

# The 4th Industrial Revolution, City, and Sustainability

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## ESCAP Projects Call for Partnerships

1. Project for the Pacific (2016-2018)
  - Build geo-portal and geo-database for early warning systems
    - ✓ with special focus on using geospatial data
  - We noted that countries have problems in accessing to geospatial data.
  - Develop a strategy to promote existing Pacific knowledge hubs related to early warning systems
    - ✓ to access easily to regional data and platforms

## ESCAP Projects Call for Partnerships

### 2. Project for Central Asia (2017 – 2019)

- Develop a set of geospatial indicators to measure the disaster-related SDGs implementation
- Pilot test in Central Asia through EGMs in 2017 – 2018
- It helps Central Asia to monitor and report the progress.

### 3. Project for Regional Drought Mechanism in ASEAN

## Key Words for PPTs

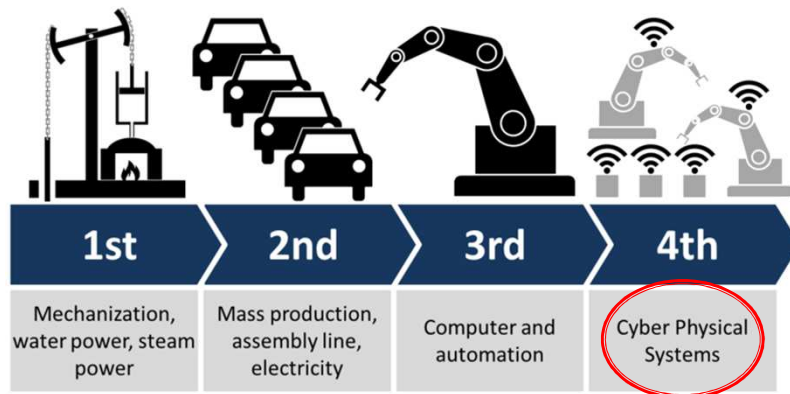
The 4<sup>th</sup> Industrial Revolution

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)?

Advanced technologies + Manufacturing  
 For **innovation and explosive productivity**,  
 They will change structure of our economy,  
 They will lead to sustainable economic growth.

## Change of Economic Structure



CLOSE TO CONSUMER MARKET  
SMALLER  
MULTI PRODUCT  
MADE TO ORDER



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

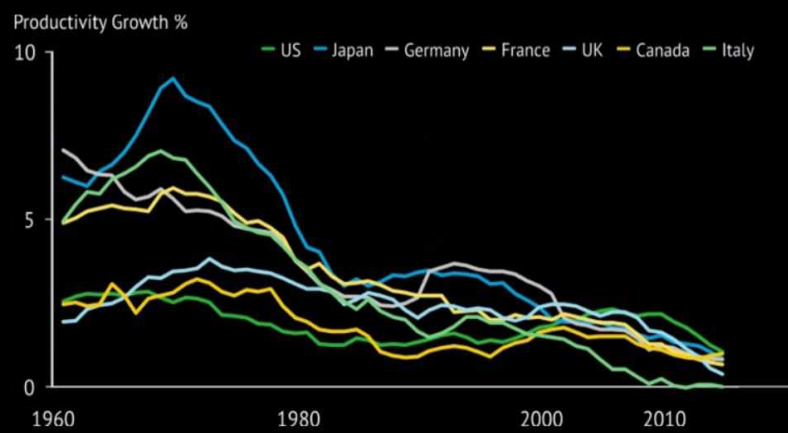
- Hyper-Connected,
- Hyper-Intelligent,
- High-convergence (integration)

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

Because of next slides

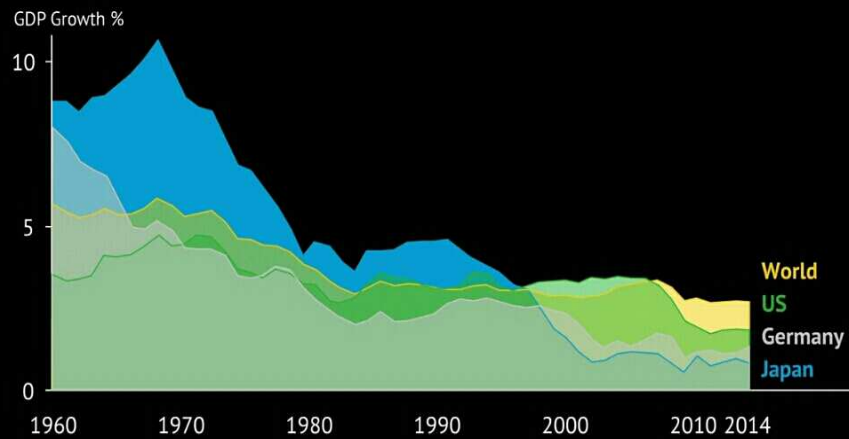
## Productivity Decline

### Productivity DECLINE



## 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 paradigms and mindset.

In which manner?

