



# Building the Innovation Economy

City-Level Strategies for Planning, Placemaking, and Promotion

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**Case study: Rotterdam**

October 2016

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Front cover image: Rotterdam waterfront

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## Acknowledgements

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This case study has been developed through a literature review of available academic scholarship, public and private research reports, and media publications. This has been supported by interviews with public officials, landowners, and district marketing organisations.

Our thanks to the following individuals for their insight and advice in the development of this case study:

**Maike Akkers**, Project Manager, Port of Rotterdam

**Peter Anker**, Lecturer, Rotterdam Business School/RUAS

**Thomas van Bergen**, Consultant, Deloitte

**Michiel Jak**, Managing Director, SmartPort

**Bart Heintz**, Project Manager, City of Schiedam

**Menno Huijs**, Policy Maker City of Rotterdam and MRDH

**Maarten Keesman**, Adviser, City of Rotterdam

**Caroline Rovers**, Urbanist, City of Rotterdam

**Walter de Vries**, Urbanist, City of Rotterdam

The authors wish to thank the following for their advice, ideas, and input: **Lisette Van Doorn**, CEO, ULI Europe; and **Dr Elizabeth Rapoport**, Content Director, ULI Europe

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## Executive summary

Many cities around the world are seeking an enhanced presence of the emerging innovation economy in order to grow a new base of jobs, adjust to industrial change, or leverage technology to address sustainability, resilience, and social cohesion. In the current cycle, cities are focusing investment and promotion on new 'innovation districts', locations within the city where the innovation economy may develop and expand. However, not all cities have the endowment, ecosystem, or expertise to host them.

As part of a collaboration between ULI and the City of Rotterdam, this case study was developed to highlight specific attributes that other international cases could highlight to inform the development of the Rotterdam Innovation District so that it will foster an innovation ecosystem and build a long-term strategy to establish itself as centre for innovation. The international cases to compare with Rotterdam are the following: Munich, which has a mature innovation system that is now in its third cycle as a city of innovation; San Diego, California, which has an innovation economy that is now reurbanising and which has leading governance institutions that are actively building a new identity around innovation and global opportunities; and Tel Aviv, which has experienced a full cycle of innovation system growth over the past 30 years and has built a distinctive innovation brand.

Three overriding research questions informed the four case studies:

- What roles are played by city governments, landowners, and investors in building an innovation economy, creating new innovation districts, and sustaining them over time?
- How do land use, placemaking, and real estate help support the innovation economy, and how can they contribute to making a city more liveable and attractive?
- How do branding, communication, and promotion of the city's innovation focus help build identity and successfully attract investors and businesses?

Rotterdam finds itself in a place in which innovation is essential to answering its present and future challenges in the fields of inclusivity, resilience, and economy. The city is challenged by relatively high unemployment and a shortage of skilled workers and environmental issues regarding air quality and pollution and flooding. The redevelopment of former port areas close to the city is seen as an opportunity to explore the Next Economy.

The Rotterdam Innovation District (RID) consists of the RDM Campus, where innovation is stimulated through interaction between university, industry, and government partners who reuse industrial heritage buildings of a former shipyard, and Merwe-Vierhavens (M4H), a partly abandoned waterfront where makers and startups are pioneers who explore the opportunities of the vast site.

In 2015, both areas on opposite shores of the river were launched as one innovation district. But because no direct public transport connection by water is available, a trip from RDM to M4H takes around 30 minutes. Along with limited placemaking and mixed-use construction, interaction or collaboration between both sub-districts is rare and limits innovation development and growth. RDM and M4H today are part of one innovation district label, but the RID developers have a long way to go to shape them into one Rotterdam Innovation District.

### Key success factors for Rotterdam's innovation economy and district development

#### Strategy

##### Develop a Strategy as a City of Innovation

Recognise and leverage the regional innovation context

Prioritise attention on citywide ecosystem development and networking

Grow and support existing innovation firms and activity

Manage externalities that arise

Adapt through the cycles

#### Tactics

##### Optimise Land Use and Placemaking

Support district development with flexibility, responding to market preferences

Use infrastructure and land as platform for experimentation

Employ placemaking to achieve critical mass of real estate and commercial activity, and authentic sense of place

##### Build the City's Innovation Brand

Leverage city DNA and expertise in promoting innovation

Develop innovation brand as a broad identity and shared narrative

Invite others to feel and experience the innovation culture

# 1. The Rotterdam innovation ecosystem

Built at the intersection of both rivers Maas and Rotte, Rotterdam has been a city of trade and shipping for over 700 years. The construction of the Nieuwe Waterweg canal in 1872 improved the accessibility from the North Sea, giving Rotterdam the opportunity to become the gateway to Europe. The Second World War German bombings in 1940 destroyed the majority of the old city centre. After reconstruction, the city and port continued to grow, and new large port sites were developed.

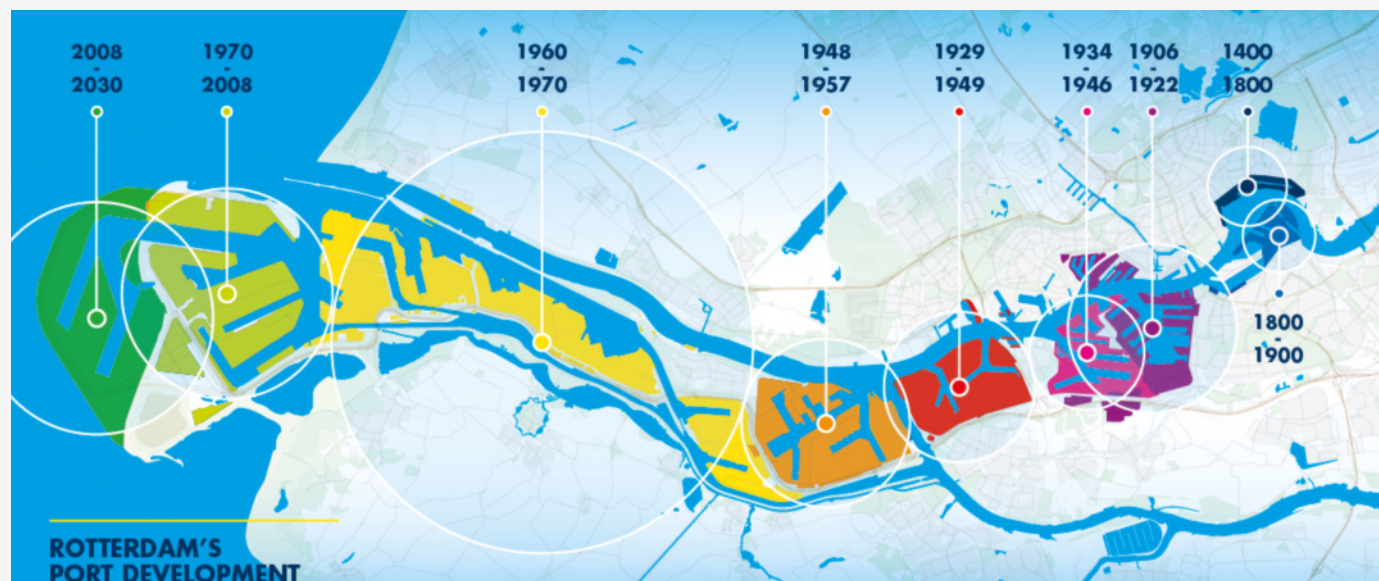
The growth of the port and the city peaked in 1965, when the city had a population of 732,000

and the port and industrial district provided 116,000 jobs. With the rise of the oil industry, Rotterdam became the world's largest seaport, and even today it is still the largest seaport in Europe and the fourth largest in the world. Over the years, as ships have become larger and larger, port activity has moved downstream (see Figure 1), leaving old port areas unused.

