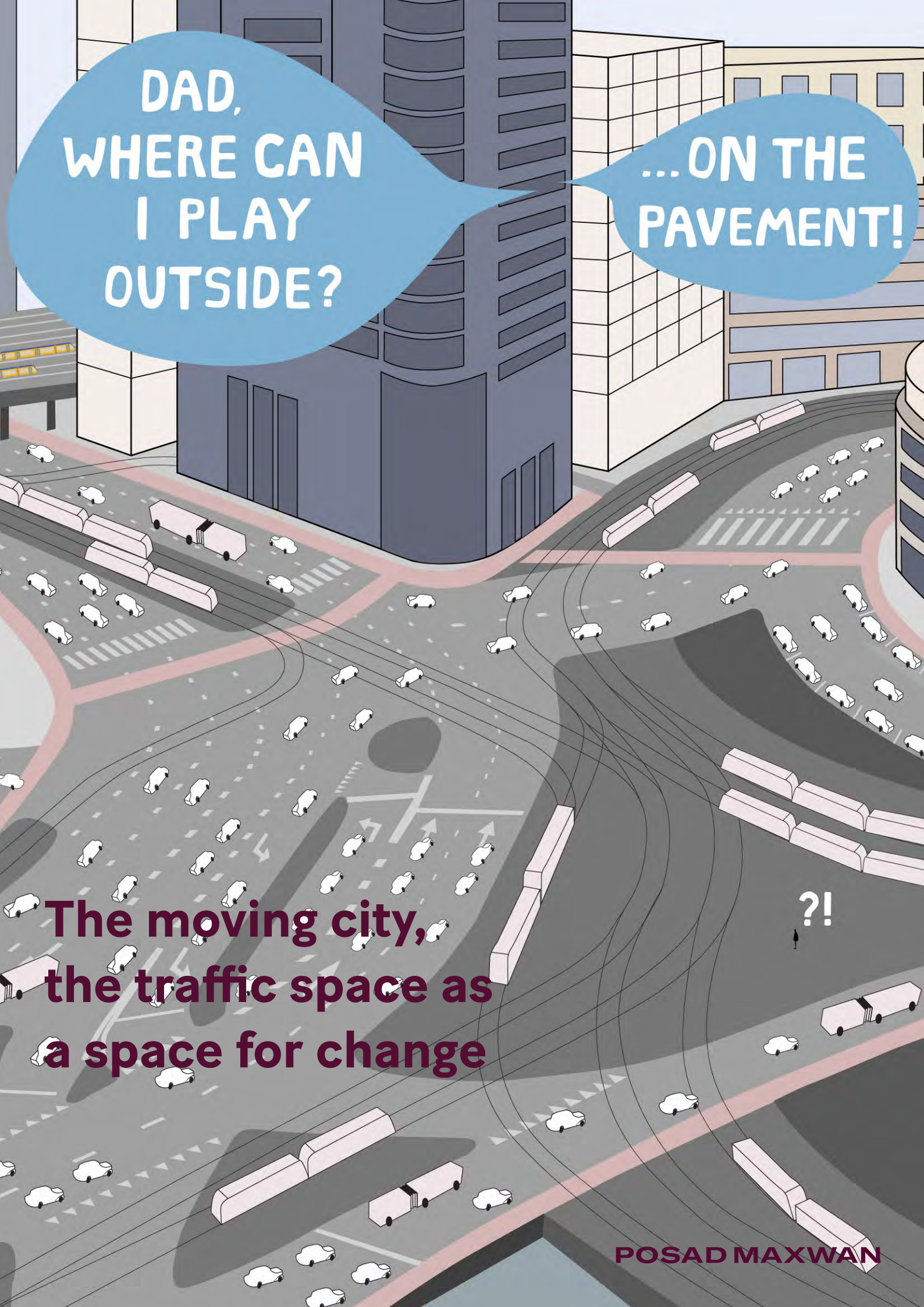


The moving city, the traffic space as a space for change

POSAD MAXWAN

Content

About this guide

Dear reader,

How can we create space to meet the various challenges facing our cities without doing so at the expense of accessibility? This guide dives deeper into that question in five chapters examining various aspects of mobility. The adjacent table of contents shows their subjects at a glance. A great many insights related to mobility, urbanism and transitions gleaned from our projects over the years have found their way into this guide. We touch on all sorts of topics, from parking standards to ultrafast deliveries, traffic pyramids to self-driving vehicles, to mention a few.

Each chapter spotlights a particular mobility issue from a planning perspective. The chapters are subdivided into:

You can read this guide from cover to cover or just browse through, perhaps focusing on particular chapters or, for example, the introductions and solutions. To supplement the discussions of the five topics in the chapters, we asked our colleagues at the Arcadis engineering firm for their response. Hendrik Jan Bergveld's reflection provides new insights and even more concrete tools and strategies for building cities that are both liveable and accessible.
We hope you enjoy this guide, and that the inspiration you'll encounter in its pages will get you travelling in a new direction!

The PosadMaxwan team

Challenge

What's the current situation in this area?
What are the main challenges, and how did they arise?

Solution

How can we approach mobility differently to create more space and/or improve the quality of our cities? We show you concrete examples of spatial solutions and new forms of mobility. Things *can* be done differently!

Introduction

The traffic space as a space for change

The moving city. It's one of our main areas of focus at PosadMaxwan. A city that moves is one in which you're able to get where you need to go and movement creates liveliness and buzz. More and more, however, we're seeing that movement grinding to a halt in cities where large numbers of people and a lack of space mean existing systems are no longer fit for purpose. Elsewhere, meanwhile, we're seeing that although space isn't a problem, the way mobility systems are used stands in the way of other developments. Thus, areas where action is needed, such as climate adaptation, circularity, livability and health, are suffering while everyone agrees that they need addressing without further delay.

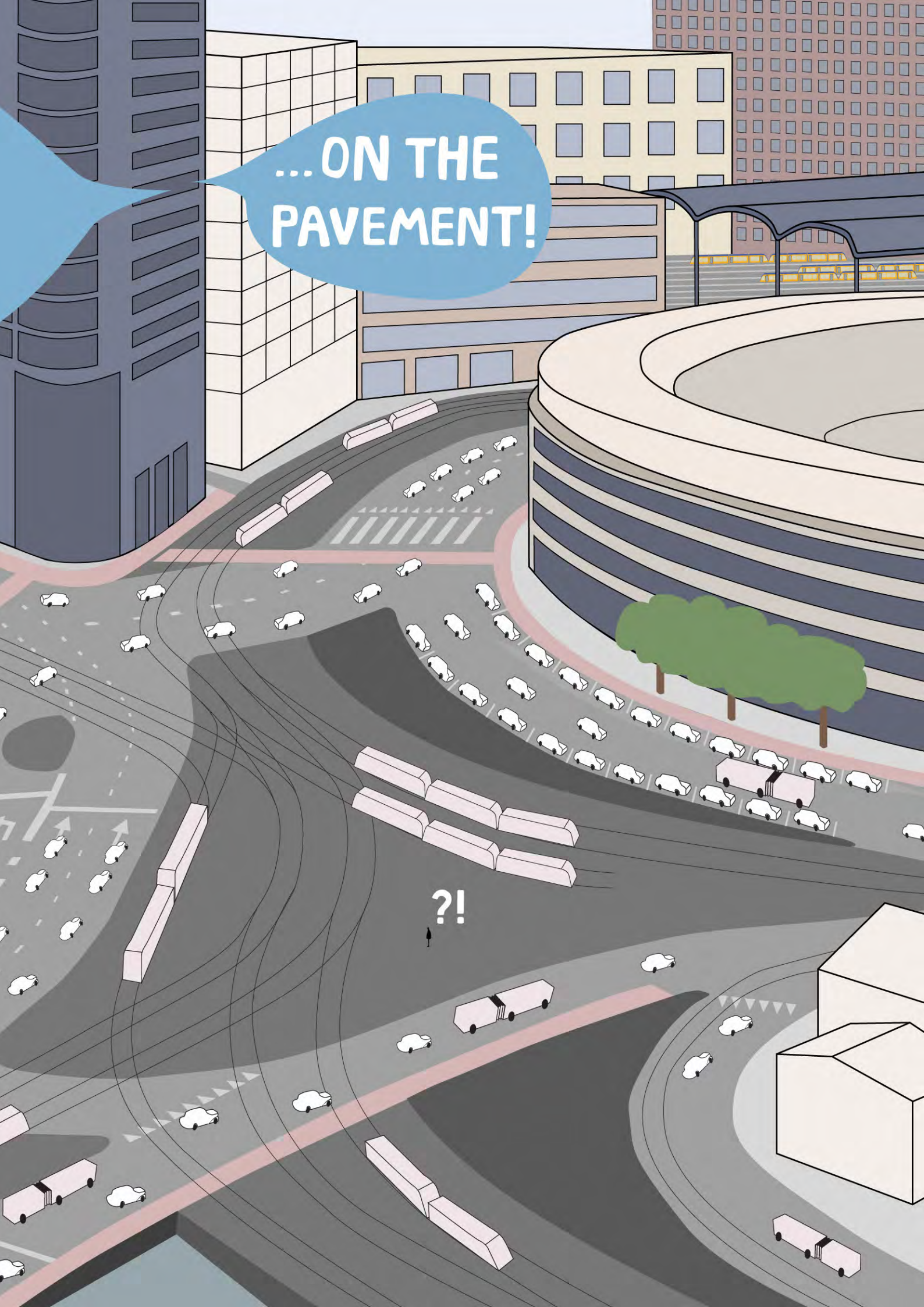
This must – and can – change. Nowadays there are plenty of new mobility concepts and innovations that can provide solutions. Often, all that's required are major behavioural adaptations on the part of the population. And therein lies the problem. Existing patterns are difficult to change, and no one wants to lose a sense of access, freedom and ownership. It is up to us as designers to show what a different mobility system can offer. The space we devote to mobility is a crucial element of how we deal with space in the city. Often, there is still scope for choice in this area, and therefore for opportunities.

We often see that simply unleashing a mobility concept on a city without a spatial plan does not work well. For example, one of our employees was in Rome recently. To people from the Netherlands, the city's traffic system has always been hectic, but now, with the addition of new types of shared vehicles, like conventional scooters and e-scooters, it has become even more chaotic. The cars are still there, and now all sorts of smaller vehicles are zigzagging between them.

"Improving the mobility system actually means creating space."

This example is yet another illustration of how improving the mobility system actually means creating space – space for solving new problems as well as facilitating new forms of mobility. Often, doing so requires us to look at that sacred cow, the car, in a different way. For many years, cars have set the standard for the design of the road structure, to an excessive degree. More and more people are realising that the situation has to change. But change will be accompanied by difficult choices and behavioural adaptations. With its series of articles on the moving city, PosadMaxwan seeks to show how we can create space without sacrificing accessibility, and what that will mean for mobility and how we move around – and, most of all, for the kind of cities and villages we will get in return. Because alongside difficult choices, changing mobility also presents some very inviting prospects.

Reclaiming public space


...ON THE PAVEMENT!
?!

To the left and to the right, cars are parked bumper-to-bumper. Between them zoom other cars, sometimes with four lanes at their disposal, heading from A to B. This is the average Dutch city street where pedestrians and cyclists are forced to bow to the automobile's iron rule and yet we need to make more space for slow traffic, kids to play, greenery and water. What would public space look like if we flipped the present day hierarchy upside down?

Challenge

So many spatial claims, so little room!

On Dutch city streets, 55% of space is reserved exclusively for cars according to Milieudefensie, an environmental organisation which conducted research on the division of street space in the 20 largest cities in the Netherlands. The figure was highest in the Cruquius neighbourhood in Haarlemmermeer where some 77% of road space is dedicated to four-wheelers. Although the space allotted to cars is designed for peak hours, the roads are far from being fully used for a large part of the day and the automobiles that use them often travel only short distances. In fact, the average car spends 95% of its time parked as per Milieudefensie's calculations.

