Stations as Nodes

Edited by

Manuela Triggianese
Roberto Cavallo
Nacima Baron
Joran Kuijper

Contributors

Maarten Van Acker
Marjo van Amerongen
Nacima Baron
Fabrizia Berlingieri
Hans de Boer
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Paul Chorus
Valentina Ciccotosto
Debbie Dekkers
Albane Grandazzi
Maurice Harteveld
Marcel Hertogh
Serge Hoogendoorn
Kees Kaan
Bachar Kabalan
Yo Kaminagai
Jurgen Krabbenborg
Joran Kuijper
Tom Kuipers
Nils Le Bot
Niels van Oort
Wouter Oostendorp
Joannette Polo
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Arjan van Timmeren
Fatemeh Torabi Kachousangi
Manuela Triggianese

exploring the role of stations in future metropolitan areas from a French and Dutch perspective

Delft University of Technology,
Faculty of Architecture and the Built Environment

Delft Deltas, Infrastructures & Mobility Initiative

Amsterdam Institute for Advanced Metropolitan Solutions

Université Paris-Est, École d'Urbanisme de Paris

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Stations as Nodes – Exploring the role of stations in future metropolitan areas from a French and Dutch perspective

Introduction

Manuela Triggianese*
Roberto Cavallo*
Nacima Baron**
Joran Kuijper*

*Delft University of Technology
**Université Paris-Est

At the main point of intersection between the railway and the city, stations are key elements in the organization of the intermodal transport as well as catalysts of urban developments in metropolises, medium and small cities. The focus of this publication is to explore the enrichment of a renewed approach of railway stations as intermodal nodes, therefore acting as breeding grounds for both urban and social developments.

This book has been initiated and built upon several activities currently running at the Amsterdam Institute for Advanced Metropolitan Solutions (AMS Institute), Delft University of Technology (DIMI, Delft Deltas Infrastructure Mobility Initiative and Department of Architecture of the Faculty of Architecture and the Built Environment) and University of Paris-Est (l'École d'Urbanisme de Paris). These activities have been framed within the context of two rapidly developing metropolitan areas: Randstad in the Netherlands and Métropole du Grand Paris in the Ile de France. This volume forms the basis for a research on the 'role of stations in future metropolitan areas' with the ambition to link the two countries, learning from their different cities and distinct geographical context through comparable mobility challenges on the levels of the inner city, suburban and peripheral areas.

In line with these considerations, in 2018 AMS Institute, TU Delft/DIMI and the Dutch Embassy in Paris with Atelier Néerlandais organized a successful workshop: 'Stations of the Future', in collaboration with La Fabrique de la Cité. Together with Dutch and French planning entities, involving mass transit operators and railway companies, this workshop focused on several case studies in both metropolitan areas to understand the role of station hubs as intermodal nodes. During this joint French-Dutch event that took place in Paris, we spoke on topics like Station as intermodal node**,** Station as destination **and** Station as data center**, including a debate on the relation between public space and architecture, densification and programming of station areas, pedestrian flows management and the integration of data.**

Following the Paris workshop, the summer school 'Integrated Mobility Challenges in Future Metropolitan Areas' was organised by AMS Institute and Delft University of Technology/DIMI with

the collaboration of the ARENA architectural research network, University of Paris-Est and the City of Amsterdam. This 8-day workshop extended the debate among international young professionals, academics and master students by looking at an important rail-metro node in the metropolitan area of the city Amsterdam: Sloterdijk Station – a crucial hub in a bigger urban area for mobility and exchange, and for urban growth. The main question was: which approaches and scenarios can be tested and applied to these intermodal nodes, particularly when dealing with lack of space and growing number of users? The results were four very different plans to improve the Sloterdijk Station area and to make the station a 'future proof' intermodal hub.

In this publication, invited experts from practice and knowledge institutes in France and the Netherlands share their common experience and draw on specific aspects and problems of conception, management and development of stations. A brief overview of the results of the two initiatives 'Stations of the Future' and the summer school 'Integrated Mobility Challenges in Future Metropolitan Areas' is here illustrated, accompanied by photo reportages of both events and by a curated reportage of the Amsterdam Sloterdijk station area.

—Manuela Triggianese, Roberto Cavallo, Nacima Baron, Joran Kuijper

December 2018

Gares et nœuds : Explorer l'avenir des gares dans les aires métropolitaines en France et aux Pays Bas.

Introduction

Manuela Triggianese*
Roberto Cavallo*
Nacima Baron**
Joran Kuijper*

*Delft University of Technology
**Université Paris-Est

En tant que maillon entre le réseau ferré et la ville, les gares sont à la fois des éléments clés dans l'organisation multimodale des transports et des catalyseurs de développement pour les villes petites et grandes. Cette publication en explore les formes renouvelées d'approche, à la fois comme nœuds intermodaux et comme germes de développement urbain et social.

Le livre a été préparé puis réalisé à travers différentes activités organisées à l'institut d'Amsterdam pour les solutions métropolitaines avancées, en lien avec l'Université de Technologie de Delft (dans le cadre du programme DIMI, Deltas Infrastructure Mobility Initiative que soutiennent ensemble la faculté d'architecture et la faculté de l'environnement construit) et l'Université Paris-Est (en particulier l'École d'Urbanisme de Paris). Ces activités s'inscrivent dans le contexte de deux aires métropolitaines en forte croissance : la Randstad aux Pays Bas et la Métropole du Grand Paris en Ile de France. Le livre constitue aussi le socle d'une recherche nouvelle sur le rôle des gares dans les aires métropolitaines, et il ambitionne de lier les deux pays en apprenant des différents contextes et des défis de mobilités partagés, tant pour la zone centrale que pour les espaces de première et de grande couronne.

En lien avec ces considérations, en 2018 AMS Institute, TU Delft et l'Ambassade des Pays Bas en France avec Atelier Néerlandais ont organisé un atelier très remarqué à Paris sous le titre « Gares du futur », en collaboration avec La Fabrique de la Cité. Associant des structures de planification des Pays Bas et de France, et intégrant des opérateurs de transport et des compagnies ferroviaires, l'atelier a mis l'accent sur des études de cas dans les deux aires métropolitaines pour comprendre la réalité multimodale des gares. Durant cet événement bilatéral, trois thématiques sont ressorties : l'intermodalité, la gare comme destination et la gare comme centre de données. D'autres moments partagés ont permis de débattre sur la relation entre espace public et architecture, sur la densification autour des gares, sur la programmation urbaine des gares, sur les flux piétons et sur l'intégration des données numériques.

A la suite de cet atelier, une école d'été intitulée « Défis de mobilités dans les aires métropolitaines du futur » était organisée par l'Institut AMS, l'Université de Delft (programme DIMI) en collaboration

avec le réseau de recherche en architecture ARENA, l'Université Paris-Est et la Ville d'Amsterdam. Pendant huit journées très remplies, de jeunes professionnels, des universitaires et des étudiants de Master ont travaillé sur un hub important articulant ligne de métro et de train dans l'aire métropolitaine d'Amsterdam. La gare de Sloterdijk représente à la fois un centre d'importance majeure pour la mobilité de l'aire urbaine élargie et elle donne directement sur l'un des projets de développement immobilier les plus ambitieux de la capitale. La question centrale était : quelles approches et quels scénarios peuvent être testés et appliqués sur ces nœuds pour faire face au manque d'espace et au nombre croissant d'usagers ? Les travaux ont donné lieu à quatre propositions très différentes d'amélioration de la gare et de son quartier.

Dans cette publication, des porteurs d'expertise professionnelle et académique de France et des Pays Bas sont invités à partager leur expérience et à présenter divers aspects ou problèmes de conception, de management et de développement des gares. Ce livre apporte donc un aperçu synthétique des résultats des deux initiatives, l'atelier « Gares du futur » et l'école d'été 'Défis de mobilité dans les aires métropolitaines du futur sous une forme illustrée, grâce au photo reportages réalisé lors des deux événements et au cœur de la gare de Sloterdijk station.

—Manuela Triggianese, Roberto Cavallo, Nacima Baron, Joran Kuijper

décembre 2018

Stations als knooppunten—onderzoek naar de rol van stations in toekomstige grootstedelijke gebieden beschouwd vanuit een Frans-Nederlands perspectief

Introductie

Manuela Triggianese*
Roberto Cavallo*
Nacima Baron**
Joran Kuijper*

*Delft University of Technology
**Université Paris-Est

Op de belangrijkste kruising tussen de spoorweg en de stad zijn treinstations een belangrijke basis in de organisatie van het intermodale vervoer. Ze zijn katalysatoren van stedelijke ontwikkelingen in metropolen, middelgrote en kleine steden. Deze publicatie concentreert zich op het onderzoek naar een nieuwe benadering van stations als intermodale knooppunten: broedplaatsen voor zowel stedelijke als sociale ontwikkelingen.

Dit boek is gestoeld op verschillende lopende activiteiten geïnitieerd vanuit het Amsterdam Institute for Advanced Metropolitan Solutions (AMS Institute), de Technische Universiteit Delft (DIMI, Delft Deltas Infrastructure Mobility Initiative en Afdeling Architectuur van de faculteit Bouwkunde) en de universiteit van Paris-Est (l'École d'Urbanisme de Paris). De activiteiten zijn gekaderd in de context van twee zich snel ontwikkelende gebieden met een metropolitaan karakter: de Randstad **in Nederland en** Métropole du Grand Paris, Île-de-France **in Frankrijk. Dit boek vormt de basis voor een nieuw onderzoek naar de** rol van stations in toekomstige grootstedelijke gebieden**, met het doel om deze twee landen te verbinden en te leren van elkaars steden in hun eigen geografische context door mobiliteitsuitdagingen op de niveaus van de binnenstad, voorsteden en perifere gebieden te analyseren.**

In het verlengde van hiervan organiseerden in 2018 AMS Institute, TU Delft en Atelier Néerlandais met succes een workshop in Parijs, onder de naam Stations of the Future/Gares du Futur**. Dit initiatief van de Nederlandse ambassade in Parijs in samenwerking met La Fabrique de la Cité en met Nederlandse en Franse planningsorganen, waaronder grote transitoperators en spoorwegmaatschappijen, resulteerde in een workshop die zich richtte op verschillende casestudies in beide metropoolgebieden om grip te krijgen op de rol van stations in de vorm van hubs en intermodale knooppunten. Tijdens dit Frans-Nederlandse evenement werd er gesproken over onderwerpen als** het station als intermodaal knooppunt**,** het station als bestemming **en** het station als datacentrum**, gepaard met een debat over de relatie openbare ruimte/architectuur, verdichting en programmering van stationsgebieden, beheer van voetgangersstromen en de bijbehorende integratie van dataverzameling in stations en hun directe omgeving.**

▸
Stations of the Future|Gares du Futur brochure. See https://ams-institute.org/wordpress/wp-content/uploads/StationsoftheFuture_GaresduFutur_DigiBrochure_DEF.pdf for a pdf version.
© Photograph by Joran Kuijper

Na de workshop in Parijs werd de summerschool Integrated Mobility Challenges in Future Metropolitan Areas **georganiseerd door AMS Institute, Université Paris-Est en TU Delft/DIMI in samenwerking met het ARENA (Architectural Research Network). Deze achtdaagse workshop breidde het debat over de rol van stations als intermodale hubs uit met een team van internationale jonge professionals, academici en studenten. Zij studeerden op een belangrijke spoorweg-metroknoop in het grootstedelijk gebied van Amsterdam: Station Sloterdijk – een cruciaal knooppunt voor mobiliteit en overstappen in de uitbreidingsplannen van Amsterdam. De onderzoeksvraag die werd gesteld was: welke benaderingen en scenario's kunnen worden getest en toegepast op dit intermodale knooppunt, met name wanneer het gaat om ruimtegebrek en toenemend aantal gebruikers? De resultaten waren vier verschillende plannen om het stationsgebied van Sloterdijk te verbeteren en van het station een toekomstbestendige intermodale hub te maken.**

In deze publicatie delen Franse, Belgische en Nederlandse deskundigen uit de praktijk en van kennisinstituten hun ervaringen. Ze schetsen de specifieke aspecten en problemen van het ontwerpen, beheren en ontwikkelingen van stations en hun visie op de toekomst. Verder bevat het boek een overzicht van de resultaten van de twee initiatieven 'Stations van de toekomst' en de summerschool, vergezeld van fotoreportages van beide evenementen en van de huidige situatie van het stationsgebied van Amsterdam Sloterdijk.

—Manuela Triggianese, Roberto Cavallo, Nacima Baron, Joran Kuijper

december 2018


Stations as nodes of inter modality
Peer-to-Peer exchange France Netherlands

Towards an integrated approach for stations

Marcel Hertogh

Delft University of Technology,
Deltas, Infrastructure & Mobility Initiative

Let us start by the question: What is a station? Traditionally, it is it a place to exchange your mode of travelling when going towards your destination. Because the time of passengers is important, we like to be this highly efficient. In recent times, some want to grab a coffee, or a meal for the evening, but their basic interest is quick travel time. Currently stations are far more than that. Because of their pivotal location, especially for the central stations, stations evolved towards a destination itself, with restaurants, shops and office buildings. To stress the importance of railway companies in the earlier days, and nowadays to attract customers, many central stations are architectural landmarks within their city. Because of their importance, stations can play a forerunner role towards transitions in society. Think of the stimulus to switch from car to public transport, and the opportunity to make stations more circular and energy neutral. We have to look in a broader way at our central stations, including the relationship with its surroundings. Especially at upgrades and renewals we have the chance to re-design.

Over the past decade, the Netherlands has realised an impressive (re)development programme of railway stations, initiated by tackling with highly insufficient capacity, by the upcoming high speed trains, and by giving the stations a general upgrade. In the Netherlands central stations in Rotterdam, Amsterdam, Utrecht, Arnhem, Delft and Breda got major extensions and upgrades. The focus was mainly on three aspects: extra capacity for travellers, extra shops and restaurants, as well as an attractive environment by ground-breaking architecture. And the results are fascinating. The modest Rotterdam Central Station became a landmark in the city with eye-catching architecture, being also inside a very pleasant place to stay. The materialisation is beautiful, the ceiling decorated with wood for a warm atmosphere and at the platforms solar panels are integrated in the roof. The shops and restaurants on the corridor that connects all the platforms, got a facelift. When we have a look at Arnhem, the architecture is very iconic. In Delft and Utrecht, also new town halls on top of or next to the station saw light. At each of these three aspects: capacity, shops and architecture, the stations have incredibly been improved.

Rotterdam Central Station under construction, 2014.
© Manuela Triggianese

So, can we conclude that this programme is a success? Definitely yes, when you look at the initial purposes, and the related upgrades by re-designing the stations. But I think that in some way we missed an opportunity. An opportunity to redesign. The stations have been expanded and upgraded, but the system is still the same. In fact, the system originated from a small station with two tracks. Then the station expanded towards 4, 8, 16, ... and all the tracks were laid next to each other. The system didn't change: horizontal and still separated from other modes that are kept outside. For my mother who was travelling from her home towards mine, the hurdle why she couldn't come by train, was that she had to walk from track 16 to track 1 at Utrecht Central Station. Also, the ownership stimulated the direction of capacity, shops and architecture, because the shareholders responsible for this, were in the lead. Or was it the path dependency that led to thinking in the existing direction, held hostage by the starting conditions? Our own research[1] showed that path dependency is especially visible in the behaviour of project delivery organisations of regime players, that have the tendency to stick to previously developed solutions, focused on increasing efficiency, and tight control.

Interesting opportunities can be to consider a lane for electric cars (allowing others partners to enter the area) underneath the tracks, to facilitate efficient passenger flow within, and with outside the gated area of the railway stations. Or ideas to open up the existing buildings to other facilities than shops and restaurants, for instance from the creative sector. In other words: the use of the existing 3D-space in another way by adding functionalities. Inspiration for this can be gained from other (new) designs of railway stations, such as high speed line railway stations in China, or closer, Antwerp, or even airports. When we ask students to come up with new ideas, I am always surprised what a boost of creativity they show within one afternoon session.

At TU Delft Deltas, Infrastructure and Mobility Initiative (DIMI), we develop integral solutions for urgent societal problems related to vital infrastructure for water safety and smart mobility, which are intrinsic to the natural and built environment. An integral approach, in which different disciplines and organisations cooperate, provides the best guarantee for finding these solutions.

Recently at DIMI, we start making integrated designs for airports, cities and ... stations of the future! We bring together existing and potential shareholders (quadruple: public, private people, knowledge institutes). We start analysing the area in transdisciplinary teams. Teams with all kinds of practitioners, scientists, and students. Often we got reactions from designers such as: "this is the first time that I as an urbanist, work together with a transport specialist in these early phases of the process." We use design as a tool to analyse the area, challenges and opportunities, and also as a means to commu-

nicate among people with different perceptions and backgrounds, as well as for the visualisation of visions. To start from scratch, and with the goal to focus on 2040 or 2050, we stimulate people to step out of their comfort zone, to come up with new ideas and to incorporate technological innovations. Our experience is that some people are more problem seeking, others more problem solving; some think on a large scale, others on a small scale; some think of grand designs, other in detail engineering; some are people oriented, others are structure oriented; some think in area development, others in transport, etc. We have the belief that all insights are important and have their place in the process. By combining all kinds of perceptions and skills, we come with new insights, that stimulate thinking in new directions. Of course, we have all kinds of practices to stimulate interaction in smaller and bigger groups. And in the end, we want to come up with practical solutions helping creating vibrant and vital station areas.

I hope that this publication will give you some of these new insights from our integrated and transdisciplinary approach and will stimulate creativity which will help you determining the future of our stations.

Note

1
Hertogh, M.J.C.M., Westerveld, E., 2010. *Playing with complexity. Management and organisation of large infrastructure projects.* Erasmus University Rotterdam.

Smart Urban Mobility

Arjan van Timmeren
Tom Kuipers

AMS Institute
Amsterdam Institute for Advanced Metropolitan Solutions

The world has been shifting its attention to cities in a new dimension: billions of government funding targeting smart city initiatives and large industry players centering their growth strategies and investment plans on frameworks tackling urban solutions. An urban-centric position is being assumed by a variety of stakeholders engaging with a leapfrog related to sustainable development, better use of resources and infrastructures, improved equity, government transparency, quality of life and the technology innovation and urban dynamics amongst others.

One of the biggest challenges for urbanizing cities all over the world is to ensure that urban environments match basic human needs in order to provide good quality of life. However, cities often perform poorly when it comes to creating environments that are safe, inclusive and healthy and provide sufficient room for social interaction and daily (physical) activity and all mobility related to that.

(Train) Stations, from their introduction in the nineteenth century on, have played a key-role in sustaining and adapting such urban dynamics and balancing diverse aspects within the fragile balance, or reciprocity, between cities and their hinterlands, between people and place. Although main functionalities of the (train) station remain, the role of the station within the urban system has changed and both station and the mobility system are becoming increasingly complex. With new modes of transport, growing volumes of passengers and goods a more personal, adaptive approach towards traveling (MaaS, Mobility as a Service), and the availability of information and data, the station is -more than before- becoming a hub in our daily life. The increasing deployment of digital technologies in urban space and particularly mobility (concepts) is allowing a new approach to the study of the built environment and the conception of urban solutions. The way we describe and understand cities is being radically transformed as are the tools we use to design, plan and manage them. This development opens up the opportunity for the emergence of a new field of research and development in applied technology, at the crossroad of the physical and digital sides of the urban

domain. Nevertheless, effective designs for metropolitan solutions in general go beyond technology, involving the entire socio-technical system, including social engagement, policy development and financial engineering.

Mobility hubs, such as railway stations can be considered condensed representations of this, as they have become much more than transfer points. They are 'places to be', both for mobility and non-mobility related facilities and activities, and not only places to pass through. They attract investments and play an essential role in urban development strategies of their surroundings. Within a delicate balance of 'costs and benefits' this approach makes such developments more complex by the day. Together with the more recent rise of the 'smart' station concept and the use of new technologies, the topic of (train) stations of the future has become one of the main joint focuses and projects within the collaboration between AMS Institute (The Netherlands) with Paris (France).

In this context, the 'small' metropolitan area of Amsterdam, within the larger Randstad, continues to be a great metropolitan force. The city combines many qualities including the urge to innovate, a long history of excellence in urban planning at all scales and a way of dealing with (unforeseen) change. This has helped to build the AMS Institute's excellent 'Smart Urban Mobility' research theme, deployed at all times in consortia of pioneering stakeholders, representing the quadruple helix (academia, private, public and users/citizens). The 'Smart Urban Mobility' research portfolio contains a broad variety of projects that help understand major mobility challenges the metropolitan area currently face and find (innovative) solutions to improve the cities' spatial and functional quality and the quality of life of its citizens. Through research projects, AMS Institute works on a number of specific topics. On (1) understanding and predicting the dynamics of mobility by collecting and fusing data from a multitude of sources (2) Autonomous vehicles on land and on water and their impact on mobility and the built environment (3) Active mobility and the behaviour of pedestrians, cyclists and crowds and (4) The new role of public transport in cities as part of broader Mobility as a Service development. All aiming towards improving accessibility and the movement of people and goods, reducing congestion and air pollution and with that rethinking the mobility system and how we interact in and use existing spaces.

In a city where physical and social interaction is encouraged in a healthy way, the level of inclusiveness is consequently higher. Public spaces and public hubs, such as (train) stations have the power of democratically inviting all city users when designed and implemented correctly and providing (connections to) a better quality of life for different social groups.

AMS Institutes fosters sustainable value creation, towards a unique, contemporary and vibrant environment for learning, discovery and innovation.

The book 'Stations as Nodes – exploring the role of stations in future metropolitan areas from a French and Dutch perspective' is an extremely 'rich' and appealing outcome of such an environment and collaboration. A representation of explorations by the brightest, most entrepreneurial talents in advanced applied technology and design, always with the aim to find real life solutions that will transform cities towards prosperous, dynamic and adaptive living environments.

Mobility as a Driver of Urban Change

Kees Kaan
Manuela Triggianese

Delft University of Technology,
Faculty of Architecture and the Built Environment, Chair of Complex Projects

Undoubtedly there is an unbreakable relation between the changes in human mobility and the appearance of our cities. A town for pedestrians and horses has different physical characteristics than our contemporary city. Over centuries, European cities have developed into what they are now, strongly influenced by military, political, cultural and economic logic. For example, the traces of the water city are still apparent today in many Dutch cities, where canals once served as the main transport system.

The way we move goods and people has a defining impact on the way we inscribe the territory and thus how we organize our cities and how they take their physical shape. Naturally intersections of infrastructure within the urban territory generate extra activity and therefore those knots can become strong drivers of change**. The marketplace, a bridge, a hostel at the crossing of important routes, a train station or an airport become catalysers of urban transformations. Railway and subway stations, harbour terminals, ring roads, service stations, interchanges, underpasses, viaducts and airports, in short, cover a relevant portion of the landscape. Infrastructure and especially the railway has always played an important role in urban planning, changing the character of urban form, becoming the generator of new architectural typologies and urban configurations. The railway terminus, for instance, often served as the focus for planning or replanning towns and city centres. New York's Grand Central Station (1911) is an exemplary case, which has 'shaped the destiny of Manhattan'.**[1]

The nineteenth century marks the birth of the railway. **Railway stations not only heralded a new age of travel, they took the form of city gates with a monumental character. More than the role of entrance into the city, as demonstrated by the great Victorian station King's Cross in London (1852) or Cuypers' Central Station in Amsterdam with its Renaissance-derived façade (1881–1889), the station also provided urban and rural populations with a social centre, acting as a focal point for the community, as a centre of the** industrial society.[2]

There are, in fact, different types of trains. The ones that travel long distance and cross the continents, and the metropolitan trains that support the growth of the Metropolis**.**

Since its origin in Europe during the Industrial Revolution, rail transport has relied on heavy investment in tracks crossing the territory and train stations at important junctions and on the edges of cities. The train has spurred territorial polarity and strong densifications at hubs. Once the lines are in place and the intersections have been formed, flexibility is practically gone. The train is bound to tracks, it's a 'vectoral' modus of transport. The knots in the system become very dominant in the development of the metropolitan area.

The twentieth century brought us the car, a much more versatile and flexible vehicle. Though it cruises the road it can be used on roads that vary from a simple sandy lane to a hypermodern motorway. By car we can go anywhere. The car spurs sprawl. It gave birth to the Megalopolis. In the beginning the radius of cars was limited and for longer travel we still depended on the train, but towards the second half of the twentieth century we could cross Europe or the USA by car as easily as by train. Nevertheless, the train, a collective modality, with its dependence on high investment is likely to be a transport mode with a public character, the car is very suitable as a private asset. The car became the symbol of the twentieth-century rise and freedom of the middle class, its impact was so big that a car-oriented society developed. The car made it possible for urban territory to expand over large areas with suburbs and new towns to spring up anywhere. The car was the main driver of sprawl.

Another important development in the twentieth century was transport by air. Over decades the airplane became available to the middle class to move around on a global scale. The airplane is not bound to tracks, but it relies heavily on the existence of proper and safe facilities to land and take off: the airport. Basically, the airplane also spurs multipolarity, but on a global scale: airports became a network connecting the global metropolitan city-regions.

European cities have grown and developed as sprawling and fragmented entities interconnected by a system of infrastructure, in which transport networks have assumed a prominent visibility and importance. After the Second World War, the development of the city in the Netherlands, for example, was mostly driven by land and air transport, that for the first time took over the system of canals.

Near the end of the twentieth century the high-speed (HS) train, a new modality, brings the train back into competition with the car for distances of 100 to 300 km and with the airplane for distances of 300 to 1,000 km. Since the fast train is compatible with the stations of the 'regional' train, it impacts heavily on urban development. Most train stations go back a long time and are positioned at very strategic locations in the metropolitan areas. The fast train also makes use of these hubs. It does not need a remote site from the city, like an airport does, but the fast train can simply enter the heart of the city. With the fast train the 'vectoral' modality makes a comeback and

further sprawl can be limited. Therefore, the last decades we can see a revival of high density city centres. This development makes the train station once again one of the most important 'intermodal nodes' and therefore a driver of urban change, especially when it is also linked to a high-performing road system and near a global hub, such as an airport.

This century – characterized by a mobile society[3] – represented a turning point in the history of railways in Europe, observing increased shares of high-speed trains (HST) and light rail + metro lines in the modal split of passenger transport. Looking at the HST stations and also airport stations with the increase of mobility and number of users, a new category of buildings has appeared with complex programmes never defined but always in continuous development. Particularly the building of HST station leads to very high expectations for the growth of the surrounding neighbourhood. When located in the middle of the city, or in dense urban areas, the station leads to large-scale development plans, as happened in the Netherlands with the national key projects[4], while when located on the periphery, such as Lyon-Satolas in France, the big plans have yet to prove that they are indeed catalysts for the region's growth.

Since a train station is and has been at the heart of so many changes in the city over the last 200 years, it represents an important case study to analyse. The complexity of the redevelopment of a station building and its district has to do with several factors: the number of stakeholders involved, their ambitions and expectations, the financial conditions and unpredictable economic and political fluctuations, as well as the urban configurations of the station location – being both an infrastructural project and an architectural and urban design intervention.

In line with the assumption that 'mobility is a driver of urban change', at the Chair of Complex Projects, Department of Architecture at the Faculty of Architecture and the Built Environment Delft University of Technology, we are working in collaboration with Amsterdam Institute for Advanced Metropolitan Solutions and Deltas, Infrastructure & Mobility Initiative on an education and research project with the Randstad (the Dutch Metropolis) as a living laboratory. In this project we assume that urban changes are primarily dictated by economically strategic areas that grow more rapidly than others, such as areas around mobility infrastructure and intermodal nodes, like stations and airports. The station as a strategic intervention is the focus of the research initiative presented in this publication on French-Dutch approaches.

In the process of 'permanent change' of mobility modalities, the pressure is on main stations and it is increasing their spatial, organizational and financial constraints. Crucial questions for the design are: How can new mobility concepts be integrated with the station being a public transport hub? In complex projects with numerous

New York Grand Central Station, 2018.
© Manuela Triggianese

stakeholders and long lead times the scope itself is subject to design. The need to share the proposals and discuss them with stakeholders demands a design approach to establish the communication and to develop the scope. Therefore, design is not only seen as an activity to develop a model for a possible future but design is also a tool for communication.

Our approach in education, as illustrated in this publication by the summer school 'Integrated Mobility Challenges in Future Metropolitan Areas', is to use the design of strategic urban interventions as a didactic research tool for training students to develop a narrative and an open and curious attitude about design solutions and products of the design process. Especially on the subject of large-scale projects, where the interplay between multiple actors and the complex interventions gets another dimension, the notions of 'learning through doing' and 'thinking through design' are important.

Notes

1
See Parissien, Steven. 'Station to Station' 1997

2
In the catalogue of the itinerant exhibition at the Centre Pompidou *Les Temps des Gares* (1978) Jean Dethier presented great stations as 'centers of the industrial society'.

3
For a definition of mobile society see Bertolini Luca. Fostering Urbanity in a Mobile Society: Linking Concepts and Practices, Journal of Urban Design, Vol. 11. No. 3, 319–334, Oct. 2006

4
Due to this complexity, many station projects can take 10 up to 20 years to be finalized, as demonstrated by the Dutch key projects, the development of the main (new) stations and urban programs around them in the cities of Amsterdam, Rotterdam, Den Haag, Utrecht, Arnhem and Breda. For more information about the development process and design of the National Key Projects in the Netherlands and their future, see also: Bureau Spoorbouwmeester (2016) *De Nieuwe Sleutelprojecten. Op weg naar 2030.*

Research & Enquiry

RATP

Intermodal hubs as urban spaces

Yo Kaminagai

RATP (Régie Autonome des Transports Parisiens)
Head of Design

The urban transportation networks are made of different graded modes, from long distance or regional trains to metros, trams and buses, with collective or individual vehicles, with regulated or unregulated and free systems, and now with possible new autonomous vehicles. The places where they all meet and connect are essential: most of the urban travellers use more than two modes and have to cross these nodes called stops, stations, interchanges, or hubs. While they are passive in the vehicles during the movements, served by the transport operators, it's the contrary in these places where they must be active and perform themselves to access to the vehicles when they link two modes by walking, going up or down in staircases, and also finding to the good way to follow.

Even if changing from one line to another seems common for most of the city-dwellers, many hubs are considered as difficult or very difficult in a customer-centric approach, especially if they are big nodes (like Shinjuku in Tokyo, Châtelet in Paris, Catalunya in Barcelona or King's Cross in London ...), or if they include bus stations, representing in many countries the worst pain points along the passenger's trips.

Until now, numerous local or general studies have been done in many countries, producing governance recommendations or practical design guidelines to be applied in the new infrastructure projects, in order to improve the intermodal quality in the interchanges. The European project **NODES**, under the leadership of UITP from 2012 to 2015, was one of the most complete approach of this subject: it could identify more than 120 tools or methods to assess, plan, develop, design, operate and maintain the urban transportation hubs, and these elements were delivered in a classified toolbox, still available on a dedicated website (www.nodes-interchanges.eu).

Despite the evidence of the value of good hubs in the urban daily life, many transportation policies still rely first on new lines to build or to extend, on new types of vehicles and on new technologies. Unfortunately the improvements or reconstructions of places often remain implicit or secondary: for most of the elected local authorities promising a better future in mobility, and also for the strategic consultants working on the future of urban transportation, the kilometres of lines, the design of new vehicles or the intelligence of new digital services still remain as the main objectives to serve.

Fortunately, some countries have begun to understand that these actions should be completed by major improvements of the urban hubs, beginning by those based on the main railway stations like in the Netherlands. In the new law in preparation in France (LOM, Loi d'Orientation des Mobilités), the objective of "a more intermodal mobility" is finally written at the same level as the other objectives (e.g. "a more secure, more connected, more sustainable mobility"), and directly linked to the governance questions, which appear pivotal to solve to improve the intermodal issues.

But in general the hubs are still too much considered as the adjustment variables of the mobility policies and not as actual strategic aims, because building the lines infrastructures and offering quicker vehicles

seem obvious targets in the mental image of many stakeholders. However, the good feeling resulting from a fast and comfortable travel on a railway and a practical trip on a local bus can be completely destroyed by a difficult usage of a long and tiring interchange.

Through the **NODES** project, one of the main findings was that most of the present hubs were resulting of additions and juxtapositions and not of fusions and combinations. The paradigm shift included in these concepts is difficult to accept and event to understand because of the funding saving requirements in the new projects: it seems always more difficult to combine old and new infrastructures (instead of planning the new ones beside the existing and connecting them), to include public spaces evolutions to an underground or elevated infrastructure perimeter, or even to superimpose a transport project and an urban real estate project. Nevertheless, the most sustainable solutions observed in the world rely on global approaches considering all the parts of an urban hub as a whole.

To improve the urban life, we know now that we must plan more compact, more legible, more user-oriented hubs, considered at the same time as transport stations connecting all modes, and as urban objects with all the functions making a city lively and economically attractive. The **RATP** has made a study called Osmose[1] in the recent years to contribute to the Grand Paris network stations, and the main findings were the following: the new stations should be enhanced (not limited to transport functions), shared (not operated only by transport operators), scalable (able to easily include new functions or new modes), and architecturally expressive (not to become common too quickly). Such places should always be considered as urban intermodal hubs creating value for the city and not only as simple transport stations.

Nowadays, the hubs issue is becoming trickier because they are stressed by the fast arrival (and disappearance) of new types of vehicles competing with their brands (shared bikes, electric scooters, mini-cabs, ...), and the emergence of new modes of usage (car sharing, carpooling, ...). How to regulate unregulated systems? How to organize a physical space to welcome these new vehicles without bothering the existing scheduled lines? How to make legible these places for all the types of users? Even if all the digital services can facilitate and make more fluid the use of all these modes, the question of the physical organization of the encounters between each person and each vehicle will remain difficult to solve. Urban hubs definitely represent a concept to reinvent, especially because many of them are located in dense and central districts where the land use is strongly constrained.

On the bus terminals issue, the **RATP** has identified several concrete possible changes to improve their "urban print" in the cityscape and to transform their use in positive moments of the daily travels. Instead of gathering bus stops along unfriendly platforms, the new concept will contain a technical bus reservoir hidden in a neighbouring building, compact spaces for waiting passengers with a positive atmosphere offering useful services, and the station will be possibly included in a real estate program with a high class architectural project. With these principles making concrete the Osmose study for the bus

mode, the hope is to make this type of hub also attractive for the local authorities and for service providers.

Last point, for the people and for the business: because a transfer will always take time, a hub is the best place to offer useful and practical services. Some examples, like many Japanese local stations, the Munich urban transport underground interchanges or many main lines termini in Europe show that they are the most practical shopping centres for the daily travellers. If shortening physically a walk between two points is impossible in a hub, why not shortening it psychologically?

As conclusion, we can affirm that an urban mobility hubs improvement program for each multi-modal network, for each city, seems to be able to really contribute to the global urban mobility quality. So "let's hub"! Let's transform the word "hub" in a positive verb meaning innovation and progress towards a better daily life for the urban citizens!

Notes

1 Gare Osmose see link: https://www.youtube.com/watch?v=R7-bG4kp7Bo

Gare de Lyon
Photograph by the author

Contemporary dynamics of stations: aspirations and contradictions

Nacima Baron

Université Paris-Est,
École d'Urbanisme de Paris

Introduction: The Station, a Great Urban Moment

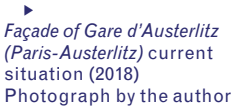
In France and elsewhere, a host of big projects are transforming railway stations and their surrounding districts, and this dynamic will continue for at least a decade to come. In Paris, all the big terminus stations have undergone or are soon to undergo major developments, and the future stations serving the express metro will further prolong this dynamic of construction in the inner suburbs. In the new regions, the Metropolitan stations associated with the TGV (Train à Grande Vitesse) and the TER (Transport express régional), such as Rennes, Bordeaux, Montpellier, Grenoble, and Nice, are also affected, and mid-size cities seem to be pursuing the same trajectory. Though all the stations have different programs, many of their elements seem linked: development of retail outlets, upgraded forecourts, office construction in converted station halls or refurbished rail premises, introduction of co-working centers, cultural exhibitions and festival happenings...

How is this movement to be understood? The architectural and urbanistic adaptation of stations reflects and reveals an effort towards the intensification and diversification of assets. The term assets should be understood both as land resources usually located in the heart of cities, and as the resources constituted by the exceptional concentration of passenger flows (including a varying proportion of tourists) and more broadly of city dwellers, who for a few minutes or a few dozen minutes are held captive by the arrival of a train. With 'big data', the ability to predict the practices and behaviours of these users, their mobility and purchasing patterns can also be considered as a further strategic asset around which ferocious competition takes place.

Governance Challenges

All these potential economic resources demand the introduction of multi-scale regimes of governance and management in order to control station systems that are nested within each other like Russian dolls: station projects in France generally fall within the ambit of Gares&Connexions and its subsidiaries and partners in SNCF (Société nationale des chemins de fer français) – Parvis, Retail&Connexion, SNCF Immo and Espaces ferroviaires; station hub projects are of particular interest to the actors who operate in the perimeter of the rail system and associated public transport activities (urban transport authorities, cycle hire firms, taxis, etcetera). On an even wider scale, station district projects cover areas of tens to hundreds of hectares, and are of interest to all public authorities, including regional authorities and central government, giving rise to more diverse and longer-term urban, economic and financial partnerships targeting the regeneration of a section of dense, mixed and intense city fabric (Bordeaux Euratlantique, Euralille, etcetera).

This article will begin by outlining the explanatory factors behind the main architectural, functional and symbolic transformations to stations, and will then go on to explore how the multiple demands,



Façade of Gare d'Austerlitz (Paris-Austerlitz) current situation (2018)
Photograph by the author

expectations or pressures around stations make sense together or, conversely, reveal tensions, expose divergences of interests and objectives, or even lead ultimately to contradictions.

First, the legal and economic transformations that have taken place in the sphere of rail operation in the last 20 years or so constitute one of the main drivers of the current changes to stations. In the past, or more specifically at the time when the big private companies established the rail system, the function of the station was simultaneously technical and metaphorical: it was an embarkation point, which provided access to the train; and it embodied the prestige of the company, what today we would call its 'flagship', hence the attention paid to its frontage onto the city. In any case, the station was a cost component in the railway system, or to put it differently, the train paid for the station, since the companies' revenues were generated by the transport function.

Today, the approach has been reversed: the station also pays for part of the train and the rails. As the 'historical' rail companies (SNCF, Deutsche Bahn and so forth) have adapted to the new rules of the unified rail market, stations have become the object of major investment, in the hope of achieving returns large enough to correct big balance-sheet debt burdens. Stations as sources of value creation are becoming essential to the operation of the rail system. At the local and regional levels, they are also pivotal to urban regeneration and metropolitan development. This has led to the formation of a new ecosystem of actors interested in sharing space, responsibilities and potential outcomes. As a result, the pricing of stations has become a very precise exercise, under the vigilant eye of the regulatory authority (ARAFER), leading to a close-grained calibration of station areas and services. Employing a model quite close to that of the airport sector, unit pricing corresponds to the sum paid by the rail carrier to board and disembark its passengers in a given station. The rail company rents ticket sales spaces from Gares & Connexions, and grants restaurants or any other retail outlets operating licences within a complex framework that takes into account the station's position in the rail network, service levels and frequencies, the types of train and line, the location of the outlet, the scarcity of space, the range of intermodal services, the urban and tourist environment, and of course the scale of passenger flows and their specific contributive capacity.

