An overview of Smart Sustainable City

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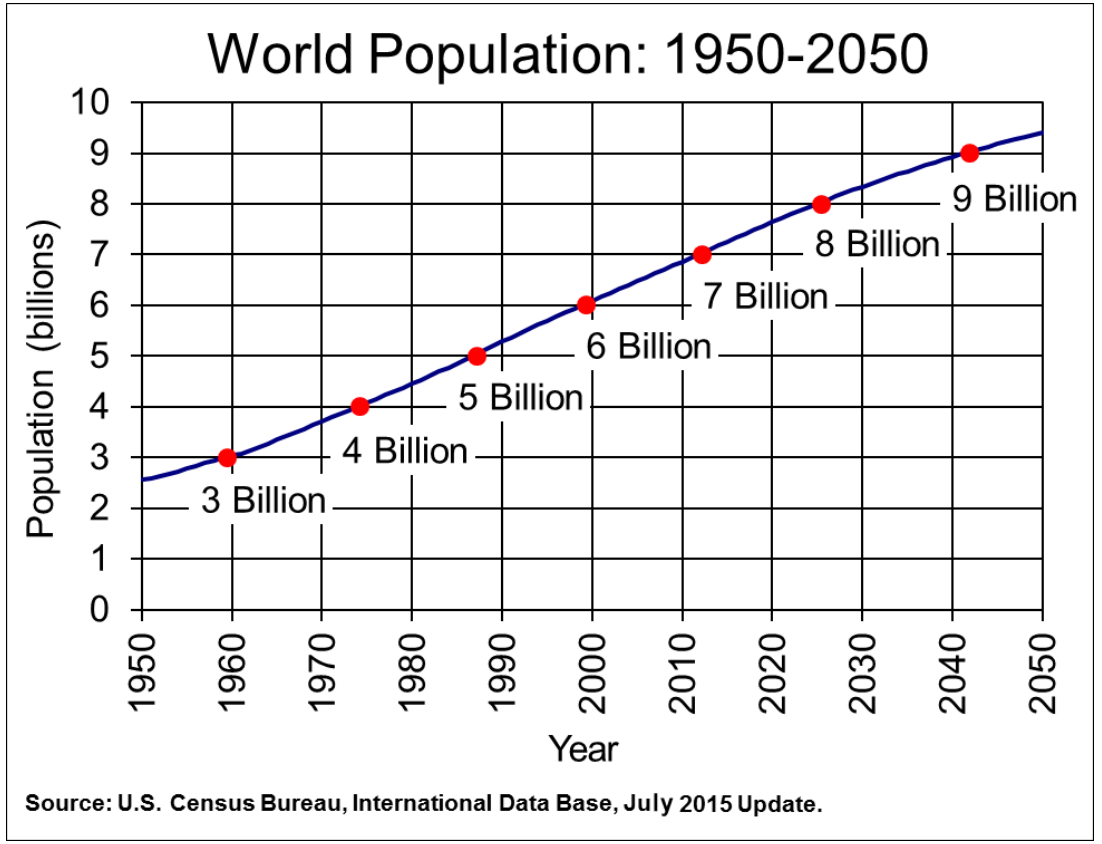
I. Sustainable Urbanization

Population of the world

Population of the world:
- Over 7 billion in 2011
- Over 9.3 billion in 2050

Urbanization:
- Present: Over 50% population live in cities
- By 2050: 68%



Government is required to:
- ✓provide services to more people
- ✓promote efforts to encourage economic growth and make environment sustainable

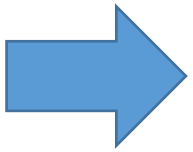
Sustainable urbanization

Urbanization is a powerful engine of

- ✓economic growth
- ✓intensive interpersonal communication
- ✓high concentrations of specialized skills

But... Urbanizations will face significant sustainability challenges

- ✓Over 70% of global greenhouse gas (GHG) emissions
- ✓60-80% of global energy consumption
- ✓Insufficient infrastructure
- ✓Social inequality



Sustainable urbanization is a key to successful management of urban growth

Management of sustainable urbanization

- Urban growth is closely related to the 3 dimensions of sustainable development:

✓Economic
✓Social
✓Environmental

✖

✓ Integrated policies to improve quality of lives of urban/rural dwellers
✓ Strengthening the linkages between urban and rural areas

- Inclusion

  To ensure that the benefits of urbanization are shared for all, policies to manage urban growth need to ensure access to infrastructure and social services for all

II. Smart Sustainable City

What is smart sustainable city?