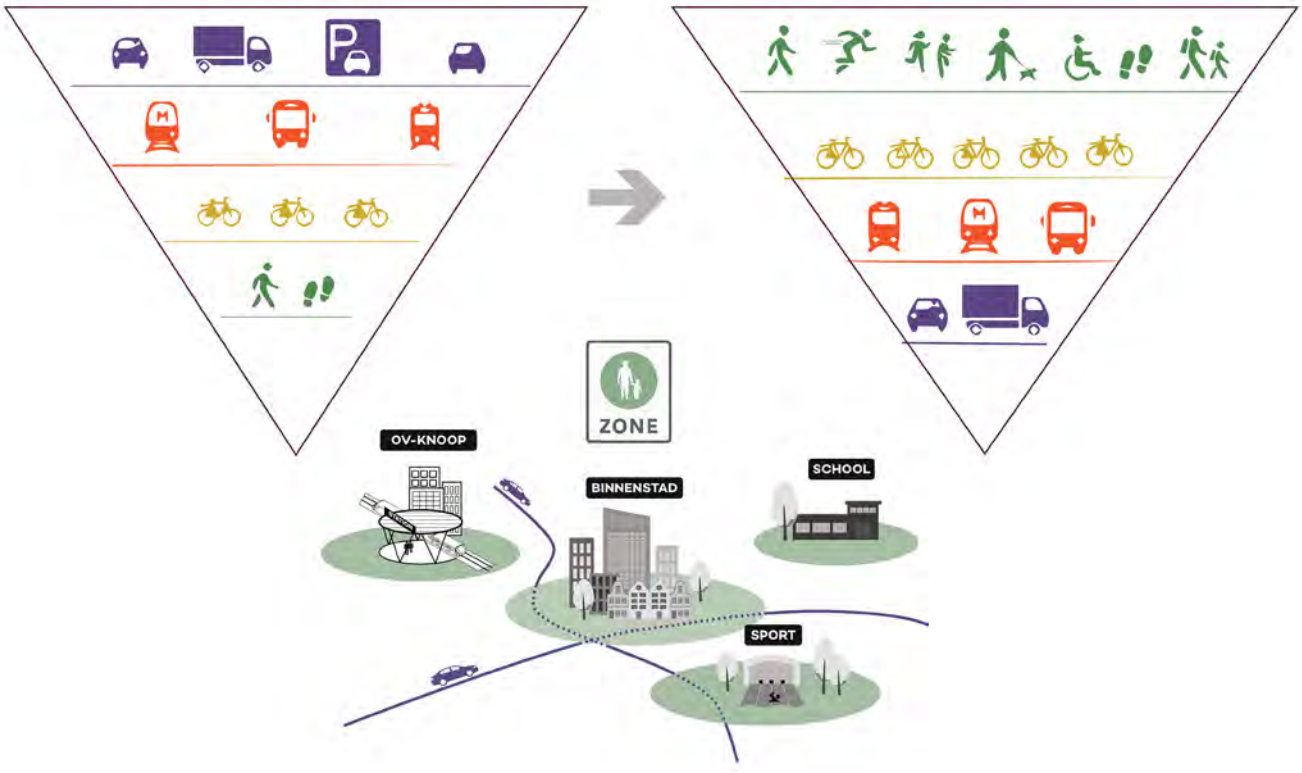
This inefficient use of space is galling when you look at the country's often overcrowded cycle paths. Between 2000 and 2017, the number of kilometres cycled in the Netherlands increased by 18%. New means of transport such as e-scooters which also use cycle lanes, add to the crowding. It's even more troubling when you stop to think about the space cities badly need to accommodate the necessary transitions. Space, much of it public, must be freed up and/or transformed to enable climate adaptation, as well as mobility and energy transitions. Concurrently, cities are also striving to provide their residents with a livable environment and safeguard their health and safety. But with so much land use under the control of private property owners, the question arises, 'Where can more space be found?' Areas devoted exclusively to automobile traffic are some of the last remaining places where there is still room for negotiation since this is public land for and belonging to us all. So how do we want to use those precious square metres?

Solution

Inverting the traffic pyramid

If the domain of the car is where space can still be found, the solution is simple: take the traffic pyramid with the car at its apex and invert it to prioritise slow traffic – cyclists and pedestrians – rather than cars. The municipality of Rotterdam is applying this principle in the Rotterdam Mobility Approach. Motivated by the population growth expected in the coming years, the city is seizing on traffic-related investments to make more room for cyclists and pedestrians. Car traffic is increasingly being routed along main roads around the city instead of through it.

"Areas devoted exclusively to automobile traffic are some of the last remaining places where there is still room for negotiation."



The municipality of Groningen is also moving away from cars in public space design and will henceforth think in terms of 10 dimensions, based on a plan by Felixx Landscape architects and planners; mobility being one of them and the rest ranging from ecology and climate to economy and social character. Other cities like Delft, Leeuwarden, Maastricht and Utrecht are similarly choosing to restrict traffic.

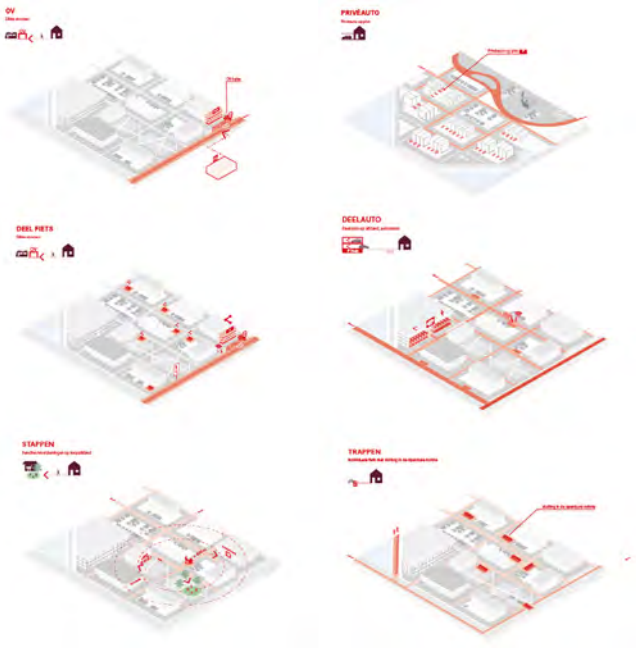
© Felixx Landscape Architects & Planners

In many places however, cars are still taken as the starting point for infrastructural design with planners calculating how many parking spaces will be needed in a new neighbourhood and swiftly drawing them in. Calculated rush hour traffic loads determine the number of lanes and turn lanes on roads leaving pedestrians, cyclists, greenery and water to fill whatever space remains. Reversing this hierarchy means looking first at how much room is needed for safe cycle paths, comfortable pavements and sufficient blue-green space to manage flooding. It also entails prioritising space for

"In many places, cars are still taken as the starting point for infrastructural design."

social encounters and making sure streets are pleasant places to linger, leaving cars as the last in line.

The same principle informs the STOMP method, which stands for *Stappen* (walking), *Trappen* (pedalling, or cycling), *OV* (openbaar vervoer, or public transport), *MaaS* (Mobility as a Service, or shared mobility), and *Privé* (private cars). STOMP is guiding the development of the new Floriadewijk neighbourhood in the city of Almere. The site where visitors are currently flocking to see the latest horticultural innovations at the Floriade international exhibition will be transformed after the event into a green health-promoting residential neighbourhood. The public transport links that have been built between the site and the centre of Almere will enable future residents to opt for clean mobility and leave their cars at home.



Finally, if we wish to simultaneously clear the way for slow traffic and improve the quality of public space in Dutch cities, we will have to address the problem of bicycle parking. For the Dutch Board of Government Advisors we developed design tools to get cars and parked bicycles off crowded streets. The new approach proposes to invert the conventional design of public space by considering slow traffic, green spaces and places to linger first, and car traffic only after. Focusing on spatial quality in every infrastructural intervention instead of sacrificing it will ensure that cyclability and walkability gain priority. Notwithstanding, smart solutions for efficient parking of cars and bicycles are an integral part of the solution. This approach will utlimately create more space for parks, gardens, water, social encounters and all the other aspects that make our cities sustainable and livable.

Conclusion

With fewer cars, more walking and cycling, this transition will inevitably cause inconvenience from a driver's perspective. The reflexive decision to drive, even when one only needs to travel a short distance, will have to give way to a conscious decision to walk or cycle when it makes more sense – as it usually does in the city. The question is, what price does society want to pay for mobility? Right now, the ones inconvenienced are pedestrians, cyclists and children at play, who have too little room. Also suffering are the climate, the need for more housing and the livability of cities, which are being given short shrift. By employing design principles that prioritise slow traffic and a pleasant future-proof living environment, we will ensure that a critical balance is restored.

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REMEMBER
THIS?!

Area development or parking development?

Parking plays a central role in the design of Dutch cities. For every new area development, official standards specify how many parking spaces must be created. These standards determine the street profile and building volumes and therefore limit the amount of housing, working space and green space a new area can contain. Yet we need more room for these things, not less, just as we do for the energy and climate-related changes that must be made. So how can we bid farewell to parking-dependent developments and make space for a high-quality living environment? What will happen if we base our standards on mobility instead of parking?

Challenge

The chokehold of parking standards

Taking parking standards as a driving factor in area development puts a brake on housing growth. Every Dutch municipality sets a parking standard for each area based on guidelines from the knowledge platform CROW. This can be as high as two spaces per new dwelling. Of course, reserving so much room for parking means less is left for public space and housing. This can be solved partly by placing parking (semi-) underground, making projects unnecessarily expensive. Accommodating cars appears to be a higher priority than housing people. In addition, parking standards keep our roadways filled with vehicles. Beyond making the streets unattractive and unsafe, this has an additional consequence: people in the Netherlands have got used to the luxury of having a car parked right outside the door. Driving is a convenient tempting choice.

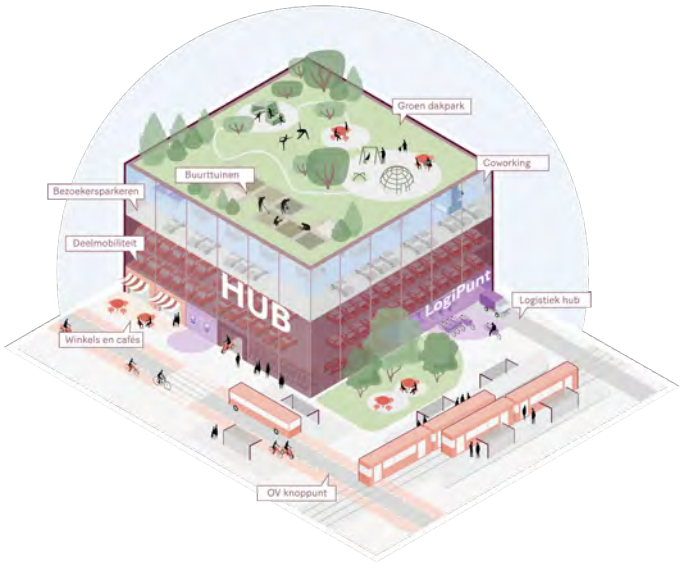
New construction projects almost always have to include on-site parking. The idea is to minimise the number of extra cars parking in public space. But whether that on-site parking is in a residential block's ground-level courtyard, in a semi-basement or underground, it causes significant spatial effects. Courtyards no longer contain greenery, with adverse consequences for biodiversity and climate adaptation. Every developer comes up with its own parking solution, leading to a lack of coherence. Every residential building features an unattractive section of plinth housing the garage entrance and in the worst cases, a ramp in public space. Another problem is the threat to personal safety posed by deserted public spaces. Residents drive straight into their buildings and courtyards, never setting foot on the streets.

Do we want to live in a place where children play outside and neighbours meet or one where the car is close at hand? To prioritise environmental quality again, we must first of all free ourselves from the chokehold of parking standards. That starts with thinking differently about mobility.

