

# TRASPORTI

# *& cultura*

57

rivista di architettura delle infrastrutture nel paesaggio



## RETI E STAZIONI DELLA METROPOLITANA TRA FUNZIONALITÀ E ARCHITETTURA

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# Subway networks and stations between functionality and architecture

by Laura Facchinelli

*The subway, the backbone of the public transportation system in metropolitan cities, is a theme that is ever more open to disciplines and considerations.*

*The creation of a subway is a matter of structural engineering, vehicle design and scheduling of timetables throughout the day. But in this case we turn our attention not to the subway as a transport infrastructure, but rather to the stations: places conceived to handle masses of rapid transport travellers which become complex, formidable machines constantly evolving their configuration of spaces and services. The stations are architectural works excavated into the underground, which stimulate the creativity of architects to create luminous, dynamic and stimulating spatial experiences, and to lead travellers intuitively and pleasantly towards their destinations. There are significant historical examples of subways, as well as successful more recent inventions, in which the project translates into a search for collective cultural meaning and identity-building. The very existence of the stations makes them poles of attraction that concentrate a multiplicity of interests and which, if they are part of an intelligent and forward-looking urban plan, are in a position to stimulate the regeneration of the areas around them.*

*It seems superfluous to highlight the fundamental role of a subway network in reducing traffic and pollution, both air and acoustic, in the road network. Naturally the "underground" transport service must be coordinated with the public transport services on the surface, planning functional, convenient and safe points of interchange. A subway, with its stations disseminated across the territory, is fundamental for the future of the city's environment; the presence of a subway brings the suburbs closer to the centre of the city, facilitating the integration between its citizens, and bringing greater balance to the entire city.*

*By vocation, our magazine likes to look beyond our national borders. We are thus enthusiastic about working with the two editors of this issue in a collaboration between the Architecture and Planning Department of the Università La Sapienza di Roma and the École Nationale Supérieure d'Architecture in Paris-Belleville. The result is a collection of articles from professors working in different academic contexts, both of which are open to vast geographic horizons.*

*In the following pages, we publish research studies, analyses, narratives developed from multiple points of view. We review the history and outline the future of the Milan subway; we take a close look at the integration of the underground infrastructure in the city of Rome, where the earth produces significant archaeological discoveries. The experts from France describe the projects underway and the future plans for the Grand Paris metrò, and elsewhere in France, the infrastructure of Lille and Toulouse; they rightly examine the rich, ambitious and magnificent Moscow subway, with its long history of urban planning. There are also focuses on projects for London (intermodality and urban spaces) and Barcelona (the station as an engine of transformation). In Asia, we have explored the spaces surrounding the Tokyo subway (which has stimulated projects in the areas of access to it, both public and private) and the role of the subway in Shanghai (with its future plans for increasing efficiency in the public transport system).*

*Technology, aesthetics, urban planning: a subway must relate to the identity of a place and the need for renewal. Both these requirements, yesterday and today, depend on the quality of the project.*

# Reti e stazioni della metropolitana tra funzionalità e architettura

di Laura Facchinelli

*La metropolitana, spina dorsale del sistema di trasporto pubblico nelle metropoli, è un tema più che mai aperto a discipline e suggestioni.*

*La creazione di una metropolitana riguarda l'ingegneria strutturale, la progettazione dei veicoli e la programmazione delle corse nell'arco della giornata. Ma non è tanto la metropolitana come infrastruttura di trasporto che ci interessa, in questa sede, la nostra attenzione è rivolta soprattutto alle stazioni: luoghi destinati ad accogliere folle di viaggiatori in rapido transito e quindi macchine formidabili, complesse, in costante evoluzione nell'articolazione degli spazi e dei servizi. Le stazioni sono architetture scavate nel sottosuolo, che stimolano la creatività degli architetti per creare spazialità luminose, dinamiche, stimolanti e per condurre in modo intuitivo e piacevole i viaggiatori lungo i percorsi. Di metropolitane ci sono esempi storici importanti, ma anche felici invenzioni recenti, in cui il progetto si traduce in ricerca di significati culturali e identitari per la collettività. Le stazioni, con la loro stessa esistenza, sono poli di attrazione che concentrano molteplicità di interessi e – se inserite in un intelligente e lungimirante progetto urbano – sono capaci di stimolare la rigenerazione delle aree circostanti.*