Stations Technological Turn

This first contextual element interacts with a second factor that is equally profound and powerful: digital technology. Stations and smart phones share a characteristic, in that the former integrates human flows and the latter integrates data flows, and that the two join forces, or rather hybridize, to produce radically new conditions for the use of stations: this hybrid transforms access to the traditional functions of stations, that is information on where to board different trains, advance or immediate ticket sales, access to luggage lockers or car parks, as well as the experience of waiting, of strolling and of shopping. Through the omnipresence of Wi-Fi, GPS and a multitude of apps, the station becomes a tertiary zone dedicated to a range of extremely personalized solutions. In addition, while the station becomes an essential facility for cities, and in particular urban tourist destinations, the smartphone has the property of modifying the perception and use of time in the station, and therefore the travelling experience as a whole. Fed with real-time information and therefore, in principle, relieved of uncertainty and stress, travellers are able to take greater advantage of their time and space. In this temple of speed and punctu-

ality, they can enjoy a bubble of relaxation, even a sort of parenthesis. Between city and journey, time spent in the station is the field around which teams of designers construct a rich and diverse experience of travel, which they perceive as a precious moment. Their activity consists of making the station a warm and human experience through the use of materials and colours, the construction of visual and acoustic ambiences or the invention of carefully designed décors. This special moment out of time is also an opportunity to offer commercial innovations, of which there is an ever-growing list: express hairstyling or a massage, salons de thé or top-rated chefs, 'Monop lab'... Even the traditional newsagent kiosks are being reinvented to offer comfort and enjoyment, erasing the traditional divisions between areas of flow (halls and passages), free waiting spaces (lounges of different levels and types) and retail zones.

Do the dynamics of innovation affecting stations all run in one direction? Do they reflect a sort of general underlying movement that nothing will be able to stop? Or conversely, could it be that this avalanche of systemic transformations is leading – by means of some process of substitution and replacement of one element with another – to a self-neutralizing change, a version of Guépard de Visconti's classic view that the more things change, the more they remain the same? Our answer to this is qualified. We propose to formulate it first by identifying the situations of friction, or even relative incompatibility, among the contemporary phenomena affecting stations, before focusing on the latter's contributions to new and emerging mobility practices.

Taming Congestion, Modulating Saturation

The first impressions that the traveller experiences in a big French station are agitation and saturation. The volume of human traffic moving in all directions, the visual and acoustic density of all the different but sometimes almost indecipherable mes-

sages (information panels or advertisements, announcements and so on) create an accumulation that can be oppressive. The addition of a host of new services of varying utility, such as the news bulletins, the 'smiley' terminals asking people to 'like' the station, the pianos, the tricycle sellers, the table football games, the picture walls, together form a baroque mix of spectacles. The ideal of legibility and transparency with which so many stations were built (think of the fine glass and steel buildings of the Mediterranean high-speed line, designed as balconies over the landscape) is countered by the overload of anecdotal objects or the profusion of signage that blocks visibility, affecting our ability to find our way in spaces that are growing much larger. Is it the pressure of the operators to achieve greater urban intensity and a better return on investment that produces this effect of busyness and compression, or does the drive to accumulate derive from a public company that is aware of the poor social image of the train (strikes and delays), and is trying to compensate in and through stations? In any case, the quest for a zen and minimalist station, pursued by ever better equipped professionals of architecture and design, enters into conflict with another trend that is difficult to regulate because of the normative changes described above, which is that of endless addition. Experimental innovation, the introduction of services of varying utility and trickiness, is creating stations that are varyingly busy and calm, noisy and quiet, and therefore possessed of a diffracted, fragmented spatial identity, differing not just from one station to another, but within each station.

The growing dissociation within the station between spaces and ambiances, between operational objectives and forms of regulation, constitutes a second impression that is apparent to visitors, since they themselves are increasingly encouraged to follow specific routes depending on whether they are business or leisure customers, individuals or part of a group, alone or accompanied by children... Behind this process of personalization of customer itineraries, also of course present in airport terminals, lie not only commercial objectives, but also very strong operational and managerial priorities. One of the emerging contradictions arises from the need to guarantee optimum movement around stations, in particular to comply with a series of standards (for instance fire regulations for train and platform evacuation), while accommodating and retaining enough visitors to facilitate the act of shopping. It is not a simple issue. In a building like the Gare du Nord, which handles more than 700,000 passengers a day, a 15-minute interruption in passenger traffic creates a blockage for almost 20,000 people. True, it might seem simple to separate waiting areas (like waiting rooms and lounges) and 'idling' halls or rooms more suitable for strolling. However, commercial logic dictates the need for maximum closeness to traffic flows where foot traffic is greatest. What are at work here are the tensions between the desire for speed and for slowness, between the pursuit of fluidity and retention, and finally between the station as a dynamic space, occupied by passengers (those preparing to board a train), and the station as a building that attracts customers (those preparing to consume, to spend time, to make the station an extension of the city).

Station Openness and Interaction with Local Dynamics

There is a third potential tension affecting stations in the opposition between the real effort to open them up to the city and the growing demand for surveillance. The new openness is apparent, for example, in cultural events. Cultural programmes

enable the station operators to capture the effects of urban centrality, to construct a 'village' atmosphere and to collaborate with the most advanced creative communities (artists, innovative groups, voluntary organizations). However, today, there is a powerful counterforce to this dynamic. Spontaneous flash mobs are forbidden. The reinforced security presence and the practice of evacuation procedures associated with the discovery of a 'suspicious package' generate palpable anxiety. Station operators today are forced to take a more systemic approach to the risks associated with security and rail safety alike (urban risks, environmental risks, risks associated with crowd movement, computer hacking, terrorism, etcetera). Creating emotion, surprise, spontaneity and empathy among travellers in a security context is not easy, and the role of technological instruments (the proliferation of CCTV and tracking software) under these conditions is somewhat ambiguous, since they simultaneously govern and limit such a trend.

The final form of competition and potential friction is apparent in the strategies at work in the land ownership and real estate spheres. As we have seen, access to the station is a significant factor in the valuation of land resources. Proximity to the station hub is too: design offices have taught us to interpret station plans in terms of concentric circles – the buffer zone identifying streets with the best connections to station entries and exits, ZAC (agreed development zones) with the best access, in a sense 'irradiated' by the presence of the station. This spatial approach, often applied on a very close-grained scale, generates big differences in land and property values between the districts of a city, even before the beneficial impact of the station in terms of urban attractiveness has actually been proven. The common confusion between the optimum zone of access on foot and by bicycle (300 or 500 m for walking, 1 to 3 km by bicycle) and the actual influence of a station on its surrounding area (obviously much greater, and not necessarily mappable in terms of these buffer zones) constitutes a divisive factor, as if the inclusion of a building or a facility within or outside the field of influence of the station could be determined in advance by a distance effect. We know that many other factors play a part, such as the reputation of the station district (which varies greatly between cities), topographical factors, sociological aspects and so forth. Indeed, it is interesting to observe how actors in the urban and economic spheres sometimes employ tricks or diversions. For example, we see the emergence of 'third places' which, by their name and address, are symbolically associated with the station, while remaining prudently separate from the station footprint, in order to enjoy the benefits without suffering the constraints. Co-working centres or office buildings may be built across the road or opposite the forecourt, or even on the edge of these station hubs, in order to enjoy the advantages of contiguity, of proximity or of connection, without bearing the costs and inconveniences of presence within the station boundaries, such as noise or security constraints. These questions of spatial adjustment are critical; they prompt the backers of station redevelopment projects to reconsider and adapt their business models. Rail operators are being obliged to upgrade old station buildings and therefore undertake major refurbishment costs, at a time when the competition for temporary workplaces is visible a few meters away in new office buildings.

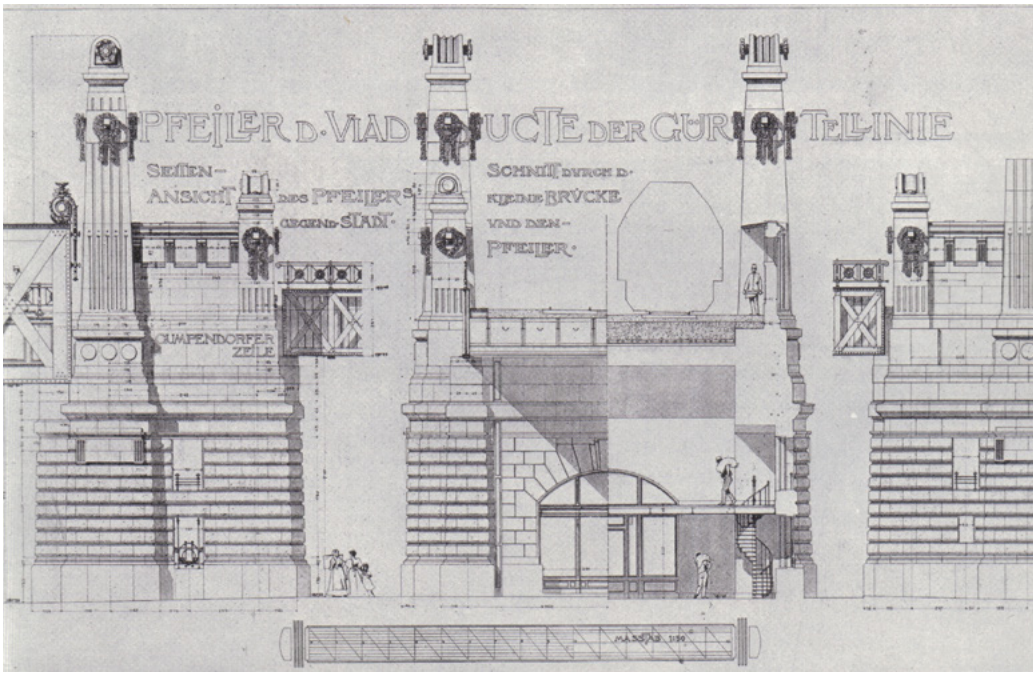
Conclusion

Stations Are Not Only Flow Containers, They Are What Diverse People (Urban Society, with Its Inherent Potential for Conflict) Make of Them

These different points show the complexity of the issues around the upgrading of contemporary stations. They lead to discussions and feedback that are developed further on in this book. Research across all disciplines has been directed towards some of these questions, with the aim of reaching a more systematic understanding of the highly variable forms of cooperation between the different types of institutional and economic actors associated with the change underway in stations. These layers of contradictions and tensions cast light on the reality of the competition and conflicts, explicit and implicit, arising around and because of stations. This is no reason not to tackle these objects as genuine arenas of political controversy, or not to examine them as mirrors or laboratories of the urban development of the future. In any case, in identifying the criteria of effectiveness for the promises they express, the criteria of efficacy of the solutions they propose, or indeed the efficiency of their impact on the territory and the destinations that they serve, there is one central element that cannot be neglected. Whether we call them pedestrians, passers-by, users, passengers, customers, city dwellers or neighbours, everything hinges on the people who live the experience of stations. We need a close-grained understanding not only of their mobility expectations and behaviours, but also of sharper and more subjective – or qualitative – perspectives: tolerance for (and resistance to) innovation in stations; degree of adoption (or indifference) with regard to the changing opportunities provided by stations; collective factors (social interactions, rejections, tropisms); emerging collaborative uses, while bearing in mind how the experience of mobility is made up of many dimensions and projections other than travel alone.

▸
Façade of Gare d'Austerlitz (Paris-Austerlitz), postcard


292. — PARIS — Gare d'Austerlitz
P. Marmuse, Paris



Otto Wagner, Vienna Stadtbahn, drawing of a viaduct on the Gürtellinie Source: Otto Antonia Graf, Otto Wagner, *Das Werk des Architekten 1860–1902*. (Vienna: Böhlau), 1985.

Stations and station areas: envisioning spatial integration with the city

Roberto Cavallo

Delft University of Technology
Faculty of Architectureand the Built Environment

Introduction

Today, in the 21st century, the constantly growing demand of mobility claims an important position in the current and future agenda of cities. In addition, the necessity of improving public transportation networks as alternative to congested vehicular traffic, together with the urgency of developing environmentally friendly mobility solutions, poses very complex prospects for all involved actors. This issue is becoming even more challenging when looking at the current development strategies of transportation nodes in many European cities, particularly in the case of railway nodes: densifying and increasing urbanization around railway hubs via mixed use interventions combining effective public transportation with high quality public areas. As matter of fact, the above mentioned framework applies to several cities in The Netherlands. With the 2008 crisis left behind, the main Dutch cities are currently flourishing and attracting more and more people and activities within or very close to their centres. The positive economic climate favours investments, the number of jobs is constantly increasing and, subsequently, the demand of housing in the main cities is running sky high. With regard to railway nodes, higher frequencies of transportation, the accommodation of different flows of traffic, the increased variety of functions as well as number of users, and the necessity of attractive public spaces, is requiring stations and station areas to be repositioned and to transform towards much strongly integrated and interactive public (transportation) poles in their urban context.

The aim of this essay is to focus on the integration of railroads and stations in the urban context, drawing particular attention to the architectural approach and touching upon the way new forms of interaction with the existing cities can be envisioned. Starting with some historical premises about the matter, one excellent example from the past will be illustrated, the Vienna's Stadtbahn by Otto Wagner. This project is still very contemporary with regard to the approach towards integration of railroads and cities. The final reflection will be addressing the stations of Amsterdam Central and Amsterdam Sloterdijk. Some of the themes, very clearly tackled by Wagner's project, are actually very fruitful contribution particularly when thinking about several spatial but also functional challenges that current stations and station areas bring about.

Railroads in the urban context of the modern city

In the course of history, the integration of railway yards and stations into urban areas has been always a rather problematic matter. Although often kept out of the historical cities, the first railway lines and stations became part of the urban landscape rather quickly, but only by being functionally and economically related to the city. When cities expanded and train tracks were suddenly laying into the city, this relationship changed drastically. The main problem is that, for various reasons throughout history, it has always been quite complicated to combine other types of urban circulation and functions to the railway yards. Railways are by nature too

▸ *Mollen—Theatre at Sloterdijk Station*, 2018
Photograph by the author

often physically disconnected from their (urban) environment, forming an autonomous transport system that follows the logics of efficiency in performance and technique, even when they are located in central urban areas. According to this practice, many railways have been built in the past without considering their integration into the surrounding (urban) environment. On top of this, stations as well as railway yards, due to the expansion of cities and the rapid developments around railway terminals, ended up being completely enclosed by urban fabric; phenomena like ribbon developments and fringe belts[1] became more and more common. Typical 'fringe belt' buildings had no fixed characteristics and, depending on their functions, had fronts or, more often, backs facing the train tracks. While the city was further developing, reaching the railway tracks, the characteristics of the fringe belt zone did not change. Even when the railway is located in the city centre, this tendency does not show any major mutations over the course of time. Long blind walls mark the boundaries between city and railways and the backside of most buildings face the tracks. Nevertheless, already from around the second half of the 19th century, the necessity of changing the identity of stations from mere shelters for trains to modern gateways to the city came about in a rather substantial way. Meanwhile, with the construction of metropolitan railway lines, railroads started to play a role themselves as a means of urban transportation. It became than evident that, in order to accommodate trains in the existing cityscape, the construction of metropolitan railway lines required a different architectural approach; in order to build stations, viaducts, tunnels and bridges in existing cities, the expertise of architects was needed.

The Vienna's Stadtbahn

The debate about expanding modern cities finds in Otto Wagner one of its most remarkable advocates. This theme was already a subject in Wagner's writings. About the modern city he stresses in his book Moderne Architektur**: "their unprecedented size has given rise to a number of new problems that await an architectural solution."[2] Wagner underlines the need of technologically advanced transportation systems as the backbone of the ideal city. The new problems awaiting an architectural solution become visible when the new railway system needed to be integrated in the existing cityscape. The railway with its iron bridges and viaducts, symbols of the modern technology but traditionally belonging to the world of engineers, is considered a threat for the existing city and its monuments. In this respect the mission of the architect is to harmonize the realistic and practical approach of the engineer with the more idealistic attitude of the artist.**

The participation in the competition for the Stadtbahn **in Vienna in 1890, is for Otto Wagner a unique opportunity to deal with this issue in practice. In the various projects for the railway system presented since 1871, the main concerns of both municipality and public opinion were on how viaducts and railway tracks above ground could be appropriately combined with the existing city. Wagner won the competition by proposing six lines in total, four of which would be realized. The commission choose Wagner probably because in his plans the elevated part of the metropolitan railway is reduced to the minimum. But what makes Wagner's proposal extraordinary is the powerful range of drawings wherein he envisions the integration between infrastructure and city. The production between 1894 and 1900 of almost**

2000 drawings for the Stadtbahn confirms Wagner's determination to control every single detail of the project.

In the final realization we can identify various stylistic tendencies, particularly in the stations of the various lines. In the extension of the Wientallinie line, the Donaukanallinie, we can observe more formal research by the architect. This line develops itself along the embankments of the Donau canal and thereby represents a transition between nature and city. This part of the Stadtbahn is completely integrated in Wagner's proposal for a general plan of the city of Vienna, including the Stadtpark and the re-make of the canal embankments. His drawings for the rearrangement of the Donaukanal are the first studies to assemble two new urban routes lying on different levels.

In the most peripheral line, the Vororterlinie, Wagner designs several types of stations stylistically different. A remarkable example is the Unter-Döbling station. Wagner's various studies about the relationship between city and infrastructure become completely explicit, in my opinion, in the Gürtellinie. This part of the Stadtbahn, characterised by the alternation of bridges, viaducts and walkovers, crosses almost all city radials connecting the heart of Vienna with the outskirts. In the main traffic points, Wagner treats the side elevation of the railway viaducts like the facade of a building. In addition, Wagner studies carefully the overlaying points between railway and city, controlling as much as possible the impact of the infrastructure on the existing urban context. In several illustrations Wagner shows how the new railway line could be superimposed on the existing urban tissue; this is clearly visible in the drawings by means of broken lines projected on the urban plan.

The famous perspective drawings for the Hochbahn-Viaduct and the pavilion on the Elisabethplatz are clear examples of Wagner's interest in the architectural problems of the modern city. Wagner's studies on the integration of architectonic prototypes in the urban scenery, without any reference to precedents, are quite unique for that time. The viaducts fulfil a double role. On the one hand they statically support the tracks on the higher level but, on the other hand, they function as buildings with facades on the street or facing the square. Following this interpretation, we could consider these elements as hybrid buildings produced by the development of the modern city. On the same level of the street or square we find not only the access to the station or the accommodation for the railway machinery, but also other commercial activities, often housed on two levels under the viaducts. Therefore, these 'new buildings' are not only prototypical by means of their integrated architectural

features, but are also effectively part of the city through the interaction fed through the activities and the functions they house.

Yet, Wagner's choice for the perspective's viewpoints brings about the experimental character that he entrusts to his drawings. He controls the perception of the entire urban space as well as the proportion of viaducts from man-height viewpoints. It is for this reason that, as Günter Kolb notes in his publication on the project,[3] the viewpoint in Wagner's perspectives is very decentralized in relation to the drawing frame. By making the drawings in this way he can appropriately show the right proportions of the different elements composing the street. Pylons and walls, the main structural elements of the viaduct, are placed parallel to the direction of the street, underlining the urban continuity at ground level also in the presence of an underpass.

These hybrid buildings are treated almost as monuments envisioned as architectural symbols of the modern city. As already mentioned before, the means of transportation becomes a building with facades but also through the enclosure of functions; it is not a barrier anymore but it integrates itself in the cityscape. This is one of the most innovative aspects of Wagner's work; he is fascinated by the possibility created for the traveller of understanding the city through another perception and speed, thanks to the new means of transportation. In some of his writings he describes the coexistence between railway and city in a romantic way, fitting to his period, but at the same time with the firm conviction of a Modernist.

Beyond mobility; towards attractive public space in Amsterdam' stations and station areas

Urban transformations and increase in number of users, both visitors and locals, required many adaptations of Amsterdam Central Station throughout history. While the flux of users continues to grow, the amount of public space stays the same. This is the cause of increasing pressure on pedestrians, cyclists and drivers, bringing along the negative effects of overcrowding. In order to cope with this problem, a major redesign addressed recently the space historically 'behind' Amsterdam Central Station, where the many ferries take cyclists and pedestrians commuters across the IJ river to Amsterdam-Noord. This public space has been recently delivered following the idea of shared space[4], avoiding the use of traffic lights. This concept is also bringing a new dimension of interconnection between station and its surrounding area. The traveller space intertwines with the public space, making these two spatial entities, usually rather separated, merging into one another, echoing the fundamental spatial ideas brought forward in Wagner's project. Subsequently, and in line with the contemporary tendencies, the station area is becoming more and more a multifunctional gathering place for the public, whether travelling or not. This is underlined also by the integration of leisure activities and new public spaces in the renewed spatial configuration of the station, reinforcing the role of Amsterdam Central as prime urban destination. An example is the Lil'

Amsterdam[5] venue, a multifunctional event space positioned in the historical part of the station complex, an attraction for visitors of different ages. Yet, the Cuypers passage for bicycles and pedestrians, with the very attractive Delft Blue ceramic pattern on the walls portraying some important moments of Dutch history, and highlighting the link between mobility hub and the monumental station.

Although via different kinds of processes and initiatives, similar ideas are taking shape also in other stations. In this respect, the case of Amsterdam Sloterdijk is definitely interesting. Most probably triggered by the recent financial and economic crisis, the area around the station has been the theatre of a number of bottom up interventions that delivered a renewed dynamism, particularly in terms of conveying other (public) activities next to the main purpose of travelling. Café Bret**, but also the reshaping of the front station area, the so called** Orly Plein**, made the immediate surrounding of the station much more attractive for the public. Thereby, other projects, like the crowd funded vineyard** Tuin van Bret**, but also the realisation of couple of extra bars in small pavilions located in the vicinity of the station, contributed to an increased liveliness in a neighbourhood that only couple of years ago was one of the most unattractive areas of the city. Last but not least, thanks to the new policy of NS Stations[6], and although without undergoing major spatial upgrading, it is worth mentioning the inside space of the station itself, where some interesting cultural activities took place, like the live theatre spectacle** Mollen **in May-June 2018.[7]**

Also in the case of Sloterdijk it is clear that station and station area are attempting to get ready for future transitions, where traveller space and public space should smoothly merge into a high quality urban configuration.

Notes

1
For a detailed explanation about fringe belts, see B. von der Dollen, "A historical-geographical perspective on urban fringe-belt phenomena," in T.R. Slater, *The built form of Western cities. Essays for M.R.G. Conzen on the occasion of his eightieth birthday*. Leicester, Leicester University Press, 1990, p. 319.

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Otto Wagner, *Moderne Architektur, Seinen Schülern ein Führer auf diesem kunstgebiete*, Vienna 1896, 1898, 1902, revisited in 1914.

3
Günter Kolb, *Otto Wagner und die Wiener Stadtbahn*, Munich (Scaneg) 1989.

4
See article *Is de shared space bij CS nog veilig?* In Het Parool, 19 April 2017 available on: https://www.parool.nl/amsterdam/is-de-shared-space-bij-cs-nog-veilig~a4488569/

5
For more information, see: http://lilamsterdam.nl/

6
NS Stations is the Dutch company taking care of station buildings. For more information about public related activities in stations, see: http://www.activatieopstations.nl/

7
For more information, see: https://watwedoen.nl/project/mollen/

Tienen: station renovation as the occasion for a new, linear park © OMGEVING

Small stations, big challenges

Maarten Van Acker

University of Antwerp
Faculty of Design Sciences

The past decade was dominated by major European station renewal projects in cities such as Antwerp, Liège, Rotterdam and Lille. The coming period will see the same thing happening in smaller cities. However, this second wave of station renewal projects requires a different approach and a different spatial vision than that for the metropolitan HST stations.

In Flanders and the Netherlands, many smaller and medium-sized cities are working on new strategies for embedding their station environment in the city. For example, in the Belgian-Dutch border region, 11 cities are working together on the redevelopment of their station environment: Aarschot, Bergen op Zoom, Diest, Hasselt, Heerlen, Herentals, Roosendaal, Sint-Truiden, Tienen, Tongeren and Turnhout. Backed by a European Interreg project, the 11 cities share knowledge and know-how.

Shared Challenges

The station and its surroundings play an important role in many cities. The station environment attracts economic activities and is the hub of various transport flows. The public space around the station is the gateway to the city. The quality of the public space of the stations is under pressure in many cities, due to various factors such as poor accessibility, vacancy, outdated patrimony, insufficient activity, a lack of green areas, noise pollution or the uncertain real estate market.

The revitalization of a station environment is not easy in practice, because of complex problems and a multitude of interests (municipal and higher authorities, transport companies, infrastructure managers, private owners, investors and developers). Moreover, smaller cities and municipalities do not always have an extensive planning department or the necessary experience to steer such large projects in the right direction.

Small Stations Are Gaining Importance

After the downturn in the past half century, the track seems ready for a revival today. Small stations are also gaining importance again. More and more travellers acknowledge the strategic position of small stations in the transport network. Commuters drive their cars to the smaller stations, and instead of moving into the traffic jam together with their colleagues in the direction of the big city, they continue their journey towards their workplaces by train. These smaller, so-called shuttle stations also serve a large hinterland, they are not stations of the city, but serve the wider region.

The primary users of stations are therefore not city residents, nor do the commuters make use of the city. This presents the designers of station environments with major challenges: How can the new station be embedded in the city while the majority of the users are not residents of that city? A recurring design issue is the way in which a large parking lot can be integrated into these station districts. In Aarschot, for example, Studio SK and Environment

propose the concept of the parking park. A depot where the car is parked among the trees also serves as a new green connection between the Elzenhof park and the city centre. In Hasselt, West 8 moulded the parking lot into an 'Esplanade': a semi-underground parking garage with an undulating park above it.

Of course, commuters not only travel to the new stations by car. The designer of the twenty-first-century station must also provide more space for busses: more and more spacious platforms, but also a larger bus buffer. A station like Hasselt is even making provisions to receive the future commuter via light rail.

Some cities want their station to be more than a shuttle station. For example, the city of Tongeren also wants to make the city centre a destination for the train passenger. The station is being developed into a centre of attraction on the cultural and commercial axis. The new station environment of Tongeren will be the crown on the urban renewal operation of the past decade. The station must also become more than a transit zone in Sint-Truiden. The designers consider the station as a starting point for pedestrians to explore the wider environment. In their design, PLANNERS cross-border the new housing developments around the station with a recreational network reaching towards the Haspengouw landscape.

Motor and Barrier

The arrival of the railway in the nineteenth century transforms the urban structure in a drastic way: the 'bipolar' city suddenly arises. In addition to the old centre with the market and the church, the station area grows into a second centre, often located on what was then the edge of the city. The rail network also introduces new urban design figures: the station street becomes a new central trading street, with hotels, restaurants and grand cafés clustered around the new station square. The station environment grows into a full-fledged city district, but clearly has a different character.

With the station as the motor of urban growth, the railways reach deeper and deeper into the city at the end of the nineteenth century. In addition to being a hub of development, the railway infrastructure paradoxically turns into a barrier, one that is difficult to bridge by horse and cart, and later by car. How to overcome the morphological division of track beds and shrubs is therefore a recurring design issue. In Aarschot, WEST 8 realized a multiple bridge over the tracks. The bridge not only leads to the other side, but also to the platforms. In addition, a bicycle parking facility was installed in the foot of the bridge. For the same station environment, Studio SK and Environment put forward a new take on the harsh, draughty railway underpass. Instead of a tunnel, the team designed two sunken squares on either side of the track. By allowing the squares to gently slope down a floor height, a clearly readable and pleasant railway underpass was created. In Heerlen, studio SK and Michel Huisman jumped at the opportunity to design the new railway building on top of the tracks as a new so-called 'inter-city connection'.

Other designers manipulate the track itself to remove the barrier. For example, in one of their scenarios, Bureau B + B and B-architects investigate the possibility of relocating the tracks to the subsurface for the new station environment of Turnhout. Finally, the barrier effect of the track can be reduced by decreasing its traffic. Consultancy firm Vectris, for example, proposed a second station on the outskirts of Turnhout, strategically located next to the motorway and a large-scale business park. This complementary station would

absorb a large part of the rail traffic, keeping it outside the city. The waiting times on the ground-level crossing in the city centre could thus be significantly reduced.

Looking for Programme

Undeniably, the station environment in the nineteenth century was a catalyst for activity and industrialization. For example, around 1800, Heerlen was still a small municipality in an isolated border region of the province of Zuid-Limburg. When coal was found in the area at the end of the century, private mining companies settled in the city. The government initiated the development of the mining concessions and Heerlen experienced explosive growth. Industrial railways connected the mines to the new workers' districts. The logistical scheme of the mining organization determined the structure of the urban expansion. Heerlen is a 'network city': it was composed of various nuclei around the mines and along the tracks. When the role of the railway was taken over by the road after the Second World War, however, the industry also moved towards the motorway. Most cities therefore lagged behind, with neglected and empty industrial heritage around the station. The station area became a blind spot in the city.

The redevelopment of the station environment is therefore primarily a search for a new programme. Some cities seek refuge in supra-local needs, a regional programme that can mean local impetus. For example, Hasselt created a new courthouse next to the station (designed by J. Mayer H., Lens Ass Architects, a2o architects) and the new Flemish Administrative Centre (a design by AWG and a2o architects). But Hasselt is an exception. In most small to medium-sized cities, no investors are ready to develop large-scale, generic programmes, such as offices or large public facilities. The smaller city has to look for something specific, often a more local programme. For example, Sint-Truiden is planning a complex connected building block full of public and local facilities on the former Gazometer site. Beel & Achtergael architects gave shape to a primary school, a welfare campus, a youth house, a party hall and residences.

The economic crisis caused a lot of work on a number of station development projects. For example, the Spoorhaven master plan for Roosendaal was deemed to be too ambitious and too expensive. In 2002, Palmbout proposed to reduce the railway yard, to move part of the activities and to put the tracks underground to heal the historical break in the city with new developments. With the new 2010 SpoorStad Master Plan, designed by KCAP, the city returns to its roots. With room for distribution functions, it wants to profile itself as the logistics hotspot in this border region. The city of Aarschot focuses on local, but labour-intensive activities, supplemented with new forms of living, visualized by architecture firm HUB. In Diest, BUUR is also drawing up a master plan for the new station area that consists of a residential programme and space for local businesses.

The city of Turnhout devised its station environment with a special interpretation. The big old timber shops have to give way to the so-called 'Living and Care Lab'. In consultation with the city, K.H. Kempen and Janssen Pharmaceutica, Bureau B + B and B-architects are designing new care models here. In these houses, the initiators investigate how to bridge the gap between new products or services and end users in their own home environment. The city wants to support medical-technological innovation and attract new investors to the station environment.

New Public Space

Several designers are using station renovations to enrich cities with new public and open urban space. It is not about an aesthetic update of the existing station square, but about introducing sometimes entirely new city parks.

In Tienen, Environment and a2o designed a new, linear park along the railroad as the green backbone of the station renovation project. A walking and cycling path runs along the entire length of this station park. The adjacent space has been made available for homes, offices and businesses.

The Esplanade in Hasselt is an elevated, linear city park along the tracks. The strip between the railway and the Esplanade forms a varied skyline with a mixed programme. This is the first image that people arriving by train in Hasselt see. The green Esplanade connects to a second, floating station square that lends access to the new station hall.

The Station of the Twenty-First Century

In the nineteenth century, railway technology enriched cities with new architectural landmarks. The often prestigious station building symbolized progress, its architecture radiated the pride of the city. Station areas and buildings are featured on numerous postcards from that period. Today, things are different for the 11 cities mentioned here. Over the past decades, no postcards have been printed of these stations. If you visit them today, you often see debris from the nineteenth and twentieth centuries.

Some of the original nineteenth-century buildings are still there. In Tienen, for example, the oldest existing station building in the country is still up and running. In cities such as Hasselt, Sint-Truiden, Diest, Aarschot or Herentals, second-generation station buildings are already in need of urgent renovation or replacement.

The question of what the station of the twenty-first century should look like is difficult to answer. One thing is certain: in small to medium-sized cities the new stations are not railway cathedrals as in the international metropolises. Nor have they developed into large-scale high-tech transfer machines with spacious halls full of counters. Ticket sales are gradually disappearing from these small stations.

The other projects show a different trend. The station of the twenty-first century seems to be a public infrastructure along, over and between the tracks; a consistent grammar of awnings, squares, bicycle parking, public facilities and intermodal functions. In other words, these stations are not architectural totems, but rather intelligently designed concatenations of public spaces. For example, in Sint-Truiden, in the plans of EIS and planners, we see a smaller station building adjoining a new square, an underpass with a canopy that also unfolds into a roof over the platforms. In Herentals, where the station building has partially lost its function, the designers of EIS have drawn an elongated square into which various reception and other public functions are plugged. Finally, in the city of Turnhout, the public centre of gravity of the station is shifted under a new awning that makes a conciliatory gesture over the historical railway rupture.

Note

More information about these station projects can be found in the *Spoorboek*: Joeri De Bruyn en Maarten Van Acker (eds.), *Spoorboek. Vernieuwing van stationsomgevingen in Vlaanderen en Nederland*, Uitgeverij Public Space, Mechelen, 2013, 344 p., ISBN 9789491789007

Figure 1 The 5E framework:
—Effective mobility (E1) – effectiveness of transport and mobility
—Efficient city (E2) – suitability of spatial use and spatial/urban (re)development
—Economy (E3) – prosperity and wellbeing in/for cities
—Environment (E4) – decreasing carbon footprints; sustainable cities, health
—Equity (E5) – socially inclusive cities
(Van Hagen and Van Oort 2018)

The future of intermodal Hubs

Fatemeh Torabi Kachousangi
Niels van Oort
Serge Hoogendoorn

Delft University of Technology,
Faculty of Civil Engineering and Geosciences

Today, mobility is considered to be an inseparable part of urban life and the need for efficient transport facilities is increasing. Sustainable transport currently attracts more attention and it is clear that modes as walking, cycling and transit can contribute to more than transporting people from A to B alone. In their research[1], introduced the 5E model illustrating the potential benefits for society of sustainable transport modes. This model, based on an analysis of over fifty public transport systems worldwide, consists of five domains, also illustrated by Figure 1.

Potential benefits of E1 are related to 'basic' mobility quality aspects, such as travel time, service reliability and comfort. Hass-Klau et al.[2] present research into common modes of transport, like tram and bus, showed that suitability and, therefore, effectiveness are intertwined with the scale and scope of the specific demand for transport within an urban environment.

Beyond pure transport, high-quality public transport has proven to be able to contribute to the efficiency and quality of the city. Public transport projects have been used as an opportunity to reshape and redesign the public realm and over time, networks have proven to structure spatial and functional development of the city.

High-quality public transport can stimulate the economy, although there are no direct, let alone causative, economic effects shown. Hass-Klau et al.[3] emphasized that these effects only showed up in combination with relevant interventions, initiatives, investments and other forms of support. Not only private parties with interest in profit play an important part in that, but also public parties, in particular a (local) government that stimulates, coordinates and facilitates infrastructure and economic development.

High-quality public transport, especially rail bound, contributes substantially to the improvement of local environments along its routes. Electric propulsion of (light) rail vehicles and buses decreases CO_2 emissions, as well as air pollution since fewer particulates are emitted, and noise pollution likewise diminishes.

Finally, public transport systems such as in France, the UK and the USA are generally considered to contribute to recovering social cohesion. The importance of these systems is emphasized for access to employment, shops, education and other public facilities.

These aspects are also relevant when looking at intermodal hubs. An intermodal hub is a major node in a transport network where multiple modes are connected and synchronized. One primary mode, often train or metro, is fed by multiple other modes, such as walking, bicycles, cars and/or public transport. Well-designed intermodal hubs could contribute to all five aspects. However, society is changing and new modes will be introduced, such as car- and bike sharing systems. Our question then is: what is the intermodal hub of the future, incorporating all these new modes?

Intermodality

In order to improve the multiple goals with regard to sustainable mobility, the integra-

Figure 2 Door-to-door appreciation of time: two ways to manage the customer journey: shorten the door-door travel time or enhance the appreciation of the travel time (Van Hagen and Van Oort 2018, restyled by Joran Kuijper)

Figure 3 Access and egress modes and main user characteristics (Stam 2018)

tion between public and private transport services in transportation should be considered. Using various vehicle types with wider capacities in transportation systems enable to decrease the transportation costs and increase the economies of scale[4]. Intermodal transportation can be defined as seamless transferring of passengers or goods from one place to another by using several means of transport, including walking or cycling[5]. This concept aims at optimizing travel efficiency by taking advantages of different modes against minimizing their negative impacts[6] as well as improving the efficiency of the total transportation system by integrating different transport modes and services together[7]. By offering multiple services, passenger can pick the one(s) that fit best to their specific needs. Figure 2 shows the results of a literature review showing multiple access/egress modes to and from a train station and the major characteristics of the users.

The services connect to each other at one location as an intermodal hub, seamlessly such as rail, buses, automobiles, taxis, walking, and bicycling[8]. Scott et al. state that intermodality hubs can improve community liveability by incorporating land use, demographic, socioeconomic, environmental, health, security, and public policy issues together.

Time and Experience

Intermodal hubs facilitate efficient travelling by connecting and synchronizing multiple modes of (public) transport services. One of the objectives of hub design is optimizing the transfer time between these services, which is the subject of many studies[9]. Another dimension is the quality of the transfer time. Hubs should also be designed to enhance the quality of the travel time, by making sure passengers can use their travel time in a useful or pleasant way. These two dimensions of travel time are illustrated by Figure 1 and further demonstrated by Van Hagen and Van Oort.[10] They conclude that enhancing the quality of a customer's journey is about time well saved and time well spent.

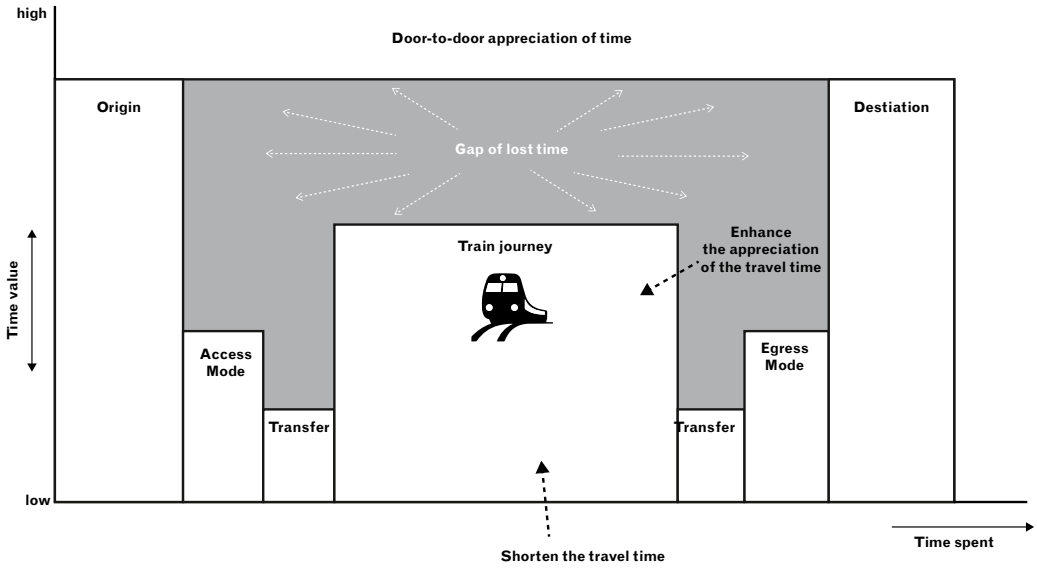
Design

Pitsiava-Latinopoulou and Iordanopoulos[11] present the elements of an intermodal hub design as follows:

- Number and type of modes that will be served.
- Time period through which the terminal is expected to be operational maintaining the desirable level of service without the need for extensions or reconstructions.
- The expected level of activity in terms of number of passengers served, frequencies and passenger waiting times.
- The variations in demand for transport (seasonal, monthly and daily).

In addition of the mentioned items, intermodal hubs should provide seamless intermodal transfers, pedestrian-friendly to allow easy access by foot or bicycle, car parking and bicycle parking and multifunctional services[12].

