Port city innovation ecosystems
A symbiosis of capital

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14. Landesfachtag Geographie
April 24, 2021
Today’s objectives

- Explain how ecosystems fit in sustainable port development
- Understand the ‘stocks of capital’ on which port-city ecosystems are built
- Translate the ecosystem concept to Hamburg maritime capital
A port city is in transition all the time

Waalhaven, Maximilien Luce, Rotterdam (1908)

Maasvlakte 2, Boskalis (2008-2013)
Port evolution models

Anyport Model (Bird, 1963)

Evolution of a port: setting, expansion, specialization

Reconciliation of conflicting influences, objectives and interests involved.

Port evolution and where we are heading towards

- We are witnessing a **renaissance of the port-city links**, which translates in various approaches to re-develop the old port areas for new purposes and new economic activities.
- These areas seek **active participation** of stakeholders, primarily entrepreneurs and knowledge workers.
- At the same time there is an ongoing **widening** of the port and the traditional port-city, as can be observed with **port expansion projects** such as in Rotterdam, Shanghai or Jakarta (Great Garuda Project).
- The future is **not one-directional** and will be based on combinations of port functions.
- The art is how port authorities (or port development companies) can develop **new business models** while not ruining the revenues of existing port users.

![Stages in port/city evolution (Hoyle 1988)](image-url)
Basic model

The ecosystems approach is embedded in the SDG framework and distinguishes three hierarchical layers. The economy is built upon the society, where the society is built on the biosphere (Stockholm Resilience Centre, 2020).
Changing port-city relationships - conflictive or creative tensions?

There is a bottom up movement coming to surface that can either become reactive or proactive.
A capital perspective of the port city innovation ecosystem

An inclusive approach to port development starts with the port’s inherited resources, the stocks of capital, its favourable location for human activities, whether it be a location for settlement, for clusters of industry or a gateway for trade and transport.

- Industrial (business) capital
- Human capital
- Social capital
- Creative capital
- Cultural capital
- Natural capital (location)
Natural capital is related to favourable location in the delta

- The natural capital is defined as the stock of renewable and non-renewable resources, such as air, water, land, minerals and forests as well as biodiversity and ecosystem health, that combine to yield a flow of benefits to people (Natural Capital Coalition, 2020).
Industrial (working) capital

The industrial capital perspective on ecosystems regards port cities as clusters of economic activity, which are competing in a global marketplace, however prosper on the basis of collaborative action and shared value creation within the cluster.

'It is important that we all pull together on this. Not only do we want to speed up the development of hydrogen in the Netherlands, we also want to make sure our country plays a pivotal role in the renewal of Northwestern Europe’s energy system.'

— Allard Castelein, COO Port of Rotterdam Authority
Industrial capital – what to do with existing assets?

Green parties (14-11-2017):
"We have to prepare a plan as soon as possible to bring down coal storage/stevedoring in Rotterdam. Only then can the port contribute to reaching the Paris agreements."

Municipal executive councillor (wethouder) (20-3-2018):
"The transition to renewable energy is an irreversible process. I strongly advise to reconsider the old port vision (2011), but we have to balance energy transition with economic development and employment".

Operator Rotterdam coal-fired power station takes State to court due to closure. 16 April 2021
**Human capital**

- There is a strong relation between regional income levels and **technology, talent and innovation** (Florida & Mellander, 2020).

- **Smart cities** investing in human and social capital and traditional and modern (ICT) infrastructure (Caragliu, Chiara and Nijkamp (2011),

- Cities speed **innovation** by connecting their **inhabitants** to each other (Glaeser, 2011)

- **Education hubs**, developing human talent is a way to compete in the global knowledge economy (Lee, 2015)

- **Brainport**, the focus on coordinated efforts by governments, businesses and knowledge initiatives in advanced technology innovation (Horlings, 2014).

The human capital perspective on the ecosystem is centred around the bundling of talent and technology into ‘smart ports’, ‘smart cities’ also referred to as ‘knowledge cities’ and ‘brain ports’.
Human Capital map

Extensive maritime innovation ecosystem: R&D, incubators, accelerators, funding.

Broad fieldlab infrastructure; leading in application of disruptive technologies in port and maritime sectors

Maritime-related:
- 14 Master degree programs
- 8 Bachelor’s degrees
- 34 Vocational programmes
- 11,000 students
Social capital

The social capital of the city comprises the networks and the horizontal and vertical connections that are present within professional groups and associations and that, as such, act as lubricants between institutions. Successful port cities know how to effectively utilise this capital, and in such a way that social problems are minimised.
Cultural capital

For port cities cultural capital provides the shared identity, shared values. Knowing the history and passing on stories from part times connects generations. Maritime museums play an important role in bridging the distance newcomers, migrants and children may have towards the maritime industry.
Creative capital

• Creative capital denotes the ability of economic actors to generate **scientific, technological and artistic innovation** on the basis of relational assets which are socially produced within a city or urban region (Kratke, 2011).

