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A Study on New Mobility Services and Sustainable Urban Development

Ai Nishimura

2017 FFJ/Renault Fellow

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Abstract

This study considers methods for connecting new mobility services with regional issues by analyzing the process of recent urban projects in which new mobility services were introduced. In the context of global environmental changes, private sectors have developed various innovative services, which are now moving from the experimental to the operational phase. To promote their utilization, these services must be adapted to regional issues and contexts. Simultaneously, at the regional level, local societies face various challenges to improve their citizens' quality of life. To address the regional issues, local governments or other institutions attempt to construct necessary urban facilities and offer new urban services to citizens by creating sustainable urban space. Considering these dynamics, this research hypothesizes that the organizations governing urban projects play a vital role in promoting the utilization of new mobility services. This study focuses on three case studies of sustainable urban district projects in France and Japan, in which new mobility services were introduced, and analyzes the process of these urban projects, which determined that the project organizer or land owner, who creates the concept of urban space to respond the regional needs, plays a key role in the introduction and implementation of new services. Additionally, the project organizers are categorized into different types based on the local historical urban project scheme in each country. To promote their utilization, it is important to consider these services as a tool for realizing urban project aims, including both global environmental issues and regional issues. Moreover, the urban project process and management system must allow the service provider to participate in the urban project during the initial phase of the urban space design and to review the actual condition of service utilization during the management phase.

Keywords

Sustainable urban project, new mobility services, governance, service utilization, process, comparative analysis, environmental issues.

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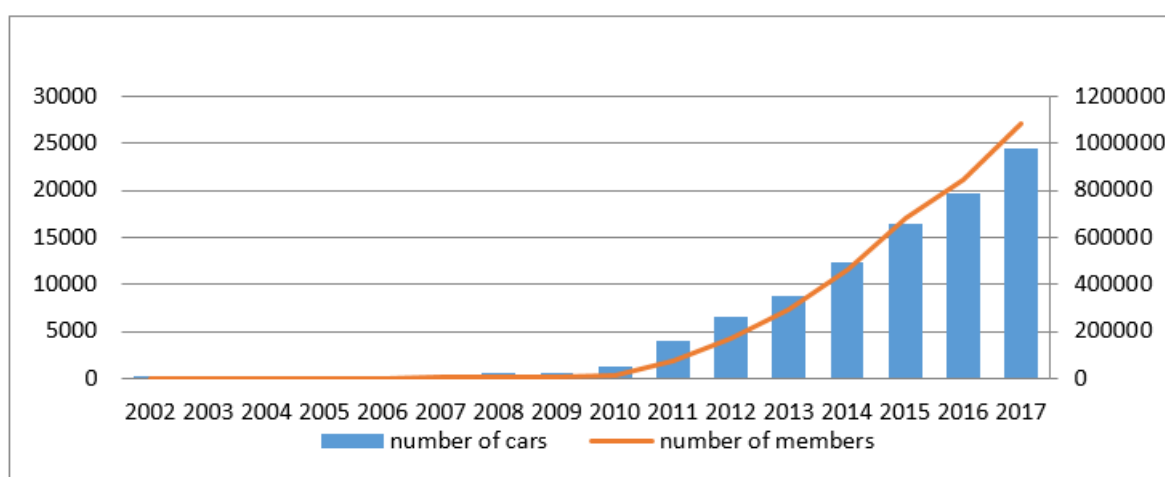
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1. Introduction

From the perspective of urban environmental problems, the types of transportation that aim to reduce excessive dependence on automobiles has been significant, and in recent years, various kinds of mobility services have been developed by private sectors. For example, the use of car sharing has shown a rapid growth in Japan (Foundation for Promoting Personal Mobility and Ecological Transportation,2017) and the development of new technologies such as electric vehicles (EV) and automatic vehicles have been carried out by technically demonstration in various regions.

Chart 1. Trends in the number of car sharing vehicles and members in Japan



Created by the author based on the information by the Foundation for Promoting Personal Mobility and Ecological Transportation in Japan

Transport is one of key components for regional development and also a means for supporting citizens' life. Concerning the relation between transport and urban development, improving public transportation, starting with railway networks, for example, greatly contributes to economic growth and urban development, and it also supports the activities of ordinary citizens. Improving access networks to various urban functions and activities in major cities is closely related with economic activity, and is deeply involved in the growth of metropolitan areas. At the same time, high-speed transportation and safe subways that strictly adhere to schedule also have contributed to improving accessibility for ordinary citizens to activities within the city. On the other hand, in rural areas or sub-urban areas, personal cars have for long been thought as main mobility means for citizens, new mobility means are now being sought due to the regional changes of population demographic and the progress of global environmental issues.