Space is crucial in designing intermodal hubs. Figure 4 shows the different areas in a hub, consisting of the arrival/departure zone of the main mode(s), the facilities zone and the access/egress zones. The last one could consist of multiple (new) modes. Depending on which access and egress services are offered and used, this zone can be designed and sufficient space could be allocated. However, the amount of service types and offered vehicles strongly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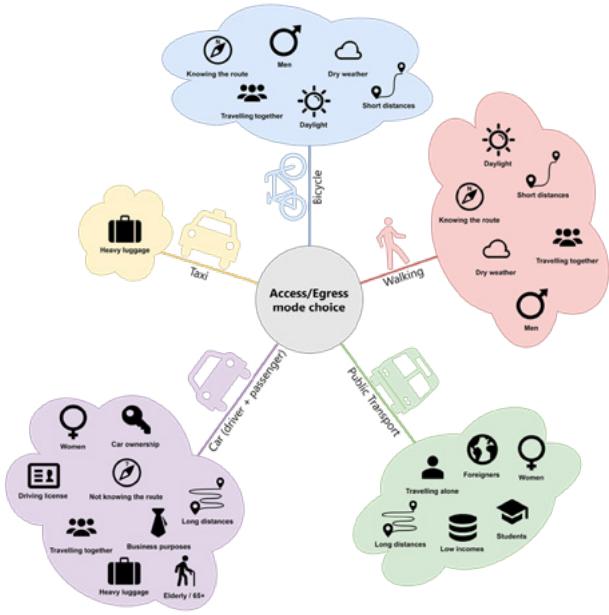
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Heavy luggage
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Knowing the route
Travelling together
Dry weather
Men
Car (driver + passenger)
Public Transport
Women
Car ownership
Driving license
Not knowing the route
Long distances
Travelling together
Business purposes
Heavy luggage
Elderly / 65+
Foreigners
Women
Travelling alone
Long distances
Low incomes
Students

Figure 4 Multiple zones in intermodal hubs

depend on the (expected) usage and thus on user preferences and choice behaviour.

Generally, to define the effecting aspects on transporting experience and services, a clear understanding of the users' needs is crucial[13]. However, currently, the main focus of intermodal hub design and research is on traditional modes, such as cars (kiss and ride) and train, bus and metro. In this fast-paced world of technology and business, new public transport modes in transportation network should also be taken into consideration alongside reinforcing traditional public transportation modes. Thus, a sustainable mobility pattern should be adapted with different transport modes which complement each other including traditional modes such as train, tram, bus, metro and taxi, in addition to active modes walking and cycling and new modes such as car sharing, automated vehicles and bike sharing and (new) hide railing services such as classical taxis, Uber and Lyft.

Although there are a lot of research studies about each new mode individually, the lack of comprehensive studies to design and optimize intermodal hubs functionally is tangible, and should be given attention. The intermodal hub of the future will only be a success if all modes and passenger preferences and behaviour are investigated integrally, resulting in an integrated design.

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Avignon Digital
Collage by the author

Smart Stations[1]: Issues and Limits of Hyper Connectivity

Nils Le Bot

AREP

Université Toulouse II Jean Jaurès

For several years now, the dominant school of urban thought has been to leave 'sustainable design' behind for a more 'dematerialised and systemic approach to the city'.[2] It makes the 'Smart City' its new dogma for growth.[3] Many questions about the metropolitan interchange hubs that main central stations have become, however, remain to be explored. Intrinsically mixing space, ruled by the heaviness of the infrastructure, and movement,[4] regulated by information and time – quantifiable and trackable characteristics – stations are pioneers in the experimentation of smart concepts.

Constantly reaffirmed in their role as hyper hub, they will have to absorb an important part of the mobility transitions over the next 30 years.[5] Public authorities are relying on digital technology to achieve this. However, are we aware of the issues and limits of further optimization of station mobility through digital technologies?

Towards an Optimized Use of Space?

The station is a place sized by and for crowds. One of the first issues in the massive rollout of connected technologies is making uses more fluid, to free up space. We know of the productivity gains that the generalization of automation will bring, in subways for instance, which are seeing their frequency accelerate significantly. In consequence, platform doors are now required, and spaces for traffic have to be resized. As digitally 'oiled' as it can be, mobility cannot avoid the constraints of space.

Around stations, autonomous vehicles are seen as the key solution for accessibility and traffic congestion problems. As is the case with planes approaching the tarmac today, cars, buses or any vehicle tomorrow will be able to interact near stations, optimizing the use of lanes while avoiding traffic jams. Parking, particularly space- and time-consuming, could be replaced by automated drop-offs. The smart vehicle will park itself wherever it sees fit, or reinject itself into the network to benefit other users. The land thus freed from car parks around the station, whose value is currently under-exploited, can then be repurposed.

In this context, the 2017 initiative of RATP to link Paris Austerlitz and Paris Lyon stations by autonomous shuttles running on a dedicated lane should be mentioned.[6] This experiment paves the way to what could be called an 'augmented connection'. If frequency and efficiency are guaranteed, it becomes possible to consider these two stations as one single nodal point. After all, there is less distance between them than in some subway/bus or subway/train connections in the Paris-Montparnasse hub; the distance issue can be blurred by this type of solution.

To channel information, passengers and vehicles, stations overlay physical infrastructures with a sort of 'virtual superstructure', a digital mark-up that criss-crosses space and allows any sensor and any mobile thing to notify and be notified by a common database. Comparable to developments in logistics, this hyper-synchronization inevitably places stations in a just-in-time logic, for which they were not designed. As it is inconceivable to make

▸
Digital Station
Collage by the author

travellers wait like a mislaid package, the 'station system' will have to be given an absolute layout resilience.

To achieve full synchronization of physical and digital networks, without any disruption, is a work in progress, perhaps as challenging as the PRM accessibility of the last ten years.

Clearly, smart mobility cannot avoid what we might call the 'resistance of space': a kind of intrinsic heaviness of what is already spatially there, which is not always flexible and which will clearly not have the same reactivity as the immaterial layer that intends to rule it.

The Human Factor

Unless we limit the access of hubs to autonomous vehicles, multimodality will always have to deal with the presence of humans, sometimes not connected, moving rationally or not. Their unpredictability is scarcely manageable for algorithms. Today, however, it is still the human presence that helps to solve complex, emotionally loaded situations.

One goal of smart concepts is to replace human action, for reasons of efficiency and reliability. However, in France, during disrupted situations (rush hour, operating incidents, mass departures), both SNCF and RATP increasingly deploy staff to fluidify traffic and guide passengers. Paradoxically, they mostly confirm and explain traffic information displayed on connected screens, whose reliability is doubted by passengers. It will require technological revolutions to render algorithms empathic, patient or pedagogical. In stations, the benefits and limits of digitization reach far beyond the simplistic question of efficiency.

Observing passengers using their smartphones is highly instructive: they stop or slow down. In a flow of people, they become an obstacle. In this sense, online information, supposed to fluidify the passengers flow, might actually create the opposite result. Where mobile network stability and quality is poor, in particular in subways, passengers are not able to benefit from digital services such as route planners. In addition, security risks are not negligible. Apart from accidents due to inattentiveness, the use of connected objects in crowded places makes passengers feel exposed to delinquency.

These observations illustrate the connected user's condition: the need for immobility, security, reliability. The number of 'Wi-Fi areas', mobile recharging areas, or passenger lounges with restricted access are becoming increasingly common in stations.

Their service level, however, differs (Wi-Fi with or without advertising and profiling, quality of data transfer rate, free-of-charge, security). Where access to connected spaces is not merely a comfort experience, but actually becomes pivotal for travelling, smart stations risk becoming 'two-speed' stations. This development forms part of the already apparent segregation trend in mobility, with on the one end high-speed train prime customers, and on the other users of low-cost bus services.

Furthermore, a new type of spontaneous hub seems to be appearing in the cities, which we could qualify as informal. 'Informal hubs' are usually linked to an intense car-pooling activity, and combine three factors: the presence of efficient urban transport, the proximity of a motorway bypass, and the availability of parking space (for instance at the Porte d'Orléans and the Porte de la Chapelle in Paris). For now, informal hubs have no legal status and are based on a very precarious range of services provided by mobile apps. The development of these hubs manages to side-line the intermodal offer concentrated around stations, while the absence of

KundenInformation
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proper infrastructure in an informal hub makes one yearn for the station's intrinsic qualities.

Data Governance

Thanks to microsensor data, it will be possible within stations to prevent breakdowns, optimize maintenance and modulate replacement. Massively analysed, these data and those of station traffic could tomorrow be used for predictive models that allow for dynamic adaptations of modal offer and passenger information.

If proposing a mobility offer that will be based on data control in the future, it is the role of transport providers that will evolve. The FAMGA companies have already started an innovation race for the leading position in the future autonomous vehicle market, and seem to aim to become public transport providers managing fleets of vehicles.[7] It is worth noting the 10 May 2017 Court of Justice of the European Union judgement, requalifying Uber as a 'transport provider', to force it to comply with the regulations specific to this status. On the same day, Citymapper, the company that is developing the eponymous mobile app for the management of urban transport itineraries, launched a super-connected bus service in London.[8]

The arrival of these major companies will force public authorities to acquire new tools for data regulation, security and control. Regulation, because their functioning allows an unprecedented evolution towards transport liberalization, and with it, an exacerbated form of job insecurity. Control, because the level of expertise and knowledge necessary for massive data management is currently monopolized by North American web majors, over which European public authorities lack sovereignty.

Finally, if hypermobile stations operate on a just-in-time basis, the issue of hacking will also become crucial. At the end of 2016, the entire San Francisco public transport ticket system was paralysed by a Ransomware.[9] In May 2017, with the virus WanaCryptor 2.0 spreading across Europe, Deutsche Bahn railway screens were frozen.[10] These events, which could multiply, illustrate the weakness of the systems on which the resilience of mobility will be based in the future.

Spatial resistance, the human factor and Big Data governance question the self-sufficiency of the smart station concept as a response to the challenges of mobility transition. Current busy stations will not have the resilience to absorb this connected multimodality. Hypermobility will then manifest itself where it can: either on a German-Scandinavian model – several stations form a cluster, thereby reinforcing the multi-polarization of metropolises –[11] or through a proliferation of informal hubs.

Beyond these challenges, it is society's logic of mobility organization as a whole that needs to be questioned. Putting city and mobility into an algorithm also means accepting that stakeholders, for the moment private players, judge the relevance, or not, of certain parameters. Consequently, on what ideology will arbitrations be based? Is it appropriate that cost-benefit or return on investment be the variables chosen for such complex, fundamental and political phenomena as urban life and its movement?

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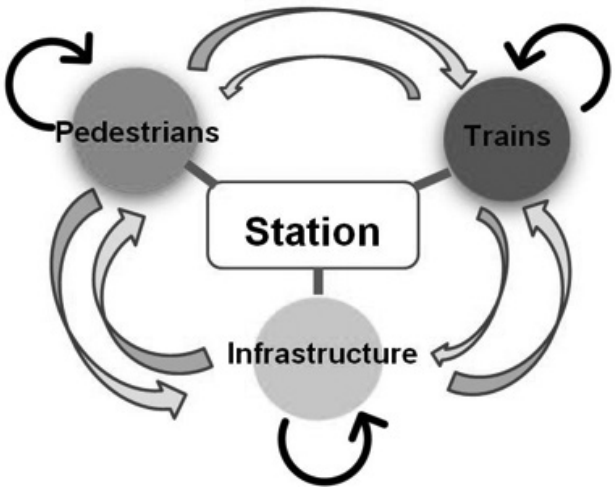


Figure 1 Complex systems interacting in train stations.
Image by the author

Railway stations: why pedestrian movement should influence design

Bachar Kabalan

Movement Strategies
London

Designing pedestrian facilities requires a deep understanding of crowd movement. In railway stations, this is a very challenging task due to the number of factors that influence pedestrian behaviour and the number of constraints that limit the solutions to optimize design. This work addresses the factors that influence crowd dynamics and pedestrian behaviour in railway stations with a focus on the design of pedestrian facilities.

Introduction

Population growth and urban centralization is increasing demand on existing public space. The efficient and safe interaction between people and space is significant today more than ever before. This is especially true in railway stations, where passenger numbers are on the rise year after year. For public transport to remain an attractive mode of transport, it is important to find solutions to the crowding problem. This is a very challenging task since any change must consider the passengers, the trains and the infrastructure. These three complex systems influence and interact with each other under time, space and resource constraints. To ensure a safe and efficient interaction among them, a profound understanding of people movement is necessary.

The following paragraphs introduce the topics of crowd dynamics, the complex systems that interact in train stations and the influence of the design of pedestrian facilities on crowd movement through a selected case study.

Crowd Dynamics

Observed individually, the unpredictable nature of how a pedestrian behaves in a crowd shows no sign or will for organization. It is characterized by sudden stops, avoidance or overtaking others, and sudden changes of direction. Moreover, individuals in crowds have different motivations and walking patterns. This paradox between individual behaviour and self-organization can be explained by the fact that crowds are complex systems whose collective dynamics rely on self-organization processes. These systems function in a decentralized manner where pedestrians neither cooperate with each other nor follow general orders. Individuals are independent but connected through a vast network of interactions. The global dynamics of the crowds result from these local interactions. Therefore, collective behaviour may appear spontaneously.

Density is one of the most important internal factors that influence crowd dynamics. Below 3 pedestrians/m², pedestrian-pedestrian interactions lead to self-organization phenomena that makes movement fluid and increases flow. Between 3 and 5 pedestrians/m², space is scares and movement is no longer fluid. Areas of congestion start to appear and people are forced to stop. If density exceeds 5 pedestrians/m², movement becomes extremely difficult. At this level, turbulence phenomena might appear where the crowd becomes like a fluid and individuals lose control over their movement. This phenomenon is very dangerous and can lead to casualties.

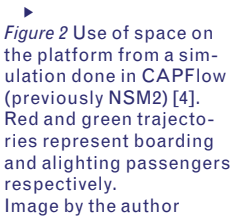


Figure 2 Use of space on the platform from a simulation done in CAPFlow (previously NSM2) [4]. Red and green trajectories represent boarding and alighting passengers respectively.
Image by the author

In the next section, external factors that can affect pedestrian movement are discussed in the context of railway stations.

Interacting Complex Systems in Train Stations

In the context of railway stations, pedestrians, trains and the infrastructure interact with each other (see Figure 1). Each of these complex systems has its own internal and external factors that influence its dynamics. In the scope of this work, we are interested in the crowd as a complex system and the external factors from the other two systems that influence it. Therefore, the influence of train traffic and infrastructure on crowd dynamics will be discussed in the following sections.

Trains

Trains have both a macroscopic (large-scale) and a microscopic (small-scale) effect on pedestrian flows. The train timetable is the main factor behind the macroscopic effect while the technical specifications of the train are responsible for the microscopic effect.

Timetables allow trains to run safely on a railway network. They also induce pedestrian flows in and out of the station. Therefore, they have a major influence on the arrival/departure profiles of train stations. A high-frequency timetable means intense pedestrian traffic during the rush periods. On the other hand, a low-frequency timetable means low pedestrian traffic apart from a surge before train arrivals. The interaction between timetables and arrival/departure profiles is of great importance since the latter is used to estimate the required capacity of a train station (stair widths, concourse area, number of turnstiles, etcetera).

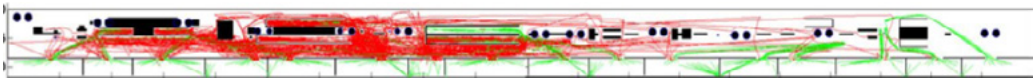
On a smaller scale, the technical specifications of a train have a direct impact on pedestrian traffic conditions on platforms. The capacity of a train and its dimensions affect the crowd dynamics on the platform, which in turn might lead to train delays. If the train doors are not dimensioned to absorb the demand on the platform, passengers accumulate on platforms, leading to safety issues and increasing train standing times. This can disrupt the traffic on one or several lines of the network.

Infrastructure

Here, infrastructure refers to the space accessible to passengers and everything that is found in it. This comprises pedestrian facilities, signage, obstacles and so forth. A well-designed infrastructure makes a pedestrian's journey smooth and seamless. A station's infrastructure has a strong influence on crowd dynamics and people's movement through each element's capacity and design.

The capacity of pedestrian facilities has a direct relation to density levels. If the capacity does not match or exceed the demand, density levels will reach maximum levels and queues will build up quickly. The relation between capacity and density levels is well known. Several guidelines and standards exist on how to calculate demand and capacity of pedestrian facilities.

Pedestrians do not always use space as it was designed to be used. The way space is used leads to different density levels. For example, a concentration of access/exit points in one place can lead to a disproportionate use of space, since pedestrians usually try to minimize the distance they have to walk. As a result, even if the facilities are well dimensioned, the unequal use of space leads to bottlenecks and congestion. In addition, pedestrians do not use the space in the same way. A train station has information screens, wayfinding signs, service points, escalators, stairs, elevators, benches, advertisement panels, etcetera. Pedestrians might want to queue or stand and wait, creating static areas, while others want to walk and require 'dynamic



areas'. If a pedestrian facility is not designed to accommodate these two types of areas, their interference might deteriorate circulation severely. Moreover, dynamic areas should be designed in a way to minimize cross flows.

A deep understanding of how people use space coupled with an active and passive management of flows is necessary to ensure a fluid circulation inside the train station[12].

Case Studies

In this section, the influence of the design of pedestrian facilities on crowd movement is demonstrated through a case study of Bibliothèque François-Mitterrand (BFM) train station, which serves over 25 million passengers per year.[3] One of the platforms of the BFM station is an excellent example of how the train timetable, the design of pedestrian facilities and human behaviour can interact in a way that leads to severe congestion.

BFM station serves the automatic metro line M14 and the suburban line RER C. Line M14 has a rather constant time headway (from 85 to 120 seconds) while RER C headways range significantly from 5 to 30 minutes with each mission serving only a relatively small amount of the demand (between 20 and 60 per cent). The problem starts here with a flow rate that the RER C is not capable of serving. To make things worse, all the access points to platform E/F of RER C's are concentrated in its first half. The result is that passengers are stocked in the proximity of the access points and are not distributed over the whole length of the platform (see Figure 2)[4]. Nominal platform capacity is dropped to an 'operational' capacity that seems not to be enough. Circulation on the platform is made even less fluid by cross flows caused by placing access and exit escalators next to each other. This is an example that shows a snowball effect caused by the train's range, the platform design and pedestrian behaviour.

Conclusions

To design for pedestrians, an understanding of people movement is important. This is especially true and challenging in train stations where crowds interact with the infrastructure and the trains in very complex ways. These interactions can have an important impact on circulation fluidity in pedestrian facilities. Pedestrian facilities can be designed to reinforce interactions that facilitate movement and eliminate those that create congestion. As a final note, people from different cultures can use space and behave in very different ways. It is import to know who are we designing for and what the characteristics of the movement of the local population are.

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Marseille train station
Photograph by the author

Design as a Daily Practice: an Ethnography in Train Stations

Albane Grandazzi

SNCF Mobility
PSL, Paris-Dauphine Universityz

In the social sciences literatures (geography, urban studies, sociology, organization studies), transit areas are often regarded as "transitory empirical spaces"[1]. Design still seems mainly focused on functional, esthetical and technical issues, neglecting the organizational dynamics at play[2]. Considering that 'architects (...) are not trained in issues that regard organizational design'[3], this research aims to fill this gap and suggests how an organizational perspective on spatial design could be explored. We[4] consider how design is produced through daily practices – becoming a practice as well. In our perspective, we consider daily work practices as embodied expressions through movements and gestures. We seek to answer the following research question: How can embodied work practices (re)design transitory spaces? To answer this question, we will put forward the concept of "boundary-gesture", understood as daily embodied practices performing spaces at a micro level. This chapter is structured as follows: first, to situate our contributions to current debates on organizational studies, we outline a theoretical framework on transitory spaces, developing an embodied perspective on spatial design. Secondly, we introduce our case study on train stations followed briefly by a methodological section about our data collection and analysis. Finally, we analyse the empirical data and discuss the findings, showing a taxonomy of gestures that (re)design space in practice. Our analysis of these daily work practices provides us with important insights into the enactment of transitory spaces, and more broadly of spaces in-between. This analysis, in turn, contributes to a greater understanding of employees' and users' capacity to conceive space through interactions. As such, we put forward our concept of "boundary gesture", providing an interesting way to renew our traditional view on spatial boundaries.

Overcoming a Macro-Level Understanding of Spatial Design

Organization science literature consider transitory spaces as empirical survey sites[5]. The main conceptual approach refer to "non-places"[6] or "liminality"[7]. Despite this interest, the literature has paid little attention to how these spaces are performed through work practices. Indeed, the literature is still more focused on the experience of users or travellers in spaces[8], rather than the labouring bodies that are producing space in their everyday work.[9] New work and mobility practices challenge this historical, bounded, functional perspective of space. First, 'with the increasing number of people working on the move and between the office and the home there are many more spaces in-between'[10]. Secondly, 'mobilities challenge the spatially bounded conception of organization that traditionally underlies studies of organization'[11]. As a result, the notion of space in organization studies often implies 'a certain kind of spatial determinism that shapes action and conduct within – a kind of "terminal architecture" in which workers are marshalled by spaces'[12]. For example, train stations are often viewed as a 'combination of immutable built structures'[13].

To respond to these limitations, the notion of "spacing" conveys "a rethinking of space as processual and performative, open-ended and multiple, practices and

▸
Marseille train station information employees
Photograph by the author

of the everyday"[14]. Space is thus not only made by its architecture, but by our sensations that create a lived, personal and intimate experience of space: "Although atmosphere and mood seem to be overarching qualities of our environments and spaces, these qualities have not been much observed, analysed or theorized in architecture or planning"[15]. In this experience, embodied practices become important in the way interactions are part of the spacing process[16]. Through the notion of embodiment, we understand movements, gestures and rhythms[17]. These gestures are daily practices "in which bodies are moved, objects are handled, subjects are treated, things are described and the world is understood"[18]. Movement is central in this analysis, understood "as well as bodily experiences and realities are perceived, created and unfold"19. Following this idea, we conceptualize work practices through bodily expressions in desiging space at a micro level.

An Ethnography in Train Stations

Our study is grounded in qualitative methodologies to uncover the space constructed by the daily work practices. We conducted our ethnography in three major train stations in Europe to compare different spatial contexts of conception through work practices. We conducted participant observations (eight weeks), photo-ethnographic (150 pictures) and interviews (40) with the employees. We focus on key work practices that are understood partly through the experience of one of the researchers: "work experiences are thus embedded in a journey of repeated emplacements/displacements, during which we construct our narratives in space–time". Indeed, despite local differences, spatial design and organization seem to be standardized whereas practices remain diverse between various locations in train stations (for instance the platform, the ticket office, the boarding gate).

We define the train station as a form of in-between space, considering the experience of passengers who are traveling from one point to another. Focusing on how work practices are performing this space at a micro level, we highlight how the design of the railway station has been constitutive of this functional area. Historically, each space of the train station was bounded and dedicated to a stable function. More recently, there has been a dislocation of these spaces considering the market opening and the digitization of historical functions such as information or ticket selling. As a consequence, the employees are more and more mobile, within spaces that are permanently delimited in a continuous time flow. We chose to focus on three work practices that are enacted in various environments: selling tickets (1); welcoming passengers (2); and boarding passengers on the train (3).

Findings and Analysis

Our results show the importance of embodied work practices in the design of railways stations. Spaces are no longer (only) created by walls, but rather by moving bodies. We understand these micro-practices as "boundary-gestures" – defined as embodied practices which are organized and performed through bodies, materials and temporal rhythms. We propose five types of "boundary-gestures": backgrounded boundary gestures, directional boundary gestures, isolating boundary gestures,filtering boundary gestures and atmospheric boundary gestures. We will first present our typology before discussing it based on the theoretical and practical contributions we want to address

Our results show how bodies are re-enacting fixed spatial boundaries through

movements and gestures. The enactment and the articulation between these boundary gestures tend to show a historical shift from static gestures (as isolating boundary gestures) into a diversification of boundary gestures that are not bounded in a spatio-temporal context (as filtering boundary gesture, directional boundary gesture or atmospheric boundary gesture). The market opening in train stations had led to more and more mobile practices regarding segmented demands, users and public/private owners. This segmentation of the space in train station echoes as one of the key features of our contemporary society[20].

These findings underline the construction of space at a micro level. We draw two intended theoretical contributions: first, spatial theories considering the role of embodiment in producing a space in-between. This focus offers a different perspective than those that are still describing the experience of users, travellers or passengers in transit spaces. A second possible contribution is on literature on spatial experience which still suffers from a lack of concreteness, especially regarding methodological concerns. The role of moving bodies in creating spaces in-between appear to be original regarding architectural perspective on spatial design.

Table 1 A taxonomy of boundary gestures

Boundary gesture	Definition	Illustrations of practices	Spatial production	Embodied expressions of practices
Backgrounded boundary gesture	These boundary gestures are designed for rapid and fluid interactions in the space. They create micro sequences of interactions within the flow, aiming to regulate and facilitate the transition for travellers.	–Information on the platform. –Helping clients use automatic tickets machines. –Welcoming clients on high-speed trains.	Space is not bounded	Visibility : bodies are visible and delimit the interaction
Directional boundary gesture	These boundary gestures are designed for personal interactions regarding some segmented customers (VIP, children, disabled persons). They create movements in the train station by joining various subplaces within it.	–Help a disabled person to get to the train. –Go with professional clients from the lounge to the train. –Take care of children and get them to the train.	Space is a container	Movement: bodies are in movement
Isolating boundary gesture	These boundary gestures are designed for long and discontinuous interactions in time. They create dedicated areas that can be compared to bubbles, apart from the flow and the surrounding space.	–Selling tickets (both in a classic or modern stores) –Information on a desk. –Taking care of passengers in the lounge.	Space is clearly bounded and delimited through materials	Fixity : bodies are fixed and not physically mobile
Filtering boundary gesture	These boundary gestures are designed for rapid and discontinuous interactions. They aim to segment the space by creating visible boundaries where the employee stands. They are not conceived for personal interactions even if these can happen in practice.	–Boarding passengers onto the train. –Segmented welcome in the ticket office/ in the lounge.	Space is delimited through a visible and materialized boundary	Visibility: bodies are mainly fixed but need to be visible
Atmospheric boundary gesture	These boundary gestures are designed for rapid interactions at the core of the flow. They aim to create discontinuous areas in space, highlighting an emotional experience within it. They create a continuity with a past or a future experience.	–Take care of passengers in case of disturbances: giving them a coffee, a meal –Take care of children before they get onto the train during holidays by games.	Space is not clearly bounded	Gestured: gestures are important in conveying emotions

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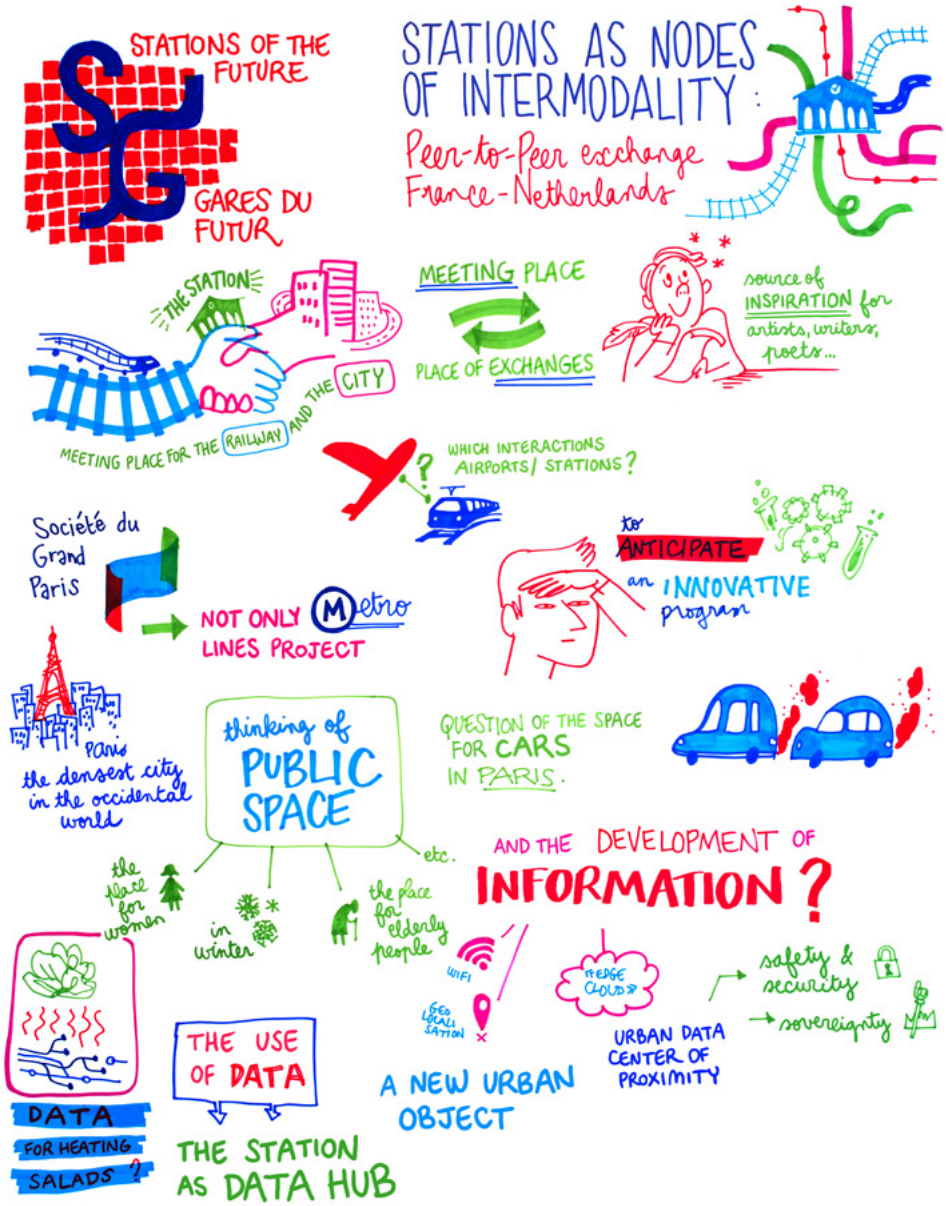


Stations of the Future by Louise Plantin, visual note made in at the 'Gares du Futur/Stations of the Future' event in March 2018

Stations of the Future: New Urban Paradigms

Manuela Triggianese

Delft University of Technology
AMS Institute

Stations as landmarks, districts and transfer machines

In Europe at the end of the 19th century and beginning of the 20th century, many stations have been designed with monumental character expressing the grandiose architecture of the time, for example the Euston Station in London (1840) and the Gare d'Orsay in Paris, symbol of Beaux-Arts too (opened for the 1900 Exposition Universelle).

Stations were also symbols of national pride, such as in Italy the Milano Centrale (as a monument to Mussolini's Fascist hegemony) and Santa Maria Novella in Florence (1932). With the development of the highways, roads and metro-lines, stations became more transfer machines, functional and less monumental buildings. They tend to look less and less like they were designed in the 19th and beginning of the 20th centuries: from both an architectural and functional perspective they will no longer have a tight knit central nucleus, but rather a number of different junctions and intersections translated into the (re)organization of the station layout. Rotterdam's former Central Station by architect Sybold van Ravesteyn, built 1950-1957, is an example of both considerations.

At the second half of the 20th century, train stations were presented along with new visions and options. Business opportunities were generated by stations in strategic locations of the city. In some cases in the United States, these opportunities represented new meanings and roles of station buildings, such as with Penn Station in New York City. The station still exists but now hidden in the middle of a business district and the well-known Madison Square Garden. In Europe with the arrival of the High-Speed Railway (HSR) development, at the end of the 20th century and beginning of the 21st century, railway stations are on top of the agenda of policy makers, acting again as a key element to anticipate future transformations of the city and its territory, especially due to the large volumes of people attracted by the stations themselves. Although it is not necessarily the most important modality in terms of passenger numbers, the introduction of the HSR in many cities gave a boost to urban development.

The combined efforts of public authorities and private developers lead to an unprecedented (re)development of existing stations and their surroundings or the development of new stations in cities such as Paris, Lille, Antwerp, Brussel, Madrid, Rotterdam and Amsterdam. This phenomenon continues to expand towards the creation of a new generation of railway stations: the intermodal node, which is a combination of multiple modes of transport and a mix of urban functions. The recent regeneration plans of the historic Gare du Nord intermodal node in Paris (the first station opened in 1864) is an exemplary case of a railway station that continues to reinvent itself, putting parties together and adapting to current and future urban challenges. After a first big renovation project that took 10 years of work on the platforms, on the area around the station and on the passengers' building itself, Gare du Nord will get a new facelift. As more than 700,000 people pass through this node every day (200 million passengers a year), the plans include tripling the size of the station for the 2024 Olympics in order to accommo-

▸
Euralille
Photograph by the author

date new users. The ambitious plan of the French railway company aims at improving the quality of both the mobility and urban space, by facilitating all circulations inside and outside the train station and by (re)generating its district for the comfort of its users (passengers, visitors and inhabitants).

France was the first country in Europe – back in the seventies – to invest in developing high-speed lines; their TGV (train à grande vitesse) became the role model for comparable developments in other countries. In this framework, the Euralille project provided a context for upgrading the Lille-Flandres terminal (with regional railways and TGV services to Paris), constructing Lille-Europe, the new through-station, opened in 1994 (with international HSR services) and the realisation of car parking, links to the metro network and urban amenities.[1] As in France happened with the choice of Lille, using the advent of the HSR and the related instruments to improve the image of the metropolitan region and the status of the urban area, in Netherlands and in other European cities, the station became part of a new urban imagery. Stations became again symbolic buildings (as they were at the end of the 19th century) but also attractive places for their architecture and quality of the urban space, social places and not only transfer machines. Some examples are the recently rebuilt Rotterdam Central Station, with its iconic roof, designed by TEAM CS Dutch architects and planners (opened in 2014), or the station Madrid Puerta de Atocha (the first station opened in 1851), partially rebuilt and transformed several times, until the renovation in 1992 with the arrival of the HSR that included the transformation of the old station into the main concourse, with a tropical garden in the middle, designed by Rafael Moneo. Both stations became landmarks of their times and for their cities and most important opportunities for new urban developments by attracting new investments.

At the same time, not only main stations along the HSR were subject of transformations. Due to the increase of passengers' numbers and the new line passing through the city (as in Lille, Rotterdam or Madrid), also medium size stations in smaller cities became an opportunity for city developments. This is the case of the redevelopment project of Delft Central Station in the Netherlands. Here the station became a regenerator for the city of Vermeer and for the internationally renown Delft University of Technology. It is an urban connector between the inner city and the residential neighborhoods to the west and south (in Dutch Nieuwe Delft). The new station was opened in 2015 – designed by Mecanoo – as a multifunctional building, housing a combination of the local municipal offices, spaces for intermodal transfers (train, car, bus, tram, bike) and parking facilities. The development of its surrounding areas still need to see its completion. Joan Busquets made a master plan for the entire railway zone in 2003. Since then, the real estate market has changed considerably. As a result, Busquets' plan remains intact only partially and since 2012 it can no longer fully serve as a basis for urban development. A nice example of small station is in the city of Helmond in the Netherlands, where the train station became an urban regenerator for the surrounding areas and an occasion for improving the quality of the space. In this station project all elements of the surroundings of the station are being considered as an equal part of the project: parking areas, station plaza and art in public space.

The "station of the future" will continue to provide access not only to railway transport but also to other urban modes of transport, both traditional (bus, bike, car...) and innovative (such as shared mobility solutions), serving as an intermodal node,

acting as a source of revenue for its manager, slot into the urban fabric and life of the city, and becoming a destination for people. A main question arises: 'which financial mechanism work the best for a station as a destination?' This and other issues have been addressed in a French-Dutch debate that took place in Paris, illustrated through the various contributions in this book.

Station-City of the Future

The station is in the network both a 'node', for interchanges with other types of mobilities, and a 'place', to meet people and to find different urban amenities.[2] The more strategic it is positioned in the city and its territory, the more it is playing a pivotal role as a destination point/place. "Walkability, attractiveness and public safety are key factors, but a good station also needs a full range of different programs in the area to attract people at different times of the week", mentioned the architect Ton Venhoeven during the workshop in Paris. This means also to look for new financial mechanisms, governance models, business models and, last but not least, for value creation models. The Station-City interaction is the key for successful station projects as urban places (and not only as transfer machines). The governance and spatial interaction, that of course vary from city to city, has been explained and illustrated by the 'open-station' model[3] set up by the Union International Chemins de Fer (UIC), a model including several degrees of openness of the station towards the city: 1-spatial, economic and decision making between the station and the urban permeability, 2-Interaction between Public/Private, 3-Functional mixite in the station, 4-removing station limits (station as part of the city), 5-station as a link to a global network (urban, commercial and transport networks).[4] This means finding a good balance between the users' needs (passengers, visitors and inhabitants) and clients' expectations of the station with an optimal mix of transport related functions and other urban activities (such as commercial activities or public facilities). This model has been recently updated by UIC by adding the layer of new technologies that could help the station to adapt to their users and their environments (the 'smart' station model). What can technology offer to improve the station's function, making it

sustainable, more attractive, pleasant and efficient in the future?

In line with these considerations, the stations of the future are not only places of passage but places of life. Furthermore, they need to become energy efficient and environmental friendly interchanges, and they need to cope not only with climate change but also with new mobility demands (Mobility as a Service)[5] and the increasing growth of users. This is true for all type stations: from main train station and airport-stations to secondary rail-metro stations. In France, 10 million people pass daily in the 3,000 stations, and they will be 13 million in 2020. Patrick Ropert, Director of the Railway company SNCF Gares & Connexions, defines stations as "City boosters",[6] welcoming an increasing amount of people, becoming living spaces, with shops, nurseries, co-working areas and starred restaurants. Several railway stations at Île-de-France for example will become laboratories of urban innovations, a network of start-up of local services. If we look at the Netherlands, the number of passengers per day will grow from 440,000 to 900,000 in all big stations among the 400 stations in a relatively small country.[7] This means that the station of the future has to deal with big numbers and most important with lack of space in dense urban areas. In 2010 NS Stations, the Dutch Railway company in charge of the station buildings, has started to measure pedestrian flows at train stations on a large scale using new technologies. "After seven of years of practice, we have made significant progress in improving the design and operations by using a large amount of data on how people use train stations", says Jeroen van der Heuvel station, developer at NS Stations. Therefore, other challenges are: the integration with new technologies, automation and the use of data (such number of users), last but not least social equity and segregation.

At the same time, designers are speculating on station typologies as intermodal node that new urban strategies and new technology may construct. Several existing and future rail-metro stations and airport-stations have been presented during the event in Paris, all linked to the new metropolitan challenges of the Randstad and the Grand Paris. A selection of these projects is illustrated in this publication.

Notes

1
Triggianese, M. *Euralille twenty years on*. OverHolland, [16/17], p. 111–139, mar. 2017.

2
The Node-Place model was developed by Luca Bertolini and it was based on TOD (Transit-Oriented Development) theory. For more information about the Node-Place model, please read: Bertolini, L. 1999. *Spatial development patterns and public transport: The application of an analytical model in the Netherlands*. Planning Practice and Research, 14(2):199–210.; Bertolini, L. 2008. *Station areas as nodes and places in urban networks: An analytical tool and alternative development strategies*. In F. Bruinsma, ed., Railway development: Impacts on urban dynamics, pp. 35–57. Heidelberg: Physica- Verlag. For TOD theory, please read Cervero, R. 1998. *The Transit Metropolis: A Global Inquiry*. Washington, D.C.: Island Press.

3
UIC Handbook on *Smart Stations in Smart Cities* (2017) Available online: https://uic.org

4
UIC Handbook on *Railway Stations Adapting to Future Society* (2013) Available online: https://uic.org

5
The next revolution in mobility is based on the concepts of *multimodal travel experience* and *mobility on demand* (named Mobility as a service – MaaS). At its core, MaaS relies on a digital platform that integrates end-to-end trip planning, booking, electronic ticketing, and payment services across all modes of transportation, public or private.

6
Patrick Ropert. *City Booster: Les gares à l'aube d'une révolution* (2017) éditions Débats Publics

7
Based on the estimated growth of travellers, the Dutch company having the governmental task for the construction, maintenance and management of railway infrastructure, ProRail has been expanding infrastructure capacity to enable the higher frequencies. This includes quadrupling the lines for several corridors and therefore transforming railway stations.

