TELOS TOPIC 08

Production & Logistics

Content development led by
Gdańsk University of Technology:
Karolina A. Krośnicka

POLITECHNIKA GDAŃSKA

Hochschule für Wirtschaft und Umwelt Nürtingen-Geislingen

ULB Faculté d'Architecture La Cambre Horta

SAPIENZA UNIVERSITÀ DI ROMA

LE:NOTRE Institute
Linking Landscape Education, Research and Innovative Practice

Co-funded by the Erasmus+ Programme of the European Union

Introduction

Health & recreation

The Commons

Mobility

Energy

Retail

Production & logistics

Housing

Forestry

Agriculture

Tourism

Landscape system presentations

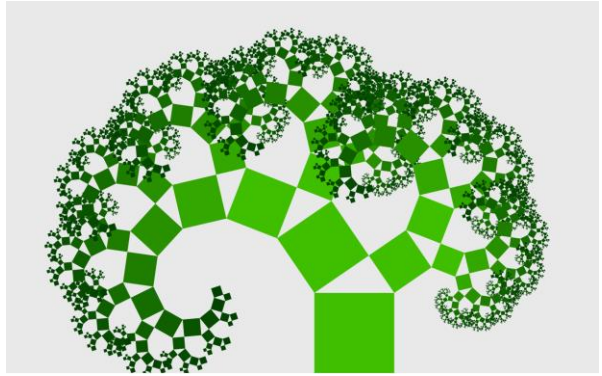
Scenario / Visioning presentations

Social Business modelling

Impact evaluation

Production&Logistics landscapes

according to their values



Pythagoras tree (Albert Bosman(1942)
https://javalab.org/en/category/math_en/fractal_en

#1 **Key concepts / Glossary**

#2 **Visual values**

#3 **Functional values**
- **Industry**
- **Logistics and Transport**

#4 **Evolution and heritage values**

#5 **Rooms: Economies of scale**

#6 **Recognising Trade-off / Synergies**

Basic definitions

01

Production/Industry

Production - the process of making or growing goods to be sold (Cambridge Dictionary)

Industry - the companies and activities involved in the process of producing goods for sale, especially in a factory or special area (Cambridge Dictionary)

02

Industry, group of productive enterprises or organizations that produce or supply goods, services, or sources of income. In economics, industries are generally classified as primary, secondary, tertiary, and quaternary; secondary industries are further classified as heavy and light (Encyclopaedia Britannica Last Updated: Oct 21, 2022).

03

Logistics

(in business) the business of transporting and delivering goods (Oxford Dictionary).

04

Economies of scale

in the long run, the phenomenon of lowering the average total costs along with increasing the scale of production and introducing new technologies, are also referred to as growing revenues in relation to the scale (Wikipedia)

05

Industrial district

Areas where objects are linked into production and technological chains, such as: raw material districts (Ruhr region), metropolitan districts (Paris), transport districts (Gdańsk), of mixed genesis (London)

06

Production & Logistics landscape

Is a type of cultural landscape (man-made), characteristic for areas where industrial activities are very intense, as well as all activities connected with transport, logistics and energy production serving this production.

Production & logistics landscapes

Visual values and composition

Physic-Morphological Urban Features

Training samples for the LCZ classification in the Metropolitan City of Milan

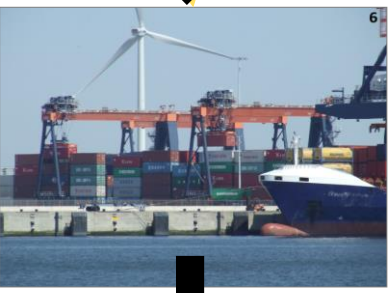
source: Eldesoky A., Connanino N., Morello E., „An Approach for Improving Local Climate Zone Clasification including Physic-Morphological Urban Features”, http://www.labsimurb.polimi.it/wp-content/uploads/2020/02/191003_Barcelona_CTV_LCZ.pdf

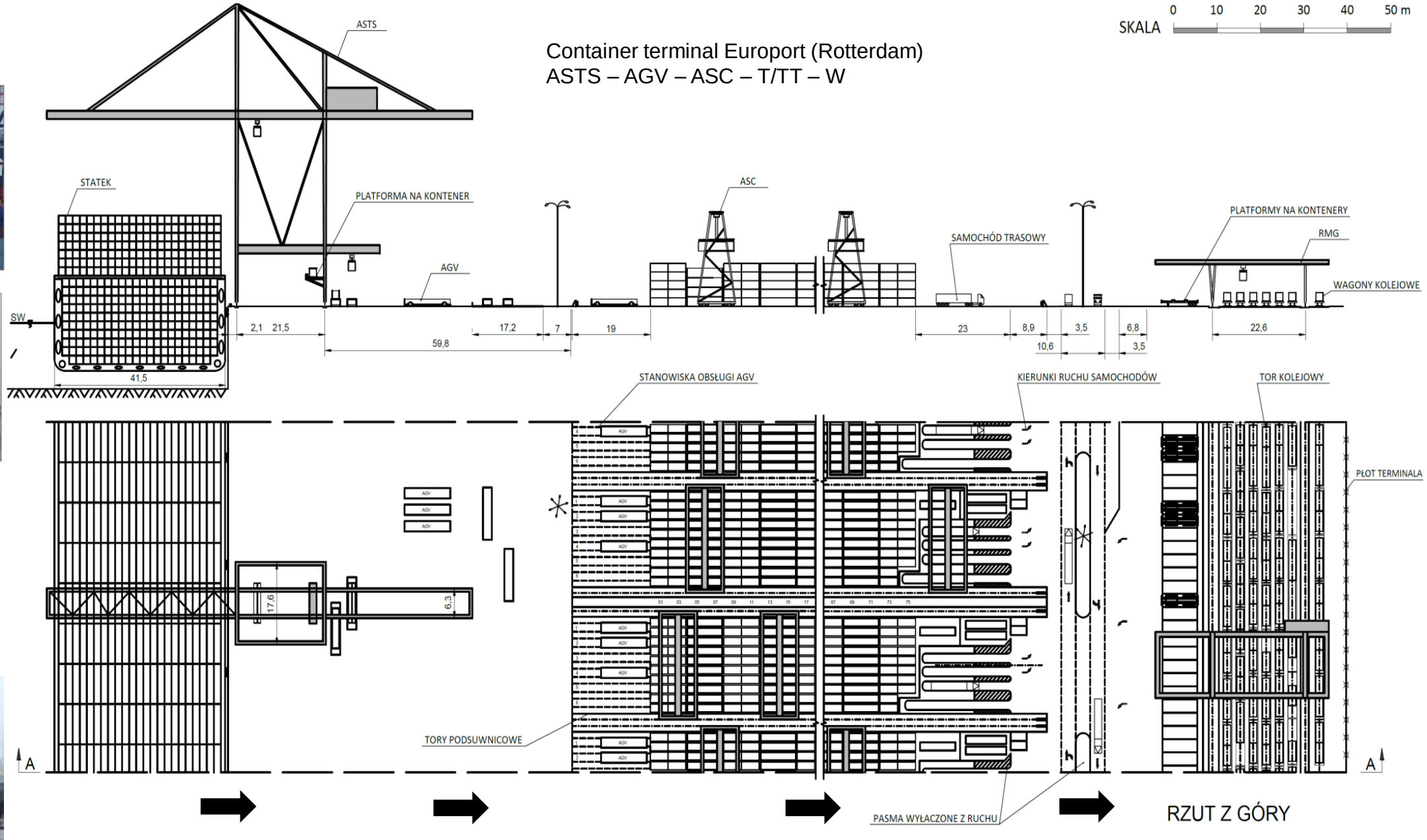

A38


HES
International
BOTLEK
TANK TERMINAL
T-201
T-105
T-104
T-103
T-102
T-101
T-113
T-114
HEXION


NACCO
NACCO
NACCO
NACCO
NACCO

Space defined by logic of technology!!!



