

International City Network and Public-Private Cooperation for Urban Water-Environment Management: A Study of Japanese Public Water Services' Overseas Expansion

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Abstract. *Urbanization has progressed in parallel with rapid economic development in Asia, and people living in the region's megacities face severe urban environmental problems, with the water-environment problem being especially serious. Meanwhile, water-supply and sewerage services in Japan are conducted by municipalities as a public service, but their revenues are shrinking in response to a decreasing birthrate, an aging population, and the water-conservation movement. In this study, we investigated the overseas expansion of Japanese public water services as an effort to improve the living environment in developing Asian countries and to advance the sustainability of public water services. The research methods included scrutinizing preliminary research, conducting case studies through text analysis of materials issued by national and local governments, and conducting interviews with municipalities. As a result of the research, we first identified the overseas expansion of public water services as a collaborative model—based on an international inter-city network—for solving urban problems. With national governmental support, major municipal water services in Japan have aimed to expand their business abroad to achieve regional economic development, relying on trust based on the solidarity and cooperation of the international cities to reduce the transaction cost of international water-related project development. Second, we clarify that the public-private cooperative platform established by the leadership of municipalities enhances the accountability and transparency of the overseas expansion projects of public water services. Third, we find that the international city networks that municipalities build are evolving from one-to-one mutual networks to multilateral networks.*

Keywords: Accountability, Multilateral network, Municipal Water Service, Overseas Expansion, Public-Private Cooperative platform

JEL Codes: L32, R11, R58

1. Introduction

Urbanization has progressed in parallel with rapid economic development in Asia. As such, people living in the region's megacities face severe urban environmental problems, especially with their water environment. These cities must develop the infrastructure to provide clean water and process sewage in densely populated areas. Since the mid-1980s, liberalization has led to numerous water supply reforms, allowing for more privatized and commercialized services, thus initiating the economic globalization process (Bakker 2003; 2007; Swyngedouw et al. 2002). Municipalities are compelled to make trade-offs between environmental and social sustainability and economic sustainability. So that utilities may circumvent contradictions, they need to find creative solutions with regulations, service delivery models, and municipalities (Furlong and Bakker 2010; Furlong 2012). The potential to realize economies of scale is greater when water utilities are aggregated and regionalized, as the size and efficiency of new investments

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increase with shared infrastructure projects and access to international funding (Frone 2008). The territorial expansion of municipally owned water companies in some countries can be observed as a form of urban entrepreneurialism (Furlong 2015). Firms and governments have a strategic interest in export because it presents opportunities while potentially contributing to environmental improvements (Kanda 2014). In the smart city regionalism, growth-oriented "competitiveness" and "sustainability" are pursued (Herrschel 2013). This allows developing countries to gain access to internationally recognized best practices and contractual innovations developed by other governments (Trebilcock and Rosenstock 2015). By becoming part of an international city network, cities can share resources, knowledge, and experiences; facilitate learning about a particular topic; gain legitimacy; create milieus in which they can contribute solutions and offer important benchmarking opportunities (Mejía-Dugand et al. 2016). These municipally owned companies are largely motivated by external factors such as customer requests and opportunities to contribute to environmental sustainability. Their export experiences are influenced by their municipal ownership, technology, and the institutional contexts within which they operate (Kanda et al. 2016).

Japan's water supply and sewerage services are managed by municipalities as a public service. However, their revenues are shrinking in response to a decreasing birth-rate, an aging population, and the water-conservation movement. Therefore, the Japanese government is focused on municipal water services as a new export industry. Expanding municipal water services abroad contributes to solving Asian cities' urban environmental problems through international cooperation and sustainable management of their public water services. The New Growth Strategy decided by the Cabinet in December 2009 indicated that Japan would package its technology and experience as an engine for sustainable growth in Asia. It would facilitate the development of environmentally symbiotic cities by promoting business opportunities for Japanese companies with advanced civil engineering and construction technologies. In May 2010, the Ministry of Internal Affairs and Communications released the municipal water service overseas expansion team's interim report. From the perspective of international contributions and Japan's economic growth, this report underscored the importance of public and private sector partnerships that utilize technology and expertise to work towards international development.

In this study, we investigated the plan to expand Japanese public water services overseas as an effort to improve the living environment in developing Asian countries and to advance the sustainability of public water services. The remainder of the paper presents the research methodology and analysis, followed by a discussion on the results and a conclusion.