Strengthening French-Dutch expertises on Stations

—Projects of Practice

Strengthening the French-Dutch expertise on stations

Nico Schiettekatte
Joannette Polo
Marjo van Amerongen

Embassy of the Netherlands in Paris
Innovation Section and Economic Cluster

The Economic Section of the Embassy and the Innovation Department in particular, aims at strengthening technology, innovation and economic ties between France and the Netherlands. This is done by the organization of events, networking moments, missions and visits.

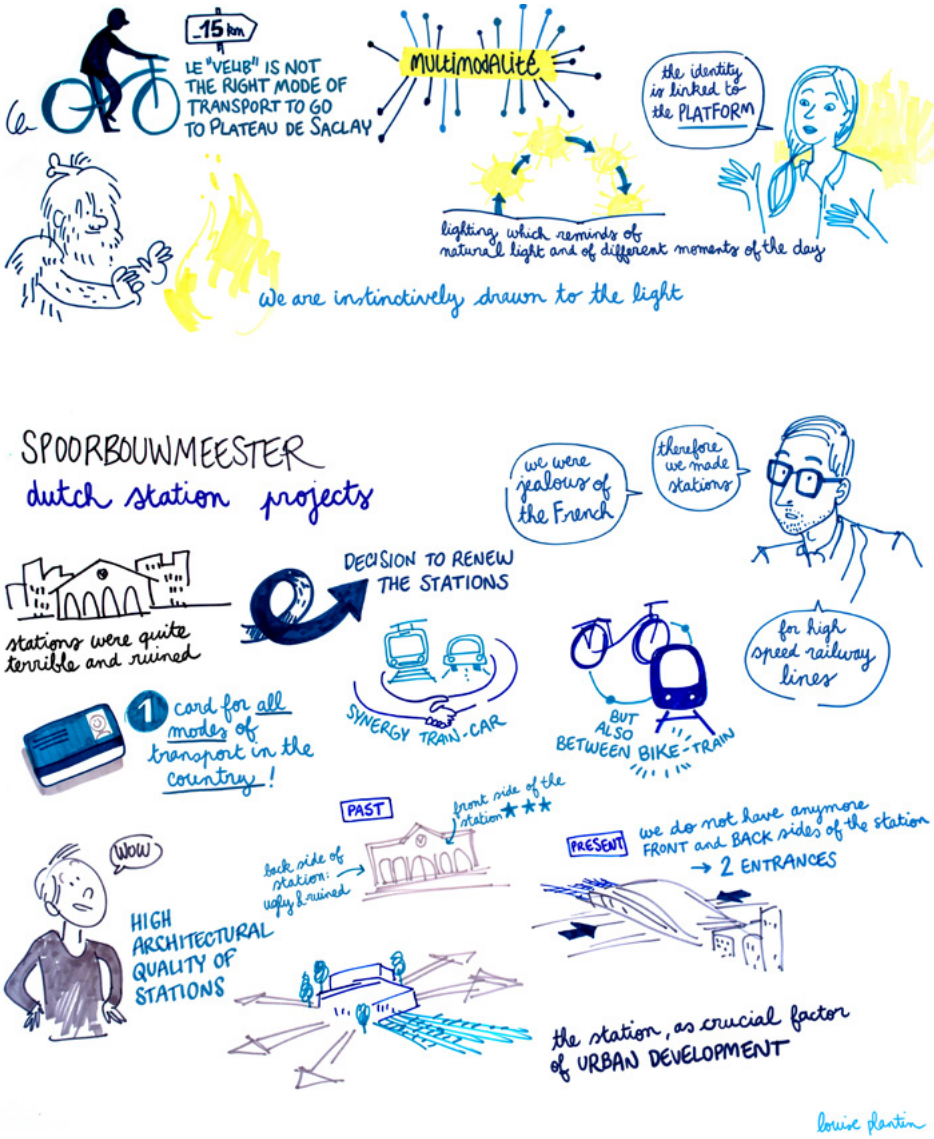
In the field of public transport, both countries are in the midst of large infrastructure projects. The Netherlands has recently renewed all of its bigger railway stations to accommodate the ever-growing flow of commuters, students and tourists. These stations – Rotterdam, Arnhem, Breda, The Hague and Utrecht – all function as important junctions as the Dutch railways serve an estimated one million travellers a day. France, on their part, is now deeply involved in an ambitious automatic transport network project, called "Grand Paris Express." The aim is to build 68 train stations and to lay down 200 km of railway. It is the largest public architectural project in France since the great projects of former president François Mitterrand. By 2030, more than 95% of the Ile de France region's residents will live no more than 2 kilometres away from a train station. All stations of the "Grand Paris Express" are designed by different teams of architects, and although the majority is French, the diversity of these 37 teams is to be noted: they include Italian, Japanese, Swiss, English, Dutch and Austrian architects. The Innovation Section and the Economic Cluster of the Embassy decided to bring together some of the parties involved so that they may exchange their know-how and expertise.

This is how the idea for the Franco-Dutch seminar and networking event "Stations of the Future" was born. It took place in Paris on the 15th and 16th of March 2018. It was discussed with the AMS Institute and with La Fabrique de la Cité, two parties that were brought together by the Embassy some years earlier which signed an MoU during the royal couple's state visit in March 2016. They agreed the topic was very interesting also within their roadmaps and decided to join the project. The bilateral seminar was the occasion to celebrate their two year collaboration and to sign a new MoU.

Manuela Triggianese, main editor of this book, led the project and found the partners.

The seminar took place at the Atelier Néerlandais in Paris, which is part of the Embassy of the Kingdom of the Netherlands in France and serves as a platform for the Dutch creative and cultural sectors. The location is not only a place to (co)work, meet and present. The Atelier also assists entrepreneurs, providing practical support and advice in order to benefit from a better visibility on the French and the international markets. Furthermore, it hosts seminars and networking events in close collaboration with French and Dutch partners.

Cartoon by Louise Plantin, visual note made in at the 'Gares du Futur/Stations of the Future' event in March 2018



The Randstad and Grand Paris: New Metropolitan Challenges

Manuela Triggianese

Delft University of Technology
AMS Institute

In the 21st century clusters of well-connected cities are becoming a reality in Europe, since the creation of the term megalopolis in 1961 by Gottmann, that defined metropolitan areas with the following characteristics: big center of reference, the physical discontinuity of the urban settlement, the functional continuity of the network as independent to the minor urban settlements, the economic force.[1] According to Gregotti, despite of globalization processes and the emerging informational society (also known as network society), Gottmann's previsions are influencing contemporary conditions in Europe.[2] From 'global' cities to 'mega-city' regions, European metropolitan areas are facing new challenges, as the one to maintain and even strengthen their positions among the most attractive international cities. For this reason, they are making strategic plans on several urban scales, most of the time associated to the development of their public transport corridors (rail and highway), such as for Great London, Greater Berlin, Ruhr area or Greater Paris Metropolis. The main objective of their plans is the sustainable development of the region's economy and employment.

None of these European cities have a defined border, being the condition that makes them all comparable. In the Netherlands, the most important Dutch metropolitan area is called 'Randstad', a conurbation of four big cities - Amsterdam, Rotterdam, The Hague, Utrecht - and at least six smaller ones, which are linked by suburban extensions. Both the Randstad and the Greater Paris Metropolis, also known as the Grand Paris, have a long history of infrastructural planning and both are facing similar challenges to update/upgrade their rail-metro networks and to densify the territory through strategic urban interventions situated along these corridors, most likely around existing or new stations, here called hubs. What is the role of the hubs as nodes and places along the networks of future metropolitan areas? This question became also the starting point for the French-Dutch debate that took place in March at the Atelier Néerlandais in Paris.

If we look at the numbers, the urbanized Grand Paris has a surface of 170,000 ha and a population of 12M inhabitants. Its (urban) density is 70/HA. When compared to urbanized Randstad with a surface 108.000 ha, population of 9M and the (urban) density of 83/HA, we see that these two urban realities or metropolis are rather similar.[3] I will hereby give a brief introduction about the plans that these two countries are developing to cope with their urban challenges: the Grand Paris Express project and the scenario of the Randstad 2040, that has been followed by the policy document of the future of public transport towards 2040 in the Netherlands (in Dutch Toekomst openbaar Vervoer 2040).[4]

Grand Paris Express

In the Grand Paris plan the focus is the creation of a public transport network (train/metro) towards a better connection with the airports and TGV stations. The aim is to provide a framework to link the region's main economic centres, as well to support local development with the network's future stations as key points of focus. With

22,6 billion € investment, the Grand Paris Express (GPE) is part of the Grand Paris project announced in 2007, under Nicolas Sarkozy's presidency, to develop Greater Paris into a sustainable metropolitan area. Société du Grand Paris (SGP) is the overall project owner and contracting authority and the state-owned public transport operator Régie Autonome des Transports Parisiens (RATP) is the operator of the network. Within the scope of this initiative, the GPE will cover 200km of new and fully automatic metro lines and 68 stations with the aim of providing direct connectivity among suburban districts/neighborhoods and with the city center, improving the connections to TGV stations and the airports. At the same time the emergence of the GPE will be a great boost to the city attractiveness and financial center, as being not only a network but also an urban growth accelerator. In less than ten years, Paris may play host to two major international events: the Olympics in 2024 and the World Expo in 2025. The GPE train stations, which will combine very significant users' flows, up to 3 million passengers per day, with property potential that will create a host of opportunities, will give substance to the Grand Paris project for millions of Ile-de-France residents.

"The new subway lines will open up the poorest neighborhoods around railway stations and enhance the international attractiveness of Greater Paris", says Catherine Barbé during the workshop, Director of Strategic Partnerships at Greater Paris Authority (Société du Grand Paris-SGP). She presented the research 'Observatory of the Grand Paris Express Station Neighborhoods' carried out by the Paris Urbanism Agency (Apur) in 2013. This work is set up as a tool to understand and analyze all the future station neighborhoods in the Grand Paris Express network, through monographic studies covering each neighborhood and cross-analyses of the planned GPE lines. These analyses cover 6 themes: densities, centralities, the urban and landscape context, demographic, family and social changes, mobility and the dynamics of construction and urban projects. It has made possible to describe and compare the urban and social characteristics of the 68 neighborhoods which will accommodate the future Grand Paris Express stations and which can be used as a decision-making tool for the new developments.[5] Furthermore, SGP intends to use private funds to finance cultural and artistic programming in the GPE neighborhoods. Artistic projects will spotlight and breathe life into 68 stations and their districts, endowing each of them with their own personality.

Furthermore, with the launch of the international consultation for stations in the Greater Paris area, Jacques Ferrier architecture in association with the Sensual City Studio developed the station concept of "Gare Sensuelle", that was presented in Paris and it is illustrated in this publication. The designers became responsible for the design and architectural consultancy for the 68 new railway stations of the GPE, commissioned by SGP. This concept was intended to define stations according to the specific features of the environment in which they are located, to deliver efficient and user-friendly spaces for the use of travelers, which are both open to the city and marked by common characteristics for the entire network. For each station neighborhoods, a specific answer has been addressed to each geographical, social and economic context and providing connections with almost every existing train and metro lines.

At the same time in 2016, the Prime Minister and the Chairman of the Métropole du Grand Paris (MGP - Greater Paris Metropolitan Area) launched an in-

ternational competition, called 'Hubs du Grand Paris' along with the subsequent 'Inventing Greater Paris Metropolis' final exhibition. The aim was to challenge international talents to plan the future of 19 neighborhoods that will host stations of the Grand Paris Express. The station projects (that include the development of the buildings and their districts) were thus designed to be demonstrators of the smart and sustainable 21st century city, including construction, economy, energy, logistics, as well as social and civic life, culture, multimodal services, digital technology. In conjunction with the development of the GPE transportation network, these projects have made the Grand Paris one of the most dynamic metropolitan area in the World.[6]

The completion of the Grand Paris Express is accompanied also by the foundation of La Fabrique du Métro. Like the stations of the future, which will host shared workspaces, La Fabrique du Métro is an exhibition and co-working place, welcoming innovation stakeholders working in mobility, digital, services, customer information and construction sectors. Engineers, students and employees of the Société du Grand Paris are working side by side to build the new metro. During the Stations of the Future event, French and Dutch professionals and experts in station design visited the exhibition.

Randstad 2040

The Randstad region, a conurbation formed by the capital Amsterdam, Rotterdam, The Hague and Utrecht, covers 26% of the Dutch territory and is home to 46% of its population. It is necessary that the cities and towns in the west of the Netherlands, the economic engine of the country, start to function as one region, thus competing with other metropolitan areas in Europe and the world. Some comparison to other conurbation areas are not only with Paris with 11 million inhabitants, but also with London 9 million inhabitants, almost 4.4 million people live in the Barcelona metropolitan area and 5.1 million in Madrid. In the 21st century the Dutch government decided to improve all main stations and their districts that are more or less linked to the high-speed railway (HSR) network. They are called the 'Nationale Sleutelprojecten' (in English National Key Projects). The government decided to invest more than 1 billion euros on the renovation of six stations served by the HSR: Utrecht CS, Rotterdam CS, The Hague CS, Amsterdam-South, Breda and Arnhem CS.[7] The key projects had to include a total of 3.7 million m2 densification program, in which will be build 1.6 million m2 offices, 1.4 million m2 residential and the rest for urban facilities. This was a great opportunity for the Randstad to compete with other European cities. Nevertheless, many station projects have been downscaled (as for Rotterdam Central station and its district) while for others the planning has been taken over 20 years, as the case of Amsterdam South. Only in 2018 the construction of the new station South and the highway beside the station has started. Several station models and development plans have been drawn for this key project. "In the new model, value creation based on retail development has been used to optimize the plans", says Sebastiaan de Wilde during the event, Director of Station Development and Maintenance at NS Stations. Amsterdam South, as part of the Zuidas project (station area development), is the last of the six key projects that still needs to be built.

In September 2008, the structural vision on the future of the region entitled "Randstad towards 2040" gives importance to the development of accessibility between Dutch cities for the spatial develop-

ment of the region with a new generation of key projects (replaced later by the structural vision on infrastructure and space 2013).[8] The ambition is to strengthen the Randstad for the long-term to address declining liveability, climate change, mobility issues, sustained high demand on space and pressure on our international competitive position. According to the proposed scenario, in conjunction with urbanisation, accessibility in the northern and southern Randstad needs a more quality-oriented approach. Improved housing market performance and accessibility are among the most pressing issues in the Randstad. Investment in public transport, roads and station construction are closely interrelated in the government's vision who is willing to facilitate greater interaction between the various residential and working environments.

An important condition is to improve links within the Amsterdam-Almere-Utrecht region (North Wing of the Randstad) and Rotterdam-The Hague region or MRDH (South Wing of the Randstad), allowing both to perform more effectively as metropolitan city-regions. Faster and better links to the main ports will also improve the economic dynamism of the Randstad. The ambition is to accommodate synergy in space-road-rail at nodal points of the public transport networks, exploring the potentials of a 'second generation of key projects' as stations situated along rail-metro networks, to play a significant role in the growth of the region. For example, the Stedenbaan project in the MRDH region consists of 35 stations (32 existing and 3 new) identified as potential locations of new development in a radius of roughly 1200 meters around them. Concrete ambitions have been attached to the development of these station areas including new dwellings, office space and other non-transport related facilities. At the same time the sub-regions that compose the Randstad, (North Wing and South Wing) have their own approaches to tackle with their developments. These are for examples projects such as Stedenbaan and the Randstadrail in the MRDH.[9]

Several researches on stations as drivers of urban regeneration – by using TOD Transit Oriented Development approaches - in the metropolitan regions of the Randstad, have been made in the last years. Public transport hubs and corridors are compared and positioned in the metropolitan networks. In the province of Noord-Holland for example eight corridors are appointed by the project 'Maak Plaats! (Make Space!)'.[10] These corridors either start or end at the Ring of Amsterdam, at Amsterdam Central station or Amsterdam South station. The project brought together studies, the available knowledge and data, providing insight into the opportunities for better utilization of public transport hubs in the Province of North Holland. This work will come back later in this publication with the contribution by Paul Chorus, TOD policy advisor at the Province.

The Zaancorridor is one of the analyzed corridors which could play an important role to the development of the metropolitan area of Amsterdam (MRA). For this reason, in 2014 the research project 'Designing TOD – opportunities for the Zaancorridor' was carried out by professional teams of designers and the stakeholders involved in the case studies/station areas situated along this corridor.

In line with these considerations, the new Noordzuidlijn metro line in Amsterdam can be considered as an important connector within the city as well as urban catalyzer for the future urban developments envisioned in the metropolitan areas. The recently opened line and its metro-stations have been presented by their designers

Benthem Crouwel Architecten in the event in Paris.

"In the past decades we worked on implementing both a high-speed line and regional light rail lines to our major stations, that all got a big upgrade. We made them not only efficient transit machines, but great places to meet, work and stay. The bike is a great feeder of Dutch public transport. Currently we face a task to build 1 M homes and extend the transformation from 6 to 60 or even 600 stations," says Daan Zandbelt, Dutch State Advisor for the Physical Living Environment. In line with these considerations, everyone in the Netherlands should be able to travel quickly, easily, reliably and affordable with public transport (OV). This is the motto of the Ministry of Infrastructure and Water Management, that together with twelve provinces, the metropolitan regions of Amsterdam, the MRDH region and the railways, works on a future image of public transport 2040 (in Dutch Toekomst Openbaar Vervoer 2040**). This vision of the future gives direction towards a 'smart' and flexible public transport to the policy of the government and its implementation together with partners.[11]**

Notes

1
Megalopolis or mega-region is a clustered network of cities. The term was introduced in 1915 by Patrick Geddes' book *Cities in Evolution*. Later, it was used by Jean Gottmann in the 1961 study, *Megalopolis: The Urbanized Northeastern Seaboard of the United States*, to describe the chain of metropolitan areas from Boston, through New York City and ending in Washington. See also: Peter Hall and Kathy Pain, *The polycentric metropolis. Learning from mega-city regions in Europe*, published by Earthscan, 2006

2
See Castells, M. (1996) *The Rise of the Network Society. The Information Age: Economy, Society and Culture*, Vol. I., Oxford, Blackwell, and Gregotti, V. (2011) *Megalopoli e città-territorio in Architettura e Post metropoli*, Einaudi, Torino

3
Studio Secchi Vigano', *Habiter le Grand Paris*, Study realised for the Atelier International du Grand Paris, Oct. 2013

4
https://www.rijksoverheid.nl/onderwerpen/openbaar-vervoer/betere-verbindingen-openbaar-vervoer/ov-in-de-toekomst

5
A summary of all the work of the Observatory of GPE station neighborhoods (in French Observatoire des quartiers des gares) has been published and it can be found online.

6
See: Consultation International Inventons la Métropole du Grand Paris, publication Pavillon de l'Arsenal. 2017

7
The National Key Projects were presented by Miguel Loos at the Stations of the Future event. He is senior advisor for architecture and urbanism at Bureau Spoorbouwmeester, an independent consulting bureau on design guidelines for and on behalf of the Dutch railway companies NS and ProRail.

8
Summary of the structural Vision *Randstad 2040*, Ministry of Infrastructure and the Environment, 2008. VROM (2006). Nota Ruimte. Ruimte voor Ontwikkeling; Zuidvleugel Stedenbaan (2010). Stedenbaan Monitor. Vastgesteld door de Bestuurlijke Comissie Stedenbaan.

9
More information on Stedenbaan (www.stedenbaan.nl) and the RandstadRail (https://www.overhtm.nl/nl/over-ons/ons-vervoer/randstadrail/

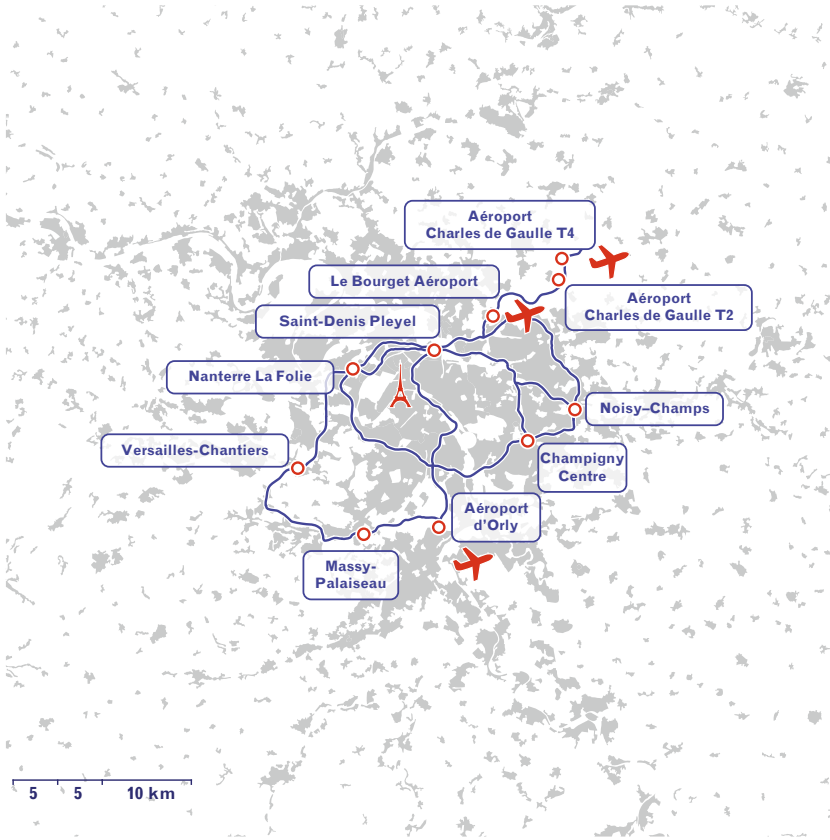
10
The publication *Maak Plaats!* (Make Space!) by Delta Metropolis Association and the province of North Holland, presents a new vision on the use of space in the province. The time is ripe for transit-oriented development; a smart growth strategy focused on a more efficient use of the existing city and its existing infrastructure network. The program for transit-oriented development is one of implementation programs of the Structural Vision Noord-Holland (Strategic Plan for the province of Noord-Holland 2040). Its goal is to better utilize the land around stations for housing and other urban functions. The 'Designing TOD – opportunities for the Zaancorridor' is a research project by BNA - The Royal Institute of Dutch Architects – based on the investigation of 5 nodes along the corridor by using TOD. The project brings together designers, stakeholders, municipalities and academia in order to find answers on the central question for the near future. The results of this project have been published in *Onder weg!* (Under way!) BNA Onderzoek (January 2015).

11
For more insight on the vision of the future of public transport in the Netherlands, visit: https://www.rijksoverheid.nl/onderwerpen/openbaar-vervoer/betere-verbindingen-openbaar-vervoer/ov-in-de-toekomst

France, Île-de-France: Grand Paris Express

The Grand Paris Express is part of the Grand Paris project announced in 2007, under Nicolas Sarkozy's presidency, to develop Greater Paris into a sustainable metropolitan area.
Société du Grand Paris (SGP) is the overall project owner and contracting authority and the state-owned public transport operator Régie Autonome des Transports Parisiens (RATP) is the operator of the network.
Map by Joran Kuijper, based on the maps in the paper ATELIER INTERNATIONAL DU GRAND PARIS, *Urbanised Grand Paris*Habiter le Grand Paris © Studio_013, Secchi Viganò—l'habitabilité des territoires: cycles de vie, continuité urbaine, métropole horizontale.

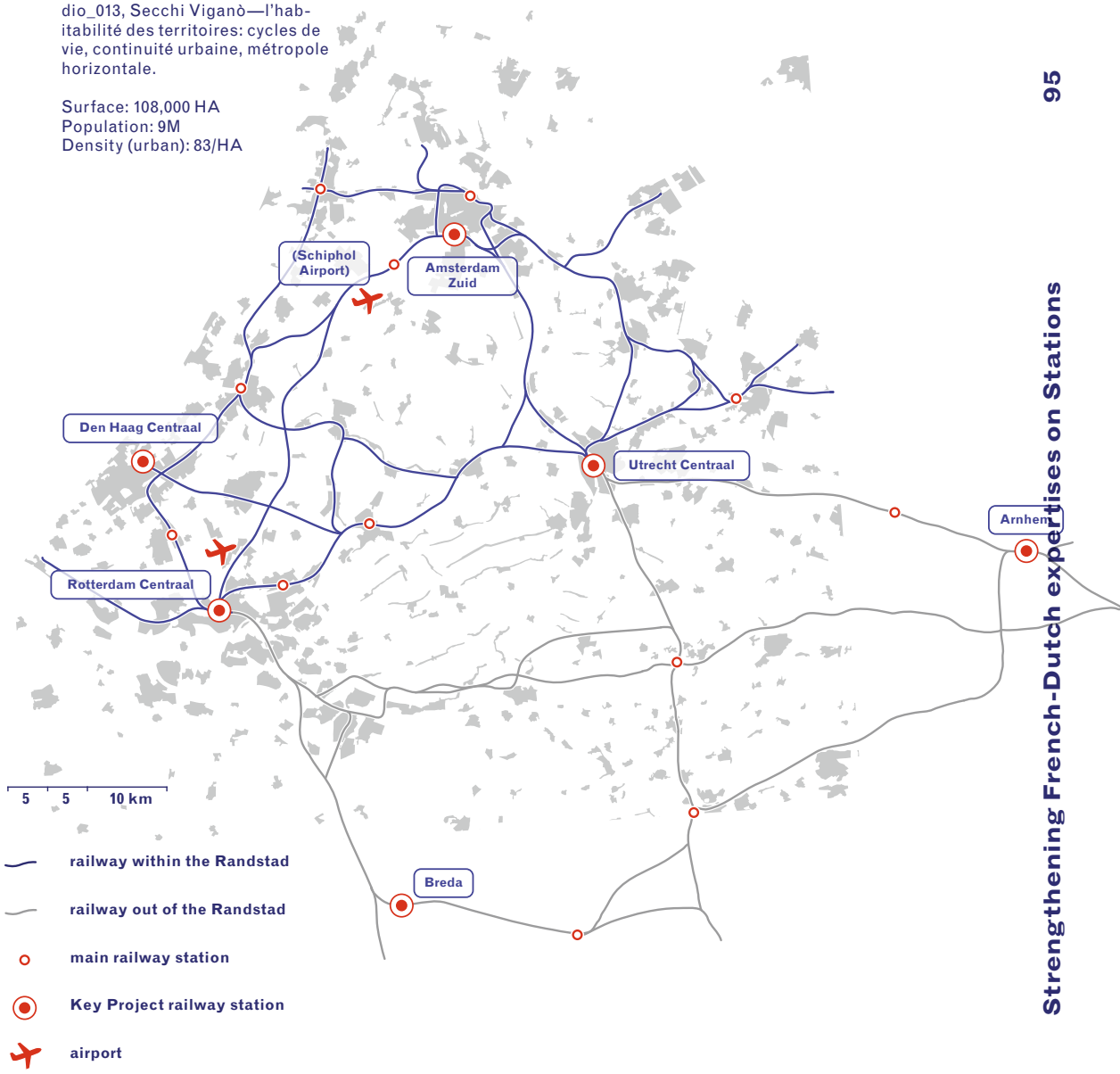
Surface: 170,000 HA
Population: 12M
Density (urban): 70/HA

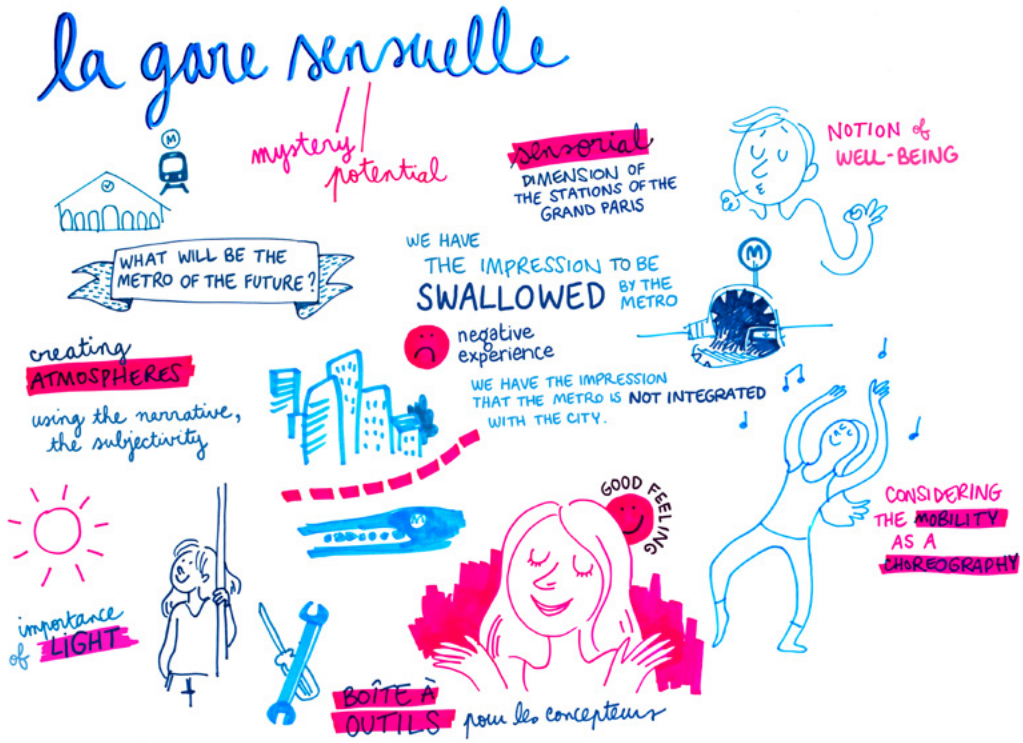


The Netherlands, Randstad: National Key Projects

Decades ago the Dutch government planned to invest more than 1 billion Euros on the renovation of six stations that would serve a high speed line. These projects are known as the New Key Projects (NSP). As the owners of almost all stations in the Netherlands, NS Stations and ProRail are closely involved in redevelopment of NSP.
Four of them are in The Randstad, which is a conurbation of four big cities – Amsterdam, Rotterdam, The Hague, Utrecht – and at least six smaller ones, which are linked by suburban extensions.
Map by Joran Kuijper, based on the maps in the paper ATELIER INTERNATIONAL DU GRAND PARIS, *Urbanised Randstad* Habiter le Grand Paris © Studio_013, Secchi Viganò—l'habitabilité des territoires: cycles de vie, continuité urbaine, métropole horizontale.

Surface: 108,000 HA
Population: 9M
Density (urban): 83/HA




la gare sensuelle
mystery / potential
sensorial
DIMENSION OF THE STATIONS OF THE GRAND PARIS
NOTION of WELL-BEING
WHAT WILL BE THE METRO OF THE FUTURE ?
WE HAVE
THE IMPRESSION TO BE
SWALLOWED BY THE METRO
negative experience
WE HAVE THE IMPRESSION THAT THE METRO IS NOT INTEGRATED WITH THE CITY.
creating ATMOSPHERES
using the narrative, the subjectivity
GOOD FEELING
CONSIDERING THE MOBILITY AS A CHOREOGRAPHY
importance of LIGHT
BOÎTE À OUTILS pour les concepteurs

1

La Gare Sensuelle

Pauline Marchetti Sensual City Studio

The station's grip on the city is growing, reasserting its status as an important urban landmark. The sensual station is the laboratory of contemporary urban life, the place where we test new ways of sharing space and of building the Paris of the future. We want to move towards a better way of managing urban living, and the development of a much wider public transport network will not only improve access to the rest of France, but radically reconfigure the shape of the Parisian landscape.

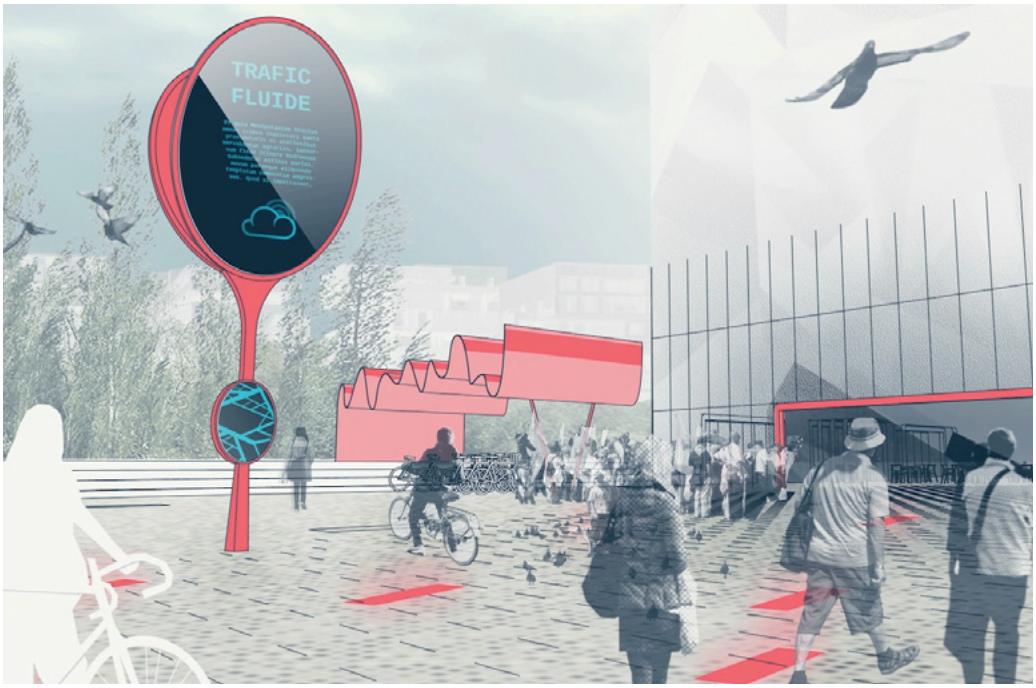
With the launch of the international consultation for stations in the Greater Paris area, the Studio found the ideal context for the deployment of its philosophical concepts associated with the sensual city. The scheme was intended to define stations according to the specific features of the environment in which they are located, to deliver efficient and user-friendly spaces for the use of travelers, which are both open to the city and marked by common characteristics for the entire network. We have decided to focus on the sensual dimension of Paris's stations: their atmosphere, the emotions they inspire, the impressions they leave and the stories they tell. In addition to creating built space and infrastructure, we aim to use light and sound to create a welcoming, calming and pleasant environment inside the station. While the quality of public facilities and their incorporation into the urban environment are of fundamental importance, the scheme will also sow the seeds for the achievement of a new and urbane quality. Based upon the pursuit of atmospheric urban development, the Studio therefore couched its proposal in terms of the humanistic perspective which informs its policy. This position provides a response to the apparent contradiction in the brief, which emphasizes the creation of a specific and shared identity for stations on the GPE, whilst requiring compliance with the commitment to local municipal authorities that each station should be rooted in its respective territory. By transposing the formal recognition of facilities into an approach based upon the perception of space – the quality of air, light, sounds, smells and textures – the JFA-SCS group has expressed the all-encompassing qualities of the network in terms of shared ambiances and sensory experiences, rather than in terms of form. This approach gives a substantially free rein to the creativity of the future designers, who will be guided in their decisions by three charters which are intended to ensure the standardization of all stations on the future metro network: the architecture and development charter, the spatial design charter, and the facilities integration charter, established by SCS.

◂ 1. *la gare sensuelle/ Pauline Marchetti* by Louise Plantin, visual note made in at the 'Gares du Futur/ Stations of the Future' event in March 2018

▸▸ 2. *La Gare sensuelle*, *le parvis*, Sensual City Studio, 2012

▸▸ 3. *La Gare sensuelle*, model, Sensual City Studio, 2012

▸▸ 4. *La Gare sensuelle*, concept sketch, Sensual City Studio, 2012



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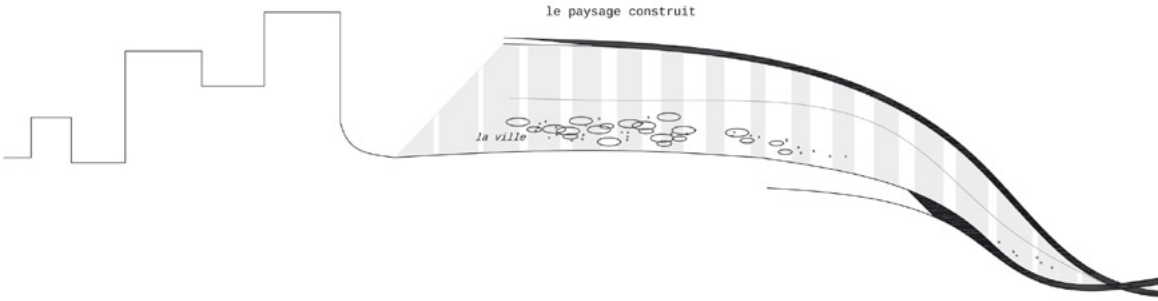

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the line 17
WILL SERVE MAINLY ATTRACTIVE PLACES
STATION TRIANGLE DE GONESSE
there will be a station
here a business district
here Europa-city
FUTURE STATION OF TRIANGLE DE GONESSE
VIRGIN, AGRICULTURAL AREA
VERY SIMPLE VOLUME
the infrastructure integrated into the ground
EXPOSED STRUCTURE, CONCRETE, NATURAL LIGHT, VEGETAL PRESENCE
NATURAL LIGHT ON THE PLATFORMS
VERTICAL SKYLIGHTS
STATION OF THE BOURGET AIRPORT
IMPORTANT FOR THE HISTORY OF AVIATION
→ to evoque the AIR & the SPACE
VERY OPEN SPACE
NO RECEPTION ON THE GROUND FLOOR, everything is underground
WE WILL SUSPEND MANY PLANES!
AH NOT REALLY
louise plantin

Deux gares de la ligne 17 du Grand Paris Express : Le Bourget Aéroport— Aéroport Charles de Gaulle

Jacques Pajot Atelier Novembre

Gare Triangle de Gonesse

Currently, located on the North-East of Paris the Triangle de Gonesse is a vast agricultural plain. In the next decades, it will be at the heart of a major development project that will be exemplary in terms of sustainability.

The master plan is structured around two main guiding principles: first, the integration of the GPE station, two RER lines and the bus station into the multimodal hub, a desired compact unit; then the landscape continuity with the park, an emblematic green area of the project.

Connected with Europa City, the station will be twinned with a station on the future RER D line.

The whole is dominated by the office development, in order to reinforce the attractiveness and the readability of the node, which will be at the core of the urban composition.

The guiding principles of this station are openness to the public space (free of all car traffic), permeability, urbanity, and accessibility in several points, with a balcony-belvedere that opens on Paris: a gateway to the neighborhood, it will be a lively place, animated and widely crossed.

The entire length of the station will blend into the landscape and will take advantage of the inclination of the topography.

Gare Le Bourget Aéroport

Located at the intersection of three cities, the Bourget Airport station will serve the aeronautical hub of Le Bourget, the Museum of Air and Space, the Exhibition Center and the town of Le Blanc Mesnil.

Currently underserved by public transit, the territorial ambition on this site is to create along with the construction of the Grand Paris Express Station, a true aeronautical cluster in Paris region.

The architectural concept anchors its genesis in the emblematic history of aeronautics of the site. The station benefits from the opportunity to accompany a major architectural intervention, the Museum of Air and Space.

The Museum is not to be considered only as a station entrance but as a new access to the site, a 'lever' of a changing territory.

Thus, from the forecourt and the surrounding context, this intervention is the signal of the renewal of the site. It allows to take a new look at the changing territory, thanks to its volume, its permeability and its materiality. From the square, it is highlighted by the transparency of the facades and symbolizes this new trajectory rising in an extensive landscape.

In a peripheral structural cube an inner cone evoking a hot air balloon accompanies the traveler as he descends into the station, as a link between the aerial universe of the territory and the underground universe of the metro.

The design will make a sign in the city, echoing the historical and technological vocation of the site.

