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Outcomes and Impacts of Smart City Policies in Japan

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Abstract

The first generation of Japan's smart city policies began around 2010. However, the latest trends in smart city policies and the impacts of the first generation on the latter one were not fully covered in either official documents or academic literature. In such circumstances, the purposes of this study were firstly to identify outcomes derived from the smart city projects in the first generation, and then, to reveal the present situation of the latest smart city policies, including the influence of the first generation on these state of the art policies. The present study was also intended to evaluate the validity of a conceptual framework presented by Fernandez-Anez et al. (2018) for smart city policies. As a result, it was revealed that (1) policy outputs and outcomes derived from the smart city policies in the first generation were highly regarded, (2) the conceptual framework of smart city policies was evaluated as valid, and (3) the second generation of smart city policies after Society 5.0 was characterized by the establishment of smart city platforms.

Keywords

Society 5.0, Industry 4.0, smart city platform, Global Smart City Alliance

1. INTRODUCTION

With the rapid development of information and communication technologies (ICTs), including 5G technology, a number of smart city policies have been planned and implemented in recent years all over the world. While the implementations of these smart city policies have been summarized, these policies have also been classified in terms of their implementation (Alawadhi et al., 2012; Angelidou, 2014; Marsal-Llacuna et al., 2015; Kourtit et al., 2017; Viale Pereira et al, 2017; Yigitcanlar and Kamruzzaman, 2018). Previous studies addressing such summaries and classifications of policy implementation for smart cities could be regarded as the policy research for the stage of policy implementation, namely the *Do* stage of the policy cycle (PDCA cycle). On the other hand, there are relatively few studies on the evaluation stage, also known as the Check stage, of the PDCA cycle, especially on the impact of smart city policies.

Among the few policy evaluation studies on smart city policies, Carogliu et al. (2019) used patent data to reveal that smart city policies contributed to the growth of high-tech technologies in EU cities where smart city policies have been implemented, rather than other EU cities where smart city policies have not been implemented. Bower (2019) also showed that the smart city policies implemented in Istanbul had a positive impact on the following policy areas: infrastructure including transportation, human capacity building including education, safety and security, health services, and emergency management.

From the viewpoint of the policy cycle, it is necessary to disclose impacts of the present smart city policies on future ones. However, policy evaluation studies on smart cities are not comprehensive in this study domain. Regarding the research objectives in the present study, namely smart city poli-

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Table 1. Smart city-related major legislation, projects and events in Japan

2008	(P) Low-Carbon City Model Project (MLIT and MoE)
	(P) Ecological urban development project (MLIT)
	(P) Eco-model and future cities project (CO)
2010	(P) The next generation energy and social system demonstration project (METI)
2011	(P) FutureCities project (CO)
	(P) Project for Promoting Introduction of Smart Communities (METI)
2012	(L) Low Carbon City Promotion Act
	(P) Supportive project for building energy storage and saving models for towns, homes, and transportation (MLIT)
	(P) ICT Urban Development Promotion Project (MIAC)
2013	(P) Pilot project for building low-carbon urban development plans based on public participation (MoE)
2015	(P) Promotion project for creation of ICT towns, people and jobs (MIAC)
2016	(L) The 5th Science and Technology Basic Plan
	(L) Basic Act on the Advancement of Public and Private Sector Data Utilization
	(L) Comprehensive Strategy on Science, Technology and Innovation
2017	(P) Promotion project for data utilization driven smart cities (MIAC)
2018	(P) SDGs Future Cities (CO)
2019	(P) Smart city model project (MLIT)
	(C) G20 Ministerial Statement on Trade and Digital Economy (Tsukuba, Japan) (June)

Notes: (P): Projects, (L): Legislations and plans, (C): Conferences
Affiliations: CO: Cabinet Office; METI: Ministry of Economy, Trade and Industry; MIAC: Ministry of Internal Affairs and Communications; MLIT: Ministry of Land, Infrastructure, Transport and Tourism; MoE: Ministry of the Environment.

cies in Japan, impacts of the first generation of these policies on later ones have not yet been fully covered in either official documents or academic literature. Further accumulation of evaluation studies on smart city policies is, therefore, needed.

After various discussions on the aforementioned policy evaluations, policy studies turned their attention to conceptual frameworks for smart city policies from the viewpoint of the stage after the evaluation stage, called the *Act* stage. The conceptual framework proposed by Chourabi et al. (2014) was a widely used one for smart city policies. They presented a two-layer model centered on smart city initiatives as the core. The three elements of technologies, organizations, and policies, which directly affect the success of smart city initiatives, are situated in the layer nearest to the core. On the other hand, the five elements of governance, people and communities, economy, built infrastructure and natural environment, which are considered as less influential elements than the aforementioned three ones, are located in the outer layer of this conceptual framework.

