A Report on Trends of Mobility on Demand in the United States

～Part 4～

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1. Examples and Analysis of MOD／MaaS Piloting in the U.S.

"Rapid population concentration in urban areas" and "development of degital technology" are items that have been introduced in previous parts of this report as helping raise interest in MOD and MaaS in the U.S. Following this trend, some large U.S. cities have started MOD／MaaS-related projects. However, many of them are still at the trial stage right now, so it's hard to see what problems may exist in developing these projects. In this report, first we will sort out what major MOD／MaaS-related projects are being constructed in New York, Washington, D.C, and Chicago. Then, we will investigate obstacles MOD faces in order to be brought about, including integration challenges into current transit systems and digital technology, as well as partnership issues with digital transit service providers, by reviewing local city and public transportation hearings.

2. Area Selection

In this report, New York, Washington D.C, Chicago were surveyed with consideration for the following comprehensive requirements:

Requirement ①: Residents are concentrated.

Reason: The concentration of people in urban areas is the main reason for rising interest in MOD／MaaS in the U.S.

Indicator: Population density

Requirement ②: Excluding the use of private cars, public transportation is accessible (a wide availability of rails and buses).

Reason: Public transportation, which is the backbone of MOD／MaaS in urban areas, is established and functioning.

Indicator: High rates of commuting via public transportation

Requirement ③ : The location is becoming a key transit hub where multiple transportation modes converge.

Reason: Economic activity is concentrated in cities where populations are dense. Traffic networks, excluding private cars, are developed to support population inflow from nearby urban areas.

Indicator: Total in-service rail track miles in a surveyed urbanized area (UZA[1)]) and adjacent regions

Requirement ④: There are multiple operators of public transportation.

Reason: MOD／MaaS's goal is to connect multiple transit services seamlessly. In this report, cities with higher numbers of operators were prioritized, as it is easier to see what partnership challenges there are when there are more of them.

Indicator: Status of the main public transportation operators in each city

Requirement ⑤: There are multiple public transit operators entering from other states.

Reason: There are cases where crossing state boundaries make partnerships more challenging, as each state has its own regulations under the U.S. federal system.

Indicator: Access of public transportation from neighboring

states

Requirement ⑥ : Commitment from the top of local communities.

Reason: Transportation policies are usually led by transit authorities of local governments and public transportation organizations. However, there are attempts to promote partnerships among related parties under the leadership of the top of local municipalities.

Indicator : Actual examples

Firstly, in regards to ① and ②, Figure 1 (created with information from the U.S. Census Bureau's publication "QuickFacts United States[2] and American Community Survey"[3]) shows the U.S.'s cities with the highest population density and public transportation utilization rate. New York has the highest population density with 10,715 people per square kilometer. In comparison, Kawasaki City has 10,405 people per square kilometer, and has the highest population density in Japan. San Francisco, Boston, Chicago, Philadelphia, and Washington, D.C. follow New York, with population densities of less than 8,000 per square kilometer. (Matsudo City in Chiba, Japan has a population density of 8,054 people per square kilometer.) On the other hand, compared to other cities New York also has by far the highest usage rate of public transportations for commuting[Note1] at 57%. 47% of commuters from Tokyo's 23 wards traveled via public transportation, 10% less than New York according to Figure 2, which shows the ratio of public transportation use (from a sum of rail and bus numbers) during weekdays. (Figure 2 was created with information from the "2015 Traffic Characteristics by City" in the "National Urban Traffic Characteristics Survey and Data Summary" by the Ministry of Land, Infrastructure, Transport and Tourism of Japan, as well as the "2017 Survey of Financial Results by Municipality" by the Ministry of Internal Affairs and Communications of Japan.) We can see that the market penetration rate of public transportation is extremely high in New York. However, other cities do not have over 40% public transportation usage, as Washington D.C. has 36%, Boston has 34%, and San Francisco has 34%. The graph for the U.S. includes Rockville, Maryland and Dublin, California. They are close to Washington D.C. and San Francisco respectively, and are accessible to those cities through public transportation.

Next, regarding the point made in ③ of the location becoming a key transit hub where multiple transportation modes converge, we will take a look at the total revenue service track miles (miles of track) of surveyed cities and nearby urbanized areas (UZA). Table 1 (created using information from the "2018 Track and Roadway[4]" found in the FTA National Transit Database) shows that the longest UZA route is "New York-Newark, NY-NJ-CT." Then following are "Chicago, IL-IN" and "Boston, MA-NH-RI."