• Companies cluster in order to draw from **concentrations of talented people** who power innovation and economic growth (Florida, 2011)

• Driving forces for the knowledge city are universities, society entrepreneurship, knowledge cafes/cathedrals (meeting places), diversity, strange attractors (marketing, branding) and ICT and multimedia infrastructure

Creative capital forms the top layer of the ecosystem, it flourishes from the nurturing of deeper layers of capital. When cities nurture their talent well, it facilitates creatives and entrepreneurs and creates value through innovation.
Creative capital is found in startups, incubator and accelerator programmes
A symbiosis of capital means to re-connect to the ecosystem

<table>
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<th>Capital</th>
<th>leads to</th>
<th>therefore investing leads to</th>
<th>or neglect leads to</th>
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<tbody>
<tr>
<td>Industrial capital</td>
<td>Know what</td>
<td>Earnings</td>
<td>Emissions</td>
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<td>Human capital</td>
<td>Know how</td>
<td>Jobs</td>
<td>Strikes</td>
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<tr>
<td>Social capital</td>
<td>Know-who</td>
<td>Young</td>
<td>Old boys</td>
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<td>Cultural capital</td>
<td>Know-why</td>
<td>Connected society</td>
<td>Disconnected society</td>
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<td>Natural capital</td>
<td>Know-why here</td>
<td>Protect &amp; preserve</td>
<td>Pollute</td>
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<tr>
<td>Creative capital</td>
<td>Know what’s next</td>
<td>Create a future</td>
<td>Destruct the future</td>
</tr>
<tr>
<td>Maritime capital</td>
<td>Know your reason d’etre</td>
<td>To be</td>
<td>Not to be</td>
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Watersnoodramp, 1953
Sandy, New York, 2012
Beirut, 2020

Erasmus Centre for Urban Port and Transport Economics
RDM Makers District rejuvenates old port areas in Rotterdam

Merwe Vierhavens

RDM Campus
Merwe-Vierhavens is still an active logistics port (fruit & vegetables, breakbulk) but is in transition

**Port-area in transition**

**Towards circular economy**

- 3+1 Flows: Construction, Agri-food, Textiles + Energy
- First pilots have landed: Floating farm, but challenge is to build a cluster of businesses (value chain)
- Symbiosis between port and city
- Circular business model only possible through partnerships
RDM Makers District rejuvenates old port areas in Rotterdam
What about sustainable growth?

The Interceptor unveil event, Oct 26, 2019 Rotterdam, NL
What about the port-city ecosystem in Hamburg?
Maritime capitals of the world – is this the new competition?

Menon / DNV GL, 2019
Hanseatic League is existential to the maritime capital of Hamburg

Maritime capital during Hanseatic League era

This cultural capital is the link between Hamburg’s past and present industrial capital

Maritime capital in 21st century
Cultural and human capital bring new life in HafenCity

International Maritime Museum

HSBA Hamburg School of Business Administration

Berufliche Schule für Spedition, Logistik & Verkehr

Kühne Logistics University

HafenCity University

Erasmus Centre for Urban Port and Transport Economics
Maritime Cluster Northern Germany follows similar path

“Our vision for 2025 is a global maritime hotspot in Northern Germany, a maritime industry that is strong and competitive on a global basis, one that is characterised by innovation, sustainability, efficiency, international competitiveness and an attractive working environment; moreover, we see the MCN e. V. developing into a highly professional, powerful and ever-growing network that offers its members significant added value”.

Matrix of the MCN Agenda 2025, list of possible courses of action
Summary and food for thought

• The ecosystems view of port cities provides a fundamental understanding on sustainability and innovation. How stakeholders can create value for themselves and for others considering the scarcity of resources and space in port cities is one of the wicked problems and requires further research.

• Rotterdam was used as a case study in which we have chosen to reflect on the stocks of capital and how they can be visualised. How to visualise the other layers. We have tried to relate this ecosystems approach to Hamburg, being a maritime capital in the world

• What mechanisms are at play in creating a successful innovation ecosystem? How strong is the influence of port authorities and municipalities is on the innovation ecosystem? What are the effects of investing in one area in respect to other areas where investments are not done?
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