



Innovation as an economic discovery process

chap.2

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MGT 403 – Spring 2019



- **Innovation as an economic discovery – definition**
- No strict determination of the stock of ideas on the flow of innovations
- A short break on the notion of ‘technological achievement’

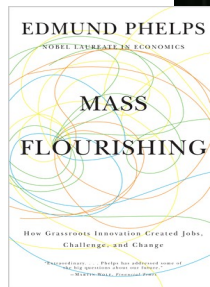
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Innovation - 1

- Not only a new idea – a new technological knowledge or an invention...
- ..but a new idea which is materialized under the form of a new (or improved) product, process, business (or social) model..
- ..AND which is tested and experimented in the economy
 - *If the new idea is not adopted on the market, it is not an innovation (Phelps)*
 - *The innovation translates in a so high decrease of costs that it changes the world! (Ridley)*
- Innovation \neq Invention or scientific discovery

Edmund Phelps

EPFL, Nov. 2014



Discovery procedure : « *the term refers to the process of determining whether the imagined product or method can be developed and, if developed, determining whether it will be adopted. Through internal trials and market tests, a modern economy adds to its **knowledge of what can be produced and what methods work**, and to its knowledge of what is **not** accepted and what does **not** work* »

- The key moment of a technological revolution is the explosion of the economic knowledge
- The difficulty of economic discovery

«*Most who try this business model will fail miserably, after burning through mountains of cash. Some of the copycat 'Uber for Something' will revolutionize industries, but most will close-down and become the Uber for Nothing*»

Technological achievements *vs.* Innovation (in the sky)

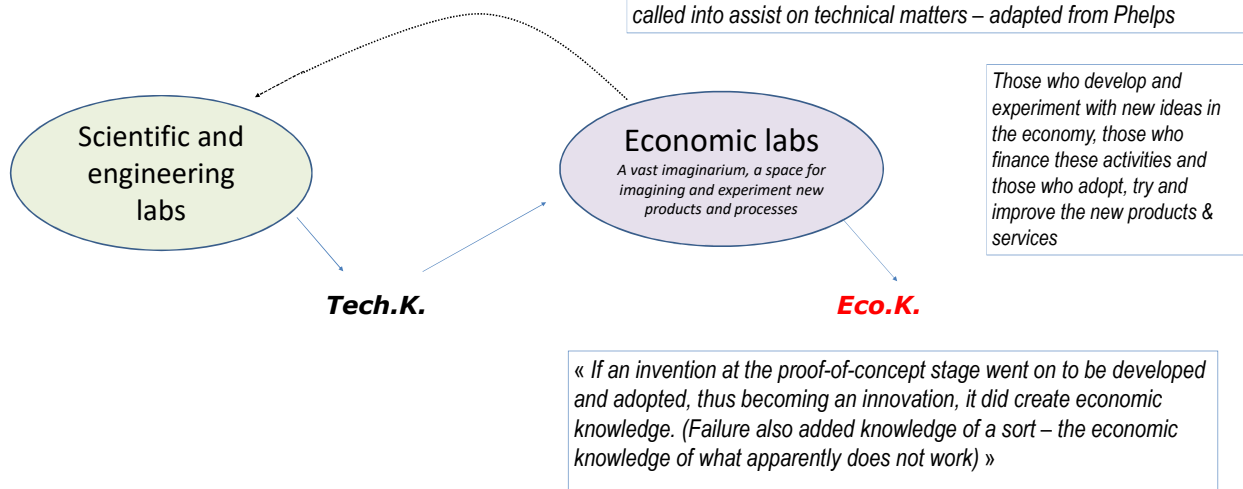
- Concorde – a magnificent and prestigious object – never entered the economy – no economic discovery (otherwise it would probably never have seen the light of the day)
- « *The Concorde was a magnificent achievement in terms of engineering design and speed, but it was also an unqualified financial disaster* » (N.Rosenberg)
- The low cost phenomenon is a radical innovation, whose creation mobilised very few S&T and which originated primarily from a process of economic discovery
- *The innovation translates in a so high decrease of costs that it changes the world!*
- The macroeconomic importance and productivity impact of the latter having been extraordinarily greater than those of the aeronautic gem

Innovation - 2

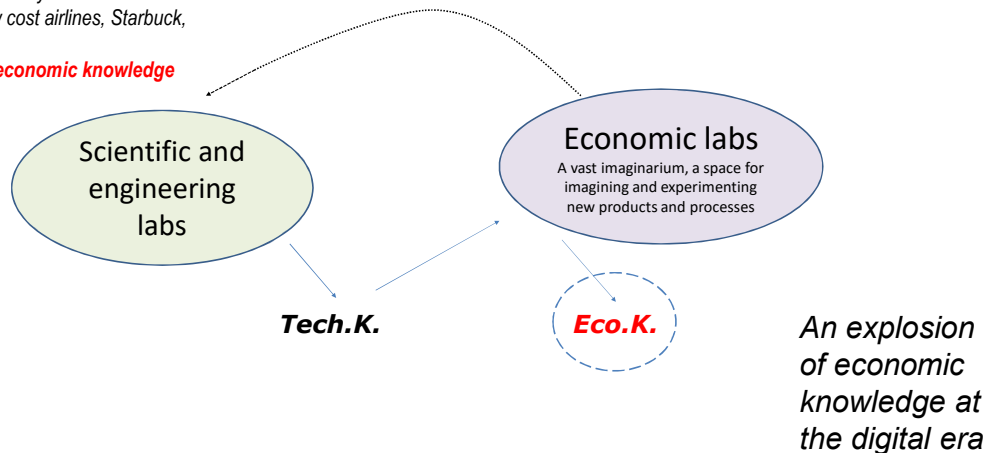
- Innovation involves entry and experimentation in the economy
- The economy in a broad sense
 - Business
 - I innovate to generate a private profit
 - Social
 - I innovate to respond to a social need
 - Household or family or local community (*Oikonomia*)
 - I innovate for my own use (or the use of my community)

Two laboratories in the great knowledge factory!

