

Using Advanced Technology and Data in Yokohama for Co-creation based on Open Data

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1. Introduction

Yokohama is Japan's largest municipality, with 3.75 million inhabitants. To address the city's mounting social and regional issues, we are promoting city-wide co-creation (public/private partnership) measures to create diverse solutions through cooperation and collaboration through interaction between the government and various private-sector entities including citizens, businesses, NPOs, universities and research institutes.

The analysis of data underlying social phenomena is indispensable for identifying issues and examining and implementing solutions. Due to the accelerating pace of developments in information and communication technology in recent years, there are now various types of data that can be used. The city of Yokohama recognizes the importance of using advanced technologies and data-gathering together with open data as a platform for promoting co-creation. In this article, we present an overview of the current state of co-creation through such efforts.

2. Recent efforts to establish data utilization environments

With new business innovations, it is possible to use data to solve various issues of a super-aging society with a declining population, and to promote data-driven reforms in a wide range of fields such as administration, agriculture, medical care, tourism, finance and education. In December 2016, a new statute called the Basic Law for the Promotion of Public-Private Data Utilization was implemented in order to expand the distribution of data that supports these initiatives, and to promote the development and utilization of AI and IoT related technologies. This law provided Yokohama with the opportunity to establish its own system of byelaws, and in March 2017, the city's municipal government enacted the first basic byelaw on the use of public and private data in Yokohama. In April 2017, the Yokohama Open Innovation Promotion Headquarters led by the deputy mayor (chief information officer) was established to perform inter-departmental promotion of the city's advanced technology/data utilization and open innovation initiatives. Following the enactment of this law, a municipal public/private data utilization promotion plan was put in place according to the obligations imposed by Article 9, Paragraph 3, and in May 2018, Yokohama became the first government-designated city to implement its own public/private data utilization promotion plan. To develop human resources that can support data utilization, Yokohama City University opened the Tokyo metropolitan area's first department of data science

in April 2018. Yokohama is also currently preparing to open a graduate school to train the advanced data scientists that will be needed by society.

3. A co-creation helpdesk to promote dialog with the public

As a mechanism for the promotion of co-creation, Yokohama City has established a one-stop helpdesk to handle co-creation proposals. Since this service was launched in June 2008, we have received about 900 proposals, of which about 400 have been put into practice. Some examples of data utilization projects realized through the co-creation helpdesk are described below.

3.1 Working with I-Net Corp. to develop a parent-oriented information portal

After two years of collaborative research with I-Net Corp. (one of Yokohama's major ICT companies), a website containing information on childcare facilities and businesses catering to working parents was established in June 2017. Although the city of Yokohama had previously been providing childcare information on its own website, this information had not been released as open data and was lacking with regard to qualities such as searchability.

I-Net put forward the idea of a joint study with the city authorities with the aim of leveraging I-Net's expertise in system development and making the city's information resources available as open data to enable the construction of a web-based system that provides useful support to female employees around the time of their maternity leave. This study was centered on the Women's Committee, which reports directly to the mayor, and involved conducting research and discussions with relevant city departments on how to implement open data provision, the nature of this data, its content, and how it should be disseminated. A user-friendly website was developed to cater to the needs of young female employees. After it went online, it received a favorable reception from users who particularly liked being able to compare multiple childcare facilities closest to a particular train station, and to gather facility-specific information such as the size of bags that children are expected to bring with them. This collaborative study also led to the release of open data related to childcare in Yokohama, including the location of childcare facilities/offices, the services they offer, and their free capacity. In March 2019, with the publication of the Yokohama City Open Data Catalog site, an API was implemented to cater for strong demand for this data from private users. This joint research clearly demonstrates the benefits of open data usage in Yokohama, and has also served as

■ **Figure 1: Home page of the support website for working mothers**
<https://kosodate.inet.co.jp/>



a popular example of how open data can provide benefits in other fields.