## 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**

## Paradigm Change

1. Prior to talking about technology, job and education,
2. Talk about our traditional development paradigms and mindsets.
3. **One reason is 2 dimensional development paradigm.**
4. See cases in next slides

## Examples: City



## Examples: Urban Transport





## Examples: Urban Transport

How we change our mindset 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



A photograph showing a person in a dark suit holding a white quadcopter drone in the air. The person is standing in front of a green chain-link fence. In the background, there are trees and a brick building under a clear blue sky.



UNITED NATIONS  
**ESCAP**  
Economic and Social Commission for Asia and the Pacific

# New Tech in Space and GIS



Two images illustrating solar-powered aircraft technology. The top image shows a solar plane with a long, thin, curved wing and multiple solar panels, flying over a blue ocean. The bottom image shows a similar solar plane flying over a satellite map of a river delta, with the ground appearing in shades of brown and blue.

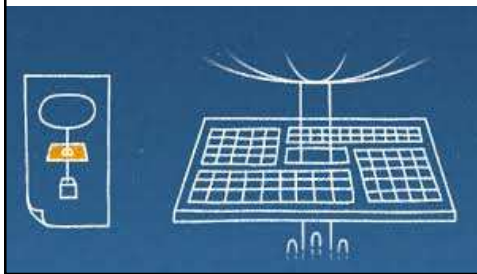
## Loon Project



20km from surface

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

13 balloons cover Sri Lanka



## Key Role of Spatial Community

1. In order to enable the 4<sup>th</sup> Industrial Revolution and global development agendas,
2. Need to provide conceptual framework (blueprint) and innovative solutions
3. Through fostering **Spatial Ecosystems**
4. Why Ecosystem building necessary?
5. Past IR experiences it takes around 30 years from innovation to productivity.

## What looks Spatial Ecosystem?

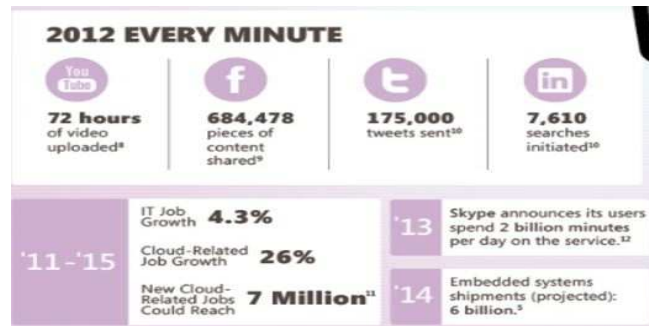
1. One idea is moving toward **3 dimensional development paradigm**
2. is equivalent to **2 dimensional IT Ecosystem.**
3. IT ecosystems started with a simple objective: transfer documents and data between research institutes
4. Initial IT people never dreamt of present big IT ecosystems.

## Spatial Ecosystem vs IT Ecosystem

|           |                   |  |
|-----------|-------------------|--|
| 1974-1985 | Founding stage    | Intel 8080 process (74)<br>UNIX 6 (75)<br>Floppy disk (76)<br>Intel x86 architecture with 8086 process (77)<br>Seagate 5 MB hard disk driver (80)<br>First version MS-DOS (QDOS) (80)<br>Tech companies appeared: Adobe, Compaq, Lotus, Sun, MS, Symantics, Dell<br>National Science Foundation linked 5 Univs as first Internet |
| 1986-1995 | Development stage | CERN invented WWW (Tim Bernes-Lee) (89)<br>Intel 486 architecture (89)<br>SQL server 1.0 (89)<br>Linus open source for PC (91)<br>MS windows 3.1 (32 bit) (93)<br>Amazon (95)  |