Today, Rotterdam has around 620,000 inhabitants and is the second largest city in the Netherlands after Amsterdam. In comparison with the Dutch average and with other large cities—that were able to acquire land from

neighbouring municipalities and to develop new living areas—population growth has been modest. Rotterdam has significant land available within its municipal boundaries, especially in port areas near the city centre. Areas that once formed part of the port have been the focus of large-scale urban redevelopment projects as the city has begun to grow its knowledge economy. Rotterdam's innovation hubs are present in all of its inner-city interaction environments.

**Figure 1:** The relocation of Rotterdam's port functions over time, 1400-2030



© Port of Rotterdam



In November 2015, the City of Rotterdam and Port of Rotterdam jointly launched the Rotterdam Innovation District (RID), just west of the city centre. It aims to redevelop 1.3 million sq m of former port land along the river Maas. The RID and the Rotterdam Central District (RCD), the city's central business area, have been designated as strategic locations to explore the opportunities of the next economy. The RID is the umbrella under which two distinct city port areas—RDM Rotterdam campus and Merwe-Vierhavens (M4H)—are now advertised as one hub of port-related industry and small creative businesses, the Rotterdam Innovation District (see Figure 2 and Figure 3).

The regional innovation ecosystem

Given the proximity and connectivity to other urban centres, Rotterdam is part of an innovation ecosystem that is clearly regional in scope and comprises academic, public sector, and business research and development (R&D) activities.

Figure 2: Attributes of RDM Campus and M4H

	RDM Campus	M4H
Location	South bank	North Bank
Land volume	30 hectares	100 hectares
Properties	Industrial heritage	All sorts
Ownership	Port of Rotterdam	Port of Rotterdam and City of Rotterdam

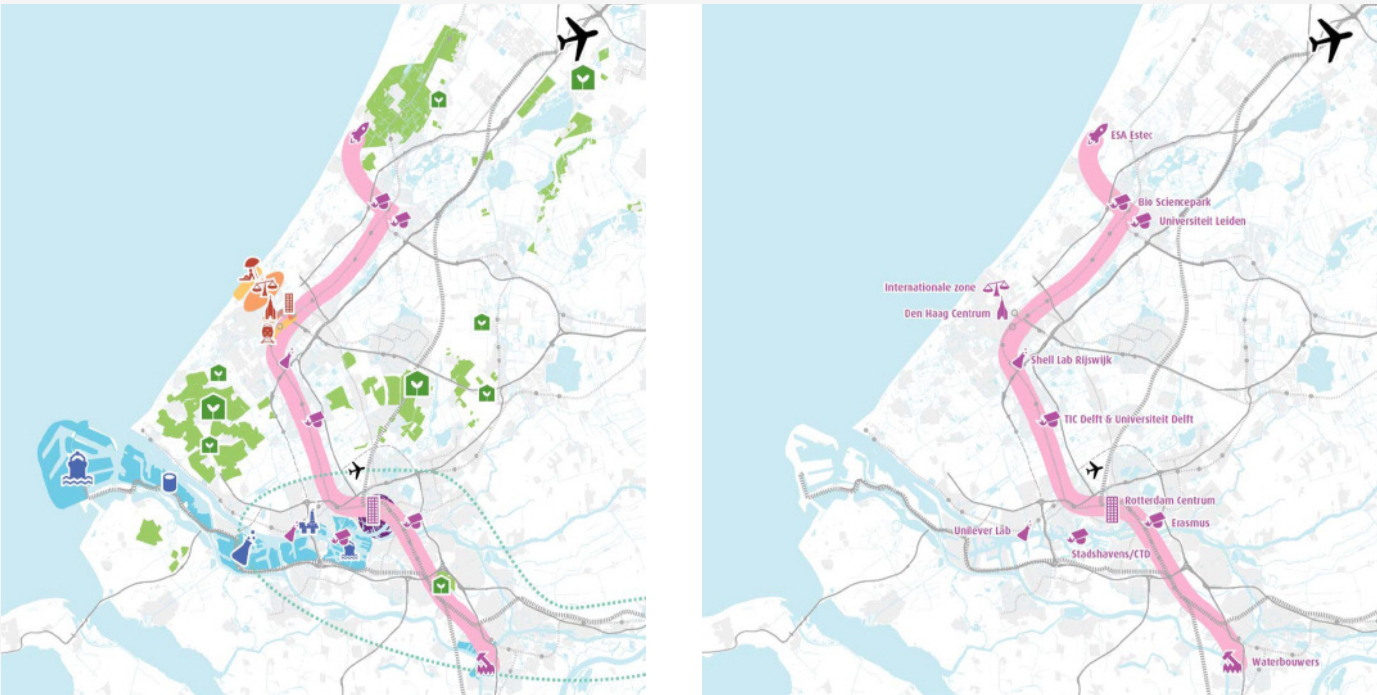
The province of Zuid-Holland is home to a population of 3.5 million people and a labour force of 1.6 million people. The delta region, which includes the cities of The Hague, Rotterdam, Delft, Leiden, and Dordrecht, is one of the most densely populated areas in the Netherlands, accounting for a fifth of the Dutch population and over a fifth of national gross domestic product (GDP).<sup>1</sup> The wider region, and indeed the rest of the Netherlands, have a clear advantage in a pivot towards the innovation economy. Zuid-Holland was ranked tenth in the E.U. Regional Competitiveness Index 2013, with Utrecht ranking first and Amsterdam ranking

sixth.<sup>2</sup> More is invested in R&D in Zuid-Holland than in any other Dutch region, almost €2.8 billion, thanks to a number of strong public knowledge institutions, including Delft University of Technology, Leiden University, and Erasmus University Rotterdam. In contrast, R&D spending by private companies lags national and international standards because relatively few innovation-driven companies are located in Zuid-Holland, although those that are active in the region do collaborate more than average and are very R&D intensive and internationally competitive.<sup>3</sup>

Figure 3: Rotterdam Innovation District includes RDM Campus (in front) on the southern bank of the river Maas and Merwe-Vierhavens (M4H), on the northern riverbank.