Further expansions of Chourabi et al. (2014)'s conceptual framework were proposed. One direction of such expansions was incorporation of stakeholders (Etzkowitz and Zhou, 2006; Lombardi et al., 2011; Deakin, 2014). In this direction, the triple/quadruple helix models were incorporated into Chourabi

WTR 2019;8:92-103 https://doi.org/10.7165/wtr19a1220.21

et al. (2014)'s framework for further articulation of the element "people and communities," which activates technologies. In addition to stakeholders, some policy frameworks address the importance of governance, which could integrate these stakeholders (Castelnovo et al., 2015; Meijer and Bolivar, 2015). In another direction apart from the stakeholders, some frameworks focused on further articulated determinants shown in the outer layer of Chourabi et al.'s (2014) framework (Monzon, 2015; Fernández-Güell et al., 2016). Although the two directions were proposed, each study dealt with only one of these articulated elements rather than the whole. Fernandez-Anes et al. (2018) exceptionally presented their conceptual framework covering the whole elements.

The framework presented by Fernandez-Anes et al. (2018) consists of three layers from the center to the outer layer: *stakeholders, smart city dimensions,* and global trends. In this framework, smart city policies are assumed to be decided and implemented by interactions among three layers and their elements. The inner layer is composed of four stakeholders: political, social, economic and knowledge stakeholders. The idea of these four stakeholders, namely government, citizens, industry and research institutes, relies on the quadruple helix model for innovation (Carayannis and Campbell, 2009). The middle layer, the smart city dimension, consists of six elements: governance, economy, environment, mobility, people and living. Giffinger et al. (2007) proposed these six elements, and this six-element model for smart cities is also employed in the European Parliament (2014). Among the six elements, governance has the chief role to integrate the other five. Finally, the outer layer of global trends comprises six areas: climate change, social polarization, new governance models, global urbanization, economic instability and technological innovations. Although this framework consists of the aforementioned three layers, each element on these layers is inter-related. Thus, stakeholders respond to challenges caused by global trends and prioritize and implement smart city initiatives in the six smart city dimensions. However, Fernandez-Anes et al.'s (2018) framework was validated only for smart city policies in Vienna. It is, therefore, necessary to evaluate the validation of this framework by applying this framework to smart city policies in other cities.

The purposes of the present article, therefore, are firstly to identify outcomes derived from the smart city projects of the first generation, and then to reveal the present situation of the latest smart city policies, including the impacts of the first generation on these states of the art policies, using the conceptual framework presented by Fernandez-Anez et al. (2018). The present study was also intended to evaluate the validity of this conceptual framework because it seems that no studies have tackled framework evaluation.

In the next section, implemented and ongoing smart city policies in Japan are briefly mentioned. While the research methodology is shown in the third section, results derived from this methodology, namely outputs, outcomes and impacts of these policies, are presented in the fourth and fifth sections. While some concluding remarks are drawn, further research directions are discussed in the final section.

2. SMART CITY POLICIES IN JAPAN

The national smart city policy started in 2008 in Japan. In this year, the Cabinet Office initiated the eco-model and future cities project on the basis of the "future city" initiative, while the Agency for Natural Resources and Energy, under the Ministry of Economy, Trade and Industry, launched the next generation energy and social system demonstration project, also called the smart community project, in 2010 (Table 1). Although both smart city national policies aim at the construction of smart sustainable cities, their directions are slightly different. While the former is tightly connected to the term "smart," namely ICT, the latter is oriented toward environmental sustainability. Two cities, Yokohama and Kitakyushu, were designated not only as model cities for the next generation energy and social system demonstration project, but also as eco-model and future cities.

In the eco-model and future city project, 23 cities were designated as eco-model cities in total (13 cities in 2008, 7 in 2012 and 3 in 2013) and 11 cities as future cities in 2011 (Fig. 1). To extend the "FutureCity" initiatives, the Cabinet Office started the SDGs Future Urban project in 2018. In this project, the SDGs are utilized as a new tool to foster the creation of an economically and socially sustainable society across Japan.