◂ 1. *Jacques Pajot* by Louise Plantin, visual note made in at the 'Gares du Futur/ Stations of the Future' event in March 2018

▸▸ 2. *Gare Triangle de Gonesse,* vue du parvis sud @ Société du Grand Paris, ATELIER NOVEMBRE (design : Menomenopiu), 2018

▸▸ 3. *Gare Triangle de Gonesse,* vue de la mezzanine @ Société du Grand Paris, ATELIER NOVEMBRE (design : Menomenopiu), 2018

▸▸ 4. *Gare Le Bourget Aéroport* vue depuis le parvis @ Société du Grand Paris, ATELIER NOVEMBRE (design: Menomenopiu), 2018

▸▸ 5. *Bâtiment voyageur de la gare Le Bourget Aéroport* @ Société du Grand Paris, ATELIER NOVEMBRE (design: Menomenopiu), 2018

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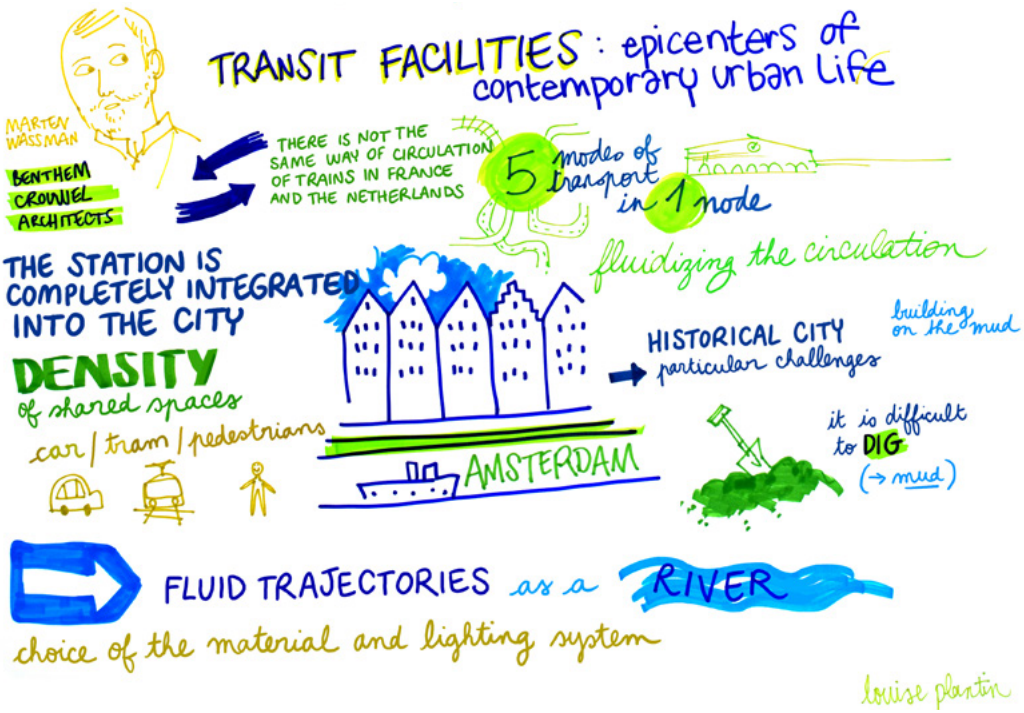
TRANSIT FACILITIES : epicenters of contemporary urban life
MARTEN WASSMAN
BENTHEM CROUWEL ARCHITECTS
THERE IS NOT THE SAME WAY OF CIRCULATION OF TRAINS IN FRANCE AND THE NETHERLANDS
5 modes of transport in 1 node
fluidizing the circulation
THE STATION IS COMPLETELY INTEGRATED INTO THE CITY
DENSITY
of shared spaces
car / tram / pedestrians
HISTORICAL CITY
particular challenges
building on the mud
AMSTERDAM
it is difficult to DIG
(→ mud)
FLUID TRAJECTORIES as a RIVER
choice of the material and lighting system
louise plantin

Latest addition to Amsterdam's metro system: The North-South Line

Marten Wassmann Benthem Crouwel Architects

Across the globe, metropolises are re-inventing transportation facilities, turning them into destinations in their own right, revitalizing entire urban districts in their slipstream. Amsterdam's North-Southline, a new underground metropolitan railway, opened on July 22nd 2018.

Over 20 years of designing, consultations, drilling and construction brought an impressive end result: inhabitants of Amsterdam, commuters, tourists, and metro enthusiasts can now travel from Noord Station to Zuid Station in just 15 minutes, through seven uncluttered, spacious and bright stations.

Benthem Crouwel Architects designed these stations, two at grade and five below ground. They are modest and functional, each with its own recognizable appearance but by using the same formal language and design principles, they are clearly family members.

The metro brings relief to the above-ground public transport and connects the Zuidas with the IJ-as, two areas that have been developing strongly in recent years.

City and Station

The underground stations are not designed as separate buildings, isolated from the city, but function as public spaces and as an extension of the street above. The architectural concept is the same for all stations: the shortest possible connection between platform and street level, even at stations more than 20 metres below ground, and a flowing, continuous logistical route that enables travellers to easily find their way. Restrained use of colour, sober materials and a well-thought-out and innovative lighting plan create spaces that feel compact, natural and safe.

A Technical Tour de Force

It was no easy task to build a metro line dozens of metres below the historic city centre, which was constructed centuries ago on poles in the boggy ground. Using a structural engineering technique developed in the 1990s, tunnels were drilled (in some places up to 30 meters deep) into this damp and unstable soil.

However, one can't just bore out a metro station. To do this, holes had to be made in the street, deep construction pits within which the stations were built. The resulting large high spaces between the station and the street were used creatively: at Rokin station for a public parking garage, at Vijzelgracht station, a parking garage for residents has been incorporated, and at De Pijp station, where the street is too narrow to place the tracks side by side, they are arranged one above the other.

Underground Art Route

Each station has a unique work of art especially designed for it, creating a fascinating underground art route with works by Dutch and international artists. Additionally, at Rokin station a selection of the more than 700,000 archaeological finds is exhibited that were excavated during construction.

The new metro line transports and connects, and gives Amsterdam seven cosmopolitan stations to be proud of.

◂ 1. *Marten Wassmann* by Louise Plantin, visual note made in at the 'Gares du Futur/Stations of the Future' event in March 2018

▸▸ 2. *Amsterdam North-South Line, interior* © Benthem Crouwel Architects 2018

▸▸ 3. *Amsterdam North-South Line, interior* © Benthem Crouwel Architects 2018

▸▸ 4. *Amsterdam North-South Line, interior* © Benthem Crouwel Architects 2018

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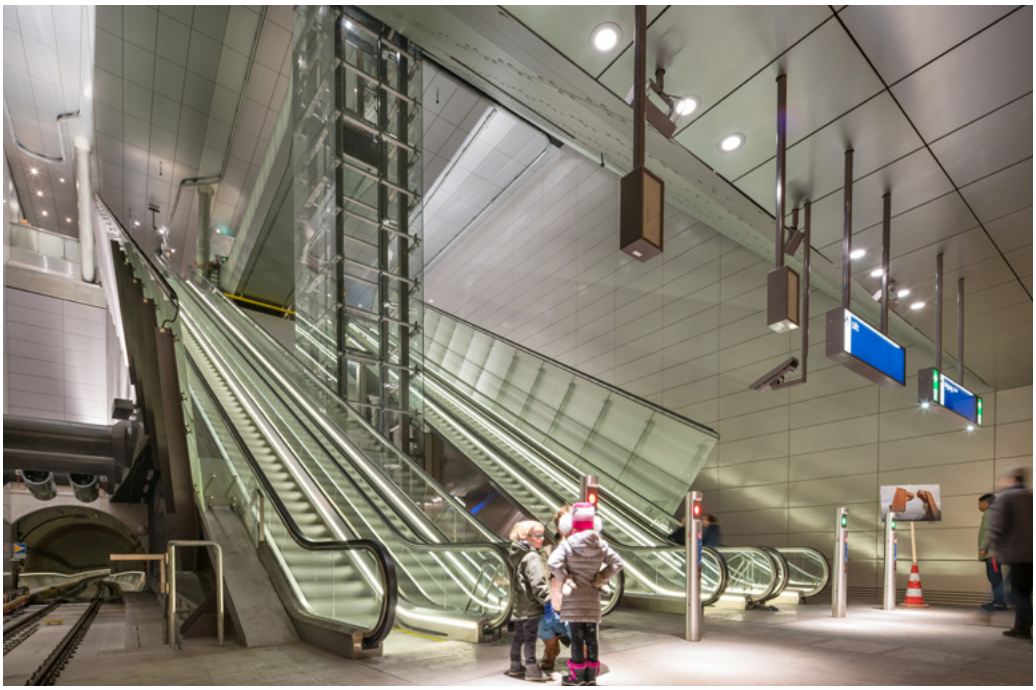

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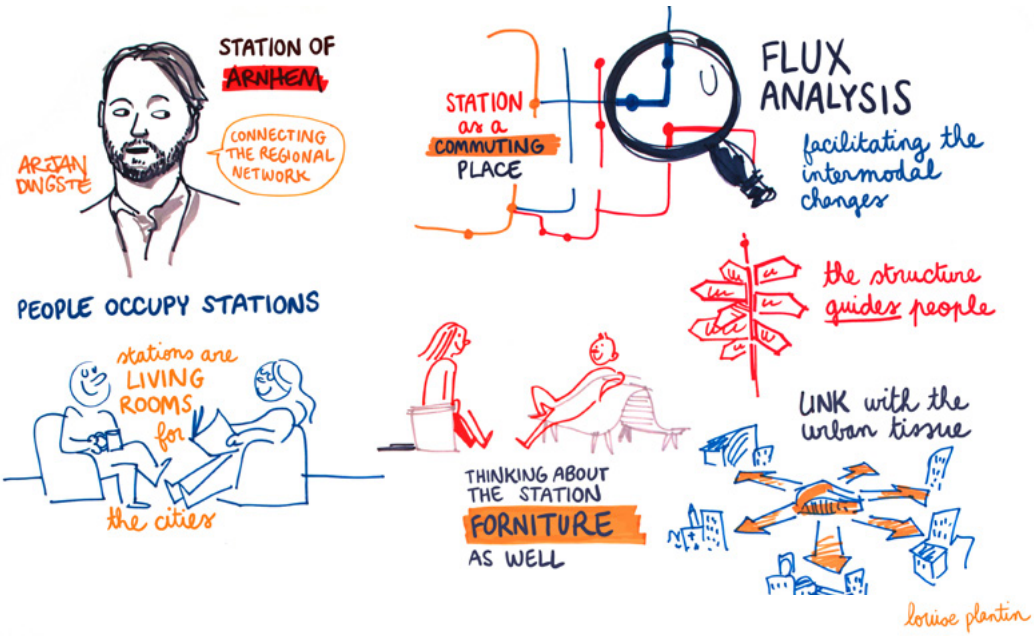
STATION OF ARNHEM
ARJAN DINGSTE
CONNECTING THE REGIONAL NETWORK
PEOPLE OCCUPY STATIONS
stations are LIVING ROOMS for the cities
STATION as a COMMUTING PLACE
FLUX ANALYSIS
facilitating the intermodal changes
the structure guides people
LINK with the urban tissue
THINKING ABOUT THE STATION FORNITURE AS WELL
louise plantin

Arnhem Central Station: a transportation hub

Arjan Dingsté UNStudio

The station is the result of an ambitious 20-year project – masterplanned by UNStudio – to redevelop the wider station area; the largest post-war development in Arnhem. Backed by the Dutch government, this transfer hub rewrites the rulebook on train stations and is the most complex of its type in Europe. The station will become the new 'front door' of the city, embracing the spirit of travel, and is expected to establish Arnhem as an important node between Germany, the Netherlands and Belgium. The new terminal houses commercial areas, and a conference centre and provides links to the nearby office plaza, city centre, underground parking garage and the Park Sonsbeek. The area around the station will become a place in of itself, with 160,000 m² of offices, shops and a cinema complex.

The 21,750 m² Transfer Terminal features a dramatic twisting structural roof geometry, which enables column-free spans of up to 60 m in the transfer hall. Taking references from the continuous inside/outside surface of a Klein Bottle, UNStudio aimed to blur distinctions between the inside and outside of the terminal by continuing the urban landscape into the interior of the transfer hall, where ceilings, walls and floors all seamlessly transition into one another. The structure of the roof and twisting column was only made possible by abandoning traditional construction methods and materials; much lighter steel replaced concrete – originally intended for the station – and was constructed using boat building techniques on a scale never before attempted.

Delivery of such a complex and lengthy project on time, on budget and without design compromise required the courage and determination of both the client, ProRail B.V. and the architects. It is also the result of an exceptional collaborative endeavour by the key stakeholders, ProRail, Contractor Combination Ballast Nedam – BAM, the Ministry of Infrastructure and the Arnhem City Council.

UNStudio began the masterplan in 1996 and completed its first sketch design for the Transfer Terminal back in 2000. After intensively researching passenger flows and transportation modes, UNStudio proposed that the new terminal should expand to become a 'transfer machine' that incorporates the whole spectrum of public transport, meeting the travel demands of the 21st century. Working with structural engineers Arup, a space without columns was produced, forming an architectural expression designed around the ways people will intuitively use the space. The station works on international, national and regional levels, allowing passengers to move between cities intuitively and with ease. This project is part of a countrywide railway upgrade that will see new stations in Rotterdam, Delft, The Hague, Breda and Utrecht.

In 2001, Arnhem Central acquired the status from the Dutch Government as of one of the 'New Key Projects' (station areas of national importance). These stations should function as catalysts for urban renewal and economic growth. It is anticipated that the new Transfer Terminal, which replaces a 1950s train station, will facilitate economic growth by enabling a vastly increased daily passenger flow to the city of 110,000 commuters per day in 2020.

◂ 1. *Station of Arnhem* by Louise Plantin, visual note made in at the 'Gares du Futur/Stations of the Future' event in March 2018

▸▸ 2. *Station Arnhem Centraal, exterior* © Hufton + Crow, 2015

▸▸ 3. *Station Arnhem Centraal, train platform* © Ronald Tilleman, 2011

▸▸ 4. *Station Arnhem Centraal, interior* © Hufton + Crow, 2015

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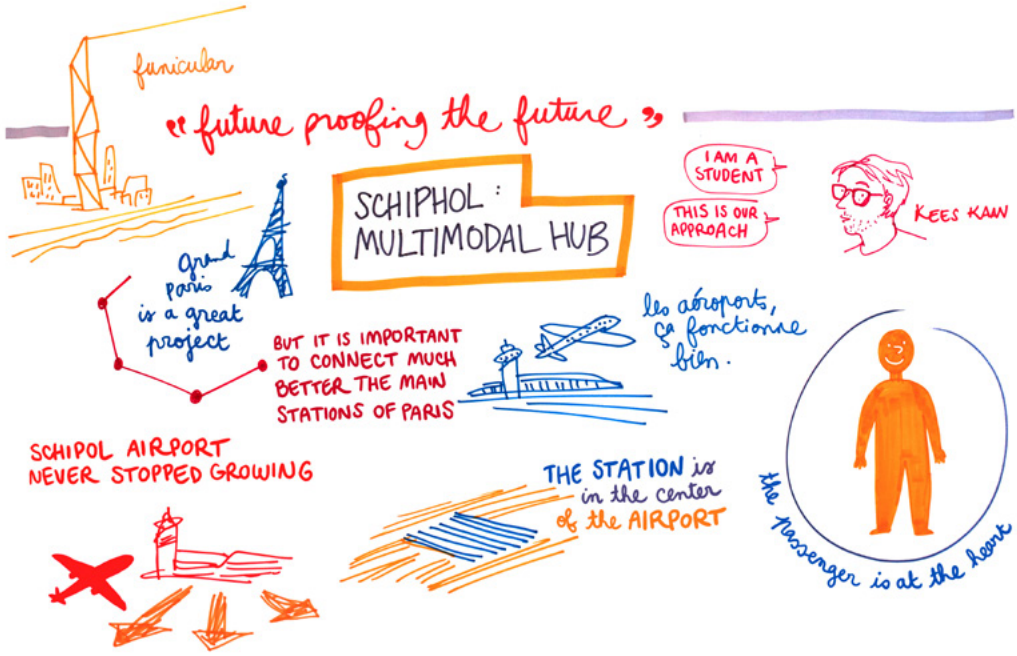
funiculaire
« future proofing the future »
SCHIPHOL : MULTIMODAL HUB
I AM A STUDENT
THIS IS OUR APPROACH
KEES KAAN
Grand Paris is a great project
BUT IT IS IMPORTANT TO CONNECT MUCH BETTER THE MAIN STATIONS OF PARIS
les aéroports, ça fonctionne bien.
SCHIPOL AIRPORT NEVER STOPPED GROWING
THE STATION is in the center of the AIRPORT
the passenger is at the heart
louise plantin

Amsterdam Airport Schiphol Terminal

Kees Kaan

KAAN Architecten
KL AIR (KAAN Architecten, Estudio Lamela, ABT, Ineco, DGMR, Arnout Meijer Studio and Planeground)

KAAN Architecten in collaboration with Estudio Lamela, ABT and Ineco, with the support of Arnout Meijer Studio, DGMR and Planeground, will design the new terminal at Amsterdam Airport Schiphol. The building will be located at Jan Dellaert Plein, south of Schiphol Plaza, the main airport meeting area and arrival point for passengers via Schiphol train station and the A4 highway. The new terminal is to be completed by 2023.

The spatial organization of the new 100,500 m2 terminal for approximately 14 million passengers per year, its design and the treatment of its façades, are based on the ability to link up with Schiphol Plaza, the train station, the new pier, and potential future expansions. This is achieved through architectural clarity, spatial openness, and details such as overhangs and black eaves.

Central to the design is the urban integration of the new terminal that will ensure an excellent connection with the rest of Schiphol. An overlapping area and a diversity of user flows distinguish the reception hall for departing passengers, and make a distinctive space for the baggage reclaim hall underneath the check-in floor. Furthermore, short and direct routes on the landside are urban integration elements that contribute to keeping Schiphol a "compact city".

"The most inspiring architectural and planning DNA at Schiphol is that of De Weger and Duintjer's 1967 Departures Hall, with interior design by Kho Liang le Associates, which is characterized by abundant daylight, simplicity of space and an impressive spatiality"

says the design team.

The large-scale terminal offers diverse spatial experiences to travellers within a light-infused environment, and the understated design allows the use of spaces to be self-evident, while not diminishing the overall functionality.

At the heart of the building, a raised Plateau creates a higher ceiling for the baggage hall and gives the check-in and security control area more privacy. Here passengers have a sweeping view over an entrance hall that is superbly crowned by a lattice-work of light, allowing travellers to take in the big Dutch sky.

Materials such as wood flooring on the Plateau and lush greenery in the large light wells above the security control area communicate elements of sustainability inherent in the design. The columns in the façade and a few facility areas within the building will bear the load of the unique roof.

◂ 1. *The future proofing the future* by Louise Plantin, visual note made in at the 'Gares du Futur/Stations of the Future' event in March 2018

▸▸ 2. *Amsterdam Airport Schiphol Terminal*, render, © Beauty & The Bit, 2018

▸▸ 3. *Amsterdam Airport Schiphol Terminal*, render, © Beauty & The Bit, 2018

▸▸ 4. *Amsterdam Airport Schiphol Terminal*, render, © Filippo Bolognese 2018

▸▸▸ 5. *Amsterdam Airport Schiphol Terminal*, render, © Filippo Bolognese 2018

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New Terminal

The Workshops at Atelier Néerlandais

Manuela Triggianese

Delft University of Technology
AMS Institute

During the event at the Atelier Néerlandais in Paris, and in line with the considerations on the scope of the « Grand Paris Express » and the « Randstad » in the Netherlands, all the themes mentioned in the previous articles on Stations of the Future have been addressed. A selected group of professionals, stakeholders, experts, designers and scientists from both France and the Netherlands were invited to share their experience, knowledge, and expertise. We had lectures and debates on exemplary case studies in both countries in order to understand the different roles that stations are playing and will play in these metropolitan areas. In working sessions, the participants focused on: the intermodal character of the station, as 'node' and as an 'urban place', the catalyst role it plays in the city becoming a 'destination' by itself, and last but not least the potential of the ICT technology to make stations user-centric. Several research questions and definitions were developed in these sessions on the following topics: business cases of rail-metro stations, public space and architecture, densification and programming of station areas, crowd sensing, way-finding and navigation systems, pedestrian flows management and security systems (waiting zones and retail), and the integration of data.

The workshops aimed at defining the role of the Station of the Future as being: an intermodal node (in French gare comme nœud intermodal**), a City destination (in French** gare comme destination**) and a data center (in French** gare intelligente comme centre de donnees**).**

A special thank goes to

—Carolien van Tilburg and Joannette Polo for hosting the participants at Atelier Néerlandais;

—Tom Kuipers, Ebru Isguzarer-Onder and Maartje Meesterberends for reporting the workshops;

—Niels van Oort, Ton Venhoeven and Winnie Daamen for moderating the workshops;

—Yo Kaminagai, Jeroen van der Hoevel, Sebastiaan de Wilde, Ute Schneider for their interventions and all attendees for their active participation to the three workshops.

How would you define a station as an intermodal node?

The word cloud is the result displayed in real-time during the workshop, created with Mentimeter presentation software, by asking the participants '**how to define the station as a node?**'.
A multitute of keywords and concepts get the conversation started and three main points were defined:

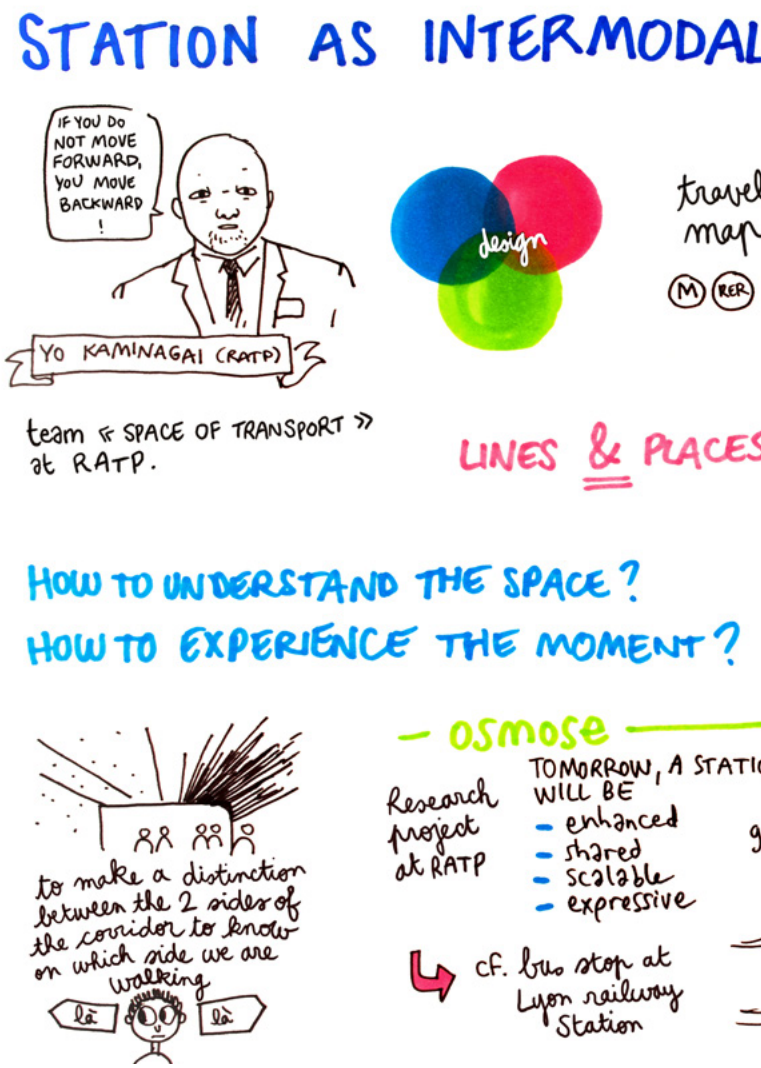
1.Concept: consider the hubs not as a consequence of stops but as an asset to identify, to enhance, to promote.

2. Design: how to make scalable hubs, open to changing new modes of transportation?

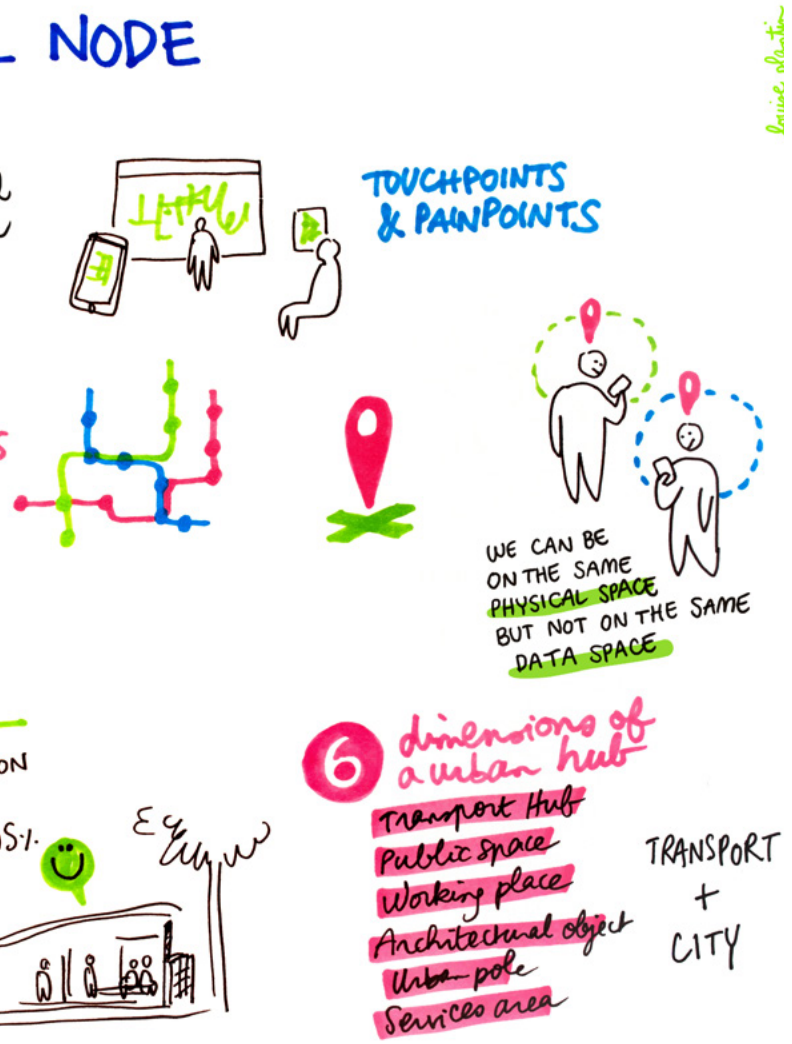
3. Policy: how to invest radically in nodes?

Station as Intermodal Node

The development of a rail network is often associated to the most ambitious of objectives: a tool of economic development, in spatial planning, but also of social and urban innovation. The intermodal node does not only connect different modes of transport but also several scale levels (local, regional, (inter) national). Finding an optimal mix of transport modes for each situation and making it as seamless as possible for the user, are the main goals to achieve. The workshop was introduced and moderated by Niels van Oort (Assistant professor at TU Delft). "To conceive stations as intermodal nodes, we will have to focus on their spatial organization, and not just combine buildings, as is often the case in France "says Yo Kaminagai during the session, Head of the Design department at RATP. During the workshop he described Stations as Urban Places; a new places culture is needed in urban mobility planning. Stations have to be a mix between a transport-object and an urban-object. Thinking of stations this way calls for a shared governance and a better articulation between public and transport authorities. Design oriented approach links the following aspects: Aesthetics (image perception) Functionalities (uses) and Durability (feasibility, maintainability, economy). He also defines 6 dimensions of an urban hub: -transport hub -public space -working place -architectural object -urban pole -service area.



▼ *Station as Intermodal Node* by Louise Plantin, visual note made in at the 'Gares du Futur/Stations of the Future' event in March 2018



"Public space is the support for all urban exchanges. It becomes a central issue of development and innovation, a place of encounters and socialization, and a new environment that is much more than mere operations targeting functional or connective surfaces" says Julien Peyron responsible for the public space and intermodality for the Grand Paris Express (GPE) project at the Société du Grand Paris (SGP). Through its program in favor of intermodality, the SGP is a key stakeholder, along with its partners, in the conception of efficient intermodal nodes that also provide quality, evolutionary public spaces. Intermodal nodes should be evolutional and flexible in their development and governance/management. Main features are Flexibility and Governance (multi layering, policy and design). How to design and govern flexibility? How to build the governances for the hubs projects and for the hubs operations? How new mobilities will be integrated into the station/hub? New challenges include providing answers to autonomous vehicles, demand responsive transport, electric vehicles, information technology, societal changes (aging population). However, we need to take into account that intermodal nodes are very situation-specific and thus choices per location should be made, while we also need to rethink the intermodal node as an urban place and look for new design solutions.

How would you define a station as a destination?

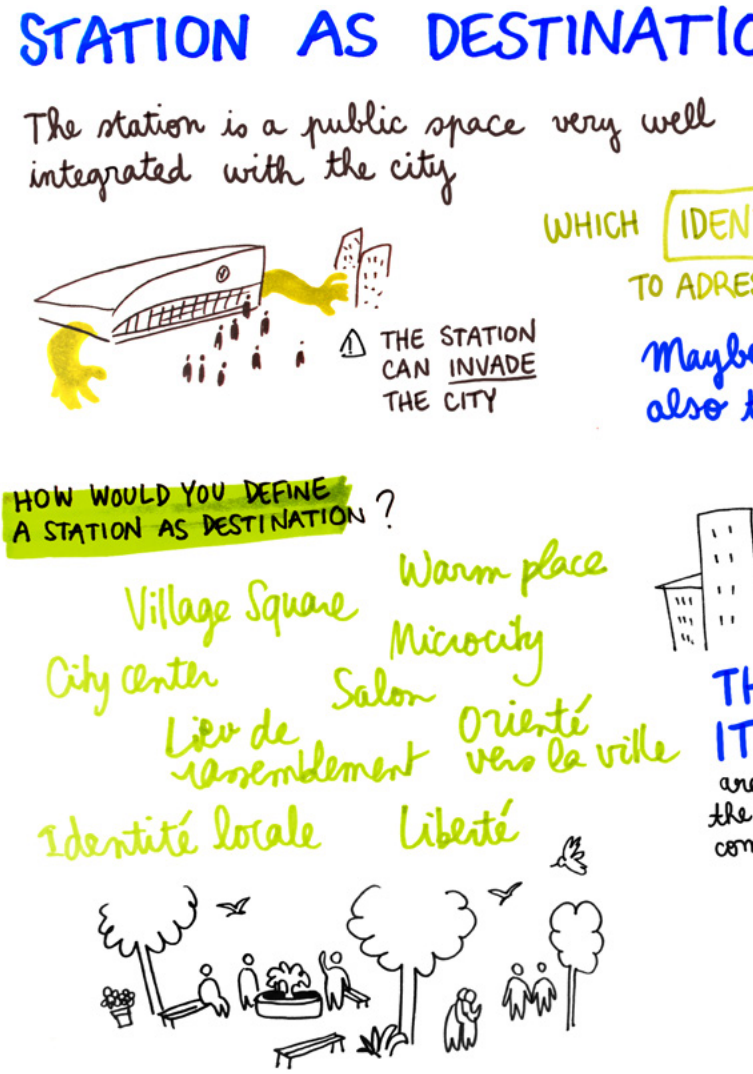
▲
This word cloud is the result displayed in real-time during the workshop, created with Mentimeter presentation software, by asking the participants how they would define the station as a destination. A series of 'challenges' were identifyied:

1. How to provide attractive pedestrian networks in the station area?

2. How to make an attractive area?

3. How dense do we build around stations?

4. Which kind of governance would suit these type of stations?



Station as Destination by Louise Plantin, visual note made in at the 'Gares du Futur/Stations of the Future' event in March 2018

Station as City Destination

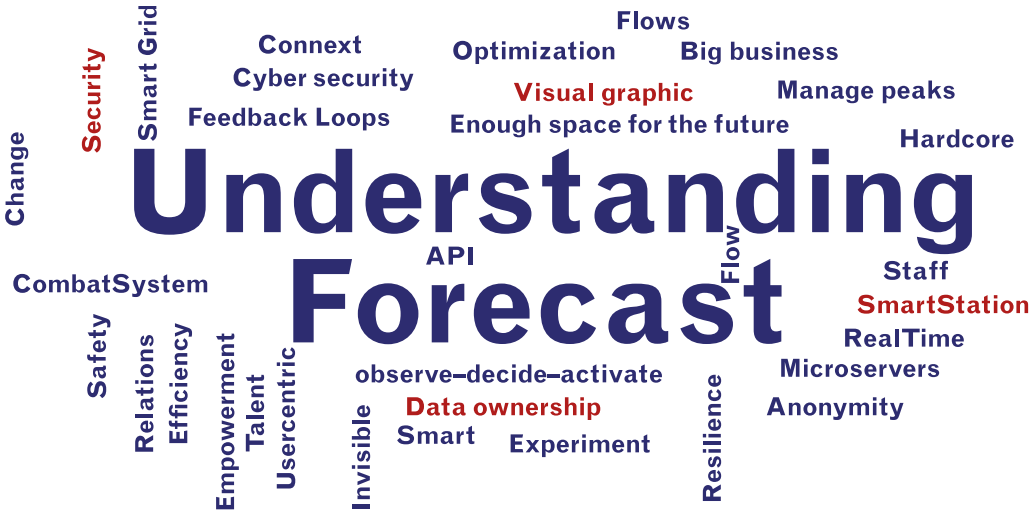
Railway stations have become much more than just a place to get on and off trains. Instead, they are places to work, do business, meet, shop and relax. Cities began seeing them as a 'Grand Projects' to boost their image, to serve as a symbol and eye-catching entrance into the city. The development of a station project can be used to promote a high level of architecture and the revitalization of city areas.[1] A basic function that a station should provide is transfering to other means of transport. But the best stations are important places as well, with attractive public spaces and a range of vibrant destinations in the station area, according to Ton Venhoeven, founder of VenhoevenCS, who introduced and moderated the session. Yet, "Stations should attract people with a program mix, next to offering transfer to other means of transport", he mentioned. Sebastiaan de Wilde, Director of Station Development and Maintenance of the Dutch Railway company NS Stations, showcased the renewal plans for Station Zuid in Amsterdam, in which he focused on value models and the added value of public and

Note

1 The railway station becomes as a centerpiece of urban design, see the case of Rotterdam Central Station in: Manuela Triggianese, 9 September 2015, full interview available online in RailTech: https://www.railtech.com/all/2015/09/09/the-railway-station-as-a-centrepiece-of-urban-design/

private industry in the development of stations. Finally, Ute Schneider, architect and urban planner at KCAP, glanced through the recent phenomena of urbanization processes in relation to the question "How do networks of transport inform our cities?". She focused on public transport as an urban generator, the station is both a connector and a destination, and on transport-oriented developments including master-plans for station, harbor areas and airports like Europaallee in Zürich and the area around the future Gare TGV Montpellier. During an interactive session that followed, the participants discussed, among other topics, on their perspectives about stations being destinations, and on which financial mechanisms work best for a station as destination. Impressions from the audience included terms like "People place, meeting place, desti-station." Statements included "The station can invade the city", "The station is a public space well-integrated", "Which identity do we want to give to the station?", "There are different notions of stations", "The importance of urban planning", and "Healthy city".

How would you define a station as data center?



This word cloud is the result displayed in real-time during the workshop, created with Mentimeter presentation software, by asking the participants how to define the station as a data center. Some research questions were developed during this session, such as:

1. What type of data we could collect in stations?

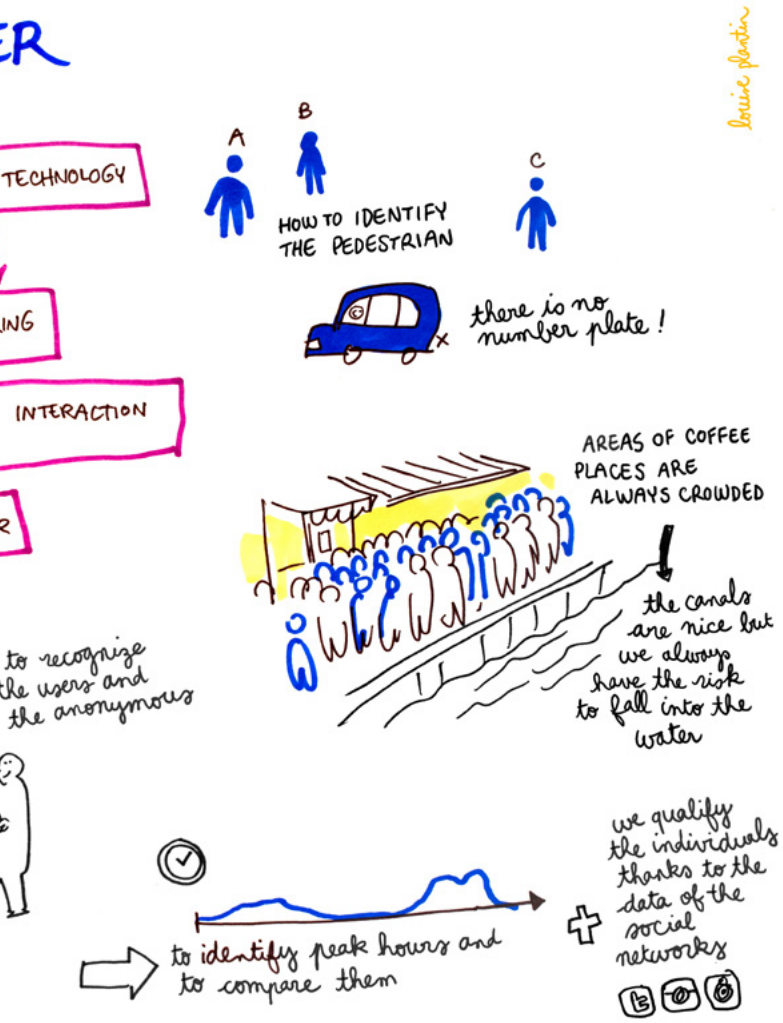
2. How do you make value of the data you have?

3. How do you detect a case that will lead to savings/efficiency/new businesscase?

Station as Data Center

The use of information and communication technology (ICT) has revolutionized the travel process for those using not just the train but also other means of transport. Technology is contributing to enhancing the experience of station users, but also is creating new demands from passengers using the rail network, and the managing new services need to be provided. The topic of ICT technology and the use of data, was introduced during the plenary session by Gaelle Pinson, responsible for the valorization of data for the Grand Paris Express (GPE) project at Société du Grand Paris (SGP). She defines stations as 'datacenters' at the heart of the smart-city concept. The SGP is installing digital infrastructures in the civil engineering infrastructure of the GPE metro capable of enhancing the digital offer for the Greater Paris territories and bringing new revenue to the SGP. Among these infrastructures, the datacenters, installed along the Grand Paris Express and interconnected by optical fiber, will be a key resource. Small captures and well distributed in the heart of the urban fabric, they will be an essential link in the data processing of smart-city and edge computing. During the working session, participants from SNCF (French Railway Company) defined the concept of station as a 'data center' as follow: it is about understating behavior, changing flows and being able to forecast. The data is used to support the design and decision-making process.