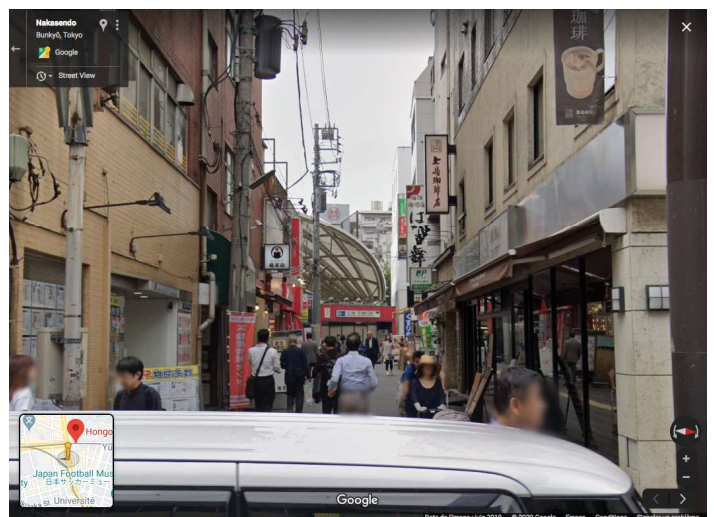
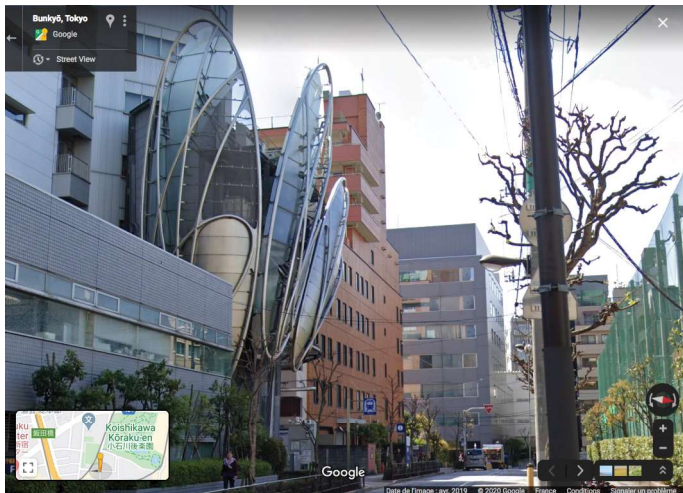
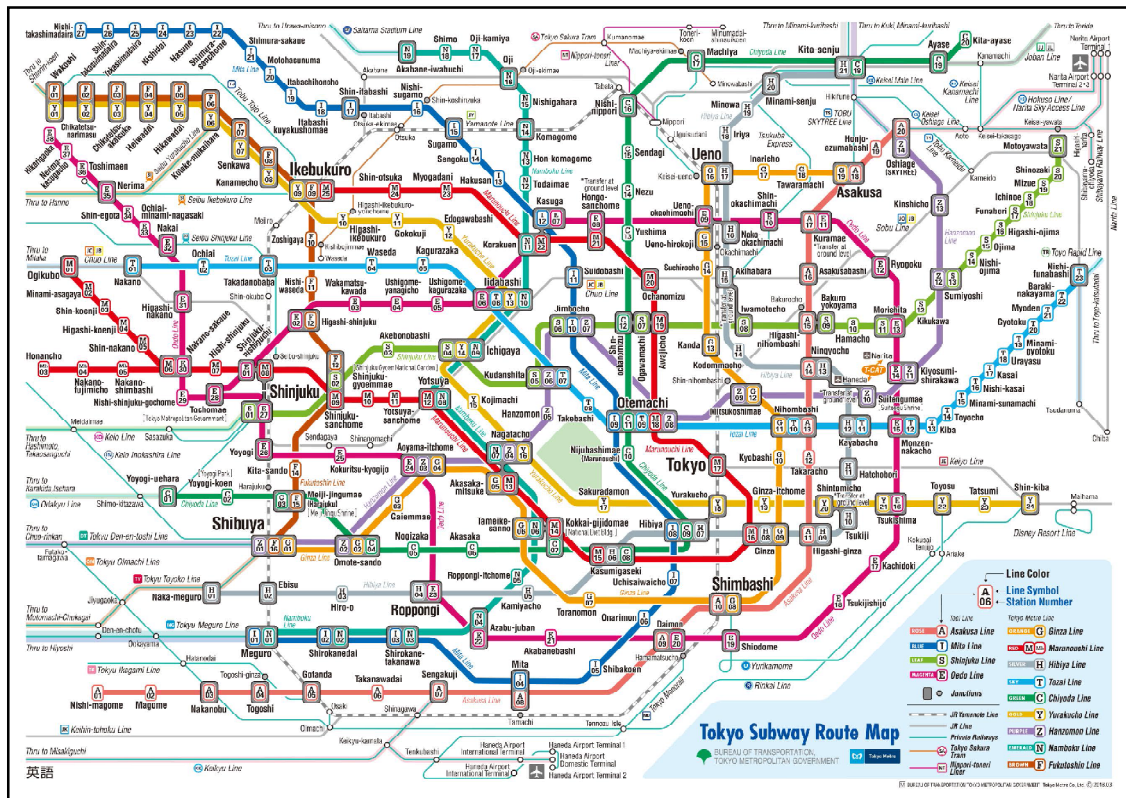
*È superfluo evidenziare il ruolo fondamentale di una rete di metropolitana per ridurre la congestione e l'inquinamento, anche acustico, delle arterie stradali. Naturalmente il servizio di trasporto "underground" dev'essere coordinato con i servizi del trasporto pubblico di superficie, predisponendo punti di interscambio funzionali, comodi e sicuri. Una metropolitana, con le sue stazioni diffuse nel territorio, è fondamentale per il futuro ambientale della città; la presenza di una metropolitana avvicina le periferie al centro città, facilitando l'integrazione dei suoi abitanti, e quindi rendendo l'intera città più equilibrata.*