On the other hand, four cities, Yokohama, Toyota, Keihanna and Kitakyushu, were selected for experiments of the next generation energy and social system demonstration project (Fig. 2). In this project, the smart community was defined as "a new form of social system that compre-

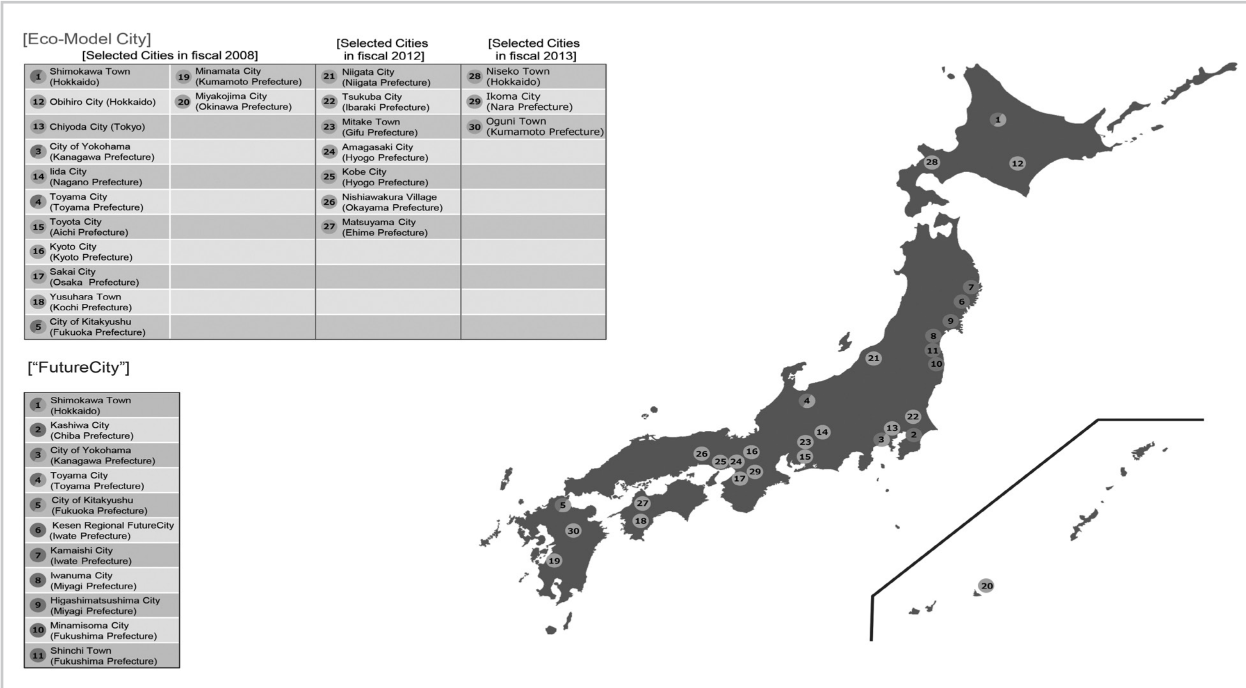

Fig. 1. Eco-model and Future cities in Japan

Source: Promotion Council for the "FutureCity" Initiative (2016)

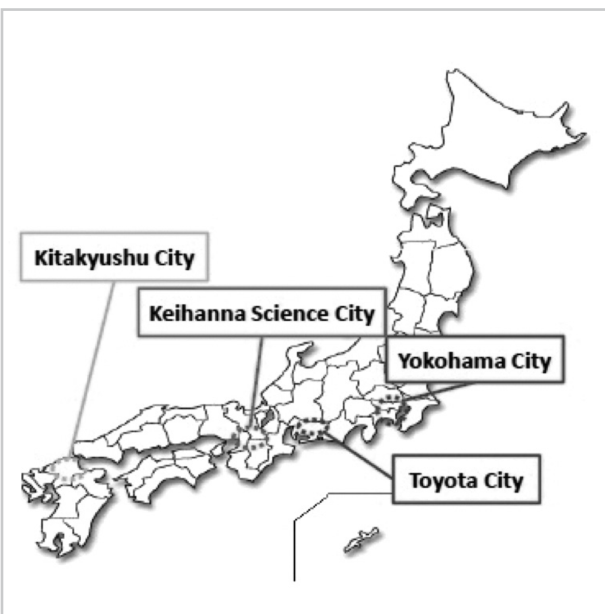

Fig. 2. Four designated cities for the next generation energy and social system demonstration project in Japan

Source: Komiyama (2012)

hensively manages the supply and demand of energy in the distributed energy systems, optimizes the use and application of energy, and incorporates lifestyle support services, including monitoring service for the elderly, through the energy management system utilizing IT and storage energy technologies, while making use of distributed energy resources such as renewable energy and cogeneration" (Japan Smart Community Alliance, 2015, p. 2).

In the present article, particular attention is paid to the four cities regarding their outcomes and impacts on the next generation energy and social system demonstration project in the third section and beyond because these cities were ICT-oriented, and ICTs have a large influence on today's smart city policies in Japan.