Station as Data Center by Louise Plantin, visual note made in at the 'Gares du Futur/Stations of the Future' event in March 2018



Winnie Daamen (Associate professor at TU Delft) and Jeroen van den Heuvel (Station Development at NS Stations) introduced in the working session how and which kinds of data has been collected at Dutch stations on crowds and pedestrian flows: real-time crowd-monitoring through counting camera's, Wifi and Bluetooth-tracking and public transport chip card data; and measuring sentiments through the use of social media data and surveys. According to the participants, data can mainly be used to understand crowds and pedestrian flows and to forecast future situations in relation to safety, but also to understand customer satisfaction and comfort, in order to improve the design of stations. NS Stations collects data from pedestrian flows in stations from three data sources: 1-Sensors (human shape is detected by sensors, Bluetooth and Wifi sensors at 6 stations in the Netherlands), 2-OV-chipcard (creating a flow data out of OV-chipcard data by linking check-ins to train schedule then an algorithm matches the swipes with trains), 3-Survey (every three months a survey on satisfaction among passengers is held at 50 large stations, two per year in smaller stations). All participants agreed that challenges lie in the integration and cross-fertilization of data from different operators of the different modalities that come together in a station (an ecosystem approach would be preferable) and in integrating stations in their surroundings, creating new and optimal user experience and designs based on data, better understanding causality within the data and researching privacy issues related to the data.

"The actual station bubble hides many vulnerabilities, especially in the institutional and financial dimensions. Yet stations still have future if they address social use and sustain passenger empowerment. A better understanding of the very diverse social uses of station (copresence benefits and commoning experiences) and a fresh exploration in the way stations represent community resources is needed, and a selection of case studies will illustrate."

—Nacima Baron

"The design of multimodal Arnhem Transportation Hub (2016) and multiple award winning project is based on careful analysis of the people flow, lines of sight and natural wayfinding principles. The articulated architecture is guiding these transfer movement in an articulated space of flow."

—Arjan Dingsté

"In 2010 NS Stations has started to measure pedestrian flows at train stations on a large scale using new technologies. After seven of years of practice, we have made significant progress in improving the design and operations by using a large amount of data on how people use our train stations."

—Jeroen van den Heuvel

"A basic function of a station is transfer to other means of transport. But the best stations are important places as well, with attractive public spaces and a range of vibrant destinations in the station area. Walkability, attractiveness and public safety are key factors, but a good station also needs a full range of different programs in the area to attract people at different times of the week."

—Ton Venhoeven

"The Netherlands is not a country. It is an empty city instead. Our national train system more or less operates as a metro system to mainly support daily commutes. But is was not designed for that purpose. In the past decades we worked on implementing both a high speed line and regional lightrail lines to our major stations, that all got a big upgrade. We made them not only efficient transit machines, but great places to meet, work and stay too. The bike is a great feeder of Dutch public transport. Currently we face a task to build 1 M homes and extend the transformation from 6 to 60 or even 600 stations."

—Daan Zandbelt

"Through its program in favor of intermodality, the Société du Grand Paris is a key stakeholder, along with its partners, in the conception of efficient intermodal nodes that also provide quality, evolutionary public spaces. Public space is the support for all urban exchanges. It becomes a central issue of development and innovation, a place of encounters and socialization, and a new environment that is much more than mere operations targeting functional or connective surfaces

Intermodal nodes will have to be adapted to all;
Intermodal nodes will function all day, all year;
Intermodal nodes should be evolutional and flexible in their development and governance| management;
Intermodal nodes will be modern, connected, and innovative."

—Julien Peyron

"Since 1992 Schiphol train station is fully integrated in the landside of the airport thus creating a real multimodal hub. With Schiphol Plaza functioning as the central point for departures and arrivals, both passengers on landside and airside appreciate the convenience of the One Terminal concept and the unified system of Schiphol. In the coming 10 years, Schiphol landside will change drastically. Apart from the 120.000 m New Terminal that will be built, the train station will be updated and landside logistics will change for security reasons. Schiphol, will have to show once again its ability to adapt and surprise."

—Kees Kaan

Quotes on Stations of the Future

"Located at the intersection of three cities, the Bourget Airport station will serve an aeronautical cluster composed of Le Bourget, the Museum of Air and Space, the Exhibition Center and the town of Le Blanc Mesnil. Currently underserved by public transit, the territorial ambition on this site is to create along with the creation of the Grand Paris Express Station, a true aeronautical cluster in Paris region. The design will make a sign in the city, echoing the historical and technological vocation of the site."

—Jaques Pajot

"With the launch of the international consultation for stations in the Greater Paris area, the Studio found the ideal context for the deployment of its philosophical concepts associated with the sensual city. The scheme was intended to define stations according to the specific features of the environment in which they are located, to deliver efficient and user-friendly spaces for the use of travelers, which are both open to the city and marked by common characteristics for the entire network. The JFA-SCS group has expressed the all-encompassing qualities of the network in terms of shared ambiances and sensory experiences."

—Pauline Marchetti

"The planning of the new railway station Amsterdam South has been taken over 20 years. In 2018 construction of the new station and the highway beside the station will start. The presentation will show the different station models that have been drawn and the development of the current plans, including the way in which value creation based on retail development has been used to optimize the plans."

—Sebastiaan de Wilde

"We need to merge stations, otherwise they will become urban 'monsters'. To conceive of stations as intermodal nodes, we will have to focus on their spatial organization, and not just combine buildings, as is often the case in France. The billions we will invest tomorrow should not only be focused on the ways but also on stations as places. Transportation hubs are not only mobility objects. They are a mix between a transport-object and an urban-object. Thinking of stations this way calls for a shared governance and a better articulation between public and transport authorities."

—Yo Kanimnagai

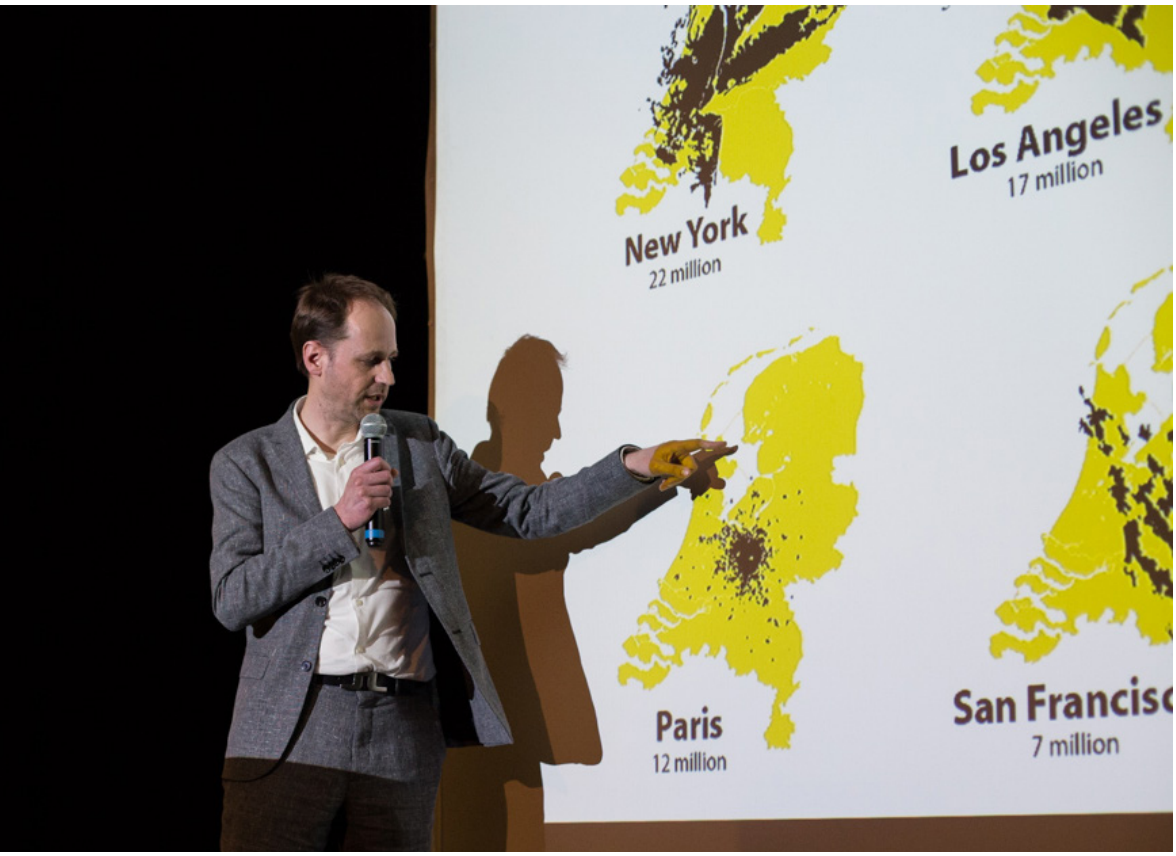
"The Grand Paris Express project is about building 200 kilometers of new subway underground lines around Paris by 2030. Half of the 68 new stations will be in correspondence with existing metro or train lines in order to improve the service of the 7 million inhabitants of Greater Paris Metropole. This subway will open up the poorest neighborhoods, develop new neighborhoods around railway stations and enhance the international attractiveness of Greater Paris."

—Catherine Barbé

▲ *Kick-off of Stations of the Future at Le Hazard Ludique, Paris, 15th March 2018. In this picture: Carolien van Tilburg (Atelier Néerlandais) and Kees Kaan and Manuela Triggianese (TU Delft|AMS Institute) © Bart Koetsier*

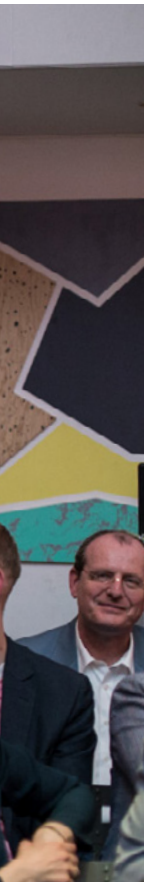
▼ *Catherine Barbé (Société du Grand Paris) lecturing about "Grand Paris Express" project at Le Hazard Ludique, Paris, 15th March 2018 © Bart Koetsier*

Daan Zandbelt (College van Rijsadvisor) lecturing about the Randstad and the National Key Projects at Le Hazard Ludique, Paris, 15th March 2018. © Bart Koetsier



Yo Kaminagai (RATP) intervening to the debate on the network system in the metropolitan areas of the Randstad and the Grand Paris, at Le Hazard Ludique, Paris, 15th March 2018. © Bart Koetsier

Joannette Polo and Nico Schiettekatte (Dutch Embassy in Paris) (Atelier Novembre) and Ebru Isguzarer-Onder (AMS Institute) at Le Hazard Ludique, Paris, 15th March 2018. © Bart Koetsier



Kick-off of Stations of the Future at Le Hazard Ludique, Paris, 15th March 2018. In the pictures: Nico Schiettekatte (Dutch Embassy) Etienne Riot (AREP), Miguel Loos (Bureau Spoorbouwmeester), Ton Venhoeven and Cecilia Gross (VenhoevenCS), Paul Chorus (Province of Noord-Holland) © Bart Koetsier

▼
'Stations of the future' plenary session at Atelier Néerlandais, Paris, 16th March 2018.
© Bart Koetsier

Carolien van Tilburg welcomes the participants to the 'Stations of the Future' at Atelier Néerlandais, Paris, 16th March 2018. © Bart Koetsier

Kick-off of Stations of the Future at Le Hazard Ludique, Paris, 15th March 2018. © Bart Koetsier

Robert Jan ter Kuile (GVB Amsterdam) intervening in the debate after 'Stations of the Future' plenary session at Atelier Néerlandais Paris, 16th March 2018. © Bart Koetsier

▲
Marten Wassmann: keynote about North-South metroline in Amsterdam (Benthem Crouwel Architects) at 'Stations of the future' plenary session at Atelier Néerlandais, Paris, 16th March 2018.
© Bart Koetsier

Debate with Gaelle Pinson (Société du Grand Paris), Arjan van Timmeren (AMS), Marten Wassmann (Benthem Crouwel Architects), Miguel Loos (Bureau Spoorbouwmeester) and Arjan Dingsté (UNStudio) at 'Stations of the future' plenary session at Atelier Néerlandais, Paris, 16th March 2018.
© Bart Koetsier

Jacques Pajot (Atelier Novembre), Marten Wassmann (Benthem Crouwel Architects), Nico Schiettekatte (Embassy of the Netherlands in Paris) and Hubert Habib (SWECO) at 'Stations of the future' at Atelier Néerlandais, Paris, 16th March 2018.
© Bart Koetsier

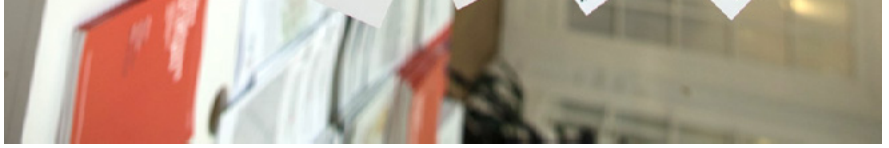
▲
Jacques Pajot (Atelier Novembre) lectures on GPE airport-stations at 'Stations of the future' at Atelier Néerlandais, Paris, 16th March 2018.
© Bart Koetsier

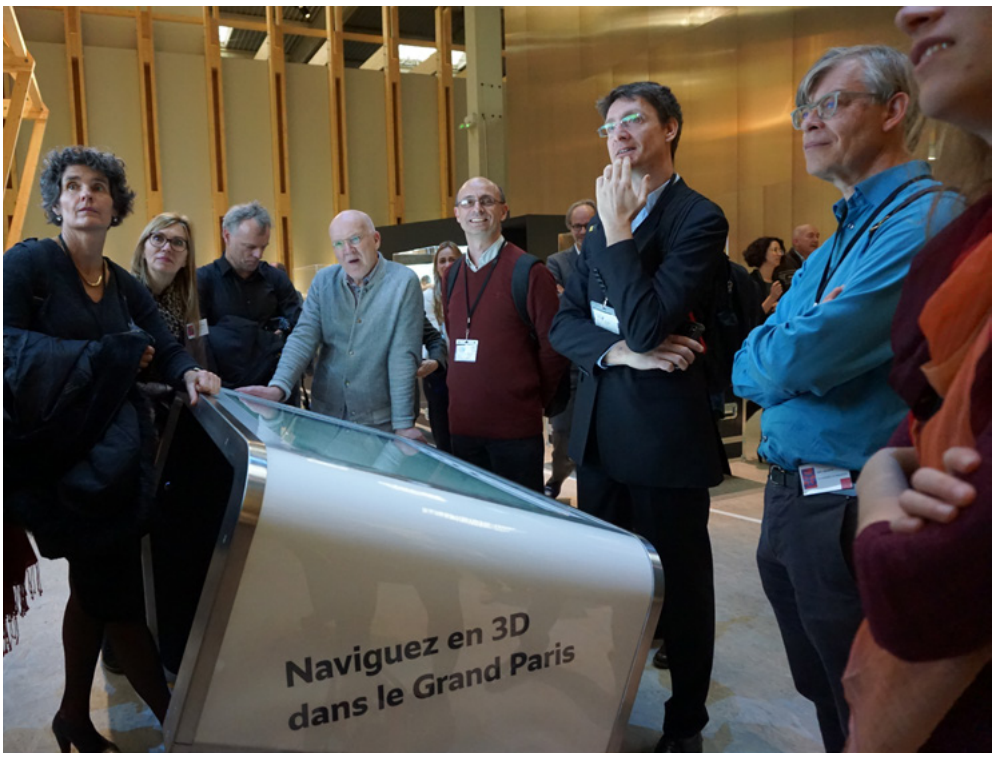
▲
Winnie Daamen (TU Delft) and Jeroen van der Heuvel (NS Stations) lecturing at the workshop 'Stations as Data Center', 'Stations of the future' at Atelier Néerlandais, Paris, 16th March 2018.
© Bart Koetsier

Yo Kaminagai (RATP) and Ton Venhoeven (Venhoeven CS) lecturing at the workshop 'Station as Intermodal Node' and 'Station as Destination', 'Stations of the future' at Atelier Néerlandais, Paris, 16th March 2018.
© Bart Koetsier

Yo Kaminagai (RATP) and Sebastiaan de Wilde (NS Stations) lecturing at the workshop 'Station as Intermodal Node' and 'Station as Destination', 'Stations of the future' at Atelier Néerlandais, Paris, 16th March 2018.
© Bart Koetsier

Board of Intentions Stations of the Future|Gare du futur. To ensure match-making and the follow-up of this event, this board was singed by Nico Schiettekatte (Dutch Embassy), Marcel Hertogh (DIMI TU Delft), Cécile Delolme (Université Paris-Est), Cécile Maisonneuve (La Fabrique de la Cité) and Arjan van Timmeren (AMS Institute). Participants of the workshop expressed their intent for further developing the project by adding their contacts at Atelier Néerlandais in Paris. 16th March 2018. © Bart Koetsier





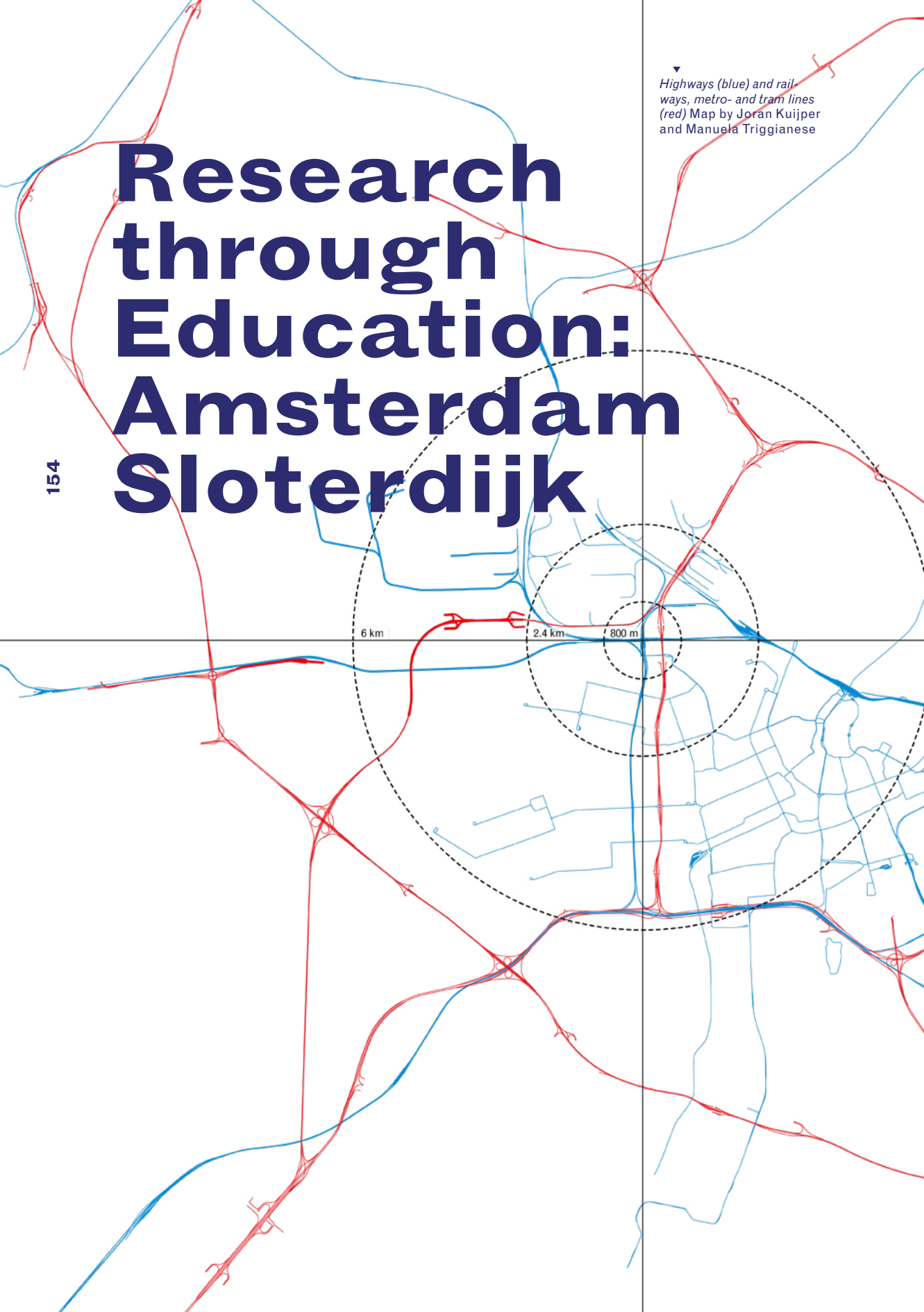
Visit to the exhibition dedicated to the Grand Paris Express project at La Fabrique du Metro, Paris, 15th March 2018. © Maud Kaan

Connaître
l'environnement
naturel et son

Space
Flexibility
Governance
Adoptability

Julien Peyron
Head of public space and intermodality, Société du Grand Paris
Responsable de l'unité espaces publics et intermodalité, Société du Grand Paris
Gaëlle Pinson
Project manager for Data centers, data and smart-city, Société du Grand Paris
Chef de projet datacenters, data et smart-city, Société du Grand Paris

Research through Education: Amsterdam Sloterdijk



Highways (blue) and railways, metro- and tram lines (red) Map by Joran Kuijper and Manuela Triggianese

Black & white photography of Amsterdam Sloterdijk Station: potentials and limitations of the infrastructure. Visually the massive presence of the highway, railway, the pathways in contrast with the emptiness of the space of mobility and public space, gives to Sloterdijk Station the impression of a *megastructure*. Its unlimited length and clear distinction between the built and unbuilt space is emphasized by this reportage.
Photographs: © Sebastian van Damme

Photo reportage: Amsterdam Sloterdijk

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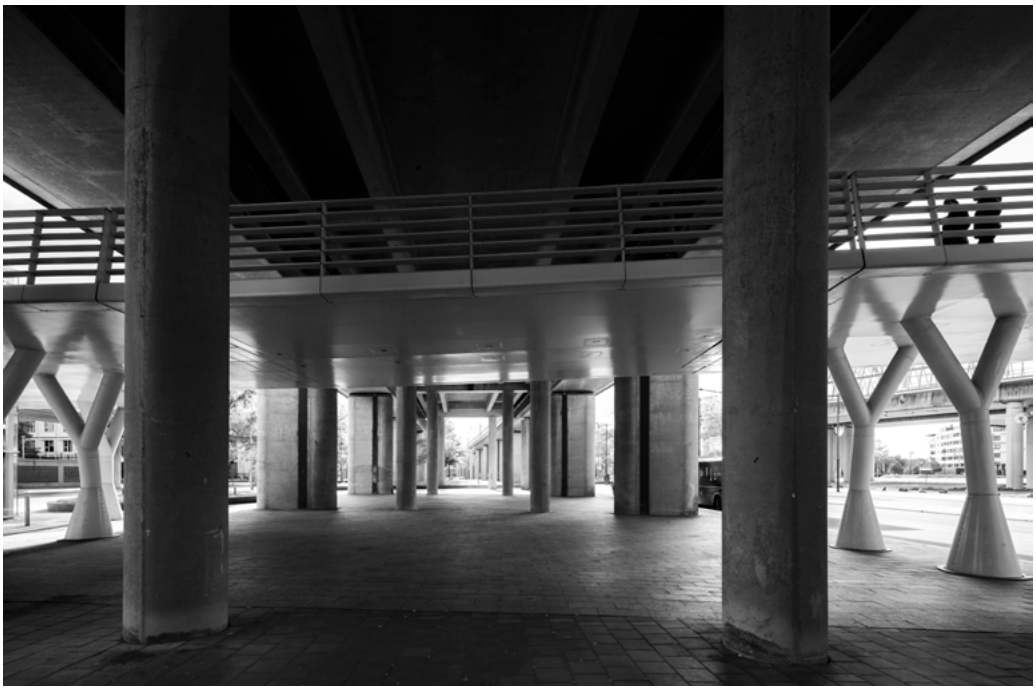


CRYSTAL TOWER
Amsterdam Sloterdijk

Amsterdam Sloterdijk

Metropolitan Stations, Places for Change and Innovation

Maurice Harteveld

AMS Institute
Delft Univerisity of Technology

Metropolises are growing. Hinterlands are changing. People migrate to seek better futures elsewhere. They relocate themselves in order to find better life conditions. Humans move in or out, from city to city, in a desire to change. Some, like refugees, are drifted and forced to flee. In the global manifestation of the present wave of urbanization, new disciplines have emerged to illuminate the 'urban' dimensions of existing ones. Think of urban agriculture, urban behavior sciences, urban computing, urban economics, urban geography, urban informatics, and many more. It seems, that everyone is acting in a fast urbanizing world. Of all, we, a broad group of analysists, designers, and engineers, are particularly concerned with the physical realm in the urbanization processes. Together we face spatial questions: how to keep the city accessible and connected, attractive and livable, and environmental sustainable, with the resources available?

The population of Amsterdam is expected to grow with twenty percent in 2050. One million people will live within municipal boundaries, up to three times more in the larger metropolitan area[1], and between eight and almost ten million inhabitants in the Randstad conurbation.[2] Yet, although not every area will grow and some peripheral cities and regions in The Netherlands will shrink too, we have to find answers to aim for the connected, vital and sustainable metropolis in all cases, particularly in the booming cities. If cities extend, more people will live on large commuters distance from the core, and if skylines will rise, more people live elevated, reluctant to multi-deck elevators. New centralities will emerge and hybrid solutions are most likely. Of course, we know how to deal with this. One may say: "I am a planner!" "I am an environmental scientist!" "I am a system analyst!" "I am a civil engineer!" "I am an urban designer!" "I am an architect! I know how to do this!" If traffic jams are forecasted, sure one can plan, design and built new ring roads. If the amount of passengers is increasing, one can add some tracks and extend the station building. If people have a street level desire in high-rise, one can simulate this in public sky lobbies. Where do we move and meet in the future...? Many answers are possible, but sure there'll be better environments from one's perspective. We are able to do it. Are we really? With the legacy of the twentieth century, we know we are able to make what one wants, but we have to ask ourselves: can we make the whole? Every profession has its own angle and claims its own space. In addition, non-pros have an idea and a claim too. In the current age of participation, pro-active citizens, and populist society, everyone adds. Processes have changed. Building new roads, tracks, terminals, buildings may face opposition. Paper work is challenged by reality. The last decades have unfolded an unstructured approach to the transformation of our cities. Especially in The Netherlands, we have become aware that "no actor or stakeholder can make metropoles move in one certain direction".[3] People influence space even simply by being somewhere. Their "social trajectories leave digital trails that can be analysed to gain a deeper understanding of collective life". As scientists, we need to work together to make sense of these traces.[4] Next-generation metropolitan solutions require cooperation between disciplines, between actors,

stakeholders and users, as well as between cities, citizens and civil society. Roughly following complexity theory, we are learning to combine systems and networks, including actors and entities with an own dynamic, in order to understand our urban living space and act wisely in every emergent situation. As practitioners we need to work together. As people we do. Interdisciplinary work, as such co-created with the public, is not easy, but for sure it is pushing everyone together. This so-called transdisciplinarity[5] provides us unexpected encounters in the meeting rooms, design labs, as well as in the street. More so, the street becomes a lab and meeting room and vice versa. Multi-layering scientific, technical, and social knowledge help to develop answers and come to changed concepts for the metropolis.

All old-school sources for innovation[6] are present at major human hubs in the growing metropolis. The multimodal Amsterdam Sloterdijk station is one of those places where the pressure on space becomes manifest. Perfect for change. People move in or out, from platform to platform, in a need to change. Most live on distance, some pushed out, others avoiding the buzz. People run to catch the next train or they are forced to wait. They eat something, they flirt or play with the smartphone, they are bored. At this metropolitan station, Amsterdam is about to transform big time. The station area, including offices and some hotels, is designated as the new midst of Haven-Stad. The urban area around it, currently dominated by harbor activities and industry, will house ten-thousands of new homes and workplaces.[7] Without knowing every detail on the whole yet, close to the station, currently already new towers are being developed within existing plotlines. Of these, the residential 'Vertical' of architect Kamiel Klaasse stands out literally.[8] In an aim to open-up to the surrounding, the design extends the network of public spaces, yet also, it remains still one project delineated by plotlines. Other disciplines involved work within these too, seemingly by invitation. Especially in this station area, designers are confronted with a heritage. A past way of doing echoing through. Amsterdam Sloterdijk station is a perfect pars pro toto for the glory of disciplines from the past. It lacks integration. Zooming-out, one sees highways, roadways, waterways, and overhead power lines, neatly designed next to the train tracks. Here, every profession has claimed its own space. The architect too. "Pressure? Which pressure?" Not only the station but the whole needs an update to cope with the influx of people. This includes multidisciplinary work.

Following the early Modern structuralistic mono-disciplinary approaches of the old days, the first station on the line was designed and constructed next to the village Sloterdijk in the fifties, as part of a larger infrastructural plan to serve urban extension areas. Lou Scheffer, Theo van Lohuizen, and Cornelis van Eesteren developed a sequence of policy making, researching and planning.[9] The last one passed the baton to architects, like Koen van der Gaast for the design of the first Sloterdijk station and others for mass housing, industrial complexes, et cetera. From Modern planner's perspective these are just 'urban-planning elements',[10] parts of the whole. In a shift of senses, particularly stations have become multimodal hubs for commuters and office workers, and thus urban, architectural and infrastructural disciplines have come closer together. The development and design of the current Sloterdijk Station, replacing the first, exemplifies this. It is built on a crosspoint of tracks. While its architects Harry Reijnders, Jan van Belkum and Wienke Sheltens added subsequently new station

halls in 1983, 1986, 1997 and 2008, a variety of other designers and engineers have been responsible for the plot-wise development in the proximity of the station. Each one adds a piece, closer and closer to each other. They do in multi-disciplinary teams more and more, hence professionals work increasingly synchronic. Nevertheless, disciplinary boundaries and plotlines are today as clear as they have been. The result is a fascinating clash of infrastructural and architectural presence. From an urban perspective, the area is highly connected by public transport, but poorly accessible by different means. From a human perspective, it is still not really vital, hardly designed to stay, let alone livable. In the midst of everything, humans move on an elevated walkway, colorfully repainted as a 'rainbow path' in 2016, as if they are on a assembly belt. People move as particles almost everywhere around the station, if anyhow they can move. In thousands a day, they flock in and out the metropolitan station and, as said, more will come. Absorbing space, concrete and other resources, it must also be a very unsustainable area. Change is near however.

Outdoors, the Bret pavilion is co-created in 2015. Inpatient people changed part of the area as a place to stay amidst wild flowers. More gardens followed, again a similar team effort.[11] Perhaps these are hipster places, but different people appropriate spaces too. They have their own perception and ideas. Indoors, public amenities serve travelers, tourist, congress visitors, knowledge workers, civil servants, officials etc. Are they able to change stations, hotel lobbies and office atria? Which teams will act first? If thousands will follow, our concern is to fully serve all desires and habits; present locals, hipsters, backpackers and passers-by and every next group of unknown newcomers. People's spaces overlap. The multi-layering of use, appropriation and experience need complex coalitions of interdisciplinary teams of professionals, including continuous input of users. We're pushed together in the growing metropolises, and, at metropolitan stations, the architectural, infrastructural and urban comes together by nature. Here a real innovation district has emerged. Whereas the station has always been a space for many, it is about time to be approached and designed as such. The urgency is there. Stations are part of a larger network of public spaces, indoors – outdoors, and interlink other hybrid places and buildings. From a human perspective, it all makes sense. The more people flock to the city, the more move and stay at stations and/or elsewhere close-by. As such, from the observation that the whole is more than the sum of fixed demarcated elements, ever-changing human hubs are perfect settings for place-based innovation in design and by design, because where people move society changes, and where strangers meet change takes place. At metropolitan stations change becomes spatial and physical: a transdisciplinary domain in which we act. Design is on-going!

Mind The Gap poster by GVB
Photograph by author
(22 augustus 2018)

Notes

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6
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7
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10
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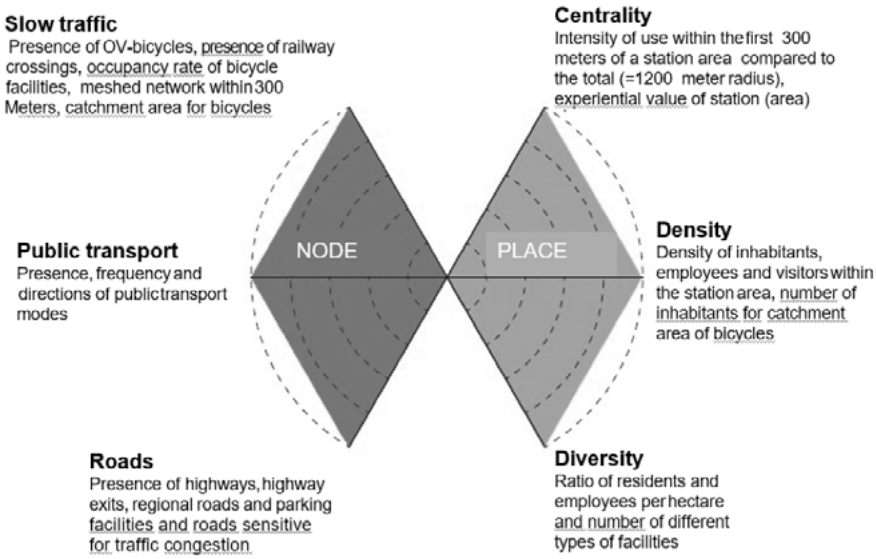


Figure 1 Butterfly model
Adapted from Provincie Noord-Holland & Vereniging Deltametropool, 2013

Amsterdam Sloterdijk: from public transport hub to metropolitan centre

Paul Chorus

Province of Noord-Holland

For decades the station of Sloterdijk served merely as a public transport hub. It was not considered an attractive place to meet and to stay because of the presence of dominant infrastructures in the area and due to its rather mono functional land use. Offices were dominating its surroundings having as a result that the station of Sloterdijk in the evening was a rather deserted place. The situation worsened when the economic crisis started and the station area was confronted with large vacancies among offices. However, in recent years this image has changed drastically. Vacancy rates have dropped significantly and plans are being made to build a significant number of houses around the station. As a consequence, the function of the station is likely to change in the future, from a mere public transport hub to an important destination in itself.

In this article the development potential of the station area of Sloterdijk is assessed by using the Butterfly model (Vlindermodel). This theoretical model can help municipalities in identifying opportunities for optimising their public transport nodes. The Butterfly model is an important part of a large study jointly carried out by the province of Noord-Holland and the Deltametropolis Association (Vereniging Deltametropool) in which 60 railway stations and 4 regional bus stations have been analysed. This study marked the start of a transit-oriented development program in Noord-Holland.

Policy context

In 2010 a new structural vision for the province of Noord-Holland was adopted. Sustainable use of space was one of the core themes in this vision. The province of Noord-Holland envisaged that by utilising existing built-up areas and existing infrastructure in an efficient manner valuable landscapes could be preserved and maintained and there would be less need to build new infrastructure. Concentrating developments around public transport nodes is considered as an important means of realising this. In the structural vision 64 public transport nodes are designated; 60 railway stations and 4 regional bus stations. Public transport nodes became one of the implementation programs of the structural vision. Between 2010-2013 various studies were carried out since public transport nodes were a rather new topic for the province of Noord-Holland. The outcomes of these studies were bundled in 'Make Space!' ('Maak Plaats!' in Dutch) in which a transit-development strategy for the province of Noord-Holland was launched. Public transport nodes played a pivotal role in this and were seen as important places for concentrating houses, offices, shops and recreational facilities. In addition, it was recognised that (most of) the public transport nodes play an important role as a transfer node, albeit on different levels of scale. Therefore, when developing the area around a public transport node its transfer function should always be taken into account. In other words, the development of a station area always requires an integral approach in which land use de-

Figure 2 Butterfly model
Butterfly model for Amsterdam Sloterdijk
Image by Provincie Noord-Holland

velopments and transport developments are well aligned. The butterfly model is a useful tool for this.

Butterfly model

A crucial component of 'Make Space!' is the Butterfly model. This theoretical model is used to assess the development potential of the 64 public transport nodes within the province of Noord-Holland. Besides assessing the potential it also provides a picture of the current state a public transport node is in. In this way insight is gained into how a public transport node is functioning at present. Incorporating future transport and land use developments allow the model to demonstrate how this is affecting the functioning of the node.

The Butterfly model is based on the node-place model of Bertolini[1] (1999). The node-place model follows the reasoning that transport and land use patterns are closely related to each other and aims at further exploring this relationship with a focus on station areas.

According to this model each station area consists of a so-called node and a place value. The node value represents the transport provision of a location, the place value represents the spatial development of a location. The basic idea is that improving the node value of a location, by improving accessibility, will create conditions favourable to the further development of the location. In turn, the development of a location, because of a growing demand for transport, will create conditions favourable to the further development of the transport system. It is assumed that a station area functions optimal when its node and place value are in balance.

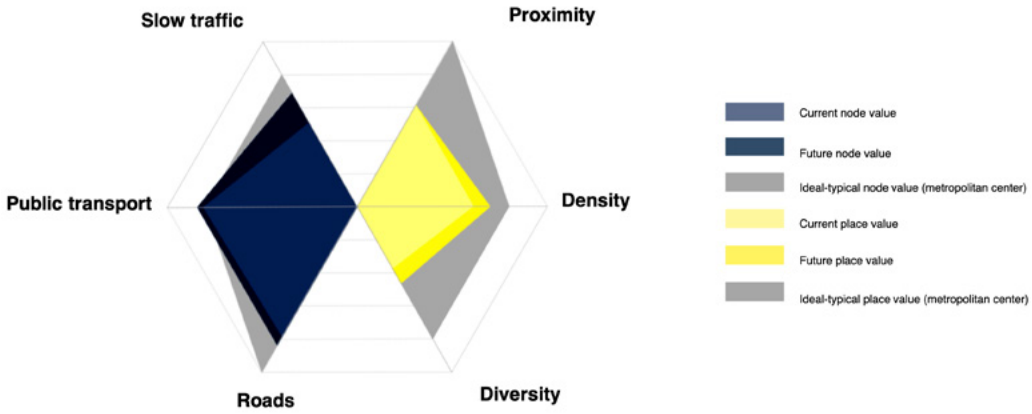
The butterfly model further elaborates on this. It is based on three distinctive features for the node and three distinctive features for the place value (see figure 1).

Decisive for the node value are its position in the public transport network, road network and slow traffic network. Decisive for the place value are the density of inhabitants, workers and visitors, the degree of functional mix and its proximity. The latter refers to the extent a station itself functions as a centre in its surroundings. The Butterfly model positions these six characteristics in relation to each other with the node value representing the left wing and the place value representing the right wing of the butterfly. The butterfly (and thereby a station area) functions best when both wings are in balance with each other. A minimal requirement for a station area is that its position in the public transport network should match with the density of inhabitants, workers and visitors.

In the next section the working of the Butterfly model is illustrated by applying it to the station area of Amsterdam Sloterdijk.

The butterfly model applied to Sloterdijk

In figure 2 the Butterfly model for the station area of Sloterdijk is displayed with the left wing representing the node value and the right wing representing the place value. Each wing consists of three colours. A lighter colour (blue for the node and yellow for the place value) representing the current situation, a darker colour (ibid) representing the future situation and a grey colour representing the ideal-typical situation. The 64 public transport nodes in the province of Noord-Holland are categorised in 12 station typologies. Each typology has its distinctive butterfly. In other words, there are 12 different butterflies. They represent ideal-typical situations. The station area of Sloterdijk is designated as 'metropolitan centre'. Characteristics of this station typology are a good ac-



cessibility by public transport as well as by car, a high degree of functional mix, a high density, a diverse group of users. The challenge for Sloterdijk is to what extent it is able to meet this ideal-typical situation. When looking at the left wing (i.e. the node value) one can see that there is particularly a gap to bridge regarding the position of Sloterdijk in the slow traffic network. When looking at the right wing (i.e. the place value) one can see that for each respective value a quite large gap needs to bridged.

The Butterfly model shows that the station area of Sloterdijk is rather unbalanced. The node function, in particular its position in the public transport network, is much stronger than its place function. Accordingly, the station area of Sloterdijk does not function optimally. This is not surprising as there is ample development space around the station area that yet needs to be utilised. The economic crisis of 2008 and environmental regulations have refrained the station area from being further developed in the past. The current economic boom and a partial easing of environmental regulations have changed this in recent years. Whether the ideal-typical situation can be fully met depends on the extent to which each node and place characteristic can be utilised. Eventually, this depends on the local situation. What at least the model demonstrates is that there seems to be potential to further strengthen its position in the slow traffic network by for example expanding bicycle facilities and improve routes for cyclists or pedestrians.