*Per vocazione, nella nostra rivista ci piace lanciare lo sguardo oltre i confini nazionali. Pertanto abbiamo accolto con entusiasmo la proposta, da parte delle due curatrici, di realizzare questo numero sulla base di una collaborazione fra il Dipartimento di Architettura e Progetto dell'Università La Sapienza di Roma e l'École Nationale Supérieure d'Architecture di Paris-Belleville. Il risultato è l'affiancamento di contributi di docenti operanti in contesti accademici differenti, entrambi aperti a vasti orizzonti geografici.*

*Nelle pagine che seguono, pubblichiamo ricerche, analisi, narrazioni condotte da molteplici punti di vista. Ripercorriamo la storia e delineiamo il futuro della metropolitana di Milano; guardiamo con attenzione all'inserimento dell'infrastruttura sotterranea nella città di Roma, dove il terreno è generatore di importanti scoperte archeologiche. Gli esperti d'oltralpe ci raccontano gli interventi in corso e i progetti futuri per il metrò del Grand Paris e, sempre in terra di Francia, per le infrastrutture di Lille e Tolosa; doverosamente si soffermano sulla metropolitana di Mosca, ricca, ambiziosa, magnifica, legata a una lunga storia di progetti urbanistici. Poi ci sono approfondimenti sui progetti per Londra (intermodalità e spazi urbani) e Barcellona (la stazione come motore di trasformazione). Del continente asiatico abbiamo esplorato gli spazi riferiti alla metropolitana di Tokyo (stimolatrice di interventi nelle aree di accesso, anche da parte di privati) e il ruolo svolto da quella di Shanghai (che attende interventi di pianificazione e di efficientamento del servizio di trasporto pubblico).*

*Tecnologia, estetica, progetto urbano: una metropolitana si rapporta con l'identità di un luogo e con l'esigenza di rinnovamento. A conciliare queste due esigenze, ieri come oggi, la qualità del progetto.*





# Tokyo subways: a public-private tool to renovate the 21<sup>st</sup> century metropolis congested spaces

by Corinne Tiry-Ono

When travelling in very large Japanese cities, such as Tokyo, Yokohama or Osaka, it is not always easy to differentiate the subway network and service from the urban railway ones. In Tokyo especially, as subway cars are sometimes running over ground and railway cars underground on the same tracks on the one hand, as a single pass is valid on both types of networks on the other, confusion can rapidly arise for unfamiliar users. In such hybrid and dense context, signage and architecture design are useful clues for the latter as well as strong identity tools whether—or because—the transportation company is public or private, owning and managing one network or another. For a few decades and various reasons, those transportation companies are investing to improve the quality and attractiveness levels of the collective space they have generated originally to make the users' massive flows always smoother. Some of them are also taking advantage of some important metropolitan mutations and policies, which emerged at the end of the 20<sup>th</sup> century, at different scales.

Tokyo Metropolitan Government (TMG, 2018) reports that "A daily total of some 30 million people use public transportation in Tokyo's 23 special-ward areas."<sup>1</sup> (p. 36)—although less than the half is living there. This contrast shows how the mass-transit urban network, largely run by private companies, plays a major and crucial role in the metropolitan everyday life and the economy of the capital city of the country. Looking at the metropolitan scale, this dense infrastructure network covers a radius of 50 kilometres from the Tokyo Central station. But today, it is only at the city scale of the 23 wards that the rail mode—here including subways—remains dominant among users. If Tokyo's demography is still dynamic (Scoccimarro, 2018), the golden age of rapid growth is gone. Since the beginning of the 1990s, the

## Metropolitana di Tokyo: uno strumento pubblico-privato per rinnovare gli spazi congestionati della metropoli del XXI secolo

di Corinne Tiry-Ono

L'articolo è focalizzato sullo spazio congestionato delle metropolitane di Tokyo per il trasporto di massa, in particolare sul suo livello sotterraneo, che noi consideriamo come un innovativo generatore di spazialità. Tradizionalmente sbilanciati dal punto di vista economico, o comunque a rischio, i quartieri orientali e quelli occidentali della capitale del Giappone sono diseguali anche in termini di servizio di trasporto.

Guardare ai programmi più recenti delle linee pubbliche e private – la linea Ōedo e la linea Fukutoshin, attivate rispettivamente nel 2000 e nel 2008 – offre la possibilità di ricordare la storia del tardo sviluppo delle metropolitane di Tokyo e le nuove opportunità per gli stakeholders pubblici e privati all'inizio del 21° secolo.

Entrambe le nuove stazioni sono state progettate e concepite per rispondere a molteplici funzioni. Il dinamismo della rigenerazione urbana, l'aumento dell'attrattività, le contromisure studiate per i disastri naturali, l'accessibilità, per esempio, sono combinate con la condizione problematica insita nelle infrastrutture sotterranee. In modo inusuale, sono stati chiamati architetti indipendenti per risolvere quei problemi complessi con soluzioni spaziali semplici o spettacolari, ma adeguate alle esigenze. Se le caratteristiche architettoniche specifiche di ogni nuova linea stanno rafforzando la storica disparità fra est e ovest, ognuna, comunque, rafforza la singolare identità urbana che sta servendo.

