MASTERCLASS

Eindhoven 2050

Masterclass

Eindhoven 2050

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Foreword

Mary Ann Schreurs,
Elderman of the city of Eindhoven

The smart city is very much in fashion. But the policy tends to focus just on technology and its applications. But not in Eindhoven. Enabling as technology is to help solve societal challenges, it will not be enough to create a liveable city; let alone a city we actually want to live in.

And the last is exactly what this day and age is offerening us. We are able to, no, obliged to rethink what we see as quality of life, to reinvent what kind of society we want to be, redicide what we want our city to be. Essentially these are cultural questions with a big ethical component. The technology of today makes new answers possible. But it also has literally to take form in actual lives, in our actual city. That was why we embraced the workshops. To explore physical scenarios of life in the city and the transformation of our city in different domains. Scenarios worth striving for. Of course it is only a first attempt. And of course the decision what city to go for will have to be decided or rather co-created by all of us. Democracy will also take a new form. But it is wonderful to have images of what life could be. Life not as we know it and we probably won't ever know, but enabling us to make a next step. And another one. And then another one.

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Introduction

Marc Glaudemans
Director Stadslab European Urban Design Laboratory,
Professor Urban Strategies, Fontys School of Fine and
Performing Arts, Tilburg

"The past is always tense, the future perfect."

Zadie Smith

A Master Class program called 'Eindhoven 2050' suggest a very ambitious project. It almost naively presupposes a belief that the future is inherently knowable. Did anyone predict the financial crisis in, say, 2006? Had anyone, even in early 2014, expected the oil price to drop so dramatically over the following months? These examples refer to events with a timespan of mere months to just a couple of years and they seem to illustrate how unpredictable the future in fact is. At the same time however, it would also be naïve not to speculate about the future and just submissively wait for events to happen. An orientation towards the future is essential in the domain of urban planning and in contrast to the economic domain understanding and predict-ing the development of a city over a period of several decades is not beyond imagination. The physical reality of cities is literally heavy and rather slow to transform. Significant developments in urban infrastructure are usually only measurable in years or even decades. The same goes for urban demography, which cause is related to the development of the urban economy, which might be the most capricious category of urban transformation. Unpre-dictable economic development, such as the examples referred to above, can have a substantial impact on cities, both in terms of their physical appearance (think about vacancy of shops and offices due to economic decline) and the urban demog-raphy (for instance the appearance or disappearance of large numbers of international knowledge workers).

The most important reason to initiate this speculative forecast-ing study for the city of Eindhoven has been our interest in the spatial impact of emerging innovations. We expect a disruptive impact on city's by the cumulative effect of these innovations. The immense progress and intrusion of ICT in virtually all societal domains results in vastly more knowledge and understanding

(Big Data) of our behaviour, which can be translated into practi-cal and useful applications. An example is (urban) mobility, in which domain we see the potential impact of the applications of numerous sensors and ICT in cars and road infrastructure. Vehicles become increasingly 'smart' and connected and the first driverless cars have been spotted on the roads already. It is interesting to note that many of such innovations are driven by new actors in the field. Not long ago, few people would have predicted the rise of companies such as Google or Tesla in the automobile industry. ICT also contributed heavily to the rise of the 'sharing economy', in which new digital platforms enable a fast, seamless and virtually free connection between supply and demand. In the domain of mobility this has given rise to an already controversial but nevertheless very successful new player such as Uber, which challenges the monopoly of taxi's. The com-bination of smart, connected, driverless vehicles and the sharing economy may well develop into innovations with a phenomenal impact on our cities. After all, if we start to imagine the maximum potential of such innovations, a fraction of the current number of (unconnected, 'dumb') vehicles will be able to offer the same level of mobility services. Those new vehicles would also not demand the excessive amount of parking spaces of the current cars, since they would be continuously on the road to bring cus-tomers from A to B and park themselves on peripheral parking lots when there is no demand.

Reflecting on the spatial impact of such possible future devel-opments has been the main objective of this Master Class and Studio program. Even though our cities may be slow in their spatial and physical development, these kind of radical shifts in our economy or behaviour can have a significant spatial impact and planners and designers should be involved to help anticipate such transformations. An example of the fact that we are still sometimes overwhelmed and unprepared by the speed of development is the current vacancy level in offices. A com-

bination of – again - ICT-driven developments related to work and the economic decline as a results of the financial crisis, has completely disrupted the real estate market for commercial office space. Today, there is a vast excess of supply – often in unpopular, peripheral, mono-functional business areas, and a demand for more open, connected, flexible workspaces. A similar mismatch is happening in commercial retail. The rise of online shopping in combination with a decreased purchasing power of consumers due to the recession, is causing mayhem in many conventional shopping areas.

Mobility, workspace, retail; these are very substantial categories that define the appearance and the functioning of our cities. If we are truly witnessing such ground-breaking innovations and change in behaviour patterns of citizens and customers, then we as planners and urban designers should develop spatial concepts for the city of tomorrow. Admittedly, the year 2050 is way beyond 'tomorrow', but not far enough nót to influence our thinking and acting of today. We were very lucky to discover in Eindhoven an open-minded attitude and an openness and willingness to embrace such foresight and future-oriented think-ing and to apply the combined forces of technology, design and social innovation to enhance its liveability and economic appeal. Of all Dutch cities, Eindhoven may be best positioned to transform into an urban laboratory to explore the potential of design and innovation. Therefore, it has been a truly rewarding and exciting project to work in an environment of continuous debate between local actors and international designers and planners to envision the meaningful first steps towards a future that has already started.

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Master Class program

THU - 15 May

16h30	Opening Exhibition City council1
08h30	Welcome dinner in Eindhoven

FRI - 16 May

09h00	Opening Lecture by Marc Glaudemans
	Introduction by Caro van de Venne
	Introduction Eindhoven by Cees Donkers
	Presentation Studio work by Caro van de Venne
11h00	Formation of groups
11h30	Bike tour Eindhoven
15h00	Lecture 2 Eindhoven / Sidney van Well
16h00 - 18h00	Jason/ Caro work with the groups
18h00 - 19h30	Dinner
19h30 - 22h00	Lecture Carl Rhode / Jaap Modder

SAT - 17 May

09h00 - 13h00	Work in groups
13h00 - 14h00	Lunch Lecture Jason / Caro
14h00 - 16h00	Preparation of groups for presentation
16h00 - 18h00	Presentation of all groups
18h00 - 22h00	Discover Eindhoven by night

WED - 21 May

09h00 - 13h00	Work in groups with Jason
13h00 - 15h00	Presentation of all groups
14h30 - 22h00	Work in groups with Caro

THU - 22 May

09h00 - 13h00	Work in groups with Jason / Caro
13h00 - 15h00	Presentation of all groups
14h30 - 22h00	Work in groups with Jason / Caro

FRI - 23 May

09h00 - 13h00	Make exhibition / print/ plot / prepare
14h00 - 16h00	Presentation of all groups in City hall
16h00 - 18h00	Evaluation
18h00 - 22h00	Dinner

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Eindhoven 2050

Caro van de Venne, Tutor of the Masterclass
Principle of BARCODE Architects, Rotterdam
member of lectoraat 'Future Urban Regions

The Master Class: Eindhoven 2050

The objective of the Masterclass is to research the long-term development of the Eindhoven Metropolitan Area and to equip Architects and Urban Planners for knowledge development toward the future of 'healthy urbanization'. Healthy urbanization is the coherent development of socio - cultural, economic and environmental goals at the scale of the region, city, and street; in collaboration with citizens, businesses and governments. This involves optimizing the exchange of people, knowledge, and goods to improve the environmental performance and increasing the socio - cultural possibilities and opportunities for users of urban environments.

