

# **The 4th Industrial Revolution, City, and Sustainability**

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# Key Words for PPTs

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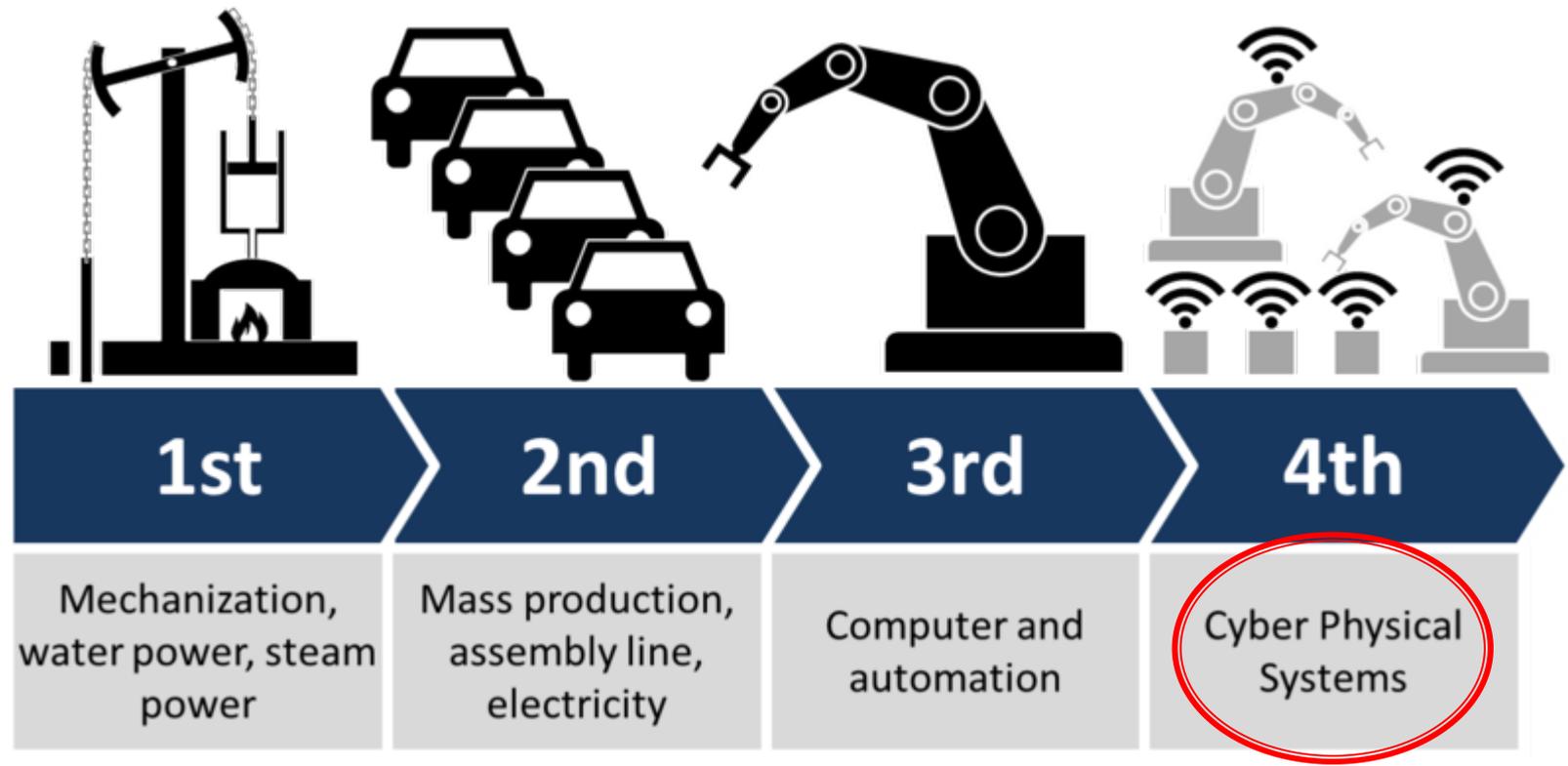
The 4<sup>th</sup> Industrial Revolution

Spatial Ecosystem

City

SDGs

# What is 4<sup>th</sup> Industrial Revolution (IR)?



Source: Forbes (<http://www.forbes.com/sites/bernardmarr/2016/04/05/why-everyone-must-get-ready-for-4th-industrial-revolution/#a5dabca79c98>)