In October 2015, ITU-T Study Group 5 agreed on the following definition of a Smart Sustainable City as:

"*A smart sustainable city is an innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social, environmental as well as cultural aspects*".

Advantages of smart city

- Promotion of economic development
- Improvement of “Quality of life (QoL)”
- Make the environment of the city more sustainable

3 Keywords to plan smart sustainable city

1. Issue-oriented
2. Overall optimization
3. Public-Private Partnership

Concept 1. Issue-oriented

- Simply implementation of technology is **NOT** purpose to build smart city **(NOT technology-oriented)**
- We should always consider to improve QoL of citizens:
  - ✓Which issue should be solved in the city?
  - ✓What is the bottleneck to solve this issue?
  - ✓To eliminate the bottleneck, which technology is required?

→ Issue-oriented

Mobility

All citizens can comfortably move around public transport

Environmental symbiotic

Urban space harmonized with water and green

Saving energy

Utilization of renewable energy such as sunlight, wind power

Safety and Security

Building towns resistant to disasters

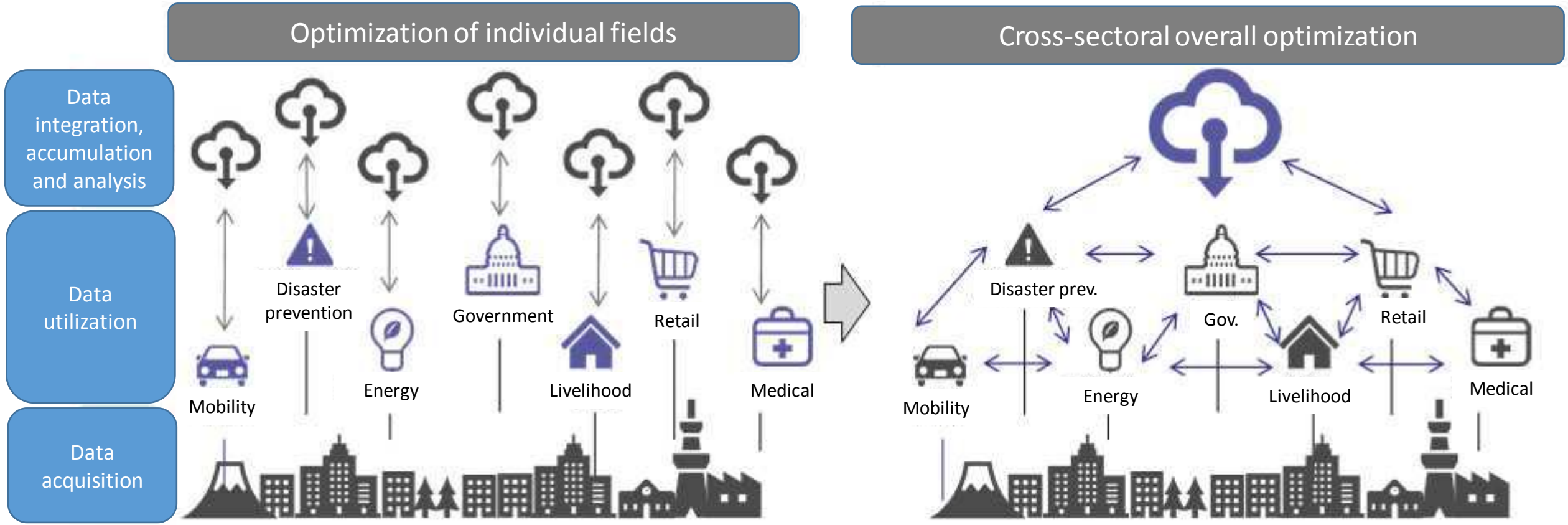
Recycle

Reuse of waste water for planting

Concept 2. Overall optimization

- In a city, various activities are performed by diverse entities: the optimal solution for one field or one entity is **not always the optimal solution for the whole city**

➡ Overall optimization by **collaboration of stakeholders** and **data coordination**



