

Survey of Smart City Trends in the West:

Transit-oriented Development and Mobility-as-a-Service

Part 3: Case Study 2- Stockholm, Sweden

Akito Okabe, Japan International Transport and Tourism Institute, USA

1. Example of Exemplary TOD: Specific Details of Hammarby Sjöstad

In the previous issue of this report, I took up the Hammarby Sjöstad district located in the southeastern part of Sweden's capital, Stockholm, as a good example of TOD that attracted MaaS. I introduced the background of the project and its environmental development goals. In this issue, I would like to introduce more specific details of the district, such as the transportation planning, promotion system, and financing.

1.1 Transportation Planning

As part of the environmental load reduction target, which is the centerpiece of this project, it is stated that 80%¹ of residents' and commuters' travel (trips) will be supported by the use of public transportation, walking, and bicycles. Therefore, as a matter of course, the project was promoted with the highest priority since it was to improve the convenience of transportation via public transportation, walking, and bicycle, while staying consistent with the public transportation master plan.

By 2002, a dedicated Light Rail Transit (trolley/tram) was constructed through the main streets of the Hammarby area. This was an extension of 4 tram stations, including Gullmarsplan Station, which connected the existing Tvarbanan tram line (Fig. 1) and the Gröna subway line in Stockholm to the Hammarby area. A 4~8-story commercial and residential multipurpose housing complex was also placed along the route.²

In addition to connecting to the subway, the Light Rail Transit (LRT) connects to commuter lines going to the suburbs. There is also a well-developed bus route connecting to Stockholm's city center, which takes 10-30 minutes from the Hammarby area. It can be said that the area features an environmentally friendly transportation plan. In the lake at the heart of the development area, biogas-powered ferries operate free of charge throughout the year from early morning to midnight. The use of city-owned electric vehicles is promoted not only for city staff but also for residents by installing and outsourcing the operation of charging stations to the private sector.

Furthermore, the Hammarby area is adjacent to the high traffic toll area of Stockholm, and being charged for entering this area by personal vehicle during rush-hours is further incentive for residents to avoid using personal cars.



Source: Jonas Risen³

[Fig. 1] Tram running in the Hammarby Sjöstad area

1.2 Housing / Business Development

With housing and business development, in order to take advantage of the Hammarby's unique environment of land surrounded by water, buildings are symbolically arranged so that instead of being crowded together, there are gaps between them in order for the waterside landscape to be visible from the buildings in the back (Fig. 2). Shops and various service industries are located in the basements of the residential building facing the main road.⁴ Residential properties are available for rent and for sale, and are more expensive than similar properties in the city, so the city initially assumed that there would be a large number of seniors with relatively high incomes. However, with a desirable environment of abundant nature and convenient transportation, the occupancy rate of young households with small children was higher than expected. For that reason, schools and childcare facilities have been newly established, and 20% of the entire redevelopment area is green areas like forests and parks.

A most distinctive feature of the Hammarby region is the use of renewable energy and the circulation system for reusing waste and sewage from homes and offices. It has a heat/power plant, a sewage treatment facility, and an automatic waste collection system installed in the underground space in the area. In addition, biofuel is collected from human waste and used for district heating and cooling, and the remainder is used as fertilizer. These efforts for a circular urban environment system are called the "Hammarby Model," and it's said that many visitors from overseas come to observe it.⁵



Source: Jonas Risen

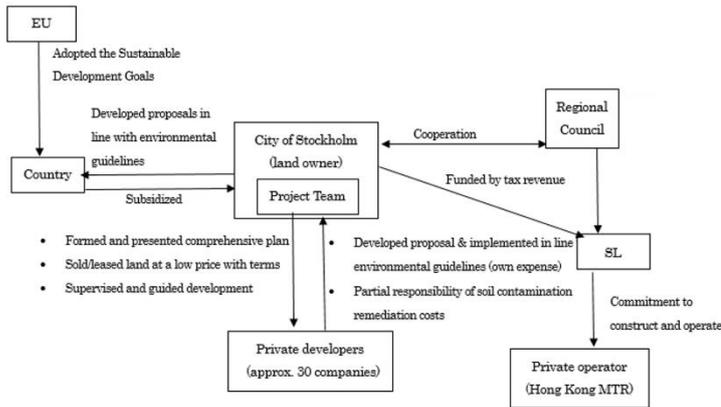
[Fig. 2] Aerial view and landscape of Hammarby Sjöstad district

1.3 Promotion System

The city of Stockholm owns most of the city's land, and nearly all of the development land in the Hammarby area has been purchased by the city. The core constituents of construction project funding are public institutions such as the city of Stockholm and the National Road Administration, and the private sector. In the private sector, about 30 developers and others have entered the market.

The development of transportation systems is not limited to Stockholm, but in Sweden, national, regional and local governments are the main actors in the development of public transportation lines and stations.

The strategic masterplan for the Hammarby development was led by the Stockholm City Planning Bureau, and together with the Urban Environment Planning Committee, the City Waterworks Bureau, and the City Environment and Health Committee, it aimed at creating an environmentally friendly city. In addition, many organizations, including local governments at the county and municipality level, were involved in the planning process.⁶ The city is said to have taken the position of collaborative planning by giving private developers fairly free discretion within a certain framework to come up with energy-saving systems and solutions.⁷ The city is fundamentally responsible for environmental management systems such as wastewater treatment plants, water services, and garbage incinerators, but in terms of their management, the operations are outsourced to private companies and co-governances that share responsibility.