3. METHODOLOGY

The aforementioned four cities, Yokohama, Toyota, Keihanna and Kitakyushu, were the research objectives for the

WTR 2019;8:92-103 https://doi.org/10.7165/wtr19a1220.21

Table 2. The numerical targets proposed in the next generation energy and social system demonstration projects, 2010

Name of city	Numerical targets
Yokohama	(1) Electricity supply by PV: 27MW, (2) HEMS introduction: 4,000 households, (3) EV introduction: 2,000 vehicles
Toyota	Carbon dioxide reduction of 8,000 t-CO2/year in the project area, namely 67 households
Keihanna	The carbon dioxide emissions per capita per year should be 1.6 t-CO2/person/year in the project area.
Kitakyushu	(1) Carbon dioxide reduction: 50% cut in comparison of the project area with ordinal city blocks. (2) Stable electricity supply: To maintain frequency and voltage fluctuation within a certain range (voltage is 101±6V, frequency is 60Hz) even if introducing a large amount of new energy.

Source: Yamashita, 2018

Table 3. Qualitative and numerical targets and achievements of each next generation energy and social system demonstration project (Yamashita, 2018)

Numerical targets		
Items	Targets	Achievements
1) Yokohama		
Carbon dioxide emission	30,000 t-CO2	39,000 t-CO2
Peak cut	20%	Maximum peak cut: 23% (for buildings) Net peak cut: 15.7% (for household)
Energy saving	17%	17%
PV installation	27MW	37MW
HEMS installed houses	4,000	4,230
PV (newly purchased)	2,000	2,294
2) Toyota		
Carbon dioxide reduction	35%	35%
Peak cut (1-4 PM, Summer)	28%	39%
Peak cut (6-9 PM, Winter)	42%	45%
3) Keihanna		
Carbon dioxide reduction	35%	35%
Peak cut (1-4 PM, Summer)	28%	39%
Peak cut (6-9 PM, Winter)	42%	45%
4) Kitakyushu		
Carbon dioxide reduction	50%	51.50%
Energy saving	20%	40.50%
Peak cut	15%	102.60%

outcomes of the first generation of smart city policies in Japan. The numerical targets for each project are shown in Table 2. These targets were utilized to evaluate *policy outputs.* On the other hand, technological transfers to other cities/regions are regarded as the *policy outcomes,* because the next generation energy and social system demonstration project was a pilot project in that the national government intended to transfer knowledge and techniques accumulated in this project to other places, not only in Japan, but also overseas. For evaluations of both policy outputs and outcomes, reports of four next generation energy and social system demonstration projects were utilized. In the evaluation process, moreover, this study also focused on the global trends of Fernandez-Anes et al.'s (2018) framework, which had impacts on the current smart city policies in Japan.

4. POLICY OUTPUTS AND OUTCOMES

In this section, first project outputs are evaluated using numerical targets of each next generation energy and social system