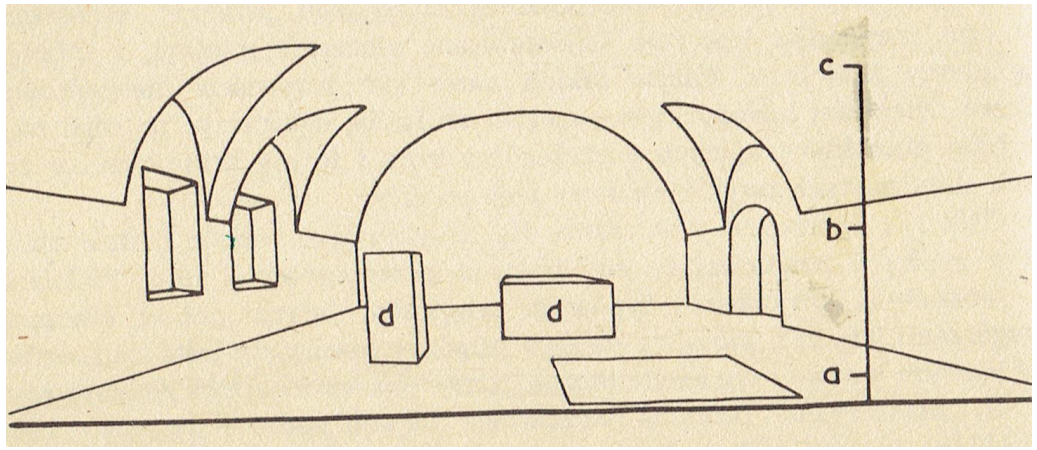


Container terminal Europoport (Rotterdam)
ASTS – AGV – ASC – T/TT – W

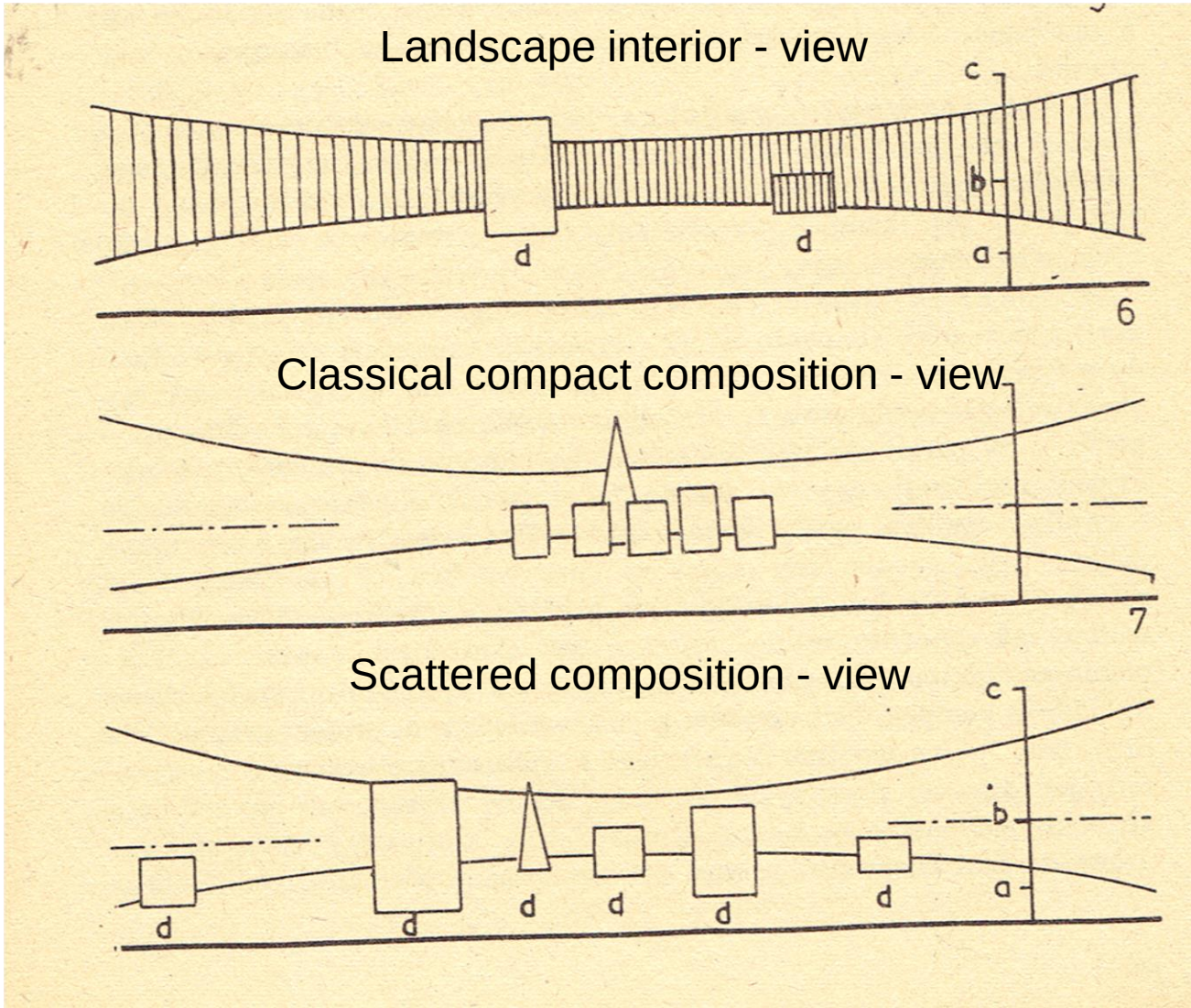
Space defined by logic of technology!!!
Also before…

https://historia.trojmiasto.pl/Trwa-wyburzanie-100-letniej-fabryki-olejow-z-ciekawa-historia-n142704.htm after: https://fotopolska.eu

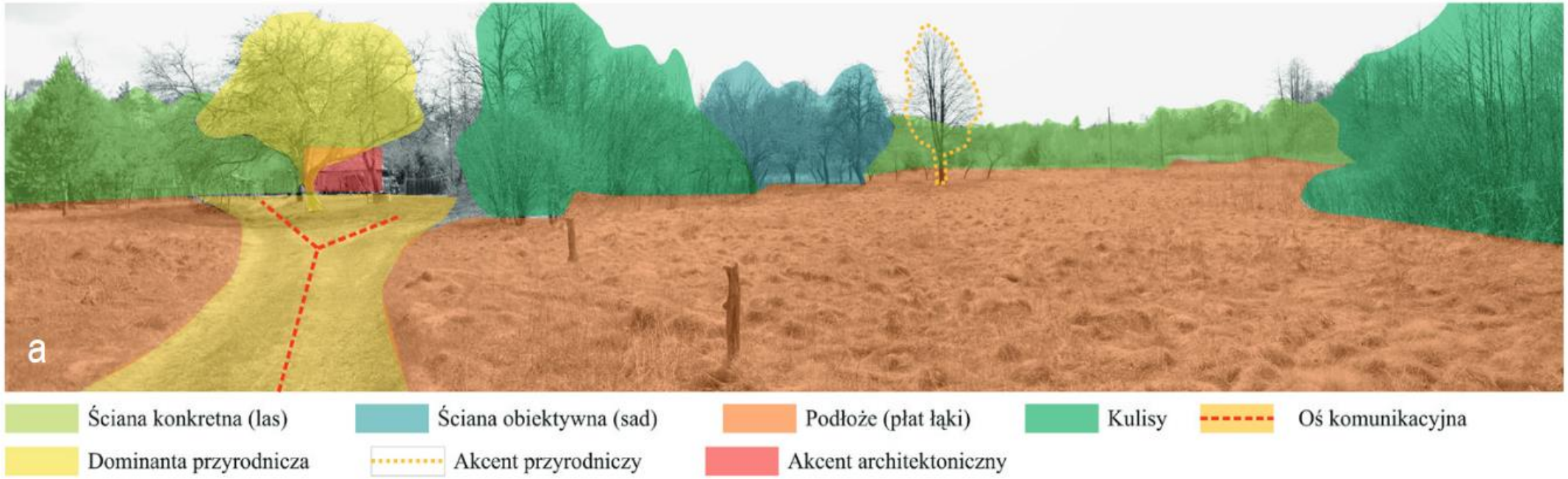
Janusz Bogdanowski's (1976) method of anlysing and designing landscape as an interior



a – substrate (horizontal surface)
b – walls (back wall – background)
c – vault
d - free-standing elements
- in a rythmic pattern/arythmic
- accents (height, cubatural, architectural)
- dominants (height, cubatural, architectual)

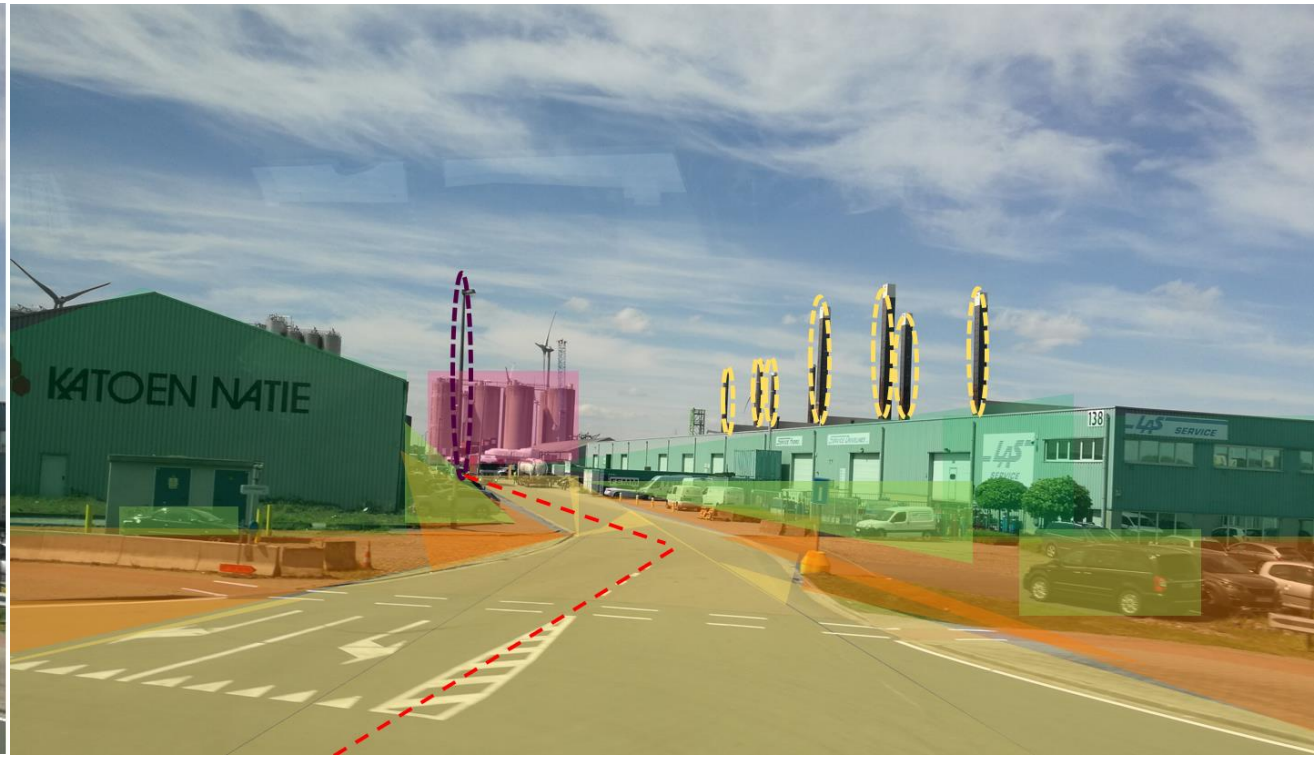


Visual landscape analysis rural interior



file:///C:/Users/DELL/Downloads/Atlas_to%C5%BCsamo%C5%9Bci_krajobrazu_lokalne.pdf

Analysis of composition of production-logistics landscape interiors



Legend:

- vault (sky)
- wall (production halls)
- background (silos, also architectural accent)
- height accent (chimney)
- substrate (asphalt)
- subjective wall (cars)
- composition axis
- height dominant (lighting tower)

Elaborated by author using Bogdanowski method (1976, 1994), modified by Chmielewski (2012). Case of Port of Antwerp (2018)

Production and logistics landscapes

Visual values - conclusions

01 Elements

- Flat substrate (easy to built)
- Domination of artifical substarte (mostly concrete and asphalts - transport spaces) very low biologically active surface factor
- large-cubature buildings

02 Composition

- Lots of height dominants and acents (chimneys), but scattered
- Sometimes rythmic composition, but usually not concentrating around one area
- Domination of long, horisontal straight lines in landscape (not so many soft lines)
- large distances between comlexes of buildings
- Composition is a result of technological chain and the effectiveness of the complex

03 Others

- accompanying large areas of energy and transport infrastructure
- out of human scale
- with time industrial and logistics landscapes are accepted by people and become cultural heritage

Production & logistics landscapes

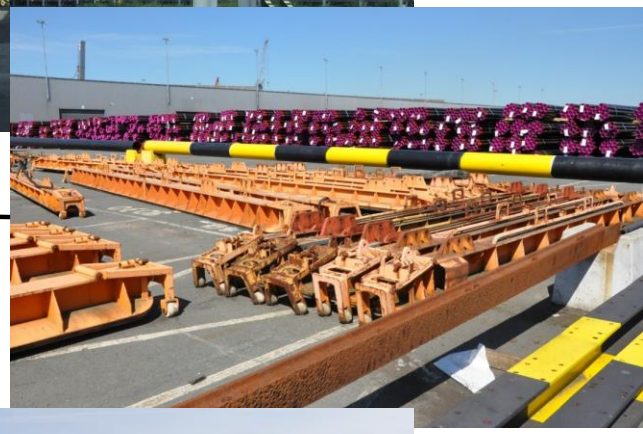
Functional values

01 Industry

Types of industry

1. **Primary**
- genetic industry – agriculture, forestry, fishing, livestock management
- extractive industry – **mining, quarrying, and the extraction of minerals**

2. Secondary (manufacturing industry)
- **Heavy** (large-scale) - petroleum refining, steel and iron manufacturing (metalwork), motor vehicle and heavy machinery manufacture, cement production, nonferrous metal refining, meat-packing, and hydroelectric power generation.
- **Light** (small-scale) - textile work, clothing manufacture, food processing, plastics manufacture, electronics, computer hardware manufacture, precision instrument manufacture, gemstone cutting, craft work.



3. Tertiary industry (service industry)

retail, resale trade; banking, finance, insurance, investmentreal estate services; professional, consulting, legal, and personal services; tourism, hotels, restaurants, entertainment; repair and maintenance services; health, social welfare, administrative, police, security, defense services, **wholesale**, **transportation**;

4. Quaternary industry

information systems and information technology (IT); **research and development, including technological development and scientific research**; financial and strategic analysis and consulting; media and communications technologies and services; and education, including teaching and educational technologies and services.