In the economic labs, central role of people who are close to the economy, where they are apt to be struck by new economic ideas (business or social)..in a role reversal, scientists and engineers are called into assist on technical matters – adapted from Phelps



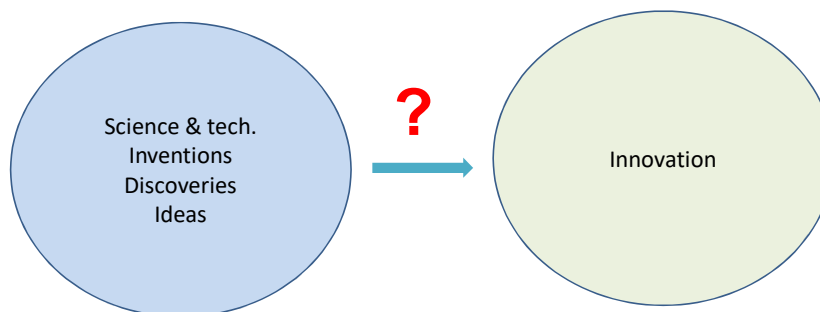
In some cases, S&T invention or discovery is a fundamental building block of the innovation (biomedical)
 In other cases, the key building blocks are economic intuition and discovery – R&D is of secondary importance (low cost airlines, Starbuck, Uber,..)
 In all cases – centrality of **economic knowledge**



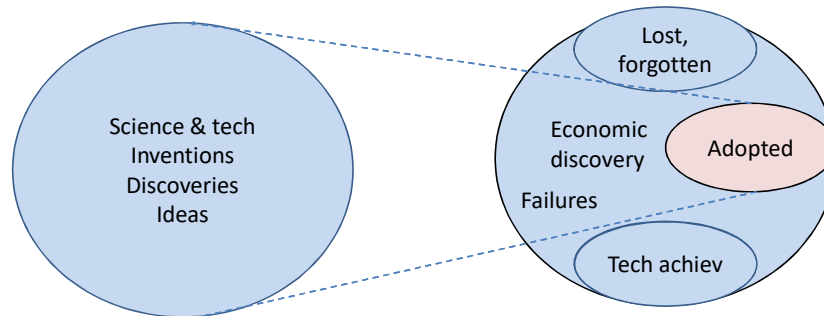
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Stratégies de Spécialisation Intelligente

« Even though the Chinese produced an astonishing abundance of inventions, there was little innovation, in the sense of the application and distribution of the inventions. Most such inventions were put to little productive use and often soon disappeared and were completely forgotten » Baumol

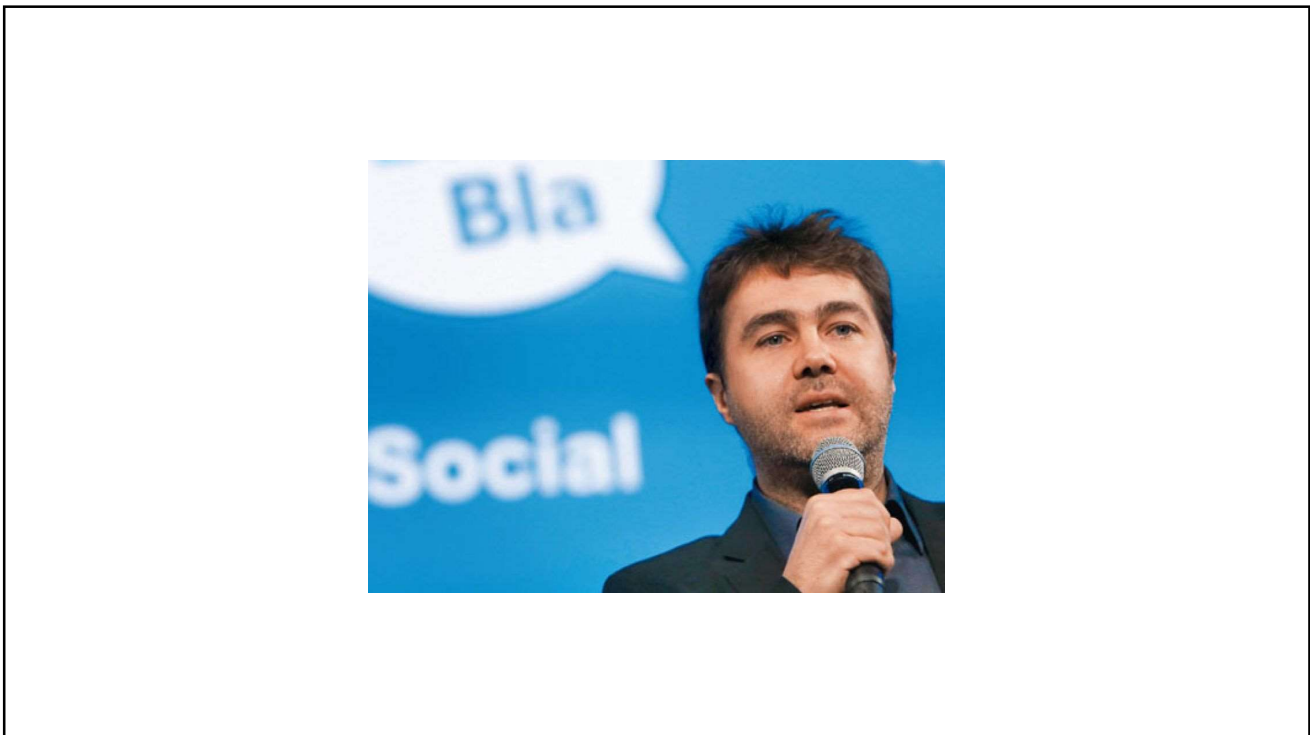
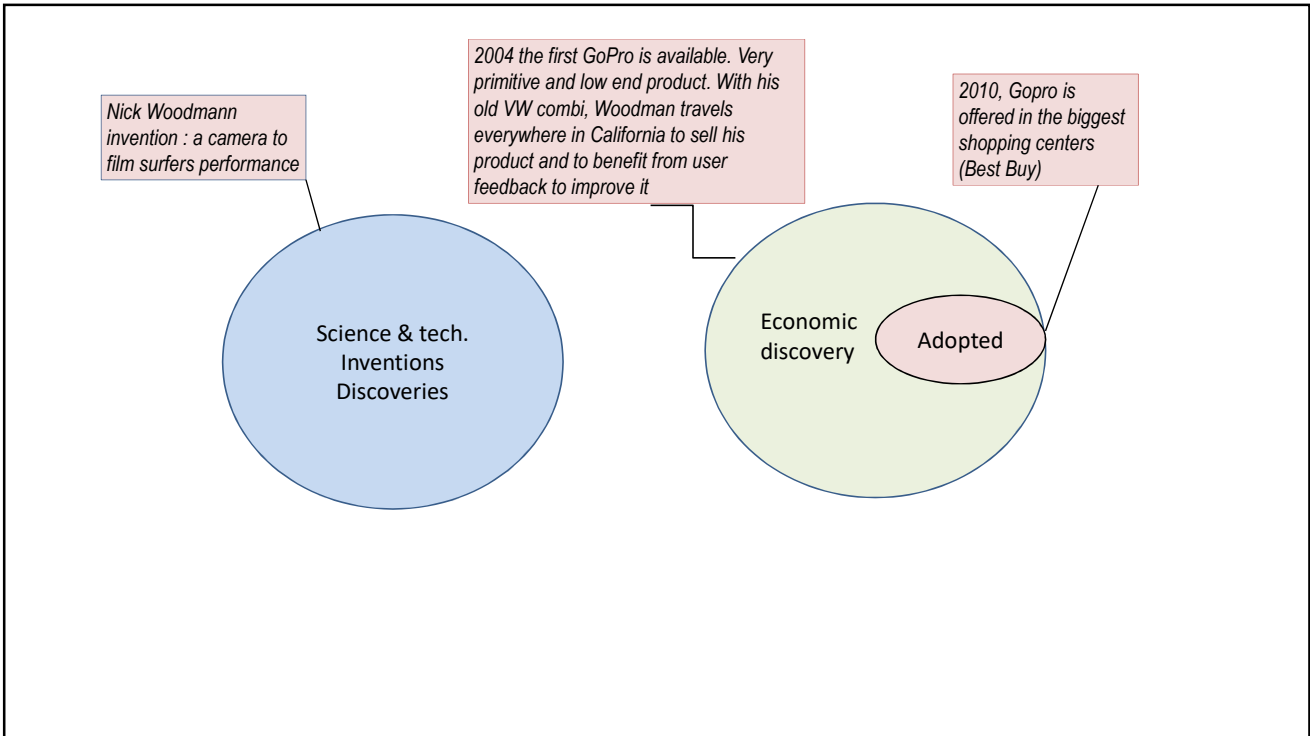


