

Future Design and Innovation Policy for Smart City

Reiko Aoki

Commissioner, Japan Fair Trade Commission*

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*All views expressed here are personal views of the author and do not reflect that of JFTC.

Outline of this talk

- The Smart City Platform in Japan
- What is Smart City ?
- What is Innovation Policy?
- What is Future Design
- Future generations
- Implications to Smart City

Smart City Platform in Japan

- Platform for achieving UN SDGs
- Members
 - Central Government (Cabinet Office (Council for Science, Technology and Innovation Policy). Ministry of Economics, Trade and Industry, Ministry of Internal Affairs and Communication, Ministry of Land, Infrastructure, Transport and Tourism), etc.)
 - Local Government (Osaka, Aichi Prefecture, Yonakuni town, etc.)
 - Universities and Research Institutes (Tokyo, Waseda, Ryukyu etc)
 - Companies (Toyota, NTT East, Mitsui Sumitomo Bank, Tokio Marine & Nichido Fire Insurance, Tepco, Shimizu Construction, JR East, etc)
 - Industry associations and other associations

What is Smart City ?

- Industrial policy ?
- Science, technology and innovation policy ?
- Smart City is one way to organize (elements of) a city.
- City being a place where there is concentration of people.
- It (any organization or institution) cannot be separated from technology.
- Smart City is determined by what people want

What is Innovation Policy ?

- Innovation
 - Technological and social innovation
 - Basic science
 - Technology (includes business models, logistics)
- Public policy
 - Information is a non-rival good
 - Long term investment
 - Intergenerational
 - Cost and benefit in different generations
 - Uncertainty and risk

Examples (1)

■ Horizon 2020 (EU, 2014)

- **Challenges :**

- 1) Health, demographic change, and wellbeing
- 2) Food security, sustainable agriculture, marine, maritime and inland water research and the bioeconomy
- 3) Secure, clean and efficient energy,
- 4) Smart, green and integrated transport
- 5) Climate action, environment, resource efficiency and raw materials
- 6) Europe in a changing world – inclusive, innovative and reflective societies
- 7) Secure societies – protecting freedom and security of Europe and its citizens.

- Industrial **technologies:** Space, Nan-technology, ICT

Examples (2)

■ UK

- **Challenges:**

- 1) Deciding priorities,
- 2) Nurturing scientific talent,
- 3) Investing in our scientific infrastructure,
- 4) Supporting research,
- 5) Catalysing innovation,
- 6) Participating in global science and innovation

- **Technology:**

- 1) Big data and energy-efficient computing
- 2) Satellites and commercial applications of space,
- 3) Robotics and autonomous systems,
- 4) Synthetic biology,
- 5) Regenerative medicine,
- 6) Agri-science,
- 7) Advanced material and nano-technology,
- 8) Energy and its storage.

Examples (3)

■ Germany

- **Technology :**

- 1) Priority challenges with regard to value creation and quality of life,
- 2) Networking and transfer,
- 3) The pace of innovation in industry,
- 4) Innovation-friendly framework,
- 5) Transparency and participation (of stakeholders)

- **Challenges :**

- 1) The digital economy and society,
- 2) The sustainable economy and energy,
- 3) The innovative workplace,
- 4) Healthy living,
- 5) Intelligent mobility,
- 6) Civil security.

Examples (4)

■ US

- “Science and Technology Priorities for the FY Budget” each fiscal year memorandum identifies **priority areas**
- **R&D BUDGETARY PRIORITIES for FY2021**
 - 1) American Security
 - 2) American Leadership in Industries of the Future
 - 3) American Energy and Environmental Leadership
 - 4) American Health & Bioeconomic Innovation
 - 5) American Space Exploration and Commercialization

Examples (5)

■ China: STI policy plan for 2006-2020

- Ultimate goal is for China to become an economy based on innovation with world class science and technology
- **frameworks:**
 - 1) Priority **areas** (necessary for socio-economic development, national security)
 - 2) Priority **projects** (resources concentrated on strategic products and basic technologies)
 - 3) Advanced **technologies** (next generation of technologies and technologies for new industries)
 - 4) Priority **science research** plan (research leading to innovation identified from trends and strategic needs)