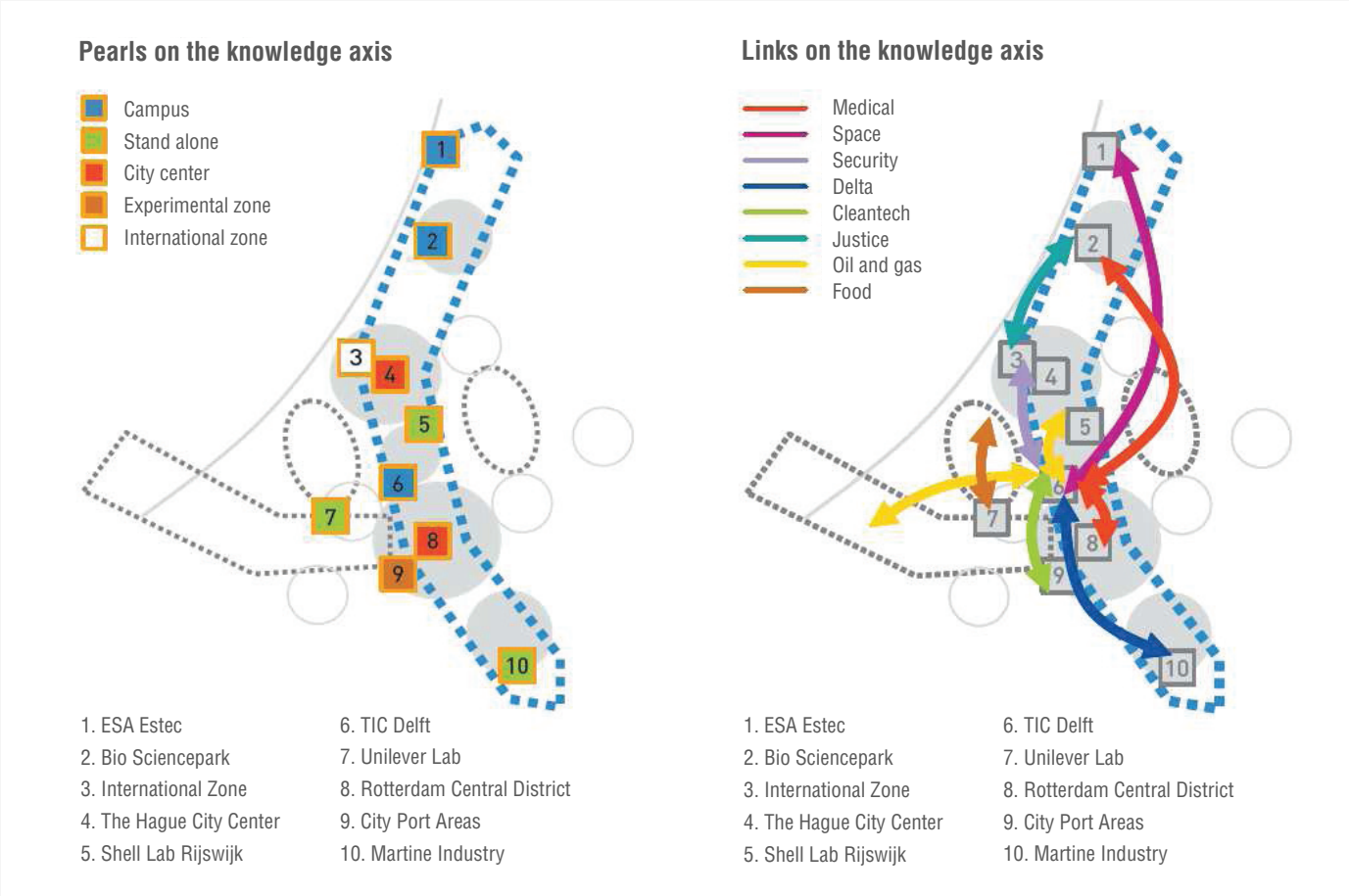


Figure 4: Zuid-Holland knowledge axes



Source: APPM Management Consultants, Ecorys, and Goudappel Coffeng BV<sup>4</sup>

Figure 5: Pearls (left) and links (right) in the Zuid-Holland knowledge axes



Source: Provincie Zuid-Holland<sup>6</sup>



The Zuid Holland innovation system is shown in Figure 4. Universities, knowledge institutions, and R&D facilities of large companies in this regional ecosystem are the 'pearls' in the innovation chain (see Figure 5).

Rotterdam's wider region ranks among the world's leaders in the fields of agri-food; maritime and logistics; health and life sciences, and security and justice.<sup>5</sup> The pearls in the chain are linked by these and other economic activities, making use of rail (intercity and high speed) and motorway (A4, A13, A16) transport links that run along the knowledge axes and provide international connectivity from Schiphol Airport towards Antwerp and Paris.

The most established innovation hub in Zuid-Holland is business incubator YES!Delft, which secured the fourth position in the European UBI Index 2015 list of leading university incubators. Since its founding ten

years ago, YES!Delft has supported more than 160 startups, and hundreds of technologies developed there have been patented. In 2015, these companies were active in more than 80 countries and jointly accounted for an invested capital of over €130 million and over 1,000 jobs.<sup>7</sup>

The Organisation for Economic Co-operation and Development (OECD) review of Dutch innovation policy in 2013 identified the need to increase public spending on innovation and the provision of innovation skills and to support small entrepreneurial companies and startups and cross-sector innovation.<sup>8</sup> One response was the establishment of the MRDH region. This collaboration of 23 local authorities worked on a "Roadmap to the Next Economy" in collaboration with social thinker Jeremy Rifkin and in 2014 helped establish Innovation Quarter, a regional investment agency for the metropolitan region.

## Innovation hub Cambridge Innovation Center (CIC)

The innovation hub Cambridge Innovation Center (CIC) chose to locate in Rotterdam for a number of reasons: high proximity to technical universities, easy access by air and rail, and access to the broader network of complementary cities (see Figure 6). These distinct strengths of Rotterdam, along with the strategic vision of the city government are at the heart of the CIC vision.<sup>9</sup> CIC aims for its Rotterdam base to house 500 companies within three years. In May 2016, its shared office co-working space is home to 11 start-ups, seven sole proprietors, one scale-up, two venture capital investors and eight corporates.<sup>10</sup> Although it is difficult to predict exactly how many jobs these young, fast-growing companies will generate, evidence would suggest a sizeable impact in job growth from CIC companies.<sup>11</sup> (See Box 1).

**Figure 6:** Location of Cambridge Innovation Centre (CIC) next to Rotterdam Central Station at the heart of in the Rotterdam Central District (RCD)



## Box 1: **Venture Café**

Venture Café Rotterdam provides networking programmes and targeted initiatives to foster an entrepreneurial and innovative ecosystem in Rotterdam. Created by the Cambridge Innovation Center, the café creates a unique environment that seeks to ensure interaction between all of the city's entrepreneurs, whether based in the innovation district, the Central District, or elsewhere.



## **Drivers of the next economy for Rotterdam**

For Rotterdam, the innovation economy is critical to developing a new economic and employment base. Although the city has seen GDP per household increase, growth is lower than that of other large Dutch cities. The unemployment rate is 13.9 per cent, higher than Amsterdam (10 per cent), The Hague (11.1 per cent), and Utrecht (8.3 per cent). Over the period 2009 to 2014, employment in the Rotterdam region declined by around 5 per cent, compared with moderate growth in other Dutch regions.<sup>12</sup> Furthermore, a mismatch can be observed in the regional labour market: there is a relatively large pool of job seekers (including low-skilled former port workers) in addition to a shortage of skilled workers, especially people with a technical background. This gap is expected to grow in the near future because of the ageing workforce and further technological innovations.

As a port city, Rotterdam has attracted migrants from all over the world and now has a relatively young population coming from 166 countries. The city has a high share of households with incomes under the social minimum compared to the Dutch average.

The Rotterdam region suffers from more pollution and congestion than most other regions in The Netherlands, problems that the City of Rotterdam and the Port Authority are actively trying to address.

To overcome these economic, social, and environmental challenges, Rotterdam wants to lead the way to a more sustainable and resilient

society and economy. The City and the Port have recognised the imperatives and opportunities of global trends like climate change, natural resource depletion, and digitisation, and the region's vulnerability in terms of its fossil-fuel economy dependence. Their work is informed by research that shows that every euro invested in the old economy costs society two euros, whereas every euro invested in the new economy yields three euros of added value in terms of innovation, employment, and economic structure.<sup>13</sup> Thus, building an innovation economy is essential if Rotterdam and the wider region aim to become a leading engine in Europe's future.