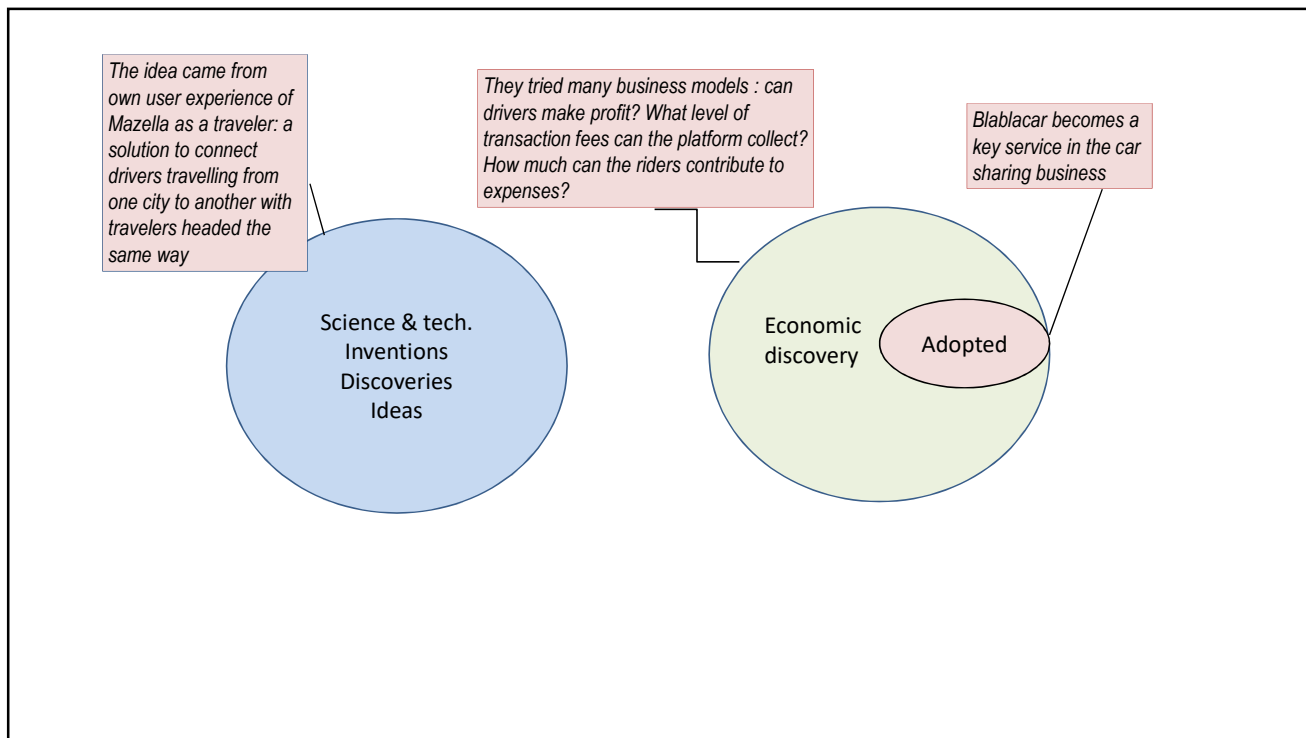
There is no homomorphism between the set of inventions and the set of innovations – no determination of the stock of ideas on the flow of innovations