On the previous page, from left to right, top to bottom: Tokyo Subway Route Map in 2018 (© Bureau of Transportation, Tokyo Metropolitan Government, Tokyo Metro Co., Ltd.). Iidabashi subway station entrance near Koishikawa kōraku garden, designed by Watanabe Makoto Sei and opened in 2000 (© Google, 2019.04, from <https://www.makoto-architect.com/iidabashi.html> (last view: 2020.03.03)). The Hongō-sanchōme subway entrance on Kasuga Avenue, designed by APLdw and opened in 2000 (© Google, 2019.06). A shared roof as a signal to access Marunouchi and Ōedo lines from the Hongō-sanchōme dense urban fabric

1 Here "public" means mass-transit.



YEAR	TRAM (*)		SUBWAY (TRTA & TMG Subways, altogether)		
	Network length (km)	Number of passengers	Number of lines	Network length (km)	Number of passengers
1911	103.4	138,317,000	-	-	-
1920	143.8	400,636,000	-	-	-
1930	173.3	369,739,000	1	3.9	unknown
1940	178.8	507,527,000	1	14.3	unknown
1950	212.8	478,946,000	1	14.3	119,309,000
1960	213.7	597,409,000	3	42.7	315,773,000
1970	47.7	134,954,000	6	133.6	1,329,849,000
1980	12.2	27,475,000	8	186.7	1,975,282,000
1990	12.2	24,198,000	11	220.2	2,676,758,000
1999	12.2	21,172,000	11	261.2	2,631,339,000
2009	12.2	-	13 (Ōedo + Fukutoshin)	304.1	-

(\*): In Tokyo, the tram system was dismantled between 1967 and 1972.

2000-2001	Number of lines	Network length	Number of stations	Number of passengers/day
TOKYO METRO	8 lines	171.5 km	157 stations	5,590,000
TRTA&TMG	3 lines	68 km	67 stations	1,420,642
	4 <sup>th</sup> line (Ōedo) fully opened in 2000	41 km	38 stations (**)	219,358
TOTAL	12 lines	280.5 km	262 stations	7,230,000

(\*\*): Shiodome station has been opened after 2000.

2007-2008	Number of lines	Network length	Number of stations	Number of passengers/day
TOKYO METRO	9 lines	195.1 km	179 stations	7,580,000
TRTA&TMG	4 lines	109 km	106 stations	2,750,000
TOTAL	13 lines	304.1 km	285 stations	10,330,000

Table 1 - tram and subway network length and passenger traffic in Tokyo, from 1911 to 2019. Source: adapted from Aoki, 2002, p.45, and completed by the author from various documents.

Table 2a - Tokyo subway network data after the opening of the Ōedo line in 2000. Source: adapted from Omega Centre, 2010.

Table 2b - Tokyo subway network main data after the opening of the Ōedo and Fukutoshin lines. Source: Tokyo Metro, 2019, p.12 and Tokyo Metropolitan Government, 2018, p.1.

urban transportation sector has entered a less lustrous phase in which an innovative strategy must be found to address the relative decline in customers. Among various internal factors, the economic slowdown, the aging of the population and a low birth rate are having a serious impact and no significant changes are expected for the next few decades.<sup>2</sup> Working closely with the urban agenda of the TMG is undeniably an attitude that private transportation companies—and the groups they belong to—have integrated, through a “win-win” collaboration to meet specific environmental or risk chal-

2 With the COVID-19 pandemic crisis, another factor must be added to this list: in April 2020, the Japanese households budget for transportation has dropped sharply (air: -95%; rail: -90%) (Agence France Trésor, service économique régional de Tokyo, 2020).

lenges, or simply responding to the official modernisation and attractiveness policy to make Tokyo more competitive in the context of fast-growing large Asian cities. Since the post-World War Two reconstruction, among their various jointly applied strategies (Tiry-Ono, 2015), using the spatial potentials of the “privately owned public” or “POP” space (Dimmer, 2013) seems like an efficient and qualitative operational tool. This article is focusing on the case of the Tokyo mass-transit subway infrastructures congested space, and on its underground layer in particular we would like to suggest as an innovative space generator.

## Tokyo subways: planning development history and 21<sup>st</sup> century new opportunities

Although the City of Tokyo planned the construction of seven subway lines in 1920, it faced a significantly delayed development, due in part to the burden of the Great Kantō Earthquake in 1923, followed by the dramatic episode of World War Two. Indeed, in 1927, the capital city of Japan had only one operational subway line (the Ginza line between Asakusa and Shibuya), which was only partially completed. The construction of the second line (the Marunouchi line linking Ikebukuro and Shinjuku) was launched much later, and it opened—although partially again—in 1954, at the end of the post-war reconstruction period. Both lines are C-shaped, linking the eastern and western parts of Tokyo and avoiding the Imperial Palace sacred space. The 1957 Capital Region Plan defined a 5-subway line scheme, including both existing lines, whose pace of construction became real and accelerated after 1960 thanks to the dynamics of the economic recovery and the perspective of the 1964 Olympic Games (Tiry-Ono, 2018). But the capacity of the planned subway network soon appeared underestimated compared to the growing urban population and the country's industrial boom, with Tokyo and Osaka in the front line. Twenty years later, the length of the Tokyo subway network almost equalled the length of the tram network, the infrastructure of which was progressively dismantled from 1967 to 1972 due to growing automobile traffic congestion.<sup>3</sup> Most of the new subway lines were built in-

