Cities and regions all over the world are reinventing their positions; either driven by changes in national policies decentralizing governance or reacting to the reality of competition and collaboration on subjects such as economy, services or the changing number of inhabitants. This often originates from a desire or perceived necessity to respond to the changing ambitions of industries and citizens, as well as to global influences.

Due to the complex and intricate nature of upcoming challenges, there's a need to improve decision-making and policy processes just as much as there's a need to service and renew spatial structures as demands are changing. One can state that changes in urban developments are driven by changes in population and their needs. Energy and sustainability issues have become a common consciousness deserving appropriate response in terms of policy and spatial planning. One can easily add to these examples.

DESIGN THINKING

These current challenges are becoming more complex and interwoven. Fed by a large number of sometimes contradictory and various ambitions they need to be addressed in a manner that justifies all involved. Changes are good. And by nature, changes are complex and difficult to implement. They are disruptive and evoke resistance. Change needs community, involvement, and commitment. The more complex a challenge is, the more actors or stakeholders need to be involved, and the more inadequate traditional means to development becomes.

One needs to build robust solutions, or better, robust environments and contexts. Solutions tend to address current situations incapable of adjusting to changing realities. It is exactly those rapidly changing realities – economical, political and social – that have led to the realization that innovation in governance and policymaking processes is crucial for a city to keep operating successfully. Intelligent ways to address and implement developments are needed. Intelligent in terms of creating efficient and economically viable solutions for both processes and implementations; intelligent as in being informed by relevant parties. And the design practice, in general, is by nature the discipline to tackle complex challenges.

STUDIO

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Dutch Scenarios - RESILIENCE is a case study based research & design program. Students from the University of Kentucky took on the challenge to research global and national trend and ambitions related to creating resilient conditions. The city of Delft was taken as the object of projection and testing through developing potential interventions for the municipality of Delft. Current ambitions and trends involve the position of the city of Delft in the upcoming Region Metropole Rotterdam The Hague, the relation between the Delft University of Technology and the city itself and generic European and global challenges.

We did research the current condition of Delft concerning the region and in comparison to similar cities in Europe and the US. The main focus for the development of various scenarios was to enhance opportunities and ambitions and with a special interest to the built environment.

Although the subject of research is realistic and based on actual ambitions and challenges the Dutch Scenarios studio produced 'academic' results. It is not our aim to provide 'readyto-use' solutions for either the municipality of Delft or other stakeholders. Our results need to be based on an open and suggestive approach and can be as extreme in terms of content and implementation conditions (financially / political / etc.) as the research and development of scenarios dictate. As much as the developed scenarios and proposed (spatial) implementations are grounded in actual conditions and political, economic or cultural ambitions they are meant to question and unveil exactly those premises.

The studio has been run as a design office. We worked as a team, producing results both individually and as a group. Our studio is located within a collective office with professional interior designers, architects, and artists. In principal worked five days a week for an eight week period during which we also visited sites, exhibitions, and lectures in the Netherlands and abroad.

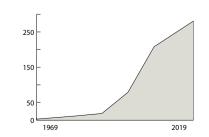
Participants gained skills in managing complex and wide-ranging design related needs and ambitions, through developing inventories, (comparative) analyses and finally extreme scenarios that unveil otherwise hidden potential. As these processes depend heavily on communication, the development of information design (of infographic design) was an integral part of this studio.