A wide range of Rotterdam partners strived to attract the World Expo 2025 to Rotterdam, but in May 2016, the national government decided not to support the bid. City government and the Port Authority have to develop the RID without the attention and funds the World Expo would have created. According to officials, however, traditional developers as well as companies are showing increased interest in the area again. It is up to the RID developers to manage all those initiatives and consider if they will fit into the city and port's ambitions.

## **The metropolitan innovation ecosystem**

This case study aims to develop an understanding of the role of the Rotterdam Innovation District in the metropolitan innovation ecosystem. Specifically, the main question Rotterdam seeks to answer is this: *How can further development of the Rotterdam*

*Innovation District (RID) be directed to strengthen the innovation ecosystem of Rotterdam and the Metropolitan Region Rotterdam The Hague (MRDH region)?*

This question is addressed by focussing on the 'catalytic' roles of innovation hubs, the roles of urban planning and the real estate community, and the physical assets of the districts themselves.

Rotterdam's asset location and cluster development has given rise to five recognised centres of activity (see Figure 7). The most central of these is Rotterdam Central District (RCD), which has long been developed as a central business district with a focus on offices for corporate tenants in a mixed environment.

In Figure 8, Rotterdam's most recent view on urban development revolving around several inner-city interaction environments is combined with the location of the most important innovation hubs. This effectively represents a spatial picture of Rotterdam's city-level innovation ecosystem. Just as on the regional level, the system might be shown as a chain or axis along an infrastructure corridor, within Rotterdam itself, the East-West metro line connects all the hotspots.

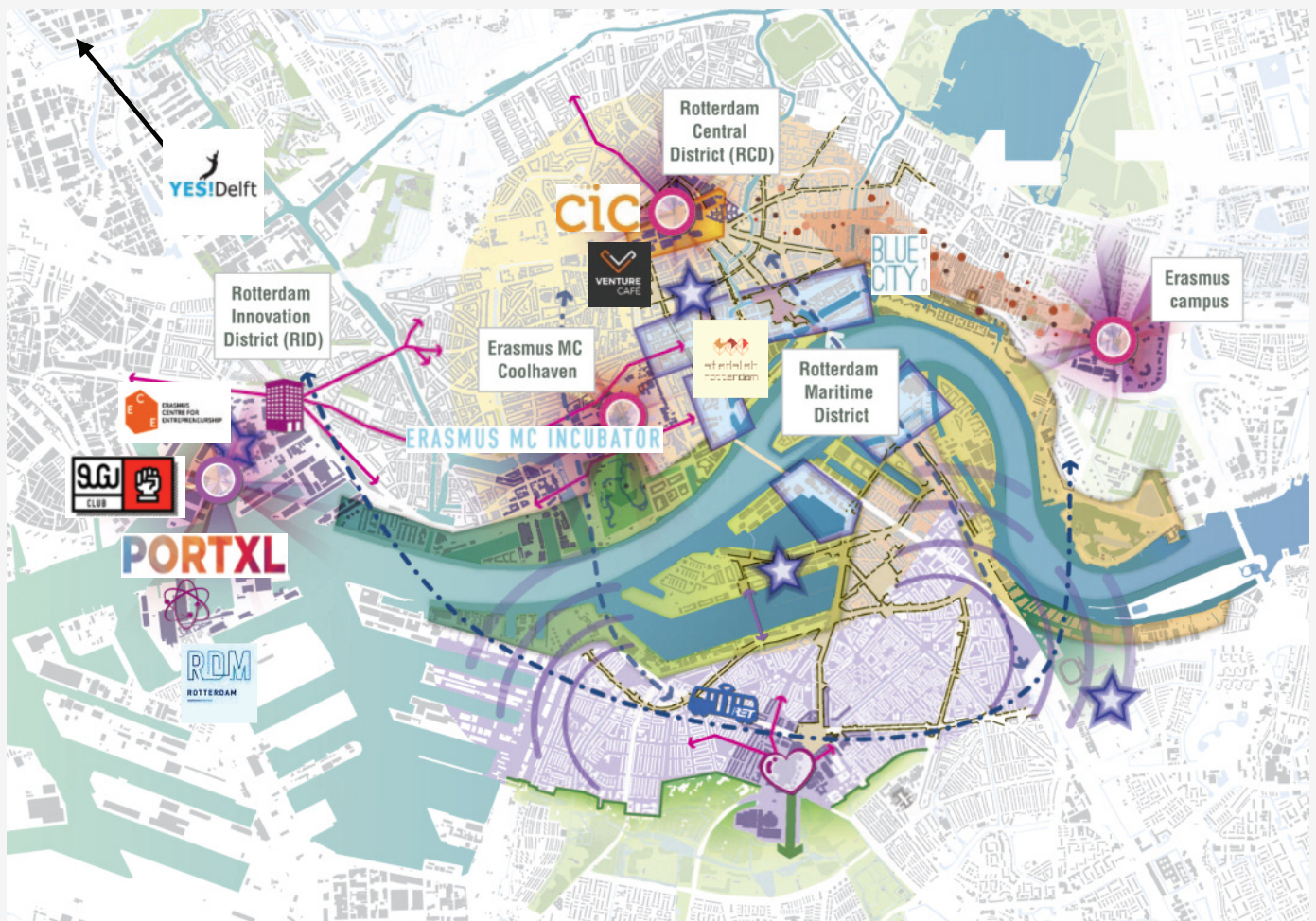
This spatial mapping of the innovation ecosystem however can be deceptive. It should not obscure the important fact that at the core of any innovation ecosystem are companies, people, and relationships and not organisations or investments (in real assets).



**Figure 7:** Rotterdam's five 'interaction environments' in its inner city

Interaction environments	Uses; scale of buildings	Co-located innovation hub
Rotterdam Innovation District (RID)	Industry and creatives; large scale	RDM* Erasmus Centre for Entrepreneurship (ECE)* SuGu Club Port XL
Erasmus MC Coolhaven	Hospital and education; large scale	Erasmus MC Incubator
Rotterdam Central District (RCD)	Offices; large scale	Cambridge Innovation Centre (CIC)* Venture Café
Rotterdam Maritime District	Mixed use; mid-scale	Bluecity010* Stadslab
Erasmus campus	University; large scale	

\*Rotterdam startup city had innovation hubs that eventually formed the heart of one innovation ecosystem.

**Figure 8:** Rotterdam's inner-city interaction environments as indicated by the municipal urban development department. Rotterdam startup city as innovation hubs that form the heart of the innovation ecosystem.

Source: Municipal urban development department of Rotterdam <sup>14</sup>



## 2. Innovation as driver for redeveloping Rotterdam's city-port: Rotterdam Innovation District

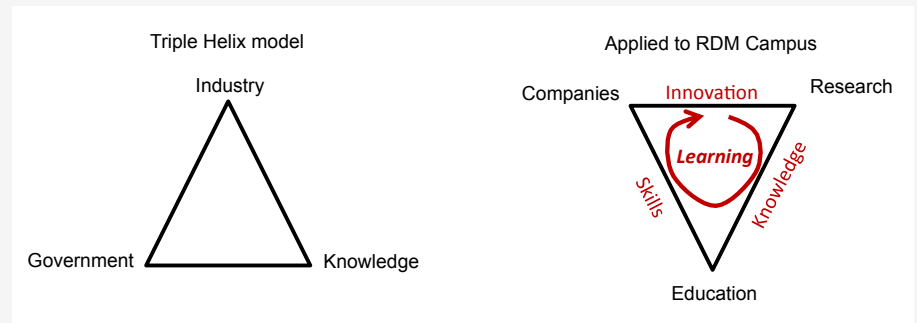
The RID aims to be complementary rather than auxiliary to the RCD. While the latter is more service oriented and home to high-tech companies, the RID is intended to be a hotspot for smart manufacturing, including R&D, testing, and prototyping. The RID seeks to create a hybrid zone between the exciting developments in the city centre and Rotterdam's globally competitive port. Together with the RCD, the RID creates a platform for innovative entrepreneurs and multinationals to join forces, as the Port of Rotterdam strives to become the world's smartest and most sustainable port.