Sharing space and mobility

Parking standards were originally put in place to safeguard residents' mobility. But cars aren't and shouldn't be the only means of getting around. So why not replace parking standards with mobility standards? This approach will do justice to the wide range of available transport modes. After all, bicycles, e-scooters, conventional scooters, walking, and so on also facilitate accessibility – as does placing services nearby. Hence, mobility standards will include all conditions necessary for accessibility.

Going a step further, prioritising shared mobility over individual vehicles will free up room for additional housing and better environmental quality. That quality will not only come from more greenery, water and services, but also from more collectivity in the city. The places where shared conventional and electric scooters, cargo bikes and cars are kept will be where every trip starts. People will walk down the streets again, on their way to pick up shared vehicles, instead of driving out of car parks underneath apartment buildings. Centring shared mobility at local hubs that also house amenities such as parcel services and neighbourhood libraries will allow residents to meet. The proximity of a wide choice of transport modes combined with the social element will replace the convenience of having one's own car outside.



"Prioritising shared mobility over individual vehicles will free up room for additional housing and better environmental quality."

The Lincolnpark neighbourhood in the municipality of Haarlemmermeer (which is currently still in development) provides an example of how mobility hubs can respond to parking standards in a new way. In this sustainable development, parking spaces are provided in conformance with the norm but grouped at mobility hubs. Hence, limitations related to parking do not need to be taken into account in the design of the residential buildings. The hubs will provide shared mobility services, and multiple users are assumed for each parking spot, enabling the further reduction of space devoted to parking.

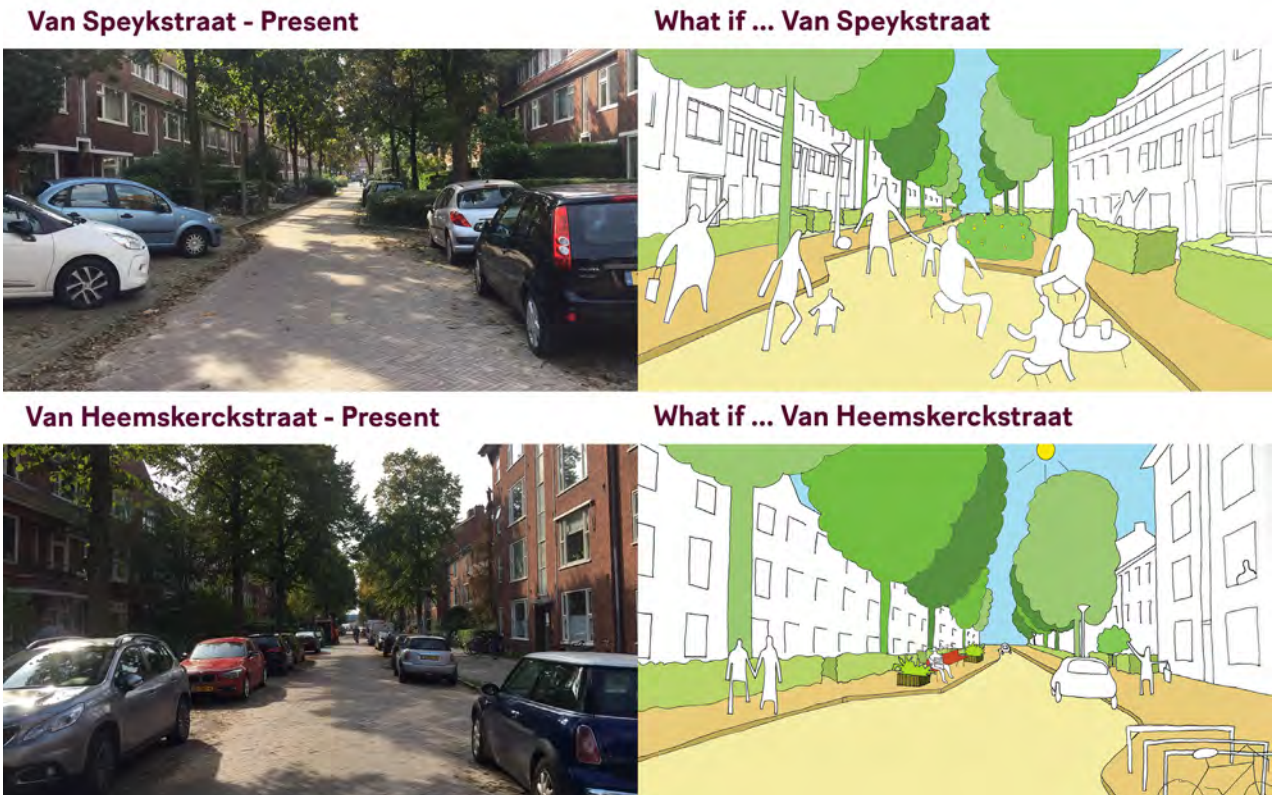
Switching from parking standards to mobility standards is an important first step in prioritising spatial quality. A second step is for municipalities to take more control of parking rather than leaving the spatial implementation of standards to developers. This will clear the way for clustered and collective solutions, such as garages at the edges of neighbourhoods and mobility hubs, which can be incorporated in developments from the beginning. The efficiency gains will make it easier to focus on the livability and walkability of our streets. And the mobility transition to slower traffic will get an instant push in the right direction.

At the same time, more space will be freed up for the building of homes and other urgent tasks.

In 2017 the municipality of Groningen asked us to map various scenarios for how alternative parking and mobility solutions could open up new spatial possibilities. We showed how assigning parking spaces a different function during the day or concentrating them at hubs or public transport points could free up room for sport and play, water, greenery and a greater diversity of housing.

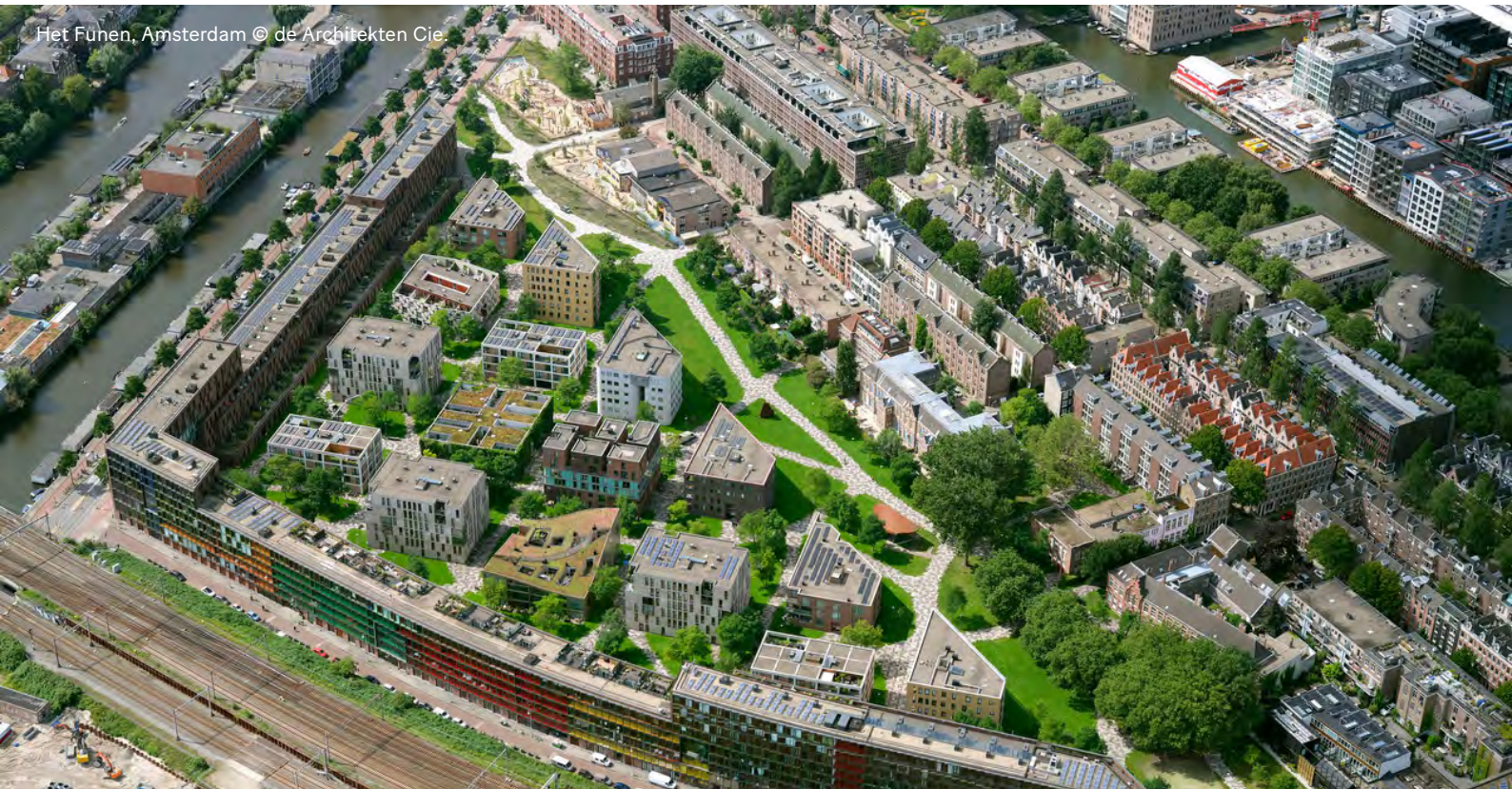
"Switching from parking standards to mobility standards is an important first step in prioritising spatial quality."

The Funen project in Amsterdam provides a real-world example of how controlling parking leads to fewer cars on the streets and a nicer living environment. Close to the railway line and the city centre, 16 residential buildings sit in a sheltered location amid park-like landscaping. Cars



are cleverly concealed in garages beneath the buildings that run along the edges of the site and there are public transport stops at the development's entrance. Similarly the new neighbourhood of Merwede in Utrecht, expected to welcome its first residents in 2025, will be car-free according to the parties involved. Walking, cycling, public transport and shared mobility (including some cars) will be the preferred means of getting around while a limited number of parking spaces will be available in garages at the edge of the neighbourhood.

These decisions are enabling the municipality to realise a higher density of housing while also creating green sustainable public spaces.


Het Funen, Amsterdam © de Architekten Cie.

Conclusion

As a concept for use in designing the Netherlands' increasingly limited space, parking standards are outdated. In view of the need to construct up to 1 million additional homes by 2050 while at the same time building a sustainable pleasant living environment, new standards – or rather values – are urgently required. And they start with the question: what kind of city do we want? First and foremost, cities and villages should be places where people can live well, not traffic zones where cars get in the way. There are many ways of ensuring good access to and within these attractive environments. Private cars – which spend most of their time parked – have long ceased to be the most logical choice.