Concerning the direction of recent urban development, it has to consider various issues such as global environmental problems, regional economic development and inclusive society, which are common issues in many counties in the world. The common global urban goal is to create a sustainable city (United Nations, 2018). Furthermore, as represented by the compact city policy, transport policy and planning also play an important role in supporting regional development (Organisation for Economic Co-operation and Development,2012). At the same time, the regions face various challenges such as security, creation of local community, and

efficient regional maintenance. They also can rely on potentials such as local culture, natural and human resources. Therefore, it is desirable that the urban services provided can respond to the regional issues and suit local contexts.

Based on the development of diverse mobility services and the direction of urban development in recent years with the background of environmental, economic, and social problems, this research aims to analyze the process of urban development project that have introduced new mobility services.

So far, much research has been done on the development of new mobility services from the technical aspects, for example research on car sharing and research on EV vehicle. Furthermore, many researchers in Japan focused on the relation between urban planning and transportation (Morimoto 2014, Utsunomiya 2014, Hato 2010, Oosawa 2014, Daimon 2013, Seta 2014).

On the other hand, there are fewer pieces of research on the new mobility services and sustainable urban development projects based on the comparative analysis on practical cases. For example, the research on the comparative analysis on the smart community projects in Japan and France pointed out the importance of care for the social elements to facilitate the energy transition, including new mobility services (Lecler and Faivre d'Arcier 2015). Considering these situations, this research focuses on the process of introducing mobility services in urban development projects.

2. Methods

FIGURE 1 shows the conceptual framework of this research.

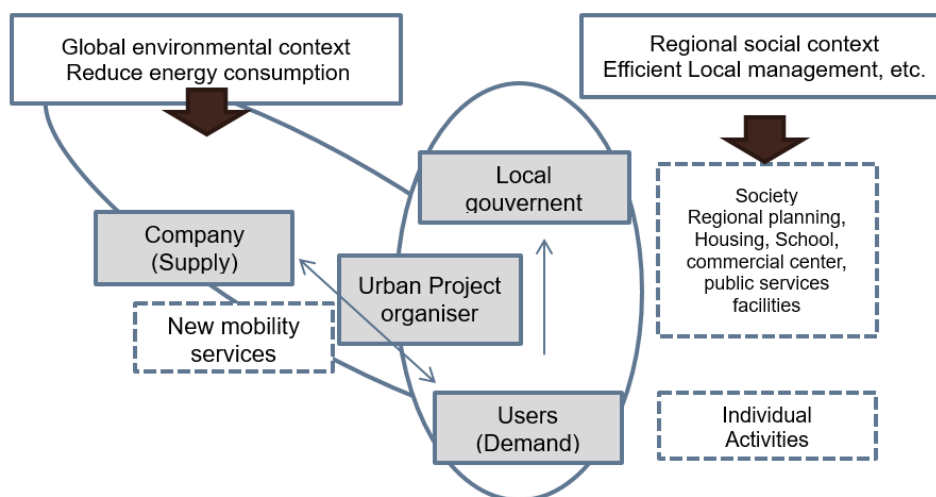
New innovative mobility services such as electric vehicle, solar charge system, and car sharing system have been developed by mainly private sectors in the global environmental context. And these are now moving from experimental phase to operational phase.

On the other hand, at the regional level, local societies are facing various challenges to improve the quality of citizens' lives. In order to respond to regional issues, local government or other institutions try to construct the necessary urban facilities and offer new urban services to citizens by creating sustainable urban space.

As mentioned in the introduction, urban development and transport / mobility have been highly linked, urban project is one of tools to improve citizens' lives by offering necessary facilities and services. Furthermore, mobility and transport strategy are key factors in urban planning.

Considering these elements, this research argues that the players concerning urban projects play a major role for promoting the utilization of new mobility services.

FIGURE 1. Relationship among urban project players



Created by the author

This research draws on three case studies in France and Japan. These were selected from recent sustainable urban spaces which introduced new mobility services as one component of sustainable urban projects. Each study area was selected from districts in countries that have an environmental district certification program, because such certification programs show the indicators for creating environmentally sustainable districts and both programs have the indicator on transport/mobility establishing the linkage between urban project and mobility services.

Since around 2008, both France and Japan have made efforts to create sustainable urban space by using similar certification systems (Nishimura and Seta 2017, About et al 2016). The French government created a system called “Eco quartier label” that certifies at least 20 sustainable goals (Ministère de l’égalité des territoires et du logement 2013). Japan has a similar certification system called “CASBEE districts” which is composed of environmental, social, and economic elements (Institute for Building Environment and Energy Conservation 2018).

TABLE1 shows the indicators of these two certifications systems. Both focus on the district scale projects and require the projects to satisfy with these indicators including mobility/transport strategy. As of October 2018, “CASBEE districts system” gave the certification to 5 districts in Japan, “Ecoquartier label system” gave the certification to 60 districts (Ministère de la cohésion de territoire et des relations avec les collectivités territoriales 2018, Institute for Building Environment and Energy Conservation 2018).

