

- one architecture
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EINDHOVEN, HACKABLE METROPOLIS

in samenwerking met:

The Mobile City
 Locative & Mobile Media / Urban Culture / Identity





An open source / open data infrastructure makes another use of the city possible, such as efficient use of space and infrastructure, more opportunities for citizens to control the city and new neighborhood- and care packages. Technical and social solutions go hand in hand.

This design proposal, originally commissioned by the Delta-metropolis think-tank, explores urban ownership of citizens and organizations, and shows the possible spatial possibilities of connecting institutions and local actors to collaboratively make Eindhoven a 'hackable' world city. After its publication, it has generated follow-up projects on both a national and a regional scale.

The pages on the right side give a treatise on the subject. The pages on the left show a spatial exploration of our proposition, projected on Eindhoven The Netherlands and its immediate surroundings.

EXECUTIVE SUMMARY

Traditional urban planning in the Netherlands with top down master plans and large scale area development is over. This is partly due to the financial crisis, demographic change, peak mobility, and the digitization of urban society. The challenge of large future investment projects is to optimize and make better use of existing resources. Cities will have to adapt in flexible ways to changing circumstances. This implies an important conceptual shift in thinking about city making: it is less about individual possession and more about the question how multiple stakeholders can make use of the various resources that the city offers.

Digital media play an essential role in developing the instruments that allow a shift of gears to happen. The question is: how are we going to make use of these technologies? On the one hand local governments, technology companies and knowledge institutions are forming consortia to turn cities into 'smart cities' with the aid of informatics. Digital technologies are used to optimize urban processes and make them more efficient, like mobility and healthcare. On the other hand citizens and cultural organizations are increasingly often taking matters into their own hands. Tapping into the online culture and ethics of do-it-yourself (DIY), they take ownership over their city and undertake collective action: from collaboratively maintaining urban gardens to creating sensor networks to measure noise pollution or air quality.

We think these initiatives are too isolated to really offer a sustainable future perspective on urban transformation. The smart city departs too much from a utilitarian view of the good city but forgets the public domain and diversity of identities of urbanites. The bottom-up initiatives in the so-called 'social city' on the other hand are often too fragmented. They are insufficiently connected to institutional stakeholders and lack impact and scalability. They also sometimes suffer from a 'people-like-us' mentality that seems to implicitly yearn for small-scale sociability rather than drawing on the potential of complex and heterogeneous city life.

These developments take place all over the world. In the Netherlands the city of Eindhoven is one of the most interesting places. In few other cities the divide is as big between high-tech business innovation occurring at the city periphery and inner city urban (sub)cultures. In this proposal we pose the question: how can we better connect 'smart city' and 'social city' in Eindhoven through research and design? The challenge is not to fall in the same trap of attempting to construct yet another grand narrative for top-down urban planning. We are more interested in exploring and creating the conditions for urban ownership of citizens and organizations. Can we connect businesses, governments and the cultural and societal sectors to collaboratively make Eindhoven a truly smart hackable world city with the aid of digital media technologies?

SPATIAL PROPOSAL

Digital technology makes the optimization of the city possible and is more efficient, more interactive (fun) and easier. Digital technology breaks the continuity of scales, territory, space and operating systems. However, this technology has little to no place in urban planning. There is a lot to be gained in optimizing cities. The current digital developments in this field ('smart cities') are atomized and mainly initiated by companies and institutions.



The commons is the playing field on which the balance is sought between the individual and the groups interests.

The question is obvious: what are the 'Commons' where digital technology can develop into a public project? It is clear that digital technology has a great impact on the fit. Brainport Eindhoven fits this technology and is therefore used as a case study. In Eindhoven there is a lot of activity within the field of 'smart cities': Cisco and the municipality have an extensive cooperation and Strijp S is for example already experimenting with smart technology for lighting. What does the radical thinking through these developments mean for Eindhoven, and, pars pro toto, for the Netherlands?

Previously, playing in the 'Champions League' was linked to density and mass. From the observation that Eindhoven is in anyway part of the 'global city' A(msterdam) B(russels) C(ologne), and mass is therefore not missing, new investments should especially be focused on the opportunity for people from around the world to be part of the city. Digital technology gives the opportunity to make city oneself.