### 2.1 Changing port-city dynamics and the new imperative for innovation

The Port plays an essential role in Rotterdam's step change to accommodate the innovation economy. A succession of port land redevelopment projects has occurred in Rotterdam in the areas around Oudehaven, Zalmhaven, Leuvehaven, and more recently with the development of Kop van Zuid and Katendrecht. Although this first wave of waterfront developments projects was very successful, the second wave demanded a different redevelopment strategy.<sup>15</sup>

Because of the financial crisis in 2008, the municipality was not in a position to initiate large-scale redevelopment projects as officials had done previously. In addition, the Port of Rotterdam has to prepare for a fossil-free future and move to a circular economy. Those requirements have involved major changes for transshipment, storage, and production activities in the port area.<sup>16</sup> In its need for innovation, the port has shown increased interest in the old port areas, particularly RDM and M4H.

**Figure 9:** The Triple Helix model applied to the RDM Campus



The relationship between the City and Port in Rotterdam is changing. Instead of a traditional 'port-out, city-in' model, the City and Port Authorities have joined forces to apply a 'city-port' approach, creating crossover areas where the opportunities of the next economy may be explored. The waterfront areas in the second wave of development are significantly further from the city centre than the first wave of waterfront redevelopments, as planners search for new economic sectors to strengthen the profile of the area.<sup>17</sup>

### RDM Campus

RDM Rotterdam or the RDM Campus is a former shipyard of the Rotterdam Dry Dock Company on the southern bank of the river Maas. The RDM started shipbuilding in 1902 and developed into a leading shipbuilding and repair company in the Netherlands. After the bankruptcy of the last RDM branches in 2004, the site was seen as a potential location for offices and business as well as for housing. However, the redevelopment of RDM was not allowed to create environmental restrictions that would negatively affect the port companies operating in the vicinity, and the redevelopment risked becoming deadlocked.<sup>18</sup>

In 2005, the Rotterdam University of Applied Sciences (RUAS) and the Albeda College for vocational education developed a campus model for their technical degree programmes on the basis of the concept of the 'Triple Helix' of university-industry-government relationships (see Figure 9).

The partners ultimately managed to convince the chief executive officer of the Port of Rotterdam of this concept and the new opportunities it would create for both the port and the city.<sup>19</sup> Redevelopment started in 2007, when the former head office and the Machine Hall of the RDM shipyard were refurbished and opened in 2009. Today, the Machine Hall is known as the Innovation Dock. The Innovation Dock is the core area within the campus whilst it is home to the RUAS and Albeda College as well as some small enterprises, based in shared facilities. The name RDM is still used, but today it's an acronym for Research, Design, and Manufacturing.

In recent years, the campus development has continued with refurbishment of the Shipbuilding Hall (2014), the Submarine Hall (2015), and the Coarse Forge, which should be finished in 2017. Campus development will be completed when the Coarse Forge is complete. At that point, all former RDM buildings today have a new use today, and only the Port Authority's Quarantine site still waits for redevelopment.

In the redevelopment of the RDM site, the Port of Rotterdam was more than just a traditional landlord. Together with the two educational institutions, the Port Authority effectively became the developer of the site in the absence of interest and funds from traditional partners. The Port Authority has been the main financier, investing over €100 million in the RDM campus, developing new competencies and expertise in cultural heritage and business development along the way. Return on investment for the RDM redevelopment is lower than the Port of Rotterdam is accustomed to. Clearly, the Port of Rotterdam has more than just financial motives for the redevelopment project. More prominent are considerations of commercial and social strategy. In this case, the Port of Rotterdam and the educational institutions have taken the role of active developer from parties such as municipalities, housing corporations, and real estate developers that are traditionally associated with waterfront developments.<sup>20</sup>

### Merwe-Vierhavens (M4H)

Merwe-Vierhavens (M4H) is a 1 million sq m site on the northern bank of the river Maas. Constructed between 1912 and 1930, this area was one of the world's largest fruit handling ports, and still is. Over time as these businesses expand, they are expected to move to port areas further from the city centre, and reuse of the current space is being planned. Today, the first pioneers have already entered the area, operating alongside the large-scale and still dominant 'old' economy.<sup>21</sup>

**Figure 10:** Startups, small and medium-sized enterprises, and multi-tenant buildings in the Rotterdam Innovation District (RDM Campus on the southern bank of the river Maas and M4H on the northern riverbank)



Since the onset of the financial crisis in 2008, the approach to redeveloping former port areas has changed. Before the 2008 crisis, M4H was meant to be the next large-scale urban waterfront redevelopment project. These residential plans attracted little interest from traditional partners in real estate development, whilst the municipality's financial situation made it impossible to make large upfront investments. During the crisis, vacant properties in the M4H area were taken by small 'maker' companies and initiatives. The makers movement embodies the next economy as they strive for a positive impact on their surroundings, creating jobs for the underprivileged and improving local environmental conditions.<sup>22</sup>

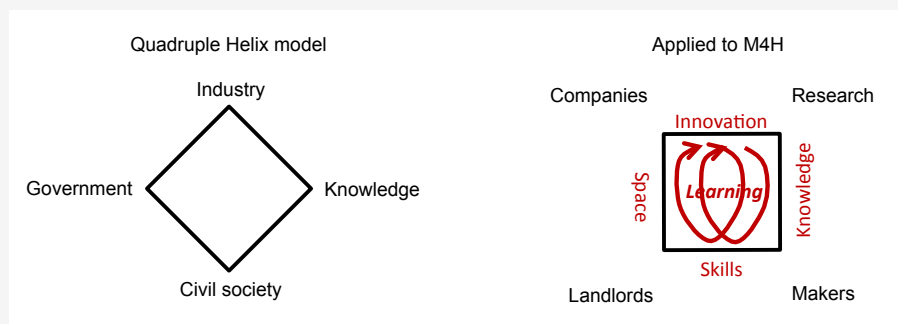
Today, the city government and Port Authority are beginning to test a more organic and flexible approach to the redevelopment of former port land in M4H. Rotterdam City Ports, a partnership between the City of Rotterdam and the Port of Rotterdam, is searching for new opportunities for the underused former port and industrial sites by accommodating new businesses and entrepreneurs and by having them take the lead in the area's development. In 2015, Rotterdam City Ports published the 'Get involved in M4H' strategy. This strategy is not so much a plan as it is an open invitation to latent local networks and bottom-up initiatives to create new structures of collaboration in the redevelopment of the area.

This approach to open governance by local networks and bottom-up initiatives resembles the Quadruple Helix blending in the perspective of civil society in innovation as shown in Figure 11.