2. Research Elaboration

The research methods included scrutinizing preliminary research, conducting case studies through text analysis of materials issued by national and local governments, and conducting interviews with municipalities. We examined urban municipal water services in four cities: Tokyo, Yokohama, Osaka, and Kitakyushu (see Figure1). Tokyo, Yokohama, and Osaka were selected because they represent the areas with the highest populations in Japan. As an industrial city, Kitakyushu has a long history of development, and from preliminary surveys, it is recognized as one of the Japanese cities most actively engaged in the overseas development of environmental technology.

3. Results and Discussions

3.1. Case study 1: Tokyo Metropolitan Government

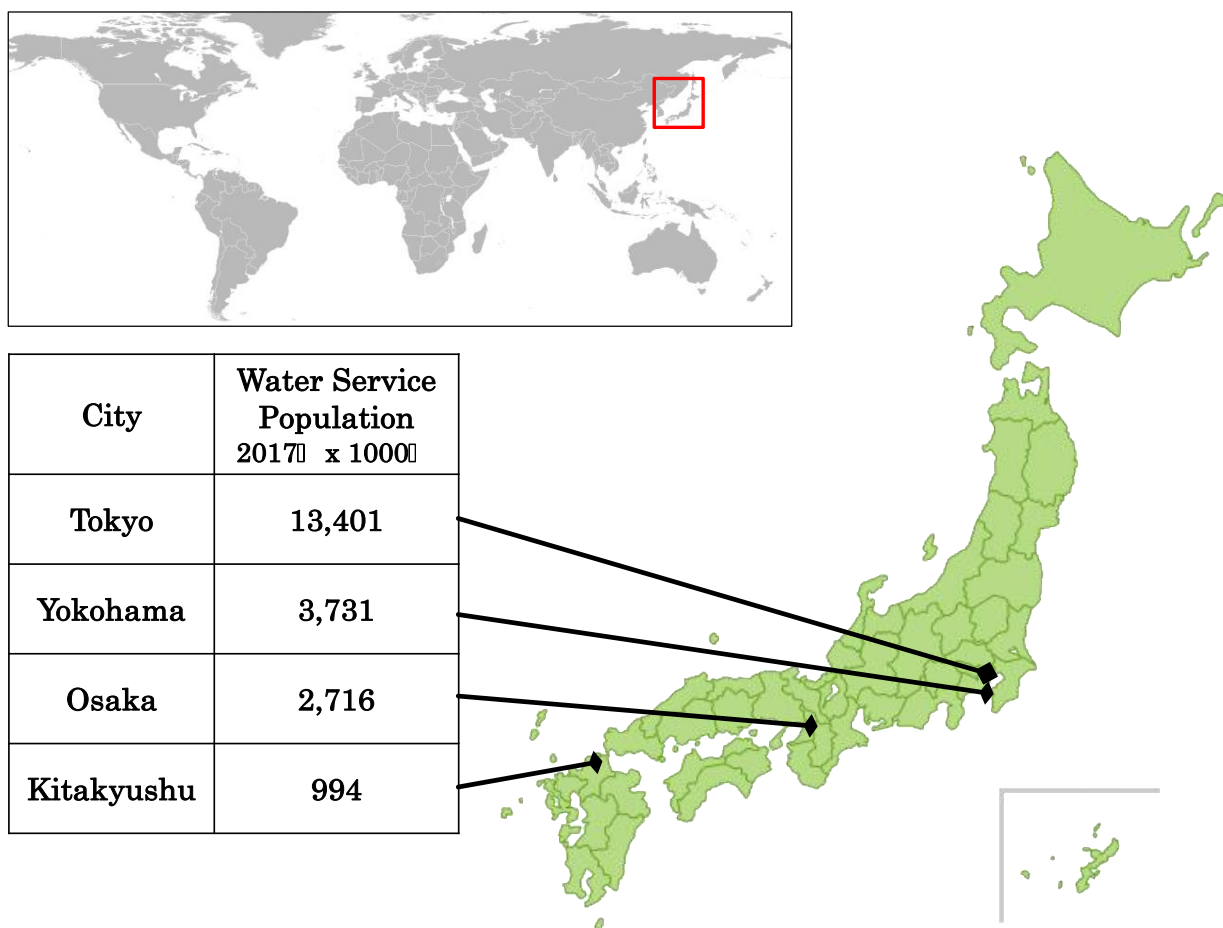


Fig. 1: Water Service Populations and Locations of Cities Investigated

In January 2010, the Tokyo Metropolitan Government (TMG) formulated the 2010 Tokyo Waterworks Management Plan for the period from FY 2010 to 2012. This plan indicated that Tokyo Suido Service Co., Ltd. (TSS), in which the Tokyo Metropolitan Bureau of Waterworks invests 51%, contributed its high-level water technology and operation expertise on an international level, while the TMG dispatched survey teams abroad to promote Tokyo Waterworks' technology and expertise.

The TMG Bureau of Waterworks and TSS collaborate as follows: gather domestic and overseas information; conduct surveys on actual conditions and design business models that meet the needs of overseas markets; establish overseas business survey and research groups; dispatch mission teams overseas; and develop and participate in business models for consulting and facility management orders. The TMG also established a private enterprise support program, as it is necessary to respond to each country's various needs and solve the world's water problems through diversity and sustainable cooperation. The program provides support to pre-registered enterprises by organizing business matching opportunities, accepting visits to waterworks facilities, and expressing willingness to cooperate in partnership with governments and other entities.

In October 2011, TSS, a Japanese water treatment company, and the Hanoi City Waterworks Public Corporation established a joint venture company that was responsible for a project to construct and maintain a water purification plant with a daily volume of 150,000 tons in Hanoi City, Vietnam. TSS established its wholly owned subsidiary, Tokyo Waterworks International Co., Ltd. (TWI) in April 2012 and an affiliated company, Tokyo Waterworks International Taiwan Co., in December 2012, thus strengthening the foundations for overseas project promotions. TSS has made efforts to understand the recipient countries' problems and needs by actively participating in international conferences, exhibitions, and field surveys to pursue dialogue with waterworks operators in each country and by continuing to provide training for overseas trainees in recipient countries and in Japan.