# What is 4<sup>th</sup> Industrial Revolution (IR)?

Technologies + Manufacturing + Technologies +  
Manufacturing;

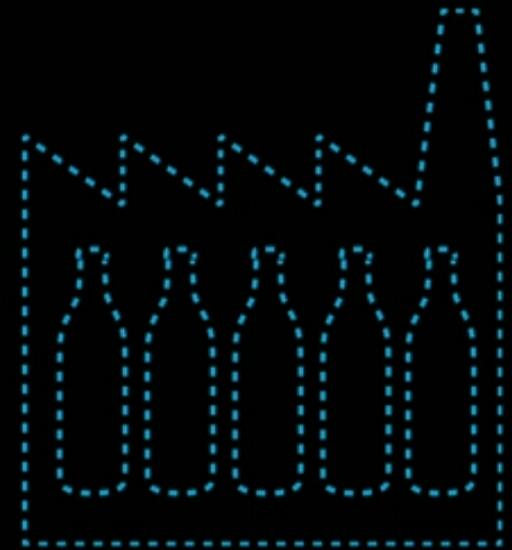
For **innovation and explosive productivity**,

4<sup>th</sup> IR changes structure of our economy,

# Change of Economic Structure



**CLOSE TO CONSUMER MARKET**  
**SMALLER**  
**MULTI PRODUCT**  
**MADE TO ORDER**



# Key Characteristics of the 4<sup>th</sup> IR

- ❑ Hyper-Connected,
- ❑ Hyper-Intelligent,
- ❑ High-convergence (integration)

# Why People interested in 4<sup>th</sup> IR

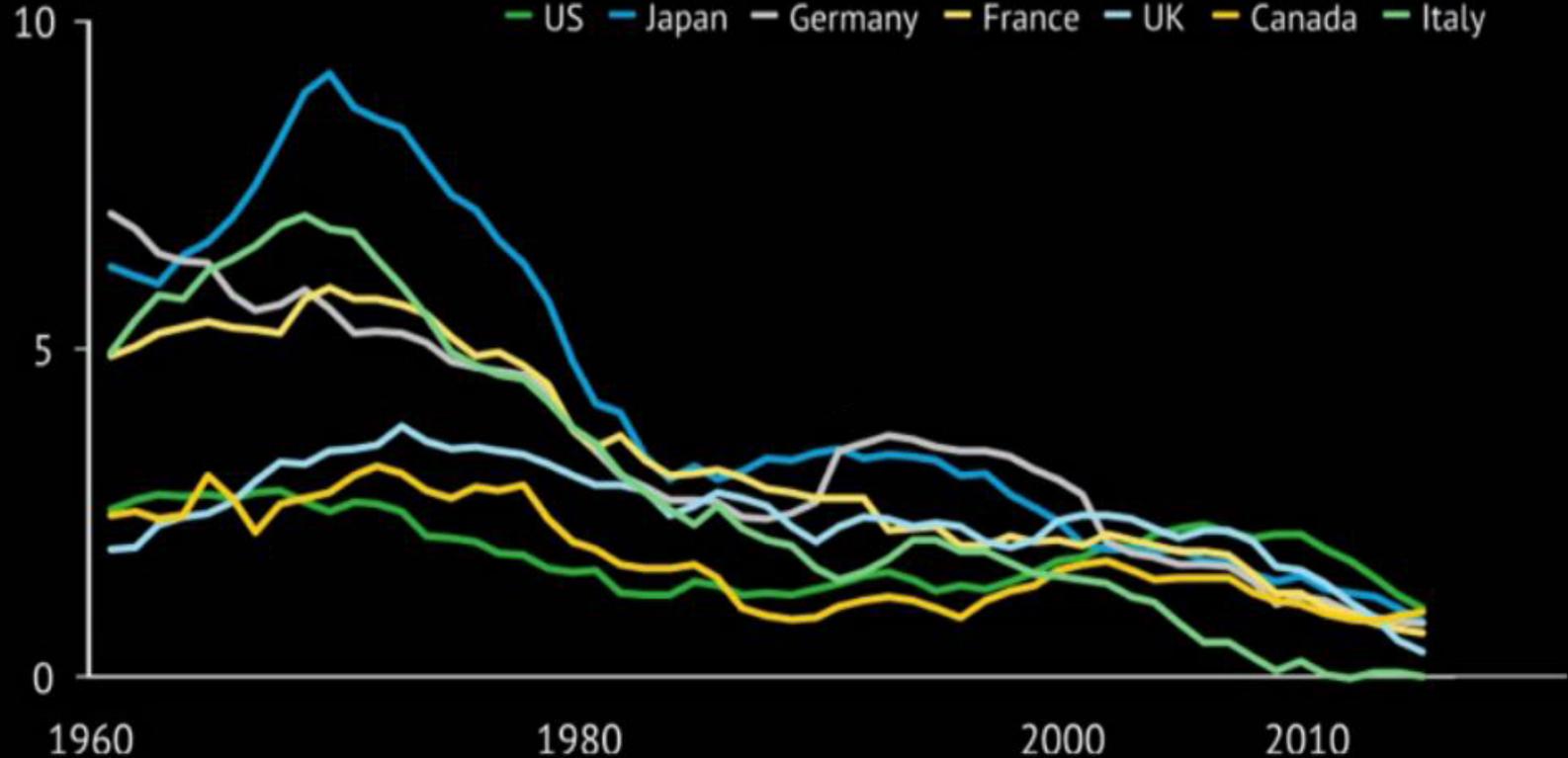
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Because of next slides