(Encyclopaedia Britannica Last Updated: Oct 21, 2022)

Hi-Tech industry

- IT
- Electronics
- Robotics
- Automatics
- Bio-tech
- Advance chemical industry
- Aviation industry
- Arms industry

https://www.travelinusa.us/silicon-valley-california/

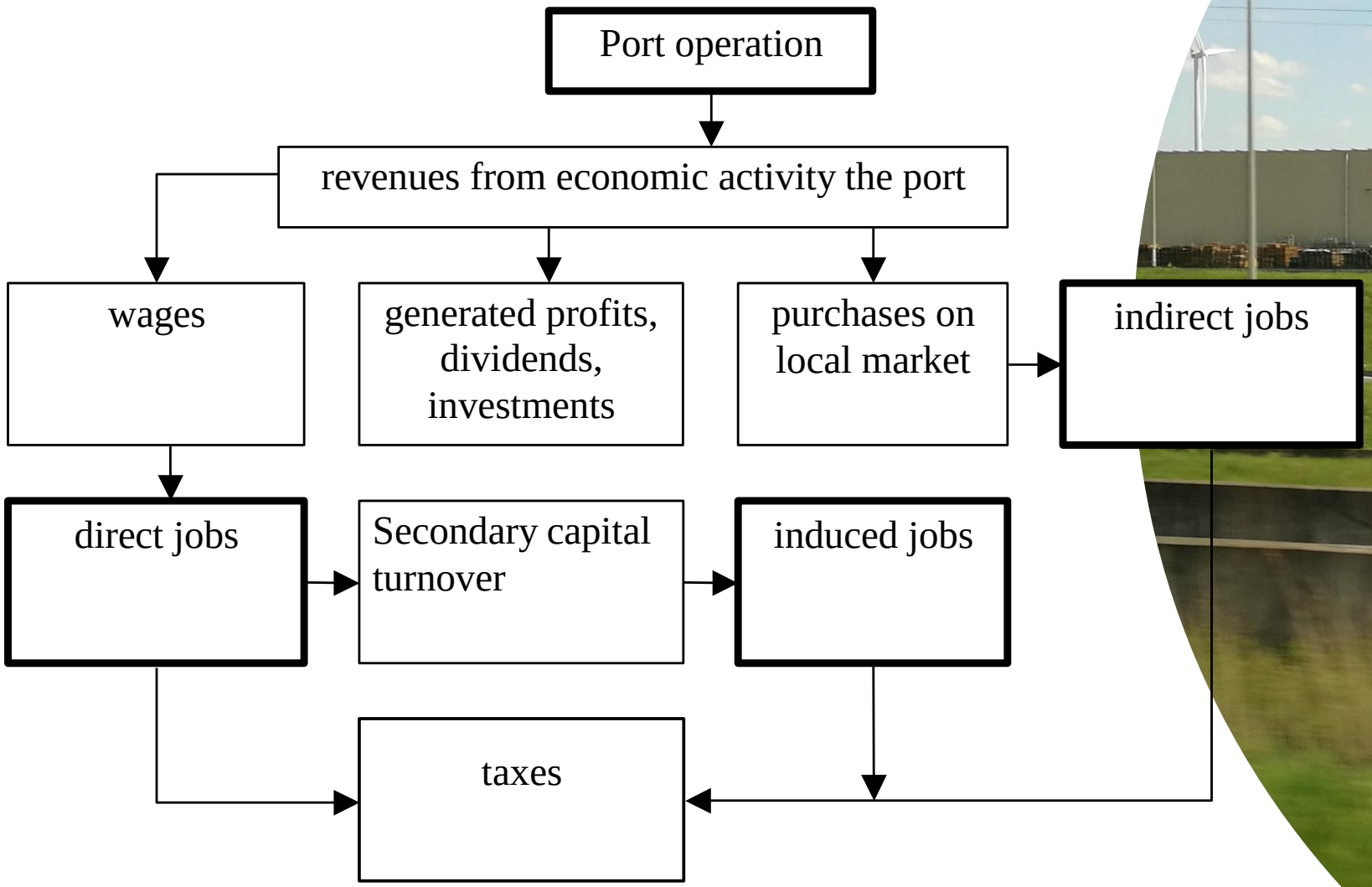
Spatial types of concentrations of of hi-tech industry

- science parks (R&D)
- technological park (R&D and production)
- technological clusters (maritime, pharma, aviation…)
- Technopolies (Silicon Valley, Silicon Bavaria)

https://www.prnewswire.com/news-releases/silicon-valley-map-highlights-the-whos-who-of-the-world-renowned-high-tech-region-123033693.html

Technological cluster (ex. maritime cluster) economic impact on the market of the metropolitan area

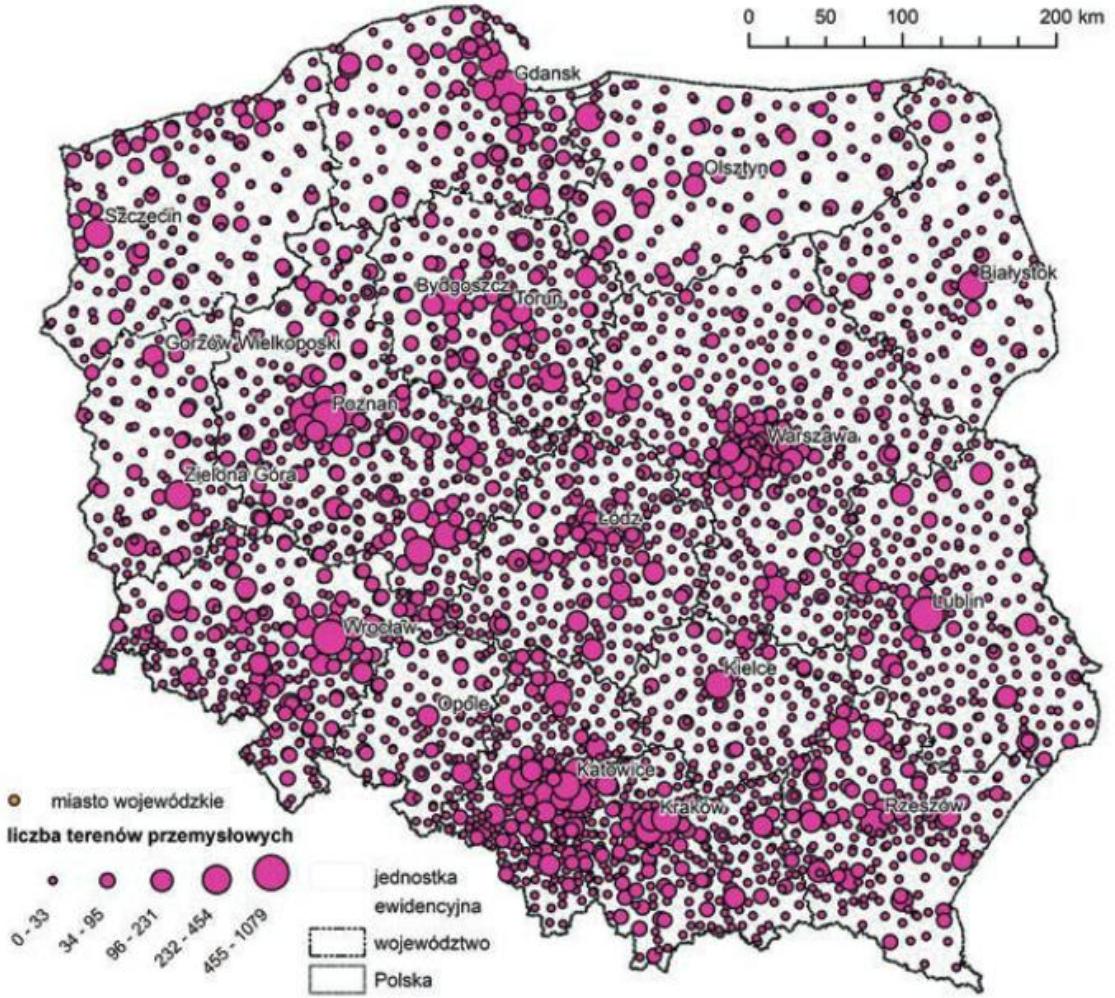
Multipier effect



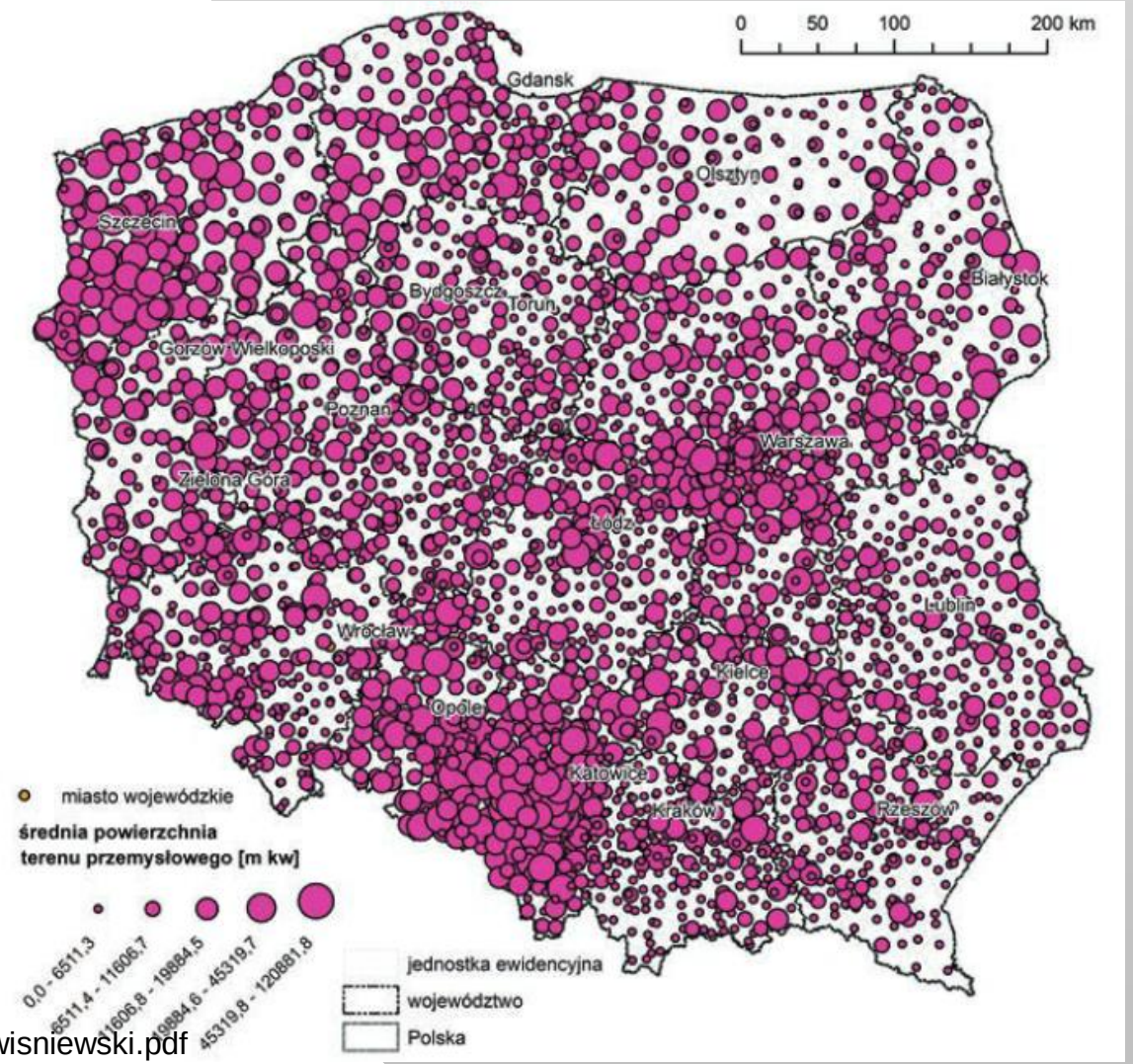
Krośnicka, K.A. (2010). The Impact of Sea-River Ports on Spatial Development of Cities. Logistics and Transport, 11, 39-44.