In September 2015, the TMG published the "Tokyo Waterworks International Cooperation Program" which included the following highlights: An explanation of projects developed using TMG technologies to improve water situations in overseas cities; concrete achievements including technical cooperation projects at the grassroots level in Hanoi, Vietnam and Penang, Malaysia; technical cooperation projects in Delhi, India; and infrastructure development, operational projects, and non-revenue water prevention projects in Bangkok, Thailand and Yangon, Myanmar.

3.2. Case study 2: Yokohama City Government

Yokohama's medium-term, four-year plan implemented from 2010 to 2013 indicated that to stimulate the regional economy, the Yokohama City Government (YCG) supported the business development efforts of enterprises in Yokohama City to expand urban infrastructure technology overseas. In January 2011, the YCG announced a public-private partnership (PPP) venture to promote international technical cooperation. The Yokohama Partnership of Resources and Technologies (Y-PORT) project was designated to help solve urban problems in emerging countries as a matter of social responsibility and to revitalize the city's economy.

In 2010, the YCG established the Yokohama Water Co., Ltd., in which they had 100% stake, to promote orders from outside the region, and the "Yokohama Water Business Association," a PPP with 133 companies and organizations, to share information, exchange views, and conduct joint promotions. In 2017, the Yokohama Urban Solution Alliance (YUSA) was established as part of the organizational improvement needed following an increase in projects achieved through Y-PORT. YUSA aims to do the following: Contribute towards creating new business opportunities as well as provide solutions to urban development issues in emerging countries by formulating projects utilizing funds from the Japanese government as well as multilateral development organizations; provide information on overseas infrastructure business, and promote the technical capabilities of private companies to overseas markets. YUSA presents a framework to receive orders for projects created by international city networks and ensure fairness in providing information obtained by the municipalities.

In January 2011, the YCG participated in a PPP in a field demonstration experiment in Brida City, Saudi Arabia, as well as conducted surveys for water supply projects in Bangladesh and in Hue City, Vietnam. In March 2012, the YCG concluded a "Memorandum of Understanding (MOU) on Technical Cooperation for the Development of Sustainable Cities" with the City of Cebu, Philippines, and conducted local surveys and organized business matching between the city and other water service entities in Sri Lanka, Saudi Arabia, Brazil, and Iraq.