Although plans for M4H aspire to bring forward a range of small ‘maker’ companies and workspaces, the site lacks amenities and public environments to generate the buzz and the stickiness needed for real interaction. This is where placemaking—creating true mixed-use environments and adding sufficient amenities—come into play in strengthening an innovation district. This process is often a challenge in districts that are remote, under complex ownership, or lack the right real estate product.

In the redevelopment of M4H so far, the city government and the Port Authority have taken on a more facilitative and supportive role than the proactive role they have played in the RDM redevelopment. With the launch of Rotterdam Innovation District, both redevelopment projects are brought together. However, the two subdistricts are separated by a 400 m wide river. With no direct public transport connection by water, a trip from RDM to M4H takes around 30 minutes. That combined with limited placemaking and mixed-use design has led interaction or collaboration between both subdistricts to be rare, limiting innovation development and growth. RDM and M4H today are part of one innovation district label, but the RID developers have a long way to go to shape them into one Rotterdam Innovation District.<sup>23</sup>

**Figure 11:** The Quadruple Helix model applied to M4H



## 2.2. The catalyst role played by city government, Port of Rotterdam, and other actors in the RID

The relatively strong regional position of Zuid-Holland in terms of innovation stems from the presence of three excellent universities and other public research facilities. Still, the crossover to the commercial economy is perceived as weak. Only incubator Yes!Delft builds on a successful ten-year track record of commercialisation. Over the past two to three years, efforts by the municipality, the Port Authority, and universities have led to the creation of a number of innovation hubs, with CIC the most prominent example. Clearly, those public actors are aware of the innovation potential that Zuid-Holland is missing out on and are trying to bridge the gap between government investment in fundamental research and industry investment in direct product development.<sup>24</sup>

## City government and the Port of Rotterdam

The development of both RDM Campus and M4H already offer some evidence of such a change in roles in a limited context. For RDM Campus, it was through a joint effort of visionary leaders of the educational institutes that the new campus concept was set up, and these organisations also took the lead in implementing the project. The new collaboration between the city and port in the Rotterdam City Ports organisation also provided an open governance structure that has enabled key stakeholders to come together to explore and clearly set out the priorities for RDM as a City Port area. Although quite flexible in execution, the development process of RDM Campus is top down, structured by the single ownership of the Port of Rotterdam.

As for M4H, it is an open or ‘organic’ urban development process. The redevelopment of the area itself is able to play a part in the innovation. It is a Living Lab, where co-creation, exploration, experimentation, and evaluation bring together public and private actors, such as companies and associations, and individuals to test new services or products.



## 2.3. Land use, real estate, and placemaking in the RID

### Land use

At present, the RID is home to a variety of innovative occupants. Most established stakeholders such as educational institutions, research centres, and corporates are based at RDM, whereas M4H is home to startups and small enterprises, categorised as 'makers'.

The RUAS is an important resident of the RDM campus. The RUAS is based in the Innovation Dock, a massive 23,000 sq m former machinery hall in which startups and established companies can rent space to develop, test, and demonstrate prototypes. RDM is home to a variety of

established corporates such as Ampelmann Operations and Franklin Offshore, research centres as RDM Centre of Expertise and Research Centre for Sustainable Port Cities, and a large number of small enterprises and young entrepreneurs. Most of RDM residents' activities and research projects are related to the port. The Submarine Hall today hosts conferences and workshops as well cultural programmes like art exhibitions, drama, and opera productions.

Among the makers in M4H, Studio Roosegaarde and Atelier Van Lieshout are iconic area residents (Box 2). Other makers have found space in vacant industrial properties, such as the Keilewerf, a former warehouse, and Vertrekhal

Oranjelijn. Entrepreneurs in M4H are supported by a variety of innovative platforms. The Erasmus Centre for Entrepreneurship, hosted by the Erasmus University, provides a learning environment aimed at helping companies become better at entrepreneurship. The SuGu-club (an acronym for startups and grownups) focuses solely on smart manufacturing bio-based plastic design and products and helps connect early-stage growth companies with large and multinational firms to accelerate the development of the makers industry in Rotterdam and beyond. Several platforms support startups as they scale up by helping connect entrepreneurs to talent, money, and ideas.

### Box 2: Roosegaarde & Van Lieshout

In 1995, artist Joep van Lieshout was the first entrepreneur in M4H when he established his workshop in a vacant warehouse. His current neighbour in M4H is innovator Daan Roosegaarde, who is internationally known with his Smog Free Tower (Figure 12). The Smog Free Tower uses patented ion technology to produce smog-free bubbles in public space, allowing people to breathe and experience clean air for free. Rotterdam City Ports collaborates with these iconic end-users as area ambassadors as they strive to direct more (media) attention to M4H, to create a stronger image for the area and to benefit from the extended worldwide network of the residents.

**Figure 12:** Daan Roosegaarde's Smog Free Tower next his atelier in M4H



## Real estate

As a port area, the backdrop to the RID is an industrial environment of docks and wharfs, terminals, port basins, factories, and power stations, and its tired look may appear visually unappealing to some. However, the buildings of the former Rotterdam Dry Dock Company in particular have significant historic value. The industrial heritage of the district is viewed as an asset to be protected and preserved to be an inspiring historical backdrop for today's entrepreneurs. Where industrial buildings have been redeveloped or refurbished into innovation-friendly spaces, this work has been done with an eye on maintaining the buildings' intrinsic raw and unpolished characteristics.

In the refurbishment of the RDM buildings, public space has been designed for cyclists and pedestrians. Because M4H is more of an organic redevelopment project, streets and roads are still used by lorries that provide logistics services for the fruit and juice handling companies in the area. Noise, pollution, and heavy road use are detrimental to the district's walkability, and a lack of substantial green space can damage the appeal and quality of place. While Rotterdam City Ports works with local entrepreneurs in the area to invest in improving bike and pedestrian accessibility, it also needs to take into account the importance of placemaking and mixed use to address the wider strategy of urban growth, liveability, and competitiveness. Rotterdam should also use the surrounding natural water environment to its advantage to create a distinctive sense of place. The aquatic landscape is also being developed to add to the aesthetic appeal and functionality of the RID. Aquadock, for example, is a new experimentation space for innovators researching sustainable construction on water, created by a collaboration between the city, the Port Authority, and the RUAS. Aquadock is part of the RDM campus and comprises a floating scaffold with its own water and electrical supplies on which entrepreneurs, researchers, and students can rent space to experiment with

floating structures. Aquadock is the first floating environment developed to date, but it will soon be joined by a floating farm (currently under construction) that will have space for 60 cows, on-site dairy facilities, an education centre, and a shop. Wharfs and port basins in M4H are suitable for floating constructions or communities as well, but they are currently still used for storage and transshipment by fruit and juice handling companies.

## Placemaking

A well-designed urban area where innovation hubs, companies, R&D facilities, housing, and urban amenities are co-located—boost the innovation ecosystem. This placemaking also relies on an open development process that adds innovation to its ecosystem.

Experimentation and the willingness to make changes or allow them to happen is an important part of adaptability and urban resilience. By inviting and permitting creative experiments, the city can observe which activities blossom and then build a strategy around them. The labs, industrial warehouses, and public realm in and around M4H and RDM offer the potential to co-locate the 'idea' and 'production' elements of innovation, and to turn the district into 'a place where ideas get to work'. Such an approach may result in not only developing the innovation economy, but also incorporating innovation into the urban development process. Parts of RID might be approached as living labs. The project 'lab on the street', which experiments with different pavement solutions, is already setting an example. Here it may be possible to pursue 'tactical urbanism' approaches to test the appetite of existing users for different kinds of public space, without large upfront investments. This approach may require a shift from focusing on physical assets and planning towards supporting the people and relationships that underpin the ecosystem, such as housing and recreational urban amenities.