Number and size of industrial lots within a country – case of Poland

Number of industrial lands by registration units in Poland in 2016

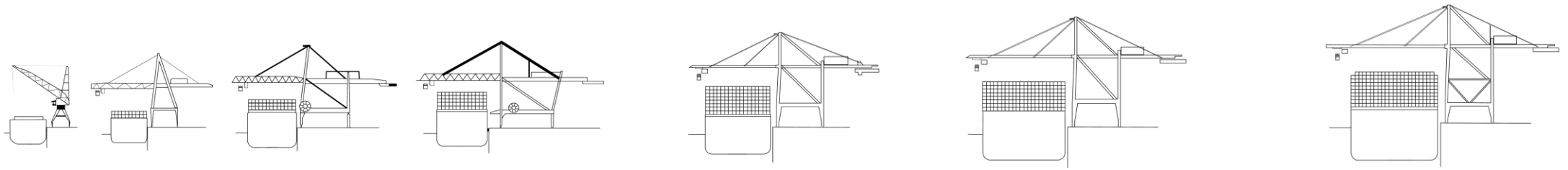


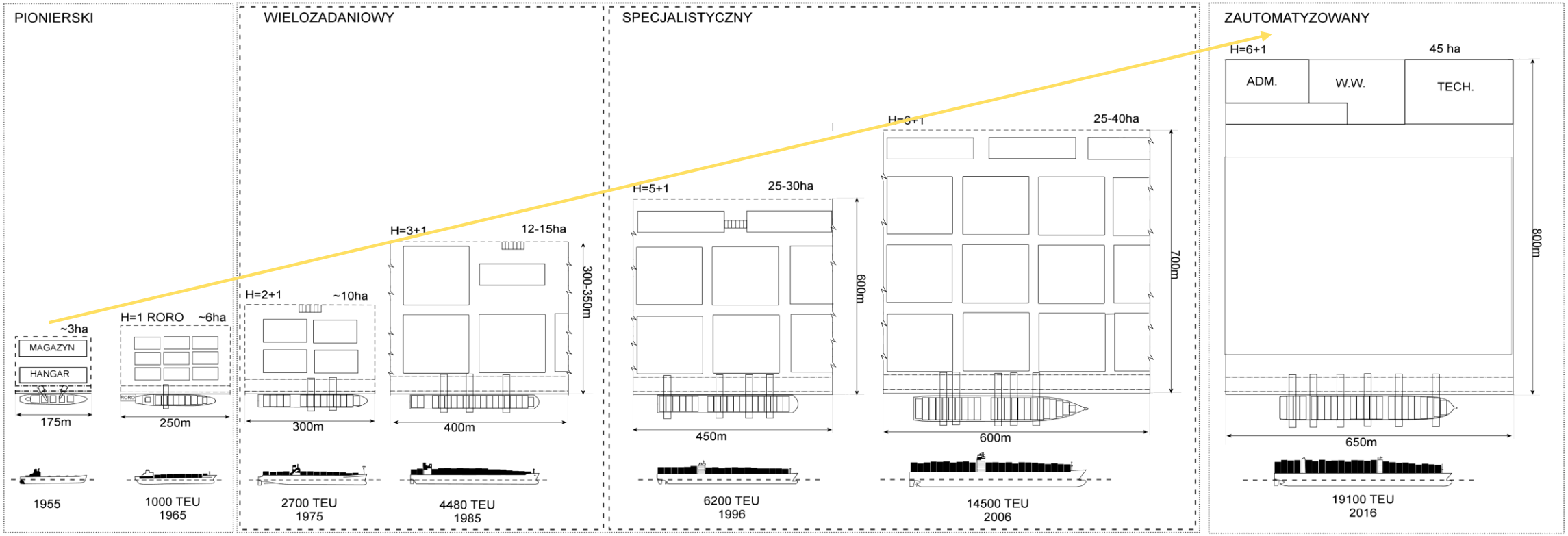
Average size [m^2] of industrial land by registration units in Poland in 2016



https://mazowszestudiaregionalne.pl/images/pdf/24/msr_24_borowska_stefanska_wisniewski.pdf

Size of industrial lots grows in time - Technology and Economies of scale!





Size of industrial lots

Traditional (XX. century)
industrial district Beijin (China)

Contemporary logistic park on
Maasvlakte II (Netherlands)

Size and distribution of industrial lots

Business culture!!!

"the way a we do things around here"
(Deal and Kennedy)

depends on:

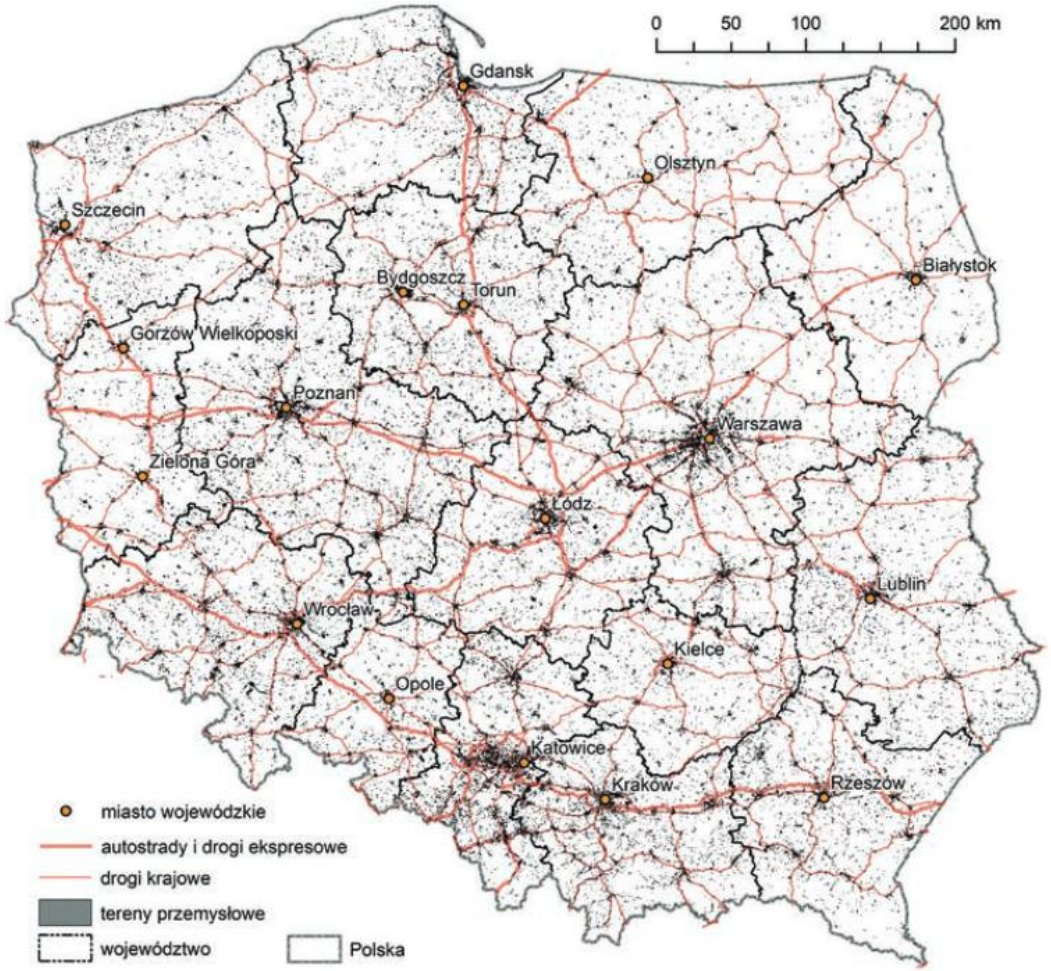
- production profile (mines, rafineries, shipyards// bakery plant, mashine factory)
- size of a company (Large Enterprise LE, Small and Medium Enterprise SME, small enterprise SE – number of people employed)
- organisational and spatial structure of a company (scattered objects within a city or compact greenfield investment)
- Price of land and legal regulations (ex. dangerous cargo)

ME in Reda (Poland) Source: https://www.google.com/maps

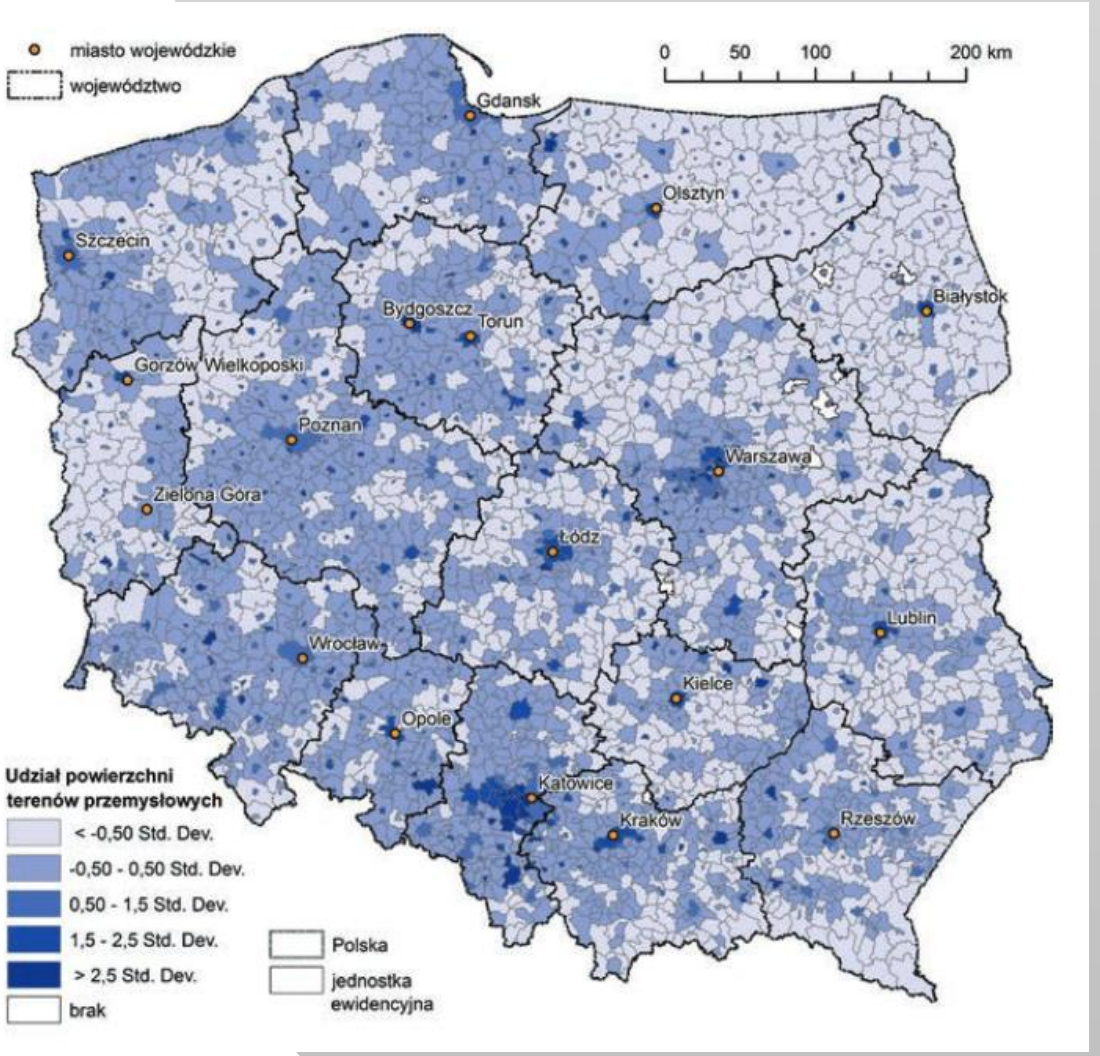
LE Europort Rotterdam (Netherlands) Source: https://www.google.com/maps