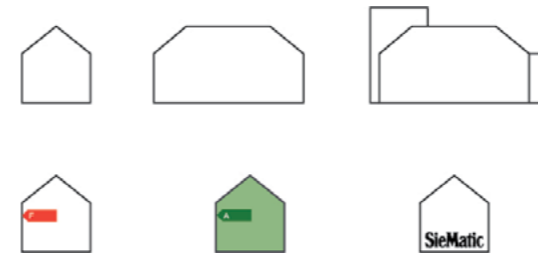
With the use of digital technology for the city three principles are guiding:

- Principle 1: The relationship between the collective 'grid' and the individual must be well regulated;
- Principle 2: Efforts should be made to create bi-directional infrastructures;
- Principle 3: Business models must be made transparent.

A NEW INVESTMENT PROJECT

by Matthijs Bouw, Froukje van de Klundert, Michiel de Lange en Martijn de Waal

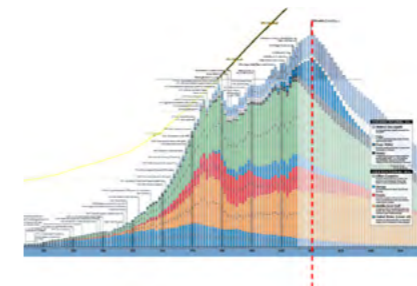
The major challenge in the Netherlands is to optimize and better use the existing spatial conditions. It is essential to not only invent smart transformations, but also to organize the environment in such a way that it is faster and more adaptable to changing circumstances, and to invite new players into producing the city. One has recently seen how changing financial circumstances, but more fundamentally also digitization and demographics, have large spatial and rapid effects. A 'traditional' large-scale spatial project does neither suit the current economic order and the current political system, nor the current time dynamics. Therefore in planning, a paradigm shift must take place. The core of the work shifts of major physical interventions to the smart use of the existing. Digital technology, as a new infrastructure, will play a major role in this shift.



'Better' no longer means bigger, but is mainly qualitative: energy efficient, more luxurious.

There are several reasons why the old investment approach to large-scale master plans has stopped working. Economic and demographic growth evens out. In the foreseeable future, physical additions to the city are often redundant and car use will not increase. At the individual level, we see a growing interest in optimizing the existing. Homeowners do not necessarily move over time to a new, bigger house. Instead, they make the existing house better: they isolate it, provide it with double glazing, or a new kitchen.

The challenge before us is to scale such an investment approach from the individual household to the city, from a private project to a public matter that concerns us all. This incorporates another major shift: that of possession to use. This is an exciting notion because our current cities are spatially based on the principle of ownership. If we could



Peak resources, peak oil, peak mobility, peak housing?

use the city in a more flexible way, it would allow us to quickly respond to changing circumstances.

This idea should not be confused with the idea that the city is unchangeable or the act of urbanism becomes non-physical. Changes will be a different, or at least a less widespread, manifestation. Saskia Sassen calls this the 'incompleteness' of cities: "Cities can constantly be remade, for better or for worse. It is this incompleteness that has allowed some of the world's great old cities to outlast kingdoms, empires, nation-states and powerful firms."¹

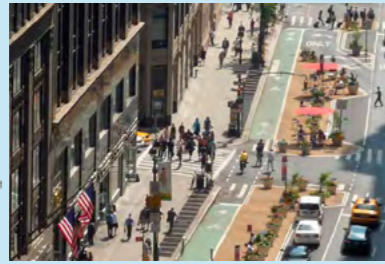
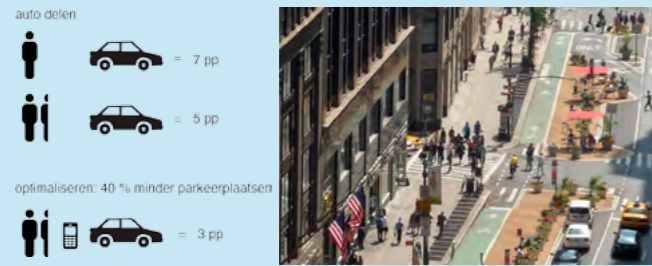
The task for the future is to turn this 'incompleteness' of cities into an asset. 'Incomplete' means that hidden or latent possibilities in the city are not yet exploited. These possibilities lie in the physical spaces that can be used in more ways than one, and in the social processes occurring there. To address that 'incompleteness' – or, more precisely, the potential - it is necessary to develop tools that provide insight and install them. Also connections should be made, and 'systems' adaptively linked. The metropolis as a brain, to paraphrase Zef Hemel, not only benefits from the involvement of millions of players, it also needs information to act based on it. Can we increase the IQ of the metropolis as a brain? What matters is to provide information about spaces, use, networks, flow charting and make them accessible through a 'grid' - the collection of data about urban life that citizens, businesses and governments can use to the potential of the better used existing city and to increase the quality of life in the city.