A dynamic mix of uses is essential to placemaking dimension of innovation districts. Many districts around the world agree on land use plans with an even mix of commercial and residential use, including affordable housing, as well as space for retail, hospitality and community uses. However, in Rotterdam, there seems to be a focus on innovative businesses and not other aspects of placemaking such as amenities and housing which ultimately helps drive an innovation economy. In other locations, Rotterdam may seek a more conventional placemaking approach to meet the preferences of science and manufacturing activities.

These considerations and a shortage of public budgets make City and Port Authorities reluctant to make any large upfront investments in assets such as public space and infrastructure that attracts people and businesses to the district. This position may slow the pace of redevelopment because private actors in the world of real estate and urban infrastructure may not be geared up to lead an innovation-driven urban area development process, especially without the right infrastructure investment. Anyway, improving connections, both in public transport and in walkability, will help the region achieve critical mass sooner. A regular connection between RDM Rotterdam Campus and Merwe-Vierhavens would be one improvement that would make an immediate difference.

## 2.4. Branding, communication, and promotion of the RID

Traditionally Rotterdam has an image as a 'city of workers' and a true port city. Over the past several years, Rotterdam has been transitioning into an attractive residential city and a tourism destination, featured by the New York Times, Rough Guide, and Lonely Planet. The City and Port Authorities today are working to position Rotterdam as a city of innovation and creativity.

To do so, the City of Rotterdam and the Port of Rotterdam together with a wide range of stakeholders are using the slogan 'Rotterdam: Make It Happen', referring to the entrepreneurial mentality and the smart manufacturing within the city. In collaboration with Rotterdam's entrepreneurs themselves, city and port officials try to tell the 'story of Rotterdam'. Ampelmann Operations has so far proved to have the most successful and compelling story (Box 3).

RDM Campus is a world-renowned example of reuse of industrial heritage and the application of the triple-helix model of innovation. It has a clear identity, attracting a wide crowd of professionals who visit the area as part of a study trip or as participants in a conference or business meeting. Internally, public and private officials interact with researchers and students by means of communities of practice and contract research.

M4H is a relatively undiscovered site. Rotterdam City Ports seeks to promote the area using a communication strategy 'Get involved in M4H!' that involve many of the entrepreneurs in the area and a distinct colouring for all advertisements. The collaboration with iconic

### Box 3: Ampelmann Operations

Ampelmann is a major international company that constructs large offshore access solutions for people and cargo. It started as a spin-off of the Delft University of Technology and found space to design, test, and produce their product at RDM Rotterdam. As it developed into an established major company, Ampelmann took over the western part of the Submarine Hall in RDM, where it has found large-scale production facilities (Figure 13).

**Figure 13:** Recent harbour facility set up by Ampelmann



end-users Roosegaarde and Van Lieshout further adds to this strategy. Studio Roosegaarde is expected to add value as an area ambassador, and it has already increased publicity and image effects, brought the attention of new large actors as potential stakeholders, and provided business to local and small and medium-sized enterprises. Internally, Rotterdam City Ports set up a platform with regular meetings at which entrepreneurs and others stakeholders can

present their businesses and ideas. This strengthens the local network and may over time result in the local community's fostering innovation. However, a sense of place through its placemaking initiatives is imperative in showcasing Rotterdam as a city, whether the efforts are through offering green spaces, mixed uses, or something else.



### 3. Conclusions and recommendations

Rotterdam's history of innovation is deep and long. Its historic roles as a leading port, gateway, entrepôt, and mercantile city all speak to its leadership in previous cycles. And, Rotterdam's story is one of continued leadership in trade, freight, energy and logistics. Due to technological and geographical changes in those industries and to Rotterdam's wider demography and aspirations, another cycle of innovation is beginning. This cycle specifically involves:

- Utilising land released by the changing geography of ports and freight.
- Increasing the technology innovation in energy and logistics.
- Fostering new urban innovation nodes.
- Deepening the urban economy with new sectors and activities.

For Rotterdam, the innovation economy is essential to the creation of additional jobs, to enhance its international visibility, and to encourage innovation in Rotterdam's own city management. The city's innovation ambitions also serve a wider development strategy to create a liveable waterfront, a desirable working environment, and a new visitor economy in the stretch between the central city and the historic port land.

As Rotterdam develops its approach to its innovation ecosystem and districts, the city may need to be mindful of some existing constraints. The innovation asset base in Rotterdam is currently very dispersed, and cannot benefit from organic and spontaneous collaboration because of the large distances and physical barriers of water. This means that Rotterdam's designated Innovation District does not currently host the economic assets, anchors or critical mass that easily attract catalytic

investment, or that can form the centrepiece for an economic strategy. Many of the most innovative activities oriented around the port or the central city are not located in the district that is being promoted as the primary centre of innovation.

This means that Rotterdam will need to prioritise and sequence its actions in the following order:

- i. Develop a strategy to promote innovation, growth, and modernisation across the city as whole, to support and foster the deepening of the wider innovation ecosystem, and to adapt continuously through multiple cycles and manage unintended consequences as they appear.
- ii. Flexibly assist the development of all districts where the hosting of key functions and clustering is possible, through placemaking and the achievement of critical mass.
- iii. Build and promote Rotterdam's innovation brand by leveraging the whole city's port and industrial DNA, retained expertise and diverse communities.

Based on the workshop findings and the comparative case study analysis, these produced a number of recommendations for Rotterdam:

#### Develop a strategy for Rotterdam as a city of innovation

- **Recognise the innovation context in the Netherlands and leverage it.** The Netherlands and its core cities are already some of the most innovative in Europe, especially in the sectors of water, life sciences, bio-based, high tech, energy,

logistics and creative industries. Rotterdam has superb connectivity and complementarity with the higher education, research, and startup scenes in The Hague, Utrecht, Amsterdam, Delft, Eindhoven and beyond. Rotterdam also has the capacity to host a substantial portion of the Dutch innovation economy. A focus on connections, complementarities, and collaboration is a key part of the Rotterdam innovation challenge, in order to help more small firms survive, scale and overcome the so-called 'valley of death', and so for the city to play a bigger role in the wider ecosystem.

Other cities have shown the way: Munich successfully observed and leveraged the innovation context in Bavaria over multiple cycles, bringing forward highly specific programmes to supplying its life sciences, ICT and mechatronics strengths with bespoke R&D, training and infrastructure. Meanwhile, Tel Aviv also identified Israel's innovation strengths as an exporter of scientific, military and energy knowledge, and has sought to leverage this by combining public research infrastructure with corporate R&D in inter-disciplinary consortia, with a clear focus on the framework conditions and intellectual property protection. Rotterdam might be able to take current public-private research initiatives - like SmartPort - to this level. The recent establishment of the Metropolitan region Rotterdam The Hague (MRDH), an approved policy framework for European cooperation of 23 local authorities in the southern part of Zuid-Holland, in addition to Innovation Quarter, the regional investment agency for Zuid-Holland, should foster such an approach.

- **Balance the focus on specific locations with prioritised attention to city wide ecosystem development.**

Fostering the ecosystem of business demand, liveability, talent attraction, startups, growth companies, business investment, spin-outs, spin-offs, spin-ins, corporate ventures, real estate and tenant services, and encouraging networking between the key players is critical to the ecosystem that will make any innovation district in Rotterdam sustainable.