3 Tokyo is not an exception and most of the large cities of the Honshū Island, like Osaka or Kyoto for instance, faced the same process (Tiry, 2008).



side the boundary of the Yamanote railway loop line, and connected to the largest (private) suburban railway terminal stations. Since 1938, the Land Transport Regulation law (*rikujō kōtsū jigyō chōsei hō*) protects the public transportation system from harsh business competition by private operators: this law forbids the private suburban railway companies from extending their tracks into the perimeter of the Yamanote line. Starting in the 1960s, progressively, agreements between public and private companies were signed to allow through services—unless major technical obstacles blocked.

The network geographies differ depending on the transportation modes: tram and bus systems give shape to a dense grid of meshed lines, whereas railway and subway modes draw a star-like figure of intersecting lines, with the exception of the Yamanote loop line. Urban and metropolitan scales each have their own dedicated transit systems, techniques and speeds. Today, the 13-line subway network is managed by two different companies, with specific historical backgrounds. The oldest one, originally called the Tokyo Underground Railway Company and then named Tokyo Metro following its privatisation in 2004, built the first subway line in the capital city (Ginza line, 1927). Compared to large cities in other industrialised countries, it appeared rather late. Today, Tokyo Metro is running 9 lines (Ginza, Marunouchi, Hibiya, Tōzai, Chiyoda, Yurakuchō, Hanzōmon, Namboku, Fukutoshin) with the latest, the Fukutoshin line, completed in 2008 as an important piece of a vast and ambitious urban renewal strategy for the western part of Tokyo. The second company, called Toei or Teito Rapid Transit Authority (TRTA) was established as a public company in 1941 but its own subway lines starting in the 1960s: Asakusa, Mita, Shinjuku, and lately Ōedo in 2000, partly operated by TMG. The Ōedo loop line, a TMG project, brought a major shift in the way subway infrastructure, station design, and their interaction with the local city are conceived in Japan today.

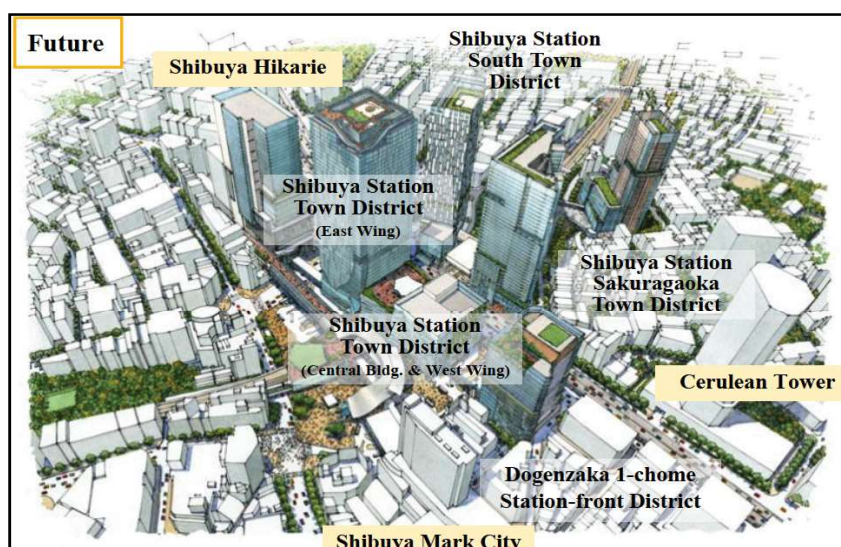
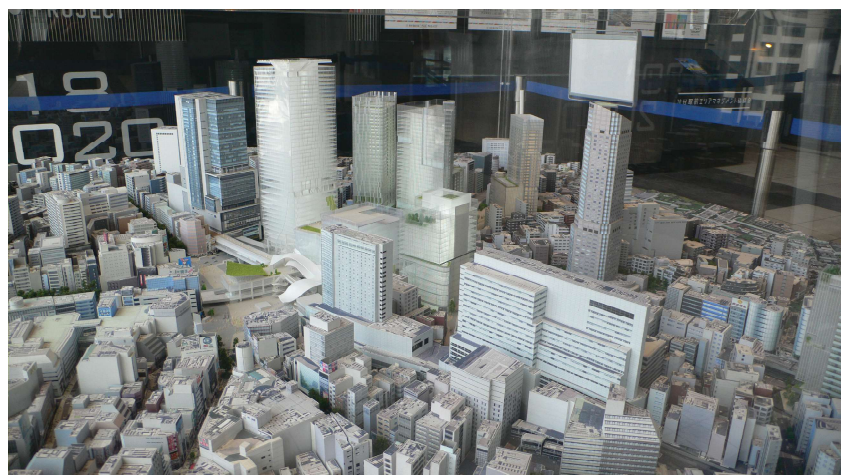
## The Ōedo line: a soft urban regeneration tool with a unique architectural identity