University of Kentucky - College of Design Alex Bosse, Olivia Braun, Frank Wang & Hannah Whitley Instructors Siebe Bakker, Kim Degen & Dré Kampfraath Extreme Scenarios Generation-G - Hannah Whitley, HYDROOG - Frank Wang, MOBI-D - Olivia Braun, UrbanHUBdelft - Alex Bosse Publication University of Kentucky students & bureaubakker Info Siebe Bakker: mail@bureaubakker.com ©2019 bureaubakker / university of kentucky - college of design

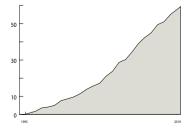
2069 GENERATION-G THE GLOBAL CITIZEN Dutch Identiy: Dutch language Kings Day Cycling Dutch Flag Delta Works Wind MIIIs Dykes The Color Orange The world is Queen Máxima of the Netherlands: becoming "The Netherlands is far too diverse to increasingly more summarize in one cliché. 'The' Dutchman connected. does not exist." Housing Trends in the Netherlands:

Amsterdam Private Hornes Single Person Households The Hague Amsterdam Precent of couples relocating to other municipalities within 4 years of the birth of their first child Utrecht Utrecht

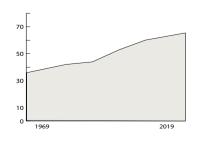
Global Trends:



Number of Trade Agreements



Precent of World Population with Internet access



World Globalization Index



Lending Economy

Comunity Kitchen

2069 GENE-G THE GLOBAL CITIZEN

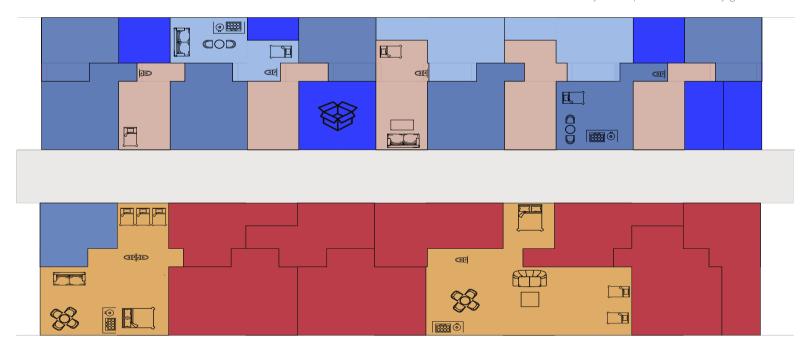
Flexible approach to housing

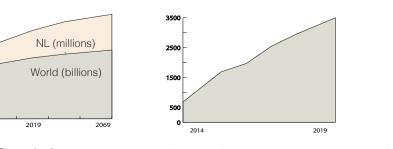
In response to the influx of people to the MRDH region due to globalization and the ambition to create 25,000 housing units in the Netherlands.

Flexiable Religion

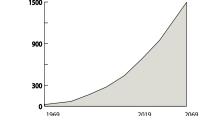
Flexible grid system based on a central unit for 1-2 occupants contains kitchen area, and a bathroom unit. Additional chunks of space and bathrooms can be leased, if smaller families become more common in the future the extra space between units (having access to private bathrooms but not kitchens) can be rented as Airbnbs or storage units.

Allowing students and individuals to live within the same buildings as families of varying size. This system also allows people to option to stay in one place as their family grows.

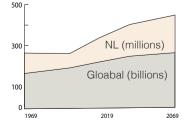




Population Global Social Media Usage (Billion of users)



International Tourist Arrivals (millions of people)

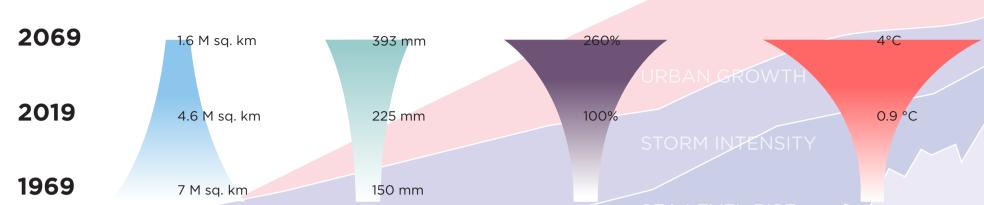


Migration Activity (millions of people)





Global warming modifies precipitation patterns, amplifies coastal erosion, lengthens the growing season in some regions, me<mark>lts ice caps and glaciers, and alters the ranges of</mark> ome infectious diseases.