In this context, this research selected sustainable urban spaces from urban projects evaluated by these two certification systems and which set up new mobility services. The Japanese study areas include: 1) Fujisawa Sustainable Smart Town in Kanagawa Prefecture, and 2) Funabashi Morino city in Chiba prefecture, both of which are located in suburban areas of the Tokyo metropolitan area. The French study area is 3) Lyon confluence in Lyon, located in the south east of France. Three case studies were surveyed to analyze whether they included the following points for considering the way to connect new services to regional issues, 1) Project process 2) Project concept, 3) Project governance 4) Type of new mobility services.

This research was conducted by work in the field, literature reviews, interviews with the urban project organizers, players and researchers¹.

TABLE 1. Comparative analysis among urban sustainability certification systems

	Creation	Number	Target size	Scope	Indicators			
					1)Environmental	2)Economic	3)Social	4)Process
Ecoquartier Label (FRANCE) 2008-2012 Ecoquartier	2012	60	Public Private District	1)2)3)4)	Natural resource Energy reduction Water resource Biodiversity	Transport Local industry Multifunction Internet Technology	Density Social mix, Safety Landscape Health History	Management Financial feasibility Continuous evaluation
CASBEE district (JAPAN) 2006-2014 Machidukuri	2014	4	Private District	1)2)3)	Natural resource Artificial environment	Transport Urban structure Growth potential,	Safety Security Amenity	
Eco-model cities (JAPAN)	2008	23	Public City	Emphasize on 1)	Reduction of Co2 emission		Local adaptability	sustainability
Future cities (JAPAN)	2011	11	Public City	Emphasize on 4)	Future vision, project concept, governance Environmental aspects (low carbon, efficient energy, natural resource) Social aspects (medical industry, education, security)			

Created by the author

1) Fujisawa SST

2) Funabashi Morino city

3) Lyon Confluence



3. The Case of Fujisawa sustainable smart town project

(Arakawa 2016, Wakabayashi 2014, Sakamoto 2011, Lecture by Panasonic 2017, 2018, Fujisawa SST project 2018)

3.1. Project process

Fujisawa Sustainable Smart Town is located in Kanagawa prefecture, which is a suburban area of Tokyo. This urban space is 19 ha. and includes multiple urban functions and types of land use, such as residential areas, commercial areas, child care centers, welfare service facilities, and an urban public space.

1. Panasonic (November 2017, March 2018), Fujisawa Sustainable Smart Town management company (March 2018), Maison de la Confluence (September 2017), Grand Lyon Metropole (September 2017), New Energy and Industrial Technology Development Organization Europe (December 2018), Professor Yveline LECLER (November 2018)

There used to be located a factory there of a well-known Japanese electricity company called Panasonic. During the high economic growth in the 1950s, this electric company made great efforts to participate in the Japanese economic development with their concept of “One factory in each prefecture” that translated into support for their regional development from economic and social perspectives, such as the company’s ability to provide employment opportunities. This company has contributed to regional development by the construction of their factories in various regions in Japan. However, as for this site, because of economic changes after the period of rapid economic growth, they decided to contribute by transforming the land use after the factory was closed down (Lecture by Panasonic 2017, 2018).

This area has also faced difficult issues, such as pollution related to the manufacturing site, which resulted in impacting the site both socially and environmentally. Consequently, this area was developed in a way that has improved these regional conditions. When this project began in 2006, the local community was required to address environmental issues from a political perspective. Furthermore, in the context of the great earthquake in Tohoku region in 2011, the local community had to assure regional security from a social perspective. In addition to this, this area has a history of significant traffic congestion. On the other hand, this area was also quite suitable for sustainable development due to its: 1) natural landscape, 2) local consensus on environmental issues, and 3) desire for the development of commercial and cultural functions.

3.2. Project concept

The first concept of this project was considered in 2006 by the electricity company, and it aimed at creating an innovative town from an environmental perspective. This concept had been developed previously by Panasonic which is also the main land owner in this area. This concept was “Smart” and its main goal was to cut on Co2 emissions. In 2008, the electricity company, who is the main project organizer, began discussions with the local government of Fujisawa city regarding the project concept. Fujisawa city proposed the construction of health and welfare facilities and the creation of delivery services in this Fujisawa SST project. Consequently, in 2010, the electricity company and local government agreed on a basic concept for the planned town. In 2011, the great earthquake occurred in the northern part of Japan, which resulted in an expansion of the developer’s vision to emphasize the importance of Security and Safety. In addition, the project concept also changed from “Smart” to the newer concept of “Sustainability,” which incorporates five fundamentals: “Energy, Security, Mobility, Community, and Wellness.” The objectives of this sustainable approach include 3 aspects: (1) environmental contribution, (2) disaster prevention, and (3) traffic congestion. This project sought to achieve these objectives in two stages: (1) construction of facilities, and (2) introduction of services and technologies. TABLE2 shows the process of concept transformation.