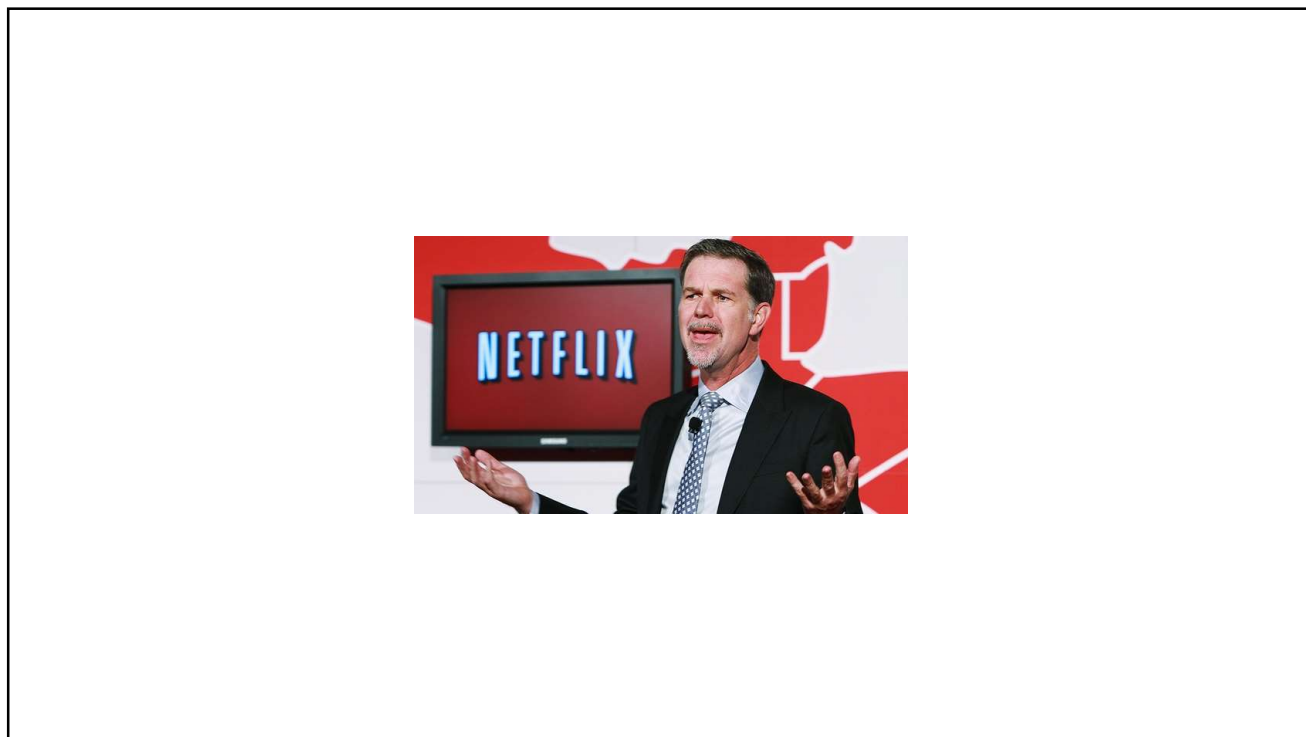
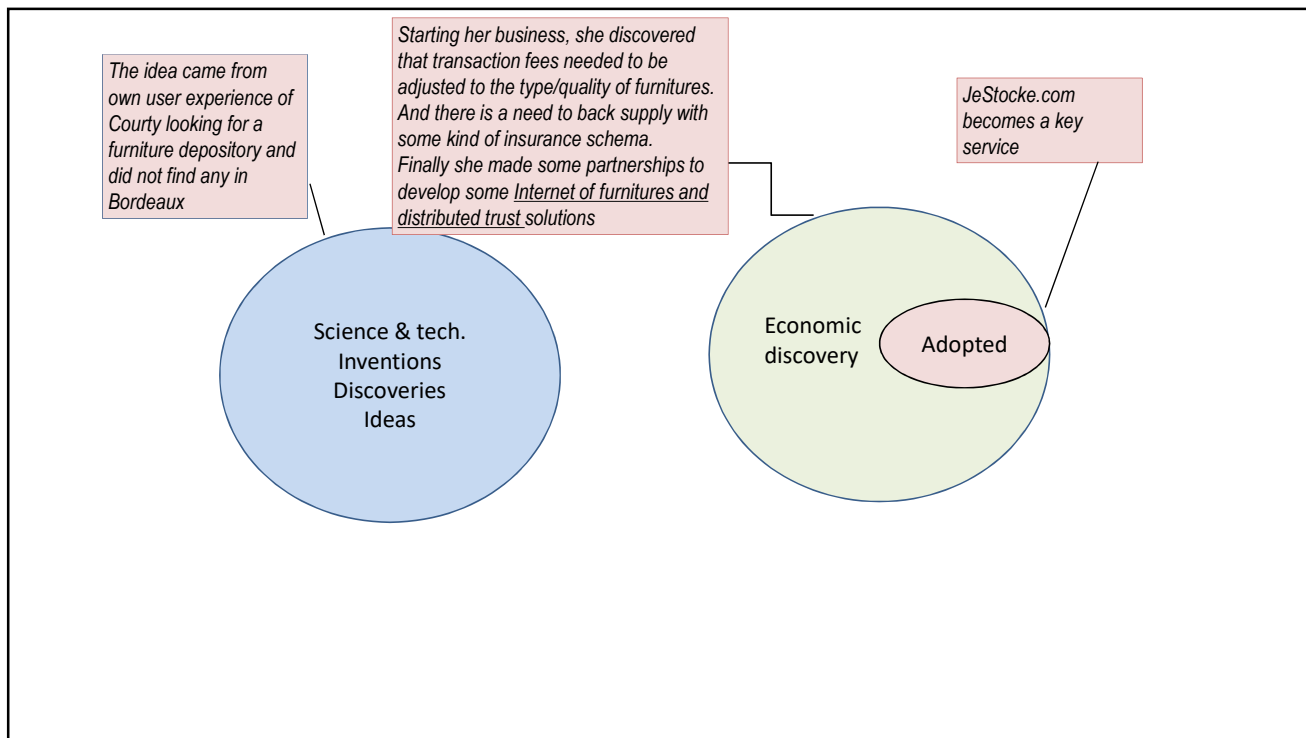