ARCTIC SEA ICE MINIMUM 12.8% per decade

SEA LEVEL 3.3mm per year STORM INTENSITY

Energy

increase up to 20%

Agriculture

GLOBAL TEMPERATURE



Costal impacts

- •The frequency and intensity of storms are changing
- Precipitation is increasing
- •Ocean temperatures rising
- •Rising acidity in the oceans has significant impacts on coastal and marine ecosystems.



Water resources

- •Climate change is increasing the likelihood of drought and flood •Drought will lead to water shortages, water quality issues and
- •Flooding will lead to destruction of crops, damage to property, and deterioration of health conditions owing to waterborne diseases.



- •Temperature rise will lead to reduced mortality during winter and increased mortality in summer
- •More heat stress caused by extreme weather conditions
- •Air quality will deteriorate during hot summer
- •Greater morbidity and mortality, more hospital admissions, reduced productivity



Mobility

- •Traffic disruption will increase due to extreme weather
- •Damage to roads will increase during summer heat waves



Recreation

•Climate change will lead to decrease of recreational activities.

•Climate change will affect how much energy is produced,

•The demand for energy used for cooling is expected to

•Lower crop yields and reduced quality due to rain, storms, hail

or saturated soil; and extended periods of drought and in the

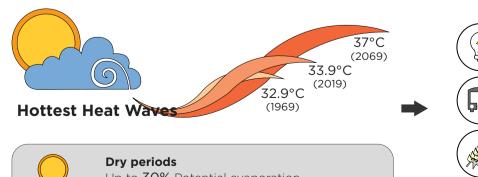
•Damage to production resources by hail, storm or lightning.

delivered, and consumed in the World

absence of adequate irrigation.



n the Netherlands, the result of changing temperature, precipitation patterns and evaporation is that most dry areas will become dryer and





Up to 30% Potential evaporation

wet areas wetter.



Average annual temperature Up to 4°C



Annual Precipitation





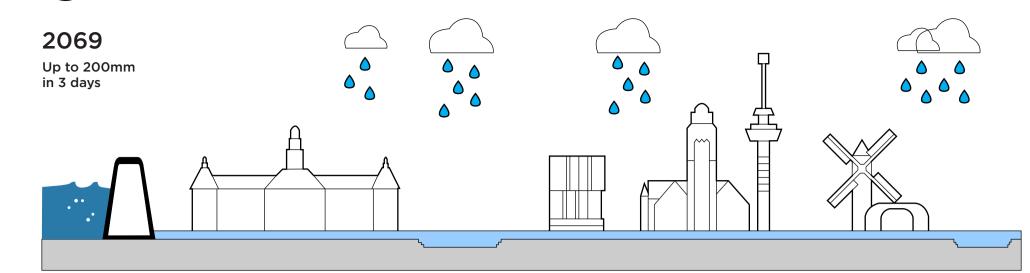
Ten-day total precipitation will exceeded once a year



River Rhine average in winter is up to 27%, extremely high discharges is up to 40 times more often



2069, the Netherlands is only prepared for rising sea levels. Dikes and levees, pump stations and retractable barriers, polders and reinforced dunes have all been erected in a ational initiative to hold back the floodwaters of the North Sea. On the other hand, they are not ready for droughts and extreme precipitation.





urban water retention & urban heat island adaptation



Green roofs are designed to intercept rainfall, which is slowed as it flows through the vegetation and a drainage layer, mimicking the predevelopment state of the building footprint. Some of the rainwater is stored in the drainage layer and taken up by the vegetation, with the remainder discharged from the roof in the normal way.