The main question is how. Who is going to manage the grid? Who gets access and under what conditions? Who can develop what services? Do we do this slowly, driven by large companies with a commercial 'window' of five years, based on successes elsewhere? Or active, as we propose, and driven by our society, with opportunities for (economic) innovation and an innovative and piloting role for the government. In a way that citizens will participate and successes become visible. The question is also a cultural and political: Can we create 'smart cities' that will remain 'open cities'?

PUBLIC PROJECT

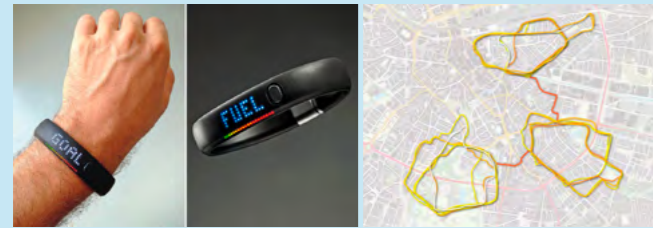
The use of digital technology as a new infrastructure for the city is foremost a public project. The citizens themselves will generate data, sometimes deliberately (open source), sometimes unconsciously. By making this data public and readable it can be used by everyone in all areas of daily life. Digital media can make the city inclusive, fun and more communal. Through shared access to collective services, space, knowledge, skills to act by themselves and reciprocity based on mutual trust urban 'commons' can be created and managed.²

EXAMPLES



EXAMPLE 1: CAPACITY INCREASE

By sharing and efficient use fewer cars and car parks are necessary. This space can be utilized to add new programs, such as parks or playgrounds, but also for densification. Fewer cars also mean fewer roads and more 'walkable neighborhoods'. Woensel for example would thus greatly improve. A project like 'depave' already shows the possibilities for transforming parking.



EXAMPLE 2: ENGAGING AND HACKING

Users collect data about the city like bad roads (Biketastic), high air pollution (Green Watch / City Pulse) or pleasant jogging routes (Nike+ City Runs). This shows how people use the city and investments can be targeted to make places more attractive. The 'slow lane' may serve as an example for a more extensive and evolving network of bicycle routes in the city.



EXAMPLE 3: IMPROVING

Energy improvement could benefit from scaling up, for example by encouraging people to jointly invest in solar panels, instead of everyone for themselves. The panels are then placed in one go at places where they can function most optimal, for example, on the roofs of business/factory areas.

"As a technological practice of innovation, Open Source has not quite been about cities, but about the technology. Yet it resonates with what cities have and are at ground-level, where its users are. The park is made not only with the hardware of trees and ponds, but also with the software of people's practices."³

One can name already many examples, like 'Biketastic'⁴, that shows restrictions and congestion through findings of cyclists routes. Or the residents around Schiphol who measure noise overruns themselves. 'Green Watch / City Pulse'⁵, which collects data on air quality in Paris via wristwatches. This information may help citizens to decide where to live or where to recreate and in addition it can be used to put pressure on the municipality to improve the city.

Participation can even go so far that they themselves generate energy. Through 'Pavegen'⁶ energy of pedestrians can light lampposts, illuminating only those places that need it.

By sharing data through digital media it is possible that other players will plan cities. "The city today is not only composed of streets and buildings, but also of displays and conversations on the street with invisible others. The city has become both a physical place and a virtual environment. The software developer is now just as important as a designer of urban life as the architect or urban planner is. Additionally, there will be other forms of ownership: the new media gives the urbanite more control over his own environment, and thus more involvement. Technology is not an end in itself, it is a means to organize ourselves around the things we share."⁷ The use of digital technology is a collective project.