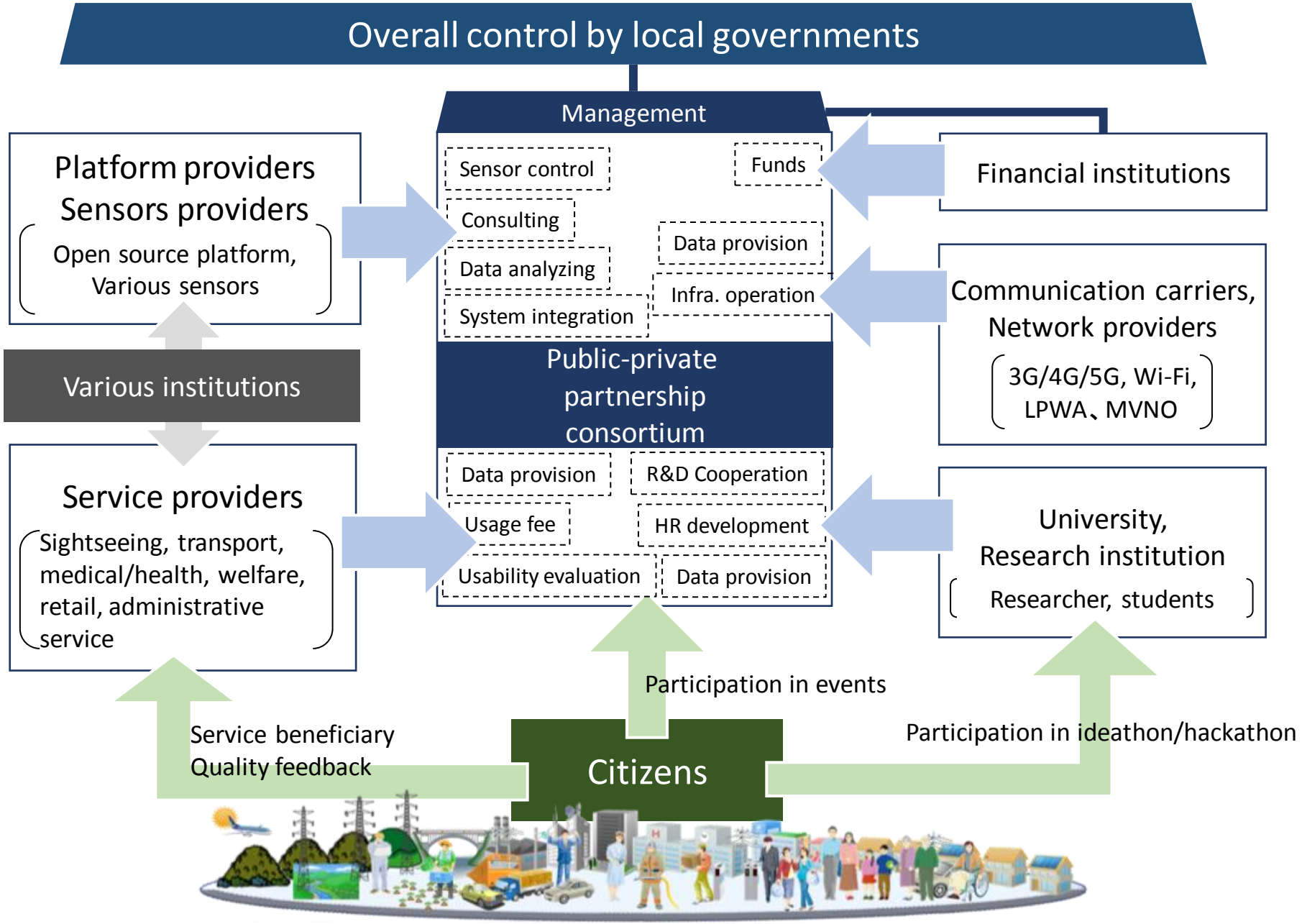
Concept 3. Public-Private Partnership

<Stakeholders to build smart city>

- ☐ Municipalities
- ☐ Academic and research institutes
- ☐ ICT organizations (service/product/network/platform providers, etc.)
- ☐ Financial institutions
- ☐ Industry forums
- ☐ Citizens
- ☐ Others (NGOs, Consulting, etc.)

➡ Consortium to exchange knowledge in the interests of identifying the standardized frameworks needed to support the integration of ICT services