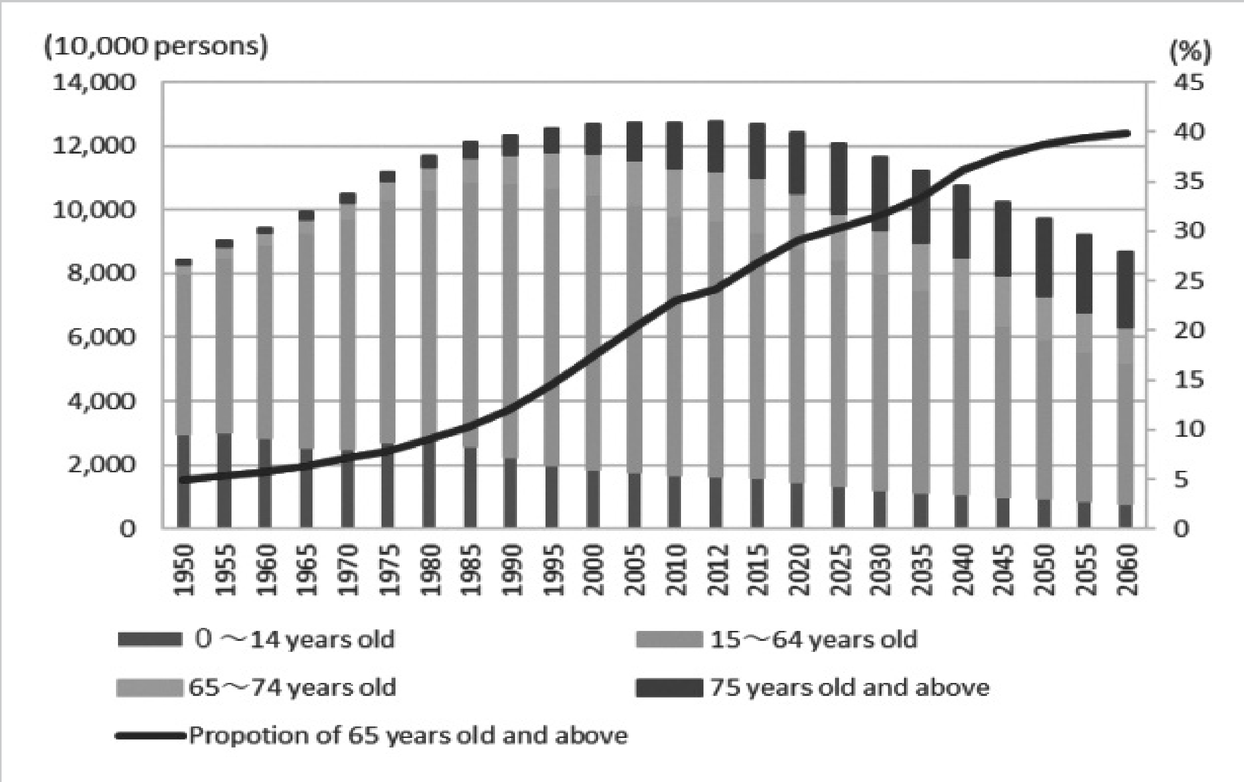

Fig. 3. Population changes and estimation in Japan (1950-2060)

demonstration project. Then, project outputs are assessed using the examples of technology transfer derived from the next generation energy and social system demonstration project.

4.1 Policy outputs

As Yamashita (2018) pointed out, targets in the four next generation energy and social system demonstration projects have been largely achieved. Table 3 shows numerical targets and their achievements for each next generation energy and social system demonstration project. This indicates that policy outputs were highly assessed in all four cities. It does, therefore, seem that these projects were successful in terms of the policy outputs, because the project achievements in the four cities outperformed almost all numerical targets shown in this table.

4.2 Policy outcomes

Knowledge and technologies brought by the next generation energy and social system demonstration project have transferred to various cities, city districts and city regions, not only in Japan, but overseas as well. Table 4 summarizes such technology transfers. This also indicates that policy outcomes were highly implemented in the smart community project, which is the extension of the next generation energy and social system demonstration project. Along with the policy outputs, it is concluded that the smart community project was also successful in terms of the policy outcomes.

5. POLICY IMPACTS

In this section, current challenges Japan is facing are shown, then the validity of Fernandez-Anez et al.'s (2018) conceptual framework for smart city policies is examined. Next, Society 5.0, presented by the Cabinet Office, is briefly suggested for addressing these challenges. Finally, the latest smart city policies relying on the notion of Society 5.0 are shown. These policies include the establishment of smart city platforms.