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bikes
for rent
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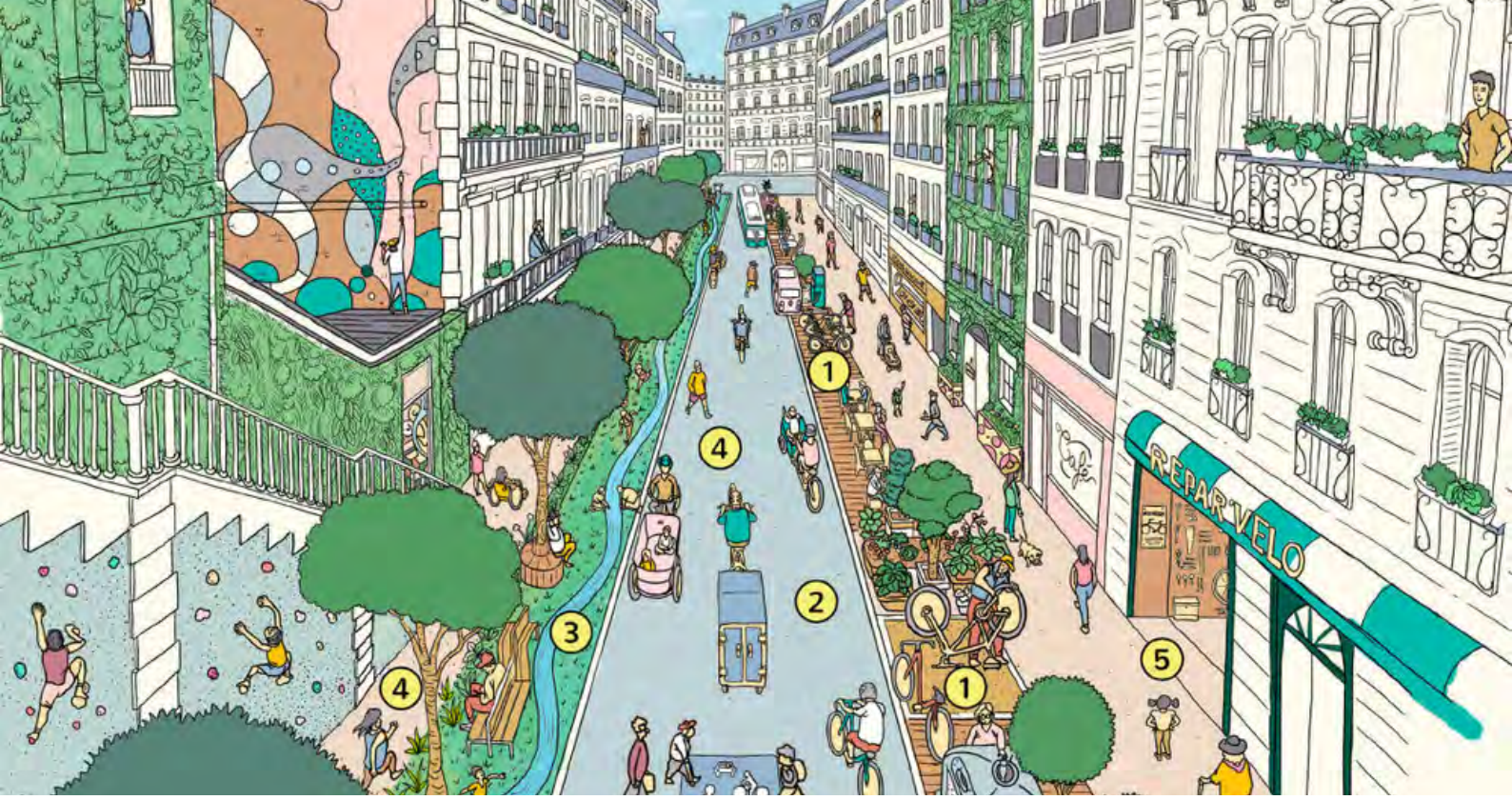
3 More is better: the accessible, polycentric city

The days when the area around a big city's main railway station was a bleak, ominous place are far behind us. Today, these areas are prized places to live and work. They are highly accessible, lively centres of development. How can we realise similar value in other parts of the city and make the most of them too? The big advantage of doing so would be that it would bring us closer to the generally wished-for 15-minute city – one with multiple attractive, easily reached centres, where key services are at most a 15-minute walk or cycle away. So how can we transform monocentric cities into polycentric networks?

Challenge

A buzzing centre with sleepy suburbs

Since the turn of the 21st century, more and more of the population growth in the Netherlands has been happening in and around the large cities of the Randstad. But cities like Groningen, Zwolle, Arnhem, Nijmegen, Amersfoort, Haarlem and Eindhoven are also growing fast. A shortage of space is compelling densification but also making these cities lively and attractive places, each with a highly accessible centre. Main railway stations offer a wide range of mobility options, from international trains to public bicycles. The Station area in Leiden is an example of such a development. At the same time, vitality at the cities' edges, in the suburbs, is decreasing. Residents of these areas are more inclined to rely on their cars for daily transportation; after all, they're parked just outside. In addition, the motorway is often closer than the station. However, continuing growth on the city fringes is reaching a tipping point, creating new opportunities. Peripheral neighbourhoods have become so fully fledged in terms of services and population that they can function as city centres in their own right.



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Solution

Hubs as nodes in a polycentric city

If we take a fresh look at the urban structure, the advantages of having multiple centres become apparent. Together, these mini-downtowns can form a well-connected network that guarantees easy access to recreational opportunities, educational institutions, medical services and other functions necessary for a healthy sustainable life. No longer do we all need to focus on a single city centre: the way is clear for the polycentric 15-minute city. Paris is a leading ville du quart d'heure. And here in the Netherlands, Utrecht is actually aiming to become a 10-minute city. This hyperlocal approach creates cities that are not only livable but also sustainable. After all, a polycentric system prioritises slow and therefore clean traffic.

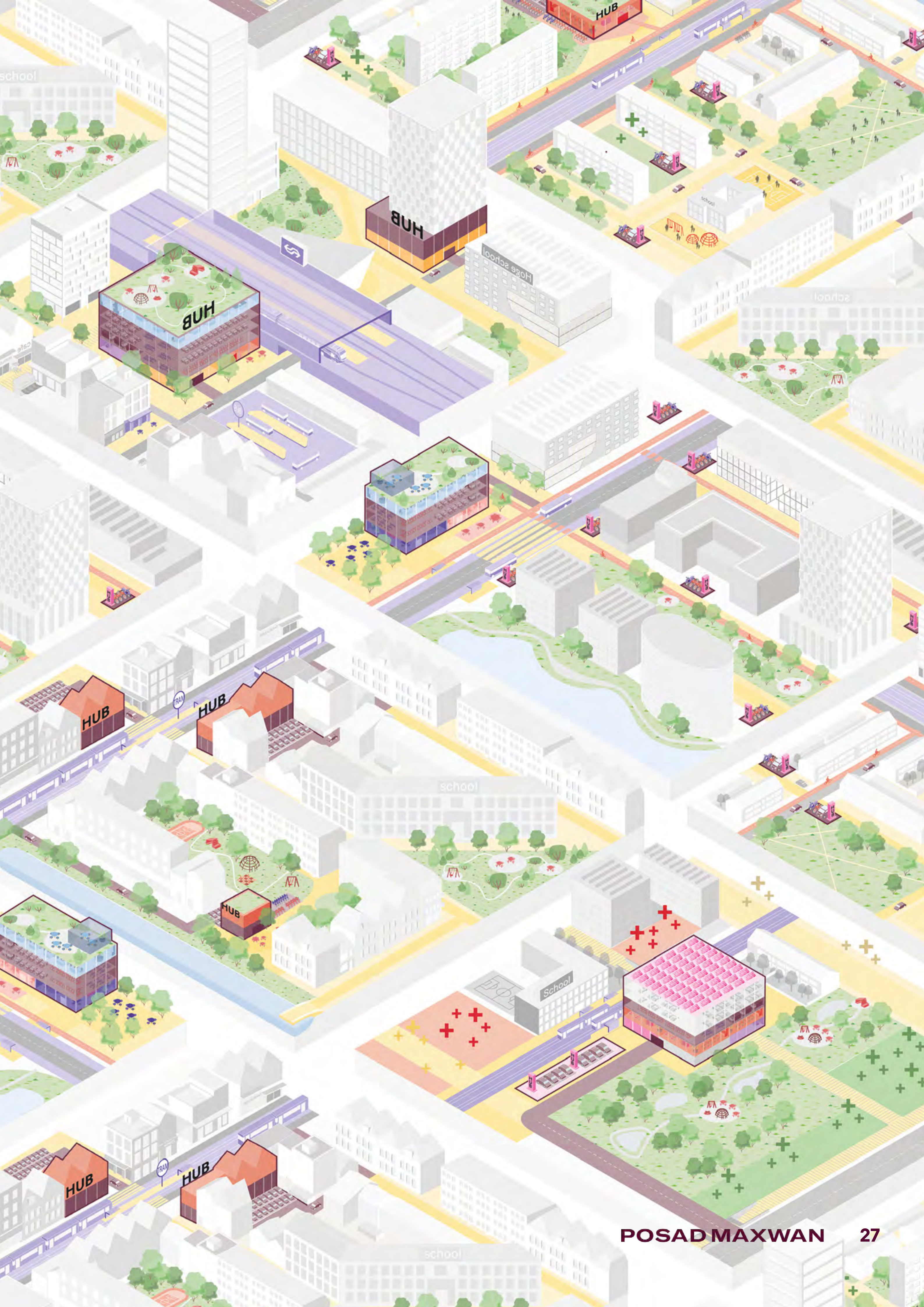
New mobility hub typologies will play a key role in this shift. These go beyond well-known types like park-and-ride locations and railway stations, which serve mainly as places to transfer from one means of transport to another. The new types of hub offer a wide range of shared mobility modes as well as services like shops and social functions, making them ideal nodes within "peripheral centres". Logistics hubs currently used only for transshipment can take on a more important role in a neighbourhood by expanding their focus in this way. By housing multiple functions under one roof, they can bring new appeal to currently dormant areas. This can be especially valuable in areas suffering from socio-economic deprivation and/or transport poverty. The latter is present where residents have few means of mobility to choose from, for instance because transport services are limited or non-existent, or because connections are inadequate, making travel inevitably time-consuming. Transport poverty makes it difficult for people to participate in social activities.

"This hyperlocal approach creates cities that are not only livable but also sustainable."

When "new style" mobility hubs are incorporated into a city in this way, they are not a goal in themselves but a means, as part of a broader transformation strategy. They will not only help to realise the city's mobility ambitions but also contribute to inclusivity, public space and the energy transition. Clustering parking and enabling people to switch to shared mobility will allow for the redesign of current parking areas, creating room for densification and greenery, for example. As such, hubs can drive improvement in an area. Moreover, differentiating mobility hubs into types – neighbourhood, district, public transport junction, private, and regional – allows the city to make appropriate choices in every location with regard to various aspects. Together these hubs make up a well-connected network of smaller city centres.

"Together these hubs make up a well-connected network of smaller city centres."

The advent of the new polycentric model raises the question of how these junctions will be distributed across a city. The fact that cities are largely already designed makes it extra-complex to incorporate hubs serving a mix of transport modes. Doing so will mean transforming the existing city. To get a clear picture of how it might be done, we researched the spatial integration and impact of hubs in suitable pre-war neighbourhoods on behalf of the five largest Dutch cities (Amsterdam, Rotterdam, The Hague, Utrecht and Eindhoven). One conclusion: a hub strategy needs to start with the entire network to be effective. A single hub in isolation adds little; what's important is the system as a whole. Accessibility is best served through a network of lots of small hubs rather than a few large ones. A network of mobility hubs can create "superblocks" in the urban structure, enabling the restriction of traffic on 70% of streets. Hubs will accommodate shared cars, bikes and scooters, which will facilitate travel between local centres along larger arterial roads.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Conclusion

The traditional monocentric city model – a single centre surrounded by suburbs – is ripe for an overhaul. Peripheral areas are full of opportunities for shifting to a polycentric network that will make the 15-minute city a reality. There are preconditions however: these hyperlocal neighbourhoods will have be able to serve residents' everyday needs, and accessibility to, from and within them should be well organised. Mobility hubs provide a solution in both cases. Offering a mix of transport modes, they will function as infrastructural nodes in a travel network enabling residents to get around quickly and efficiently. The new types of hubs will also serve as neighbourhood meeting places which will attract additional services and buzz. Hence mobility hubs are the centres where urban accessibility and livability come together.

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City logistics: towards a sustainable equilibrium

Couriers bring your groceries 10 minutes after you order them, delivery vans dash to and fro, lorries supply shops, while construction and waste removal vehicles make the roads even busier. It's impossible to picture a modern Dutch street without city logistics. It has an increasingly significant impact not only on overall traffic in the city but also on available space, which is already under strain because of densification and efforts toward sustainability. How can cities find room for logistics streams while at the same time making space for a quality living environment?

Challenge

Rapid rise, uncertain future

The number of logistics trips has grown sharply in the past eight years. More and more of these involve just-in-time deliveries to homes and shops, with products supplied as they're needed. Flash delivery is a conspicuous and much-talked-about example. Since they first appeared in the Netherlands in late 2020, their popularity has soared. Use of these services doubled in the second half of 2021. Superfast delivery is especially popular in the four biggest Dutch cities, particularly among residents in the 18-to-34 age category, with 6.9% getting their groceries this way. It's widely known among urbanites in general: 80% of city residents are familiar with the concept.