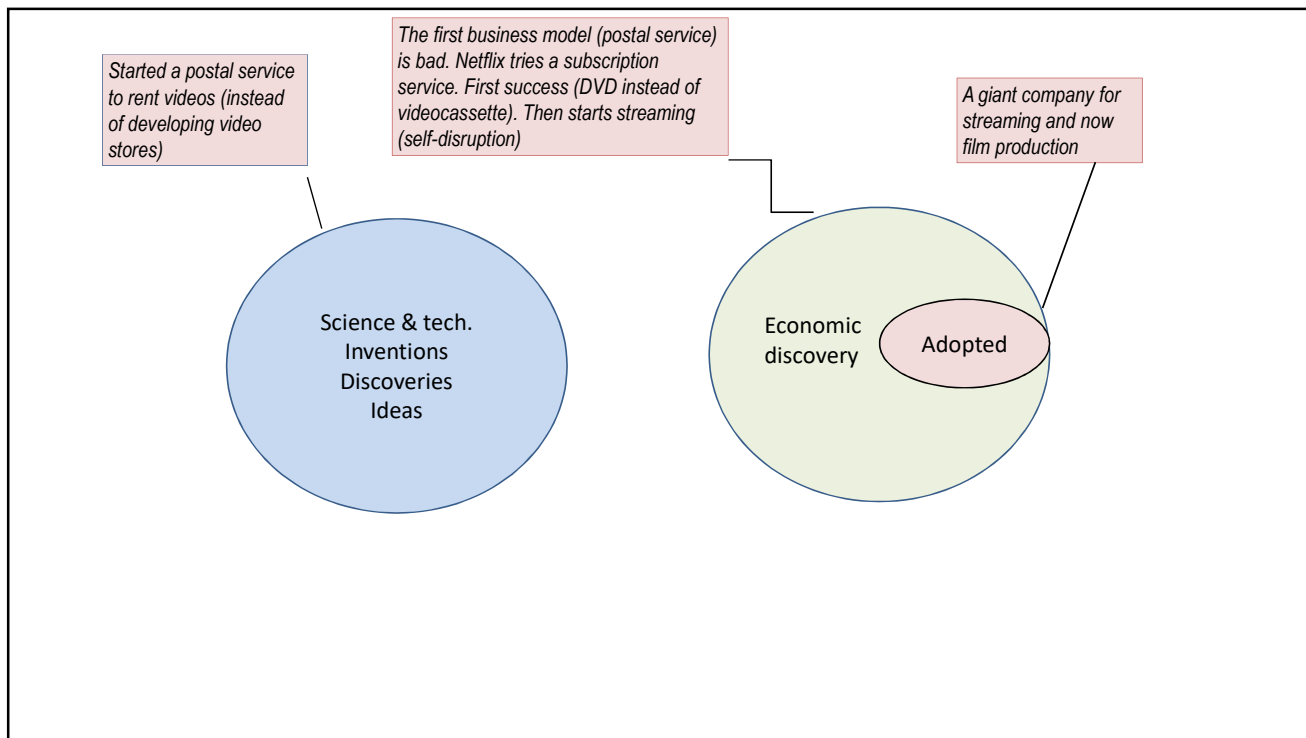
The extent to which imaginative and creative business people and students wanting to start a new company or improve an existing one can expect to find financing and talented workers determines the degree to which new ideas become innovation