Distribution of industrial lots within a country – case of Poland

Distribution of industrial areas in Poland in 2016



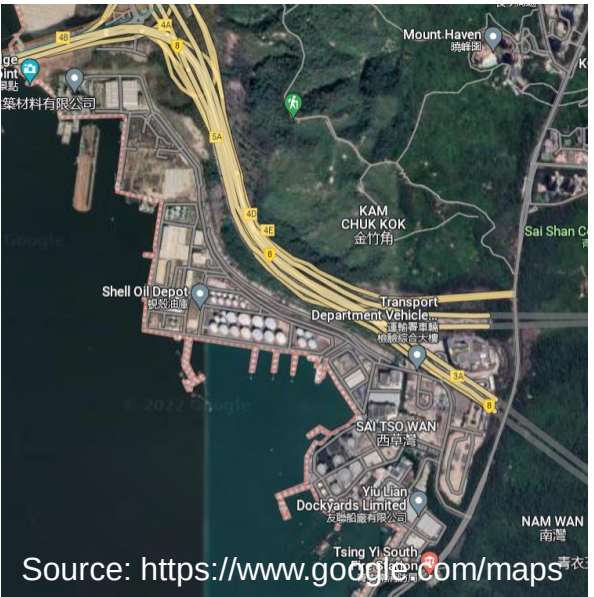
The share of industrial areas in the total area of units registration in Poland in 2016



https://mazowszestudiaregionalne.pl/images/pdf/24/msr_24_borowska_stefanska_wisniewski.pdf

Distribution of industrial lots within a country

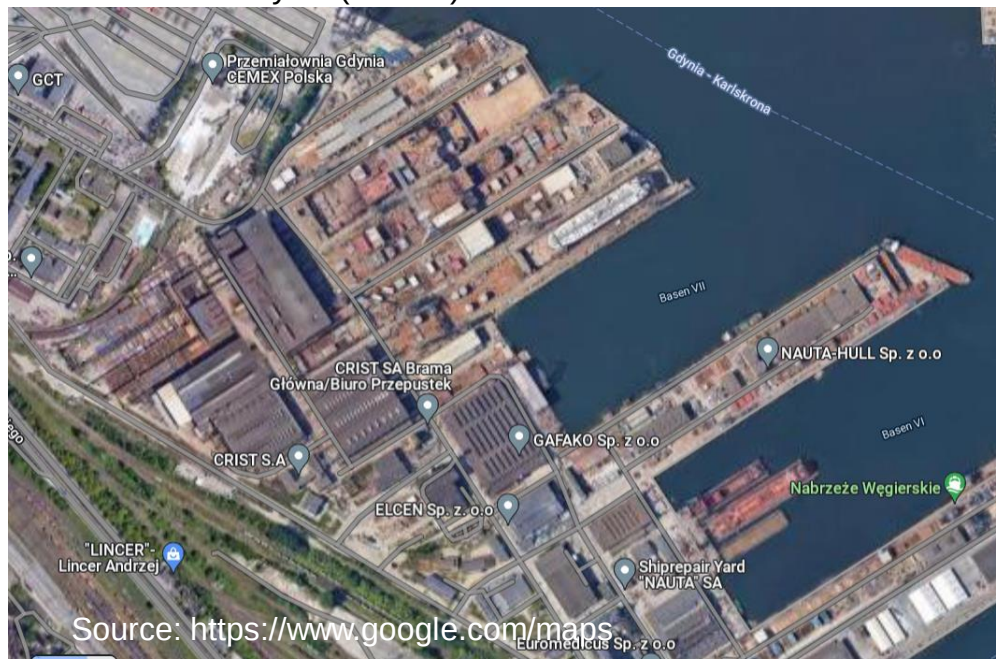
Shell Oil depot in HK (China)



Source: https://www.google.com/maps

- resources are not equally distributed (coal, gas, ore, water, sea etc..)
- concentrations of people (cities) are not evenly distributed
- infrastructure does not cover the area equally
- price of land differs in different regions/cities

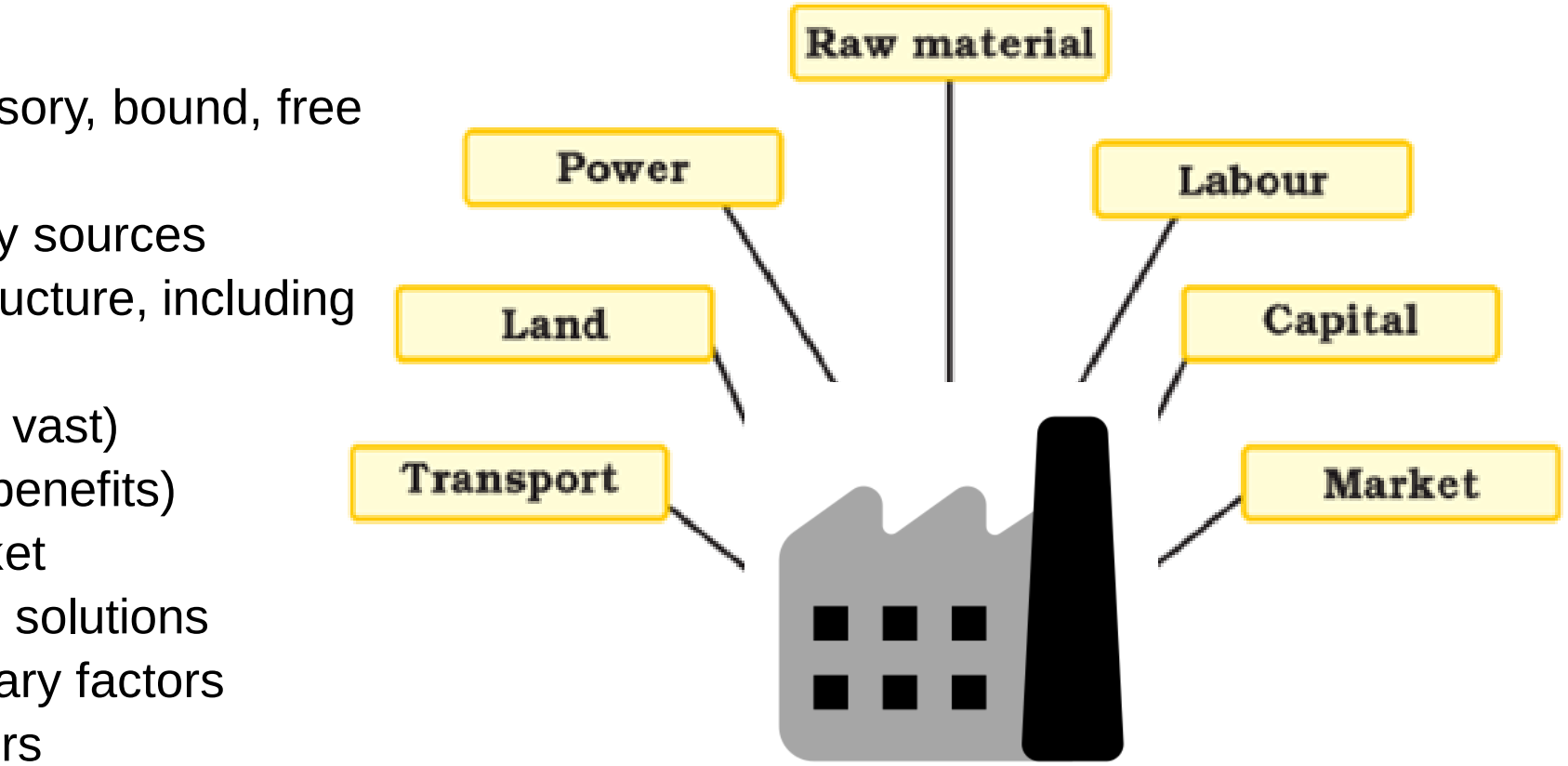
Terminal BCT Gdynia (Poland)



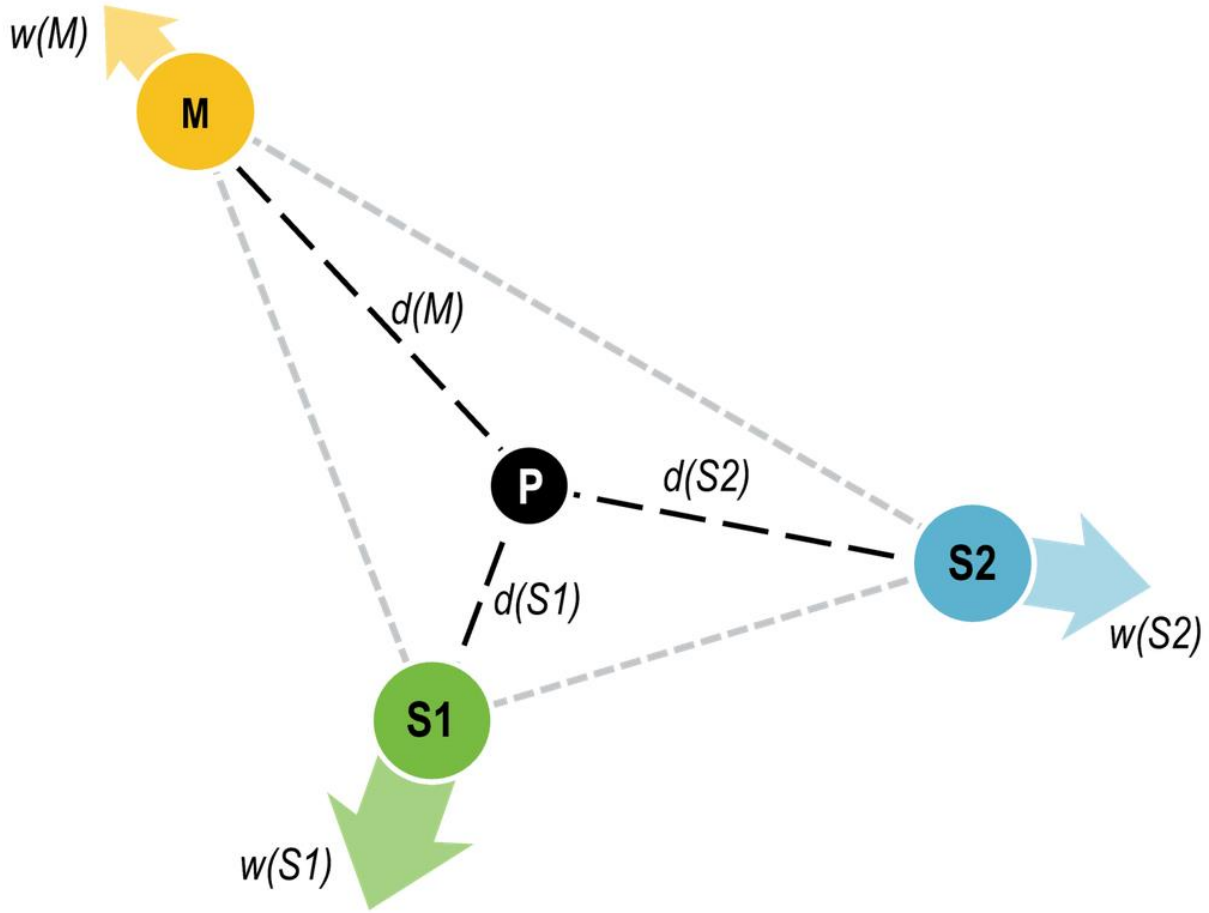
Source: https://www.google.com/maps

The spatial distribution of industry is strongly determined by:

- raw material base (compulsory, bound, free location)
- access to water and energy sources
- access to technical infrastructure, including transport
- availability of land (flat and vast)
- workforce (agglomeration benefits)
- proximity to the sales market
- availability of technological solutions
- political, strategic and military factors
- social and behavioral factors



Alfred Weber's Location Triangle



https://pl.wikipedia.org/wiki/Alfred_Weber#/media/Plik:Weber_alfred_1868%E2%80%931958.jpg

According to Weber, three main factors influence industrial location:

- **transport costs,**
- **labor costs,**
- **agglomeration economies.**

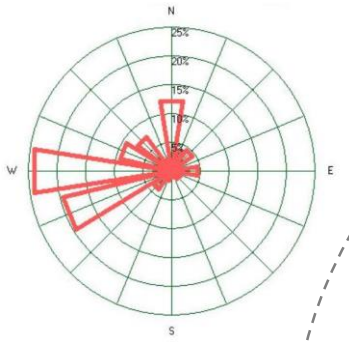
Location implies an optimal consideration of these factors and minimizing transport costs by finding point P.
The model assumes an isolated region (no external influences) composed of one market, isotropic space (no variations in transport costs except a simple function of distance) and perfect competition.

Considering a product of w(M) tons to be sold at market M, w(S1) and w(S2) tons of materials coming respectively from S1 and S2 are necessary. The problem resides in **finding an optimal factory location P located at the respective distances of d(M), d(S1), and d(S2).** Several methodologies can be used to solve this problem, such as drawing an analogy to a system of weights and pulleys (Varignon's solution) or using trigonometry.

Jean-Paul Rodrigue (2020), New York: Routledge, doi.org/10.4324/9780429346323
https://transportgeography.org/contents/chapter2/transport-and-location/weber-location-triangle/

Distribution of industrial lots within a city

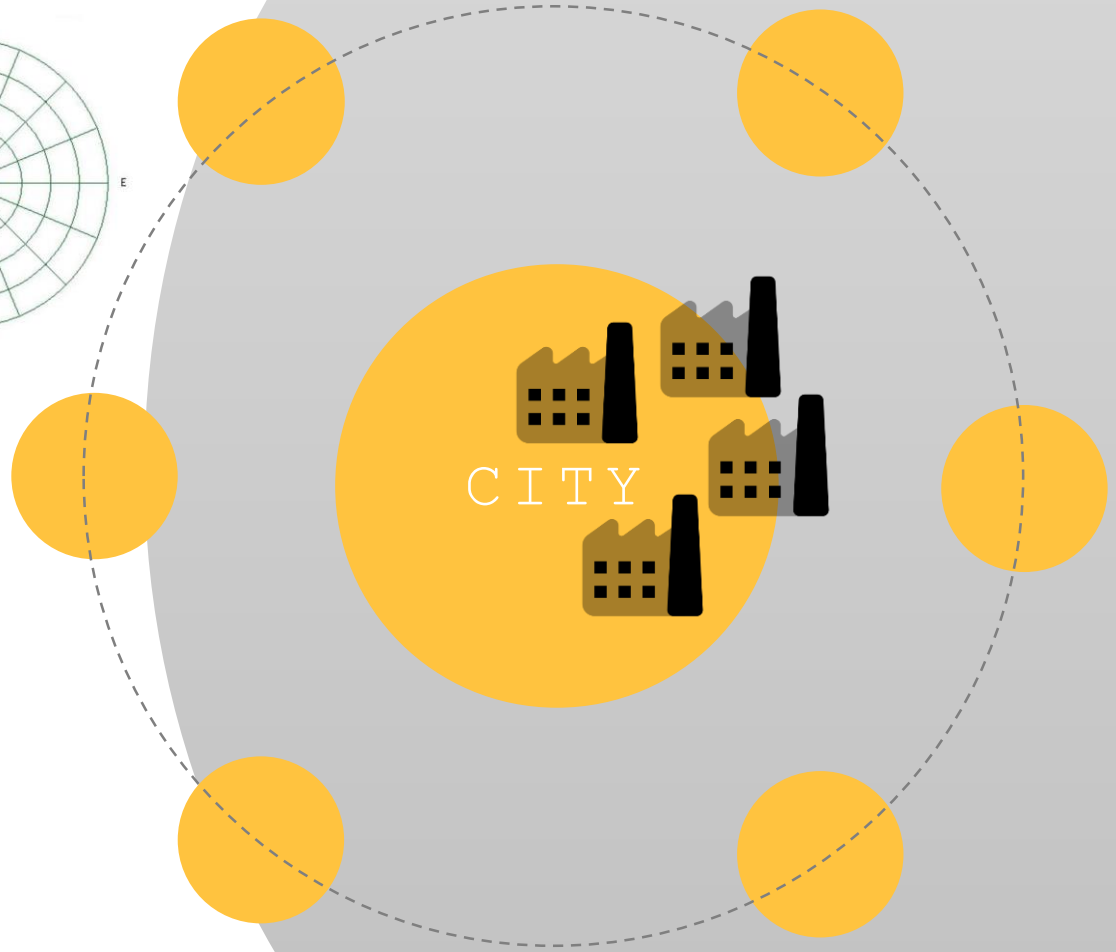
Industrial agglomeration



Concentration of industry in the city center

- benefits: easier access to technical infrastructure, human capital, other services, sales market
- - disadvantages: limitation of plot size, excessive load on infrastructure, functional conflicts

Special case - **Brownfield investment**
New technology development campuses are located in the city center on former industrial lots, after their previous remediation (Reuse of postindustrial area).



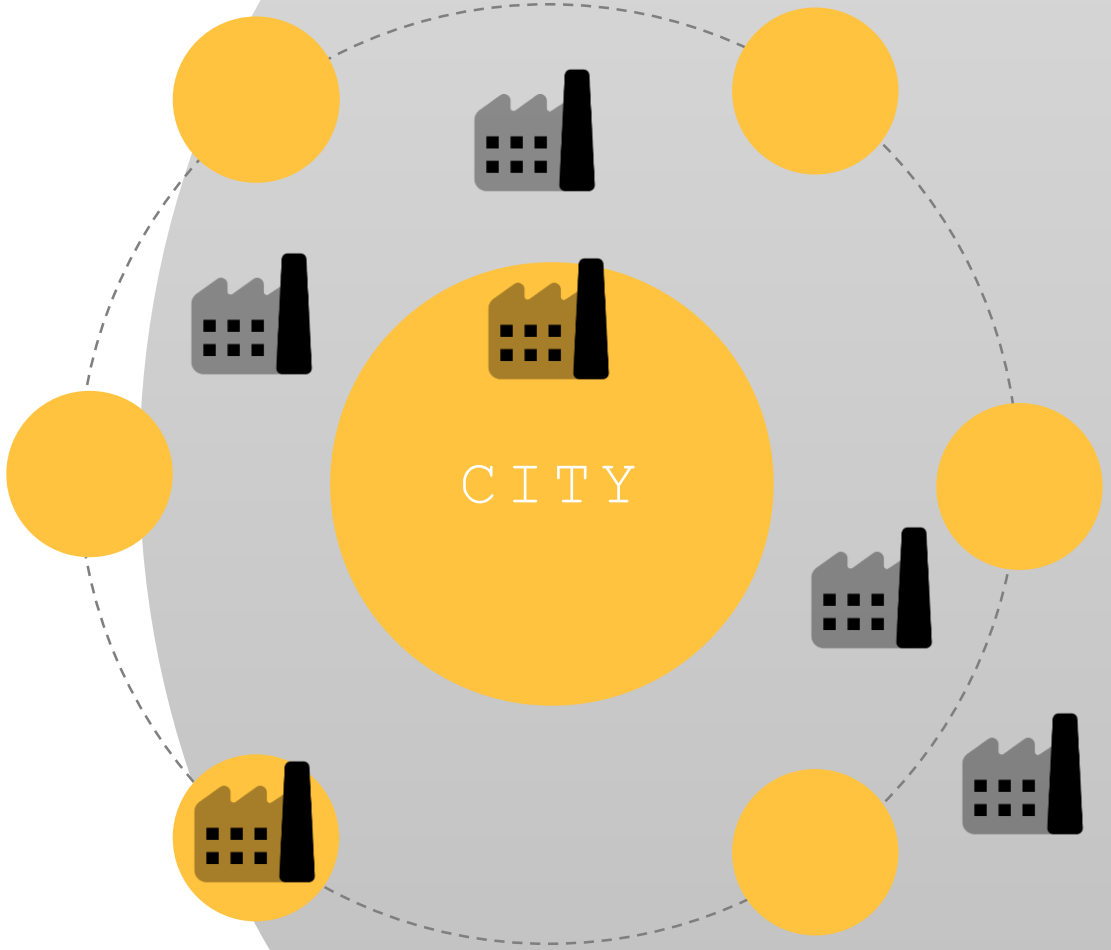
Distribution of industrial lots within a city

Industrial deglomeration

locating industry outside cities, usually in previously agricultural areas (**greenfield investments**)

Special case **- Entrepreneurship nests**

In some Polish suburban zones, areas we observe increased economic activity, often higher than in the central city. Such external areas within suburbs of economic activity (SME) are called entrepreneurship nests (Martyniuk O., Martyniuk-Pęczek J., Parteka T.)