This may have to do with the fact that this form of logistics is literally claiming its place on the streets. Cyclists and scooter riders with striking uniforms and giant bags zigzag through traffic to deliver the goods on time. And so-called 'dark stores' are appearing in more and more areas. Flash delivery drivers can often be seen queueing up outside these mini-depots with their blacked-out windows, waiting for the next trip. On the streets, suppliers impede traffic flows.

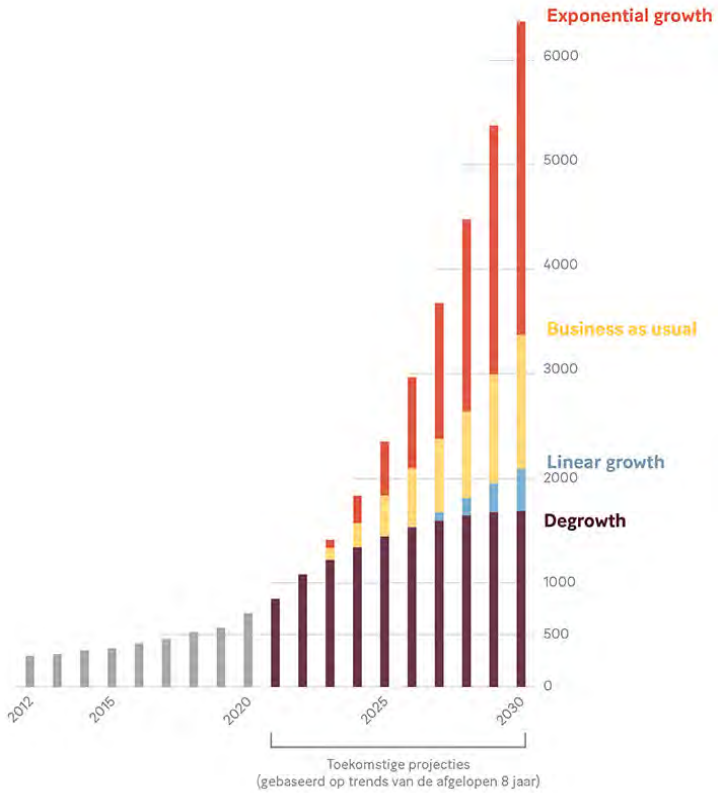
Traffic and noise problems are also worsening in tandem with the popularity of courier delivery. More and more cities are taking steps in response. The City of Amsterdam called an immediate halt to new flash delivery hubs in late January and Rotterdam followed suit a few weeks later. Other cities are doing the same, often following complaints.

"Traffic and noise problems are also worsening in tandem with the popularity of courier delivery. "

To combat the environmental effects of city logistics overall, more and more cities are creating emission-free zones to limit CO2 impact. Only electric vehicles are permitted in these zones. Goods are transferred from big fuel-burning lorries to larger numbers of smaller, clean vehicles on the fringes of the city. This system requires new peripheral transshipment points, creating a spatial planning task. Meanwhile, the growth of city logistics overall is taking up space needed by other traffic at street level, impeding livability and sustainability at city level.

"Spatial developments always run behind because the physical city changes at a much slower rate."

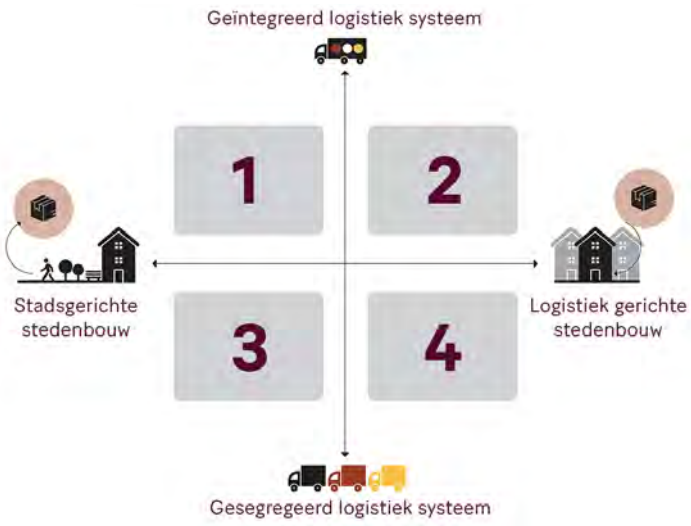
Developments in city logistics are taking place in rapid succession: new vehicles are coming on the scene, flash delivery companies are cropping up and being banished, and new legislation is forcing mobility to get cleaner. It's impossible to tell exactly which direction things are headed. But we do know that spatial developments always run behind because the physical city changes at a much slower rate. The conflict between these different paces of development is forcing us to think farther ahead and more broadly. What will city logistics look like in 20 years?



Solution

Four possible future directions

To find a well-grounded answer to that question, we conducted research to determine potential future city logistics scenarios. Extrapolating from trends, we outlined four such scenarios based on a matrix with two variables: how integrated or segregated the logistics system is and whether urban planning is more focused on quality of life or logistics. In each case, we looked at the implications for transport types, infrastructure and hubs (transshipment points between different logistics streams).

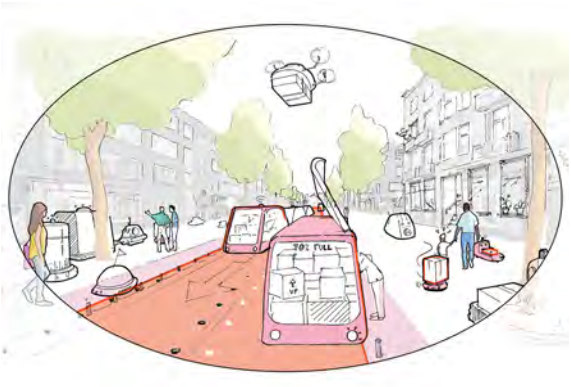


Scenario 1: Integrated logistics system within city-focused urban planning
IIn an integrated system, various logistics streams are combined to maximise efficiency. For example, couriers may also pick up customers' returns and deliver them elsewhere. The spatial impact on logistics traffic is minimised, and room is freed up for attractive, cyclist and pedestrian-friendly outdoor space.

Multiple services are combined in a small number of large hubs – clusters of shops, pick-up points, catering businesses and other facilities. Grouping services at hubs comes at a cost to small businesses.

Scenario 2: Integrated logistics system within logistics-focused urban planning
Neighbourhoods are designed as integrated logistics machines. Home deliveries are made from clustered hubs using small autonomous forms of transport. Logistics streams can be optimised with new technologies such as drones and underground transport.

Clustered logistics facilities eliminate a significant number of shops and services from the streets. A more efficient use of space makes it possible to develop housing at street level, for example.

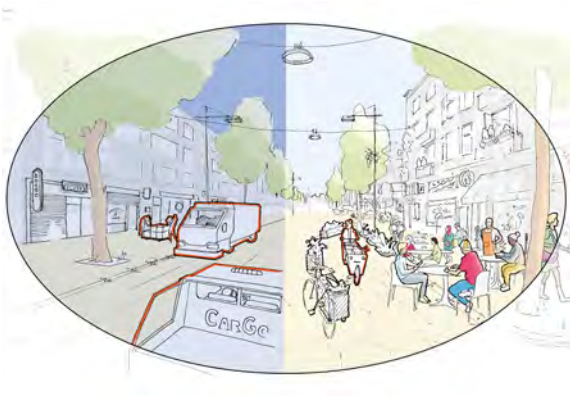


"Neighbourhoods are designed as integrated logistics machines."

Scenario 3: Segregated logistics system within city-focused urban planning
In this system, different services handle their own logistics; this is mainly more efficient for their own operations. This system results in a larger number of smaller vehicles on the roads and hubs that handle smaller volumes. Restocking and deliveries take place at night, minimising nuisance.

"Different services handle their own logistics; this is mainly more efficient for their own operations."

The city's streets contain a wide variety of shops and services. The relative calm in daytime means public space can be designed around slow traffic, greenery, and pleasant places to linger.



Scenario 4: Segregated logistics system within logistics-focused urban planning
Separate logistics streams are given as much room as possible in this scenario. Thus, logistics dominates outdoor space. Features such as priority lanes for re-stocking and home delivery ensure maximum availability and speedy service.

An extensive system of dark stores in the neighbourhood makes this system possible, at the expense of local services. These stores differ in volume and function but exist for the same purpose: facilitating instant deliveries.

"Separate logistics streams are given as much room as possible."

This article draws on our report "Stadslogistiek: verkenning van toekomstscenario's" ("City Logistics: exploration of future scenarios"). We conducted research in spring 2022 with the assistance of TNO (the Netherlands Organisation for Applied Scientific Research) and the City of Rotterdam and financial support from the Creative Industries Fund NL.

Conclusion

The more cities densify, and the greater the need for changes around sustainability and livability becomes, the more of a problem the availability of services and products will be. The four future scenarios point the way towards possible solutions by showing how logistics systems relate to spatial design in the city. It is clear that integrating different logistics services can reduce the number of transport movements. And the accessibility of logistics hubs affects the liveliness of city streets. But most of all, what's becoming clear is this: we can't do everything everywhere at the same time. Which streets do we want to be lively and pleasant, and where would we rather sacrifice spatial quality for logistics efficiency? When it comes to logistics and quality of life in the city, first and foremost, citymakers have choices to make.