For reference, according to the "How Urban Rail in the Tokyo Area Should Be in the Future (April 20th, 2016)[5]" by the Ministry of Land, Infrastructure, Transport and Tourism of Japan, the total length (km of track) of urban rail in the Tokyo area (defined as an approx. 50 km radius from Tokyo's urban center) was 2,705 km (approx. 1,680 miles (1 mile = 1.61 kilometers)) in 2015.

In continuation, taking a look at the top cities that possess ① and ②, when considering ④ the "status of the main public transportation operators in each city," Boston especially has multiple transportation modes covered under the Massachusetts Bay Transportation Authority (MBTA), making it difficult to identify cases of partnerships between different public transportation operators. Likewise, Philadelphia's Southeastern Pennsylvania Transportation Authority (SEPTA) has a similar system to Boston's MBTA. On the other hand, the status of partnerships between multiple transportation operators in New York, Washington D.C., San Francisco, and Chicago were verifiable.

In addition to the above quantitative evidence, ⑤ "there are multiple public transit operators entering from other states" and ⑥ "commitment from the top of local communities" take priority as qualitative evidence. Regarding ⑤, MOD／MaaS related projects require partnerships between various stakeholders who are involved in transit systems in the area. When crossing administrative districts, constructing budget distribution and cooperation systems tend to become more complex. By

adding these requirements, the challenges that local communities are facing executing MOD／MaaS projects becomes more apparent, along with how they are overcoming those difficulties.

Finally, spotlighting ⑥ "commitment from the top of local communities" is valuable. In general in the U.S., transit authorities of local communities and public transportation operators mainly lead transportation projects. In Chicago, a new trend has emerged as a Mobility Task Force under direct control of the mayor was established to promote urban mobility planning including MOD／MaaS. If MOD／MaaS projects aim to solve local and societal problems, as well as build the best systems to combat said problems in the future, then it will be necessary to seek partnerships and cooperation from not only the stakeholders involved in solving current public transportation system issues, but also from relevant parties at local levels. From this perspective, the fact that the mayor of Chicago has taken leadership over local mobility policy, without being restricted by traditional procedures, is unique.

Based on the information mentioned above, Table 2 shows the points for each requirement. Concerning ①～③, points from 7 to 1 are listed in descending order of evaluation. For ④～⑥, 5 points were added when cities met the requirement. As New York, Chicago, and Washington D.C. are the top 3 cities with 20 points, I will be conducting field an bibliographical surveys for these cities.

Notes

Note 1) Percentages of transportation vehicles used for commuting by workers aged 16 and over in households by city (2017) from the "2013-2017 American Community Survey 5-Year Estimates" by the United States Census Bureau was used. ①Car, truck, or van - drove alone, ②Car, truck, or van – carpooled, ③Public transportation〔excluding taxicab〕, ④Walked, ⑤Taxicab, motorcycle, bicycle, or other means, and ⑥Worked at home. In this survey, the data from ③ was used.

References

1) Incorporated areas with more than 50,000 people, nationally surveyed and assigned by the U.S. Census Bureau every 10 years. https://www.transit.dot.gov/ntd/national-transit-database-ntd-glossary, (Accessed : 3/19/2020)

2) U.S. Census Bureau, "QuickFacts United States" database, *Population estimates, July 1, 2018, (V2018), Land area in square miles, 2010, & Population per square mile, 2010*, https://www.census.gov/quickfacts/fact/table/US/PST045218 , (Accessed : 2019/11/4)

3) U.S. Census Bureau, " American Community Survey" *MEANS OF TRANSPORTATION TO WORK BY VEHICLES AVAILABLE (2013-2017 American Community Survey 5-Year Estimates)*, https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_B08141&prodType=table#none , (Accessed : 2019/11/4)

4) FTAHP, "2018 Track and Roadway", https://www.transit.dot.gov/ntd/data-product/2018-track-and-roadway (Accessed : 2020/3/23)

5)MLIT HP, "Future urban rail in Tokyo area", https://www.mlit.go.jp/common/001138591.pdf (Accessed : 2020/3/23)

Figure 1: Population Density of Major U.S. Cities by Public Transportation Utilization for Commuting