Example (Japan)

- Council for Technology, Science and Innovation Policy
- ST Basic Plan (The Fifth plan covering 2016-2020)
 1. Sustainable growth coupled with self-perpetuating growth of regional societies
 2. Securing safety and security and high quality of life for the nation and its citizens
 3. Answering global challenges and contribute for global growth and development
 4. Sustained generation of knowledge. (long term, reflects societal values)
- Identify current social **challenges** and set goals
- **Innovation** necessary to achieve goals (**back-casting**)

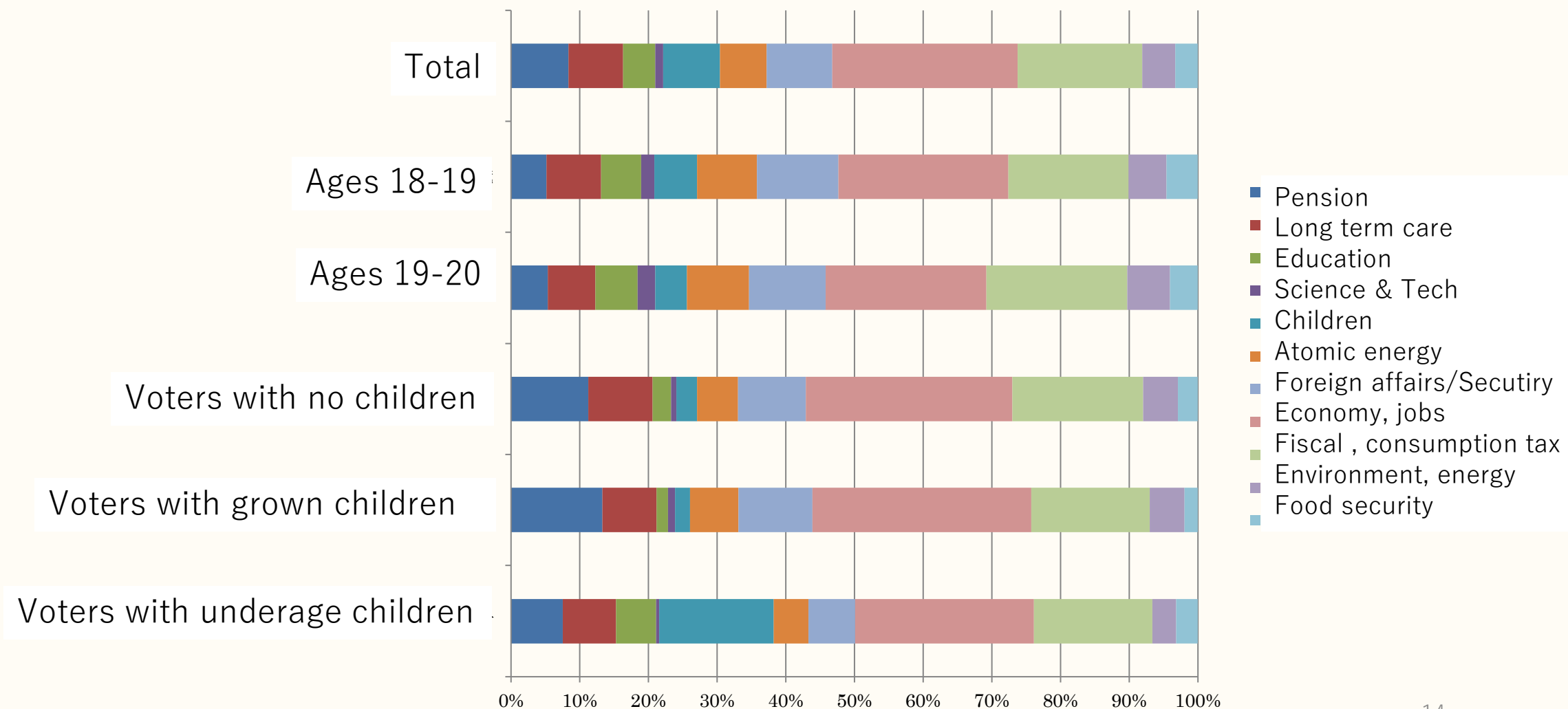
Smart City and future generations

- Smart City while there are some cities already functioning as Smart City, it is a something in the future and we are at planning and implementation stage.
- Industrial policy and science, technology and innovation policy (innovation policy) is for future generations.
- They are all long term challenges with a goal.
- To determine the goal we should ask “What do future generations want ? “