Strengthening Eindhoven

The future potentials of Eindhoven will be explored via 'Research by Design'. By understanding existing realities, then extrapolating them through the lens of future city trends we can begin to design for 2050 now.

The Masterclass cuts through all design scales ranging from the regional to the architectural, and introduces the parallel fields of expertise, which greatly influence the urban morphology of the given context. The participants will be confronted with trans-disciplinary input, do field trips, work on architectural and urban design. The studio requires to think in process rather than products. To feed this process driven thinking we work with the construction of urban scenario's.

These urban scenario's are neither blueprints nor will they define an ultimate answer. The scenarios will enable us to formulate more precise the future questions and future ambitions and explore the new possibilities and potentials of Eindhoven. The studies should support the urban transformation process and be adapted to the specific challenges, potentials and dynamics of a new urban society.

To be competitive in the future it is of vital importance for the Eindhoven region to be specific and have a further differentiation of its emerging qualities. It is our mission to contribute to the understanding and improving of these qualities. The tools that we have at hand are:
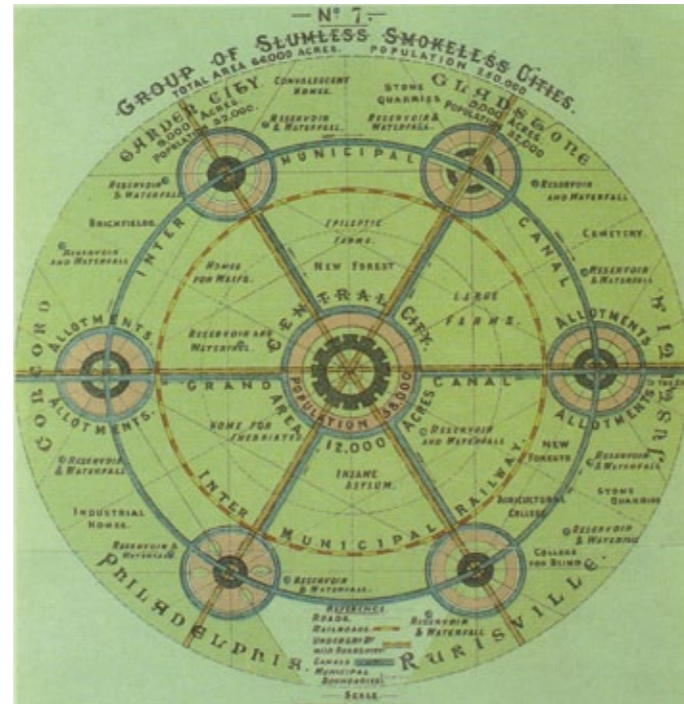Design Thinking (coming up with alternative directions and solutions) and Design (testing and visualizing the spatial impact of these solutions)

Campus Village
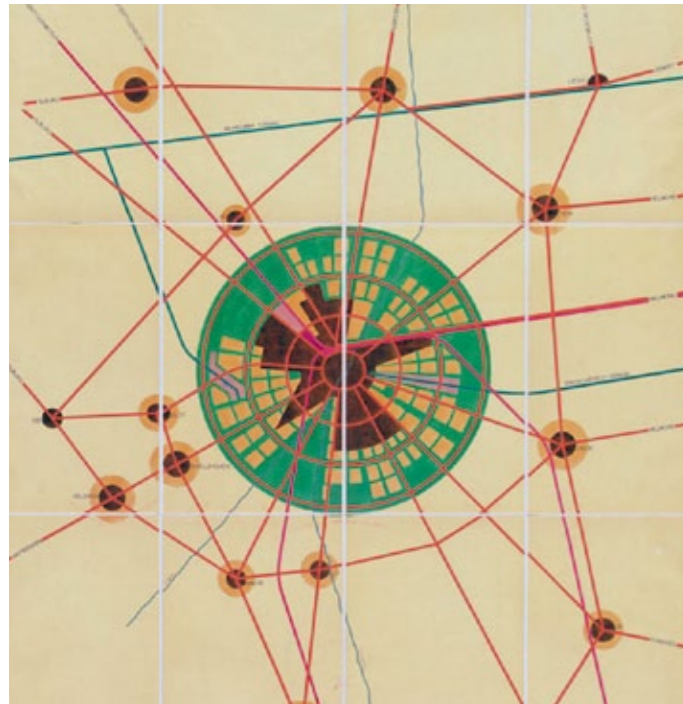
J.M. Casseres Eindhoven City expansion Map of 1930.

The original Garden City concept by Ebenezer Howard, 1902.

Having developed from central Eindhoven and the five villages of Gestel, Stratum, we can truly state that Eindhoven is a city of villages. The villages are characterized by their welcoming atmosphere and one can still recognize them through their fine street network, churches and squares. In these neighborhoods one can still walk the streets and look the other in the eye while expecting a friendly gesture. This atmosphere has been endangered by tendency of cities to transform into megacities. Despite this tendency the village identity is still tangible in the present city, a feeling which the citizens describe as ´Brabantse gemoedelijkheid´ (geniality).

Currently, Eindhoven is switching from these villages to a more campus orientated city. Clear examples of these campuses are the technical university and the high-tech campus. Other potential campuses can be recognized in places such as Strijp-S and Sectie C. In these areas experts within their own fields get together, creating a highly productive area with an astonishing efficiency. When you walk through Sectie C the crafts are clearly visible but you do not necessarily feel welcome in this gated community. These closed off spaces form a strong contrast with the original accessible villages. The challenge for Eindhoven is to make the most of both worlds. On the one hand, the city wants to be known for its design and innovation that originate from the campuses. On the other, the city does not want to lose the warm, small scale and friendly ambience. How can Eindhoven have the cake and eat it too?

The vision for 2050 is that Eindhoven will be the city of campus villages. The campus villages are compact, dense areas, each with their own culture and identity. An identity that not only encompasses the expert but also welcomes the average citizen. Just as the church was the place where people came together in the past, the campus will be the future public space where people get a feeling of togetherness and solidarity. Imagine walking through the ´crafts village´ where art is exposed in the streets. You greet the artist who is working in his workshop while you walk to the grocery store. On the map, the city will be a clear system of connected campuses. The high-tech village, the TU/e village, the design village, and the crafts village among many more (see map) will be connected by a highly efficient and well designed network of streets. Eindhoven in 2050 is known for its design, art, technology and it´s village ambience in a high-tech environment.
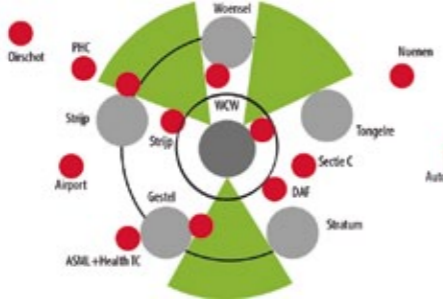
The current campuses in the Eindhoven region.