TABLE2. Concept transformation of Fujisawa SST

2006	Initial Concept Development: “ Smart ” town concept was created by the main project organizer (private company) based on national and global environmental goals.
2008	Beginning of the discussion with Fujisawa city (local government) for improving project concept (including various services such as health and welfare facilities, delivery services).
2010	Agreement on the basic project direction between the project organizer and local government. Revision of the concept to focus on both environmental and social aspects of development: “ Sustainable ” town concept was created by related players of sustainable urban project.

Created by the author

3.3. Project governance

In the initial phase of the development of the project, the electricity company, one of the project lead organizers, designed the basic concept and the local government sought to improve the concept by enhancing the focus on social aspects. To design the urban spaces, the electricity company formed the “FSST consultation committee” which includes nearly 10 companies composed by real estate companies, housing construction companies, banks, a trading company, a gas company, a medical and welfare company, and a logistic company. As for an official urban scheme, this project was realized by following urban development procedures, which included the creation of a “land adjustment project” and “district plan.” These tools are used to collaborate with the public regional direction. In the management phase, the Fujisawa SST committee and residents discussed how to manage this sustainable urban space with support from the Fujisawa SST management company. As for financial aspect, this project was supported by subsidies from the national government for promoting of sustainable (low CO₂ emission) housing construction by the Ministry of Land, Infrastructure, Transport and Tourism, and for the program for decreasing of Co₂ emission by the Ministry of Environment. Furthermore, in this project, the consultation framework created the original guidelines and rules to design urban spaces, and the partner companies were required to comply with these rules. This is an important way to share the regional direction among related stakeholders and a necessary tool for designing sustainable urban spaces, for deciding on the type of necessary facilities, and for selecting the urban services to establish.

3.4. Mobility services

There are three types of mobility services in this area. The first one is the ‘total mobility one-stop service’ for residents, it consists in a sharing service for electric vehicles (EV) and electric-assisted bicycles for residents’ purposes or needs. And this service allows residents who do not have cars to broaden the scope of their activities and to help residents have more active lives. Secondly, there is ‘The battery sharing service,’ this battery sharing service offers residents to freely replace and use batteries for electric-assisted bicycles. Thirdly, there is ‘EV installed in the committee center for emergencies.’ In emergencies, EV installed in the Committee Center will be open to the public as a valuable emergency power supply to generate energy that people require to live.

According to the above new services introduced in this area, the concept of introducing new mobility services was described by several keywords: “Convenience,” “Wellness,” “Safety.” We shall argue here that these words show the importance of associating new services with regional issues and demands. Although the information on the actual situation of the utilization of these mobility services is not accessible, these offering services are continuously reviewed by regulatory confirmation of the residents needs (Lecture by Panasonic 2018).

3.5. Summary

First of all, this project was advanced by the initiative of a private company, especially with respect to environmental assessment. However, in discussions with the public sector, the basic project focus shifted from environmental aspects to more comprehensive aspects, including social and regional issues. Secondly, the regional issues were primarily associated with: environmental impacts, disaster prevention, and traffic congestion, then the key concepts for introducing mobility services are convenience, wellness, safety. Thirdly, during the development of the basic concept and direction, the actors discussed the essential functions for residents, and those essential functions were addressed by creating multiple urban infrastructure and utilizing different services. Fourthly, these services were proposed by various private companies to be discussed among associated urban project players and the urban project organizer selected the services most suitable with the project concept. Addition to this, the partner companies (which are not mobility service providers) were requested to respond to the project concept by applying specific regional rules concerning sustainable urban district.

This case shows the following important points 1) transforming the project concept to adapt regional issues such as security, and 2) having the discussion on project concept between public and private sectors, 3) selecting suitable services to adapt the project concept, 4) constructing the continuous reviewing system on the service utilization. If the actual situation of the utilization of introduced services were accessible to the public, it will be more useful to the other urban project organizers.

4. Case of Funabashi Mori no city project

(Nomura Real Estate company 2018, Funabashi City 2018, Nishimura and Seta 2017)

4.1. Project process

The Funabashi Morino city project is located at Funabashi city in Chiba prefecture, a suburban area of Tokyo. This project is a redevelopment project being undertaken on a 17-ha former factory site based on a district plan designed by the local government. This project aimed to create residential areas and install facilities for a population composed of multiple generations. Then, in addition to housing areas, the project includes commercial, healthcare, and child care facilities. This area was a former factory of one of Japan’s well-known companies, Asahi Glass.

The initial survey on this area was conducted by Funabashi city’s local government. First of all, they announced the revised urban plan which divides the city into ten areas, in 2001.