Historically, the western and eastern parts of Tokyo have been developed and served by mass-transit transportation systems in an unequal manner. But, at the end of the 20th century, the declining industrial low

city (*shitamachi*) in the east faced an unprecedented opportunity to rebalance the metropolitan situation. The consequences of the privatisation of the Japan National Railway (JNR) company in 1987 brought a new context for the renewal of this part of the capital city. The simultaneous abandonment of freight-transport activity in the centres of Japanese metropolitan areas by the newly created JR private companies, saw land potentials from the decommissioned sites used for stocking goods, and attracted the appetites of private developers. In the centre of Tokyo, 169 hectares were involved out of the 400 hectares at the metropolitan region scale. These vacant lands, which were rather extensive and located close to railway nodes inside the dense urban fabric, were supposed to be rapidly transformed in mixed-use urban developments—although with a dominant portion of office space as a revitalisation tool. But the burst of the economic bubble in 1991, followed by the slowdown of the Japanese economy, temporarily halted the urban development projects, which were only able to finally emerge in the early 2000s. Meanwhile, the Tokyo Prefecture succeeded in the development of a vast urban transportation project in the high density area of Tokyo, overcoming the burden of high land cost value by investing in the deep underground—i.e. beyond the “vertical” land property limits. Opened in 2000, the new Ōedo subway line<sup>4</sup> draws a second loop line with multiple purposes: reducing the congestion of central mass-transit transportation on the one hand, and providing better accessibility to the eastern part of the capital city while meshing the existing radial railway and subway lines, on the other. If the eastern half-circle indeed contributed to the urban regeneration of some old industrial sites<sup>5</sup>, including the Tokyo Bay area, the western half-circle today still looks like just another tube absorbing the network’s (over)flows. Although some are now losing customers due to demographic changes (especially the

4 41 kilometers long with 38 new stations, the Ōedo line has a West-East lying “6” shape. It operates only three interconnections with the North-South Yamanote railway loop line, but more than 25 with other lines. The name Ōedo (Big or Great Edo) is a tribute to the ancient feudal capital Edo as well as a commercial sign for the expanding mass tourism policy of the TMG starting at the same time in the early 2000s.

5 The Shiodome Station is the most significant example: Shiodome is a typical large urban redevelopment area that has been developed on a vacant freight yard (Dimmer, 2013).



1 - Model of the Shibuya station area completed project (© Corinne Tiry-Ono, 2017).

2 - Sketch view of the Shibuya station area completed project (© Urban Renaissance Agency).

declining birth rate in suburban areas and an increase in the aging population),<sup>6</sup> the major goals of all mass-transit transportation companies include reducing congestion for better security and comfort, as well as offering adapted traveling conditions.<sup>7</sup> While the Ōedo line was under construction, the TMG target was moved from 180% to 150% congestion<sup>8</sup>. However, several characteristics of

this new line constitute severe handicaps, and explain why success was slow to come: firstly, high fare pricing compared to the existing lines (the TRTA company being a public entity, and its financial investment huge—although partly helped by the private sector); secondly, the smaller tunnel section that gave passengers a potential feeling of anxiety;<sup>9</sup> and thirdly, an extension of transfer time due to the very deep location of the stations.<sup>10</sup> To minimize the latter, the architecture of the pedestrian sequences in their entirety was studied and designed in a precise and original manner, calling upon the skills of famous architects through a public proposal system in 1990 and public art works commissions. It is worth noting that such an open process is quite uncommon in Japan: most of the private mass-transit transportation companies belong to large business groups which have their own architectural staff working within an integrated design and engineering Department.<sup>11</sup> The inclusion of underground facilities such as bicycle parking lots and disaster provision warehouses, although in a limited number, has also been possible due to unusual available space.

Most of the architecture in Tokyo's pre-existing subway stations is generic, robust and functional. Major investments on the existing subway stations are concentrated on passenger security and accessibility, using "universal design" devices and modernised equipment: escalators, elevators as well as ropes on the one hand, automatic platform doors on the other. In the case of the Ōedo line, the strategy is quite different and has been upgraded with unique space and light designs for each station, from the street level entrances to the underground platforms, including the interconnection areas with other lines (Kido, 2006). Implementing new

number rises to seven.

9 4.3 meters compared to 6.2 meters for conventional subway tunnels in Tokyo (Hiraide, 2005, p.33).

10 From 20 to 40 meters underground, but "nothing" compared to some of the Grand Paris Express stations that will reach a depth of 50 meters below ground, or the newly planned subway line in Montreal at 70 meters! On the Ōedo line, traffic in 2000 was only 219,358 passengers per day. It grew to 781,487 pass./day in 2007 (Omega Centre, 2010, p.7), but the passenger traffic as a whole on the Tokyo mass-transit transportation network started to slow down from the late 1990s.

11 The Yokohama Minato Mirai subway line opened in 2004 is another example where independent architects were commissioned to design the stations, with the purpose of working on the identity and bringing a higher quality and attractiveness to a regenerated urban area (Minato Mirai is the name of the harbour regeneration project).