The potential existing villages/campus' in the Eindhoven Region
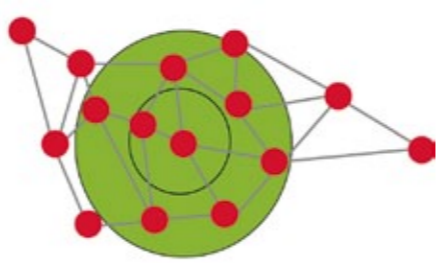
1930

2014

2050

The evolution of the Eindhoven Region. It began as a conglomoration of villages. Recently, many campuses have been added. In the future these can form a networked series of hubs that form the basis for the regional growth strategy.
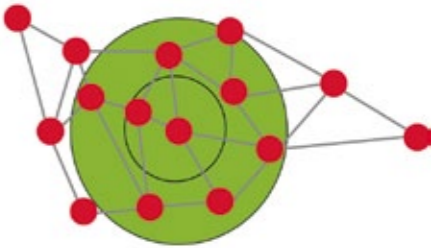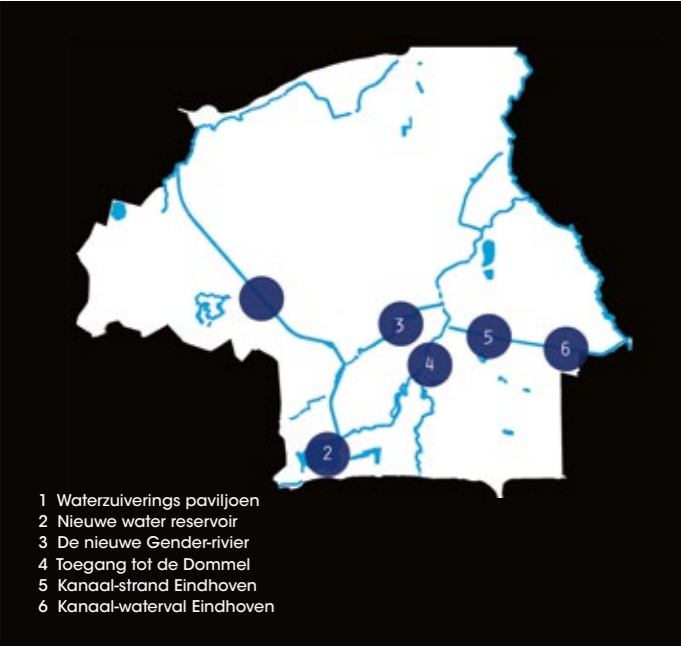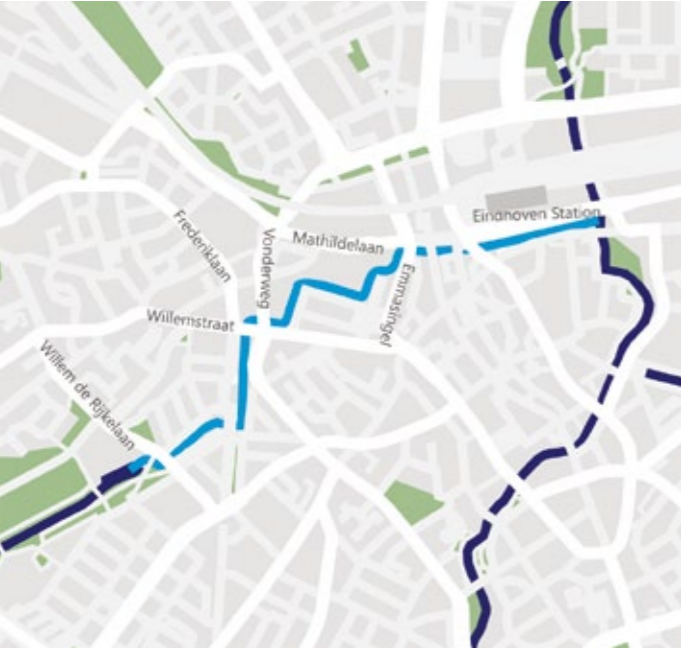

What is a Campus Village?

mixed programme

unique identity

connectivity

A series of possible key water interventions within the existing water network.

1 Waterzuiverings paviljoen
2 Nieuwe water reservoir
3 De nieuwe Gender-rivier
4 Toegang tot de Dommel
5 Kanaal-strand Eindhoven
6 Kanaal-waterval Eindhoven

A map of the existing underground Kleine Dommel, that could be opened to the air.

Case study II

Water

Water plays an important role in the history of the Netherlands. The battle against water has shaped the Netherlands to what it is now; Dikes, dams and polders fought off the sea and created space for the Dutch. This history is captured by the image of Rotterdam´s harbor and Amsterdam´s canals. Water is also the key to success in establishing a city with international esteem. Rivers are part of the identity of cities such as Basel, Bilbao, Newcastle and Dusseldorf. The river is used either for leisure or transport but in all cases the water is accessible. The water enriches the character of these cities. In Eindhoven the contrast is striking. Here the rivers and canals are not part of the city but are rather meaningless veins. The majority of the river Gender runs underground and the river Dommel is inaccessible.

In 2050 the summers are drier while the downpours will be more severe. Winters will be warmer and wetter. This increases the stress on the sandy soils of Eindhoven. The city will be dealing with both droughts and floods. The question is how Eindhoven can overcome the threats of the future and become a water resilient city. The water of Eindhoven 2050 is more than just a geographical feature. The water is part of Eindhoven´s identity. Due to the magnificent high-tech water treatment, one can literally drink from the clear blue waters of the canals, the Dommel and the newly introduced Gender. The Dommel is the aorta that connects the TU/e campus with the high-tech campus. Together with the Gender they delineate the borders of the central village. On the south side of the city the Dommel disperses into a delta area that floods during the downpours and forms the new water reservoir. The canals will be provided with vertical water treatment plants, the treatment plants have observation decks for the public to enjoy the amazing view of the campus villages of Eindhoven. The Eindhovenskanaal will be converted into a kilometer long beach making it possible to fully enjoy the water of Eindhoven. In all, instead of fearing the water Eindhoven 2050 will celebrate and endorse the water.

The ultimate goal is to make pure, clean water available within the city and readily accessible to all citizens.

Water treatment facilities could be treated as showcases and assets for the city

Existing waterways could be fundamentally transformed to leisure centers.

The existing interlocking character of green and the city.

Case study III

Green

Eindhoven has an abundance of green space but a lot of it is not considered to be particularly attractive. The green space is important for the city as it increases the livability of the city. For example green space reduces urban heat island effect, reduces air pollution and provides oxygen, creates habitats for flora and fauna and even has psychological benefits for the cities people. Cities such as Nantes, Bristol and Copenhagen have invested in their green capital resulting in international appreciation. Eindhoven today is internationally renowned for its brainport, but not for its green space. So technology already has a central role in the status of Eindhoven and the challenge for Eindhoven is to become a green city as well as a high-tech-city.
In 2050 overhead power lines and the associated pylons are committed to history, an unused infrastructure spanning the whole country and beyond. These huge iron structures will litter the space around our cities if not dismantled or transformed. In Eindhoven there are around 60 of these structures situated in the green belt to the east of Eindhoven. These structures and the transformer stations provide an opportunity for regeneration, a regeneration that can provide new work opportunities, new attractions, new services and new transport networks.
Eindhoven 2050 is a leading green tech city accommodating the ´Extreme Green´ experience. The city's eastern green belt has become activated with the Ecotech Centre, a test bed for green technology, open for the city and visitors, a public amphitheatre hosts local theatre groups, TED Talks and the world's largest light shows during Glow. The Vertical Park is a reinterpretation of the electricity pylons, providing high-adrenalin vertical sports like climbing, base-jumping, abseiling and "the Spiderman experience". To the north the water treatment centre has been incorporated into the activities of the Ecotech Centre, functioning as a test bed for green technology, whilst even providing new possibilities for recreation and leisure. To the south the rejuvenated Eindhoven Canal provides an exciting entry point to the new
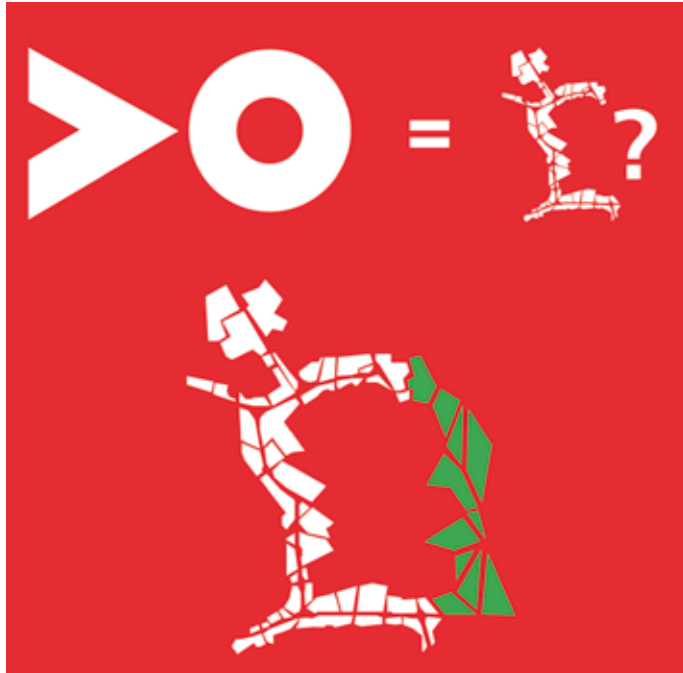
As windmills are now treasured icons, perhaps in the future, reused electrical towers also could become historic icons of technology of days gone by.

