The 4th Industrial Revolution, City, and Sustainability

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Kunming

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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

   - 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 4th Industrial Revolution

Spatial Ecosystem

City

SDGs
What is 4th 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 4th IR

- Hyper-Connected,
- Hyper-Intelligent,
- High-convergence (integration)
Why People interested in 4\textsuperscript{th} IR

Because of next slides

Productivity Decline
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
How we change our mindset and paradigm?

From ground-based 2 dimensional development paradigm

Towards space-based 3 dimensional development paradigm

Like next slides
Drone Transport

New Tech in Space and GIS
Loon Project

- 20km from surface
- One balloon covers 40km²
- 13 balloons cover Sri Lanka

Key Role of Spatial Community

1. In order to enable the 4th 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

<table>
<thead>
<tr>
<th>Year</th>
<th>Founding stage</th>
<th>Development stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974-1985</td>
<td>Intel 8080 process (74) UNIX 6 (75) Floppy disk (76) Intel x86 architecture with 8086 process (77) Seagate 5 MB hard disk driver (80) First version MS-DOS (QDOS) (80) Tech companies appeared: Adobe, Compaq, Lotus, Sun, MS, Symantcs, Dell National Science Foundation linked 5 Univs as first Internet</td>
<td>CERN invented WWW (Tim Bernes-Lee) (89) Intel 486 architecture (89) SQL server 1.0 (89) Linus open source for PC (91) MS windowos 3.1 (32 bit) (93) Amazon (95)</td>
</tr>
</tbody>
</table>
### Spatial Ecosystem vs IT Ecosystem

<table>
<thead>
<tr>
<th>1996-2005</th>
<th>From PC to Data Center</th>
<th>Windows NT and server 4.0(96)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006-2015</td>
<td>Virtualization, Big Data</td>
<td>Human created over 1,200 exabytes of data&lt;br&gt;CLOUDING: MS Windows Azure cloud platform (10)&lt;br&gt;62 billion clouding market</td>
</tr>
</tbody>
</table>

#### 2012 EVERY MINUTE
- 72 hours of video uploaded
- 684,479 pieces of content shared
- 175,000 tweets sent
- 7,610 searches initiated
- Skype announces its users spend 2 billion minutes per day on the service
- 13 new cloud-related jobs created
- 26% Cloud-related job growth
- 4.3% IT job growth

#### 2015- Beyond (2016)
- 53.4% network systems and data analysts
- 44.6% Applications software engineers
- 29% systems analysts
- 28.6% Database administrators
- 28.2% Computer and systems software engineers
- 100 billion clouding market

| 2017 | Your data center + our cloud-working together |
Are These All for 4th 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.

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**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.

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Innovation and Economic Growth Go Together

[Diagram showing correlation between log of GDP growth and log of patents 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 Giovani Botero wrote “On the Greatness of the Cities” in 1588


Conclusions

1. The 4th IR flourishes in Cities, in particular in advanced countries

2. Space-based platform will be more essential for the 4th 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 4th IR and sustainable development through Spatial Ecosystem
Thank you very much

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