Source: Created by author with reference to various materials
 [Fig. 3] Relationship diagram of major players involved in the development of Hammarby Sjöstad ⁸

1.4 Financing and Value Capture Methods

As mentioned earlier, in Sweden, where the municipality owns most of the land in the city, it is essentially the municipality that decides the use of these lands and contributes their development costs.

The Hammarby region is no exception, and its development financing is based on the government's public budget and investment from private companies. However, at the beginning of development, the city of Stockholm was a major contributor and worked hard to attract private investment. Ultimately, this effort paid off, and as of 2015, public funds covered 5 billion SEK (Swedish krona) of the total 35 billion SEK investment, and the remaining 30 billion SEK was invested by private developers.

In addition, the city of Stockholm was able to secure a national subsidy in the name of developing an environmental city. In Sweden, the national government, local governments and the private sector work together to promote policies at the national level to realize sustainable cities and communities, even including budgets. Specifically, the government has been subsidizing projects in Sweden from 1998-2004 to set up model areas in the country that can promote sustainable communities and cutting-edge housing-related technologies. These grants were contributed by an urban development fund called the Local Investment Program (LIP). As a condition of receiving LIP grants from the government, the Hammarby development was required to incorporate elements of sustainable

residential areas. Therefore, when developing the Hammarby area, the city devoted 23% of the their development budget to environmental consideration.⁹ These environmental city measures have led to a reduction in city waste disposal costs, including an energy self-sufficiency rate that covers nearly 50% of the electricity consumed by the district's community and the reuse of 95% of the discharged waste.

In addition, when constructing apartment buildings, the land is sold at a low price to a private business operator who promises development in line with the city's comprehensive plan, and then the development is carried out accordingly.¹⁰ In this case, especially in the Hammarby area, which was originally an abandoned factory district, it was necessary to purify the soil before development. The implementation of this was the responsibility of the land owner (often the city), but part of the cost was also imposed on the operator as a condition of acquiring the land at a low cost.

In the early stages of Hammarby development, it was difficult to attract businesses. It was a planned site for the Olympic Village with no residential area around it and no existing customer base. Since it was difficult to attract businesses when the construction of the apartments was not completed and there were no tenants, the city took measures such as subsidizing 100% of rentals for a certain period of time. Currently, there are no vacant stores, and there is a waiting list of tenants for housing.¹¹

2. Future Outlook

In the Institute for Transportation and Development Policy (ITDP)'s ratings of cities with excellent TOD, the Hammarby region received the highest gold rating for pedestrian convenience.¹² There are 16 targets for brownfield redevelopment (development of abandoned industrial areas near the city center) in Stockholm, but development examples from the Hammarby area are being utilized for new eco-city development in other areas.

Originally, the Hammarby Sjöstad district, home to many environmentally conscious residents, was selected as the first location for Stockholm's subscription-based MaaS "UbiGo," ahead of any other district in the city. In the eyes

of those who are introducing and operating MaaS, it can be said that TOD where residents and employment are concentrated mainly around public transportation is seen as an attractive hub. The initial evaluation results¹³ were announced in October 2020, revealing different considerations for using UbiGo depending on the family structure and existing means of transportation. One-third of the users said that they don't use private cars as often as before, they use public transportation more often than before, and they're considering public transportation and bicycle commuting. Half of the users answered that they were considering reducing the number of private cars they own. In the future, in addition to the above-mentioned user-reported data, it is expected that full-scale analysis of usage patterns based on actual usage data and experience will give insights into how to introduce and operate MaaS more efficiently and effectively.

Also related to the usage status of UbiGo, it should be noted that the car sharing field has been expanding steadily, especially with the spread of the new coronavirus in 2020. In addition, a usage pattern of railway stations and municipal parking lots as hubs is already naturally forming. The city wants to consider a more planned approach for future city planning, such as the formation of a multimodal transportation hubs centered on existing railway stations and parking lots. Part of the city's mission can be seen in the "Mobility House," which was introduced under the leadership of the public parking lot operator Stockholm Parkering. This is a facility that has personal parking spaces and alternative mobility services, and is intended to replace the traditional form of parking spaces for individual apartments and development projects. There are various ways it can look and operate. For example, it can include functions such as delivery and receipt of delivery service and garbage collection and sorting.¹⁴ There is also an example of a local scooter share company called Voi¹⁵ cooperating with a public parking lot to try an experimental scooter share rental service.¹⁶ In terms of actual construction within the city area, there is an example of a large-scale bicycle parking lot constructed underground at a railway station—a transportation hub where commuter trains, subways, buses, etc. gather. It's said to have saved

space around the station and improved the landscape where illegally parked bicycles had been a problem.

Last but not least, I would like to continue to pay close attention to the movement of private companies introducing MaaS in Stockholm.

Sumitomo Corporation initially introduced the company Aimo as a car-sharing service for electric vehicles. After that, it invested in and acquired the Scandinavian business of a major parking lot operator, Q-Park¹⁷ and changed the company name to Aimo Park. The company placed its own car-sharing vehicles in existing parking lots inside the city and has begun providing services from locations near users. In the future, there is a plan to convert these parking lots into mobility hubs that will be used for various mobility-related services beyond just car sharing. Services would include MaaS platform (public transportation, car sharing, bike/scooter sharing, vehicle dispatch) private car services (car wash, maintenance, charging) and data utilization (insurance, finance, etc.)¹⁸

As these public and private efforts develop further, it is likely that Hammarby Sjöstad and other TODs and MaaS services within the Stockholm metropolitan area will attract more attention as a new form of TOD that also incorporates MaaS.

In the next issue, I will introduce good practices in the Washington, DC area of the United States.

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