3.2 NTT, Yokohama City University, and a comprehensive cooperation agreement for a super smart society

In July 2018, Nippon Telegraph and Telephone Corporation (NTT), Yokohama City University and the city of Yokohama signed a comprehensive cooperation agreement on the use of public/private data to implement a super smart society, and began various actions aimed at the realization of Society 5.0. Our common goal is to create new solutions from the best mix of NTT's advanced information-related technology, the specialist knowledge accumulated by the Yokohama City University, and the official data held by Yokohama's local government. Specifically, we are promoting efforts to perform accurate data-based measurements of the effects of the Yokohama Walking Point (YWP) business initiative for the promotion of public health, we are developing an AI chatbot-based app to help people separate their garbage correctly, and we are constructing an information exchange support system for residents in certain areas using the same chatbot.

In verifying the effectiveness of YWP businesses, we are using anonymized electronic receipt data and specific medical consultation data to perform investigations such as a comparison of medical expenses and lifestyle-related diseases between participants and non-participants and between people who walk different numbers of steps per day, and a cluster analysis of medical expense reduction effects for participants. We will also continue to pursue initiatives in various fields, including analyzing the effectiveness of tourism investment based on inbound tourist flow data, and using a sports data analysis system to promote regular exercise to residents. Our aim is to realize a super smart society that is both convenient and lively.

■ **Figure 2: Garbage separation assistance app**

<https://www.city.yokohama.lg.jp/kurashi/sumai-kurashi/gomi-recycle/gomi/>



3.3 Care-Tech Open Lab Yokohama: a civic research pact for open innovation in nursing care

Japan's ageing society is driving a rapid increase in the demand for nursing care. The whole country is now tackling the issue of how to build systems that can improve the quality of nursing care services while ensuring that they can be provided effectively and efficiently. In March 2019, the city of Yokohama joined four local companies involved with nursing care and ICT in a research pact aimed at solving problems through open innovation in the field of nursing care. The members of this pact (called "Care Tech Open Lab Yokohama") are Tsukui Corporation, a major Yokohama-based nursing care company, J-Ark Co., Ltd., which specializes in services that support independent living and the prevention

■ **Table: Overview of Yokohama's main living labs**

Name	Main theme	Implemented by
Idogaya Living Lab (Minamu-ku)	<ul style="list-style-type: none"> ○ Stimulating the local area by making use of unoccupied properties ○ Reforming work styles 	Taiyo Jyuken KK etc.
Minamaki Lab (Asahi-ku)	<ul style="list-style-type: none"> ○ Regional branding ○ City planning 	Sotetsu Building Management Co., Ltd.
Wise Living Lab (Aoba-ku)	<ul style="list-style-type: none"> ○ Suburban town planning for the next generation 	Tokyu Corporation
Totsuka Living Lab (Totsuka-ku)	<ul style="list-style-type: none"> ○ Innovation in nursing care services ○ Area management 	(NPO) Comachi Plus etc.

of dementia and care dependence, Fujisoft Inc., a comprehensive ICT company, and Welmo Inc., a nationwide social IT venture in the fields of nursing care and disability.

A characteristic of this pact is that it is an open innovation initiative, which is open to anyone, not just the original members. For the time being, we plan to reduce the burden on care managers by providing updated detailed information on nursing care facilities and offices, develop software that uses AI to support the creation of care plans and daycare plans, and promote various events and social demonstrations such as “Digital Hackathon in Yokohama” in order to cultivate innovative talent in the nursing care industry. This research will cover topics including efficient methods for data collection and analysis, and the development of technology to facilitate the mutual cooperative use of data stored by different entities. It will also promote city-wide measures such as “living labs” that facilitate interaction with the public.

4. Development of various interactive forums and platforms

In addition to the co-creation helpdesk, Yokohama also offers a variety of interactive venues including a co-creation forum, a co-creation lab, and a living lab, as well as a platform for use by industry, government and academia.

4.1 Deployment of living labs in multiple locations

A living lab is a community-based forum where people can solve problems by interacting with organizations such as businesses and universities with a variety of insights regarding issues of local importance. To raise the awareness of lab participants regarding the current state of affairs and issues, it is expected that the labs will freely share ideas and find new solutions while using public and private data to promote visualization of the current situation.