eastern Ecotech area. The Aerial Rapid Transit system (ART) is built on the existing pylons and connects these new attractions with a 50m high ride with views over the city and the surrounding countryside. The ART can be used for the transport of people or goods. This sensitive activation of the city's eastern green belt will give a new balance to the city, complementing the loop of brainport avenue with an iconic, sustainable and active development.

EINDHOVEN

Light

Light has played a significant role for the city of Eindhoven. Philips made the carbon filament bulbs and with his factory completely changed the identity of the city. The threat now is that light will become part of the history and not of the present. A festival like GLOW is a step in the right direction but just a small step. When one thinks of light, one still thinks of Philips´ old bulbs but light is so much more. Light is not just the things we see, UV, X-ray and micro-wave all have a high purpose in our lives and can also be categorized as light. It is used for medical purposes, information & communication, art and water treatment. Since light is already part of Eindhoven´s identity it is important to ask the question: How can Eindhoven capitalize on all the benefits of light?

By 2050 all forms of light are readily available for the people in Eindhoven to use as they please. The TU/e and high tech campus have provided the city with their insights into the functionality of light. The light within the city provides a multitude of services. To figure out how to get from one place to another, one just has to look at the sky where a system of auroras tells you where to go. This system of auroras is known as the li-fi. The health care costs will be lowered because some illnesses are directly cured by the li-fi system. Seasonal affective disorder is a deficiency from the past, since the UV-feature of li-fi reduces the feeling of depression. This integrated system of light forms a beautiful coloring of the skies of Eindhoven. This new system of light can be personalized, google glasses will not be necessary cause the li-fi system can be used personally. Any information can be directly accessed and it will float in front of you. When you think about light you think about Eindhoven. Light is part of life and light is Eindhoven 2050.

Schoonmaak

Vermaak

Interactief

Gezondheidszorg

Licht is meer dan kunst

Natuurontwikkeling

Informatie

Waterzuivering

Veiligheid

As wireless internet now is all around us, WILI would be a wireless light technology that could flow freely through Eindhoven given a strong visual presence.

Mobility

By 2050, vehicles will be completely self-driving, energy neutral and part of a smart system. These future techniques will have severe effects on the efficiency of transportation. Cars will be able to drive side by side with nothing more than a few centimeters between them. Collisions and traffic are phenomena of the past and getting from Eindhoven to Paris will not take you any longer than one and a half hours. Furthermore, the trend of sharing, initiated by services such as BlaBlaCar and airbnb, has resulted in a world where vehicles are no longer privately owned. They are in constant use, once they delivered someone to their destination they drive on by themselves to pick up the next person. This increase in efficiency will make a big share of the current asphalt redundant. Parking spaces are not used and highways need less space. What will Eindhoven´s streets look like in this asphalt free world?

The streets of Eindhoven 2050 can be categorized into three scales: the international corridor; the city lanes and the citizen streets. The international corridor connects Eindhoven to the rest of the Netherlands and Europe. Brainport avenue is converted into a corridor where vehicles pass the new skyline of the city at high speed. From the international corridor to the campus villages the vehicles slow down and find their way through the simple network of city lanes. These lanes connect the campus villages with each other providing the fastest transport from one campus to the other. Within the campus villages only the most important streets remain. These streets are no longer clearly delineated. Vehicles and pedestrians move freely amongst each other. The self driving ability of the vehicle prevents the vehicle from ever causing an accident, meaning that there is a shared space within the campus villages. The spaces that are left by the eliminated streets are given back to the citizens. A modular system enables the citizen to decide upon the face of the their own street. This modular system provides the citizen with the building blocks to build up their own street. Ranging from benches

to swimming pools to little parks, the options for the citizens to express themselves are limitless. This approach will make the city both a livable and an attractive city. Eindhoven 2050 is an inter- and intraconnected city that provides the citizen with the freedom to walk wherever and let people enjoy their space the way they prefer.

Citizen Street
With the necessity of local car traffic flows and parking, community streets can be freed for community amenities. Allowing residents to encorporate more green, culture, and generally shared spaces into what once were spaces only for automobiles.

1300 ha.
asphalt

250 ha.
parking area

95 %
on parking
area
during day

5
Scenarios for the resilient city: Eindhoven 2050

Caro van de Venne & Marc Glaudemans

'A healthy city is one that is continually creating and improving those physical and social environments and expanding those community resources which enable people to mutually support each other in performing all the functions of life and developing to their maximum potential. WHO: Health Promotion Glossary (1998)

Eindhoven Philipstown
It is remarkable to note that the early nineteenth century observation by Anton Philips corresponds in high degree to the WHO definition of healthy urbanization. Philips, as an example of an early twentieth-century industrialist, defines the agenda of the company in such a way that the welfare of the workers is strongly linked to the labour productivity and therefore the success of the company. The involvement of Philips in Eindhoven is a prime example of how a private actor - in this case a multinational - could be an important factor in the welfare and the well-being of a whole urban region. Philips founded schools, sports clubs and - for the time - exemplary factories, and played an important role in supporting social cohesion. Up to the present day Philips encourages talent development by means of sports, cultural facilities, and scholarships for employee's children. Philips gave Eindhoven growth, innovation and employment; and under its driving economic force the city developed into maturity. However, Philips has also shown that even a deeply regional anchored player, under the influence of globalisation, can be forced to make choices that are negative for the (economic) vitality of its hometown. Since the 1980's a large part of its production was gradually replaced to low-wage countries, first in nearby European countries and soon to other continents. Other factors resulted in the move of the headquarters to Amsterdam and the shedding of complete divisions. Despite the successful re-launch of the NatLab in the current High-Tech Campus, this story shows that a city is vulnerable if it relies too heavily on one, or a few, domi-

nant private players. More resilient would be to invest in those qualities that have a positive effect on quality of life of the city. In the globalised world, the choice of workplace has become more flexible and it is ultimately the possibility of a healthy, secure and prosperous way of life which is an important factor in the choice for the location of businesses and individuals.

Eindhoven 2050
'How to give shape to a sustainable future for the city of Eindhoven?' was the central question of our project 'Eindhoven 2050'. In this study the scenario think and their subsequent testing was the central objective. The method applied was research by design, which was used to conceptualize and visualize possible futures. A distant date was chosen to separate thinking from current assumptions and avoid solutions that are merely extrapolations of the past. It is implausible to assume that 35 years from now society and its spatial containers, in the form of the city, will be a magnified reflection of the current situation. It is even more implausible because we are in a period of profound shifts that could radically alter our cities and societies.
The process of 'creative destruction' in conjunction with, and reinforced by, a continuing globalisation will result in unrecognizable changes both in the visible side of the economy (the companies and the applications, products and services that they provide) and in the invisible side (the business models and innovation strategies).
These innovations are at first often purely technological and not spatial per se, but will eventually, as is our argument, have a spatial impact.