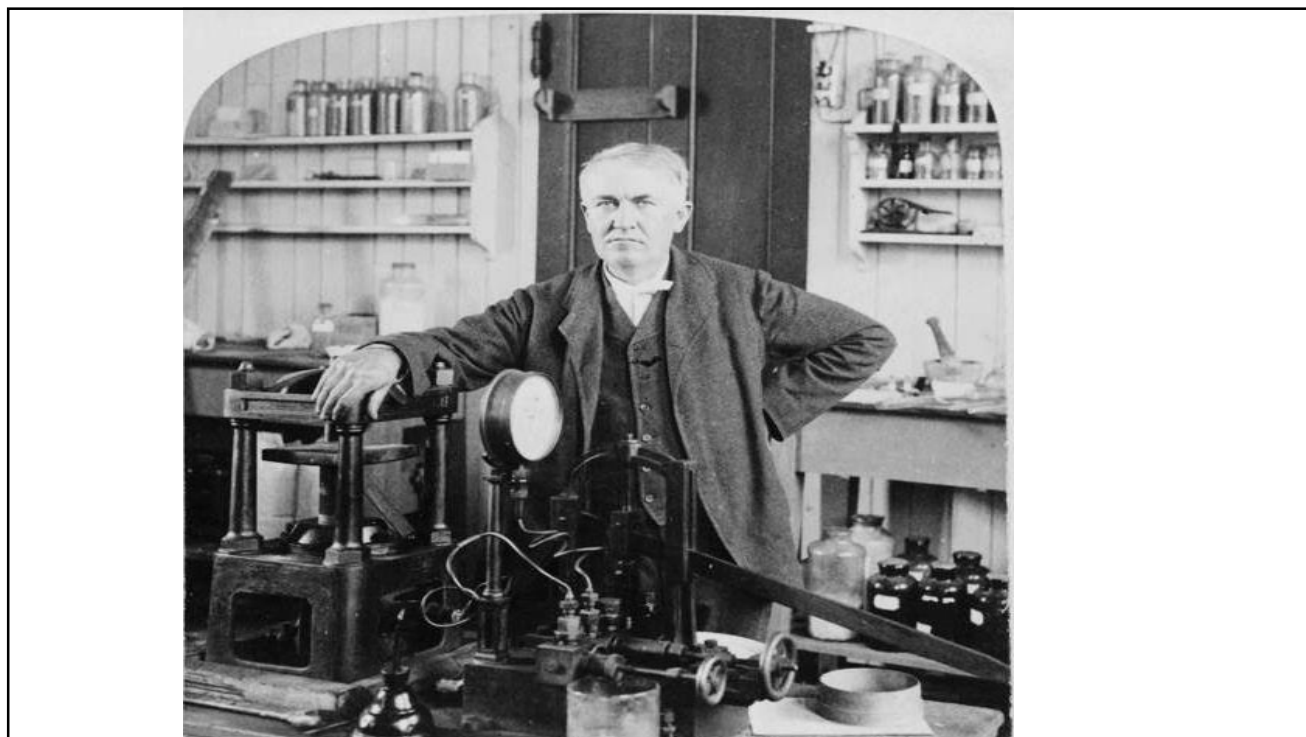
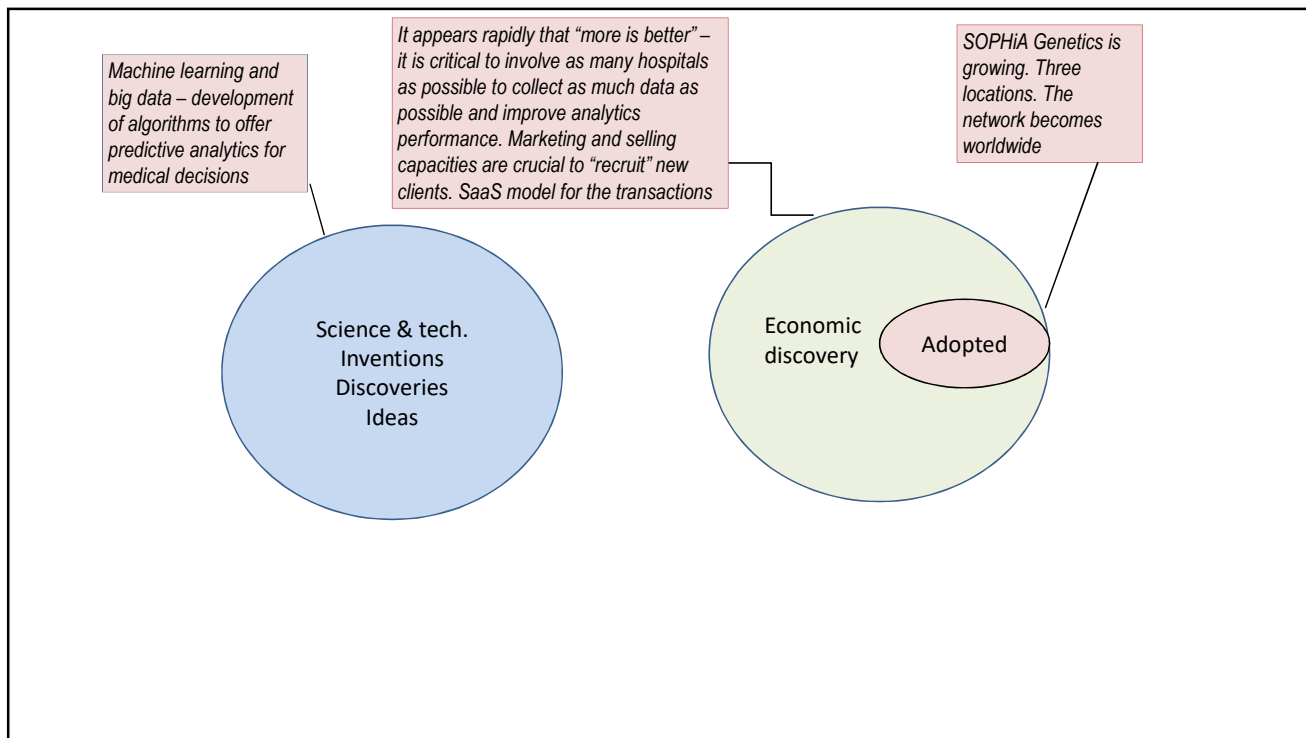












Electric light

R&D in Menlo Park – starting from 1878

In 1880 – first commercially practical incandescent light (patent)

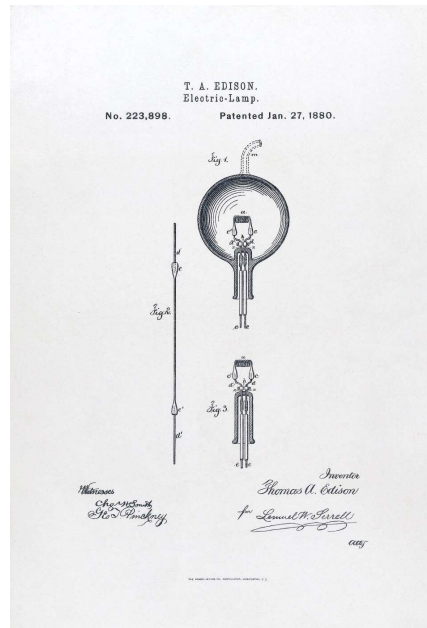
« We will make electricity so cheap that only the rich will burn candles »

Edison installed his electric lighting system aboard the Columbia (a new steam boat)

The Columbia became the first commercial application

« Edison thought in terms of the entire system – the purpose of which was to deliver cheap illumination into million of domestic residences »

Nathan Rosenberg



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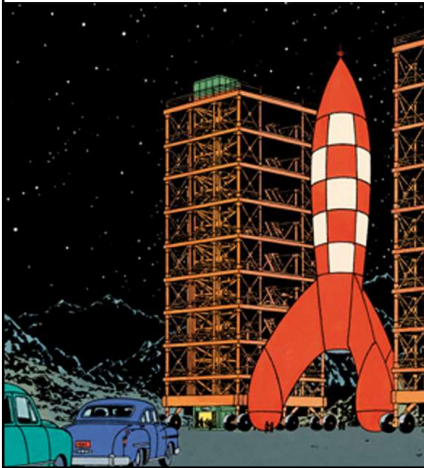
Innovation *versus* technological achievement

- Innovation involves entering and experimenting in the economy to produce economic knowledge
- A technological achievement involves only the materialization of ideas into a technology but not its experimentation in the economy