Long term challenges and goals

- Intergenerational
 - Payer and beneficiary differ
- **Who** should choose long term challenges and goals ?
- Preference over policy differ by
 - Age group
 - Parent or not
 - Grandparent or not
- Policy
 - Pension, S&T , economy

Preference over policies according to age and children (survey)



Dependency on Atomic Energy Should be						
Age / (%)	Increased	Unchanged	Decreased	Reduced to zero	Don't know	Total
Total	4.5	13.7	52.7	25.2	4	100
12~19	5.9	16.5	52.6	18.7	6.3	100
20~24	2.5	22.2	51.9	14.8	8.6	100
25~29	1.4	17.6	52.8	23.2	4.9	100
30~34	1.6	13.4	61.7	19	4.3	100
35~39	5	10.1	50.8	29	5	100
40~44	6.3	14.2	47.6	29	2.8	100
45~49	3.8	11.9	48.3	34.5	1.5	100
50~54	3.9	13.2	52.7	28.8	1.5	100
55~59	3.6	12.1	51.5	32.7	0	100
over 60	3.4	6.3	56.9	33.1	0.3	100

Survey results from R.Aoki, M.Uwasu and T.Saijo, 2013. "Party Choice by Voters and Young People, Demeny Voting, and Ministry of the Future - Survey results from the 48th General Election"

Dependency on Atomic Energy Should be					
(%)	Unchanged	Decreased	Reduced to 0	Don't know	Total
Total	13.7	52.7	25.2	4	100
Voters with underaged children	13	52.2	27.4	3.1	100
Voters with grown children	9.1	55.9	31.5	0.8	100
Voters with no children	13.8	50.5	27.6	4.3	100
Aged 16~17	15.1	52.6	18.3	7	100
Aged 18~19	17.9	52.4	19	5.6	100

Survey results from R.Aoki, M.Uwasu and T.Saijo, 2013. "Party Choice by Voters and Young People, Demeny Voting, and Ministry of the Future - Survey results from the 48th General Election"

Science and Technology Budget Should be				
(%)	Unchanged	Decreased	Don't know	Total
Total	42.1	7	8.7	100
Voters with underaged children	45.2	8	7.5	100
Voters with grown children	35.7	6.2	3.9	100
Voters with no children	40	6.8	8.7	100
Aged 16~17	44.5	7.2	13.4	100
Aged 18~19	41.7	5.6	11.1	100

Attitudes towards technology and science and technology differ by age and children (other factors)

What is Future Design ?

- Challenges for the future should be determined by **future generation**
- Needs wider representation (future generation)
- Future Design is an algorithm or protocol to reflect future generations for setting goals now.
 - Negotiation with current and imaginary future generation
 - Rawls' "veil of ignorance" (regarding which generation)
 - Difference principle (utility of least-fortunate generation maximized)
- Prevent science and technology be captured by current interests (current generation of people, technology, science)

Examples of Future Design in practice

- Yahaba Town, Iwate Prefecture: establish long term vision 2060 required by the Cabinet Office
- Matsumoto City, Nagano Prefecture: city planning related to the new City Hall.
- Suita City , Osaka Metropolitan Area: renewable energy
- Uji City, Kyoto Metropolitan Area: infrastructure planning
- Ohnuma Town, Hokkaido: urban redevelopment
- Time to apply to Smart City planning

References

- Aoki, Reiko “Future Design and Innovation Policy.” EcoDesign 2019 Proceedings.
- Saijo, Tstuyashi “Future Design: Bequeathing Sustainable Natural Environments and Sustainable Societies to Future Generations.” Research Institute for Humanity and Nature.
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