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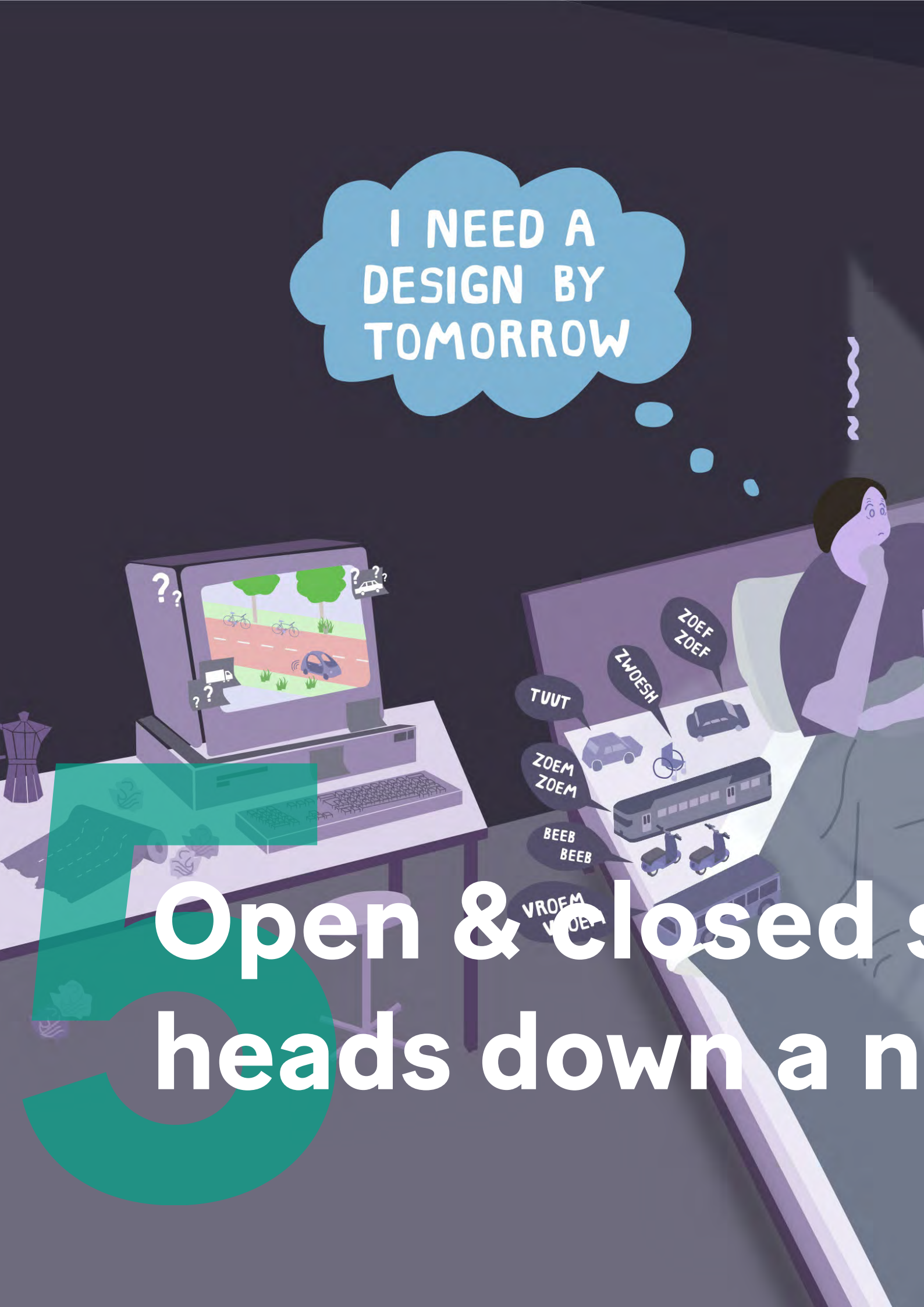
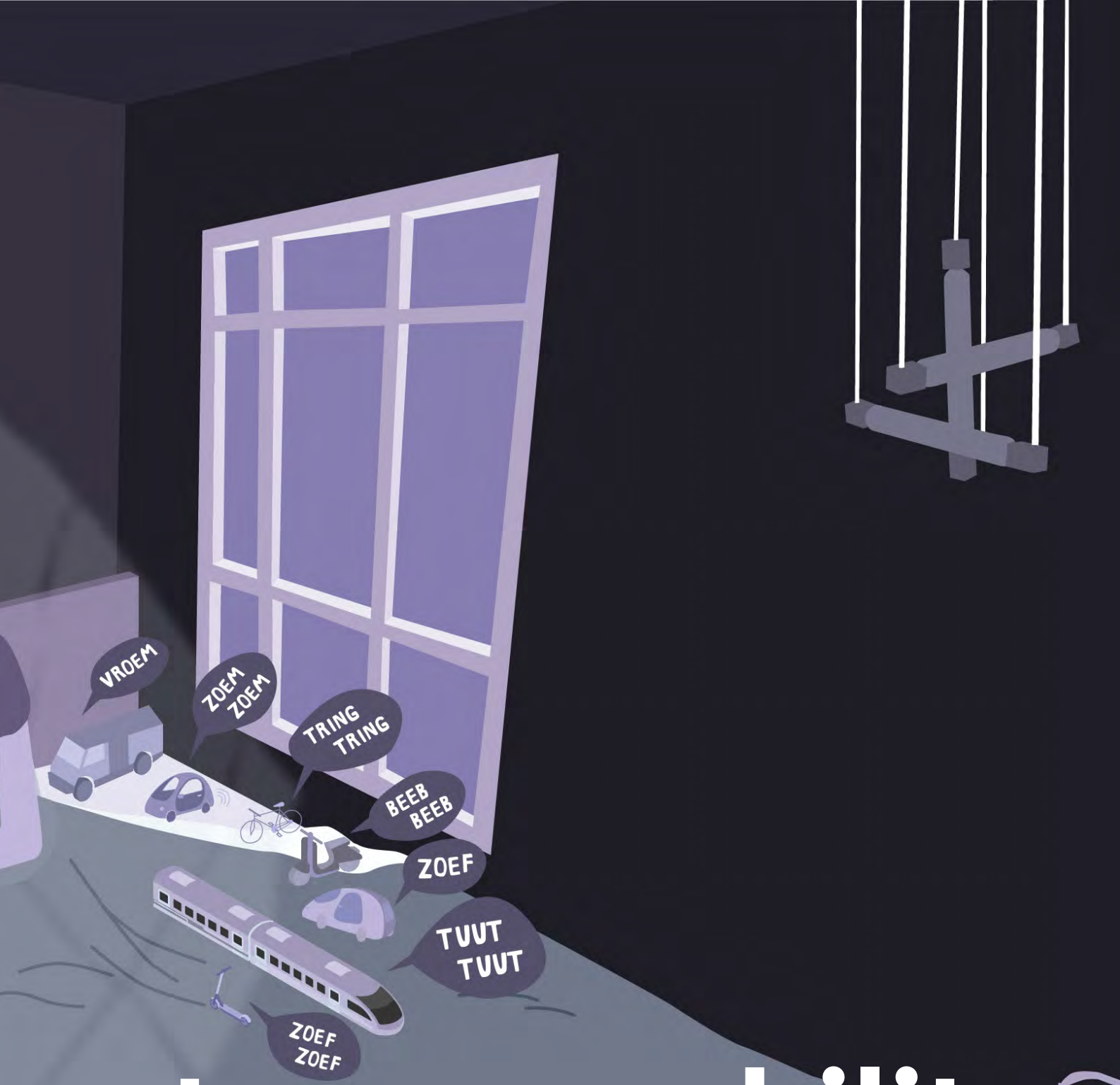


3 Open & closed s heads down a n



systems: mobility
ew track

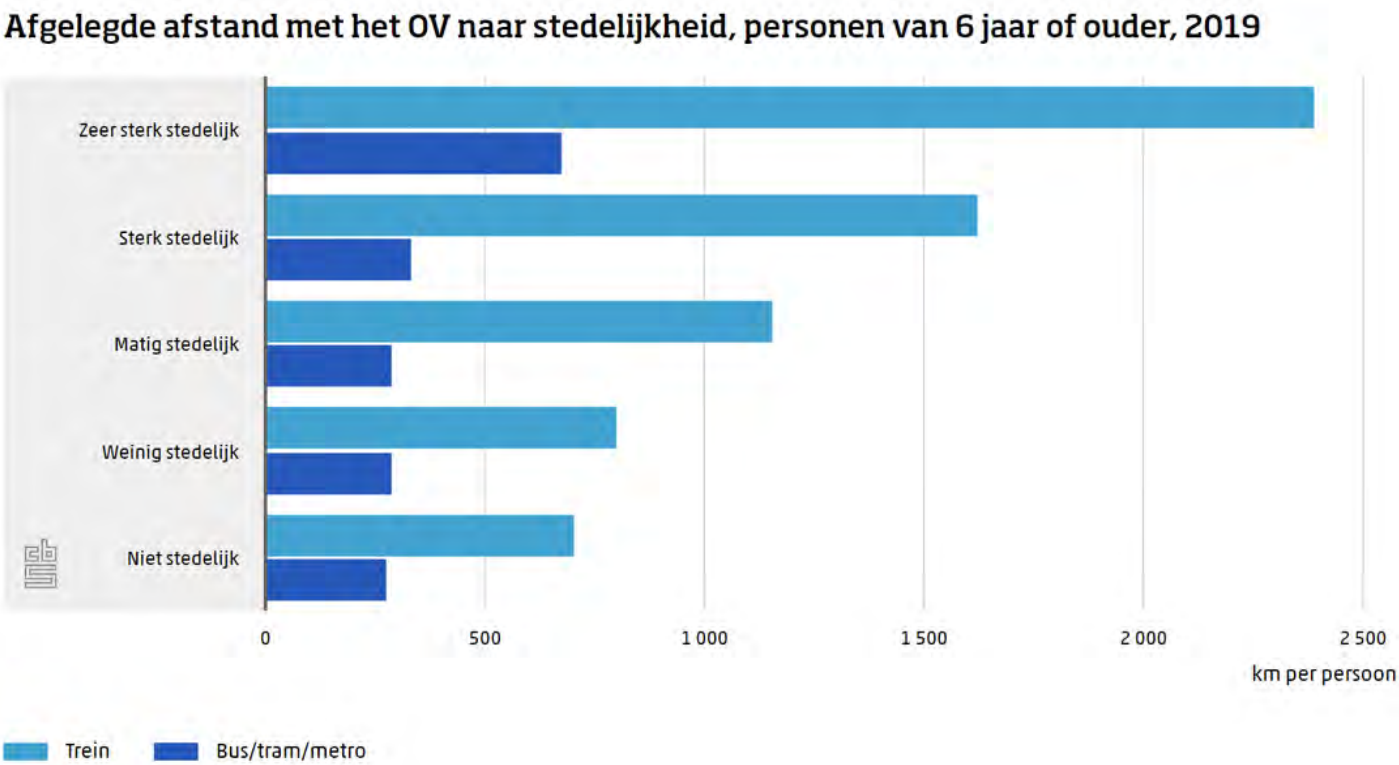
Where would we be without the train? That old Dutch railway slogan is still as true as ever, at least in densely populated areas. The same goes for the metro, light rail, and trams. The downside of these transport systems is that their success depends on large numbers of people travelling. And if the spatial circumstances change, railway lines can't easily be re-routed. So how can we design flexible systems that make less of a spatial impact?

Efficiency vs flexibility

Challenge

Rail transport is highly efficient. Trains, metros and trams run on frequent schedules and accommodate a large number of passengers at once, as buses do. Moreover, these modes of public transport use separate tracks and lanes that are closed to other traffic, so they're quicker and safer. Figures from Statistics Netherlands show that the benefits of these so-called closed mobility systems are greatest in and around big cities. In 2019, on average, residents of highly urbanised areas travelled by public transport much more often and over longer distances than residents of non-urban areas.

These closed systems do have significant drawbacks. They are expensive to build, operate and maintain. Hence profitability is greatest in urban areas where there are more travellers. In addition, the infrastructure can begin to cause problems if it is poorly spatially integrated or becomes outdated over time. Subsequent adaptation is complicated and expensive. Trains, metros and trams, in particular then, are extremely inflexible despite being highly efficient. Yet our surroundings need to be adaptable if we are to move with a changing world that requires space for increased densification, the energy transition, and climate adaptation.



Distance traveled by public transportation by urbanity, persons 6 years of age or older; from highly urban (top) to non-urban, © CBS, 2019

Solution

Combinations and innovations

If closed systems aren't the holy grail of mobility, then what might the opposite – open mobility systems – have to offer? Private cars are the most obvious example of an open system. Outside big cities, people are increasingly dependent on cars as workplaces, social opportunities and services get further away and public transport often fails to provide a good alternative. For travellers, the advantages of the car as an open system are clear. It takes you from door to door, any time you like. For society, the benefits are added flexibility in terms of spatial impact, in addition to lower construction and maintenance costs. There are also disadvantages, of course. Open systems have significantly less capacity than closed ones and therefore take up a relatively large amount of space. In previous blogs we discuss the space needed for cars and parking in particular, in detail.

Open and closed, rural and urban, private and public. While these pairs appear to be opposites, in reality, the best opportunities for future-proof mobility and spatial planning lie somewhere in between. Three recent developments are exceptionally promising in this regard:

1) Expanding closed systems into the wider region

Extending an urban closed system such as a metro or light rail line to smaller surrounding communities improves accessibility for the city and region. This type of new metropolitan system is already being explored and applied in various urban areas in the Netherlands. The benefits of a larger-scale closed system can be seen in our study on extending the Noord/Zuidlijn in the Metropolitan Region Amsterdam. If this metro line ran out to the town of Hoofddorp, drivers from outside the city would be able to transfer to public transport more easily and earlier in their journeys. It would help to relieve the growing mobility pressure around Amsterdam and provide an alternative to the busy train service to and from Schiphol Airport.