Ecosystem for smart sustainable city



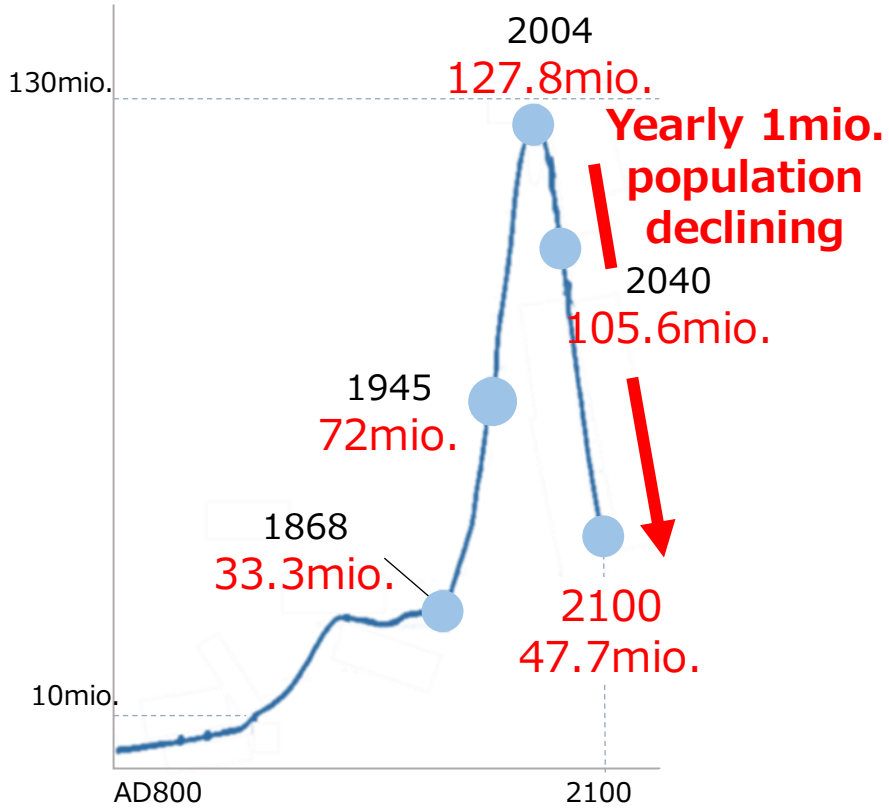
III. Case of Japan

Japan is a developed countries on issues

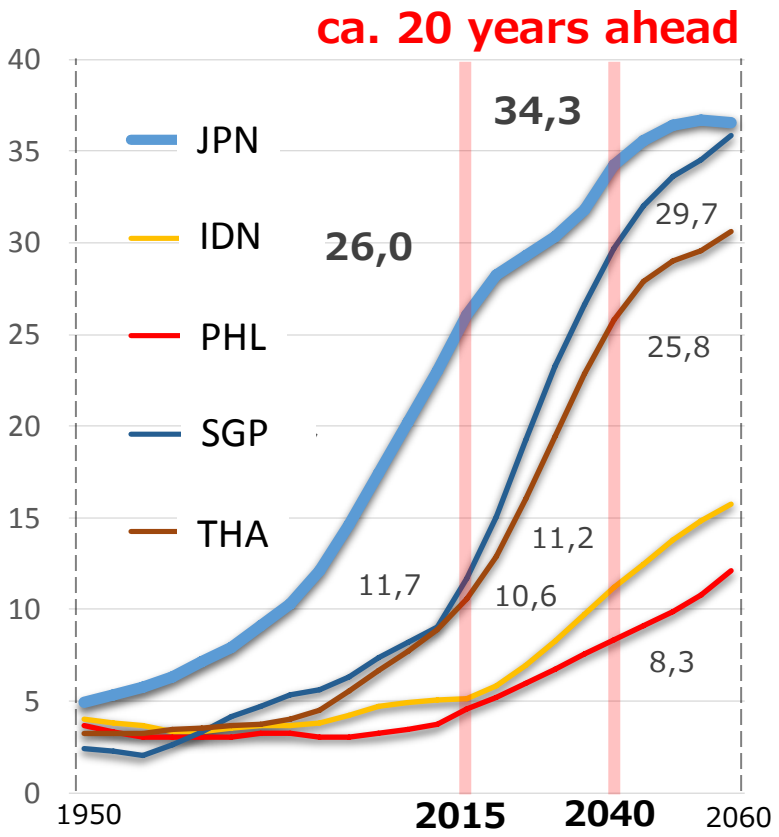
- Declining population and aging: Reduction of working-age population
- Regional gaps and overconcentration in Tokyo
- Environments issues (greenhouse gas emission, global warming, renewable energy, …)
- Natural disaster risks (typhoon, earthquake, tsunami, flooding, ...)