WTR 2019;8:92-103 https://doi.org/10.7165/wtr19a1220.21

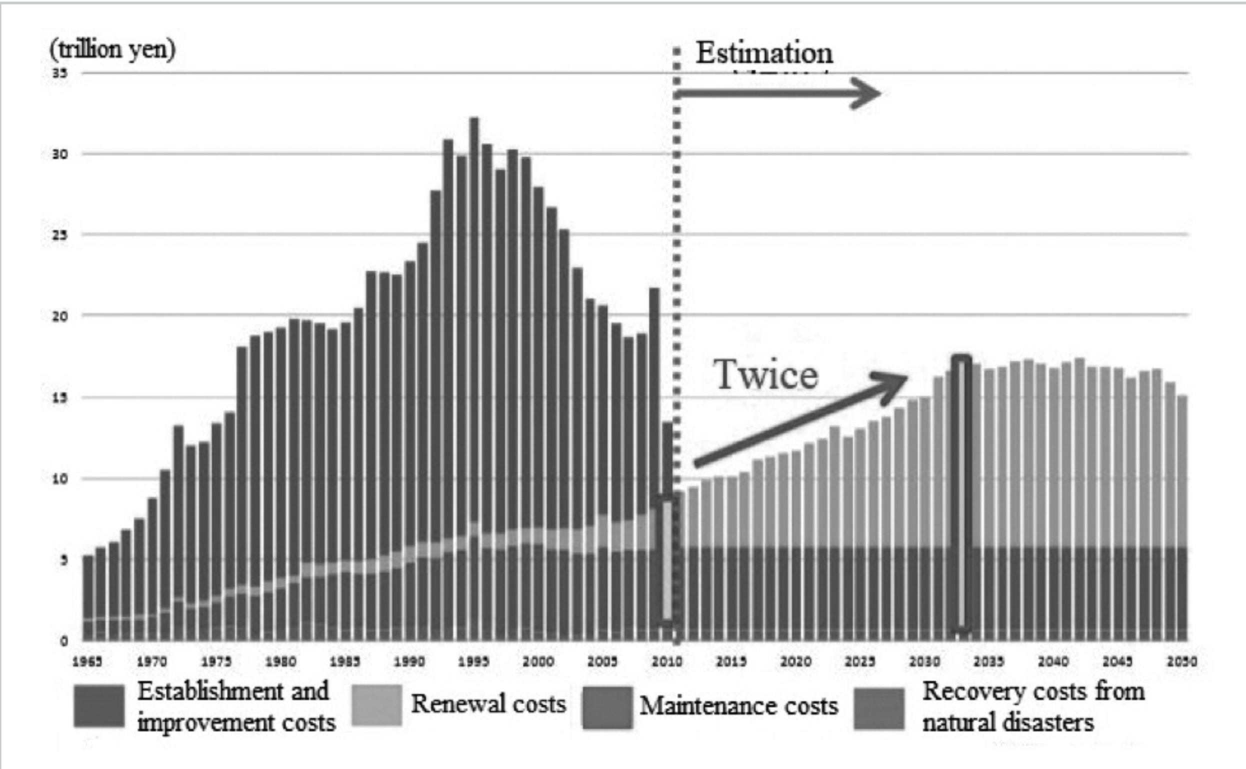

Fig. 4. Expected increase in renewal and maintenance costs for infrastructure

Source: https://www.mlit.go.jp/common/000135837.pdf

5.1 Global trends

Japanese cities are characterized by the major challenges of the declining birth rate, an aging and shrinking population (Fig. 3) and an increase in renewal and maintenance costs due to the aging of urban infrastructure (Fig. 4). In the conceptual framework by Fernandez-Anez et al. (2018), the declining birth rate and an aging and shrinking population is referred to in subcategory 2.3: "Adapting the city's economic and social life to an ageing population while attracting young people and children" within the category of "Social polarization," while the increase in renewal and maintenance costs due to the aging of urban infrastructure is mentioned in subcategory 4.2: "Maintaining quality of life in cities, ensuring access to services in line with changes in demand (education, health, culture, safety, etc.)" within the category of "Global urbanization" (Table 5).

These challenges cannot be solved without an increase in productivity. For the declining birth rate and aging population, utilization of women and elderly persons, along with robots, can enhance productivity. For the rise in labor-intensive maintenance costs for urban infrastructure, the introduction of new equipment which automatically surveys and detects problems with roads and water and sewage systems might increase productivity. Along with these policy measures, the use of ICT is essential for an increase in productivity to respond to such challenges. The use of ICT to overcome various societal challenges is also mentioned in the conceptual framework of Fernandez-Anez et al. (2018) in subcategory 6.1: "Enhancing the adaptation of society, governance and economy to transformation through ICT" within the category of "Technological innovations." This indicates the conceptual framework by Fernandez-Anez et al. (2018) totally covered the current challenges faced by Japanese smart cities, indicating they are global trends. Therefore, this conceptual framework is evaluated as highly valid for smart city policies.

5.2 Society 5.0

The Cabinet Office first presented the concept of Society

Table 4. Outcomes of the next generation energy and social system demonstration project

1. Japan
1) Electricity
Kashiwa-no-ha smart city (Chiba pref.)
Fujisawa sustainable smart town (Kanagawa pref.)
Park Tower Nishi-Shinjyuku Emsport (Tokyo pref.)
2) Thermal energy
Tamachi Smaenepark (Tokyo pref.)
Senju Techno Station (Tokyo pref.)
Shiba 2-choume Smart Community Plan (Tokyo pref.)
Sakai Teppou-chou Smart Community (Osaka pref.)
Chubu University Campus Smart Grid (Aichi pref.)
Dai-2 Sendai Hokubu Core Industrial Park (Miyagi pref.)
Shimabara city (Nagasaki pref.)
Simo-Tuga couty (Tochigi pref.)
2. Oversea (Joint developments)
New Mexico (USA)
Maui (USA)
Java (Indonesia)
Lyon (France)
Malaga (Spain)

(Agency for Natural Resources and Energy, 2016, New Energy and Industrial Technology Development Organization, 2018)

5.0 in The 5th Science and Technology Basic Plan approved by the Cabinet in 2016. In this plan, Society 5.0 is characterized as follows: "Through an initiative merging the physical space (real world) and cyberspace by leveraging ICT to its fullest, we are proposing an ideal form of our future society: a "super smart society" that will bring wealth to the people. The series of initiatives geared toward realizing this ideal society are now being further deepened and intensively pro-