Yokohama not only has locally-based communities and NPOs such as neighborhood associations, self-government associations, welfare commissioners and child welfare volunteers, but is also actively supporting living labs where members from a wide cross-section of residents and businesses can gather and interact. This allows issues to be tackled on a wider front, and our basic policy is to provide logistical support to living labs that are primarily operated by local communities.

There are currently over 15 living labs operating in Yokohama. These are mainly operated by local resident groups, locally-based small and medium-sized enterprises, and railway companies seeking to increase the value of properties adjacent to railway lines, but they always keep residents involved so they can share issues and discuss solutions with people who know the local area well.

4.2 The Graduate School of Project Design and Yokohama City: Studying a new business project for regional revitalization

In the 2019 business year, Yokohama launched a new business project for regional revitalization in partnership with the Graduate School of Project Design (Minato-ku, Tokyo). This ambitious program aims to formulate new business concepts that contribute to regional revitalization by combining the expertise of researchers from private companies with the knowledge accumulated by graduate schools and the city of Yokohama.

By treating specific areas as fields, businesses in diverse industries and with diverse business conditions are engaged in delivering commercial success in their own fields while aiming to solve social issues and regional issues. As part of this initiative, co-creation promotion staff from Yokohama are involved as visiting professors, allowing them to provide solutions and related data for the city's current situation and to share problems by interacting with others. In this way, we are taking on the challenge of creating solutions together.

Based on the opportunities for co-creation presented by our co-creation link with the Graduate School of Project Design, we have also published a series of articles on our basic concepts of co-creation in Yokohama in three editions of the monthly “Business Concepts” journal (May–July 2019). Japanese readers are encouraged to take a look:

<https://www.projectdesign.jp/201907/keyfactors/006593.php/>

4.3 Construction and deployment of diverse platforms

In Yokohama, organizations such as the Yokohama SDGs Design Center, which addresses environmental, economic and social issues associated with sustainable development goals (SDGs), I-TOP Yokohama, which engages in business creation using IoT and other technologies, and LIP Yokohama, which aims

to create innovation in the fields of medicine and healthcare, are creating and publishing a platform for use by industry, government and academia for the purpose of problem-solving and innovation using the diverse knowledge and resources of the public sector, including cutting-edge technology and data in diverse forms for different objectives and fields.

5. Other initiatives related to co-creation

5.1 Promoting social demonstrations before introducing social impact bonds

A social impact bond (SIB) is a new type of public-private partnership scheme that originated in the UK in 2010. In recent years, SIBs have appeared in the government's basic policies on economic and financial management and reforms. The government's plans for the 2019 business year also mention the "promotion of studies on public contracts and dissemination policies for the mobilization of private sector funding, such as performance-linked incentives". In cases where a private company raises funds by itself to implement a public project and then meets preset achievement targets, the government will reimburse the company's costs. In Japan, this sort of mechanism was pioneered in schemes that included an SIB in Kobe city for the prevention of severe problems such as diabetic kidney disease, and in an SIB in Hachioji, Tokyo for the improvement of colorectal cancer screening and detailed medical examination rates.

Yokohama also aims to introduce a result-linked business that aims to solve problems through early preventive intervention. From the 2016 business year, children who face problems such as a difficult home environment have been offered support for learning, living (meals) and a place to stay. This has continued to the present day, and from the 2018 business year, we have also implemented a remote healthcare consultation project for new mothers who are experiencing post-natal anxiety. Both of these projects have been confirmed to deliver measurable results in social demonstration projects.

An important consideration of SIBs is how to accurately measure their social impact and evaluate their effects. Data analysis and utilization are essential elements in this regard.

In the former project, volunteers such as university students provide learning support (Figure 3) at a community salon operated by a social welfare corporation. In addition to measuring the changes before and after intervention by twice-yearly questionnaire style interviews of children and carers, the results of the Yokohama academic achievement and learning survey (conducted at all schools in the city) are also collected by personal disclosure and are used for social impact evaluation.