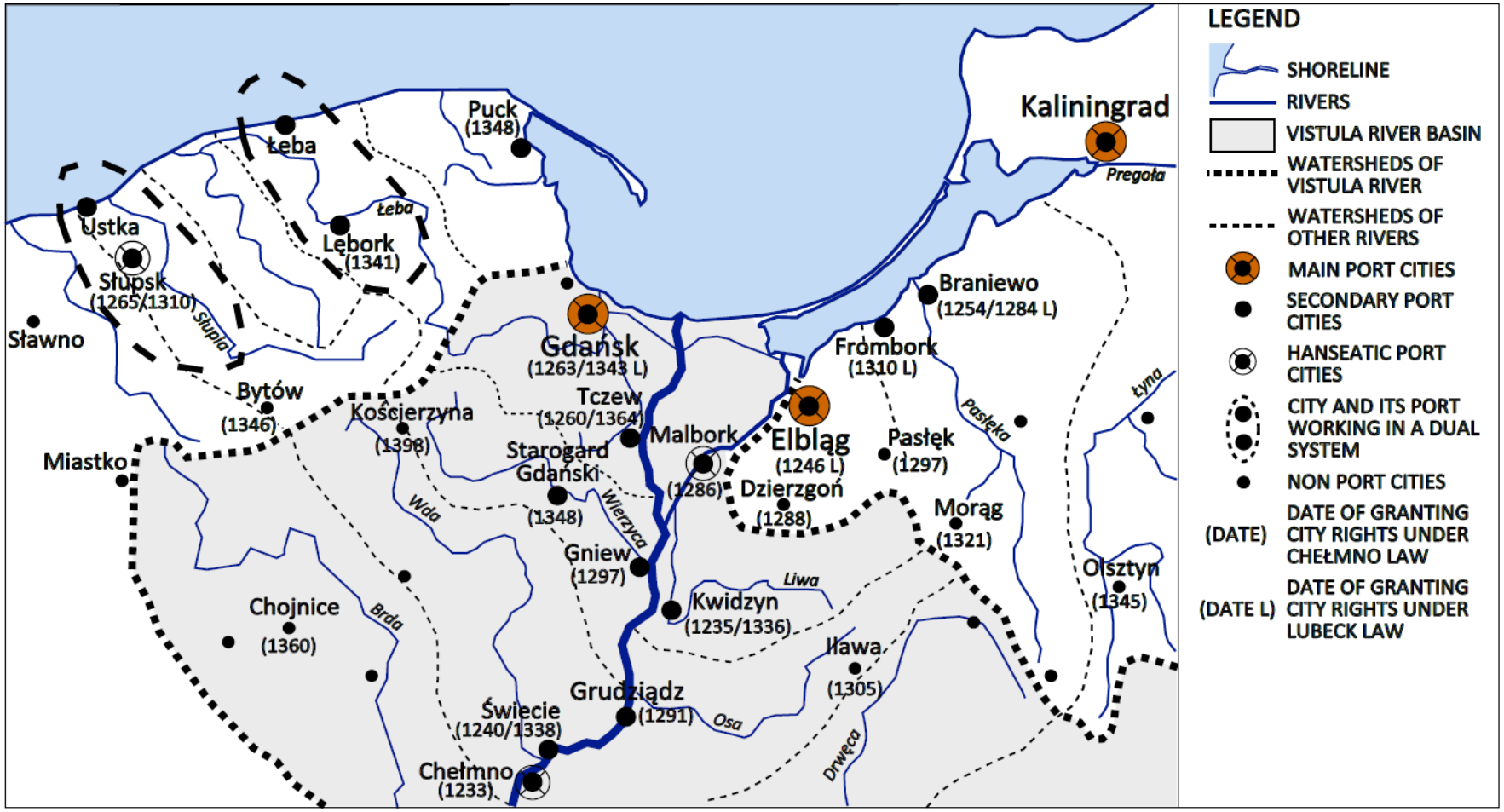


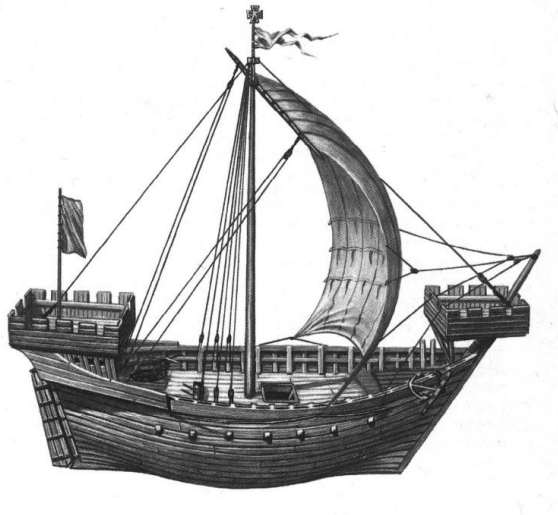
02

Logistics

Defined by means of transportation and reloading technologies

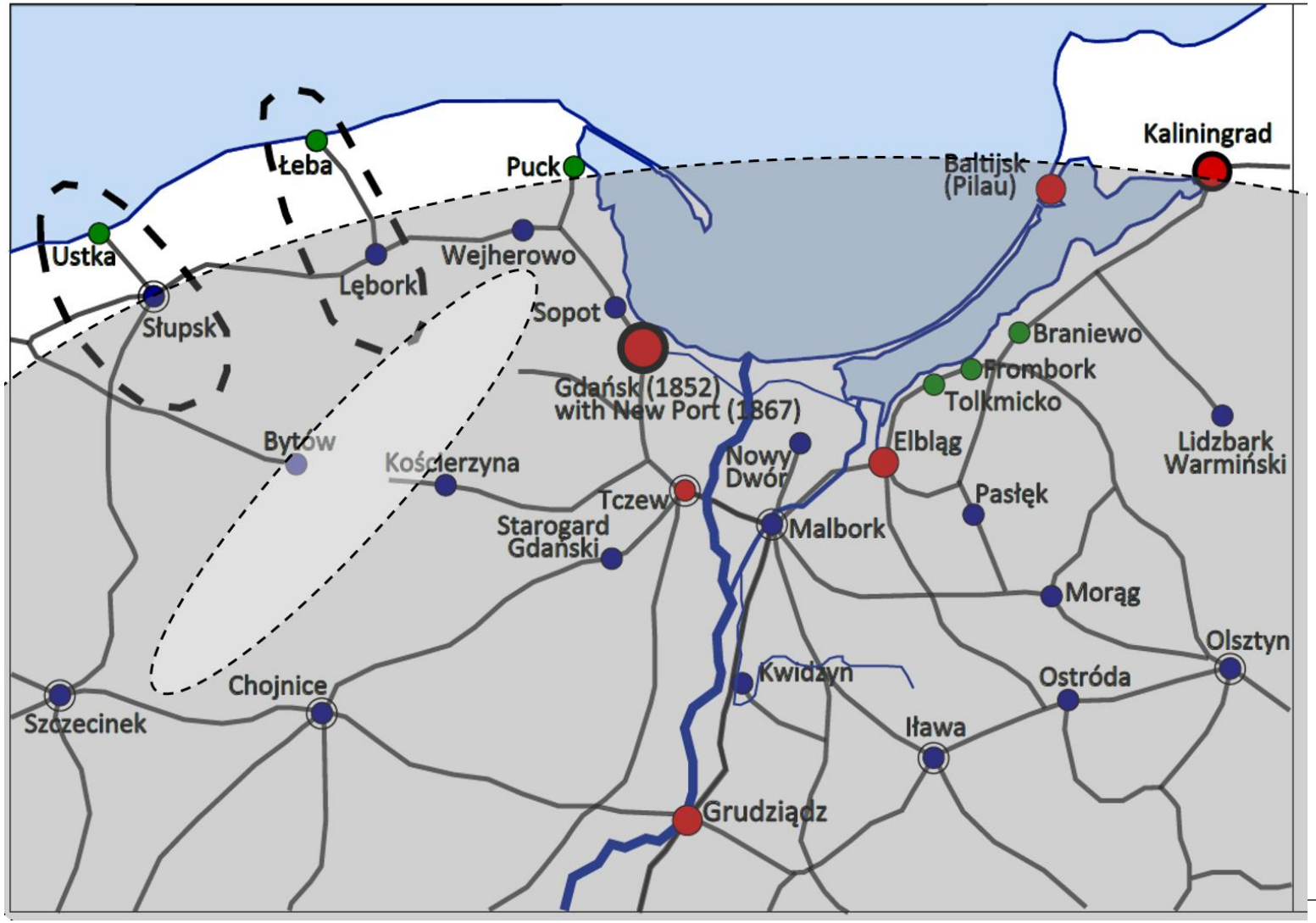
Evolution of the hinterland of Gdańsk port region

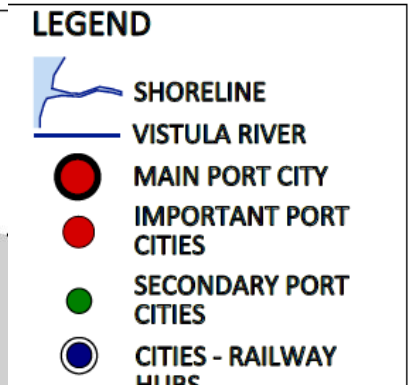




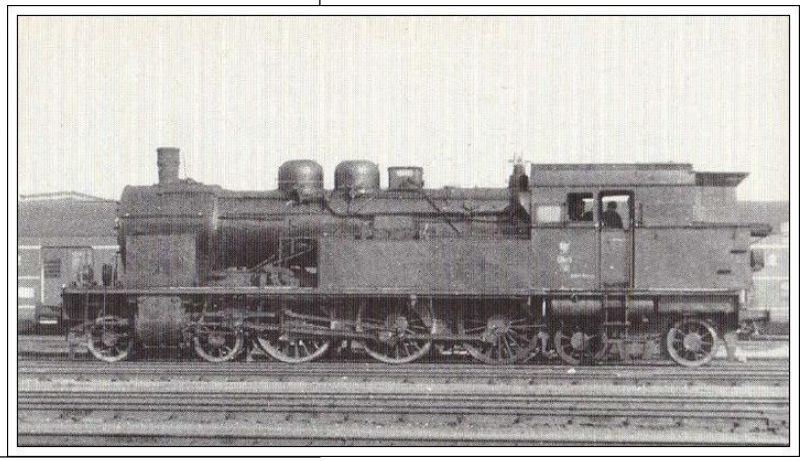
Gdańsk Bay port region geography in Hansa times (**around the year 1400**). The hinterland is defined by the accessibility of water transport. The lines of watersheds are shown approximately. Source: Krośnicka, K. A., Lorens P., Michałowska E. (2021). Port Cities within Port Regions: Shaping Complex Urban Environments in Gdańsk Bay, Poland, Urban Planning vol 6, no 3, 2021, pp. 27-42. https://dx.doi.org/10.17645/up.v6i3.4183. DOI: https://doi.org/10.17645/up.v6i3.4183