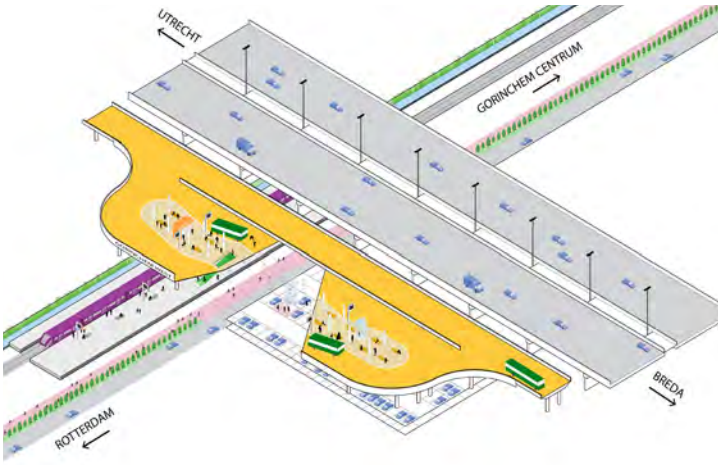
Another example is the upgrading of the Oude Lijn in the Metropolitan Region Rotterdam-The Hague. This rail link, the first in the Netherlands, originally runs from Rotterdam to Amsterdam and passes through stations including Schiedam, Rijswijk, and Den Haag Laan van NOI. In the coming years, it will be made a quadruple-track line to enable Sprinter trains to run independently of Intercity trains. This will enable more frequent services and the addition of new stations, creating opportunities for new housing near public transport (transit-oriented development). We conducted research with APPM to determine what will need to be done around the stations to create attractive station and residential environments.

"Open and closed, rural and urban, private and public: the best opportunities for future-proof mobility and spatial planning lie somewhere in between."

Hybrid solutions can involve old as well as new types of closed systems, as we found in a study conducted with Goudappel on accessibility between the Breda, Gorinchem and Utrecht regions. There is no high-quality public transport link between these towns to provide a supplement and alternative to the busy A27 motorway. The proposed solution is to build a smart bus link, with a high-quality zero-emissions vehicle running in an obstacle-free lane between Breda and Utrecht at 120 km/h. As a dedicated lane would currently require excessive adaptation and investment, we analysed an alternative model involving an easier-to-implement 80 km/h version.

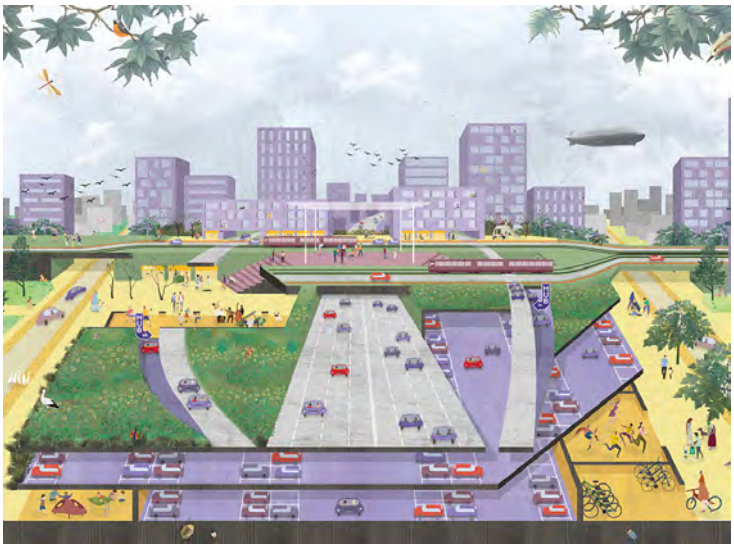
2) Hybrid systems: open/closed and old/new

An example of a system that combines open and closed features is ART: Autonomous Rail Rapid Transit. This system is already in use in cities in China and elsewhere. ART's self-driving electric vehicles are a blend of train, tram and bus. Rather than running on rails, they travel on rubber wheels along a dotted line on the road with the aid of sensors and a multiaxle steering system. So repositioning a route is no problem.



"Hybrid solutions can involve old as well as new types of closed systems."

Open systems can be used in different ways outside and inside cities. For example, multiple vehicles from outside an urban area could be brought together at the edge of town and then be routed along bus lanes to function as a closed system. In this model, smaller vehicles form a whole in densely populated areas. This idea was explored in the Toekomstperspectief Hoofdnetwerken (Future Prospects for Primary Networks) project. The advantage is that less busy routes can be served by smaller vehicles that come together to form a larger "vehicle" as needed. Such a system would also require little infrastructural intervention, meaning routes could easily be altered.

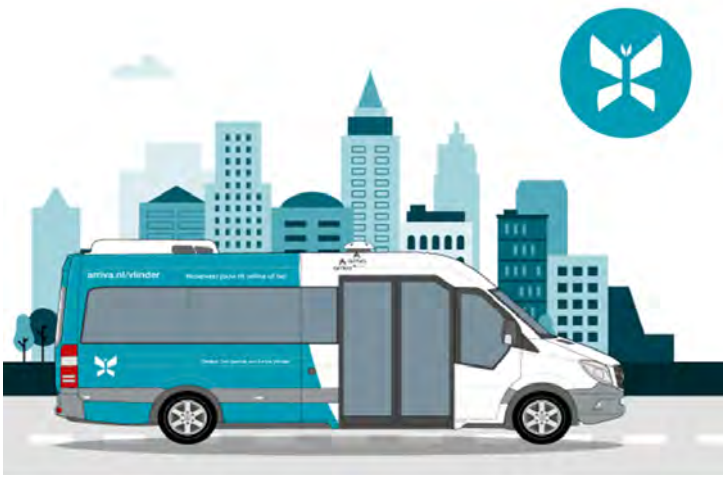


3) Innovations in the mobility field

Autonomous public transport options that combine the benefits of open and closed systems present abundant opportunities. For example, in The Hague, a driverless shuttle bus runs between a city bus stop and the entrance to the HagaZiekenhuis hospital, making the premises more accessible. Private autonomous transport also affords plenty of possibilities. Self-driving cars give users the benefits of private transport but take up less space when coordinated to travel in a train, increasing capacity on a particular route. Drivers become passengers and can use the journey time to do something else.

"Open systems can be used in different ways outside and inside cities. "

For added gains, technology can be deployed along with smart modes of transport to enable new ways of using them. The Arriva Vlinder is a good example. This on-demand service is available in a number of areas in eastern Gelderland province. The Vlinder minibus supplements the regular timetable, for example in the evenings. Passengers use an app to reserve a seat and choose the stops where they want to begin and end their journey. This solution, too, combines the benefits of an open system (because of its flexibility) with those of a closed system (because of its greater capacity). As the technology develops, it could lead to the elimination of regular stops and routes, with the service customised to the riders who are on the bus at any given time.



Conclusion

The need to make room for transitions is putting extra pressure on the Netherlands' already limited space. Investment in fast, high-quality public transport solutions will do a great deal to make travel more efficient and less space-consuming. As an added benefit, it will open up opportunities for new housing and densification, specifically around stations. Meanwhile, creative combinations of different modes and manners of travel are arising out of open and closed systems. These combine the best of both worlds while lessening the pressure on available space. This development, along with recent technological advances, raises the question of how long, and where, investment in railway lines will be warranted. After all, it is clear that plenty of flexible solutions can be found that will suit the future spatial context.

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Reflection

It's time to act boldly – together

Author: Hendrik Jan Bergveld, Arcadis Nederland B.V.

PosadMaxwan and Arcadis have been working together for some time, on specific projects (including an infrastructural study for CID-Binckhorst in The Hague, the Strandeiland mobility hub, Airport in the Sea, and area studies for U Ned) as well as in the context of framework agreements (e.g., for providing policy and advisory services to the Dutch Ministry of Infrastructure and Water Management). Arcadis's design, engineering and consultancy services combine beautifully with PosadMaxwan's urban development vision, because both organisations believe in healthy, sustainable, smart cities.

"The time has come to act on that vision together, link it to practical experience - realise it in the form of projects. "

I recognise the trend of ever-greater numbers of people moving to urban regions, where the challenges in the areas of climate, mobility, health and inclusion are great and only growing more complex. PosadMaxwan's mobility blog posts show that the agency has a strategic vision on these issues. The time has come to act on that vision together – to link it to practical experience, and especially to realise it in the form of projects. I will reflect on several aspects of how we can do so here.

The STOMP design method, mentioned in the chapter *"Reclaiming public space"*, enables us to identify opportunities for spatial design. Its starting principle is that area development should centre on human beings, with liveability and accessibility defined on that basis. At the request of technology platform CROW, to gain more experience with STOMP and share lessons learned, Arcadis, Over Morgen and PosadMaxwan analysed Zwolle city centre and the area around Amersfoort Schothorst station, which is being redeveloped into a mixed residential district . The lessons learned are set out in our booklet "Toepassen STOMP voor duurzame gebiedsontwikkeling" ("Using STOMP for sustainable area development").

The two cases show how STOMP provides a useful step-by-step plan for looking at area design from the perspectives of pedestrians, cyclists, public transport users, shared mobility users, and drivers. Designing an area according to the STOMP method might make it possible to create more space for lingering, for example, while access for people with disabilities might pose a challenge. But the conversation around public space should not become a battleground. STOMP helps to start the conversation about what kind of living environment people want, and to justify the investments required, paving the way for the optimum design of a pleasant, safe, sustainable environment.

In my view, the chapter *"Area development or parking development?"* presents an overly black-and-white picture in its portrayal of parking standards as an outdated planning concept given the Netherlands' increasingly limited space. More nuance is called for. Cars still play a big role in how people get around. So the more relevant question is whether they always need to be parked right outside our homes.

More and more, ideas are emerging for bundling dwellings' or areas' required numbers of individual parking spaces through the development of an area-oriented hub that enables healthy, sustainable urbanisation, often while making the region more accessible in a broader sense (specifically by car and public transport). An example is the XL mobility hub in Papendorp, Utrecht, currently in development. It is being built to meet the parking needs of future Beurskwartier and Merwedekanaal zone residents via a concentrated remote facility (thus combining a low on-site parking standard with a remote hub). But exactly how will this be accomplished in practice? Arcadis and Over Morgen are advising the city of Utrecht and the project developers on setting up the mobility company for the Merwedekanaal zone. More concretely, we are helping the owners to formulate a definitive business plan and business case. In forming a company, sound governance must be kept in mind, by the market players as well as the city.

It is true that allotting more space for walking, cycling and public transport leaves less space for cars. The upcoming necessary construction of one million new homes could thus be reconceived without an expansion of the automobile infrastructure. In this scenario, investment in local and regional mobility would take priority over investment in major new national road infrastructure. Specific mobility requirements could be determined with the help of various characteristics of the future residents' so-called user personas (data-driven where possible), such as household composition and income. We have previously applied the user persona method in concrete projects including a mobility program of requirements for Legmeer (in the municipality of Amstelveen) and a hub study for Strandeiland (in the municipality of Amsterdam).

Remote hubs also fit perfectly within the vision set out in the chapter *"More is better: the accessible, polycentric city"*. The idea of the polycentric city is not new but dates back to the 19th century. To keep society and the economy moving, reduce pressure on cities and districts, and improve accessibility and liveability, we envision a hub as facilitating not only multimodality but also a mix of activities, as in the 5-/10-/15-minute-city concept, and user convenience (see figure 1). A hub is a significant link in a transport system, contributing to social functions (such as sport and child care) and/or providing access to shared mobility in combination with zero-emissions logistics.

"A hub is a prime example of a concept that calls for an integrated approach."

As such, a hub is a prime example of a concept that calls for an integrated approach. Its generality, however, brings with it the issue that a mobility solution extending beyond a city must sometimes be sited on land belonging to another municipality. Most organisations are not yet equipped to deal with this. Therefore, an approach transcending the level of the individual municipality is urgently needed, in part to avert NIMBY syndrome ("What's in it for us?").

Further, to achieve healthy, sustainable, and most of all accessible urbanisation, it seems to me a good idea to resolve to use the Omgevingswijzer (Environmental Compass) and Ambitieweb (Goals Web) more often. These tools, familiar from Dutch government's MIRT infrastructural projects, help us to view aspects like climate change and the energy transition as integral parts of the job rather than add-on opportunities.