In 2015, the International Water Association Strategic Asset Management Conference was held in Yokohama City. Executives involved in Asian water utilities and water administration were invited to the Executive Forum for Enhancing Sustainability on Urban Water Service in the Asian Region. The purpose of this forum was to verify efforts to improve water utilities in each country and to share knowledge, technology, experiences, and know-how for solving future problems.

3.3. Case study 3: Osaka City Government

The Osaka City Economic Growth Strategy was announced in 2011. This strategy indicated that by packaging the city's water, sewerage, and environmental technologies and strengthening relationships with Osaka and Kansai companies with outstanding element technologies, the Osaka City Government (OCG) contributed to solving overseas water and environmental problems and supported the expansion of Osaka and Kansai economic business opportunities.

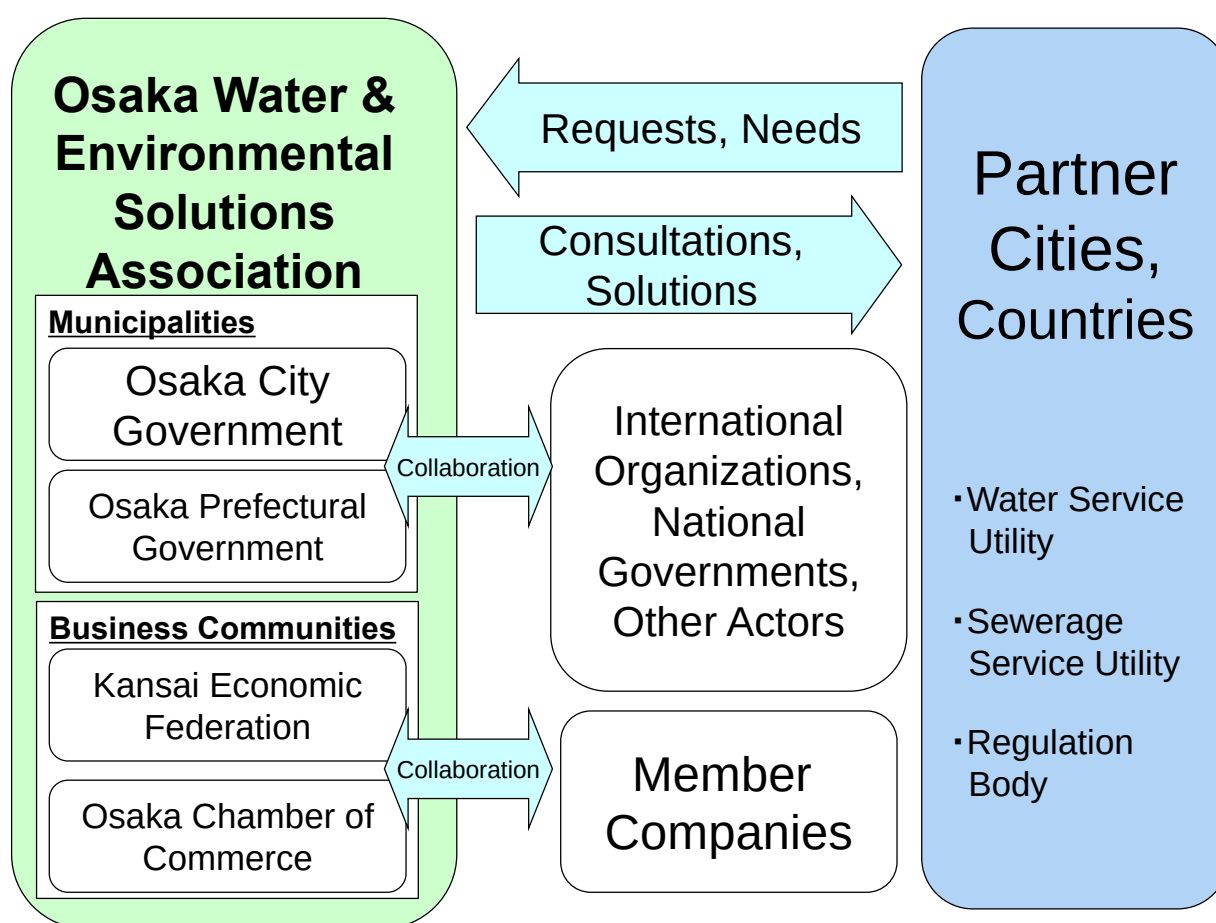


Fig. 2: Scheme of International Cooperation by the Osaka Water & Environmental Solutions Association