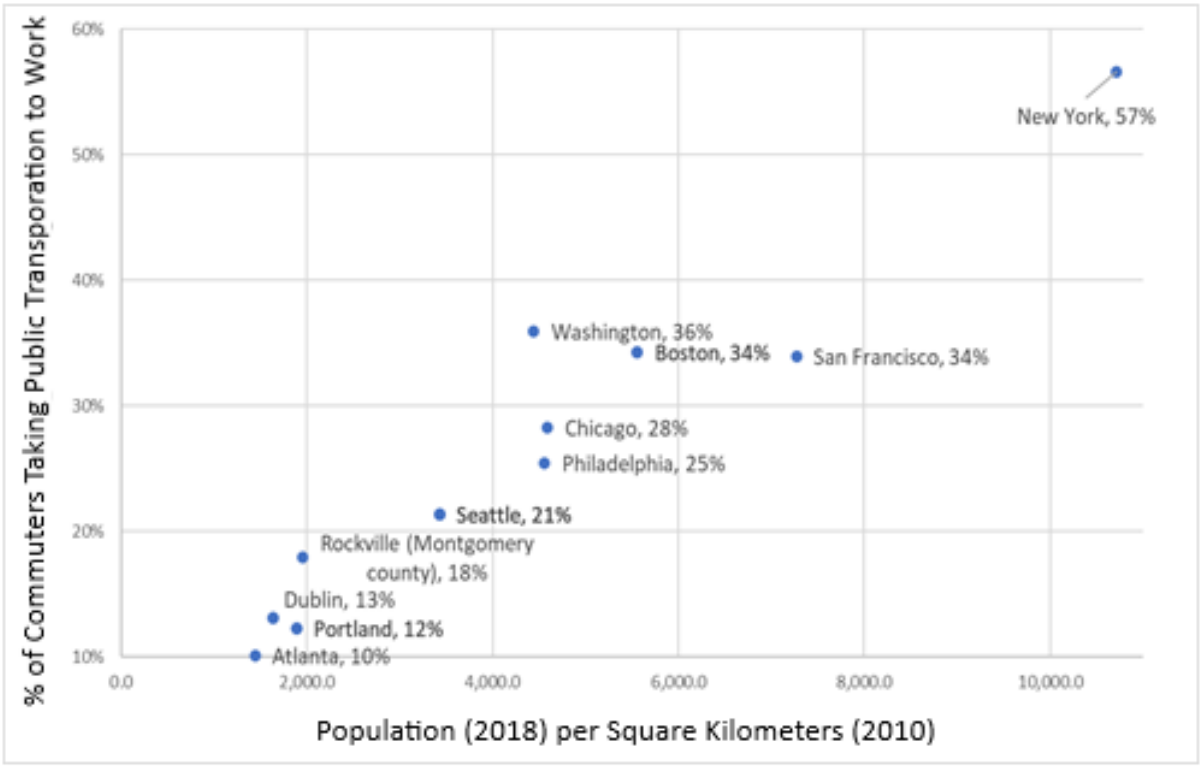

Figure 2: Ratio of Population Density of Major Japanese Cities to Weekday Public Transportation Use