## Spatial Ecosystem vs IT Ecosystem

|           |                          |   |
|-----------|--------------------------|---|
| 1996-2005 | From PC to Data Center   | Window NT and server 4.0(96)  |
| 2006-2015 | Virtualization, Big Data | Human created over 1,200 exabytes of data<br>Clouding: MS Windows Azure cloud platform (10)<br>62 billion clouding market |



## Spatial Ecosystem vs IT Ecosystem

|       |               |   |
|-------|---------------|---|
| 2015- | Beyond (2016) | 53.4% network systems and data analysts<br>44.6% Applications software engineers<br>29% systems analysts<br>28.6% Database administrators<br>28.2% Computer and systems software engineers<br>100 billion clouding market |
| 2017  |               | Your data center + our cloud-working together   |

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

1. 4th IR: Technology + manufacturing convergence for innovation and productivity
2. Is that all?
3. Still some critical questions
  - Where innovation in the 4th IR 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 only in city**

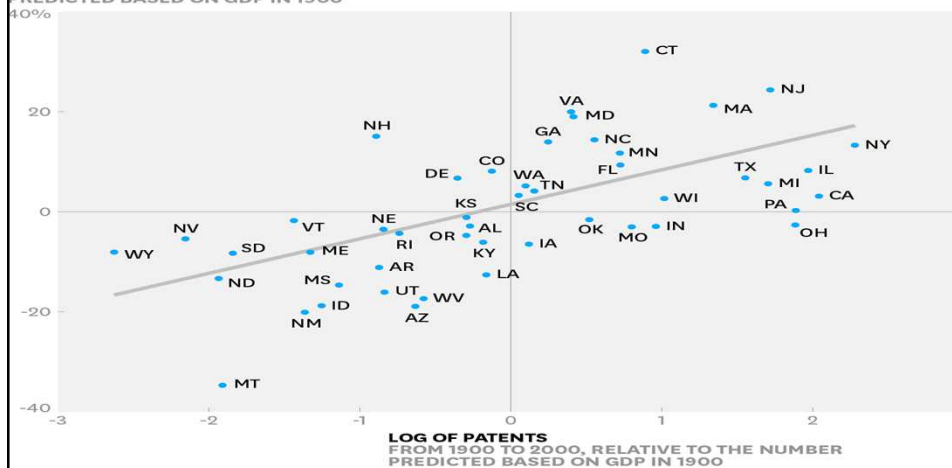
## Harvard Study on Innovation

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





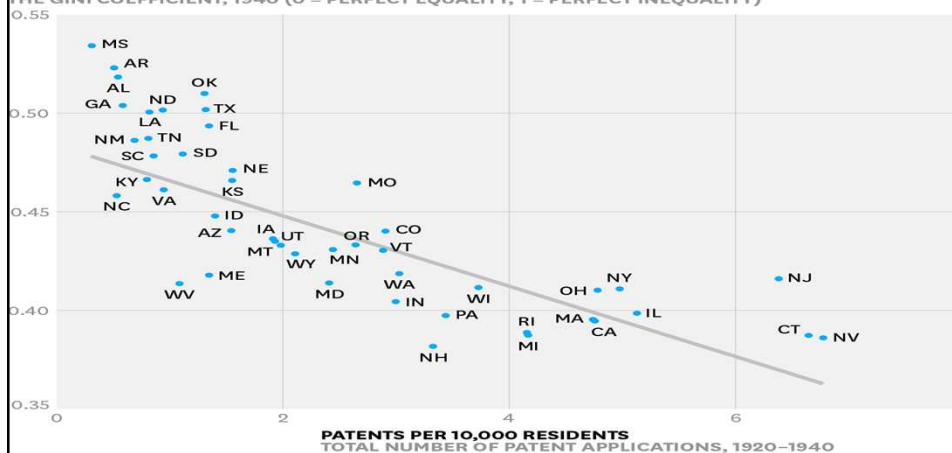
## Harvard Study on Innovation

### 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)



## 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. Space-based platform will be more essential for the 4<sup>th</sup> IR
3. To support better, spatial community focus on paradigm changes by providing practical framework and collective solutions
4. As a step, paradigm change is more possible through building Spatial Ecosystem, equivalent to IT Ecosystem.
5. Long journey with collective actions for the 4<sup>th</sup> IR and sustainable development through Spatial Ecosystem

**Thank you very much**

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