Regarding the place value there seems to be potential to increase the density for inhabitants, workers and visitors. The current plans for housing are in that respect a step in the good direction. Furthermore, while increasing densities emphasis should be placed on realising a mixture of functions with an explicit focus of doing this in the immediate surroundings of the station. Whether Sloterdijk will be able to evolve from a public transport hub to a metropolitan centre will for a large part depend on the extent to which the above measures are lived up to.

To conclude, the Butterfly model is developed to provide municipalities with a tool for the integral development of their station area(s). The purpose of the model is to identify development opportunities, rather than prescribing developments. This can help municipalities in optimising their station areas. Ultimately this will benefit all parties involved.

Notes

1

Bertolini, L. (1999). Spatial development patterns and public transport: e application of an analytical model in the Netherlands. Planning Practice and Research, 14(2):199–210. doi: 10.1080/02697459915724.10.1080/02697459915724.

Provincie Noord-Holland & Vereniging Deltametropool (2013) Maak Plaats! Werken aan knooppuntontwikkeling in Noord-Holland (Make Space! Working towards TOD in Noord-Holland), Provincie Noord-Holland.

▾ *Walk—Bike—Car Distances*
Map by Maurits van Ardenne, editedby Joran Kuijper

Introduction to the Summer School

Jurgen Krabbenborg
Debbie Dekkers

City of Amsterdam: Spatial Planning and Sustainability, Smart Mobility

Amsterdam is expanding. November 2017 the city of Amsterdam accepted the planning-strategy of Haven-Stad (Harbour City). This is an important step towards the development of 40.000–70.000 new houses and 45.00–58.000 jobs at the western part of the city. The current, mainly industrial area, will become a mixed residential area where housing together with small activity, will create a nice and healthy living environment. Harbour City will become a city within a city.

One of the biggest challenges the area faces is the accessibility. Adding houses and offices means a lot of extra traffic. The capacity of the current network of roads, bicycle lanes and public transport will not hold the predicted growth of mobility. When we do nothing, the network will reach its capacity, even before the first inhabitants set food in their new homes.

Traditional solutions such as expanding the network is not enough. Research shows that, when Harbour City is build, movements will increase by 20% to 40%. To answer the challenges presented by the city's growing population, and to anticipate the arrival of new technologies and modes of transport, we need to change the way we organize our mobility to a more integrated, sustainably and personally approach in the future. We need a new approach on mobility.

Smart Mobility solutions such as Mobility as a Service approach personal mobility integrated. Innovations in vehicle technology and new forms of modalities such as electric scooters and drones, will lead to a more sustainable and personalized mobility. To make this transition in mobility possible, behavioural change of travellers is crucial. Concepts such as sharing, mobility hubs and flexible parking will only work when people are tempted to use them. Creating a new concept for the main mobility point in Harbour City; Sloterdijk Station, is inevitable.

Originally build as an efficient interchange-machine, Sloterdijk Station is now the third largest station in Amsterdam. Based on the growth of the area the number of travellers will increase by 20% within four years. The station itself has been altered many times over the years, but it is uncertain if its infrastructure and exterior will keep up with the predicted increase of travellers. We are faced with the challenge of how to change Sloterdijk into a future-proof station, what can contribute to a sustainable mobility network in Harbour City.

This challenge recalls for reinventing the station, new concepts and an innovative approach. Collaboration between all the different actors, sharing of knowledge, technology and flexibility help Amsterdam when taking Station Sloterdijk into the future.

The collaboration between AMS institute and the municipality of Amsterdam in the form of a summer school fits this challenge. The fresh look of 40 student from all different backgrounds helps to shape ideas. Sharp analyses from various angles, a wide range of concepts and both feasible and unfeasible design proposals were delivered during this eight-day pressure-cooker. Exactly as it should be, because the real innovation starts at this intersection.

Thank you to all participants and mentors for the inspirational take on Sloterdijk. The City hopes to recognize the strategies of the Summer School in the coming 10–20 years.

Manifistation Teleport '86
The new train station Sloterdijk; image: Frans Brusselmans/Collectie Amsterdams Stadblad

Summer School Integrated mobility challenges in future metropolitan areas: 4 teams × 4 scenarios

Manuela Triggianese
Joran Kuijper

The Amsterdam Institute for Advanced Metropolitan Solutions (AMS), the Delft Deltas, Infrastructures & Mobility Initiative (DIMI), University of Paris-Est and ARENA architectural research network join Delft University of Technology in the organization of the interdisciplinary 2018 Summer School: 'Integrated Mobility Challenges in Future Metropolitan Areas'. The Summer School is a follow up of 'Making the Metropolis' edition held in Amsterdam in August 2017 and the 'Stations of the Future' event held in Paris in March 2018. By participating to this summer school, 42 graduate students, young professional and researchers have explored interdisciplinary approaches towards a sustainable integration of stations here defined as intermodal nodes.

Four teams were dealing with the following themes: the role and function of the station in future metropolitan areas, growing number of users, sustainability challenges, programming of transport nodes, public and semi-public spaces (and social dynamics), exploration of alternative, marginal and emerging social uses of stations as meeting places and culture, urban integration and integration in the overall mobility system and urban fabric, accessibility to and from the stations/airport as well as between rail-metro stations and other mobility nodes (e.g. bus, bike and car sharing).

The station is the central link in the mobility chain as well as a key element in the organization of the intermodal transport. The development of a station project from both a governance and financial perspective can be used to revitalize city areas, to promote a high level of (station) architecture and public spaces, and to adopt new technologies contributing to safety while enhancing the experience of the station users.

Working on the Sloterdijk station area is more than working on an infrastructural node, it's about developing a sustainable neighbourhood with public and social values. As a neighbourhood its development deals with many stakeholders.

The main question we addressed during the 8-days workshop were: which approaches and scenarios can be tested and applied to these intermodal nodes, particularly when dealing with lack of space and growing number of users? We have exchanged knowledge of sustainable solutions by applying different strategies on

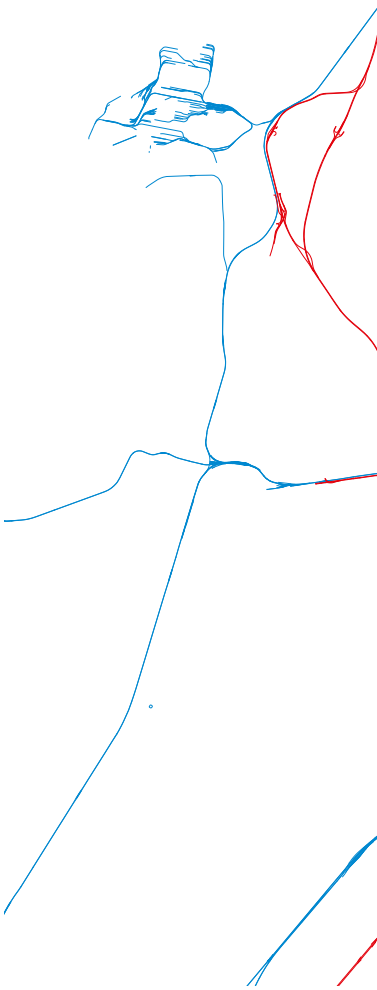
Sloterdijk station area. This test-bed and design location is considered as an urban generator for future developments in Amsterdam. Sloterdijk is part of a vast development area called 'Haven-Stad'.

This summer school was built upon the expertise of five different institutions.

By understanding the fundamental challenges in the Connected, Vital and Circular City (AMS Research Themes), the participants were able to create interdisciplinary answers to these challenges.

"Railway stations have become much more than just a place to get on and off trains. Instead, they are places to work, do business, meet, shop and relax. Cities began seeing them as a 'Grand Projects' to boost their image, to serve as a symbol and eye-catching entrance into the city. The development of a station project can be used to promote a high level of architecture and the revitalization of city areas."[1] The Summer School 'Integrated Mobility Challenges' was organized in working design sessions. The studios created an interactive setting at AMS Institute and Faculty of Architecture and the Built Environment at Delft University of Technology, facilitating disciplinary exchange. Participants were distributed over four sub groups. The teams focused on the following themes: Connected City (by dealing with mobility, infrastructure, logistics and metropolitan development issues); Vital City (social interaction and urban spaces); Circular City (local and regional networks, data and knowledge sharing, business-cases, resource security and buildings as energy sources). Groups were supervised by at least one expert as well as one appointed professor of a participating institution. As results of the design sessions, lecture series and on-site visits, four design proposals were discussed and presented within plenary mid-term and final reviews.

In the following articles, 4 design scenarios x 4 teams are presented. Each group developed strategic proposals of urban renewal and architectural intervention of Amsterdam Sloterdijk station, by looking at its influence on the areas to the Nord-East (Group A), South-East (Group B), South-West (Group C) and Nord-West (Group D). The teams investigated the role of this intermodal hub in the future urban scenario of the metropolitan area of Amsterdam.

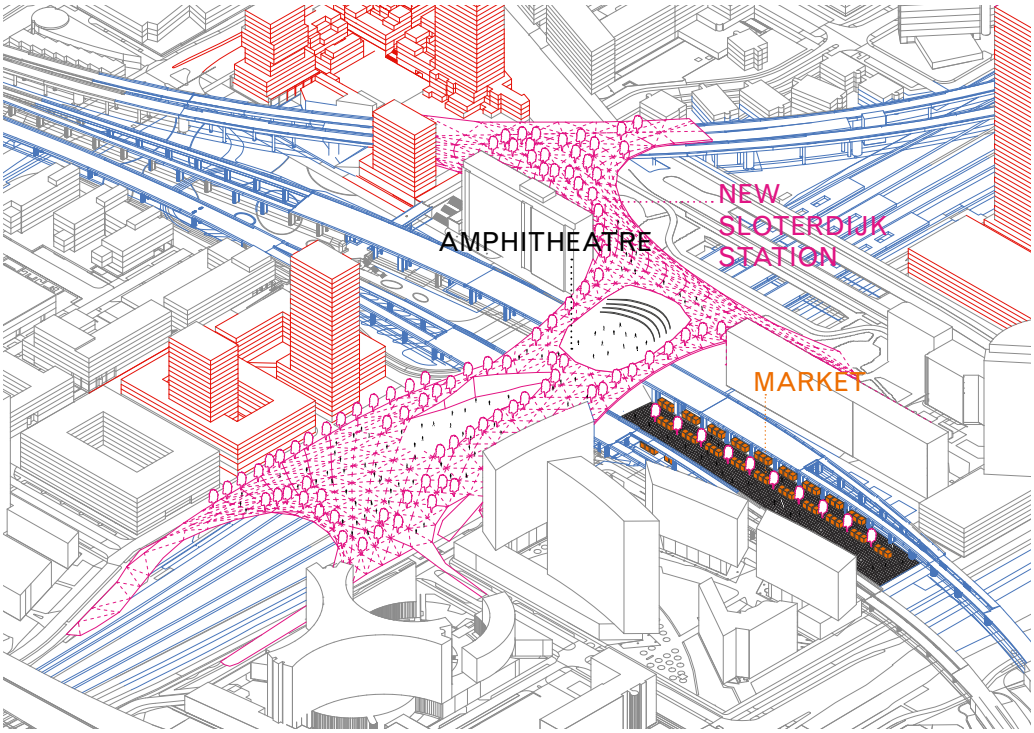


Subdivision of groups by Manuela Triggianese

Note

1
See also:
Manuela Triggianese,
Euralille twenty years on.
OverHolland 16/17,
pp. 111–139

Scenario made by Group A
imagery by Xueni Hu, Diego Otárola, Cornelia Dinca, Ninoslav Janković, Chia-Ju Lin, Francesca Lucenti, Sabah Mohammed, Sara Semlali, Biyue Wang



Group A

Haven-Stad Station: from machine to human landscape

Valentina Ciccotosto
Hans de Boer

group: Xueni Hu, Diego Otárola, Cornelia Dinca, Ninoslav Janković, Chia-Ju Lin, Francesca Lucenti, Sabah Mohammed, Sara Semlali, Biyue Wang

Initial suspicions

Located between Amsterdam Central Station and Schiphol Airport, Sloterdijk Railway Station plays a strategic role in the daily urban system of the metropolitan region, but also in the general picture of the urban development of the city itself. Indeed, in the upcoming years, Sloterdijk will become an important anchor in the development of Haven-Stad and ridership upon the already substantial incoming and outgoing commuters that will increase dramatically.

Students had to focus to the Northeast direction of Haven-Stad and they had to deal with layers of complexity, due to the fragmentation of the indoor space of the station and due to the disconnection with the future development of the Haven-Stad area.

Sloterdijk as transfer machine without urban identity

Sloterdijk Station was born as answer to a series of urgent problems over time: designed as mobility transfer point, the station is characterised by numerous massive infrastructures for railway, metro, bus, tram and car, laying on different levels in a relatively small area, making the space inaccessible and unliveable. Trains come from four directions to, below and above a central hall and around this the other transport flows are compactly organized: thus, the station hall becomes the central point in which all flows come together, creating a very critical inner space. Outside pavements and cycle paths are overshadowed and dehumanized by these grey constellation of pillars and slabs of concrete.

The fragmented indoor space of the station created by this tangle of horizontal and vertical flows and crossing of railway lines reflects an outdoor fragmentation between the station itself, the Hemboog train tracks and the transfer points for the other kind of mobility, such as public and private transport by bus. Paradoxically the connection on regional and urban scale is fine but the connection of spaces at the local scale is poor due to the convergence of all infrastructures and flows, which is cutting public space in isolated fragments.

A fragmentation that in turn is also reflected in the relationship between the station and the Haven-Stad area and its future development. Infrastructure and urban development, buildings, and public space do not always come together too well at this site which is conceived in a time when urbanism and transport development were functioning as two more or less distinct areas of expertise. As a consequence, the station is isolated at the local scale by the bundle of infrastructures and anonymous, vast office buildings, which makes the accessibility of the Haven-Stad area for pedestrians and cyclists problematic.

Project Scenario

Filling up leftover spaces or creating new urban fabric?

Sloterdijk lacks the quality and programming needed to catalyse the transformation of the district. While the redesign of Orlyplein and bottom up initiatives have

successfully activated the area, the rapid developments around Sloterdijk require a sharper vision for the station.

The ambition of the municipality for Haven-Stad, a logical step in the growth of Amsterdam, is to create a new piece of city, a human city, developing a dense residential area with mixed functions, environmental sustainable, well accessible and well connected, with a shift on mobility focused on public transport. But this is a vision in which the renovation of the station does not have a place in the coming years and improving the future mobility without thinking about a massive intervention on the building would be a stumble.

The area around the station is divided into four heterogeneous quadrants, Sloterdijk Centrum, Sloterdijk I, Sloterdijk II, and Sloterdijk III, each of which with its own characteristics: from small-scale buildings, to large-scale office buildings to empty lots. According to the future vision of Haven-Stad, Sloterdijk I, a mono-functional business area divided in Sloterdijk I Noord and Zuid and situated between the main hub and the Isolatorweg hub, is the first activated area, with the aim to be a working-home district, ensuring better connection to the immediate vicinity and the city. This means that, due its central location, the station area is the first sector affected by the effects of the changings, and it is often experienced as an "island", not well connected with the environment, that the people use only as a crossing point: it is another piece that adds complexity to the existing urban fabric.

How to align the present and foreseen housing initiatives for Sloterdijk with a better public space of the station area and how to position Sloterdijk Station and immediate surroundings as bootstrap for the future development of Haven-Stad?

Scenario made by Group A imagery by Xueni Hu, Diego Otárola, Cornelia Dinca, Ninoslav Janković, Chia-Ju Lin, Francesca Lucenti, Sabah Mohammed, Sara Semlali, Biyue Wang

Strategy

Using architecture as tool of investigation and urban transformation, and working from small to large scale, students started with the analyses of the strengths and the weaknesses of the site trying to set up a proposition.

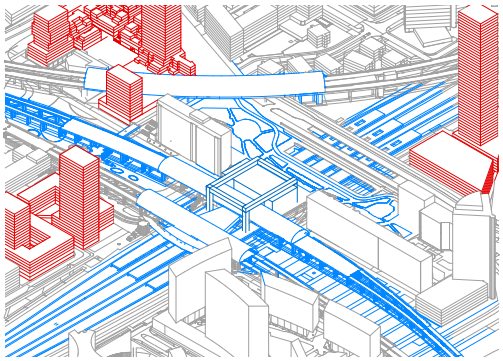
Choosing as starting point the two bigger contradictions (the hyper-connectivity transfer machine and the neglecting of the area with respect to the strategy and the ambition of the Transit Oriented Development), the project envisions the station, and its surrounding area, as a destination and as a catalyst able to give to Haven-Stad the important role of cultural and commercial district. Therefore, the principles of "connected" and "vital" city are chosen to guide the transformation of the station from "machine" to "human" scale landscape.

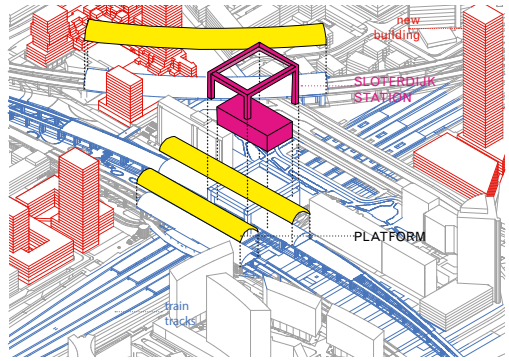
The fragmentation becomes the opportunity to rethink the station not only in terms of mobility transfer, but in a broader vision, as the main character of a larger and complex system: a machine that goes back to being catalyst, destination, connector.

Design Proposal

From machine to human landscape – Connecting space, flows, and people

The new design of the station, now named Haven-Stad Station, consists of opening up the boundaries of building and station area to create a broader and coherent public space that increases capacity and improves flows to, from and within the station. A new big green carpet covers the station creating an iconic public space that connects the previous fragmented areas around the station and invites commuters and visitors. This new space serves as a cultural landmark and becomes a desti-





nation in itself, acting as a catalyst from where people, initiatives and ideas can spread out and into Haven-Stad.

The existing program of the surrounding squares is implemented and reinforced with a new multifunctional program that includes commercial activities in the actual Piarcoplein and cultural activities in the area near Orlyplein.

Moreover, the station area becomes a test ground for mobility innovations, such as Mobility as a Service (MaaS): Sloterdijk Station will be the main hub of the future mobility network of Haven-Stad, that does not take in account the automation in the first place. If the purpose is to go back to the human perspective, it is necessary to turn around the obsession about the driverless vehicles and put emphasis on other alternative kinds of mobility, a human-centric future mobility, such as public transport, shared bicycles, e-bikes, hoverboards or skateboards, even if it means to speculate on the topic itself. Mobility starts from the need and wish to actually move instead of being encapsulated by cocoons.

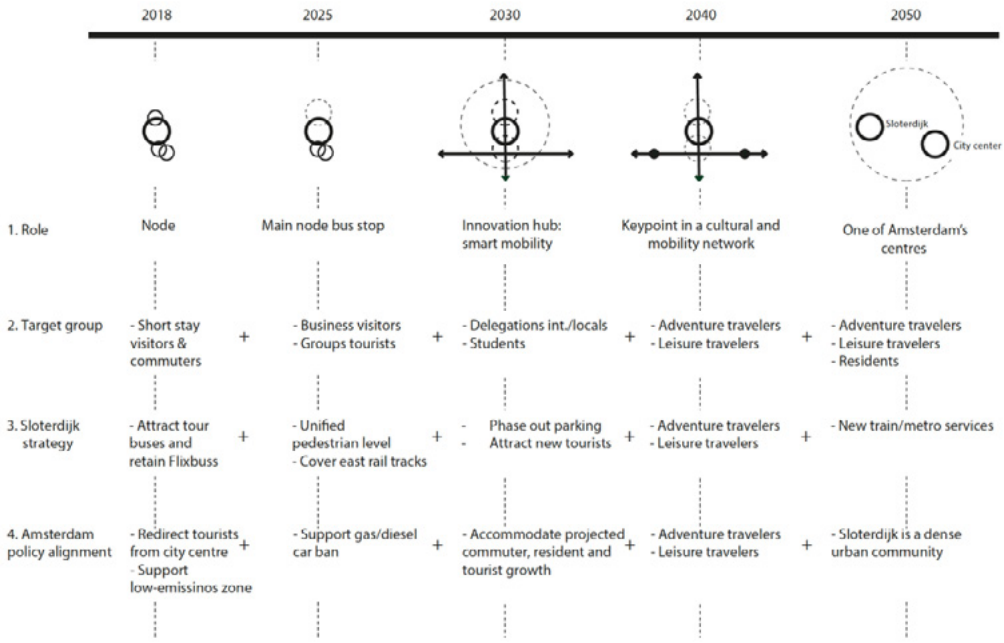
Once it is recognized as the main hub, Sloterdijk Station activates a new connection network that covers all surrounding areas of Haven-Stad, aiming to re-connect all the fragmented spaces. The new diagram of the connections is tested on the area of Sloterdijk 1: in order to create a more human environment, downgraded car-oriented lanes are situated along the edge of the zone, like a sort of ring-road that frees the inner space and encloses all the other alternative mobility lanes, such as walk and bike lanes, green space and public transport. Small satellite hubs take place at the crossing nodes of these lanes in order to relief Sloterdijk Station from car traffic.

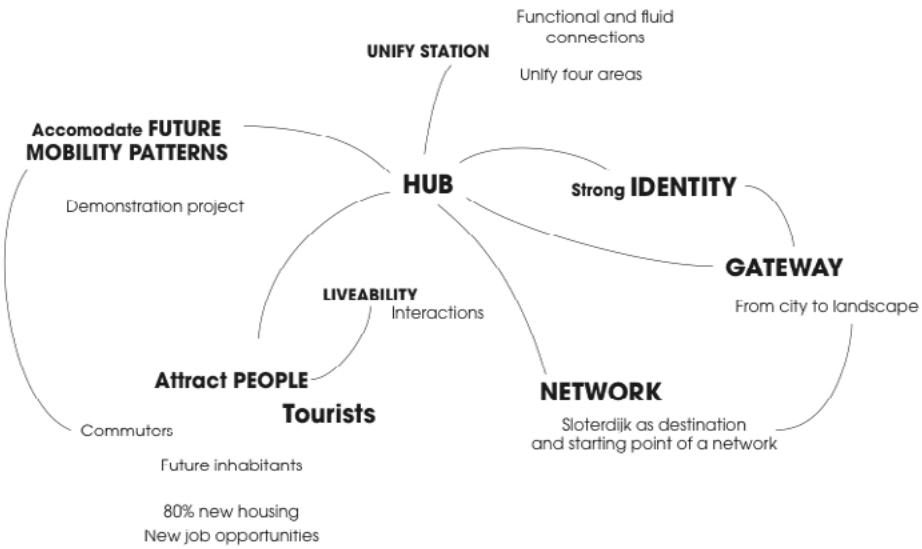
Ambition

Haven-Stad can become a dense but vibrant city bootstrapped by Sloterdijk Station and immediate surroundings and characterized by active, shared and sustainable mobility. The Mobility Hub will also act as a living lab, attracting national and international attention from tourists and professional delegations interested in Amsterdam's position as a leader in sustainable mobility innovations.

What was previously only an efficient mobility device is now transformed into an inspiring landmark and catalyst for Amsterdam's most important 21st century urban development project.

Scenario made by Group B
imagery by Isabella Flore, Sabrina Menger, Benedetta Gatti, Lindsay Wiginton, Ana Cvetić, Jolien Kramer, Salwa Cherkaoui El Baraka, Sebastiaan van Niele, Tom van Vilsteren





Group B

Gateway Sloterdijk 2050

Manuela Triggianese
Tom Kuipers

group : Isabella Flore, Sabrina Menger, Benedetta Gatti, Lindsay Wiginton, Ana Cvetić, Jolien Kramer, Salwa Cherkaoui El Baraka, Sebastiaan van Niele, Tom van Vilsteren

An Infrastructural Node in a Fragmented Area

Situated at the core of a multi-layered urban area with a typical industrial and business zone character,[1] Amsterdam Sloterdijk station is located at the intersection of four different districts: Sloterdijk I (north-east, facing the harbour), Bos and Lommer (south-east, towards the city centre), Slotermeer (south-west, also known as the Nieuwe West area) and Sloterdijk II (north-west or Westpoort). It is also placed at the heart of the Brettenpark (or Brettenzone), the area that runs horizontally from the Westerpark to Spaarnwoude. The Brettenzone was already included by master planner Cornelis van Eesteren in his General Expansion Plan of 1934, as a functional green division between a residential area (Western Garden Cities) and industry (the Westelijk Havengebied). For the Structure Vision Amsterdam 2040, the Brettenzone is referred to as an 'east-west gradient' between culture and nature. The station building is located next to the motorway and in an area where the municipality wants to realize more housing, hotels and public facilities. Sloterdijk centrum is also part of the City of Amsterdam's new vision for a port city, published in 2017.[2] Does the building have to be converted into something else? Due to its interesting multifaced urban character and as a major mobility hub in the fast-growing global metropolis of Amsterdam, the (re) development of the Sloterdijk area is a major opportunity to support the City of Amsterdam's major policy objectives on tourism, housing supply and future mobility, while creating a vibrant and dense urban place.

At the same time, the number of train passengers in all big stations in Amsterdam has been on the rise for many years, and this number will break records in the near future. Amsterdam Central Station now counts 185,000 passengers per day, in 2030 that will be 300,000. At Sloterdijk station, today around 50,000 visit the node, while in 2030 about 110,000 people will pass through the station every day. As a consequence, and in order to improve accessibility, safety measures and passenger flows, a large number of investments has been planned by the Dutch Railway manager ProRail to overcome this situation: for example at Sloterdijk station, new parking facilities for bicycles and new vertical connections (escalators). Looking at the different layers of the station building (the interior layout and the exterior connections), it becomes clear that Sloterdijk is a multimodal node with a very interesting integrated mobility system. Tram, buses (for long-distances), bike, train, metro and cars are currently crossing and parking at Sloterdijk.

When considering mobility transitions, mass transit must be the spine of the transport system with bikes as the main first/last-mile mode. Policy should favour shared over single-use modes to prevent future traffic increase from automated vehicles and align with the city's aim to have only zero-emission vehicles by 2030.

Main Port for Netherlands Tourism

The primary goals for the development of a new strategy for Sloterdik Centrum

Scenario made by Group B
imagery by Isabella Flore, Sabrina Menger, Benedetta Gatti, Lindsay Wiginton, Ana Cvetić, Jolien Kramer, Salwa Cherkaoui El Baraka, Sebastiaan van Niele, Tom van Vilsteren

are: to reinforce the integrity of the node in a fragmented urban place, facilitating current seamless pedestrian flows, and to redevelop the node as a 'place' with a more defined urban character,[3] for the current users of the station and the future inhabitants and visitors (target group).

A group of young professionals started the research and design process with a SWOT analysis, strategic planning technique, by identifying strengths, weaknesses, opportunities and threats related to the project planning of the Sloterdijk area in comparison with Amsterdam's city centre. Based on the results of this comparative analysis, the proposed strategy, *Gateway Sloterdijk 2050*, envisions the Sloterdijk area as a gateway for tourists, commuters and future residents alike. To support this vision, the Sloterdijk train station will evolve from its current state as a transport node to a major key point in a cultural and mobility network, becoming one of Amsterdam's prominent city centres. The design of the station and its surroundings will be unified, and a unique identity will be developed for the station.

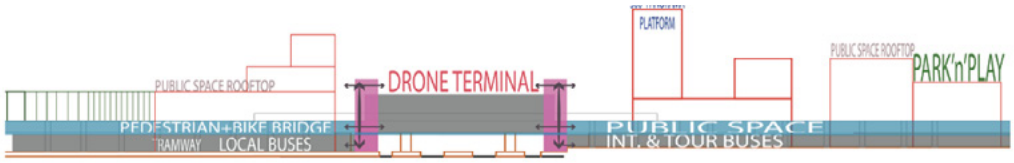
In the near future, the strategy proposes directing flows of visitors, particularly tour bus groups and international bus traffic, to the station. This, combined with the first phase of new residential development, will build the critical mass required to establish new programmes and activities at the station. Over time, the strategy proposes major infrastructural changes to improve the flows of passengers to and through the stations and overhaul the indoor and outdoor public space. Legacy transport infrastructure (such as the parking lot) will be transformed over time to accommodate an expansion of mass transit and new shared modes. The phasing plan recognizes that the future is unpredictable and leaves room for flexible uses and adaptation to new realities.

Policy Instruments and Design-Driven Solutions

Gateway Sloterdijk 2050 proposes policy and design solutions guided by the following principles: establish Sloterdijk as a main port for Netherlands tourism, plan for future mobility (growth in volume and modes), promote accessibility for all users, and emphasize a liveable public space. Recognizing that change will be incremental, the strategy proposes phasing and an evolving role for the station over time.

Main port for Netherlands tourism (2018–2030)

–Retain and improve Flixbus depot
–Relocate tour bus depot to Sloterdijk
–Improve Flixbus depot
–Establish tourism information centre
–Equip tourists to use sustainable mobility
–Marketing to new types of tourists



Future mobility (2018–2050)

–Develop new mobility demonstration centre in partnership with Havenstad employers (for instance BMW, Nissan)
–Limit or eliminate private car parking in new buildings
–Expand car- and bike-sharing options in new buildings and at station
–Increase cost of parking at station each year and use new revenue to build electric chargers
–Convert parking spaces to drop-off lanes for shared mobility (de-emphasize single-occupancy)
–Establish new metro and train line connections

Accommodating future passenger flows (2030–2050)

–Accommodation for +500 touring buses
–Cars are phased out gradually
–Bike parking located in various spots + underground
–Link platform 9 and 10 with a bridge
–Unification of the public space
–Views across the space

Liveable public space (2030–2050)

–Indoor/outdoor public space
–Public space with amenities for play and relaxation
–Green space
–Open spaces for various usage, flexibility for future needs
–In design terms this would mean starting from the reorganization of modes
–From fragmented to unification
–Bikes access from both sides station
–Ferry service at canal
–Redirect passenger flows
–Increased volumes for transit, pedestrian, cycling
–Redirect passenger flows
–New bike parking
–New entrance and platform over east tracks
–Parking converted to e-car, e-bus and shared mobility drop-off area

Master Plan

–Covering tracks east side
–Unified public space (indoor/outdoor)
–Improve station access and flows

Room for a Flexible and Unpredictable Future

The role of Amsterdam Sloterdijk station has already evolved over time. With the proposed strategy, the capability of the station to reinvent itself will be enhanced, along with its prominent role for the future of the district, for the city of Amsterdam and its region. From being an infrastructural node, Sloterdijk will become one of Amsterdam's centres, in a dense urban community, offering alternative services and flexible uses for the visitors to come. At the same time, urban and suburban networks are tending towards a metro-type service and the competition between mobility modes has increased and will continue to increase. This is a great opportunity for rethinking our mobility places, how they are becoming a combination of transport and urban facilities, a place 'to be' and not only a place 'to pass through'.

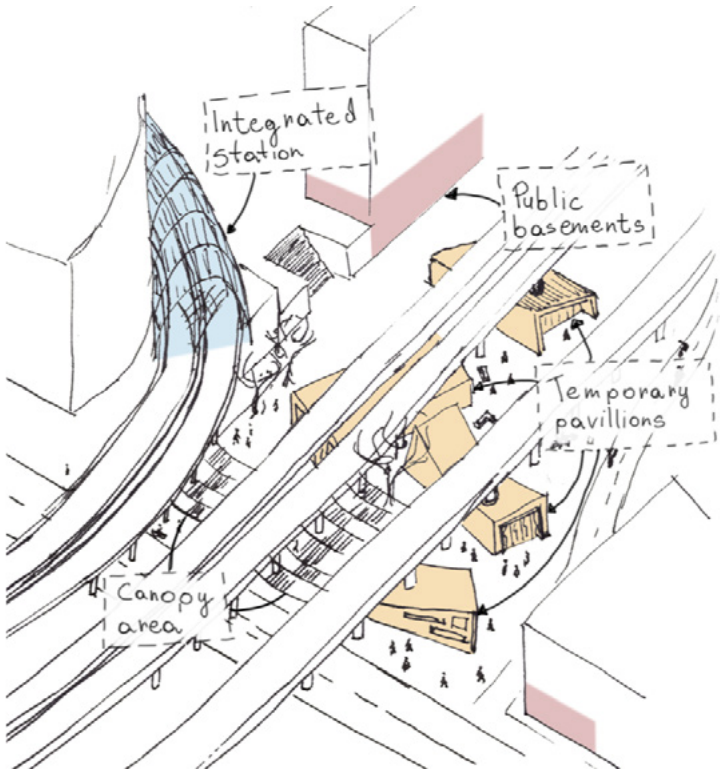
Notes

1 The 1986 Teleport project made Sloterdijk a destination for offices. For more information, see: http://www.weekvanhetlegegebouw.nl/sloterdijk-toen-nu-straks/.

2 Haven-Stad vision consists of the intensification and (re) development of 12 subareas. The full document is available at: https://www.amsterdam.nl/projecten/haven-stad/.

3 The Node-Place model was developed by Luca Bertolini and it was based on TOD (Transit-Oriented Development) theory. For more information about the Node-Place model, please read: L. Bertolini, 'Spatial Development Patterns and Public Transport: The Application of an Analytical Model in the Netherlands', *Planning Practice and Research*, vol. 14 (1999) no. 2, 199–210.

▼
Scenario made by Group C
imagery by Francesco Camilli, Elisa Cantone, Rein de vliet, Jialei Feng, Janet Hetman, Matthijs Kosicki, Nhu Luong, Qin Li and Karen Valitov



Group C

Designing Transition: A continuous variety allowing chance

Fabrizia Berlingieri
Roberto Cavallo

group: Francesco Camilli, Elisa Cantone, Rein de vliet, Jialei Feng, Janet Hetman, Matthijs Kosicki, Nhu Luong, Qin Li and Karen Valitov

A paradigmatic shift: from an incremental transfer system to a relational hub

Since its completion in 1985, the current Sloterdijk station embodies the role of the railway terminal in the 20th century society: a transfer machine. Built as one of the nodes of the infrastructural ring of urban expansion around the historical city,[1] the station was envisioned as the cross point of the most used means of transport: motorways and railways. The following development of Sloterdijk station consisted of an incremental process of infrastructural additions, connected one another simply by discrete logistic opportunities. The doubling of the flyover, in 1997, modified the structure of the station due to the accommodation of the new metro line; in 2003 the direct connection between Zaandam and Schipol Airport, with the so-called Hemboog,[2] inserted a disconnected duplication of the hub; later on the tram stop and the bus station moved from the front of the station (the current Orlyplein) to the Carrascoplein on the lower level. The growing demand for public transport, proportional to the impetuous growth of the city, has gradually occupied more space – inside and outside the main hub – according to the infrastructural needs, transforming Sloterdijk into a complex urban system of routes at different levels and of connections between parts.

Contemporary tendencies: the role of Sloterdijk

In the last decades, the development of new models of transport hubs constituted a very active research field, in which the Dutch results represent a point of reference. The national strategy about the renewal of the main railway stations concerned indeed not only with the substitution of the previous nodes with increasingly complex typologies, but generally with a deep requalification and urban development of the related districts[3]. But the case of Sloterdijk seems to be an exception. Despite the municipal ambitions to attract new inhabitants to the area within few years and with several development plans,[4] the station itself sticks to its current configuration: a complicated tangle of disconnected outputs. However, Sloterdijk railway station has already changed its role within the public transport network in the metropolitan area of Amsterdam. It represents the city gateway from the west side, connecting the north and west lines from Alkmaar and Haarlem to the inner city and serving the crossing flows coming from the outskirts with those of the main infrastructural ring. A crossroad that also marks the change between transport modes: from private to public.

The common, the district and the negotiation: station as destination

The increasing centrality of Sloterdijk in relation to the metropolitan scale has led to new interests, emerging from private and public investments, for the development of the area through densification. Yet, even if the urban profile of the district will rapidly change, its core-engine claims for new strategies. As mentioned before, European and Dutch experiences in Transport Oriented Design concentrates urban development around transport nodes, seeking a coordinated and coherent

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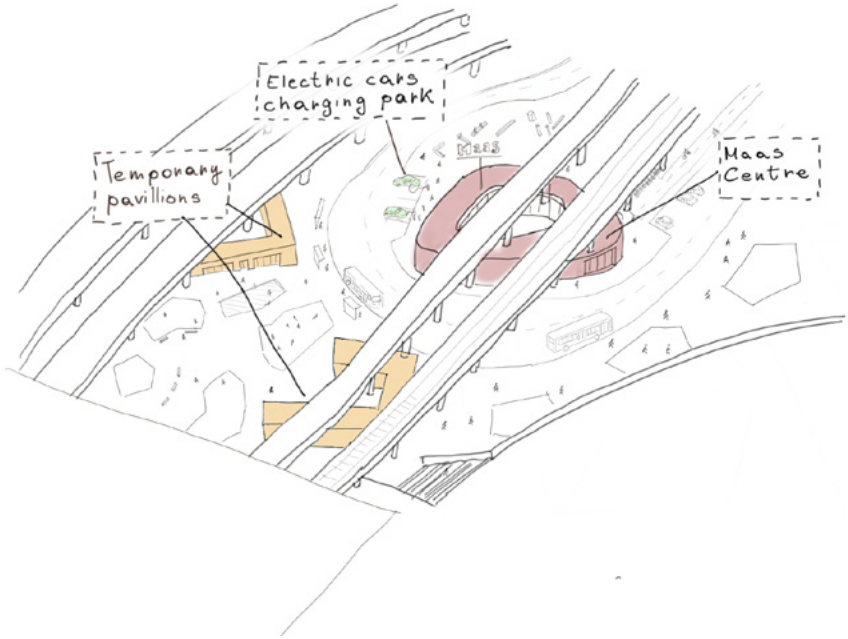
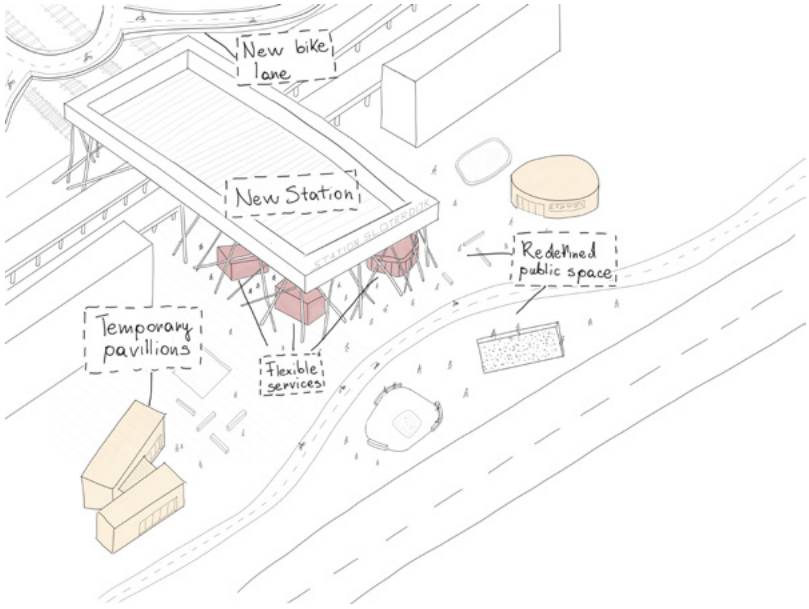




upgrade between the hub and the adjacent urban district.

The actors of these complex transformations can be identified in three main figures: the common, i.e. the new role of the station as a social fulcrum, the "public" strategy and vision of transformation; the district that replaces the building typology of the station, thus bringing forward a leap in scale and complexity for urban design strategies; the negotiation, i.e. management and policies also creating very often innovative practices in the domain of spatial planning, expressed through productive and never predictable results with positive outcomes for the community.