6 Some prospective scenarios have been studied to grasp the problem in a comprehensive way and at the metropolitan scale. Among them, Professor Ohno Hidetoshi's radical proposal consisted of increasing the urban density along the railway lines and the number of stations while transforming the lateral land into green non built-up areas (Ohno, 2004).

7 On the Mita subway line for example, some non air-conditioned cars are available in order to contribute to the less energy consumption effort or simply for the users who wish to escape from temperature shocks during the very hot and humid season. "Only for women cars" available during the rush hours are also popular.

8 In the Japanese mass-transit survey system, 100% congestion means that about three passengers can stand in comfortable conditions on a surface of one square meter; with 200% congestion, the passengers



subway access within a dense urban fabric presents at least two challenges: finding available space, within an existing node or not, on the one hand, and offering enough convenience and visibility to the users on the other. This situation led to some interesting spatial solutions and a new typology far different from the generic type, especially for isolated access. A few exemplary types or examples are worth noting in the northern part of the line: one of the numerous Iidabashi station<sup>12</sup> entrances is located inside an office building and its design is conceived as a strong signal that relies on an emerging sculptural piece to visually link the building, the street space and the park in front; the design of two distant Hongō-sanchōme station entrances address their own sites: one could benefit the disposal of a small lot, whereas the other one takes advantage of the Marunouchi line access under a shared roof. Most of their architectural designs were conceived as local urban landmarks, and are now part of the neighbourhood urban landscape.

## Fukutoshin line: a fluid new corridor highlighted by the Shibuya station area mega-project

The western part of Tokyo has concentrated the highest traffic and congestion levels since almost a century now. Less damaged by the Great Kantō Earthquake in 1923, the safer Musashino plateau absorbed a massive relocation of residents, and its rapid suburban growth has lasted for several decades. The boom of suburban travel and especially of commuting between the west and the city centre, as one of the consequences, led to the development of the biggest railway stations on the western part of the Yamanote railway loop line, namely the Shinjuku, Shibuya and Ikebukuro stations and their multiple interconnections with tram, bus and then subway lines. The 1957 Capital Region Plan defined a strategy to reduce the congestion of central business activities primarily through the idea of creating from scratch a second business district in the western part of Tokyo: the Shinjuku sub-centre (*fukutoshin*).<sup>13</sup> This strategy rapidly evolved to transform the mono-cen-



tred urban structure of the capital city into a metropolitan polycentric one, based on a collection of new sub-centres (Sorensen, 2001). From the early 1980s, remote urban sub-centres were developed as well. In fact, two types of *fukutoshin* must be distinguished: “relay centres” which are major intermodal transportation nodes offering mixed urban activities and playing an important socio-economic as well as cultural role at the metropolitan scale, and “complementary centres” that are simple local suburban centres.

Linking the three major western nodes (Shinjuku, Shibuya and Ikebukuro) which concentrate the highest passenger flows of the city, and ensuring smooth pedestrian transfers, all in safe conditions, became permanent challenges for the many operators in partnership with TMG. Needless to say that the overconcentration of passenger flows also meant huge profits for their railway and subway companies, all of which are private except TR-TA&TMG, running various business activities on site (retail stores, department stores, office space leasing, hotel businesses, various urban services including new mobility services, etc.). Indeed, these three major nodes are constantly transformed, adapted, extended underground or over ground with additional new vertical volumes—often tending, from the beginning of the 21<sup>st</sup> century, towards a skyscraper morphology. The Fukutoshin line, fully opened in 2008, answers all those purposes. Its implementation doubles the old Yamanote line western corridor, offering a fast new link between Shibuya and Ikebukuro while expanding the Shinjuku sub-centre connections area. Its terminal station, located in Shibuya, is part of a major local and metropolitan redevelopment project for the entire transportation node, which started in the late 1990s and was accelerated in view of the 2020 Olympic Games. The whole Shibuya redevelopment project is also an example of the typical joint-venture method used in Japan for the modernisation of complex trans-

3 - Section of the Shibuya Tōkyū station atrium designed by Andō Tadao and opened in 2008 (© <https://www.designbuild-network.com/projects/shibuya-station/> (last view: 2020.03.03).

12 Iidabashi station gives access to four subway lines and one elevated railway line (Yamanote).

13 Thanks to the opportunity of a huge vacant public land in Yodobashi, located only 300 meters away from the Shinjuku railway station.



portation nodes, where various stakeholders—public and private—coexist with shared needs, different economic power levels but also specific goals.

Today's redevelopment of the Shibuya area is based on the designation of the site as a "Priority Development Area for Urban Renaissance": an urban plan accepted by TMG in 2013. Launched in the early 2000s by the national Government, the Urban Renaissance policy marked a radical shift in the approach by authorities to urban congestion as Saito and Thornley (2003) analysed: « The fears of overconcentration have been replaced by a positive attitude towards agglomeration » (p.667). Guided by the compact city model and its more effective land use agenda, the strategy consists basically in encouraging urban development/improvement by the private sector. For instance, it stimulates private landowners to overdevelop their building stock or capacity thanks to deregulated rules negotiation—such as allowing higher floor-area ratios—under certain conditions. Among the targeted sites that are considered as a priority type, the Basic Policies for Urban Renaissance (Prime Minister of Japan and his Cabinet, 2004) pointed "Districts which have traffic junctions, such as stations, or the surroundings areas thereof, and which are expected to form a base of livelihood and exchange, etc."