In 2007, the local government finalized the basic survey on one of the towns called Hoten area to examine the future land use in the area, especially in the previous factory area. In 2009, private companies participated in the development plan, and in 2010 the urban project organizer, Nomura Real Estate company and Mitsubishi corporation acquired some land in the district. Finally, in 2011, the local government completed the district plan “New Funabashi station east district.” Since the local government’s survey began, this project has stepped up the process of conceptualizing the future vision of the district in collaboration with land owners, private companies, and local government (TABLE 3).

TABLE3. The project process of Funabashi Morino city project.

2001	Revised Funabashi Urban Master Plan (divided in 10 district - Hoten area)
2007	Research on Yamanote District in Hoten area
2009	Private company joins
2010	Site acquisition
2011.7	Decision on District plan Shinfunabashi Station East district
2011.8	Launching of Morino city project
2012.4	Opening of Shopping center
2013.2	Creation of Town meeting
2013.3	Collective housing inaugurated
2013.5	Opening of Hospital
2013.11	Individual Housing inaugurated

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4.2. Project concept

This project aimed at advancing the town development designed to provide a “living base that supports the surrounding urban areas.” Given the factories that currently operate in the district and considering the land-use change of the large-scale factory, the objective of the project was to “connect the area to other areas, and create a balanced town development making full use of the characteristics of the district.” This area was divided into three zones according to features, and the eastern district planning area was designated as one urban project called Funabashi morino city, which was described as a complex urban zone, with urban-type housing where multi-generation lifestyles developed. The creation of the complex urban zone was promoted by private companies after the district plan was designed. The concept of “Smart Share town” was presented as the trademark of this district. According to a private company in charge of construction, “smart” refers to wisdom, elaborated from state-of-the-art technology and nature’s work, “share” means providing opportunities to create ties and connections between residents.

Images on Funabashi Morino city project.

4.3. Project governance

In the initial phase of the development of the project, the land owner and the public authority discussed on the land use, and the public authority surveyed the regional context and shared its future regional planning. And during the phase of the designing of the urban project spaces, the real estate company and trade company designed an urban project concept

based on the vision of the future town and realized the project concept by offering necessary urban facilities and services.

In the management phase, the Morino City town association was formed by the economic bodies and residents in this district to discuss their activities at the district levels continuously and to manage this sustainable urban space. In the technical aspects for architectural rules, this project was also realized by the official urban development procedure “district plan.” This is the important way to share the urban management direction at the district level among associated stakeholders.

As for the financial aspect, this project was supported by subsidies from the national government for promoting of sustainable (low CO₂ emission) housing construction; the smart wellness housing construction (housing for elderly people) was supported by the Ministry of Land, Infrastructure, Transport and Tourism, and also by subsidies part of the program for decreasing of Co₂ emission (curtain project) by the Ministry of Environment.

4.4. Mobility services

This project is located close to the public railway station connecting to other areas in Chiba prefecture. And in this project area, there are three types of mobility services in this area for realizing the project concept. The first is the ‘200 EV Car spaces’ for residents’ use, i.e. approximately 200 chargers for electric vehicles, or about 20% of the number of parking spaces, are available in this area. Secondly, there is the ‘EV Car Sharing by energy system for emergency situation.’ During a power outage, EV are used as an emergency power source to send electricity to electrical equipment in the clubhouse. Thirdly, there is ‘EV patrol car for regional security.’ A security guard is stationed at the clubhouse during the nighttime and makes rounds throughout the town.

The concept of introducing of new mobility services was shown by following key words, “Accessibility,” “Security,” and “Safety.” These are important concepts likely to make the new mobility services match regional issues. Although the actual situation of utilization of these mobility services is not accessible to the public, the town management organization called ‘Mori no city association’ organizes discussions between the actors involved in this area concerning the ways and activities enabling to maintain the sustainable town.

4.5. Summary

First of all, the basic project’s concept was created by the land owner, then the private company in charge of the urban project realized the project concept. In the process of finalizing the project concept, the local government also participated in the discussion for improving the quality of the district. Secondly, the solutions for regional issues were showed by the following elements: providing transport, creating green spaces, offering wellness services, preserving the landscape, and the key concepts for introducing mobility services are accessibility, security and safety. Thirdly, when creating the basic concept and direction, the associated organizations discussed the functions necessary for citizens’ lives in this district. Fourthly, to realize them, the private company created the concept “Smart and Share” that evidences a comprehensive project concept. Fifthly, this project prepared these functions by constructing various urban infrastructures, introducing new services, and building a regional

community. Finally, an regional association is set up for the management of the sustainable district, including its sustainable services.