# Productivity Decline

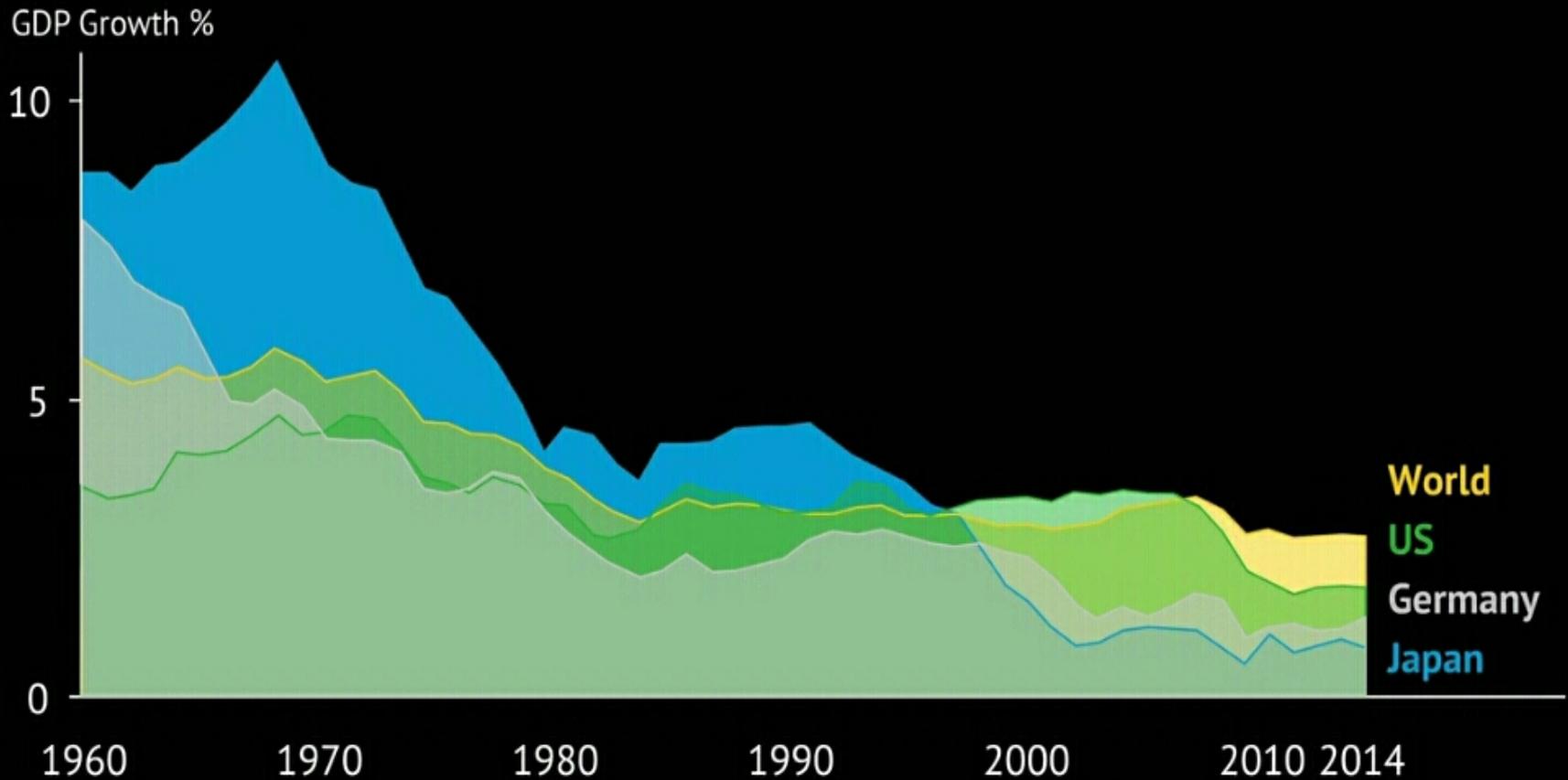
## *Productivity* **DECLINE**

Productivity Growth %



# Growth Decline

## *Growth* DECLINE



# How to Promote the 4<sup>th</sup> IR?

The benefits from the 4<sup>th</sup> IR don't happen automatically.

Need to change our development structure and paradigms.

In which ways?

# Suggested Priority Focus

## 1. Invest in **Technology**

- ❑ Smart battery, smart agricultural technologies, 5G internet, 3D printer, big data, **spatial technologies**

## 2. Create new and better **Jobs**

- ❑ Caregiving jobs rather than simple manufacturing

## 3. More, but different kinds of **Education**

# One Paradigm Change

1. Prior to talking about **technology, job and education,**
2. Our traditional development paradigms and mindsets is kind of **2 dimensional development paradigm.**
3. See cases in next slides

# Examples: City



# Examples: Urban Transport



# Examples: Urban Transport

How we change our structure and paradigm?

From ground-based 2 dimensional development paradigm

Towards space-based 3 dimensional development paradigm

Like next slides

# Trial Examples: Urban Transport



# Drone Transport



# New Tech in Space and GIS



# Loon Project



20km from surface

One balloon covers 40km<sup>2</sup>

13 balloons cover Sri Lanka



# Are These All for 4<sup>th</sup> IR and GIS?

1. 4th IR: Technology + manufacturing for innovation and productivity
2. Is that all?
3. Still some critical questions
  - ❑ Where innovation in the 4th IR usually come from?

Now let's move into city and innovation

# What is Innovation?

1. **Ben Bernanke**, the former chairman of the FRB
  - " The single most important factor determining our living standard "
2. **Joseph Schumpeter**
  - " No matter how much we increase horse carriers, the age of trains never advances"
3. **Prof. Robert Solow**
  - Study shows driving factors for economic growth in USA for 1900 - 1950.
  - Around 35-40 % contribution to economic growth comes from innovative ideas.

# Where does Innovation come from?

1. Definition in dictionary: "A new method, idea, product"
2. Need to rethink the concept
  - " New products or production systems that bring new explosive productivity increase by combining previously irrelevant two or more"
  - **Combination and utilization of knowledge as public goods.**
3. **Where does innovation come from?**
4. In a word, it comes from city.

# Urban-like Environments?

1. City is an ideal spatial location, that is close to each other, diversity and division of work, test innovative ideas, make pilot products, accessible to markets and can create synergy between different fields.
2. The city provides all these conditions. - Silicon valley
3. Why less innovation in rural areas and poor countries?
4. Key of innovation is: Diversity and Integration in City
5. Geospatial technology can work in city