Disruptive changes
A familiar example of a technological invention, with a huge impact on the shape and impact of the city, is the invention of the modern elevator mechanism by Elisha Otis, in 1852. Before

elevators could be used reliably for the vertical transport of goods and people, all cities were essentially flat objects, with an average building height of 3 to 4 storeys and rarely exceeding 6 to 8 storeys. The invention, and widespread use, of elevators in buildings enabled completely new building typologies to appear. Types such as the skyscraper, which were unimaginable previously, are now so widespread that they symbolize of the notion of 'urbanity'.

A more recent example is the invention and mass distribution of the mobile and smart phones. These technological inventions have had a massive impact on our interaction with the city. Currently, we are rarely alone or lost due to the ever present access to incredible amounts of internet information, and we are constantly accessible to our friends and colleagues. This combination of disruptive innovation and the democratization of technology – in the sense of mass availability - is an important contribution to the disintegration of 'the office' and to a redefinition of work in general. What is the meaning of a 'work day' in an era of global and permanent connectivity?

Automobile related mobility is a third example of an urban impact that is difficult to overestimate and whose perceived negative impact only increases. Early on access to individual car-mobility had a positive and democratizing influence on the lives of ordinary people, allowing for an unprecedented increase in accessible of places. We only now witness the significant impact all those cars have a on the quality of our environment (air quality, congestion, noise, cost, etc.). Though the development of clean and quiet self-propelled vehicles could eliminate many of those negative aspects; regardless, such inventions have a tremendous spatial impact on our cities.

Numerous other examples can be given of the combined effects of technological innovation, its democratization, and subsequent decentralization of technology. The rise of the 3D printing could overthrow our entire industrial paradigm; with unprecedented spatial consequences. Why would we continue to produce large quantities of goods in one place and then distribute them all over the world; if the production can be done locally, and with an extreme form of mass customization? Consider the consequences such a shift in manufacturing practices might have for the logistical networks in the world, from ports to highways and railway lines.

Designing for 2050?
The brief summary above indicates that even separately each of these developments can have a very profound influence on our lives, our economies and on our cities. The combined effect is potentially disproportionally larger. And these are not the only changes that are occurring. In a scenario-based study like ours, we can safely assume that we will not be very successful

in predicting the future. We cannot really know which technology will lead to further breakthroughs. We certainly do not know what kind of technologies will be developed in ten, twenty or thirty years from now. We know almost certainly that none of our proposed interventions will ever be realized. But then, why commit such a study? Since the future cannot be known, what is the importance of a future-oriented design research?

Future Ambitions
In consultation with the municipal authorities, we came to six strategic domains that we examined both separately and in conjunction. This took place during an international Master Class in which three local planners and some twenty international participants focused their attention on spatial research and design. For each domain, the workshop resulted in a brief analysis of the current state of affairs, as well as some ideas about how the domain contributes to the viability and potential of the city. We then discussed how this aspect could better contribute to achieving the ambitions of 'healthy urbanization'. On the basis of this analysis, we started to design based upon a speculative extrapolation of emerging innovations. These design exercises often started from a fairly one-dimensional standpoint, but were later complemented and enriched by taking into account the findings and results of the studies within other domains. Ultimately, this lead to a comprehensive and multi-layered design study based upon an accumulation of insights and intelligent connections. Innovations in one area can have major consequences in one or more other domains.

The table shows the six domains and the main ambition that has been formulated in this domain:

Domain	Ambition
Conceptual city model	From central city to an archipelago of campus villages
Water	From geographic constraint to strategic bearer of identity
Green	An innovative and design-inspired vision on green
Living	From expats to international community
Mobility	Radical reduction of 'car space' affords new forms of 'people space'
Light	Light is the image of the city and contributes to all domains.

An example we used in our study is the investigation of conceivable innovations within the field of mobility. Research has shown that in the most favourable case an intelligent system of clean,

shared and continuously available vehicles could lead to an 80% reduction in the number of required vehicles. Such a revolutionary reduction of vehicles would result in dramatically less road and parking space necessity, while the remaining smart vehicles would still deliver the same mobility performance. This would result in radical savings in required surface space for the municipality and equally huge savings in maintenance costs. These spatial and economic gains can consequently result in a redesign of the entire road network of a region. Smaller streets can often be completely stripped of their transport function and 'returned' to other users, spaces, and other functions; thus contributing to the ambitions in adjacent domains (green, housing, air quality, etc.).

This is a relatively simple example of revolutionary and often unforeseen opportunities that may arise completely disconnected from the planning disciplines. The complexity of such conceptual models will advance rapidly if all or even several relevant domains for healthy urbanization are included in the analysis. Complexity will further increase during the implementation phase, when legal, social and economic issues will have an additional impact.

Roadmaps and Actors
After the mapping and visualizing the individual and the interrelated ambitions of the six domains, it is possible to develop some roadmaps. These roadmaps are integrated spatial agendas, which aim to influence our actions of today in the interest of the qualities that we want to obtain in the future. These roadmaps help to indicate how networks and alliances of actors (initiators, legislators, finance providers and users) can reach the goals, and what actions are required to get there. Developing such roadmaps in a process of co-creation requires a solid supervision and should be supplemented by design research and social and economic investigations.

The desired future state itself should not be some fixed image, but should serve as a visualized spatial ambition that acts as a platform for developing common interests and shared goals. From Actor-Network Theory (ANT) we know that actors in the spatial domain are almost always driven by their own interests. By focusing on those interests - and not on a spatial image, which designers often do - the result is not fixed in advance and plenty of room for alternative solutions remain available. As long as these alternatives meet the common interests, all parties will seek to obtain results, thus serving their own interests. This might seem a cynical view of reality, but it rather reflects a belief in the power of processes driven by intrinsic values.

What will we do tomorrow?
To follow up on our flexible roadmaps, we have proposed some concrete pilot projects that might act as first steps of development. Also these pilot projects can help to bring about the Eindhoven of our sketched inspiring outlines. These projects are defined on the overlay of several strategic developments that require both a spatial translation (design) and a plan of action (actors).

One example of a pilot project is the transformation of the Central Station into a Central District and the new locus of Eindhoven's identity. In the future the station will still be an important place in the city, but to monumentalize this transportation hub seems an outdated idea. The station is an efficient transition-machine, but it no longer has to remain an icon of an essentially nineteenth-century technology. Imagine an open field at this place, with the platforms shifted underground. There is a simple walk-through, barrier-free axis between the formerly disconnected sides of the city: the university and the downtown. Perhaps this is also the most suitable location for the desired National Technology Museum, with light (via innovation and design) playing an integral role in redefining this place and a new gateway to the city.

Another, less monumental idea is to experiment with the concept of 'citizen streets'. As previously stated, we expect a large spatial impact of technological developments in the field of self-steering, digitally linked cars. In time, the entire road network could be revised, resulting in large quantities of streets losing their traffic function. Giving back this reclaimed road-space to the residents provides unforeseen opportunities for increasing the quality of life in the old neighbourhoods. How can this reclaimed space be given back to the community in a meaningful way? What is the new business model? The city, after all, no longer needs to maintain such streets as traffic space. Perhaps residents could take 'ownership' of the land, or perhaps other models are invented to contribute to the ambitions of the city and its citizens. The recently announced experimental space for testing self-driving cars on Dutch roads provides a great opportunity for Eindhoven - as a centre of the automotive industry - to sign up as a pilot project. In such testing, it is not just about the technology itself, but also it provides a space for speculative design research into the broad social and environmental consequences of such innovations.