To achieve the above objectives, the OCG established the Osaka Water & Environmental Solutions Association (OWESA) in 2011 with the Kansai Economic Federation and the Osaka Chamber of Commerce and Industry (see Figure 2). OWESA works in an integrated manner with the OCG, the Osaka Prefectural Government, and the Osaka business community. The association's aims are to solve diversified water and environmental issues by utilizing the administration's considerable experience and advanced technologies from the private sector. In July 2016, the Clearwater OSAKA Corporation (COC), in which the OCG has 100% share, was established with the human and technical resources amassed to contribute to the wellbeing of people and societies, both within Japan and abroad.

OWESA has two main activities. The first includes the following promotional activities: Convey information about Osaka-Kansai companies' technical capabilities to overseas entities; provide business-matching opportunities that will lead to orders abroad through joint exhibitions at international trade fairs such as Singapore Water Expo; hold seminars at home and abroad; and accept technical trainees and visits

from overseas. The second activity is to support findings and formulate overseas projects through Osaka's international city network, which includes business partner cities, and implement projects through collaboration between the private and public sectors. This activity involves identifying local water and environmental problems through intercity diplomacy and technical exchanges between Osaka City and overseas municipalities, then formulating business projects to resolve such problems with the participants' agreement.

In July 2011, OCG concluded an MOU with Ho Chi Minh City, Vietnam, for cooperation with the water environment. In September 2014, an MOU was signed between OCG and Yangon City, Myanmar, to promote technical cooperation with urban infrastructure development such as waterworks, sewage works, waste treatment, and urban planning and development. OWESA also arranged for an MOU to be signed for technical cooperation between the two cities while providing technical assistance to Yangon City. In May 2016, OWESA announced that Saint Petersburg, Russia, had adopted sewer system technology developed by a Japanese company. This technology adoption primarily resulted from a technical exchange at the Osaka Promotion Seminar, which was held in Saint Petersburg in September 2014 to celebrate the 35th anniversary of Osaka and St. Petersburg's sister-city affiliation.

3.4. Case study 4: Kitakyushu City Government

In 2011, the Kitakyushu City Government (KCG) formulated the Kitakyushu Municipal Water Service Mid-term Management Plan, which indicated the following policy targets: "Water service at low prices," "water service to promote the environmental model city," and "water service to contribute to the world." This plan also included promoting water business expansion overseas and related personnel training.

The KCG established the "Asia Low Carbonization Center" as an affiliated organization in 2010. The purpose of the center is to concentrate on Japan's environmental technologies in the Kitakyushu region, to target the remarkably developed Asian region, and to drive technology innovation through the benefits of accumulation effectively. To encourage the development of environmentally conscious Asian cities, the center promotes the overseas expansion of packaged infrastructure services according to the needs of partner cities, as this creates opportunities for companies to develop business within the city's jurisdiction. In 2010, the KCG organized the "Kitakyushu Overseas Water Business Association," a platform consisting of public and private sector entities, including 57 companies, academic institutions, and the national government, all cooperating to expand water and sewerage services overseas.

The destinations for Kitakyushu City's overseas expansion are primarily located in Cambodia, Vietnam, and Indonesia. In addition to dispatching mission teams to the target countries and holding seminars and business meetings, KCG has exhibited at international trade fairs to promote member companies' technologies, investigated private enterprises' seeds and needs, surveyed the countries' local needs, and implemented overseas expansion and project development through PPPs.

In 2011, the KCG was commissioned to serve in an advisory capacity for the planning of a water treatment plant construction project in Siem Reap City, Cambodia; they have compensated approximately 110,000 euros for their services. They also designed and managed the construction of a water facility improvement project in Mondulkiri province in eastern Cambodia, for which they were compensated approximately 220,000 euros. This was the first instance of a Japanese municipality receiving a package order for a basic plan, detailed design, and construction management. By March 2018, Kitakyushu City had formed a consortium with council member companies and had received 53 orders, including a preparatory survey for a water supply expansion plan in Cambodia.

4. Discussion

Table 1 summarizes the survey results from the investigation of qualitative case studies based on four municipalities and their public water service expansions overseas.