Rain water harvesting is similar to "cistern technology". Runoff from roofs or other impervious surfaces is captured and treated to a minimal level and used for non-potable needs - for things such as watering gardens, flushing toilets,

This is an embankment built across a depressional area of



Permeable pavers provide a transportation surface that lets water soak down through the gaps between individual pavers into a rock chamber below. The rock chamber is designed for bearing strength and water holding capacity. Water moves out of the voids in the rock chamber and percolates down through the soil, helping recharge ground water, filtering out pollutants, and cooling the water while releasing it slowly.



BASINS

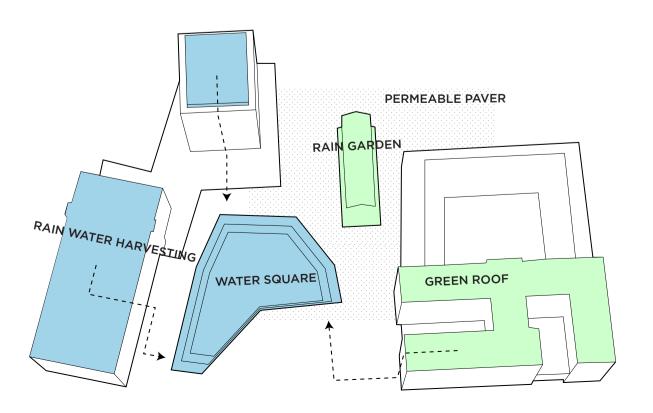
concentrated water runoff. It traps sediment and water running off farmland above the structure, preventing it from reaching farmland and water bodies below.

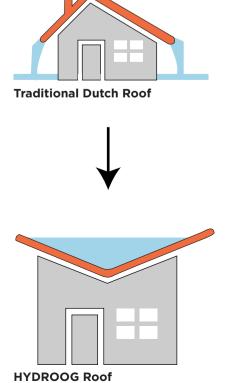


Bioswales are vegetated drainage ways that provide an alternative to buried storm sewer pipes. Bioswales may be cheaper to install and provide water quality benefits that storm sewers can't provide. Bioswales are designed to infiltrate runoff of from frequent, small rains and convey large runoff events to receiving streams. A bioswale has a perforated subdrain, a sandy soil mix, and strategically spaced berms to facilitate infiltration of small runoff events. RAIN GARDEN



Rain gardens rely on natural soils that typically allow water to infiltrate and percolate through the soil at acceptable rates. Below ground, rain gardens feature a natural, healthy soil profile that lets water move down through it.





JUNE JULY 2019

DELFT SCENARIOS - RESILIENCE

global trends and ambitions; local strenghts, weaknesses, opportunities, and threats; driving forces; critical uncertainties and four extreme scenarios #architectureschool #bureaubakker #delft #design #imadethat #kentucky #netherlands #resilience #scenarioplanning #studyabroad #ukcod #urbandesign







our local transportation



exploring delft





london, uk



antwerp, belgium



ghent, belgium





brainstorming resilience



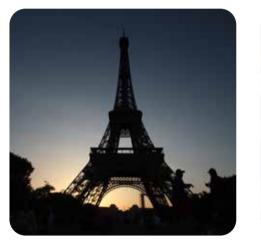
touring the region



maeslantkering, netherlands



paris, france



developing the stories



florence, italy



2nd maasvlakte, netherlands



typical studio lunch



after lunch break



rotterdam, netherlands



budapest, hungary





graphic design workshop







schiermonnikoog, netherlands



towards the newspaper





first sketches of extreme scenarios

MOBI-D

THE FUTURE OF AUTONOMOUS VEHICLES

GIVE UP THE WHEEL



1.2 billion peopledrive daily8 million of thosepeople are within the NL1.3 million die ever

4.3 million die every year due to car wrecks

.94% of those accidents are due to human error Every one in two people in the Netherlands own a car, while the average car could hold 4-5 people
Traffic jams are increasing, and were up 20% from 2018 to 2019