San Diego is a powerful example of a city whose leadership institutions focused systematically on building interactions through community intermediaries, technology commercialisation initiatives, entrepreneurship education, and technology transfer offices. By cultivating these flows of knowledge over more than 20 years, San Diego has allowed the development and commercialisation of new ideas to flourish, eventually creating the groundswell of demand for innovation to re-urbanise in the specific location of the East Village. This experience, and others, suggests that Rotterdam should move forward developing and strengthening a local and regional network of innovators and supporters, through a diverse set of actions on various levels. This may include arranging for the location of incubators, accelerators and co-working spaces, like CIC and Venture Café, hosting roundtables for entrepreneurs in Merwe-Vierhavens, and participating in SmartPort and other innovation networks.

- **Grow and support the innovation activity and growth companies that Rotterdam already has.** A full audit of firms, assets, networks and partnerships should inform Rotterdam's investment and policy approach so that it is targeted in the right areas to support the interactions that already flourish. A multi-partner strategy for innovation, working in collaboration between several sectors within local government,



should make the city of Rotterdam an essential part of the innovation ecosystem, together with other institutions, such as the Erasmus University and the Rotterdam University of Applied Sciences, and many other more formal and informal institutions.

### Optimise land use and placemaking in Rotterdam

- **Continue to support Rotterdam Innovation District, but add flexibility and market choice that investors and growing firms might want, promoting multiple locations.** The RID is an inspiring project that can become an important new node in Rotterdam's economy. But it will succeed when it complements other districts and is flexible to market preferences and choices. So, it might be expected that multiple distinctive locations will emerge in Rotterdam and the RID will be one of them. The RID will also need an authentic character and identity that is tied to the history of the area. Clear choices have to be made as to which parts of the development of RID are dependent on developments elsewhere, such as the success of CIC creating spin-offs in

industrial production in the area, and which are more autonomous and might even result in spin-offs elsewhere in the city.

- **Use Rotterdam's urban infrastructure and land as a platform for experimentation.** Rotterdam's industrial heritage means it is a city of great variety in terms of uses and infrastructures. These should be used as a basis for experimentation in new urban solutions. By inviting and permitting creative experiments, the city can observe which activities blossom and build a strategy around them. The labs, industrial warehouses and public realm in and around M4H and RDM offer the potential to co-locate the 'idea' and 'production' elements of innovation, and turn the district into 'a place where ideas get to work.' Such an approach may result in not only developing the innovation economy, but actually incorporating innovation in the urban development process. Parts of RID might be approached as living labs. The project 'lab on the street', experimenting with different pavement solutions, is already setting an example.

- **Prioritise placemaking in the districts to achieve critical mass** and help RID to acquire a distinctive identity and appeal. Rotterdam's innovation capacity will grow if several of the city's districts can attain critical mass of real estate and commercial activity, with an authentic sense of place, so that it gains a real identity and character. Rotterdam cannot know in advance which areas will ultimately host a large scale of innovative firm formation and clustering, so the city should flexibly promote the character and quality of multiple locations, and ensure adequate supply of affordable housing in the right strategic locations, just as cities such as Munich have done. Improving connections, both in public transport and in walkability, will help to achieve critical mass sooner. A regular connection between RDM Rotterdam Campus and Merwe-Vierhavens would be one improvement that would make an immediate difference.

The placemaking needed to boost Rotterdam's innovation platform may require a change in mindset among public and private actors. The redevelopment of M4H, for example, can act as a stimulus to organisational innovation where public and private partners co-create, experiment and test new products and services. The challenge for RID is to further explore the potential of this 'double loop' model of learning. Actually incorporating the urban development process in the innovation system, rather than simply viewing real estate as a facilitator, opens up a new perspective on the role of the innovation district. The Port of Rotterdam and the Rotterdam University of Applied Sciences are already innovating by becoming involved in integrated urban development and learning new skills of area marketing, and ongoing innovation in approach will be required.

## Build Rotterdam's innovation brand

- **Leverage Rotterdam Port's DNA in promoting wider innovation agendas, building upon its success.** Rotterdam is a city of unique port know-how which should be explicitly promoted. One area which Rotterdam should emphasise is its expertise at taming the water in terms of providing solutions for future water challenges in cities and for water life as a whole.

Rotterdam is part of the Rockefeller 100 Resilient Cities movement and has appointed a Chief Resilience Officer. The Rotterdam University of Applied Sciences runs several education and research programme's in water management and marine technology. Recent urban projects have shown the potential of applying innovative solutions in its own city, like combining water storage facilities with underground parking and urban squares and testing all sorts of driving objects, from houses, to a hotel and even a farm. These projects should become part of a clear narrative that promotes Rotterdam's unique expertise in addressing and solving one of the 21st century's biggest resilience challenges.

- **Develop Rotterdam's innovation brand as a broad identity, reputation and narrative.** Currently the city of Rotterdam, the Port of Rotterdam and other stakeholders are using the slogan 'Rotterdam: Make It Happen' to refer to the entrepreneurial mentality and the smart manufacturing potential within the city. The collective attempt to tell the 'story of Rotterdam' is in its early stages, drawing on success stories such as offshore access firm Ampelmann Operations. Going forward, the innovation story of Rotterdam should be told boldly and

proactively. It should not be substantially or solely linked to the RID project, but should be seen as the context for it and the driver of other improvements. Tel Aviv has shown how a consistent city brand can infuse all of its positioning activities, spanning not just its innovation brand but also its citizen, investor and visitor brands, so that real actions and initiatives in the city continually strengthen this integrated identity.

Other cities that have moved successfully into the innovation economy have worked hard to understand how the world sees them, how the larger region or nation shapes their reputation, and how they can build an innovation story that aligns with its resident lifestyle, visitor experience and business offer. Rotterdam can undertake initiatives in all of these areas. One way other cities such as San Diego and Tel Aviv have done this is to develop a brand alliance, a powerful city wide partnership to create and communicate a combined story.

- **Invite others to feel and experience Rotterdam's innovation culture** as well to 'buy' its products. Rotterdam has the assets not just to export its innovation but to bring people closer to its source. This requires a clearer story that is understood and shared by all parts of the city – tourism, business, universities, and citizens. This culture also extends into the wider region, with port related activities extending as far as The Hague where several (regional) headquarters of petrochemical firms and traders are located. The partnership between these cities towards a future-proof region can help to build this story further.





These initial high-level recommendations can form the building blocks of a long-term, multi-cycle strategy for Rotterdam's innovation ecosystem, before a more targeted approach to build a critical mass of innovation activity in order to sustain street life and retail demand.

### Key success factors for Rotterdam's innovation economy and district development

#### Strategy

##### Develop a Strategy as a City of Innovation

- Recognise and leverage the regional innovation context
- Prioritise attention on citywide ecosystem development and networking
- Grow and support existing innovation firms and activity
- Manage externalities that arise
- Adapt through the cycles

#### Tactics

##### Optimise Land Use and Placemaking

- Support district development with flexibility, responding to market preferences
- Use infrastructure and land as platform for experimentation
- Employ placemaking to achieve critical mass of real estate and commercial activity, and authentic sense of place

##### Build the City's Innovation Brand

- Leverage city DNA and expertise in promoting innovation
- Develop innovation brand as a broad identity and shared narrative
- Invite others to feel and experience the innovation culture

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