Declining population and aging issue in Japan

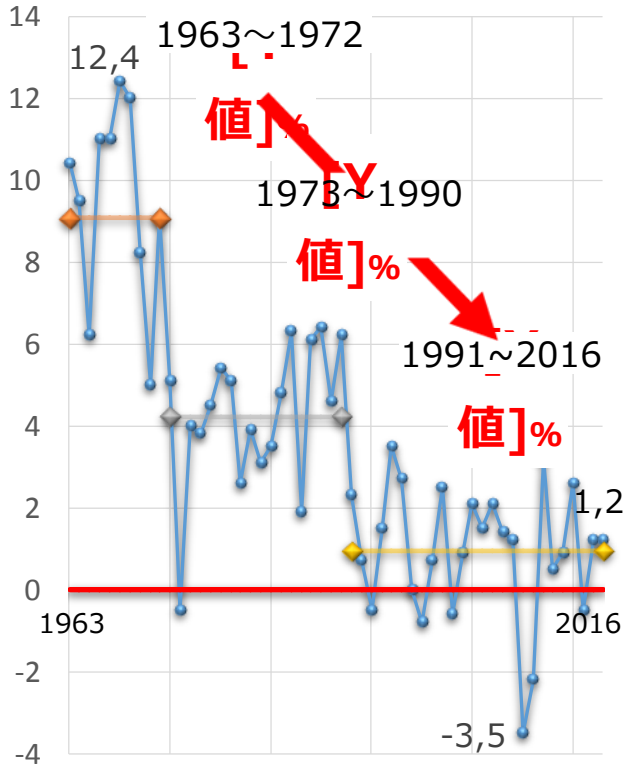
Population



Elderly Population Ratio (over 65 y.o.)