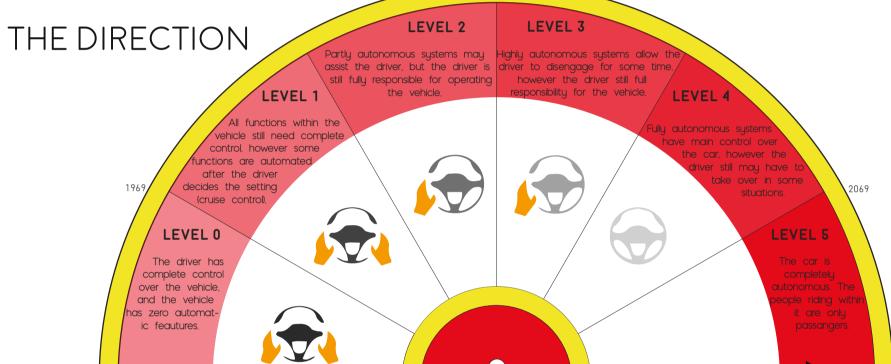
The average car cost in the Netherlands is around \$20,000
The average cost of car insurance within the Netherlands is around \$1,000 per

year

A PROPERTY OF THE PROPERTY OF

Car pollution is one of the leading causes of global warming

Cars release about 333 million tons of carbon dioxide into the atmosphere annually, which is 20 percent of the world's total

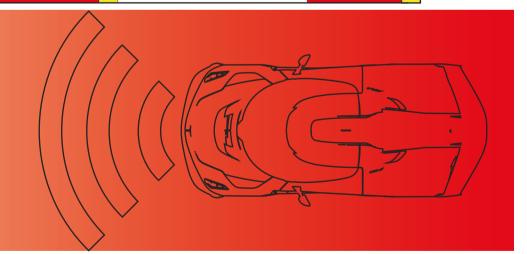


HOW IT WORKS

IoT Sensors: to monitor all movement

loT Connectivity: for constant updates and communication between vehicles

Software Algorithms: to collect data and help determine the best course of action





THE DIGITAL TWIN

According to the KPMG Autonomous Vehicles Readiness Index, the Netherlands is proving to be the world's readiest country for the introduction of driverless vehicles. This has to do with something called the digital twin. In short, a digital twin is a digital or virtual copy of a real-life structure or thing. A digital twin is utilized to connect the real world to the virtual world. This can help with autonomous vehicles because with the digital version of the world in its storage, an A.I machine learning vehicle can maneuver the real world through comparison and recognition.

Luckily, the Netherlands has an extremely planned infrastructure. Therefore, all the information needed make the digital twin for the environment already exists. This will allow for an easy transformation into a Level 5, fully autonomous city. As a midsized city within the Netherlands Delft has room to grow. Implementing this system within Delft will result in several positive changes.

A LEVEL FIVE AUTONOMOUS CITY

THE BENEFITS



Driverless cars are a much safer option for the road. They are not affected by distractions, alcohol, drugs, or emotion. They are purely analytical, quicker to act, and more accurate than human drivers.



Driverless cars can pick up multiple people traveling in the same direction. Driverless cars can detect traffic delays and accidents. The vehicle may reroute the path to the destination in advance to avoid a time-consuming stop.

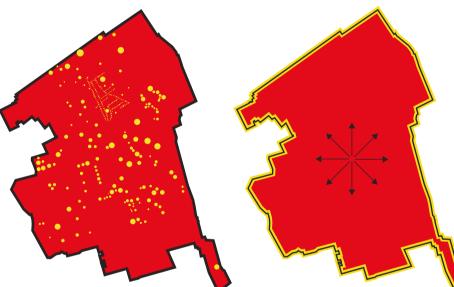


Driverless cars can pick up people wherever and whenever, therefore there is no point in anyone owning their own vehicle.
Because autonomous vehicles are safer, accident-induced costs are eliminated.



Driverless cars will not be completely environmentally innocent, however with their efficiency, it will be a step in the right direction. With significantly lessened traffic, the emissions will be cut down immensely.