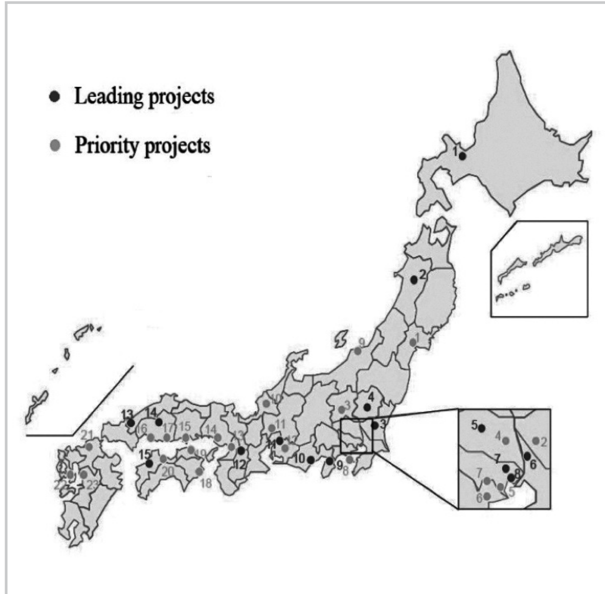

Fig. 5. Designated cities of the smart city model project

Source: https://www.mlit.go.jp/common/001291681.pdf

• Leading projects

1. Sapporo city, Hokkaido pref., 2. Semboku city, Akita pref., 3. Tsukuba city, Ibaraki pref., 4. Utsunomiya city, Tochigi pref., 5. Moroyama Town, Saitama pref., 6. Sakai city, Chiba pref., 7. Chiyoda ward, Tokyo pref., 8. Koto ward, Tokyo pref., 9. Atami and Shimoda cities, Shizuoka pref., 10. Fujieda city, Shizuoka pref., 11. Kasugai city, Aichi pref., 12. Keihanna Science city, 13. Masuda city, Shimane pref., 14. Miyoshi city, Hiroshima pref., 15. Matsuyama city, Ehime pref.,

• Priority projects

1. Sendai city, Miyagi pref., 2. Moriya city, Ibaraki pref., 3. Maebashi city, Gunma pref., 4. Saitama city, Saitama pref., 5. Ota ward, Tokyo pref., 6. Yokohama city, Kanagawa pref., 7. Kawasaki city, Kanagawa pref., 8. Yokosuka city, Kanagawa pref., 9. Niigata city, Niigata pref., 10. Eiheiji town, Fukui pref., 11. Gifu city, Gifu pref., 12. Okazaki city, Aichi pref., 13. Osaka ctiy, Osaka pref., 14. Kakogawa city, Hyogo pref., 15. Kurashiki city, Okayama pref., 16. Kure city, Hiroshima pref., 17. Fukuyama city, Hiroshima pref., 18. Minami town, Tokushima pref., 19. Takamatsu city, Kagawa pref., 20. Niihama city, Ehime pref., 21. Fukuoka city, Fukuoka pref., 22. Shimabara city, Nagasaki pref., 23. Arao city, Kumamoto pref.

moted as "Society 5.0" (Government of Japan, 2016, p. 13). The most important feature of Society5.0 is human wealth, and such a society comes after the hunting–gathering society, the agricultural society, the industrial society and the information society.

WTR 2019;8:92-103 https://doi.org/10.7165/wtr19a1220.21

Table 5. The global trends proposed by Fernandez-Anez et al. (2018)

1. Climate change
1.1. Reducing ecological footprint and pressure on ecosystems, promoting ecological functions of land
1.3. Fostering cities' resilience to climate change and disaster risks
1.4. Developing eco-friendly urban environments and responding to growing environmental concerns
1.5. Implementing a holistic approach to environmental issues
2. Social polarization
2.1. Promoting social inclusion, cohesion and equity
2.2. Enhancing the inclusion of migrants and refugees
2.3. Adapting the city's economic and social life to an ageing population while attracting young people and children
2.4. Promoting equity in access to the labour market and the work-life balance
2.5. Eradicating spatial exclusion and promoting equity in access to housing and quality urban environments
2. 6. Enhancing social diversity as a dynamic asset
3. New governance models
3.1. Changing to a more participative and inclusive democracy
3.2. Promoting citizenship via urban co-creation and co-management combining top-down and bottom-up models
3.3. Increasing the flexibility and resiliency of governance models
3.4. Improving the effectiveness of institutions, coordination among public bodies and multilevel governance (leading to more integrated sector policies)
3.5. Incorporating and regulating innovative management systems at the local level while improving capacity building (i.e. PPP or PPPP, e-governance, etc.)
3.6. Enhancing territorial cohesion
4. Global urbanization
4.1. Managing the urban population growth while reducing negative externalities
4.2. Maintaining quality of life in cities, ensuring access to services in line with changes in demand (education, health, culture, safety, etc.)
4.3. Promoting interurban variety and cities' identity by protecting cultural heritage
4.4. Developing new planning tools for sustainable development (less urban sprawl, polycentric plans, increased density and diversity, mixed land use, urban refurbishment…)
4.5. Fostering sustainable accessibility in cities and promoting sustainable, inclusive and healthy mobility when needed
4.6. Balancing urban growth and territorial development (managing the urban-rural balance)
5. Economic instability
5.1. Improving the resilience of economic systems and adaptation to changes in global and local economies
5.2. Improving the sustainability and diversity of local economies in balance with cities' specialisation
5.3. Managing adaptation to innovation and knowledge-based economies while providing solutions to a broad skill base
5.4. Fostering human and social capital as source of innovation
5.4. Enhancing integration in global economies, promoting cooperation among cities and territories
5.5. Fostering employment creation with high quality standards
5.6. Achieving balance between competitiveness and quality of life
6. Technological innovations
6.1. Enhancing the adaptation of society, governance and economy to transformation through ICT
6.2. Coordinating new technologies for energy saving and reducing emissions through planning and governance tools
6.3. Articulating mobility planning tools and policies with innovations in the sector
6.4. Promoting technological innovation driven by social and human capital
6.5. Reducing externalities in the implementation of new technologies (i.e. cybersecurity)