Table 1: Actions Taken by Large Japanese Municipalities to Expand Public Water Services

	Tokyo	Yokohama	Osaka	Kitakyushu
Municipal Company (Equity Ratio)	Tokyo Suido Service Co., Ltd. (51%)	Yokohama Water Co., Ltd. (100%)	Clearwater OSAKA Co., Ltd. (100%)	Asia Low Carbonization Center (100%)
Public-Private Cooperative Platform	Private Enterprise Support Program	Yokohama Water Business Council	Osaka Water & Environmental Solutions Association	Kitakyushu Overseas Water Business Association
Main Partner Cities	Bangkok, Thailand Delhi, India Hanoi, Vietnam Penang, Malaysia Yangon, Myanmar	Brida, Saudi Arabia Cebu, Philippines Hue, Vietnam	Ho Chi Minh, Vietnam Saint Petersburg, Russia Yangon, Myanmar	Dalian, China Hai Phone, Vietnam Mandalay, Myanmar Siem Reap, Cambodia Surabaya, Indonesia

(Source: By Author)

As a result of the research, we first identified the overseas expansion of public water services as a collaborative model based on international city networks to solve urban problems. Through the city networks' cooperative mechanisms, each urban player stands to benefit from the synergies of interactive growth via reciprocity, knowledge exchange, and unexpected creativity (Batten 1995). Japan's water-related public and private sectors are motivated to share their technologies and experiences to solve urban environmental problems in Asia's growing cities. However, it is difficult for Japanese public water services to sustain unilateral contributions to developing countries because their business environment is becoming less hospitable in a shrinking domestic market. Therefore, with national governmental support, major municipal water service providers in Japan have aimed to expand their businesses abroad to achieve regional economic development, relying on the international city network's solidarity and trust to reduce the transaction cost of international water-related project development.

Second, we clarified that the public-private cooperative platforms established by the municipalities' leaderships enhance the accountability and transparency of the overseas public water services expansion projects. Municipalities hold themselves accountable to be fair to citizens and stakeholders. Serving as intermediaries, such public-private platforms not only develop the projects' implementation capacities but also strengthen their accountability and transparency when it comes to sharing information about the water-environment problems in each partner city and selecting partner companies for international public water service expansion projects (see Figure3).