THE DELFT EXPERIENCE



Delft's Current Parking Plan (2019)

Delft's Predicted Parking Plan (2069)

By implementing level five autonomous vehicles throughout the city of Delft, a major infrastructure change will be allowed. On the first map of Delft, the red dots represent public parking areas. However, after the implementation of self-driving vehicles, all parking could be moved to the outskirts of the city. The areas that once were for parking purposes can be reconfigured into public meeting places, new housing, or even green space. Furthermore, the use of self-driving, loT connected vehicles will eliminate the need for stop lights and traffic signs. This will offer a more simplistic and open scene on the streets.



Added Green Space



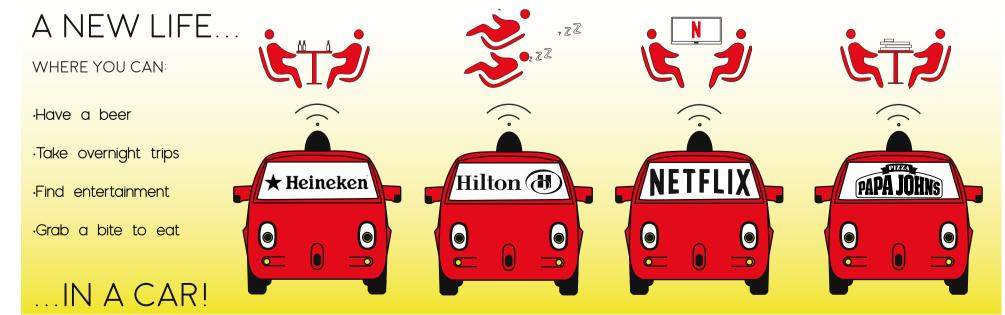
More Public Meeting Areas



New Housing Options

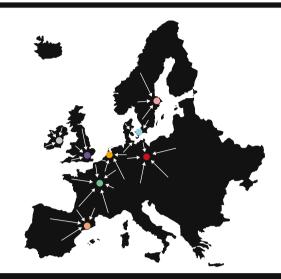


Wide Open Streets



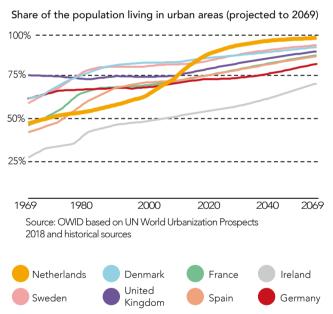
UrbanHUBdelft

Turning Urbanization into Collaboration



Growing Urbanization and Tech Economy

European populations are steadily migrating to urban regions. As a result, cities have become the desired destination for innovative companies and skilled workers. Due to this increase in economic opportunity, **job growth** is concentrating in cities and rural populations are choosing to move to



The tech industry is taking the European economy by storm – Europe's tech industry growth dramatically outpaces the rest of the European economy, with 5 times the growth than that of other industries in the last 20 years.





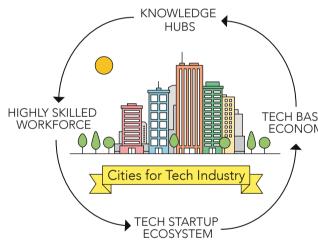
Why Cities are Cultivating the Tech Ecosystem

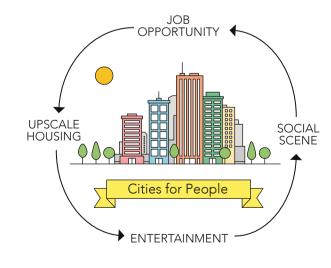
As a result of this increase in urbanization and growing tech economy, certain cities are becoming hubs of both tech industry and social life - forming their own identities within the tech ecosystem.



Acknowledging Tech Innovation Opportunity in the Netherlands

If we zoom into the Netherlands, Dutch technological prowess is not concentrated only in its capital city. Numerous booming tech hubs can be found all over the country. The 6 largest Dutch cities are also among its largest tech hubs.