Designing transition: new technologies, new mobilities

The case of Sloterdijk station could be considered as a paradigmatic example of the adaptive growth of infrastructural nodes in respect to the raising of new mobility patterns and new technologies in transportation, mostly in the last decades. Starting from the proposed critical reading of the hub evolution, the main assumption for the design scenario is to turn this process of continuous additions into the driving force for the reconfiguration and upgrade of Sloterdijk station. The design scenario grounds, indeed, on the choice of considering the incremental evolution of the station as a possible answer to strategically hosting the future changes in technologies and mobility patterns. The proposal addresses the future scenario by designing transition, complying and supporting the incremental evolution of the existing hub and, at the same time, stressing in the design scenario this peculiar character. The existing configuration becomes the starting point for a next step of stratification able to allow changes, going beyond the concept of station as a circumscribed building but, on the contrary, framing it as a proper spread urban system, as a soft infrastructural layer embedded within the district. The station as a spread system constitutes a jump from the architectural scale to the urban design one, at the same time weakening the iconic dimension of the architectural scale of the building complex in favour of the capacity to innovate characterizing the entire area of Sloterdijk. An open decentralized infrastructural system can generate new research themes for the future of intermediate metropolitan transport hubs, overtaking the obsolescent image of the caesura between the infrastructures and the city, and appearing as strong feature for the edging neighbourhoods, leaving openness for transition in transport modes[5].

The project scenario constitutes a new framework that can accommodate the technological changes in progress now and in the coming future. This basic choice is translated in the proposal by means of two complementary actions: the design of the open public space to expand the influence of the station at an urban scale; the identification of new poles to host temporary activities in the domain of transport innovation.

The ground level manifesto: the station invades the city

As mentioned here above, the main element that characterizes the design proposal is the reconfiguration of the open public space that unifies and connect physically the fragmented urban areas around the station. The proposal looks at the double level of its articulation: the one of the railway accessibility (circa 5.00m above the ground) and the one of the city (ground level). The latter level, under the flyovers of the railway lines, is actually the field of new activities supporting both the hub and the livability of the district. An area freed from the circulation of cars and reserved essentially for pedestrians, public transport by tram and bus station. The homogeneous open space is intended to support

leisure and sports activities, as well as to provide new waiting areas. A space whose characterization consists of a material uniformity punctuated by small elements or pavilions as temporary grafts. The activation of the ground level is structured not only because of common activities and pavilions, but above all by the introduction of a new soft mobility network that connects the two levels of public accessibility (railways and the city). Yet, as concluded during the preliminary analysis, there is a strong lack of north-south accessibility in the area, particularly due to the presence of the railway tracks creating a barrier for pedestrian and bicycles. Because of that, a new "spine" for soft mobility is envisioned along the north-south direction. The spine runs on the two levels of the public space and at the same time intercepts different "common spaces" that are organized in the proximity of the station and within the high rise building area that will be developed around Sloterdijk in the near future. Together with the ambiguous porosity that the spine proposes, three nodes for new mobilities are distributed in the reconfigured station area – north, center and south –, helping to finalize the "spread station system" throughout the Sloterdijk district.

Variety allowing change: phasing the scenario

The station that invades the city as a discrete system, made up of nodes connected with each others by a soft mobility network and a porous public space, is the main idea of the proposal. The construction of this new scenario can be implemented as a "spider-net", according to two main principles of contemporary design practices related to infrastructures that characterize the proposal: porosity and ambiguity. The first concept is addressed by means of the soft mobility network and the different common spaces envisioned both in the public domain and in the private developments, bringing forward also a functional mix that allows permeability and social inclusion in the future district. The second concept of ambiguity is addressed by supporting transition in the design scenario, namely proposing a temporary occupancy versus a fixed plan evolution. Indeed, an ambiguous position has, in this case, the main goal to enhance and enforce the idea of proximity between the station and the district as well as to support technology and mobility changes already happening in relation to infrastructural urban design. Consciously, the proposal turns down the iconic architectural imagery, nowadays too often self-referential, replacing it with a continuous variety allowing change.

Notes

1
C. van Eesteren and Th. K. van Lohuizen. Algemeen Uitbreidingsplan Amsterdam, 1934. Collectie NAi,

2
The name Hemboog refers to Hemhavens, the harbor area at the other side of the IJ water, marking the beginning of the municipality of Zaandam.

3
Transit Oriented Development Strategy, see also Tan, W., Koster, H. R. A., & Hoogerbrugge, M. (2013). *Knooppuntontwikkeling in Nederland: (Hoe) moeten we TOD implementeren?* 's-Gravenhage: Platform 31.

4
Ruimte voor de Stad (Space for the City). Development Strategy for Amsterdam 2025. See Plan Amsterdam 01-2018 available online: https://issuu.com/gemeenteamsterdam/docs/planam-01-2018

5
For more information look at *Transport Systems Catapult Exploring the Opportunity for Mobility as a Service in the UK*: www.ts.catapult.org.uk

Scenario made by Group D
imagery by Junquan Pan, Matteo Albertini, Alina Arnold, Gaia Calegari, Xue Kai, Omer Khalid, Dunja Krstić, Milorad Obradović and Yeqing Shang

The Green Belt

- *Flora+fauna*
- *Bioenergy from the Harbour*
- *Future mobility*
- *Smart waste management*

- *Connection areas*
- *Water*

Group D

The new Green Belt

Wouter Oostendorp
Joran Kuijper

group: Junquan Pan, Matteo Albertini, Alina Arnold, Gaia Calegari, Xue Kai, Omer Khalid, Dunja Krstić, Milorad Obradović and Yeqing Shang

Initial suspicions

Amsterdam Sloterdijk station is a well located train, metro, bus and bicycle station in between the train stations of Schiphol Airport, Amsterdam Lelylaan and Amsterdam Central Station. Its already strategically role in the transport network of today Amsterdam metropolitan region is of great importance for the upcoming years; Sloterdijk Station will become the key transfer hub of the newest urban expansion of Amsterdam: Haven-Stad. Not only this high level metropolitan urban development will benefit of Sloterdijk station – this transport hub will also be of another great importance: connecting Amsterdam to the harbor area Westpoort and the more rural Zaandam area, north west of Amsterdam city center. Therefore, the Sloterdijk Station and its surrounding area has to undergo a metamorphosis: from a mono-functional office area towards a multi-functional urban centrality as a substantial part of the City of Amsterdam.

Grown over the years from a small train station as an answer to local mobility issues in the 1980's, Sloterdijk Station became a regional massive mobility hub – an anonymous transfer machine in the mono-functional Sloterdijk area. Urban planning and transport planning developed on a very different pace over those past three decades. Sloterdijk station became an isolated entity characterized by massive infrastructures for train, car, bus, metro and tram, positioned in-between large office buildings.

Accessibility other than arriving by train or metro is problematic nowadays. Access points for the different modes of transport are scattered all over the station area. The different bus stations (local, inter-local and international) make it hard to find the right bus platform, not to speak about train track platforms in another station building that are apparently part of the same big train station. Several large bicycle parkings are located far from the train station entries. Therefore, to get to the train station visitors have to cross several car-ways and change height levels. On top of this, the different modes of transport are located on different physical levels going in opposite directions for the same destinations.

Nevertheless, the daily amount of commuters increases drastically because of the already ongoing urban developments. Sloterdijk Station area already has transformed into a multi-functional west gate for Amsterdam, unfortunately without real success. Sloterdijk is still an unattractive complicated multi-layered transport hub with unclear transport flows stacked upon each other and going in all directions.

Project Scenario | Approach

The design project is about the connectivity and liveability of the Sloterdijk Station's neighborhood in relation to its north east hinterlands and the harbor area Westpoort in between, focusing on the quality of the current public space and its connectivity towards other areas surrounding the city.

Currently the station is an area of physical boundaries, disconnecting existing public spaces. There is a lack of clear distinctions of directions towards a (final) destination of the visitors. Way-finding is overly complicated.

The current residential developments together with the ever increasing number of tourist visiting the city of Amsterdam makes Sloterdijk area popular for hotels.

▸
Scenario made by Group D
imagery by Junquan Pan, Matteo Albertini, Alina Arnold, Gaia Calegari, Xue Kai, Omer Khalid, Dunja Krstić, Milorad Obradović and Yeqing Shang

Nevertheless, Sloterdijk misses a sense of place. This means that this place must contain the physical experience **of** being **in a multi-functional environment. This is a sense of place where local inhabitants can meet each other and interact with commuters or visitors.**

In 1935, Cornelis van Eesteren presented a strategy for a ring of green neighborhoods that would foresee the growth and expansion of the city of Amsterdam: the Algemeen Uitbreidingsplan **(AUP). By stacking houses into flat slaps, the newly built apartment buildings would be able to facilitate light, air and space (qualities/standards scarcely available in the inner city) in the everyday live of the new inhabitants, thus creating the** modern **garden city. The Van Eesteren expansion plans of 1935 are partly realized. These** Westelijke Tuinsteden **(**Western Garden cities**) could be considered as autonomous 'green islands' with an enormous development of apartment buildings.**

The general approach is to use the strength of the area to design a station area that leads to a more environmental friendly scenario for the neighborhood, the city of Amsterdam, the bordering harbor area and its hinterlands, including future inhabitants, daily commuters and making this place a destination for visitors. A new audience for local initiatives, trade and entrepreneurship will arise. In this, Inclusiveness **is the key word.**

The main research question is: 'How can inclusiveness **(on the levels of** place, network **and** sustainability**) enrich Station Sloterdijk and its area in a time when heavily densification is taking place while (re)connecting the station with the harbor area and its hinterlands?' The result is a scenario on** inclusiveness **to build upon.**

On the level of livability **(identity and place making (place)) the following questions will be asked: 'How does the new development of the Sloterdijk surrounding area relate to current and old strategies for the residential development in Amsterdam?' and 'Could the original design character play a role in the new character of future public place surrounding the station?'.**

On the level of accessibility **((re)locating and (re)creating network connections (network)), the following questions will be asked: 'What modes of mobility connect the station towards the metropolitan and regional area?' Where are located the local networks that connect the neighborhoods surrounding the area? And 'what public spaces surround the station, and is there a direct access between them?'.**

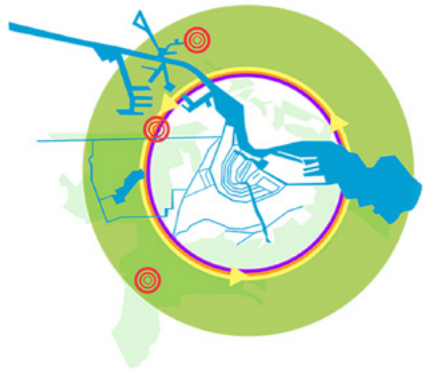
On the level of sustainability **(environment and area specific values (circular sustainability)) the following questions will be asked: 'What type of waste is being generated in the harbor (also waste heath)?' 'Are there facilities that could process waste into useful resources and is there space available to locate circular industries in that area?' 'Are there products and services that are specifically created in that area and what do local entrepreneurs produce?' And 'could we disperse these resources and products throughout the city?'.**

Design Proposal

The design proposes to connect these partly realized Westelijke Tuinsteden with a spatial circular strategy **and pull these garden cities together as a** Green Belt**, that will distribute networks and provide a green identity – an identity that relates back to one of Amsterdam's original planning strategies. Using the 1935 plan as a foundation, this Green Belt would fully surround the city center, even reaching towards the Zaandam area.**

Sloterdijk station area will be the main catalyst establishing connections between local (trade) networks and public spaces, reattaching access between current surrounding neighborhoods, future neighborhoods and the Westpoort harbor.

Algemeen Uitbreidingsplan 1935.



Group Vision for Amsterdam 2050-

Westpoort harbor has energy producing facilities. When combined with facilities that process waste into energy, Sloterdijk Station would become an excellent energy exchange center – a gateway that could collect and disperse people, waste, energy and other area specific values.

Sloterdijk will act as an intermediate between the 'grand' city of Amsterdam and its surrounding neighborhoods and will link small local networks together in one clear, green environmental gesture that ties the scattered public space together while enhancing the orientation towards public destinations. Sloterdijk will facilitate public urbanity, therefore, local initiatives can be emerging. It will collect fluxes/flows that will be dispersed through the infrastructure of the Green Belt. Local entrepreneurs, let's say chocolatiers, could lure a new audience boosting their marketing. This would enable them to invest in the future of the belt, may be even enhancing it with chocolate transport lines that flow throughout Amsterdam.

Sloterdijk will be the initial gateway of the Green Belt, facilitating different types of automated and non automated transport. The belt will change and expand over time, starting out as a sequence of green public spaces organic growing, consisting of water, event spaces, places to reside and routing for slow traffic. Dedicated areas are characterized by a flat landscape with cross connections at the important metropolitan nodes. These manifest themselves as bridge pavilions, squares or elevated roofscapes. Later on in its life cycle, automated public transport is included creating a possible hop on-hop off public transport service around Amsterdam.

Sloterdijk will have an organic roofscape in order to pick up the blocked local network, neighborhood squares and important street areas throughout its surrounding neighborhood that ties them together on top of the roof. The roof will function as a public square facilitating event spaces hosting local initiatives and will guide passengers flows towards their destination. The shape allows slow traffic from the belt to access the roof in order continue its way towards their destination in the city or its hinterlands. Instead of a station for changing transport modes, Sloterdijk becomes a station for residing, a station as destination connecting and facilitating high quality urban spaces – the multimodal station as an inclusive destination.

Ambition

This station design is a scenario that includes future inhabitants, commuters and visitors – an inclusive way of living together. Its newly created connections reach towards public spaces and infrastructures that are essential for local events, surrounding neighborhoods, metropolitan activities and regional destinations.

The bigger scale gesture of the Green Belt enhances the exchange of energy flows and the collection waste, connecting Amsterdam as a whole in a green, circular way based on Amsterdam's original planning strategies.

This bonds together a new audience undertaking new local initiatives and thus unlocking 'area specific inclusive values'. Imagine Sloterdijk chocolate for all of Amsterdam and its surroundings, powered by renewable energy from the Westpoort harbor.

▼ *Final presentation poster* group A

▶ *Final presentation poster* group B

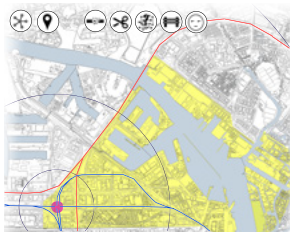
AMS/TU Delft
Summer School 2018

HAVEN-STAD STATION: FROM MACHINE TO HUMAN LANDSCAPE

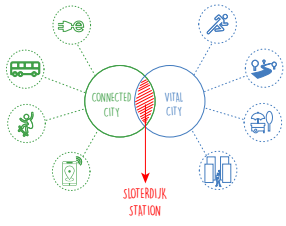
Group A students: Biyue Wang, Cornelia Dinca, Chia-Ju Lin, Diego Irizarri, Francesca Lucenti, Ninoslav Jankovic, Sabah Mohammed, Sara Semlali, Xueni Hu.
Mentors: Hans de Boer, Valentina Ciccotosto

Sloterdijk Station is an important rail and road hub, strategically located between Schiphol Airport and Amsterdam Central Station.
Though an efficient "transfer machine" for more than 50,000 daily users, Sloterdijk lacks the quality and programming needed to catalyze the transformation of the district.
In this project we envision the station and its area as a destination and catalyst for Haven-Stad and an important cultural and commercial district. We propose to transform the station from a "machine" to a "human" landscape, guided by the principles of "connected" and "vital" city. Our design consists of opening up the boundaries of the building to create a broader station area that increases capacity and improves flows to, from and within the station. At the same time, the green carpet covering the station creates an iconic public space that connects the previously fragmented areas around the station. This new space will serve as a cultural landmark and will become a destination in it of itself, acting as a catalyst from where people, initiatives and ideas can spread out and into Haven-Stad.
The surrounding squares will be enhanced with multifunctional programming such as commercial and cultural activities. Within the station area a Mobility Hub will become a test ground for mobility innovations such as mobility as a service. In this way, Haven-Stad can become a dense but vibrant city characterized by active, shared and sustainable mobility. The Mobility Hub will also act as a living lab, attracting national and international attention from tourists and professional delegations interested in Amsterdam's position as a leader in sustainable mobility innovations. In this way, what was previously merely an efficient transport machine is transformed into an inspiring landmark and catalyst for Amsterdam's most important 21st century urban development project.

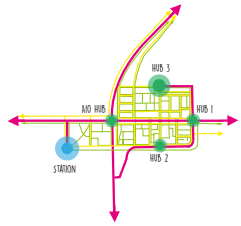
STRENGTHS WEAKNESSES



VISION



MOBILITY HUBS CONCEPT



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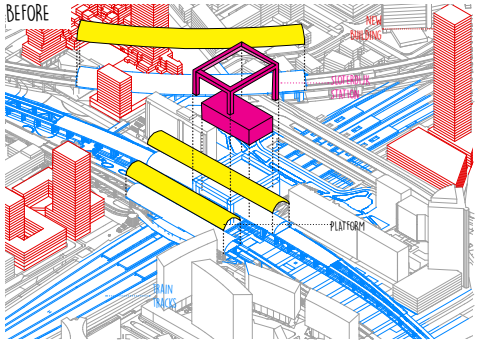

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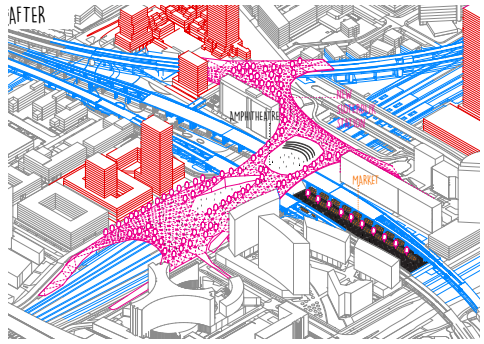


AMS/TU Delft
Summer School 2018

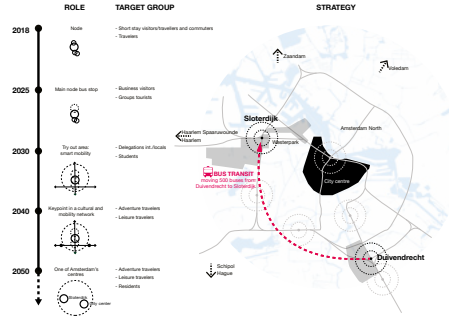
AMS TUDelft GARES DU FUTUR FOLLOW UP STATIONS OF THE FUTURE FOLLOW UP

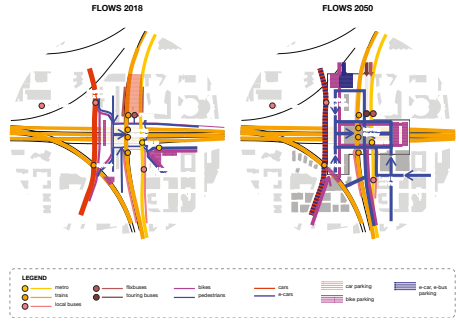
As a major mobility hub in the fast-growing global metropolis of Amsterdam, the (re)development of the Sloterdijk area is a major opportunity to support the City of Amsterdam's major policy objectives on tourism, housing supply, and future mobility, while creating a vibrant and dense urban place. This strategy, Gateway Sloterdijk 2050, envisions the Sloterdijk area as a gateway for tourists, commuters and future residents alike. To support this vision, the Sloterdijk train station will evolve from its current state as a transportation node to a major keypoint in a cultural and mobility network, becoming one of Amsterdam's prominent city centres. The design of the station and its surroundings will be unified, and a unique identity will be developed for the station.
Gateway Sloterdijk 2050 proposes policy and design solutions guided by the following principles: establish Sloterdijk as a main port for Netherlands tourism, plan for future mobility (growth in volume and modes), promote accessibility for all users, and emphasize a livable public space. Recognizing that change will be incremental, the strategy proposes phasing and an evolving role for the station over time. In the near term, the strategy proposes directing flows of visitors, particularly tour bus groups and international bus traffic, to the station.
This, combined with the first phase of new residential development, will build the critical mass required to establish new programs and activities at the station. Over time, the strategy proposes major infrastructural changes to improve the flows of passengers to and through the stations and overhaul the indoor and outdoor public space.
Legacy transportation infrastructure (such as the parking lot) will be transformed over time to accommodate an expansion of mass transit and new shared modes. The phasing plan recognizes that the future is unpredictable and leaves room for flexible uses and adaptation to new realities.

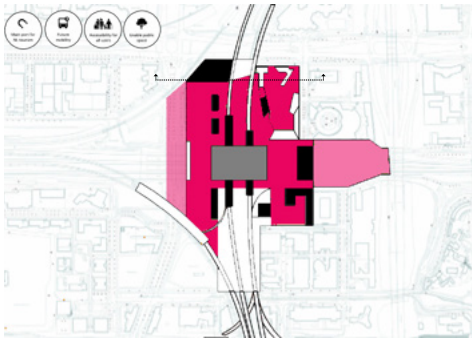
Gateway Sloterdijk 2050

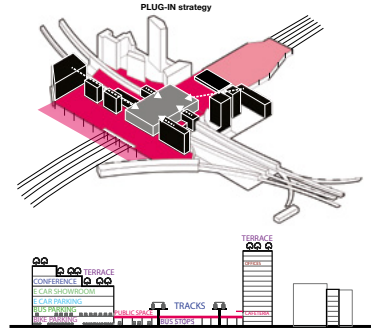
Centrum

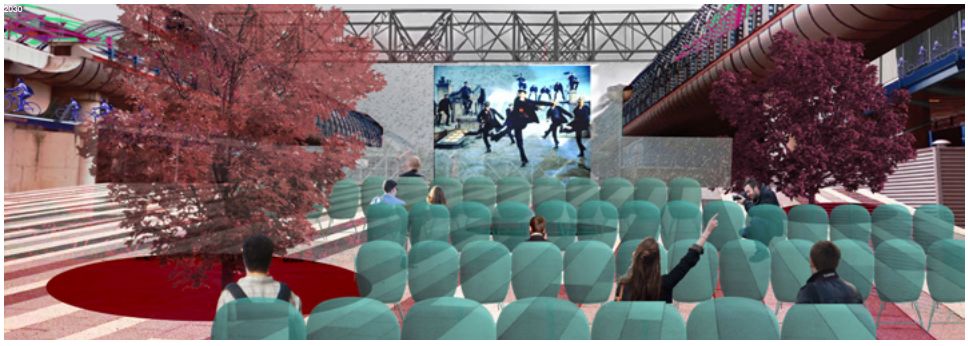
Students: Isabella Flore, Sabrina Menger, Benedetta Gatti, Lindsay Wiginton, Ana Cvetic, Jolien Kramer, Salwa Cherkaoui El Baraka, Sebastiaan van Niele, Tom van Vilsteren
Supervisors: Manuela Triggianese, Tom Kuipers











▼ *Final presentation poster* group C

▶ *Final presentation poster* group D

AMS/TU Delft
Summer School 2018

SLOTERDIJK

a continuous variety for allowing change

In the ambitious plan for the quarter of Havenstad, delivered from the city of Amsterdam to give an answer to the increasing demand of growth, a former industrial zone is being transformed into a high quality mixed residential area. The urbanization calls for extra investments in the public sphere: Sloterdijk station may function as a center of this development area.

In the past, this station was developed mainly to work as an efficient transfer hub but this, through the years, has however lead to a station that is not very attractive nor efficient.
In line with the ambition of the municipality the aim for Sloterdijk is to create a high quality public place where people want to go, stay and live.
This does not only imply good accessibility, but also livability and sustainability. In this last week, we have aimed to answer the question of how Sloterdijk station can play a role in its urban context and in its surroundings so that it becomes an attractive destination.

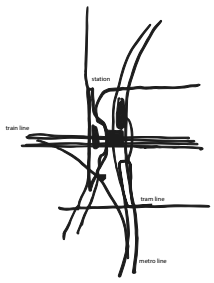
Furthermore, we looked at which approaches can be tested and applied to intermodal nodes when dealing with lack of space and a growing number of directioned users.
On the basis of a mobility and area analysis, a strategy was developed based on three pillars: **variety**, **continuity** and **allowing for evolution**. This led to an integrated design for Sloterdijk station to improve the mobility and the quality of the new public space. **It aims to serve as a catalyst for urban development for the entire area, making Havenstad an attractive mixed-use area, where residential, commercial, leisure and mobility initiatives thrive.**

AMSTERDAM NIEUW WEST

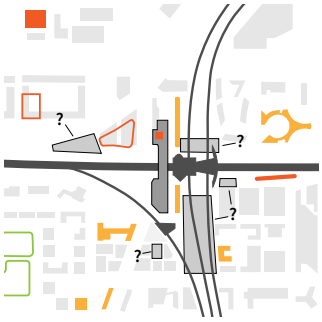
STUDENTS
Francesco CAMILLI, Elisa CANTONE, Rein DE VIET, Jialei FENG,
Janet HETMAN, Matthys KOSICKI, Nhu LUONG, Li QIN, Karen VALITOV

SUPERVISORS
Fabrizia BERLINGIERI, Roberto CAVALLO

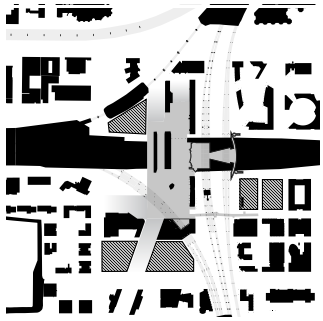
ANALYSIS



MOBILITY ANALYSIS
infrastructural layering

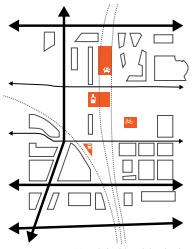


AREA ANALYSIS
scattered public functions

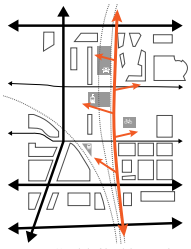


SPATIAL ANALYSIS
continuity vs. barriers

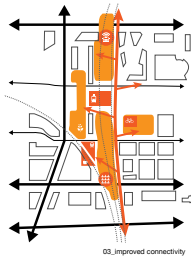
STRATEGY



01_analysis of the existing situation

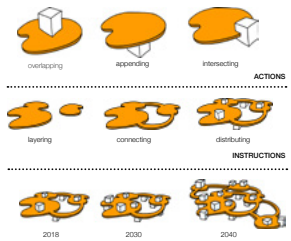


02_analysis of the existing connections

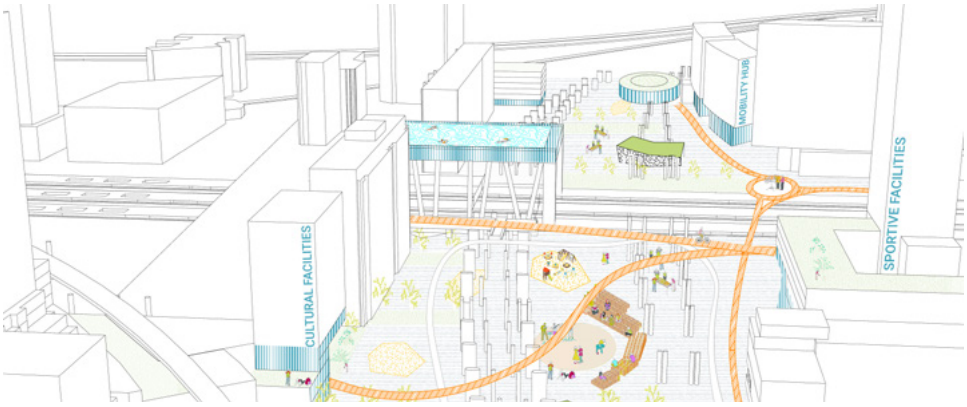


03_improved connectivity

IMPROVING CONNECTIVITY STRATEGY



STRATEGICAL VOCABULARY



AMS/TU Delft
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GREEN BELT 2050

Discovering Sloterdijk as a part of Amsterdam Metropolitan area, what was found were fragmented pieces of historical plans made by Cornelis van Eesteren in 1935 as the first expansion plans for Amsterdam. The idea of a continuous belt of greener neighbourhoods dating from the first half of the last century, reemerged in the new era as a part of a Vision for Amsterdam 2040. Here it is stated that Amsterdam needs to open its ring boundaries for green development for flora and fauna alike. The driver idea for this project came from merging these two plans, resulting in the concept of The Green Belt. It consists of three pillars: clean energy, new mobility and greenery.

The station of Sloterdijk, as one of the crucial transport nodes of this region should be accessible, sustainable and well-functioning. As it has some irregularities in its functioning system, this project aims to provide new design which will cope with the problems of orientation, fragmentation of the area and lack of attractivity. The extension of the station is open for future innovation in mobility as it provides place for automatic vehicles.

Clean energy is produced and extracted from the nearby Port of Amsterdam, where it enters the Green belt circle and from there on it is distributed further into the city and its surrounding areas. The city of Zaandam and Schipol airport are important destinations which lack proper sustainable access, therefore the project insists on widening the Green belt with the aim to connect these areas with Sloterdijk.

The Green belt project provides smart solutions for the present and the future of the area of Sloterdijk.

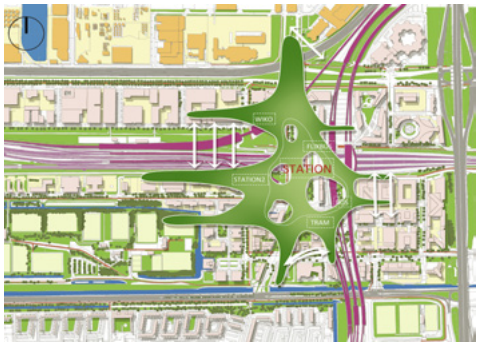
Supervisor:
Joran Kuijper
Wouter Oostendorp

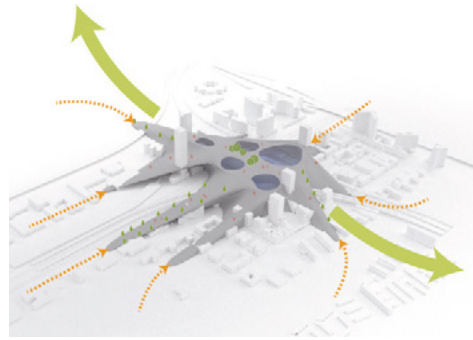
Students:
Dunja Krstic
Gaia Calegari
Matteo Albertini
Omer Khalid

Alina Arnold
Junquan Pan
Kai Xue
Yeqing Shang
Milorad Obradović

Algemeen Uitbreidingsplan 1935.

Group Vision for Amsterdam 2050.





International graduate students, young professionals and researchers participated to the summer school 'Integrated Mobility Challenges in future metropolitan areas'. Group picture at KIT – Royal Tropical Institute (former AMS Institute location). © Valentina Ciccotosto

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Kick-off of the Summer School "Integrated Mobility Challenges in future metropolitan areas" plenary session at Delft University of Technology, Faculty of Architecture and the Built Environment, 21st August 2018.
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Guest lecture on Crowd Dynamics by Bachar Kabalan, Movement Strategies, at 'Integrated Mobility Challenges in future metropolitan areas' plenary session at Delft University of Technology Faculty of Architecture and the Built Environment, 21st August 2018.
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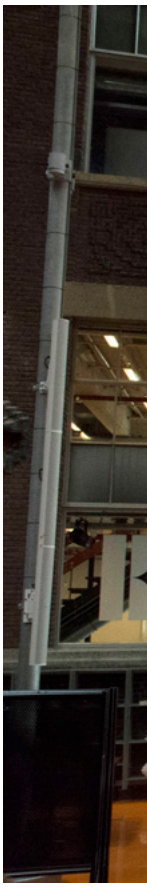
Guest Lectures by Nacima Baron, University of Paris-Est, and Maarten Van Acker, University of Antwerp, at 'Integrated Mobility Challenges in future metropolitan areas' plenary session at Delft University of Technology Faculty of Architecture and the Built Environment, Delft, 21st August 2018. © Tessa Wijtman-Berkman



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Guest Lecture by Nils Le Bot, AREP Paris, at 'Integrated Mobility Challenges in future metropolitan areas' plenary session at Delft University of Technology Faculty of Architecture and the Built Environment, 21st August 2018.
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Guest Lectures by Jurgen Krabbenborg, City of Amsterdam, and Luca Bertolini, University of Amsterdam, at 'Integrated Mobility Challenges in future metropolitan areas' plenary session at AMS Institute, Amsterdam, 22nd August 2018. © Valentina Ciccotosto

Excursion at Amsterdam Sloterdijk station guided by the City of Amsterdam, at 'Integrated Mobility Challenges in future metropolitan areas', Amsterdam, 22nd August 2018. © Valentina Ciccotosto

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Working sessions at 'Integrated Mobility Challenges in future metropolitan areas' at Delft University of Technology, 23th–27th August 2018.
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Final presentations of four scenarios for Sloterdijk station at 'Integrated Mobility Challenges in future metropolitan areas' at AMS Institute, 28th August 2018.© Valentina Ciccotosto

Closing session of 'Integrated Mobility Challenges in future metropolitan areas' at AMS Institute, 28th August 2018. In this picture, Manuela Triggianese, Maurice Harteveld (TUDelft/AMS Institute) and Marcel Hertogh (TUDelft/DIMI). © Valentina Ciccotosto

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Final presentations of four scenarios for Sloterdijk station at 'Integrated Mobility Challenges in future metropolitan areas' at AMS Institute, 28th August 2018.
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Ministry of Infrastructure and Watermanagement

Maarten Van Acker
University of Antwerp

Marjo van Amerongen
Dutch Embassy in Paris

Elise Avide
École des Pont ParisTech – LATTS

John Baggen
Delft University of Technology

Catherine Barbé
Director of strategic partnership, Société du Grand Paris

Nacima Baron
Université Paris-Est, École d'Urbanisme de Paris

Ivo Bastiaansen
Urban designer, Movares

Nicky van den Berg
Fabrique

Julien Bert
Rhônexpress

Hans de Boer
Delft University of Technology, DIMI

Sarah Black
RATP

Romain Boursier
ENSA Paris-La Villette

Ans Bouwmeester
Movares

Roberto Cavallo
Delft University of Technology

Remy Chevrier
SNCF

Paul Chorus
TOD policy advisor, Provincie Noord-Holland

Camille Combe
La Fabrique de la Cité

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University of Paris-Est, i-Site Future

Arjan Dingsté
Architect, UNStudio

Stephan van Dijk
AMS Institute

Erik van den Eijnden
Ministry of Infrastructure and Watermanagement

Mike Emmerik
Dutch Board of Government Advisors

Isabelle Garcia
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Clément Gautier
International Union of Railways (UIC)

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ProRail

Paul Gerretsen
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Julien Gicquel
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Anne Grillet-Aubert
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Hubert Habib
SWECO

Jantinus Hagens
ProRail

Flurin Hänseler
Delft University of Technology

Marcel Hertogh
Delft University of Technology, DIMI

Jeroen van den Heuvel
NS Stations

Ebru Isguzarer-Onder
AMS Institute

Daniel Jongtien
Benthem Crouwel Architects

Maud Kaan
AMS Institute

Kees Kaan
KAAN Architecten

Roland Kager
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NS Stations

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Joannette Polo
Dutch Embassy in Paris

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Manuela Triggianese
Delft University of Technology

Ton Venhoeven
VenhoevenCS architecture+urbanism

Marc Verheijen
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Royal Haskoning

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Valentijn Webbers
Fabrique

Jake Wiersma
Municipality of Maastricht

Sebastiaan de Wilde
NS Stations

Luis William
SNCF, Retail & Connexions

Daan Zandbelt
Dutch Board of Government Advisors

Summer School Integrated mobility challenges attendees

Carien Aalbers
Ministry of Infrastructure and Watermanagement

Maarten Van Acker
University of Antwerp

Fabrizia Berlingieri
Architect, Berlingieri Architetti Studio

Luca Bertolini
University of Amsterdam

Nacima Baron
Université Paris-Est, École d'Urbanisme de Paris

Hans de Boer
Delft University of Technology, DIMI

Ans Bouwmeester
Movares

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Delft University of Technology

Paul Chorus
Province of North Holland

Valentina Ciccotosto
Architect

Saksia van Eijk
City of Amsterdam

Erik van den Eijnden
Ministry of Infrastructure and Watermanagement

Albane Grandazzi
SNCF Mobility

Onno van het Groenewoud
City of Amsterdam

Maurice Harteveld
AMS Institute/Delft University of Technology

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City of Amsterdam

Marcel Hertogh
Delft University of Technology, DIMI

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BNA Onderzoek

Bachar Kabalan
Movement Strategies

Stefan de Koning
Architect, MVRDV

Jurgen Krabbenborg
City of Amsterdam

Joran Kuijper
Delft University of Technology

Tom Kuipers
AMS Institute

Nils Le Bot
AREP

Jim Njoo
ENSA Paris-La Villette

Wouter Oostendorp
Architect, Studio O×L

Joannette Polo
Dutch Embassy in Paris

Charlotte Rietdijk
City of Amsterdam

Manuela Triggianese
Delft University of Technology/AMS Institute

Oscar Vos
Architect, krft

Matteo Albertini
Politecnico Milano

Alina Arnold
RheinMain University of Applied Sciences

Gaia Calegari
Politecnico Milano

Francesco Camilli
Sapienza Università di Roma

Elisa Cantone
Università degli Studi di Genova, DAD

Salwa Cherkaoui El Baraka
ENSA Paris-La-Vilette

Ana Cvetić
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Sustainable Amsterdam

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Hunan University

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Politecnico Milano

Janet Hetman
Roma Tre University

Xueni Hu
Chongqing University

Ninoslav Janković
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Dresden University of Technology

Sara Semlali
National School of Architecture, Rabat

Yeqing Shang
Chongqing University

Karen Valitov
National Research University Moscow

Tom van Vilsteren
University of Antwerp

Rein de Vliet
Delft University of Technology

Biyue Wang
Delft University of Technology

Lindsay Wiginton
Pembina Institute, Canada

About the editors

Manuela Triggianese

Researcher and Lecturer
Department of Architecture, Faculty of Architecture and the Built Environment, Delft University of Technology and AMS Institute

Manuela coordinates the master program of the Chair of Complex Projects, at the Department of Architecture at the Faculty of Architecture and the Built Environment. She is involved in research and education projects on stations with Amsterdam Institute for Advanced Metropolitan Solutions and TU Delft Deltas Infrastructure Mobility Initiative. In 2015 she worked as visiting researcher at the Beijing Technical University and in 2014 she obtained the doctoral degree at the Faculty of Architecture in Venice (IUAV). In 2018 she became member of the scientific committee of the UIC International Conference Next Station: 'Railway Stations Boosting the City'.

Roberto Cavallo

Associate Professor and Director of Education
Department of Architecture, Faculty of Architecture and the Built Environment, Delft University of Technology

Roberto is member of the steering group for the research program at the Department of Architecture, Faculty of Architecture and the Built Environment. He is council member of the EAAE (European Association Architectural Education), member of the ARENA (Architectural Research Network) and editor of AJAR (Arena Journal of Architectural Research). In 2013 and 2014 he worked in China (Shanghai, Hong Kong, Beijing). He has extensive experience in international workshops, symposia and conferences and is often member of scientific committees in international academic and professional events. His particular research interest is about infrastructures and city.

Nacima Baron

Full Professor
Université Paris-Est

Stations is a key part of Nacima's academic activity at École des Ponts and Université Paris-Est as a Director of Chaire Gare, a five year partnership for teaching and investigation. She is responsible for the master track on Grand Paris Express station projects at École d'Urbanisme, second year engineers track 'Station Conception and Planning' at École des Ponts and since 2007 she is a full professor at the Université Paris-Est

Joran Kuijper

Researcher and Lecturer
Department of Architecture, Faculty of Architecture and the Built Environment, Delft University of Technology

Joran is involved in research and education activities at the Department of Architecture at the Faculty of Architecture and the Built Environment. Within the academic environment he has been member of several editorial teams, as for example in 2012 the international conference proceedings 'New Urban Configurations'.

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