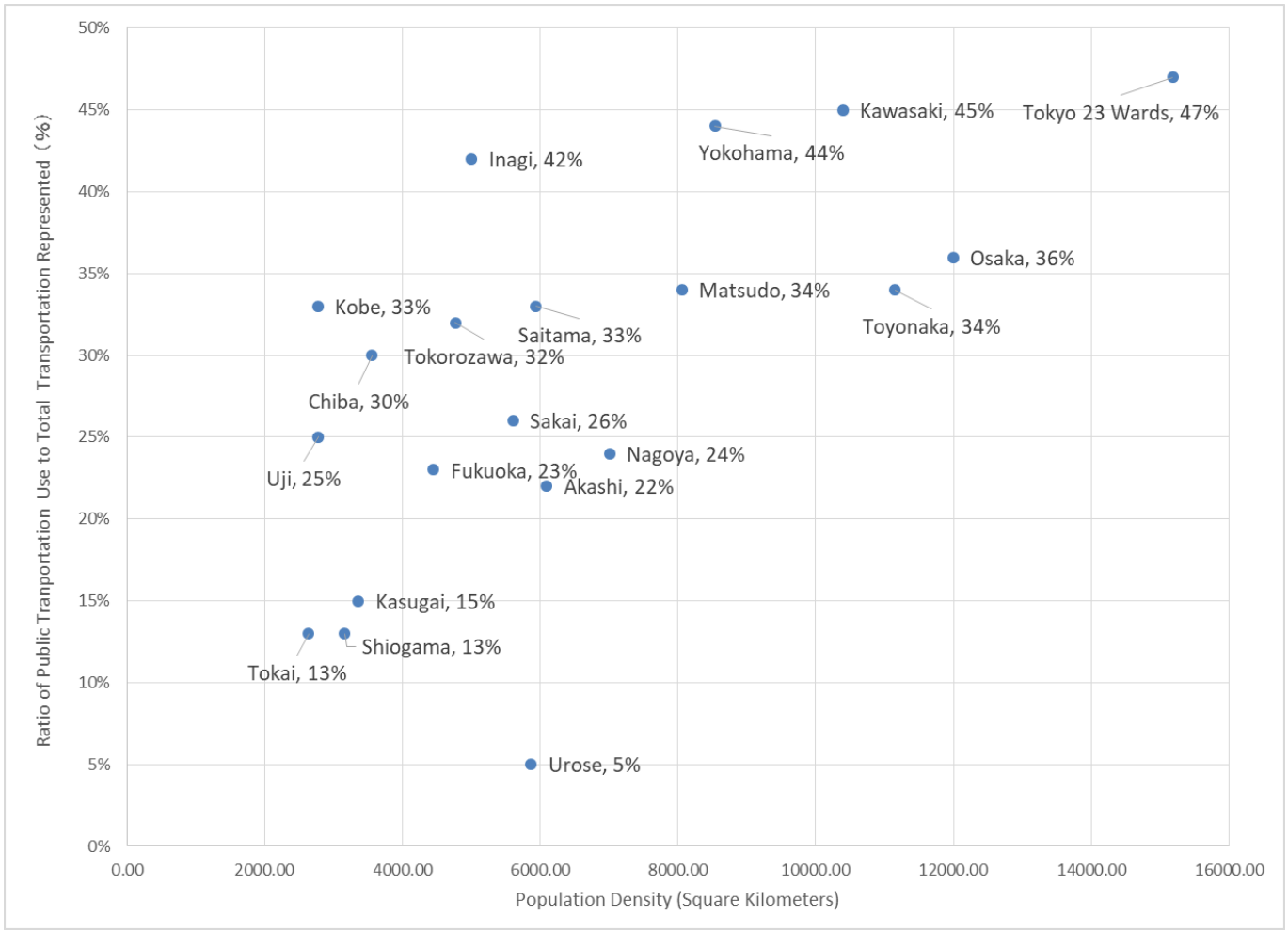

Table 1: Railroad Service Miles by UZA (2018)

UZA	UZA Population	Rail Service Miles
New York-Newark, NY-NJ-CT	18,351,295	2,965.78
Los Angeles-Long Beach-Anaheim, CA	12,150,996	667.00
Chicago, IL-IN	8,608,208	1,450.55
Miami, FL	5,502,379	200.88
Philadelphia, PA-NJ-DE-MD	5,441,567	680.72
Dallas-Fort Worth-Arlington, TX	5,121,892	243.66
Houston, TX	4,944,332	49.27
Washington, DC-VA-MD	4,586,770	429.30
Atlanta, GA	4,515,419	106.43
Boston, MA-NH-RI	4,181,019	852.93
Detroit, MI	3,734,090	9.70
Phoenix-Mesa, AZ	3,629,114	51.96
San Francisco-Oakland, CA	3,281,212	448.02
Seattle, WA	3,059,393	212.09
San Diego, CA	2,956,746	226.10
Minneapolis-St. Paul, MN-WI	2,650,890	83.95
Tampa-St. Petersburg, FL	2,441,770	3.46
Denver-Aurora, CO	2,374,203	170.23
Baltimore, MD	2,203,663	566.78
St. Louis, MO-IL	2,150,706	94.58

Table 2: Survey Results of Contender Cities Scored by Requirement Questions

	① Residents are concentrated	② Excluding the use of private cars, public transportation is accessible	③ The location is becoming a key transit hub where multiple transportation modes converge	④ There are multiple operators of public transportation	⑤ There are multiple public transit operators entering from other states	⑥ Commitment from the top of local communities	Score
New York	7	7	7	5	5		31
Chicago	4	3	6	5		5	23
Washington DC	2	6	2	5	5		20
San Francisco	6	5	3	5			19
Philadelphia	3	2	4		5		14
Boston	5	3	5				13
Seattle	1	1	1	5			8