However, Europe's tech community outside the Top 20 hubs continues to flourish – **53% of all** tech-related meetups now happen outside of the Top 20 hubs in the region, up from 42% in 2014. This is an opportunity for Delft.





StartUp City

Eindhoven³

Amsterdam



Delft



The Hague



Utrecht*



BioTech City

Groningen

Wageningen

Rotterdam³





AgTech City

Design Tech City

* The 6 Largest Dutch Cities

With the # 1 startup business climate in the European Union, its highly educated pool of tech-savvy experts, and its open corporate business culture, the Netherlands has created a rare startup ecosystem in Europe.

UrbanHUB delft anticipates a future in which Delft evolves into a major technological hub at which Delft evolves into a major technological hub at access to highly skilled tech workers, and intercon-

tech ecosystem that is blossoming in Europe. ing a number of collaborative UrbanHUB interven- The qualities of a city – under one roof.

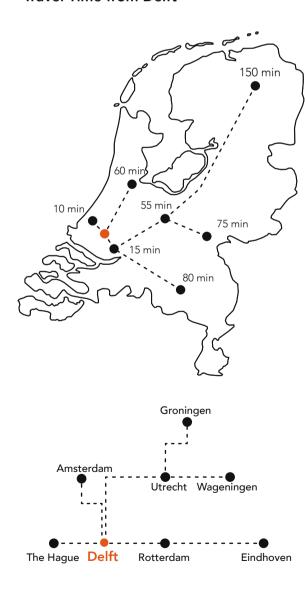
the crossroads of urbanization and innovation. nection with key tech markets like Amsterdam, The companies, skilled workers, and hopeful startups, by Delft's unique location amongst the Dutch urban Hague, and Rotterdam, Delft will become an estab- providing various collaborative work environments, agglomerate will allow for it to take advantage of the lished tech innovation hub by utilizing its ease of restaurants, bars, and luxury apartments; all for the steady urban growth of this region, as well as the mobility and cultivating industry growth by introduc- purpose of promoting collaboration and innovation.



Connecting the Dutch Tech Hubs

The Dutch ecosystem benefits from intercon**nectivity** in a number of ways that help drive the flow of knowledge, talent, and capital. Exchanges amongst counterparts, whether founders or investors, enables the flow of useful ideas and knowledge throughout the Dutch tech ecosys-

Travel Time from Delft



In order to capitalize on this vibrant tech ecosystem, the **point of connection** for these tech hubs will be Delft. Delft is already **centrally** located amongst the most populated region of the Netherlands, and can be easily accessed via existing train routes from all parts of the coun-



Creating a Hub Identity for Delft



TU DELFT

produces a **young**, highly **educat**ed, diverse population





INCUBATOR

students living & working amongst other students produces ideas & collaboration





RESOURCES

university laboratories & research initiatives, a community of tech experts





PROXIMITY

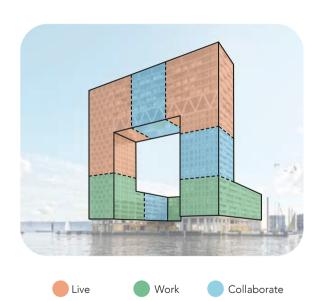
spread ideas easily to the Dutch & Europoean tech



COLLABORATION CITY!

UrbanHUB Implementation in Delft

In order to capitalize on these innovation-cultivating qualities of Delft, UrbanHUB interventions will be built within Delft's technology park on the perimeter of campus. These interventions will provide upscale apartments that will be desirable to recent graduates and young professionals. Additional amenities include co-working and collaboration zones, conference and lecture spaces, and social areas like restaurants, cafés and bars - all aimed toward the goal of promoting the spread of ideas.





These interventions will provide the opportunity for recent graduates and young tech professionals to come together in a suitable and enriching environment, expand their ideas, start a business or collaborate with others.