Technological achievements vs. Innovation (in the sky)

- Concorde – a magnificent and prestigious object – never went through the laboratory of economic knowledge (otherwise it would probably never have seen the light of the day)
- « *The Concorde was a magnificent achievement in terms of engineering design and speed, but it was also an unqualified financial disaster* » (N.Rosenberg)
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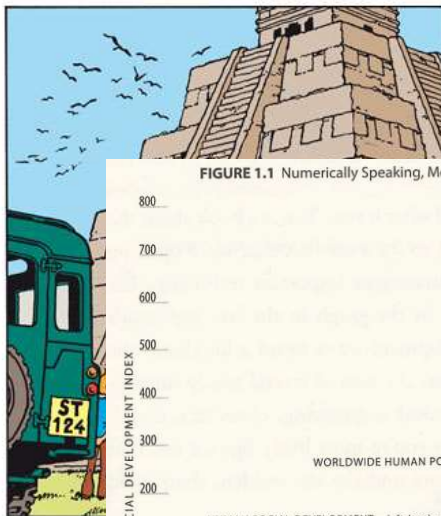




In this fictive country
(Syltavia) as well as in
USSR : incredible science
& technology
performances

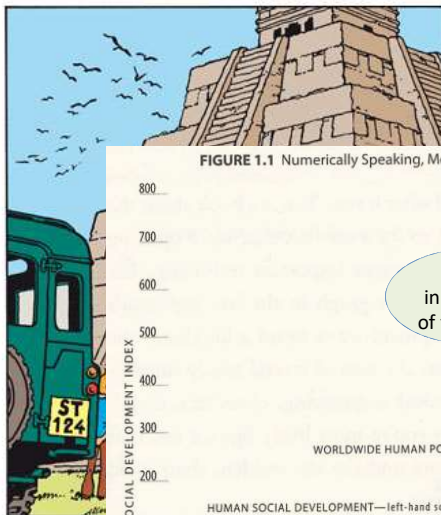
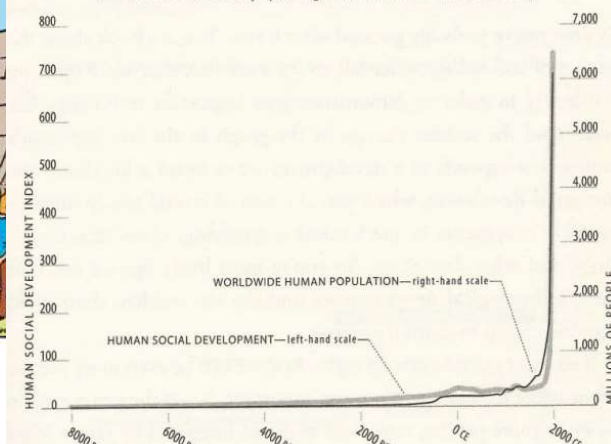
**But no
innovation!!!**

- Capacities for *Tech. Achiev.* traverse history but generate few economic gains in terms of productivity..
- *Tech. Achiev.* capacities are present everywhere and at all times,
 - This involves any centralised and disciplined structure – the State is usually the primary contractor and the main client (hence no need for economic discovery and economic knowledge). There is one sole agency in charge of the plan and its execution – rather easy to implement in any system
 - Such ‘simplicity’ stems from that a *Tech. Achiev.* is isolated and protected from economic incentives
- Innovation capacities involve much more complex institutional frameworks. This is about economic institutions that encourage entrepreneurial dynamism and economic experimentation
- « *Capitalism is unique not in invention but in innovation* » Baumol



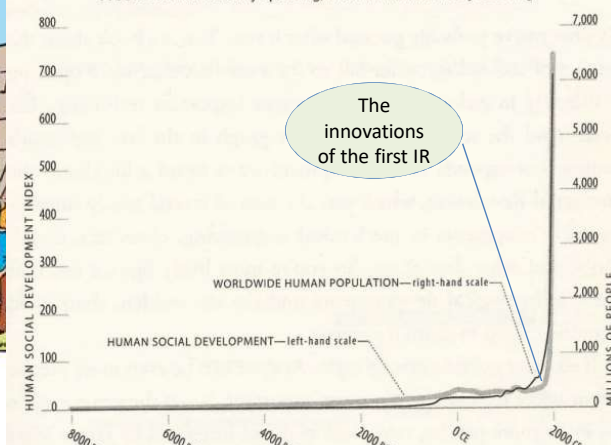
In many places – early in history – the development of technological knowledge has been incredible (pyramids, cathedrals, and lighthouses). But not of innovation! Impact on productivity was from negligible to 0 (or negative)

FIGURE 1.1 Numerically Speaking, Most of Human History Is Boring.

