

# ECONOMIC AND BUSINESS HISTORY 22/23

## LECTURE 3 – INNOVATION AND GROWTH



# Innovation and Growth



Structural Change



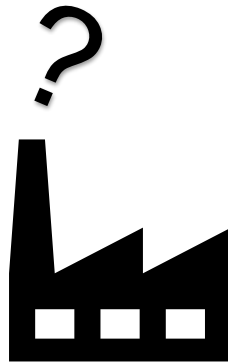
'Industrial Revolution'?



Invention and Innovation

# 1. 'Industry' and 'Industrial Revolution'

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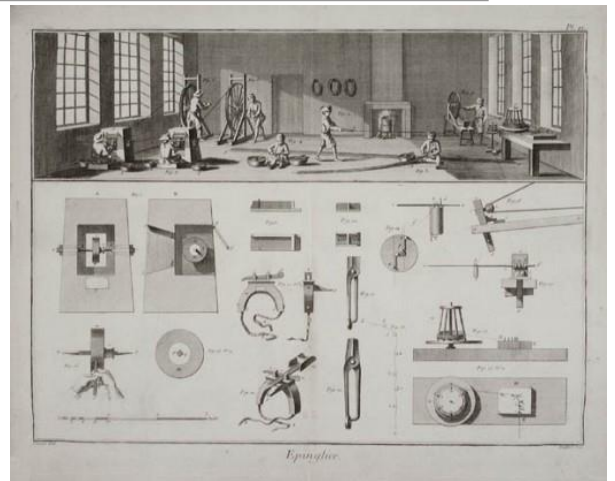


## Industrial Revolution: theory or period?

- The term “Industrial Revolution” (IndRev) describes 3 distinct ideas
  - a period (very loosely, 1750-1850) in which growth accelerated (this is the usage given by Galor)
  - a process (approx. the same as ‘MEG’)
  - a theory for explaining growth (based on the Classical theory), arguing that growth comes from technological changes in the agriculture; basically that growth equates to sectorial change
- The latest meaning of IndRev is a trap

# Growth in Labour Productivity

- Economic growth implies the increase of output per worker (or hour worked)
- The increase in labour productivity is typically the result of more (physical or human) capital per worker)
- According to the IndRev theory, economic growth was an effect of rapidly-improving technology (steam machines and labour-saving machinery in textile industry and ironworks) by 1800



A 18th-cent. pin factory, Adam Smith's example of how the division of labour multiplied productivity by a very large factor ... in the industrial sector

## Sectorial Output Shares in the UK, 1770-2001

	1770	1801	1851	1891	1931	1961	2001
Agriculture	45	31,6	19,3	9,0	4,1	4,0	1,0
Industry	24	32,6	31,9	41,0	36,1	49,3	27,5
Services	31	35,8	48,8	50,0	59,8	46,7	71,5

# Adam Smith Agreed.



*This [the division of labour] is generally carried furthest in those countries which enjoy the highest degree of industry and improvement. The work of one man in a rude state of society [is] that of several in an improved one.*

*The most opulent nations, indeed, generally excel all their neighbours in agriculture as well as in manufactures; but they are commonly more distinguished by their superiority in the latter than in the former.*

*Their lands are in general better cultivated, and having more labour and expence bestowed upon them, produce more in proportion to the extent and natural fertility of the ground. (The Wealth of Nations, I, cap. 1)*

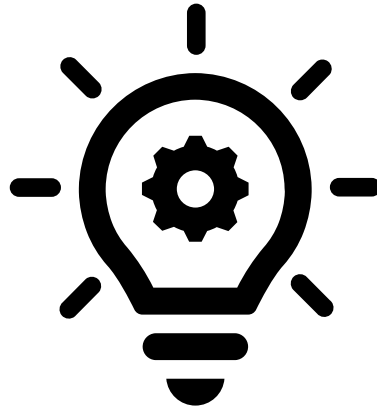
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## However,

- The fact that margins for progress are higher in the industry does not imply that the progress existed
- The IndRev was mostly a British, then European, then Western event, but it did not occur everywhere
- Why only these? It was just an issue of human capital/Pop. Composition?
- In order to understand this, it is paramount to understand 'innovation'

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# 2. Invention and Innovation



## Invention

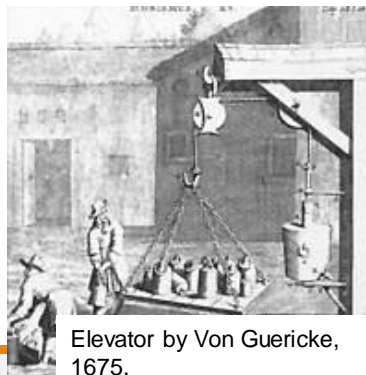
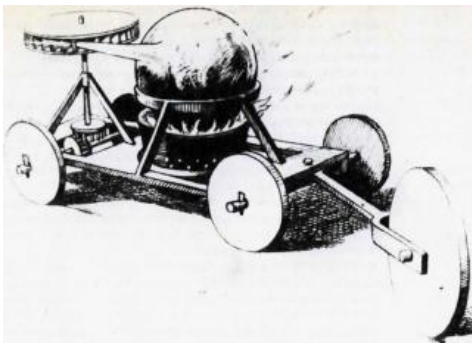
## OR

## Innovation?

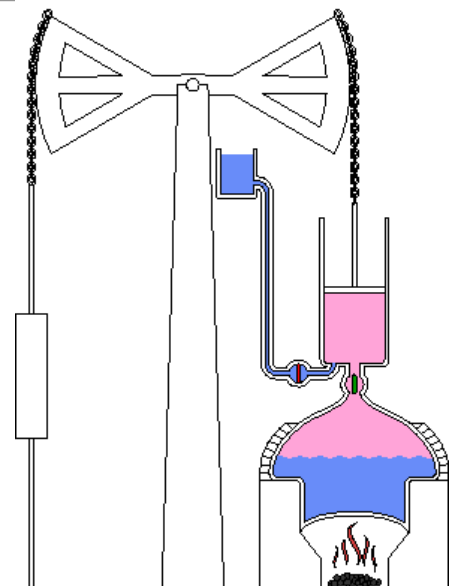
Steam engine by Hero of Alexandria ; 1st cent. AD



Steam car by Father Verbiest, 1678. Presented in the Chinese Court. No space for passengers!



Elevator by Von Guericke, 1675.



Newcomen's Steam Engine, 1712.



# Science and Innovation

- The scientific foundations for steam had been known since the 1660s, thanks to the discovery of vacuum by Von Guericke
- A few functional steam machines were around since then, but with no impact
- Portugal, for instance, was not behind in terms of scientific knowledge
  - There was even a pioneer of steam machinery called Bento Portugal ;D )
  - Vacuum even was part of the curriculum of Portuguese universities (see tiles from the Un. of Évora, depicting the Marburg experiment)
- The difference was not in the SUPPLY of scientific knowledge, but on the DEMAND for innovations.

## Innovation (cont.)

- Innovation occurred only when market conditions were favourable, it is not a function of science/technology/human capital/pop Composition
- It developed in settings (like 18th-cent. Britain) with low interest rates and high wages
- This combination made sense to replace labour with capital, thus making labour more productive

# The trajectory of Advanced Economies

Indicator	1820	c.1990	2018
Hours worked per person per year	3000*	1600	1589
Average schooling (in years)	2	11	12.7
Foodstuff and clothing/private consumption	75%	25%	20%**
Private Consumption/GDP	>85%	58%	54%
Farm employment/Total employment	49%*	6,00%	3,6%