Model 1 Dutch metropolitan regions

6
The Dutch Delta Metropolis

Beyond the Randstad conurbation
the 21st century calls for a new 'vehicle', a spatial economic area concept, to forge a distinctive position for the Netherlands in Europe and in the global economy

Jaap Modder, Independent consultant.
Boardmember Deltametropolis Foundation.

The aviation pioneer Albert Plesman is regarded as having put the Randstad conurbation on the map as an urban and economic phenomenon in the west of the Netherlands. Whether or not this is true, no one can be sure, but it makes a good story in any case: the first big boss of KLM, flying above the west of the Netherlands, looks out of his window and refers to what he sees as a 'randstad', or conurbation.

This article contends that, after 60 years of Randstad policy, if we are to play a significant role in Europe and the global economy, a different construct is needed. What is required is a Dutch Delta Metropolis: a Randstad and Brainport. This will require the redevelopment of both the sum and its parts. And improvements in connections between locations in particular. We look in detail at the different scenarios for Dutch urban regions and, in spite of the differences, identify three no-regret policies.

Randstad

One thing that is certain is that, back in the 1960s, British urbanist Peter Hall described the Randstad as a spatial economic concept and was also enthusiastic about this polycentric urban region. This (inter)urban 'structure' would reduce congestion and would also lack other metropolitan disadvantages, such as those of capital cities like London and Paris. In a polycentric urban region, functions that in capital cities are all situated in one area are spread over multiple urban centres. One major advantage of this structure, and particularly that of the Randstad, is a far better cohesion with and access to outlying areas, nature and recreation. And provided that connections between cities are well organised, frequent and fast, polycentric urban regions can function just as well as and maybe even better than major conurbations, all to the benefit of their inhabitants. Peter Hall's Randstad was also the area of the Netherlands where the real money was being made. Here, the engines of the modern

Dutch economy stood side by side. In spatial terms it was organised in a totally different way to other metropolitan areas, but, thanks to its unique structure, it could perform just as well as the major metropolises.

More than half a century after the 'invention' of the Randstad, things are quite different. Certainly, the Randstad is still an economic success story on a Dutch scale. And, internationally, it has also ranked highly on all kinds of good performance listings. Recently, however, it has not fared as well. Congestion, accessibility problems and the absence of the benefits of mass and scale (agglomeration effect), even within the North and South wings of the Randstad, are the principal causes of this decline.

It seems that the major benefits that Hall saw in this polycentric conurbation at the time have not been fully exploited. Clearly, congestion on the roads is less serious than it is in capital city regions but the planners don't appear to have succeeded in creating fast, convenient connections between the various parts of the Randstad. And the same is true of rail links. Access to and the quality of the outlying area – the Netherlands' 'Green Heart' – could have been far better. In spite of the stream of plans and investments, these spaces have been heavily urbanised. The Randstad may be a fantastic concept, but the planning and implementation of it have been less successful.

The world has changed

Another important question is whether, in 2015, the Randstad can still be regarded as the economic heart of the Netherlands. Certainly, over the course of half a century, there have been changes in the economic performance of its various components. The Amsterdam region has become far and away the most important economic player within the Randstad, while the vitality and performance of the Rotterdam region has suffered a
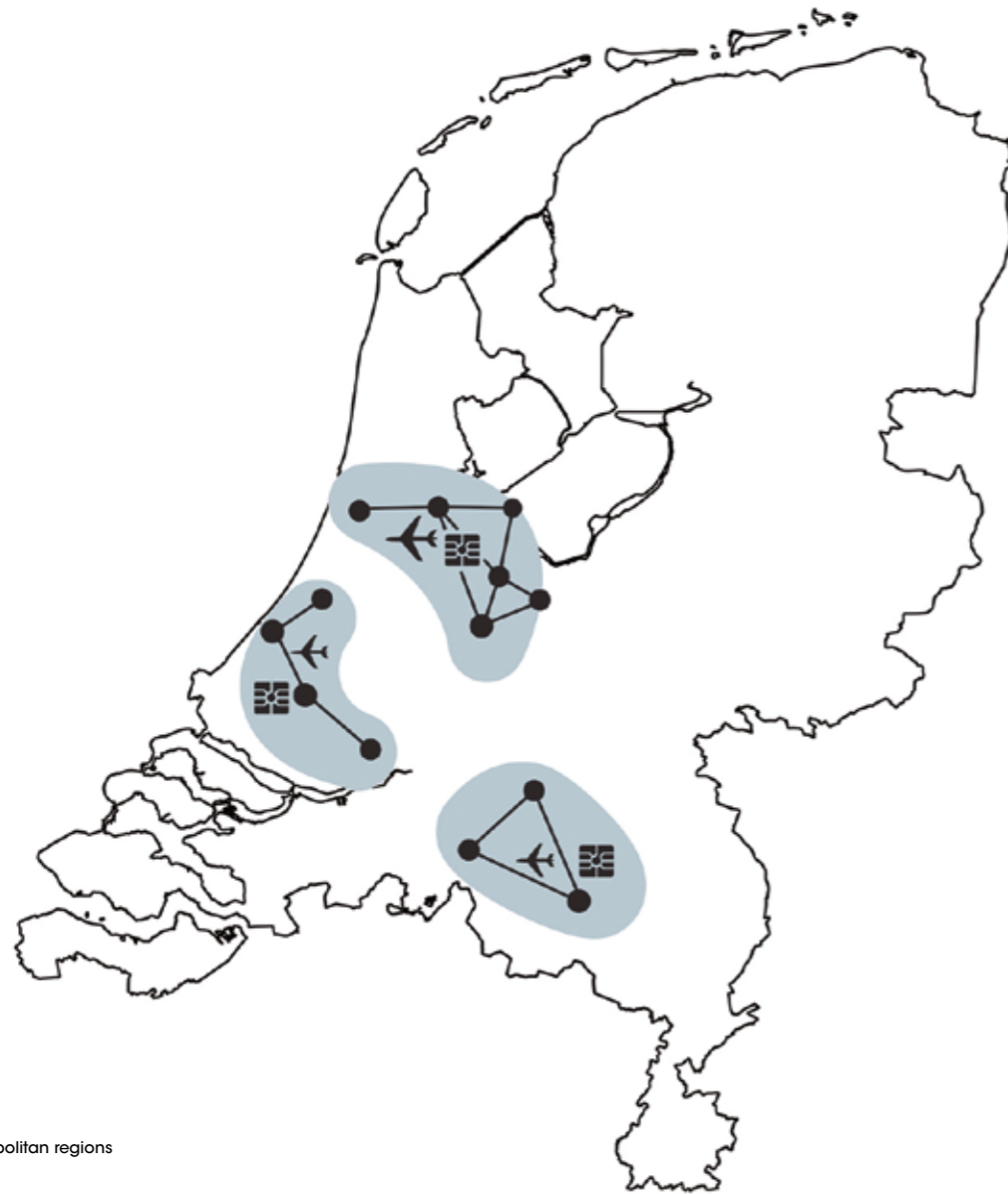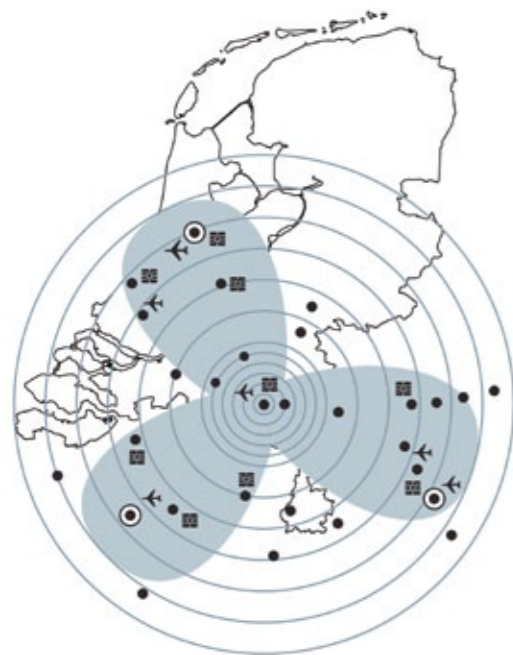
Model 2 Polycentric delta metropolis
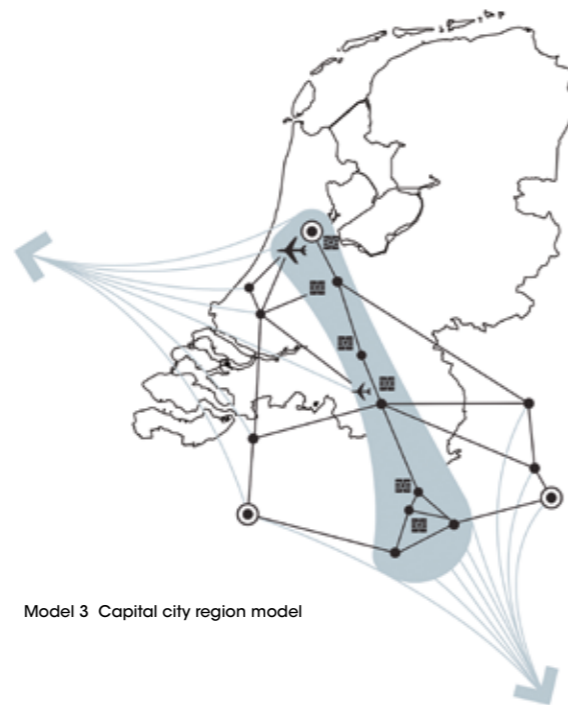
Model 3 Capital city region model