5. Case of Lyon Confluence Project

(Lyon confluence 2018, Faivre d’Arcier and Lecler 2016, Lecler and Faivre d’Arcier 2015, Lecture by Maison de la Confluence 2017, Lecture by Grand Lyon Métropole 2017, Lecture by New Energy and Industrial Technology Development Organization Europe 2018, Jaquand et al 2009, Ministère de l’Écologie, du Développement durable et de l’Énergie, Direction Générale de l’Aménagement, du logement et de la Nature 2009)

5.1. Project Process

This project is located in Lyon which is in the south east of France, regarded as an important point where the north and south of Europe intersect, since it includes a main railroad, expressway, air route, and navigable river. This project has 150 ha with multiple types of land use, including residential, commercial, and public services. This area has prospered as an industrial area since the 18th century. Historically, this area was not suitable for residential use because it was a wetland district located between two rivers (the rivers Rhone and Saône). However, in conjunction with the landfill development plan launched in the 18th century and the opening of the railway in the 19th century, various industries such as metal industries, scrap iron plants, gas production plants, and breweries, settled in this area. At the same time, the local industrial workers started to come to live in the vicinity of the factory, and the town developed gradually. In the 20th century, the factory declined and was shut down eventually, and redevelopment began in the 21st century as a result of this shift.

5.2. Project concept

The primary issues in the area were air pollution associated with the historical industrial operations, which have since declined or been shut down. For this reason, the project aims at improving the living environment of residents and to construct positive energy-type buildings and blocks by reusing the existing areas rather than new dockage. After the 20th century, the redevelopment plan for this district was considered at length, and in 2003, and a semi-public company or SEM (Société d’économie mixte) was formed to develop the project. The primary considerations and key aspects of this project were drawn to address a number of important issues. First, the movement of cars within the district is limited. Therefore, various commercials, education, sports, and public spaces were designed to allow residents to walk, use bicycles, and public transport. In addition, the social mix is an important consideration. To provide housing for all social categories, the housing planning is painstakingly conducted to realize a living space where well-off people, low-income families, students, persons with disability, elderly people, and single-people would mingle. Community activities and facilities are a third important aspect, and improving the living experience of residents is also important. Therefore, this project is designed to attract art galleries, event companies, headquarters of organizations, while providing facilities for activities such as business, leisure, shopping, and cultural activities. The protection of natural resources and environmental preservation

is also crucial. Based on the fact that this land that was once a landfill, this project aimed to reduce the risk of flooding and improve the water landscape value. In addition, this project sought to conserve various aquatic organisms in nearby water zones. Finally, efforts to reduce energy consumption in new buildings and existing buildings are also important for achieving the project’s objectives. New buildings in this district are designed to consider the effects of climate, such as solar radiation, while by installing solar energy-related equipment in existing buildings, a reduction in energy consumption throughout the district is made possible.

5.3. Project governance

This project started from 1998 by Grand Lyon for discussing the initial urban planning and the French semi-public entity --called SEM, which changed into SPLA (Sociétés publiques locales d’aménagement) in 2008, then SPL (société publique locale) in 2011-- was selected as the project organizer in charge of the project’s implementation. This project aimed to create sustainable zones in the environmental, economic and social aspects, and especially for realizing environmental aspects, the environmental research office contributed to plan the energy and environmental solutions. Various actors such as real estate companies, housing suppliers, landscape architectures, and mobility operators took part in the implementation.

Since 2011, the energy experimental project called ‘Lyon smart community project’ was organized as an exceptional case from the context of practicing environmental technologies. This experimental project was supported by the agreement struck between Japanese financial support organizations, New energy and Industrial Technology Development Organization NEDO, and Metropole de Lyon. Based on these financial supports, Japanese electric company, TOSHIBA was nominated as the experimental project leader, and 30 partners approximately participated in the operation of this project.

Furthermore, as for its finance aspect, this project has been awarded the EU’s Concerto-Renaissance project and has been partly supported its for high environmental quality constructions by European Union’s subsidies (TABLE4).

TABLE 4. Project Process of Lyon Confluence

2003	SEM Lyon Confluence
2005	construction of the first buildings,
2007	the first buildings on the Docks are opened
2008	SEM Lyon Confluence changes legal structure and becomes SPLA
2009	The architects, planners, and landscaper are selected to design Phase 2 of the urban development project.
2010	Lyon Confluence becomes the first sustainable neighborhood in France to receive certification from the WWF. The group of initial studies is completed for phase 2. The Regional Government Headquarters is handed over, and an agreement is signed between Grand Lyon and NEDO
2011	
2012	Confluence shopping center opens. La Confluence SPLA (Local Public Development Company) becomes an SPL (Local Public Company).

