physical components of **interrelated systems** providing commodities and services essential to enable, sustain, or enhance **societal living conditions**

Infrastructure as the network of assets where the **system** as a whole is intended to be maintained indefinitely at a **specified standard** of service by the continuing replacement and refurbishment of its components.

Infrastructure is the set of fundamental facilities and systems that support the **sustainable functionality** of households and firms.

Hard infrastructure refers to the **physical networks** necessary for the functioning of a modern industry. This includes roads, bridges, and railways.

Soft infrastructure refers to all the **institutions** that maintain the economic, health, social, environmental, and cultural **standards** of a country. This includes educational programs, official statistics, parks and recreational facilities, law enforcement agencies, and emergency services.

Gramlich (1994)

definition that makes most sense from an economics standpoint consists of a **large capital intensive natural monopolies** such as highways other transportation facilities, water and sewer lines and communication systems. Most of these are publicly owned by some are owned privately. An alternative version that focuses on **ownership** includes just the tangible **capital stock** owned by the **public sector**. Broader versions include successively human capital investment and/or research and development capital.

Torrisi (2009)

originated by investment expenditure and is characterised by **long duration, technical indivisibility** and a **high capital output ratio**.

Aschauer (1989)

infrastructure is often defined as a **public good**.

Goldsmith (2015)

infrastructure provides lasting **public service** in a **specific location**.

Page Pande (2018)

We conceive of invisible infrastructure as the **social** and **human systems** that enable citizens to realize their **capabilities** and **escape poverty**. This comprises traditional elements of social infrastructure like health care and education but also, importantly, the **incentive** and information structures that bring the **actions** of those who **control resources** in line with the **needs of the poor**.

Aschauer, David Alan. "Is public expenditure productive?" *Journal of monetary economics* 23.2 (1989): 177-200.

L. Page and R. Pande. Ending global poverty: Why money isn't enough. *Journal of Economic Perspectives*, 32(4):173–200, 2018.

Goldsmith, Hugh. "Actors and innovations in the evolution of infrastructure services." *The Economics of Infrastructure Provisioning* (2015): 23-91.

Gramlich, E. M. Infrastructure investment: A review essay. *Journal of economic literature*, 32(3):1176– 1196, 1994.

Torrisi, Gianpiero. "Public infrastructure: definition, classification and measurement issues." *Economics, Management, and Financial Markets* 4.3 (2009): 100-124.

Infrastructure

Spatial flows

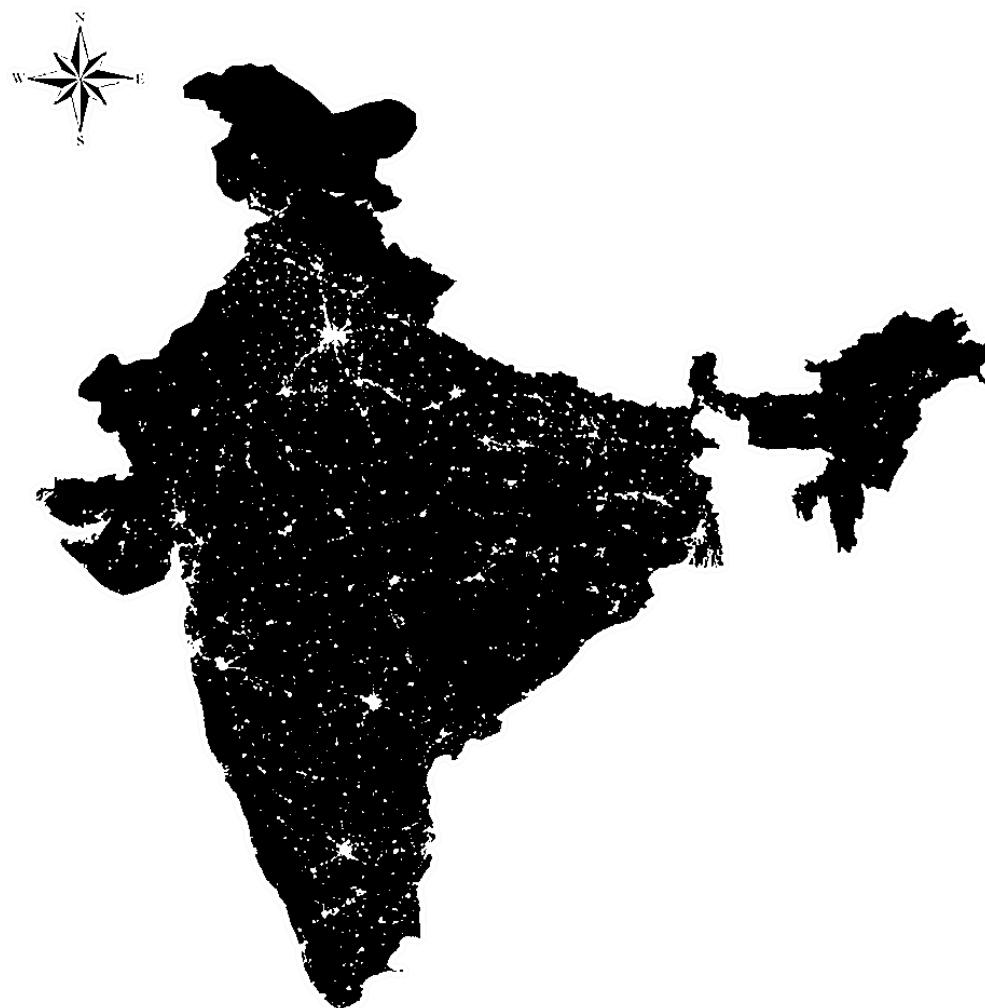
congestion

Rules to **facilitate flow**

Prevent congestion



Mapping the space through night light



Rehman, S., Honap, V., Siddiqui, A., Maske, A., & Maithani, S. (2021). Spatio-temporal variations in night lights, economy and night light emissions in states of india. Journal of the Indian Society of Remote Sensing, 49, 2933–2943.

Road Network

Table 2: Road Network⁸

Country	Population			Surfaced	
	Density (people/4km ²)	Road length (km)	Road density (km/4km ²)	Surfaced (%)	road density (km/4km ²)
India	1,878.64	6,331,757	7.70	64.69	4.98
France	493.60	1,053,215	7.67	100.00	7.67
Germany	952.08	830,000	9.30	100.00	9.30

Aniket, K. (2024). Markets, space and infrastructure. In B. Banerji & S. Sharma (Eds.), Public policies and business strategies in india and europe: Ideas for a sustainable, inclusive and resilient society. Springer.

Rail Network

Table 1: Railway Network⁷

Country	Surface area (km ²)	Rail length (km)	Rail density (km/400km ²)	Stations	Station density (per 400 km ²)
India	3,287,260	68,103	8.29	7,337	0.89
France	549,087	27,716	20.19	3,000	2.19
Germany	357,140	33,401	37.41	5,681	6.36

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Lefebvre (1974)

People in power **impose spaces** on the people who live in them

If the imposed space alienates people, people **invent spaces** through the **acts of resistance** to overcome the alienation.

Lefebvre, H., 1974. *La production de l'espace*. Paris: Éditions Anthropos.

Lefebvre, H., 1991. *The production of space*. Translated by D. Nicholson-Smith. Cambridge, MA: Blackwell Publishers.

Code

Spaces and its rules reflects the existing
power structure

Markets

Roads, Bridges

Cities

We constantly **intervene** and make spaces that
confound humans and require **maps** and **codes**