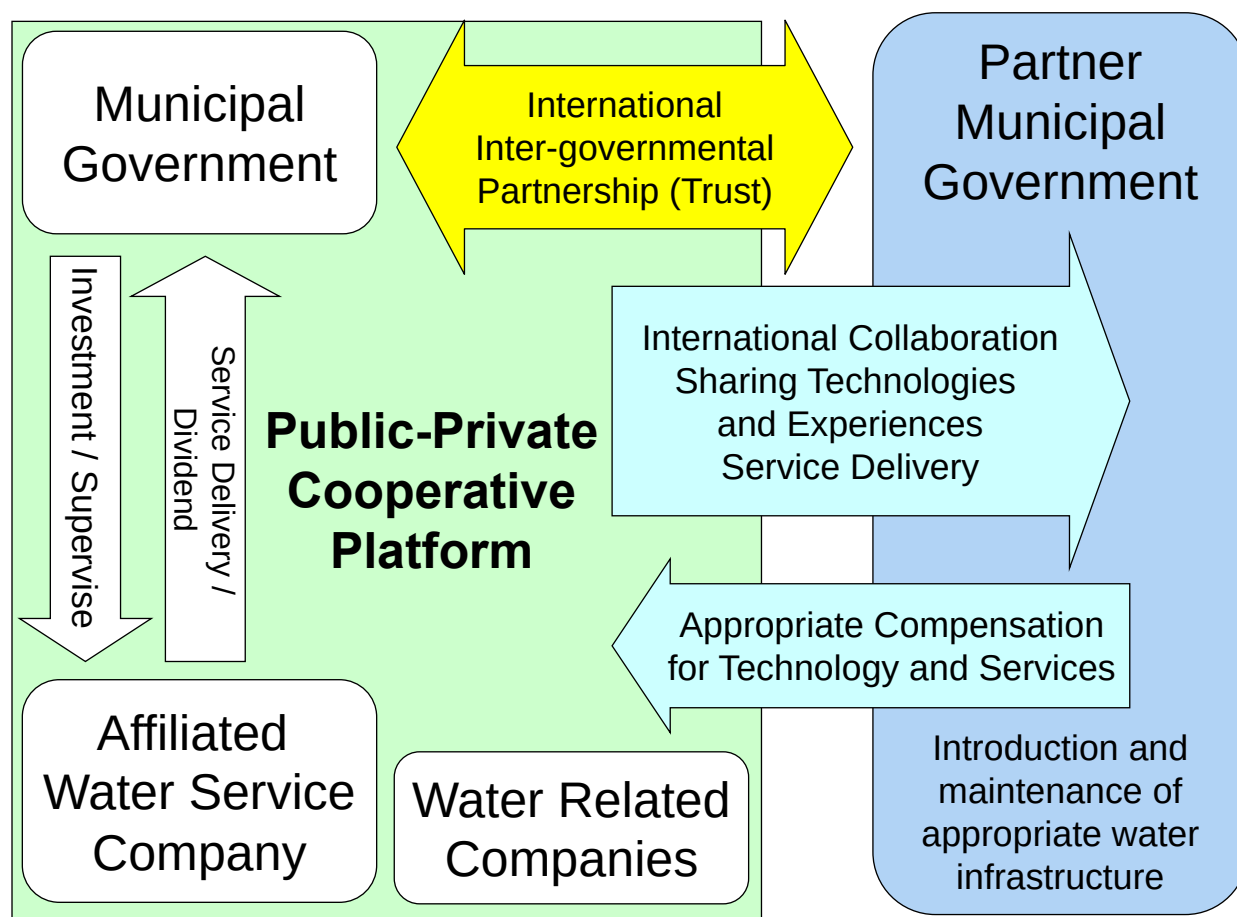


Fig. 3: Model of International Public Water Service Expansion through Municipal Collaboration

Third, we found that the international city networks the municipalities built are evolving from one-to-one mutual networks to multilateral networks. To date, municipalities have developed international sister-city networks centered more on cultural and educational administrative exchanges. However, in recent years, more pragmatic “city networks” or “transnational municipal networks” have emerged with city liaisons focused on problem-solving (Kern and Bulkeley 2009). By participating in these networks, cities exploit scale economies through complementary relationships and synergies in cooperative activities (Capello 2000; Meijers 2005). Municipalities realize that it is efficient to develop mutual projects and participate in international associations or city organizations for specific purposes. Under urban entrepreneurialism (Furlong 2015) and smart city regionalism (Herschel 2013), municipalities even organize international meetings or conferences at which they seek business partner cities, promote their environmental technologies to their region, and enhance their brand images as regional technology hubs. In addition, since top-down decision-making is predominant in Asian culture, efficient project development can be achieved by approaching mayors and governors who participate in these conferences. Furthermore, international organizations comprised of potential financial donors for projects also participate in multi-city collaborations.

5. Conclusion

This study examines the scheme to expand Japanese public water services overseas as an effort to improve the living environment in developing Asian countries and to advance the sustainability of these services. Water is indispensable to humans, as it is necessary for liveable and healthy environments. Water services need to be developed from a long-term perspective, with an emphasis on public interest (Koppenjan and Enserink 2009). Under an inefficient PPP, a firm may threaten to withdraw services in exchange for higher payments, thus attempting to hold the government captive. Compared to traditional procurement, PPPs are complex and require an institutional capacity to design tenders and contracts, then monitor and enforce contracts over long periods (Bloomfield 2006; Trebilcock and Rosenstock 2015; Iossa 2018). In recent years, with the proliferation of governmental actors and initiatives to strengthen the environmental technology sector, collaboration and learning between various public and private actors have led to more comprehensive outputs (Ćetković 2015; Kanda et al. 2016). Public owned companies have lower political or regulatory risks, are willing to accept a lower return on investment, have access to lower-cost local-currency financing, and a better understanding of social and cultural factors (Jensen 2017).

In this context, the overseas expansion of Japanese public water service enterprises, as based on solidarity and trust between the municipalities, is a unique initiative to promote international water service standardization and technology development. It is assumed that this may lead to a new form of international urban water service cooperative governance, which is different from the previous model of complete privatization or concession.