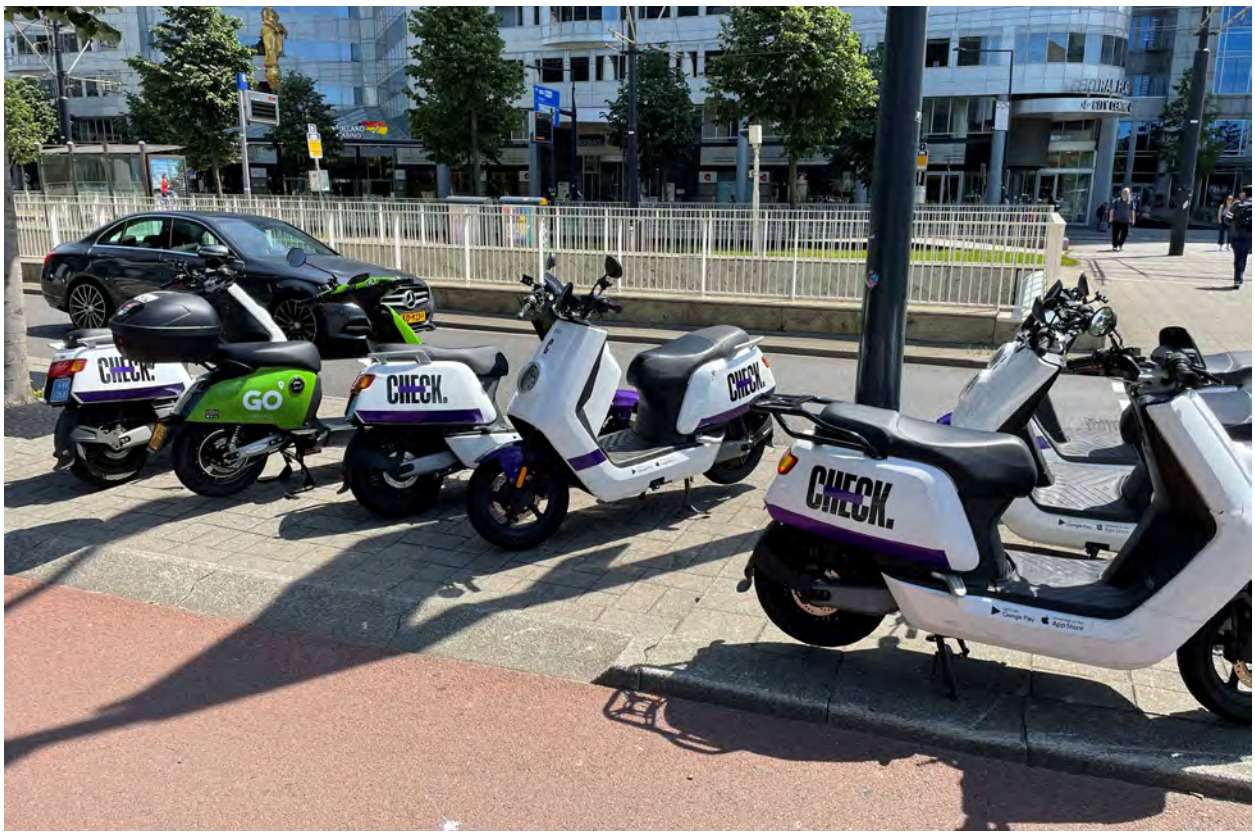
The chapter *"City logistics: towards a sus-*

tainable equilibrium" describes a specific problem that we have brought down upon ourselves thanks to our unbridled craving for speed and convenience. All of us have experience with parcel and grocery deliveries. The number of vans and trucks bearing familiar logos driving up and down the streets at random times every day makes one wonder whether there aren't clever ways of combining these services.

Superfast delivery is only available in certain parts of the Netherlands, primarily in the larger cities, and often not all over town. Most frequent users are young adults aged 18 to 34. Meanwhile, research shows that more than half of instant delivery service distribution points are located outside residential districts. Those that do have locations in such areas would do well to move them to industrial estates or shopping streets, where they would cause less of a nuisance. The scenarios developed by PosadMaxwan could definitely help. Perhaps an explicit distinction should be made between so-called free-floating areas (where everything is permitted) and more regulated zones. But even then, residents' and/or users' needs will always lead to concepts that, like instant delivery, we cannot foresee.

"Closed, rail-bound public investment in public transport can only work or be profitable to operate when there is a minimum number of travellers. Although, I'm not saying we don't need this form of collective transportation."

The chapter *"Open and closed systems: mobility heads down a new track"* raises a number of pertinent questions. Rail transport can certainly be called rigid. Rail-bound traffic is efficient for moving large numbers of passengers, but it is also highly inflexible. Track modifications are expensive, and integration is often complex. Thus, against the quoted slogan "Where would we be without the train?" it can often be said that "The train leaves from somewhere you're not and takes you somewhere you don't want to go." Closed, rail-bound public investment in public transport can only work or be profitable to operate when there is a minimum number of travellers. Although I'm not saying we we don't need this form of collective transport. In fact, projects like the Oude Lijn infrastructure and junctions treat the existing rail infrastructure as a backbone and develop an urbanisation programme around it. Thus, investment strengthens the business climate, leading in turn to greater transport demand, in a mutually beneficial dynamic.



Shared scooters outside the Arcadis offices in Rotterdam

As is often the case, the key lies in applying custom solutions. Many people still prefer cars over public transport. Systems like bus rapid transit don't require a rigid rail infrastructure and therefore have the flexibility to reach further into the remotest parts of the network. Thus, they provide an attractive alternative or supplement to cars. Pairing them with shared systems, such as for bicycles and scooters, creates a favourable combination of transport modes. Combining systems allows for the increasingly effective coordination of supply and demand and the ability for providers to offer travellers an optimum product. All that's left for us to do is to solve the problem of the many abandoned bikes and scooters that take up public space in the most inconvenient spots.

"Combining systems allows for the increasingly effective coordination of supply and demand."

I began this reflection with a heartfelt call for us to act boldly together. We agree that there are a number of tasks for which there is a widely felt sense of urgency. Our job now is to take all our ambitions and grand visions to the next level. We look forward to embarking on this challenge with you and all the parties involved, and acting boldly together to move from an integrated vision to an integrated, coherent set of measures.

Conclusion

Conclusion

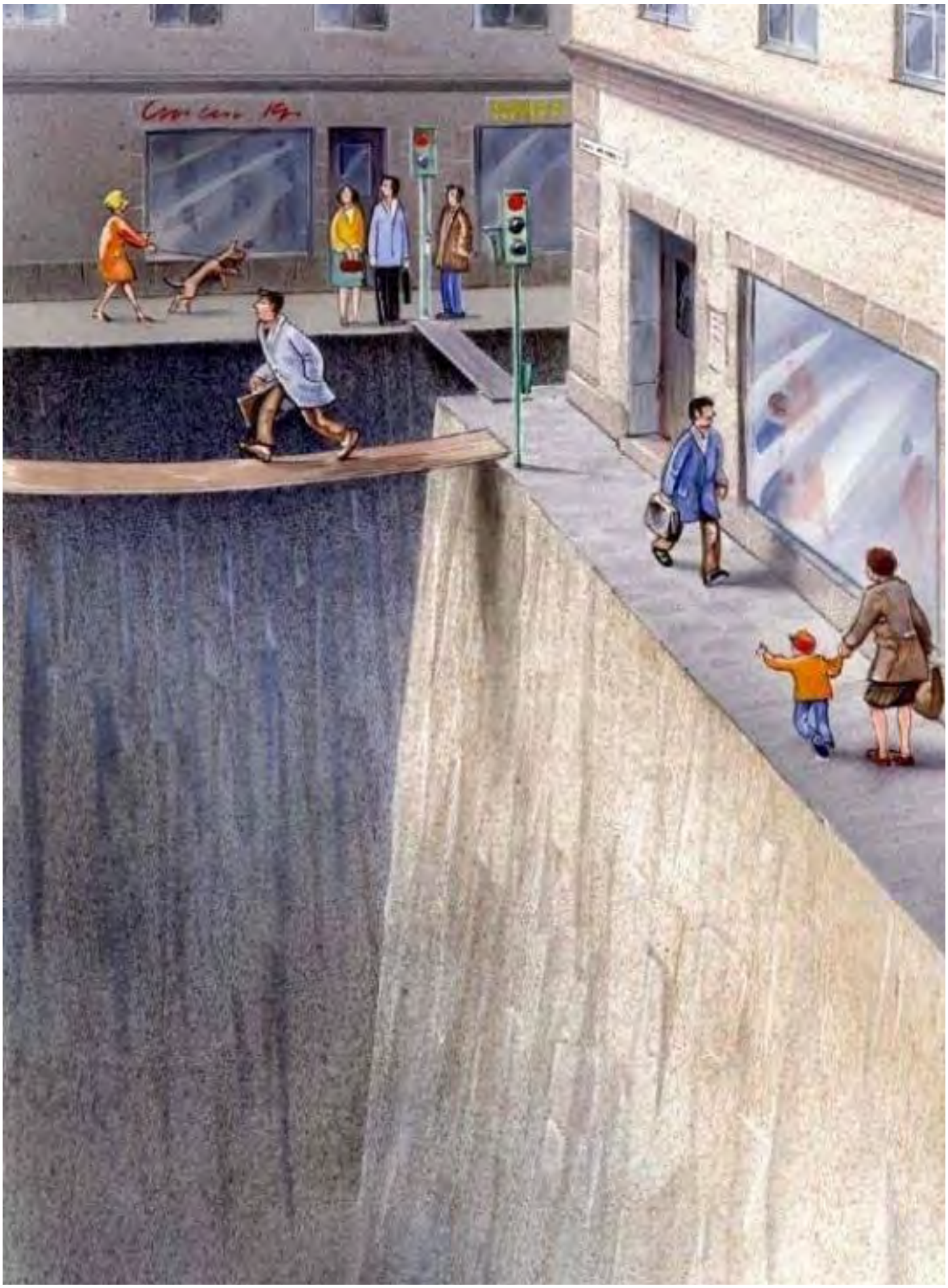
Thinking about new forms of mobility, the accompanying transitions, the emphasis on developments around public transport stops – these can often seem like matters for the big cities. After all, they have more public transport systems, and they're the places commercial providers concentrate on. But we have found that thinking about the moving city is also highly pertinent for the rest of the Netherlands, the 80% of our country that is mostly reliant on cars. If this series of articles shows anything, it's the spatial opportunities that will arise if we deal with our mobility system differently. Ultimately, the mobility transition will mainly mean dealing with cars in another way or assigning them a new role.

"Wouldn't we rather be able to proudly tell people how our children and older neighbours are able to walk safely down the street, or how clean and quiet our neighbourhood is?"

People outside the big cities often praise the places where they live. Being able to park right outside one's house is mentioned as a positive point. Of course it's nice having your car nearby. But if we're being honest, is this truly an achievement for public space? Wouldn't we rather be able to proudly tell people how our children and older neighbours are able to walk safely down the street, or how clean and quiet our neighbourhood is? Is that car outside really the definition of luxury?

The Netherlands has been investing in and building a fantastic automobile infrastructure for years. The mobility transition won't mean we'll stop using it but that we'll do so to make trips for which driving makes sense. The 80% of the Netherlands that is reliant on cars is largely made up of 15-minute cities – residential centres whose small scale means all local amenities can be reached within 15 minutes on foot or by bicycle. And yet in precisely these places, car use is heavy, even for these short local distances.

In the cities, the discussion around mobility is taking care of itself, driven by the pressure on space. In the rest of the Netherlands, no one seems to see a problem. But other places will also have to make room for climate adaptation, for mobility solutions that are futureproof and keep services reachable, for the creation of healthy, safe places to live. In these places, the mobility transition is the key to building the residential environment of the future.



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At PosadMaxwan we work to create healthy, sustainable and smart cities We show what a clean, healthy city looks like and what we can do today to move toward that goal.

We do this through a combination of research, strategy, desgin and implementation. e identify important, urgent tasks and ask relevant questions and deploy ata to find human solutions. This way, we render challenges comprehensible and we can come up with new, spatial solutions.

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