In the latter project, a remote pediatric healthcare consultation service provided by Kids Public Co. (Figure 4) is used to analyze questionnaire and medical receipt data obtained before and after intervention. In this way, it is possible to measure the reduction of anxiety and the suppression of non-essential consultation behavior.

■ Figure 3: Learning support for schoolchildren



In an SIB, data can be accurately collected and analyzed, and by sharing the results of this analysis with service providers, fund providers, third-party evaluators and government departments, it becomes possible to objectively evaluate the achievements of business outcomes. This idea of evaluating administrative services in terms of their social impact is likely to become increasingly important in the future, so Yokohama will continue to conduct social demonstrations for the introduction of SIBs.

5.2 Yokohama behavioral insights and design team (YBiT)

In February 2019, volunteer staff members from a range of different departments gathered to take part in an innovation workshop on the theme of worker behavior patterns by incorporating behavioral design concepts and methods into government agencies. The Yokohama behavioral insights and design team (YBiT) was established in order to provide feedback

■ Figure 4: Chatting with an online pediatric consultant

Users can spend up to ten minutes at a time talking to a pediatrician about their child's condition by text messaging, voice calls or video calls.



on the results to Yokohama's citizens.

Behavioral design is the science of designing environments that make people more likely to choose a desired course of action so as to achieve certain policy targets without any significant financial burden. For example, people will tend to choose the healthier option of climbing the stairs instead of using the elevator if the staircase is decorated with interesting pictures. The government is also showing an interest in this field, and has drawn up a number of broad policies and growth strategies based on behavioral design. Furthermore, the Ministry of the Environment and the Ministry of Economy, Trade and Industry have set up behavioral design promotion teams and are working with local governments.

Through the Yokohama Smart City Project, which was set up after the Great East Japan Earthquake of 2011, Yokohama has gained experience in promoting the transition to new electricity tariffs that use behavioral design to reduce peak power consumption levels. Based on this accumulated know-how, YBiT is working on the creation of advanced examples by launching projects in Yokohama with specific targets, such as combating global warming, encouraging people to have health checkups for specific conditions, improving emergency evacuation in procedures in the event of a disaster, and conducting public awareness surveys by the ward office. In May 2019, we introduced Yokohama's initiatives at a government-sponsored international symposium on behavioral design. We are collaborating not only with domestic experts but also with a British behavioral design team. It is important that these measures are adopted throughout Japan. YBiT is holding regular monthly meetings as well as workshops when requested by various government bureaus and ward offices, and these have been attended by many people from the government, other local administrative bodies, and private businesses.

The analysis and utilization of data are indispensable for realizing behavioral design, and we hope that it will also help with the promotion of EBPM (evidence-based policy making) in Yokohama.

6. Conclusion

As mentioned above, the city of Yokohama is actively working on co-creation as a means of promoting open innovation. We believe that by promoting the digital transformation of government and society, we can move towards our goal of realizing Smart City Yokohama — a “Society 5.0” city that is both convenient and prosperous. We are also certain that this process can contribute to the achievement of sustainable development goals (SDGs) in other cities around the world.

In February this year, the International Conference on Sustainable Brands 2020 was held in Yokohama. This event was attended by people from all over the world. Businesses and other types of organization were able to deploy activities and projects

using prescribed SDGs or live cycle brands, thereby raising the awareness of society as a whole and realizing a sustainable society and economy.

To solve issues that are increasingly complex and diverse, it is essential to further promote dialogue and cooperation among a wide variety of entities. We hope you will continue to watch the co-creation efforts being made in Yokohama.

Cover Art



This picture is a scene from the Kabuki play, *Sekai no hana Oguri gaiden* (Worldly Flowers, an Oguri Anecdote) played in April 1851.

The play is a based on folk tale of a historic figure, Oguri Mitsuhide.

Utagawa Toyokuni III
(1786-1865)

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