Concerning water environment management in Asia, the formation of a public-private cooperative platform by public water companies to expand their overseas leadership could play a significant role in achieving local, sustainable development from a long-term perspective for the international solidarity of municipalities. From the point of view of securing public and business interests and maintaining advanced water environments in each region, this scheme is advantageous for both overseas expansion and reception countries. Therefore, it is desirable to realize more collaborative projects based on multilateral city networks as public goods.

Future research requires more comparable analysis on the management of PPP platforms, as well as the participation of municipal-owned companies in the project development process so that more empirical analyses can be conducted.

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7. References

- [1] K. Bakker. Archipelagos and networks: Urbanization and water privatization in the South. *Geographical Journal*. 2003, **169**(4): 328-341.
- [2] K. Bakker. The 'commons' versus the 'commodity': Alter-globalization, anti-privatization, and the human right to water in the global South. *Antipode*. 2007, **39**(3): 430-455.
- [3] D. F. Batten. Network cities: Creative urban agglomerations for the 21st century. *Urban Studies*. 1995, **32**(2): 313-327.
- [4] P. Bloomfield. The challenging business of long-term public-private partnerships: Reflections on local experience. *Public Administration Review*. 2006, **66**(3): 400-411.
- [5] R. Capello. The city network paradigm: Measuring urban network externalities. *Urban Studies*. 2000, **37**(11): 1925-1945.
- [6] S. Četković. Policy capacity for promoting green sectors reconsidered: Lessons from the renewable electricity and organic farming sectors in Serbia. *Journal of Environmental Policy & Planning*. 2015, **17**(1): 65-83.
- [7] S. Frone. Factors and challenges of regionalization in the water and wastewater sector. *Romanian Journal of Economics*. 2008, **27**(2): 36.
- [8] K. Furlong. Good water governance without good urban governance? Regulation, service delivery models, and local government. *Environment and Planning A*. 2012, **44**(11): 2721-2741.
- [9] K. Furlong. Water and the entrepreneurial city: The territorial expansion of public utility companies from Colombia and the Netherlands. *Geoforum*. 2015, **58**: 195-207.
- [10] K. Furlong and K. Bakker. The contradictions in 'alternative' service delivery: Governance, business models, and sustainability in the municipal water supply. *Environment and Planning C: Government and Policy*. 2010, **28**(2): 349-368.
- [11] T. Herrschel. Competitiveness and sustainability: Can 'smart city regionalism' square the circle? *Urban Studies*. 2013, **50**(11): 2332-2348.
- [12] E. Iossa, and S. Saussier. Public, private partnerships in Europe for building and managing public infrastructures: An economic perspective. *Annals of Public and Cooperative Economics*. 2018, **89**(1): 25-48.
- [13] O. Jensen. Public-private partnerships for water in Asia: A review of two decades of experience. *International Journal of Water Resources Development*. 2017, **33**(1): 4-30.
- [14] W. Kanda. *Promotion of Environmental Technology Export: Governmental Initiatives and Business Concepts* (Doctoral dissertation). Linköping University Electronic Press, 2014.
- [15] W. Kanda, O. Hjelm, K. Kairento, and M. Nygård. Export of environmental technologies by publicly owned companies: Approaches, drivers, and obstacles among Swedish municipal companies. *European Planning Studies*. 2016, **24**(12): 2175-2196.
- [16] K. Kern and H. Bulkeley. Cities, Europeanization, and multi-level governance: Governing climate change through transnational municipal networks. *Journal of Common Market Studies*. 2009, **47**(2): 309-332.
- [17] J. F. Koppenjan and B. Enserink. Public-private partnerships in urban infrastructures: Reconciling private sector participation and sustainability. *Public Administration Review*. 2009, **69**(2): 284-296.
- [18] E. Meijers. Polycentric urban regions and the quest for synergy: Is a network of cities more than the sum of the parts? *Urban Studies*. 2005, **42**(4): 765-781.
- [19] S. Mejía-Dugand, W. Kanda and O. Hjelm. Analyzing international city networks for sustainability: A study of five major Swedish cities. *Journal of Cleaner Production*. 2016, **134**: 61-69.

- [20] E. Swyngedouw, M. Kaika and E. Castro. Urban water: A political-ecology perspective. *Built Environment*. 2002, **28**(2): 124-137.
- [21] M. Trebilcock and M. Rosenstock. Infrastructure public-private partnerships in the developing world: Lessons from recent experience. *The Journal of Development Studies*. 2015, **51**(4): 335-354.

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