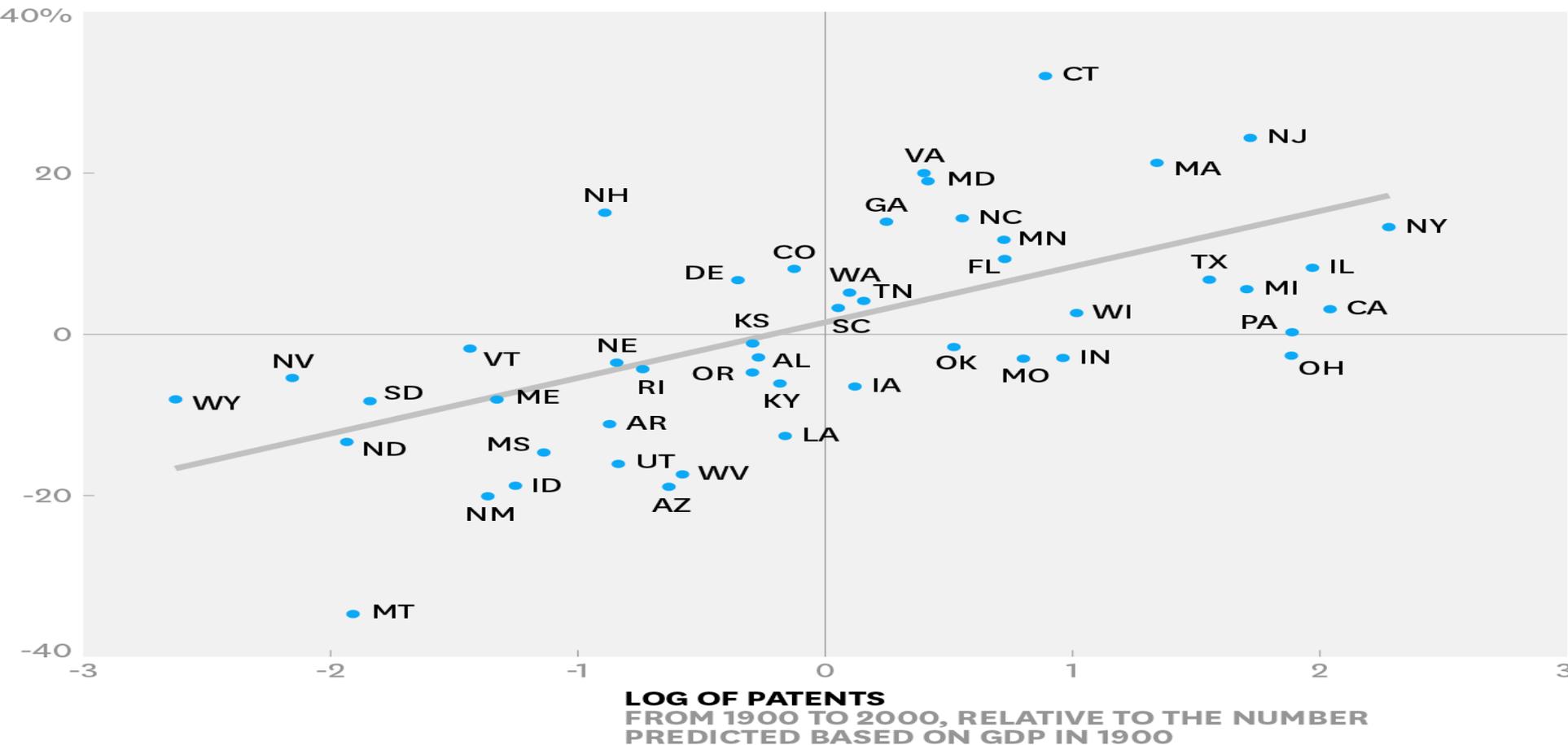
# Harvard Study on Innovation

1. Recent innovation is getting harder and the pace of growth is slowing down.
2. One way to find answers is to look to history.
  - US case.