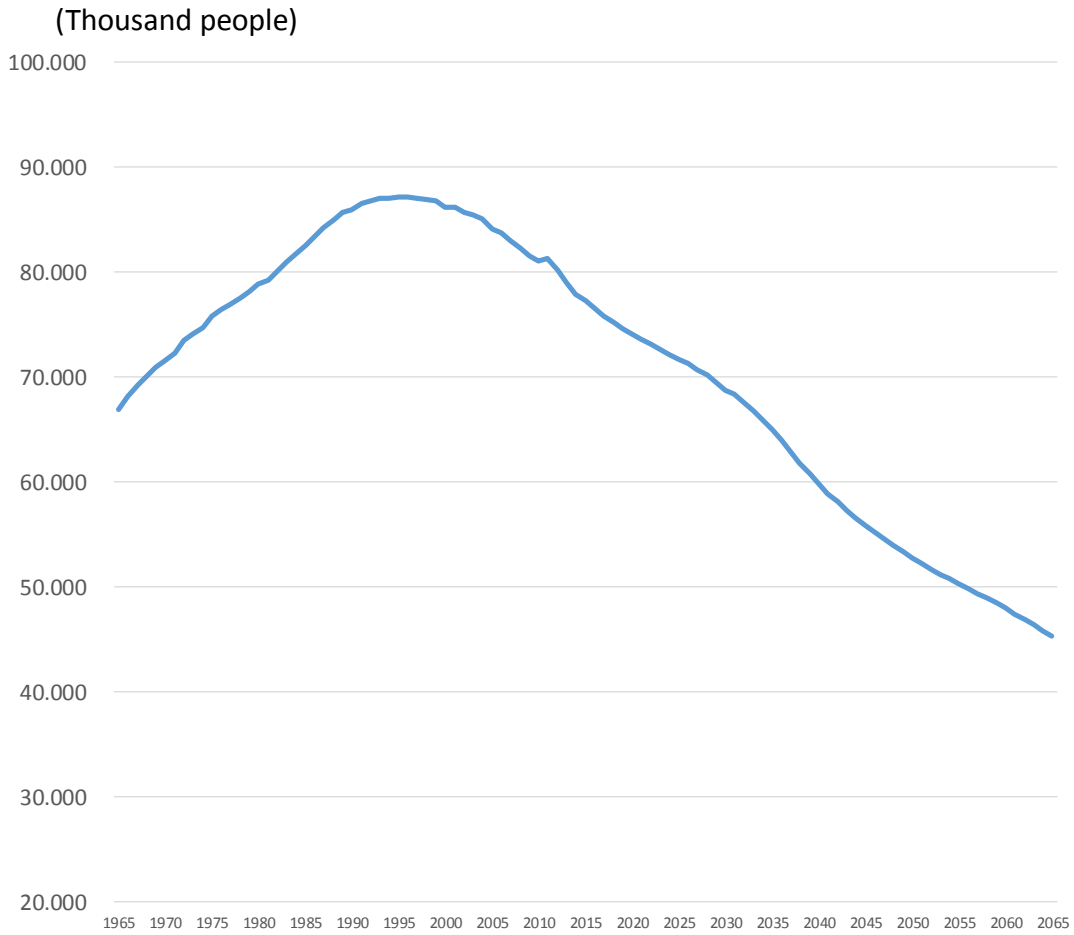


Economic Growth Ratio

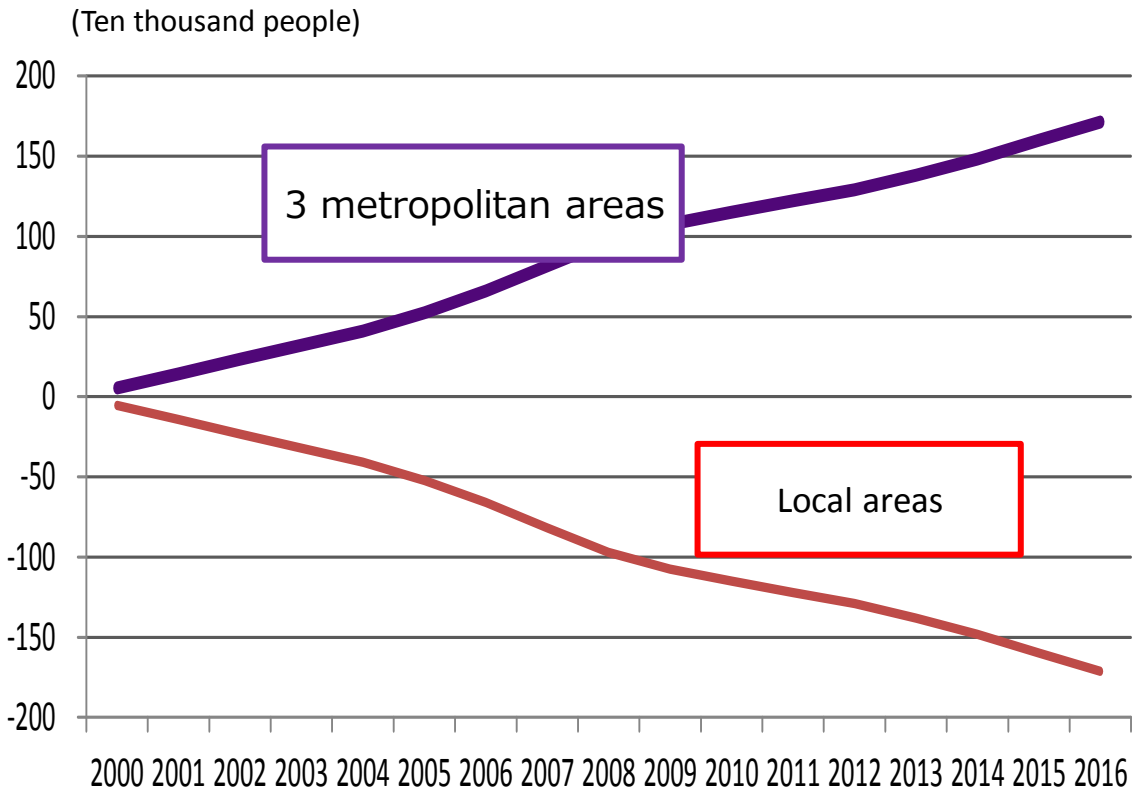


Working-age population and regional gaps

Trends on working-age population

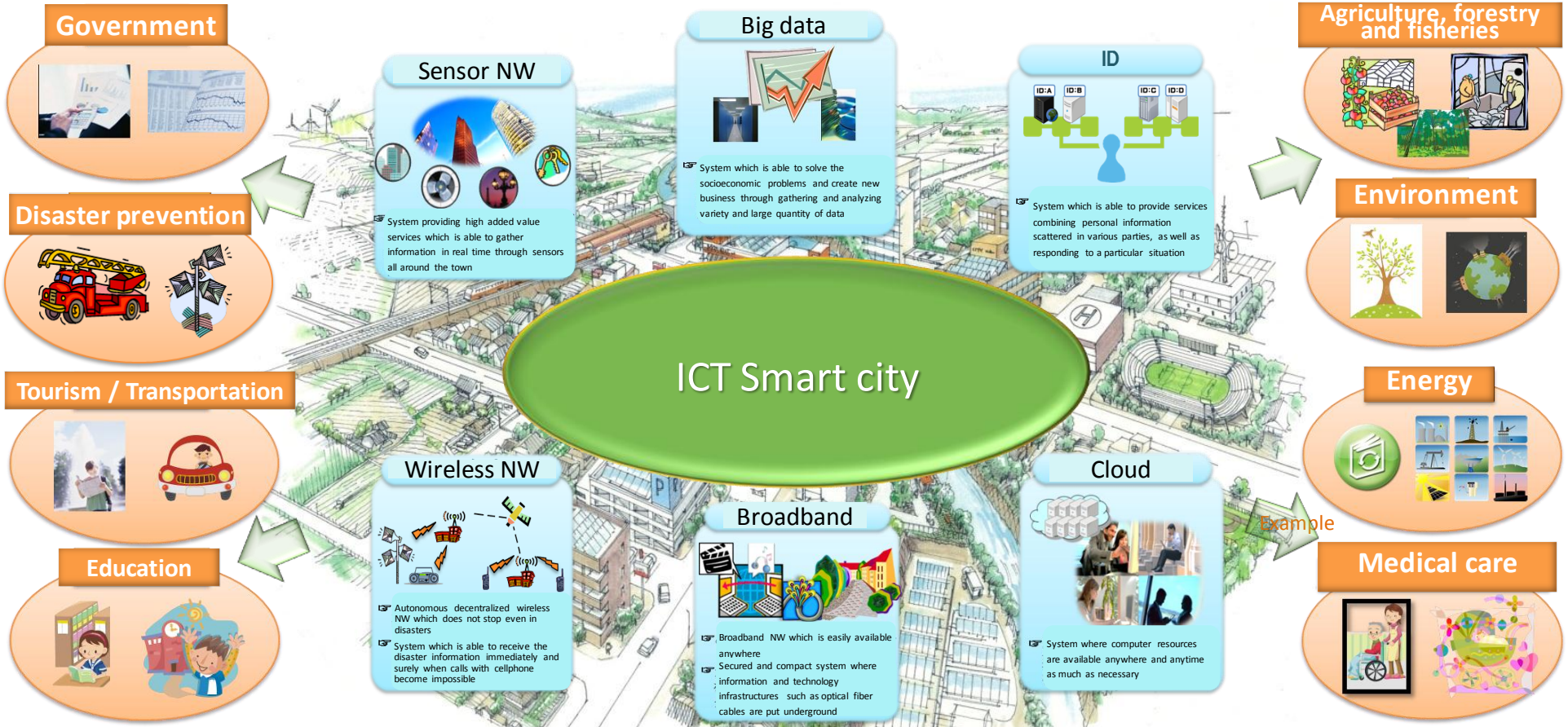


Trends on population in urban and local area



ICT smart city project in Japan (since 2012)

Aim to solve various issues in cities, implement advanced ICT technologies (sensor, big data, geospatial information, common ID, wireless, cloud, etc.) into fields such as administration, agriculture, energy, environment, medical/healthcare, transport, etc.



Data utilization type of smart city (since 2017)

Promotion of solution of local issues by ICT

- ✓Conducted pilot projects to solve the unique issues of local areas (tourism, agriculture, education, medical, employment, disaster prevention, etc.) by utilizing ICT (FY2012-14)
- ✓Support to develop succeeded pilot project of each subject field in nationwide (FY2014-17)

Resolution of individual issues inherent in the region

Compounding issues ＋ Progress of data utilization in town planning

Urban-type city planning required for digital age

- ✓ Compounding urban issues (declining population, aging, reduction of medical expenses, advance education, frequent disaster response, etc.)
- ✓ Under financial difficulties, it is urgent to improve and combine sectoral information systems

It is efficient to build a common platform necessary for administrative services and to utilize it to solve issues in multiple fields

- ✓ Technology of building city has shifted from hard-oriented technology (land, building) to soft-oriented technology with utilizing data

It is necessary to promote soft-oriented urban development by active data collection and analyze to develop application