Created by the author

5.4. Mobility services

Concerning the energy experimental project, there were several issues such as traffic congestion caused by the growth of commercial activity, shortage of parking spaces, environmental deterioration due to exhaust gas, and the instability of electric power systems. Therefore, equipment capable of charging a large number of EVs was added, which was powered by newly-installed solar power collectors on buildings and houses, which improved the overall supply-and-demand balance of electric power. At the beginning of the experimental project, EV car sharing service was provided by Transdev-Proxiway for experimenting new solar charging system technically. However, this service is isolated from similar services around Lyon, then this service was terminated within two years from the beginning of operation. Then, a new EV car sharing service by another operator was introduced in this district that makes use of renewable energy solar power (Lecture by New Energy and Industrial Technology Development Organization Europe: NEDO 2018).

Concerning the whole Lyon confluence project, this project aimed to promote shared land use, and to improve accessibility for citizens. Furthermore, this area is connected to central areas by other public transport, and new mobility services are being tested. Concerning the features of mobility services in Lyon, the transport manager of Grand Lyon shared the following comment: "In Lyon, because traditional public transport cannot cover the various needs in every area, new mobility services provided by the private sectors are one option that local government can use to compliment public transport services from a financial perspective. The local government is concerned that the national law does not cover new mobility services, and citizens do not accept new services immediately because it requires a change in lifestyle. Therefore, the local government is trying to verify the effectiveness of new innovations from technological and social perspectives. The local government is showing valuable initiative by introducing these new mobility services." In the Lyon case, this public purpose is included in the urban project by the project organizer, semi-public sectors. In fact, for this area, it was realized to connect the main rail station with Confluence area via LRT, setting bicycle sharing services, and, in 2017, an auto shuttle bus was tested from the technical experimental aspect.

5.5. Summary

First of all, historically the public authorities considered this project in the 20th century and then, from 2001, a semi-public entity called SEM took control of the project development, and has since coordinated its efforts with various actors. In the process of urban project, it was also organized as a unique case of energy experimental project in which collaborated Japanese technical financial organization and the French local government which had the aim to test a new energy system from the technical aspect, but it also evidences the traditional urban project scheme in France.

Secondly, with respect to the introduction of new mobility services in this project, for energy experimentation, the financial entity NEDO and private company TOSHIBA decided new mobility service (Car sharing), energy charge system, and providers. However, the issue of lack of connection between the initial service offered in this district and the other services in the neighboring districts undermined the use of the new service. It shows that the connectivity

with new service and existing services is also an important point in the process of urban projects.

On the other hand, as for the objective of regional urban development as a whole, the local government has shown exceptional initiative in promoting the concept of the use private-sector services to implement public transport services. Therefore, the mobility service by private sectors seem to be designed in the public urban planning in France, generally. Although, experimental project tends to implement the mobility services in order to check its quality and operation from only the perspective of technical aspect without sufficient consideration in convenience for citizens's use, it also needs to think offering mobility services for citizen's use from wide regional urban planning including the connection between public and private sectors.

6. Results

TABLE 5 presents general information concerning the three projects selected and analyzed. These projects have similar backgrounds, in which a previous factory site was reclaimed; the projects are also subject to similar environmental and regional issues. Throughout the urban district project, new mobility services were installed to help achieve the comprehensive project aims and to respond to regional issues. In the Japanese cases, the project concepts emerged in discussions between private actors and public authorities.

TABLE 6 shows the similarities and differences identified through a comparative analysis of the projects.

This research can be summarized as follows:

The project organizer, primarily the land owner, significantly influences the decisions in constructing facilities and introducing services in the process of an urban project.

In the cases in Japan, the sustainable district project organizer is generally a "private entity," and the urban facilities and services were determined by discussions held among the partner entities.

The main project organizer collaborated with the local government and other actors to design urban project concepts and discuss issues related to the urban projects, such as the construction of facilities and the introduction of services to realize the project concept.

In the French case, the sustainable district project organizer is a "semi-public authority," termed SEM, and the project concept was created during the early stages of the project process by public and semi-public authorities, reflecting the general urban project scheme elaborated in France. However, this project is a unique case with respect to service introduction because it was selected as a technical experiment for a special deregulation zone.

Mobility services were selected to achieve the project concept, considering both global environmental issues and regional social issues. The key words utilized for describing the mobility services include "accessibility," "security," and "wellness" in Japan, and "accessibility" and "proximity" in France.