Model 4 North-West European Delta Metropolis

Model 5 North-West European Delta Corridor

significant decline. In the 1960s, the relationship between the two areas was more evenly balanced. Perhaps even more important is the fact that the Randstad is no longer the only area where the engines of the economy are turning.

In recent decades, with the development of the 'new economy' (the innovative, hi-tech manufacturing industry in particular), Eindhoven has become a major economic player. This growth has been mainly in the city and the region, which together are known as Brainport. Looking at the future of the Netherlands in a heavily globalised economy, the question is whether the Randstad is still the regional concept that will enable us to compete on the European and global stage. If we add the Brainport region to the Randstad, the chances of the Netherlands competing successfully on a European and global scale would appear to be far greater. The Dutch Delta Metropolis could be a successor to the Randstad, with not four but five urban 'peaks in the delta' that, together with their hinterland and each other, could lead the way and stand out from the crowd in both Europe and the global economy.

Over the last century there has been another important change that is at least as important and relevant in relation to the new Dutch Delta Metropolis. This change is partly the result of regional policy. In the last century, national regional policy focused on clustered deconcentration (Second Policy Document on Regional Planning, 1966) – in other words on urbanisation within regions – led to daily urban systems on a different scale, at least in the regions referred to here. In terms of living, working, leisure time and mobility patterns, the world of the modern Dutchman in these areas is played out on a higher, regional and sometimes inter-regional scale. The city of the 1950s is no longer a playground for social activities; it is a 'regional city'. This social change further underlines the need for the better physical design of urban regions and connections between them. An example: the labour markets of Amsterdam/Utrecht and the Brainport region are, to all intents and purposes, separate. Integrating them could have significant economic advantages. In order for this to happen, much faster connections between the two regions are essential.

The Dutch Delta Metropolis

Going back to the idea of the polycentric metropolis, a new Amsterdam-Rotterdam/The Hague-Eindhoven triangle would literally have be put on the map, not only in terms of spatial design (on this scale) but more particularly in terms of connections. And this doesn't just apply to the whole and how it can be more than the sum of its parts, it also calls for better 'facilities' at the level of the individual regions.

The Dutch Delta Metropolis can improve its economic performance if the road and rail links in the Amsterdam-Rotterdam/The Hague-Eindhoven triangle are the best they can possibly be. Here, the approach taken by Peter Hall in the 1960s still applies. With faster connections it is possible to tap into each other's strengths – on labour markets, at universities and through synergies in innovation, production and logistics. And the same is true when it comes to the international accessibility of the Netherlands (fast connections to Schiphol from all locations). In addition, the quality of this polycentric region is also determined by the accessibility and quality of its outlying areas. Indeed, it includes more than the three urban regions. The relatively open and less urbanised areas in between are part of the region also and call for an approach that is consistent with the development of a competitive, hi-tech delta metropolis.

But at the level of the individual regions, too, more must be done to make them into a fully fledged part of the bigger whole. In summary, the following is true: In economic terms, the Amsterdam metropolitan region is not doing badly but the performance and scope of its public transport network lags behind that of comparable regions elsewhere in Europe and beyond. The newly formed Rotterdam-The Hague metropolitan region has a vulnerable economic structure that requires new impetus at this level. And, generally speaking, the economy in the Brainport region is doing extremely well; other essential components of an international metropolis, such as accessibility, quality of life and culture, are sadly lacking.

Scenarios/models

Recent discussions have raised the issue of where the focus should lie when developing the Dutch Delta Metropolis. Is it primarily about better links between the various parts or is it more about the design of the individual parts? In fact, it's both. In the context of the Dutch and European economies, the focus is primarily on better design of and facilities in the three urban/metropolitan regions. In the global economy, economies of scale are more important and the functioning and profile of a Dutch Delta Metropolis will mainly be judged on the basis of its joint capability. In this context, optimum links within the triangle are the top priority.

There are two models or scenarios for the country's urban and economic development. In the first model, the focus is on the design of the three metropolitan regions (model 1: Dutch metropolitan regions). This model/scenario endeavours to reinforce the benefits of agglomeration in each part of the Dutch Delta Metropolis. In the second model, the polycentric delta metropolis (model 2), the focus is on the whole, which is more than the sum

of its parts, mainly as a result of far better connections between the parts. The key concept here is 'borrowed size'.

A comparison with the actual performance of this area indicates that there are 'failings' on both fronts. Clearly then, a 'package' must be put together that meets the requirements of each level of scale as far as possible.

In the Amsterdam region there is an ever-increasing tendency, implicit and sometimes also explicit, to suggest that everything should simply be based in Amsterdam. As the only Dutch global metropolis, Amsterdam would have to be far bigger and would have to act as a capital city region, with twice as many inhabitants and as many economic and cultural functions as possible in this area. A bit like what has been happening in London for a long time: the metropolis is encroaching on the surrounding area and draining, as it were, the lifeblood from neighbouring cities; employment and a high-quality labour market can only be found in London. There is certainly something to be said for investing more in the Amsterdam region, but more along the lines of 'first among equals'. Extreme application of this capital city region model would lead to the 'draining' of other regions and would therefore have significant social disadvantages. Consequently, in its extreme form, this third model (model 3, capital city region) is a less desirable scenario.

Internationalisation

The question is whether, when considering the future urban development of the Netherlands, we should limit ourselves to Dutch territory. Clearly, our borders have been open for a long time now and the European economy will increasingly be played out in this arena.