Resolve issues by data utilization type of smart city

Basic concept of “data utilization type” of Smart city in Japan

Service layer

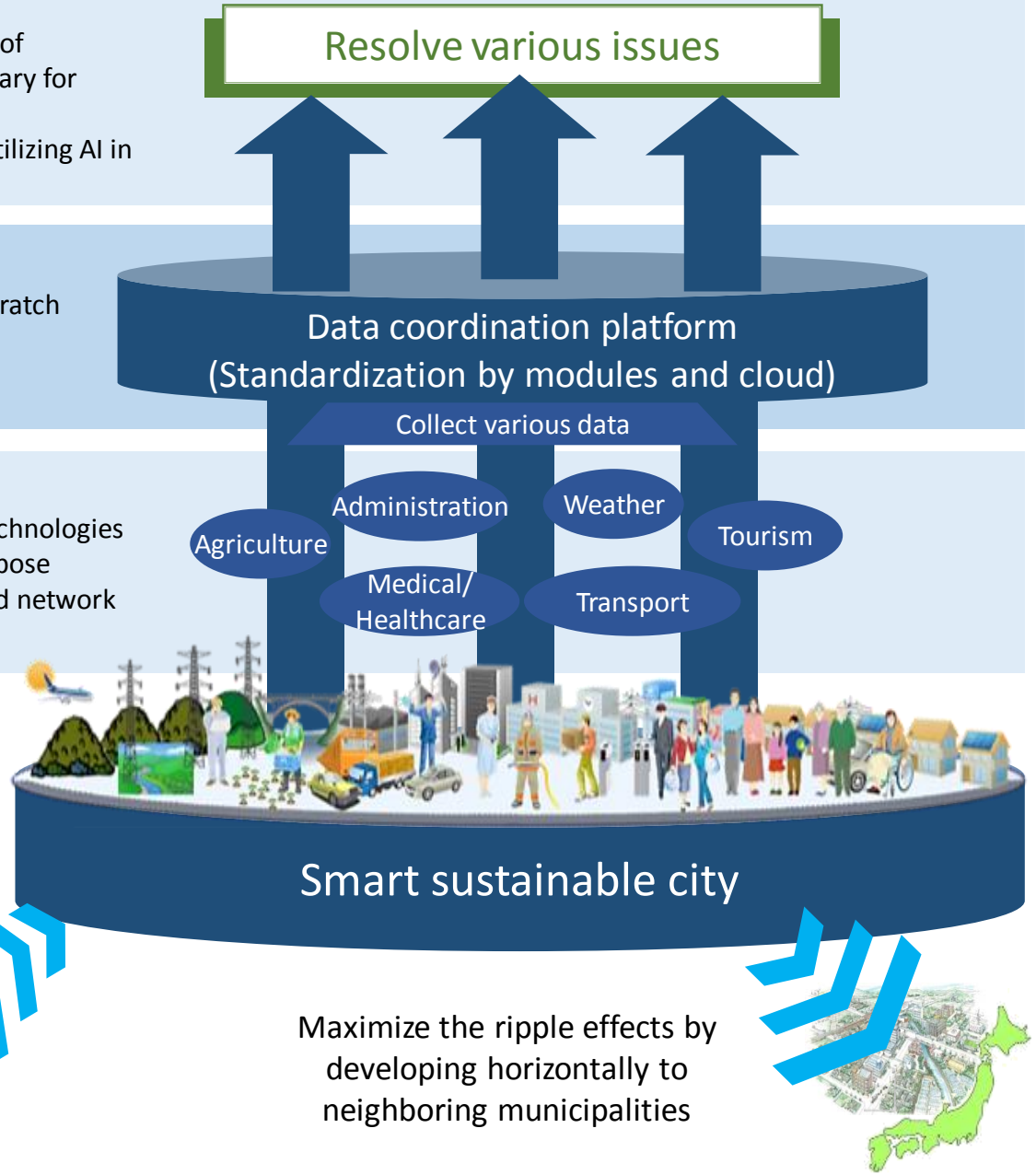
- Standardization of data, ensuring interoperability of applications, and utilization of venture are necessary for diversifying services
- Looking to the management of urban functions utilizing AI in the future

Platform layer

- Utilizing open source rather than building from scratch
- Ensure compatibility with other platforms

Network layer

- In addition to existing infrastructure, use some technologies such as LPWA or MVNO efficiently to achieve purpose
- Further considering utilization of Software defined network (SDN) and 5G



Participation of various stakeholders incl. large enterprises and venture

Maximize the ripple effects by developing horizontally to neighboring municipalities

Subject

- Whole city, areas by railroad track, urban district would be main subject from the view of expandability and sustainability
- 2 types of implementation – development from scratch, introduction to redevelopment of existing city

Planning phase

- Participation of ICT related stakeholders from the early stage of planning
- Strong commitment by municipal chiefs
- Organization within the municipality that oversees whole

Construction phase

- Utilize finance in cooperation with the private sector such as PPP / PFI
- Investment from local companies
- Consider to utilize the social impact bond (SIB)

Operation phase

- organization that performs cross-sectional management is the key
- ICT companies participate in the area management organization and utilize data
- Use PDCA cycle to upgrade the smart city