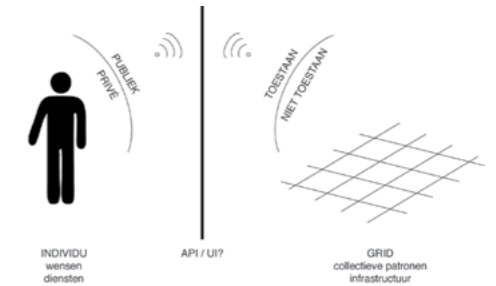
In addition, information about the city has been automatically collected in the grid. Much information is already there, while other information may be collected by placing sensors. Residents play, consciously or unconsciously, a major role in this act of collecting. Privacy in this context is a precarious thing, and there lies a responsibility for the government. The government must enforce the development of the data grid or platform in an open manner, and may also create an activation policy, both on the part of the data (labeling, accessibility), as on the side of the users (bring parties together, activate, pilots and organize 'hackathons', etc).

CONTINUITY BROKEN

The use of digital technology as a new infrastructure for the city requires a change in thinking of the existing instruments that make city. There is the need to create bi-directional infrastructures, as is already the case for 'smart grids'. The city speaks not only to and steers the residents, residents question, answer, respond and steer themselves. Where

is, outside of the institutional actors, the space to mingle in the organization of the city? What do we need to arrange from above, and where is freedom?

"In the future, successful cities will need to integrate the scale of big platforms with citizen-driven innovations. To a degree, this integration is well under way, but urban leaders need to educate themselves and frame an agenda of openness, transparency, and inclusiveness. Without this catalyst for cooperation, we may repeat the devastating urban conflicts of the 20th century that pitted central planners like Robert Moses against community activists like Jane Jacobs."⁸



The spatial paradigm shift is partly economically driven: the money is gone. Already, municipalities play no executive role in urban development anymore, due to a lack of money. These acts of city making will thus be taken over by businesses and individuals.

The use of digital technology in the city gets its logic in principle by the business models that enable them by:

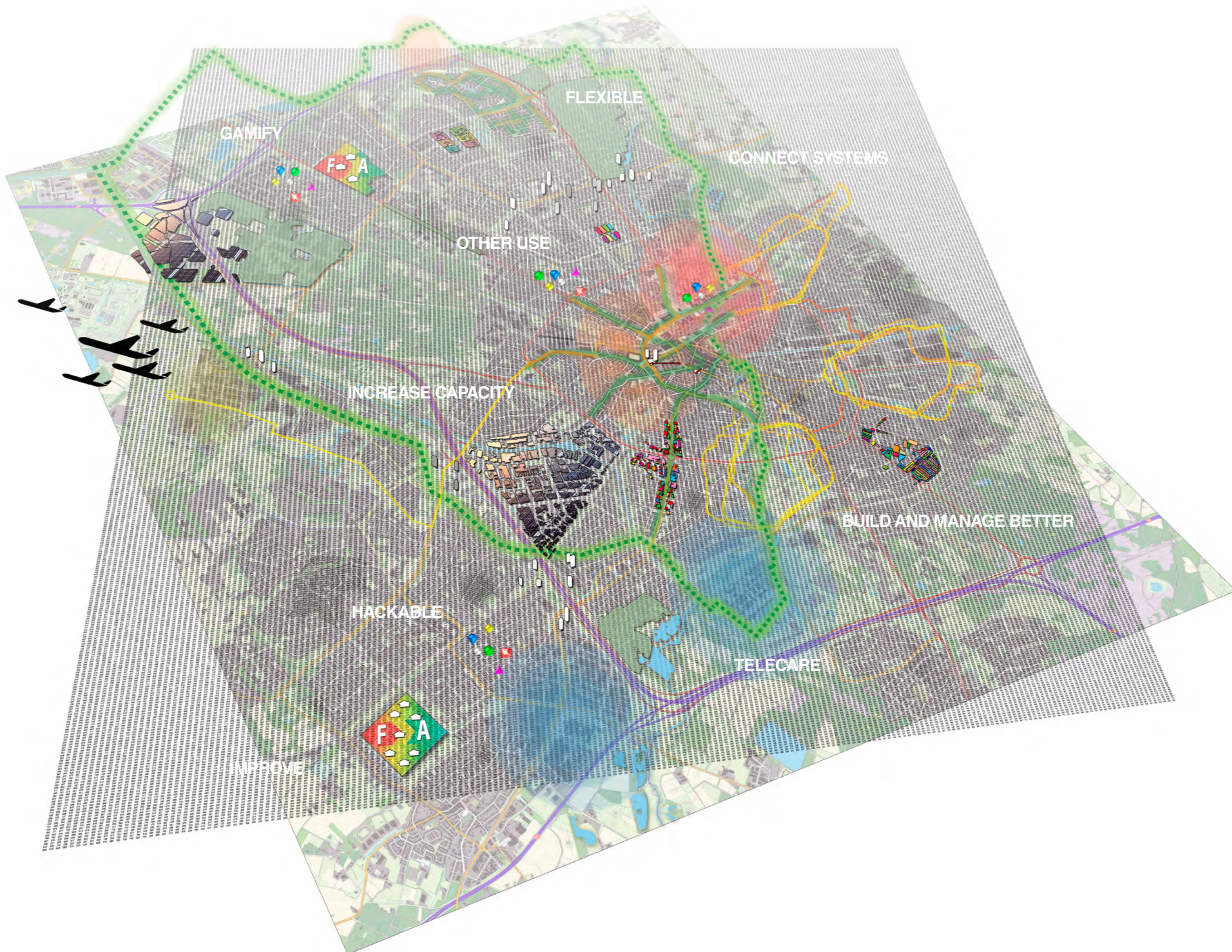
- increasing transparency;
- making the 'middle men' disappear;
- reducing planning and construction mistakes;
- utilizing capacity better;
- facilitating access to the 'market'