# Harvard Study on Innovation

## Innovation and Economic Growth Go Together

**LOG OF GDP GROWTH**  
FROM 1900 TO 2000, RELATIVE TO THE AMOUNT  
PREDICTED BASED ON GDP IN 1900



# Harvard Study on Innovation

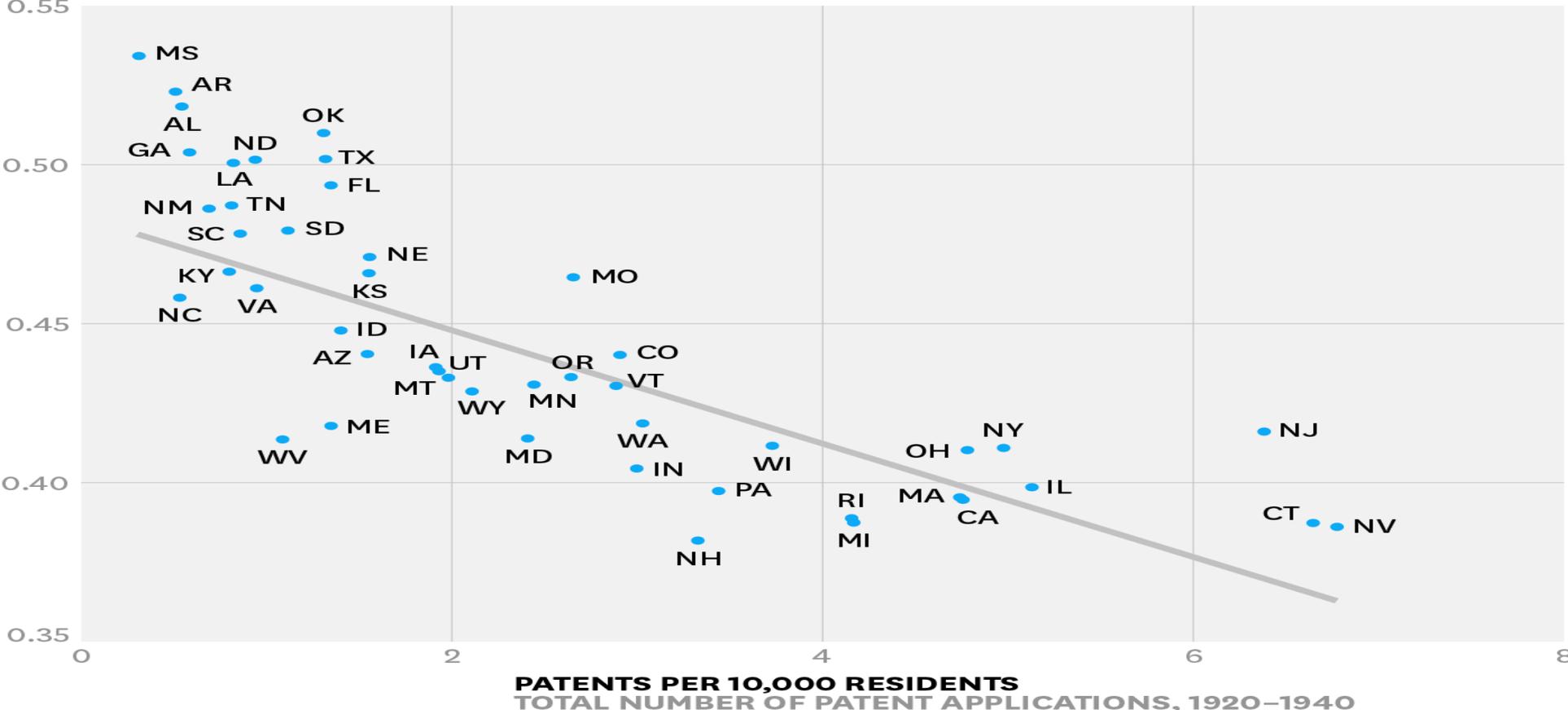
## The Relationship Between Innovation and Inequality

States with more invention had less inequality.

### WAGE INCOME INEQUALITY

THE GINI COEFFICIENT, 1940 (0 = PERFECT EQUALITY, 1 = PERFECT INEQUALITY)

0.55



NOTE DELAWARE IS EXCLUDED AS IT IS AN OUTLIER.

SOURCE "THE RISE OF AMERICAN INGENUITY," BY UFUK AKCIGIT ET AL., NBER, JANUARY 2017

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# Conclusion from Harvard Study

1. Innovation flourished in densely populated areas where people could interact with one another,
2. Where capital markets to finance innovation were strong, and
3. Where inventors had access to well-connected markets.

# History Emphasis on City

1. Antonio Serra (1613)
  - Proposed the formula to be a wealth country
  - By increasing the number of jobs and economic activities in the city
  - It will bring innovation, productivity increase and economic growth
2. Italian scholar Giovanni Botero wrote “On the Greatness of the Cities” in 1588
3. Veit Ludwig von Seckendorff, founder of German Economics emphasized the importance of city in his book “The German Principality in 1656

# Conclusions

1. The 4<sup>th</sup> IR flourishes in Cities, in particular in advanced countries
2. To benefit from the 4<sup>th</sup> IR, paradigm changes
3. One of paradigm change may be transition from 2 dimensional towards 3 dimensional development paradigms
4. With spatial technology and geospatial information systems.

# Thank you very much

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