TABLE 5 General information on projects

Areas/Cities	Fujisawa sustainable town	Funabashi Mori no City	Lyon Confluence
	Japan	Japan	France
Scale	19ha	17ha	150ha
Previous land use	Factory site	Factory site	Factory site
Project organiser	Private Electronic company	Private Real estate company who is the second land owner (previous land owner is Local government)	Semi-public entity (as for smart community project, NEDO and Grand Lyon have a partnership)
Regional issues	Pollution, Resilience, Congestion	Pollution, Creation of residential area	Pollution, Congestion
Project Concept	Creative town of energy	Creation of Living area for multi generation's life style	Improvement of quality of life
Project Process	2006 Initial concept 2008 Research start 2010 Basic town plan by Panasonic and Fujisawa 2012 Land adjustment project 2012 Fujisawa SST consultation committee 2013 Fujisawa SST management company 2013 project start 2013 Creation Fujisawa SST committee	2001 Funabashi Urban Master Plan 2007 Research on Yamanote District 2009 Private company joins 2010 Site acquisition 2011 Decision on District plan Start Shinfunabashi Station East district 2011 Launching of Mori no city project 2013 Creation of town meeting	2002 consultation about ZAC1 2003 Creation of SEM 2003 start of ZAC1 2005 extension of T1 Tram 2007 SEM →SPLA 2010 Start of ZAC 2 2012 SPLA →SPA 2013 EV sharing start
Facilities, Urban functions	Collective housing, Individual housing, shopping center, hospital, child care center, parks	Collective housing, Individual housing, public service center, shopping center, medical care service center, child care center	Collective housing, Individual housing, public service center, shopping center, Employment promotion organization
Mobility services	Total mobility services EV car sharing, Electric-assisted bike sharing, Rental car delivery service, Battery station	EV car sharing EV patrol car	EV car sharing (initial service provided for this district) Autonomous shuttle (in 2017 at the stage of technical experimentation)
Urban planning	Land adjustment project District Plan	District Plan	ZAC (Zone d'aménagement concerté) =District plan
Original rule	Concept guideline	Consultation framework	

Created by the author

TABLE 6 Comparative analysis on research projects

Area/cities	Fujisawa sustainable town	Funabashi Morino City	Lyon confluence
Common aspects	Land owner creates the urban project concept first which is improved through discussion with partner entities and collaborators Project concept targets to respond to regional and environmental issues Urban facilities and services are decided on the basis of the project concept Project's organizer has a great influence for the decision of introducing services		
Project definition	Private entities have important initiative		Public sector in at the initiative
Service introduction stage	Services are decided along with constructing necessary facilities and infrastructures by discussion among partner entities		Services as part of the project realization, especially from the perspective of public services
Key words for mobility services	Convenience, Wellness, Safety, Accessibility, Security		Share, Proximity, Accessibility,

Created by the author

Overall, the sustainable district projects were implemented by utilizing the traditional public urban planning system in each country; additionally, the partner entities were required to conform to the basic urban project direction and regional rules.

Although it is difficult for this analysis to generalize the features of each country's urban district projects, this approach helps clarify the process of urban projects and identify key points for introducing new mobility services in regional urban planning.

7. Conclusion

This study aims to analyze the process of urban projects, in which new mobility services were introduced, and to consider a method for matching new mobility services to local issues. Through the three case studies, this research determined that new mobility services are introduced to facilitate the realization of urban development project concepts. Although the urban development concept itself is designed primarily by the project's organizer, who is generally the land owner (private or public sector), the concept is elaborated through discussions with diverse project partners. Particularly in Japan, the initial development concept focused on environmental aspects brought forth by private sectors, and it was designed to address comprehensive issues, including social aspects, via consultation with public organizations. Specifically, the development concepts encompass regional issues, such as improved accessibility, reduced congestion, and greater safety, from the initial concept of environmentally-friendly town development.

Based on the revised project concept, the necessary urban functions and services were selected. Therefore, mobility services must exhibit not only high environmental technology performance but also suitability for local issues and contexts. In the studied cases, mobility services such as an EV ensure safety and the provision of multiple transportation options to ensure that the mobility of the residents were considered in the process of urban projects.

In the case in France, the concept of the urban project was primarily determined by public organizations at the initial stages and included regional issues, and advanced technologies and services offered by private sectors were introduced as additional means for public transportation. However, services that were difficult for citizens to use were not promoted, and the provision of such services was stopped. Therefore, service providers and systems were changed after the initial installment.

Considering such phenomena, to ensure that services are suitable for regional and social needs, service providers should participate from the initial stage of urban development project design and consider constructing a system tailored to regional issues. Alternatively, the usage situation and service means should be continuously reviewed to assess users' needs and regional issues.

In conclusion, regarding the provision and introduction of mobility services at a regional level, the following three aspects should be considered.

(1) Mobility services should be viewed as an urban function, combined with the construction of other infrastructure and service facilities in urban development projects (urban planning aspect).

(2) Technical capacities, such as energy storage and power generation, should be determined (technical aspect).

(3) Mobility services should be considered with respect to an improved quality of life based on regional issues and individual needs (sociological aspect).

In this sense, while previous studies primarily focused on technical aspects (2), this study focused on urban planning aspects (1) and analyzed the process of introducing mobility services in urban development projects. Furthermore, we aim to perform further research in which aspects (1) and (2) are integrated, while considering a specific means for investigating sociological aspects (3).

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