Urban designers should thereby learn from the various business models that are common in the online world. From the iStore-market model for apps from third party developers to public crowdfunding.

Also one can work in small iterations, where alpha and beta versions are created and space is built within the release for incremental improvements based on feedback from users and stakeholders.

Digital technology breaks the continuity of scales, territory, space and systems with which spatial planners and designers are used to work. Planners should learn should learn to think increasingly horizontal next to vertical. Breaking through the whole process and organization of planning:

"Open Source is different from technologies and technological applications. I see in Open Source a DNA that resonates strongly with how people make the city theirs or urbanize what might be an individual initiative. And yet, it stays so far away from the city. I think that it will require making. We need to push this urbanizing of technologies to strengthen horizontal practices and initiatives. Leading urban civic institutions tend to verticalize this work of making





EXAMPLE 4: ROADS (TEMPORARILY) USE DIFFERENT

The aggregated data of the city can also be used dynamically for a kind of pop-up planning: the rerouting of traffic and re-engineering of infrastructure. For example, one lane less, or at times closing roads completely in order to enable different use of these spaces.



EXAMPLE 5: BETTER BUILD AND MANAGE

Link administrative expenses per area to investment time in that area. Create work with work. When investments are no longer in line with operational costs: release, other investments or pilots with private management in districts. Examination of Stamen Design shows a correlation between crime and the number of trees in a neighborhood.



EXAMPLE 6: GAMIFY

Games are used as educational function, but also to engage people and imagine better plans or ideas. The game 'busmeister' for example lets people think about the bus system and its inherent complexity in their own city.



EXAMPLE 7: TOGETHER ON A SMALL SCALE

Bottom-up: organizing groups can stimulate initiatives. Existing space can be flexibly used throughout the day. Different groups at different times. Sometimes green, sometimes parking, sometimes playing.

the urban. But they do matter. Here the appropriate technology is more akin to developing an urban Wikileaks: vertical institutions that begin to leak and thereby enable citizens to work with at least some of what is useful in those leaks in the ways they see fit. This is akin to horizontalizing what is now vertical, imposed by top-down authority.”⁹

EINDHOVEN, HACKABLE METROPOLIS

In 1983 TU Eindhoven ran the project “Eindhoven Metropolis”. It was an analysis of the city of Eindhoven, a city without borders, that incorporates all forms of the city into itself. “The clear typological city structure is accompanied by an ambiguous blend of buildings, partly rural, partly urban, partly radial and partly tangential, partly linear, partly flat shaped.”¹⁰ Based on this analysis, a plan was drawn for a ‘metropolis’ with 1 million inhabitants. In this plan a clear grid appeared at a certain height above this ‘soft city’ that allowed the city to densify. Above 30 meters Eindhoven looked like Manhattan.