Society 5.0 is similar to the notions representing the fourth industrial revolution based on ICTs, such as "Industry 4.0" in Germany, "Advanced Manufacturing Partnership" in the United State and "Made in China 2025" in China. Whereas these concepts chiefly address industry itself, Society 5.0 represents society as a whole.

5.3 Smart city policies after Society 5.0

A larger difference between the first and second generations of smart city policies after Society 5.0 is the presence or absence of smart city platforms. In the first generation of smart city policies, namely the next generation energy and social system demonstration project and the successor, the smart community project, both information and data on energy, transportation and other public services were shared and utilized through ICT systems within an individual public service sector. However, such information and data were not used across these service sectors. To overwhelm such shortages pertaining to the first generation of smart city policies, the smart city policies after Society 5.0 include the establishment of smart city platforms that enable us not only to obtain cross-sectoral data and information sharing, but also utilize big data derived from various data sources, including citizens. Examples of such platform-oriented projects are the promotion project for data utilization driven smart cities by the Ministry of Internal Affairs and Communications in 2017 and the smart city model projects by the Ministry of Land, Infrastructure, Transport and Tourism in 2019. Both are briefly mentioned below.

5.3.1 The promotion project for data utilization driven smart cities

To solve various problems facing cities and regions and to revitalize local communities, this project subsidizes a portion of the expenses for initial and continuous investments on cross-sectoral smart city development by local governments. In 2017, six cities (Sapporo, Aizu-wakamatsu, Saitama, Yokohama, Kakogawa, and Takamatsu cities) were designated for this project.

5.3.2 The smart city model project

Using new technology and public-private data, this project aims to implement solutions for sustainable and cross-sectoral urban development. Two types of projects, which are leading and priority projects, have been implemented since 2019. In the leading project, 15 cities were selected, while 23 were chosen in the priority projects (Fig. 5). The leading projects are financially supported to back up both the leading and priority projects. In the leading projects, new programs in a project are launched, and program results and bottlenecks are analyzed. In addition, project results are shared with other projects. The priority projects are given national implementation support so that experts are dispatched and planning is also supported.

The results of smart city policies in Japan were intended to be shared not only in Japan, but also internationally, particularly in the Global Smart City Alliance. This alliance was approved in the G20 Ministerial Statement on Trade and Digital Economy in Tsukuba, June 2019, and established during the Asia Smart City Week in Yokohama, October 2019. This suggests that the international network of smart city policies is expanding.

6. CONCLUSION

The purposes of this study were, firstly to identify outcomes derived from smart city projects in their first generation, then to reveal the present situation of the latest smart city policies, including the impacts of the first generation on these state of the art policies. Along with these purposes, the present study also intended to evaluate the validity of the conceptual framework presented by Fernandez-Anez et al. (2018). As a result, it was concluded that (1) policy outputs and outcomes derived from the smart city policies in the first generation were highly achieved, (2) the conceptual framework of smart city policies was regarded as valid, and (3) the second generation of smart city policies after Society 5.0 was characterized by the establishment of smart city platforms. For the findings on the conceptual framework for smart city policies, however, it seems that further studies are necessary to confirm its validity in other countries.

Although the establishment of smart city platforms was identified to enhance data sharing among different policy domains about the impacts of smart city policies in Japan, sector-based projects are still observed among the second generation of smart city policies, just like in other countries (Mattoni et al., 2015). As installed in Fernandez-Anez et al.'s (2018) conceptual framework, governance is the key issue to bridge such sector-based smart city projects/policies (Albino et al., 2015; Meijer and Bolívar, 2016). Further studies are required to reveal how the smart city platform is utilized to foster governance in the second generation of smart city policies in Japan. In addition, the present paper was dedicated to qualitative evaluation of the conceptual framework presented by Fernandez-Anez et al. (2018) for smart city policies. Further quantitative studies are necessary to confirm the validity of this framework, especially for the governance bridging the other five elements of Fernandez-Anez et al.'s (2018) conceptual framework using actual data.

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