Geographically speaking, the Randstad is on the periphery of Europe, and its relations with neighbouring countries are traditionally limited. Amsterdam, of course, is connected to a worldwide network of cities through the air. The situation in the Brainport region is quite different: it is far closer to the border and far closer to Europe. Here, the interaction with Germany and Belgium (labour market, imports and exports, higher education) is far greater and is increasing year by year. It is only natural to think on a far larger scale, of a North-West European Delta Metropolis (model 4), also known as the ABC metropolis (Amsterdam, Brussels, Cologne). In that model, Eindhoven has a far more central position, which is perhaps fitting given the way this area is developing – namely, as a link between the (old) Randstad and the rest of NW Europe. And there is another possible model, which goes one step further, looking at things from more of an international corridor perspective. Nothing new, the Blue Banana

– stretching from Amsterdam to Milan – has been on a multitude of maps for decades. In that model the focus is firmly on the Amsterdam-Eindhoven-Maastricht axis and onwards to Germany (model 5, North-West European Delta Corridor).

No-regret policies

With five scenarios/models – three for the Netherlands and two with a cross-border perspective – which policy fits all models? In other words, which no-regret measures can we consider without selling one of these five scenarios short? There may well be more but, in our view, there are three things we should do right now:

1.
Optimisation of the metropolitan 'resources' in the Amsterdam region, concentrating primarily on a more efficient public transport network, fits with each of the aforementioned models/scenarios.

2.
A second initiative relates to the performance of the Amsterdam-Eindhoven (economic) axis. The area between Amsterdam and Utrecht is the growth engine of the Netherlands. This is an important task, which focuses primarily on faster and better public transport and better design and logistics for stations and station environments. If you look at the axis as a whole (up to and including Eindhoven), the labour markets above and below the major rivers are currently separate. A much faster train, ultimately an HSL, would give the area a significant economic boost.

3.
The third major initiative relates to better design of both spaces and flows for the 'new kid on the block', the Brainport region. Partly due to the good relationship that it has with the public sector, the market in the region has grown strongly, from traditional urban manufacturing industries to a hi-tech region that competes on a global scale. However, the Brainport region is lagging behind when it comes to the other 'props' that go with its newly acquired status: regional and external accessibility (Düsseldorf Airport, HSL Germany, Brussels), a station environment, interaction between universities, facilities for expats, an airport, etc. But also, and in particular, quality of life (culture, public spaces, green spaces in the city, etc.). The policy has yet to be drawn up, but this is also a 'must' for the development of the Dutch Delta Metropolis, which fits with all the above scenarios.

The Dutch Delta Metropolis: the challenge and the context

In a nutshell, after more than half a century of loyal service, the Randstad is ready for retirement. A new constellation, a combination of the Dutch Delta Metropolis, the Randstad and Brainport, is

emerging. Design on this scale is necessary, as is a new policy for this global metropolitan region. Drawing on the lessons learned from Peter Hall in the 1960s, the Randstad, as a part of this region, 'posthumously' requires better facilities, better connections and also, in today's world, brand new initiatives consistent with the creation of a sustainable metropolis. Equally important is a policy for the metropolitan region of Brainport, for its external accessibility from within the Dutch conurbation and, more particularly, from Germany.

From a European and global economy perspective, the Dutch initiative also requires a keen eye for the international positioning of a link to the North-West European context. A regional or a corridor approach on that scale is not mutually exclusive. What is certain is that, on that scale, better connections between the 'peaks' of the North-West European delta must be the top priority.

Personal Rapid Transit
Automated guideway Transit
Vactrain
Air & Spaceport System
Water

TESTING GROUNDS
1 Central district, 2. Citizens streets, 3. Ecotech village 4. Health Tech village 5. Brainport Village 6. Airport village 7. Design village 8. Sciencepark village 9. Shopping village 10 TU/e village 11. Crafts village 12. Chip village 13. International village 14. High Tech village 15. ISE village

7
Afterword

Jason Hilgefort

When we began to construct the thinking for the Master Class, we were aware of the risks of looking too far forward into an urban future and the pitfalls of making predictions based on technological breakthroughs. Yet being the City of Eindhoven the notion of thinking bold and framing our thinking within the context of technology seemed the inherently correct mode of working. Given the rapid urban development and technological leaps of our modern world this made both our task more relevant and more daunting.

Given Eindhoven's global position the notion of an international master class made even more sense as a mode of investigation. The mix of born and bread locals and outsiders is the future of the city and was key to our work. With much of our group from the rapidly developing Asian world they both brought development lessons from their lands and their desires as potential expats. This knowledge was grounded with local partners and participants that could ground the information within the region's realities. Attempting to look far into the future of the city forced us to look at the city's development in new ways. None of us could have predicted how much the historical development and framework of the city would drive our future vision for the region. Further, no one in the Netherlands thinks of Eindhoven as a city of water, but given the future global realities of water usage and the need for Eindhoven to prepare, this became an opportunity for our work. These new modes of thinking and operating on the city gave us new insights. To not just think about growth models, infrastructural systems and environmental maps, but to think about how something we all have in our pockets – smart phones – could transform the shape of our future cities. By going through this exercise, we were not only able to make predictions about the future, but we were able to advise the city on how to be more smart and efficient with decisions now that will have a large long term impact. We looked far into the distance in order to better perceive what is right in front of us.

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	Ahmed Al-Mallak (Iraq)
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	Jing Feng (China)
	Jochem van Boxtel (The Netherlands)
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Ahmed Al-Mallak Associate lecturer, Coventry University

When I heard about the master class I felt it was an excellent opportunity to visit the Netherlands and learn more about the Dutch design process and approach that always inspired me as a student and impressed me as an architect, also being a lecturer in Architecture and Urban Design involved heavily in design studio work I realized this is an opportunity to learn more about different academic methods of teaching and feedback.

The master class was fantastic, all participants had the right mind set to work as a team discussing and working on future scenarios, the diversity of the participants was another important aspect for the success of the master class.

The Benefits of the course were not limited to approaching and thinking about future but it was a simulation of future teams, how they are going to function and how the most diverse will be the most likely to survive.

Reflecting on this experience I can confidently say it inspired new techniques to my teaching, enriched my network of contacts and was an amazing experience.

Tom Billingham Landskapsarkitekt LAR/MSA

There were a couple of reasons for me wanting to join the masterclass. The first reason was that as an experienced landscape architect and urban designer I work with the busy day-to-day running of projects and it can be a challenge to stay on top of the emerging research, themes and ideas that are continuously evolving within our branch. I saw the masterclass therefore as an opportunity to really come up to date in this regard and to discuss and share ideas with knowledgeable, practicing researchers and other like-minded professionals from a range of international backgrounds.

Another reason for joining was that the project focus seemed very relevant with regards to it dealing with the future development of a medium-sized city. The problems being investigated are modern-day urban issues that are relevant to many cities across the world and as a result the lessons learnt can be taken home and applied locally. The masterclass was knowledge-intensive, inspiring and something I would highly recommend.

Jochem van Boxtel Urban Designer at Eindhoven Municipality

As un urban designer, working for the municipality of Eindhoven, I am involved in the development of this city on a daily basis. My job is to assess and accommodate initiatives by professional developers and citizens within the set spatial policies of the municipality. Quite often, these are initiatives related to current spatial problems, which might in the future require totally different approaches or in fact might even become redundant. That is why participating in this Master Class was a good experience for me. Together with participants from China, Macedonia and Iraq we developed design thoughts on Eindhoven in 2050, from a totally new perspective.

The themes of the Master Class are closely connected to the current design challenges in Eindhoven. There are plans to reduce road space for cars and involve citizens to redesign the streets. An example is to transform redundant lanes to urban green or to improve the quality of the pedestrian space. Another example is to improve the use of water for recreational use. Personally I am currently involved in the development of a new campus in the north-western part, "the new villages of Eindhoven". The results of this Master Class are important sources of inspiration during my work on these design projects, and help to create an awareness for everyone involved in the future of the city. This is valid not only for municipal officials but also for private developers and citizens.

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participants take
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