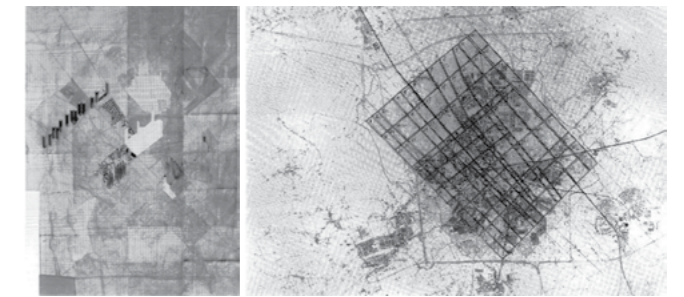


J. Mayer H. - Audi Urban Future Initiative: bi-directional infrastructure makes traffic lights superfluous

At the moment Eindhoven characterizes itself by an excess of space. Especially in the infrastructure of roads: the center is easily accessible by car and therefore other forms of mobility are not stimulated. In addition there is a surplus of industrial sites and even a surplus in social housing. Growth in Eindhoven will therefore certainly not translate as (vertical) expansion, but in exploiting the inefficiency.

Where in the first project the development of Eindhoven into a ‘world’ city was accompanied by quantity and densification, one could say that at the present time it is much more about quality and ‘connectivity’. The physical metropolis Eindhoven must be mainly a mental metropolis, a city that (part of) the global elite can master.

Eindhoven is one of the smartest areas of the world, but has struggled to gather and hold on to global knowledge, innovation and design (how do they stay within the ‘Champions League’?, as they say in the region). The jobs are there, but the city is not attractive enough. The use of digital technology for the city, to go and see this as a public project and ‘open’ the city for and by digital technology will make the city, so is the premise, more attractive. The city is thus indeed ‘hackable’: shaped



In the plan ‘Eindhoven World City’ a grid appears at 30 meters, on which the city is densified.

and improved by its (future) residents. Eindhoven is an interesting field for new spatial and organizational forms of urban development, its own testing ground for innovation. The city is not created for, but by the residents exactly in the way they want to design, use or see it themselves.

Eindhoven is a suitable test-site for the use of digital technology in the city because of social necessity, the combination of high-tech, manufacturing and design, and because of its spatial structure.

The use of digital technology in the city requires another type of map: from space and quantity to another type of spatial thinking. The map of Eindhoven Hackable Metropolis shows that investment in open data makes a wide range of bottom-up activities, improvements, other uses and primarily a nicer city possible.



EXAMPLE 8: MINIMAL VIABLE PRODUCT

In software development a prototype and the reactions upon it are tested first. This could also be applied in the development of cities. For Eindhoven that could mean that with some boxes and other paving a pedestrian route between downtown and the Bergen area could be made on the Fens terrain.



EXAMPLE 9: CONNECTING SYSTEMS

The relationship between city and country will change: typical rural activities in the city (agriculture, green and recreation) and typical urban activities in the landscape (energy generation, shopping and theater). Eindhoven the quality of a green environment will also be noticeable in the city.



EXAMPLE 10: TELE CARE

Smart technology can be used for healthcare. For example, the opportunity to monitor patients without home visits (time saving). To keep healthcare functions within the neighborhood, and use neighborhood networks to better organize 'social care'.

SOURCES

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- ³ *The Economist*, *Commons Sense, Why it still pays to study medieval English landholding and Sahelian nomadism*, 31/07/2008
- ⁴ <http://www.biketastic.com/>
- ⁵ <http://www.lamontreverte.org/>
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Accountability illustrations:

- p. 3: Illustration by Jac Depczyk³
 p. 5: Stefan van der Spek - *Sensing the city*, Delft van boven. TU Delft
 p. 7: Joost Meuwissen et al. - *Plan Eindhoven Wereldstad*. 1983

COLOPHON

Amsterdam 2013
 One Architecture in collaboration with The Mobile City

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An assignment of the Deltametropolis Association
 Workweek: Metropolis NL

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