Historically, Shibuya is "the" place for shopping, leisure and nightlife amusement. It is above all the Tōkyū Corporation "empire", with its two suburban railway lines—the Tōkyū Tōyoko line and the Tōkyū Den'en Toshi line—terminating there, and its multiple department and retail stores inside and outside the labyrinthine Tōkyū Shibuya station (Tamura, 2013)—the whole being closely connected with the JR Yamanote loop line, subway lines, buses and taxi services. Tōkyū is therefore the dominant landowner and stakeholder in the Shibuya area redevelopment plan,<sup>14</sup> for which the group has recently completed two mixed-use skyscrapers—Hikarie in 2012 and Shibuya Scramble Square (or East Wing) in 2019—while heavily reconfiguring its multi-layered complex transportation node. Here, the geography is a main constraint: the whole site has a natural valley shape, and attracts huge crowds night and day... Firstly, the topography explains why Tōyoko line trains

used to enter the Shibuya station on the upper level, forcing the passengers to move down three storeys to reach the subway platforms. The Tōyoko line tracks have been relocated underground,<sup>15</sup> and they now allow through services and shorter transfer times. If the three busiest stations in the western part of Tokyo benefit from this new route, it also impacts a larger scale, with faster access to remote attractive destinations such as Yokohama in the south or the Tokorozawa resort in the north-west of Tokyo for instance<sup>16</sup>.

A brand new atrium has been created to channel the different passenger flows. For the first time, the spatial device of the station—a project entrusted by Tōkyū Corporation to the 1995 Pritzker Prize-winning architect Andō Tadao—integrates ecological concerns into the architectural design, such as natural ventilation for the 3-storey underground volume. An 80 meter-long ellipse-shaped void space, located in the middle of the concourse, links the three levels (Hikarie building entrance, Tōkyū Tōyoko line, Fukutoshin line) while an egg-shaped volume helps the natural air movement to circulate. Secondly, its topography carries a high risk of flooding during the heavy rain season, and as a consequence, serious threats to the underground users and infrastructures. Impressive engineering works have also been completed to include a huge rainwater storage reservoir underground, which is invisible to the public, and the partial canalisation of the Shibuya river. The new Tōyoko line Shibuya Station was built jointly by the Tōkyū Corporation and Tokyo Metro, whereas the reservoir was a joint effort by Tōkyū and TMG.

## Public versus private regeneration means: a question of scale?

From the 1950s, underground space development in very large Japanese cities became a common approach to address the issue of passenger congestion in the transportation system, and to interlink a dense and hetero-

15 Unfortunately, the elegant multi-curved roof of the old elevated Tōyoko line platform, designed in the 1950s by the great modern architect Sakakura Junzō, was not protected by the heritage law although it was a powerful landmark in the post-war urban landscape of the Shibuya area.

16 According to Tōkyū Corporation, this interconnection improvement with the Fukutoshin line quickly boosted the number of passengers and company revenue (Tokyu Corporation, 2014).

14 The others are: the Ministry of Land, Infrastructure, Transport and Tourism, TMG, Shibuya Ward Office, East JR Company, and Tokyo Metro Company. The Urban Renaissance Agency acts as a coordinator.

geneous network. In Tokyo too, during the post-war subway line construction boom, underground commercial galleries (*chikagai*) flourished to create tentacular pedestrian labyrinths that were artificially air-conditioned and lit: functionality and efficiency were the key words for such an underground “public” space considered as a modern and safe environment.

The recent projects in Tokyo display a completely revised vision by the urban transportation authorities, whether public or private, towards the definition of the underground interconnection space and its relation to the surface area. If they have integrated local users’ expectations for better-quality spatial environments—users here are passengers but also shoppers, from the metropolitan area and abroad, domestic as well as business tourists—, they have above all understood the new potential of transportation facilities to change and reboot the image of the city. Some critical points are nonetheless worth to observe, like the risk for public urban authorities to rely exclusively on the private sector to improve the quality of collective large urban spaces. More generally speaking, according to Dimmer (2013): “Whereas only design excellence of POPS entitled to exceptional planning benefits, later POPS degenerated into a useful tool for generating more, valuable area.” (p.41). However, the case of Shibuya shows a hybrid strategy, offering “stararchitecture” quality and uniqueness as a strong signature and identity for the hub on the one hand, and corporate architecture making profit as much as possible from the deregulation system on the other. When the private transportation sector can afford a vertical rise and transform the Tokyo “metropolitanscape”, nowadays the public one has no other possibility to develop its capacity elsewhere than underground. It nonetheless contributes to regenerate the local urban landscape, in a meaningful and innovative way as well. Finally, if each new line’s specific architecture characteristics are reinforcing the historical east-west disparity of Tokyo, each one is nonetheless fitting and reinforcing the particular urban identity they serve.

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