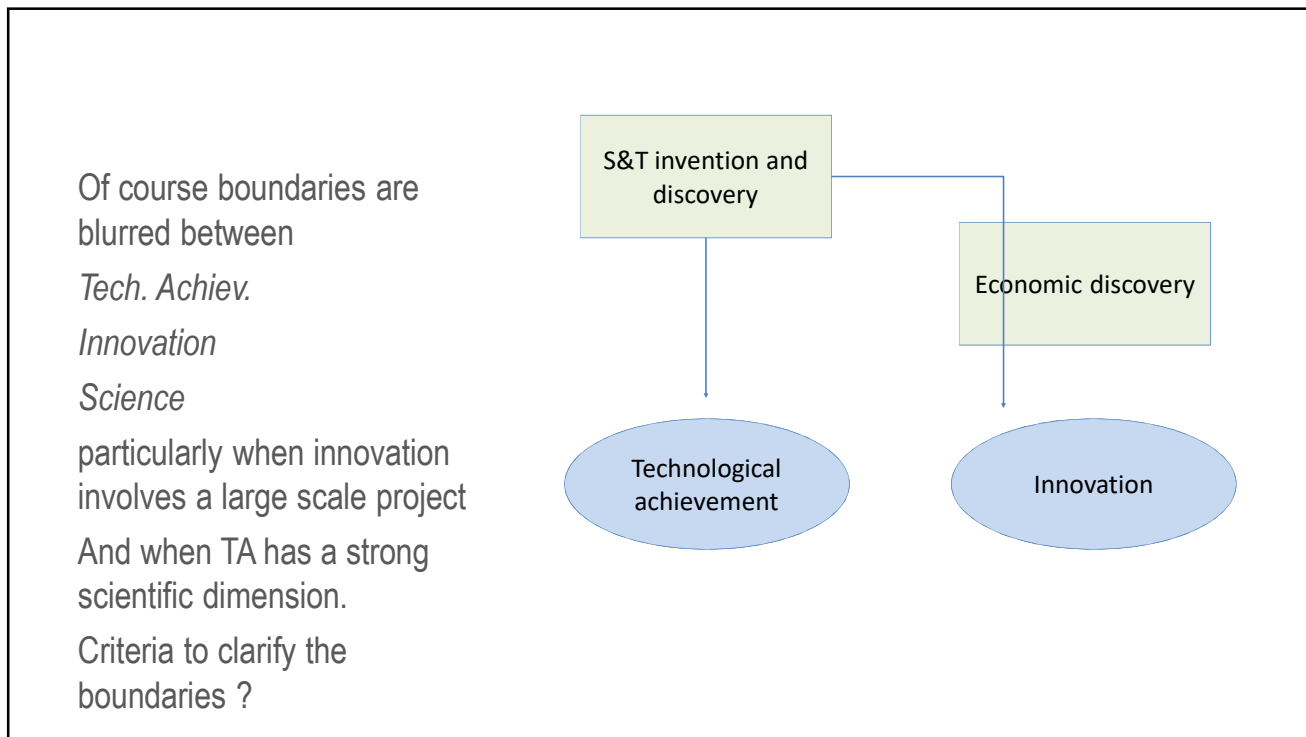


« The Renaissance made pivotal discoveries in science and art and brought riches to royalty. Yet the resulting gains in economic knowledge were too meager to elevate the productivity and living standards of ordinary people... » Phelps

FIGURE 1.1 Numerically Speaking, Most of Human History Is Boring.

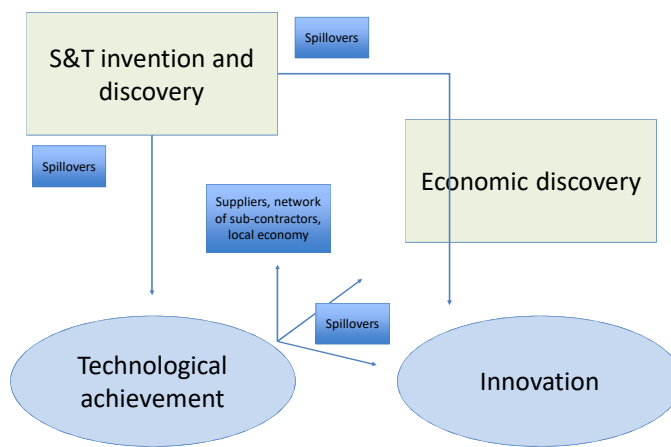


<h2 style="text-align: center;">Innovation</h2> <p style="text-align: center;">Uber, low cost</p>	<h2 style="text-align: center;">TA</h2> <p style="text-align: center;">Concorde, Pyramids</p>
<p>Needs adoption by firms and consumers (Phelps) and impact on productivity and cost</p> <ul style="list-style-type: none"> Operational efficiency Better quality New product/service New combination of supply and mode of use <p>Productivity growth translates into higher profits and/or wages depending on how the gains are distributed</p> <p>How gains are distributed provides the foundation to define business <i>versus</i> social innovation</p> <p>The economic discovery is about how to maximize economic value and to distribute it</p>	<p>Does not need adoption (there is <i>de facto</i> one client)</p> <p>Involves very negligible productivity gains - either because only a marginal fraction of consumers can benefit it- <i>for instance Elton John can fly London – NY in 3 hours –</i></p> <p>- or negligible gains in any case (taking account <i>spillovers</i> effects)</p> <p>Hence no effect on wages and no impact (or very small) on the economy</p>



*An innovation is validated and adopted **within the framework of the economic knowledge space** while a *Tech. Achiev.* is governed only by scientific and technical constraints and laws

*Science generates **an order of magnitude of spillovers** to the economy – TA generates only a few (in spite of what is claimed by TA champions)



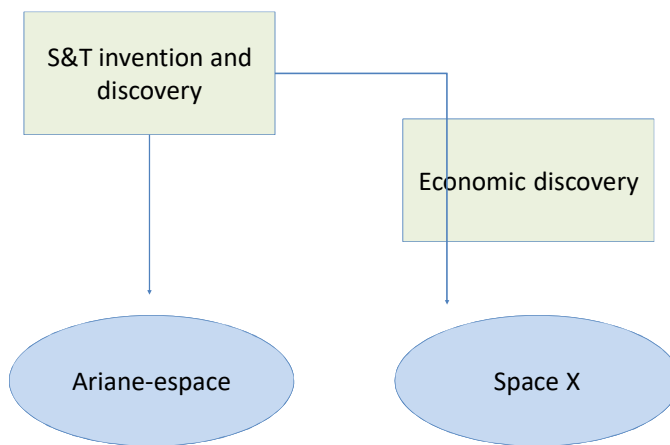
It is hard for a TA-dominated sector to shift towards an innovation culture

Value, culture, organizational inertia

Firms active in aTA logic exhibit large technological capacities but very low innovation capacities

Favourable conditions for an innovation culture to invade a TA dominated sector

An outsider enters and radically changes the codes of the profession



«It is about re-inventing Ariane; it's the lesson taught us by the garages of California» Le Gall – President of CNES

- **To take home**
- The economic nature of innovation – innovation ≠ invention, scientific discovery & technology development
- An innovation is an innovation only when the new idea has been materialized, experimented and adopted in the economy – (centrality of economic knowledge)
- Many ideas are simply lost or become a technological achievement or fail the economic discovery test
- Economy in a broad sense – business, social, Oïkonomia