Evolution of the hinterland of Gdańsk port region



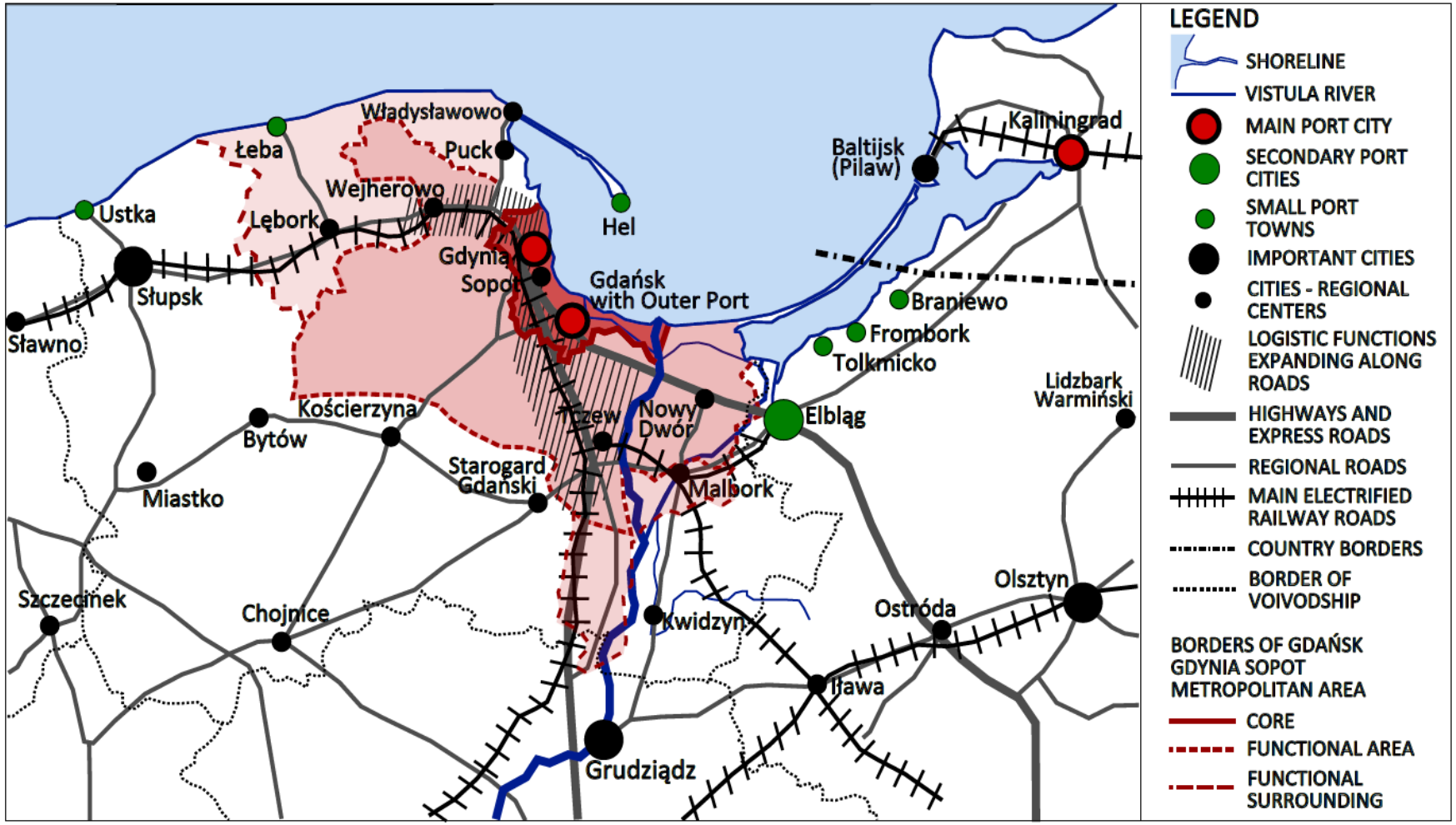


http://www.izba.centrum.zarow.pl/artykuly/872-lokomotywy-parowe-w-ruchu-pasazerskim-i-towarowym-na-odcinku-imbramowice-zarow-w-latach-1945-1965



Gdańsk Bay port region geography at the end of the 19th century (**around the year 1900**). Source: Authors based on Lijewski and Koziarski (1995). Source: Krośnicka, K. A., Lorens P., Michałowska E. (2021). Port Cities within Port Regions: Shaping Complex Urban Environments in Gdańsk Bay, Poland, Urban Planning vol 6, no 3, 2021, pp. 27-42. https://dx.doi.org/10.17645/up.v6i3.4183. DOI: https://doi.org/10.17645/up.v6i3.4183

Evolution of the hinterland of Gdańsk port region



Contemporary Gdańsk Bay port region geography. **The hinterland covers the whole region, activities concentrate along the main transport coridors**!
Source: Krośnicka, K. A., Lorens P., Michałowska E. (2021). Port Cities within Port Regions: Shaping Complex Urban Environments in Gdańsk Bay, Poland, Urban Planning vol 6, no 3, 2021, pp. 27-42. https://dx.doi.org/10.17645/up.v6i3.4183. DOI: https://doi.org/10.17645/up.v6i3.4183

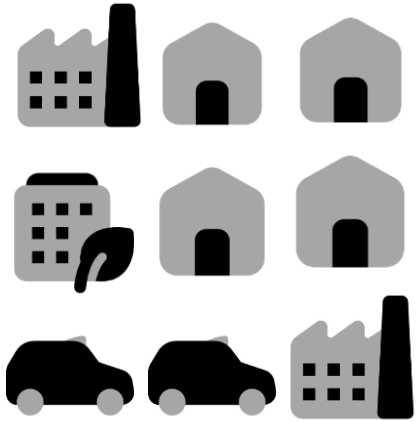
Spatial forms of logistic activities:

Logistic warehouse

is a spatial object with an organization and infrastructure, enabling to perform operations on goods in connection with their storage and transport between the sender and recipient

After: I. Fechner, *Miejsce centrum logistycznego w warstwie pojęciowej infrastruktury logistycznej*, „Logistyka” 2008, nr 3.

Spatial forms of logistic activities:



Logistic centre

freight villages
plates-formes multimodales
Güterverkehrszentrum (GVZ) *Interporti*

is a group of objects with an organization and infrastructure, enabling various independent enterprises to perform operations on loads in relation to their storage and transport between the sender and the recipient, including the operation of intermodal transport, providing users with various additional services

After: I. Fechner, *Miejsce centrum logistycznego w warstwie pojęciowej infrastruktury logistycznej*, „Logistyka" 2008, nr 3.

Pomeranian Logistic centre in Gdańsk
https://akcentoffice.pl/property/pomeranian-logistics-centre/#gallery-images

Percentage share of land with a specific function in German logistics centers (2004):

- Industrial areas - 65.2%
- Transport areas - 10.9%
- Intermodal terminals - 6.2%
- Other land - 17.7%

NESTLER, S., & NOBEL, T. (2004). Neuorientierung der GVZ-Idee. Strukturen und Erfahrungen der europaeischen GVZ-Entwicklung. *Internationales Verkehrswesen*, *56*(11), p. 141.

Spatial forms of logistic activities:

Intermodal terminals

is a key component of the intermodal transport chain since it has to ensure an efficient and safe interchange between road, rail and other transport modes (inland waterway, short sea shipping including ferries).

After: https://www.intermodal-terminals.eu/intermodal-terminals/

Baltic Container Terminal in Gdynia (~2005)

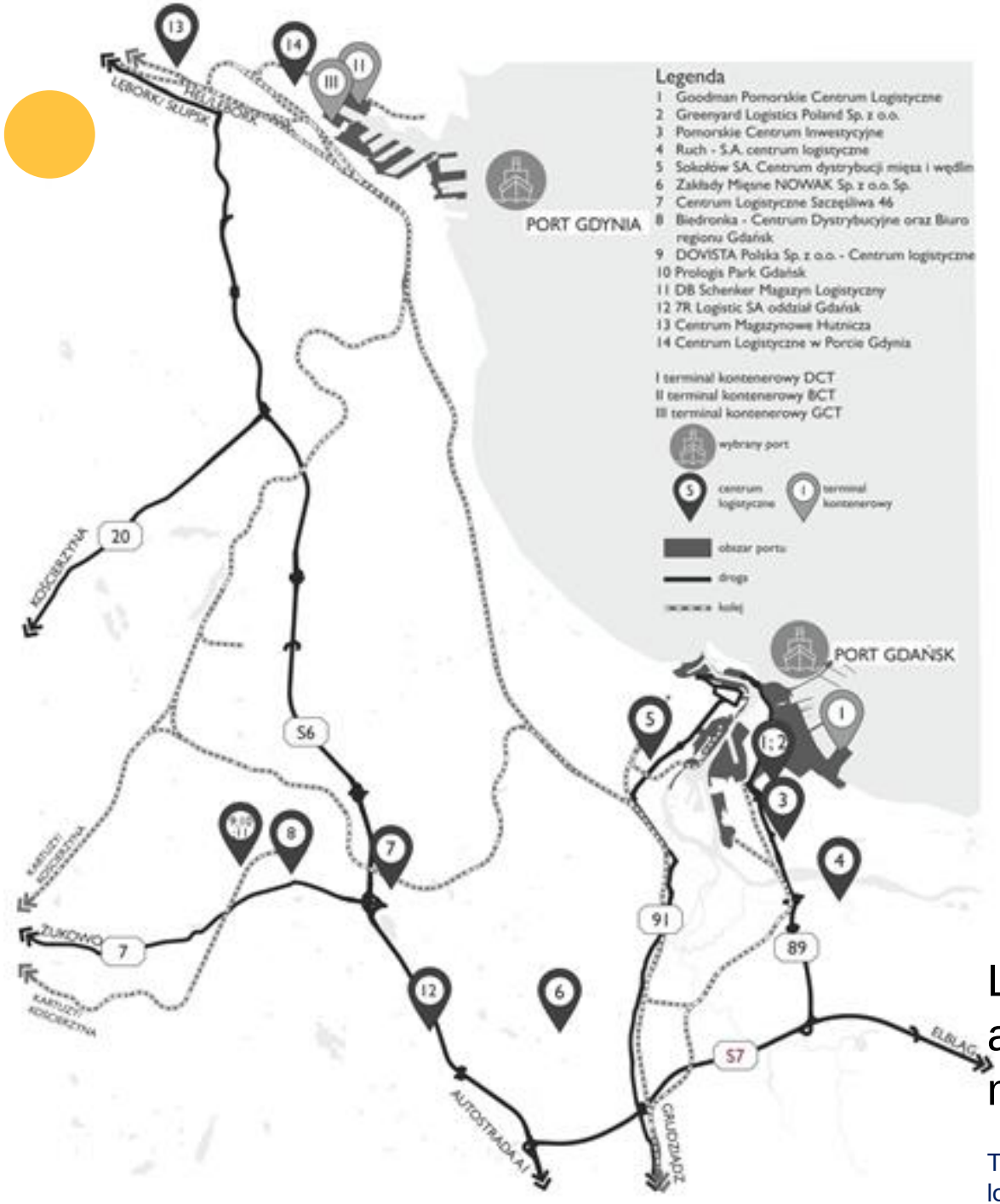
FORELAND	PORT	HINTERLAND			
	function of facilities bounded functionally with a terminal	direct vicinity of terminal (up to 5 km)	port city metropolis (up to 50 km)	port city region (up to 150 km)	further hinterland (over 300 km)
as in ports' hinterland (vicinity of terminal)	back-up facilities (technical support of a terminal)	external techno-logical area parking for ter-minal's transport equipment terminal oil/gas station container depot			
as in ports' hinterland (vicinity of terminal)	servicing area for external transportation	gate's terminal trucks' parking gates' awaiting truck lanes parking pre-gate external terminals' marshalling yard	extended close dry ports and marshal-ling railway yards	pre-gate	
as in ports' hinterland (vicinity of terminal)	storage and warehousing areas and objects	external storage surfaces cargo freight	stations (CFS)		
as in ports' hinterland (vicinity of terminal)	logistics and industrial zones	distriparks LC/ LD	logistic	and distribution	centers (LC) (LD)
forelands' satellite terminals (off-shore terminals) satellite terminals in other ports	inland and sea satellite container terminal	inland satellite terminal on close ports' hinterland new deep-water container terminals		dry ports of medium range dry ports of medium range (extended gate type)	long-haul dry ports long-haul dry ports (extended gatetype)

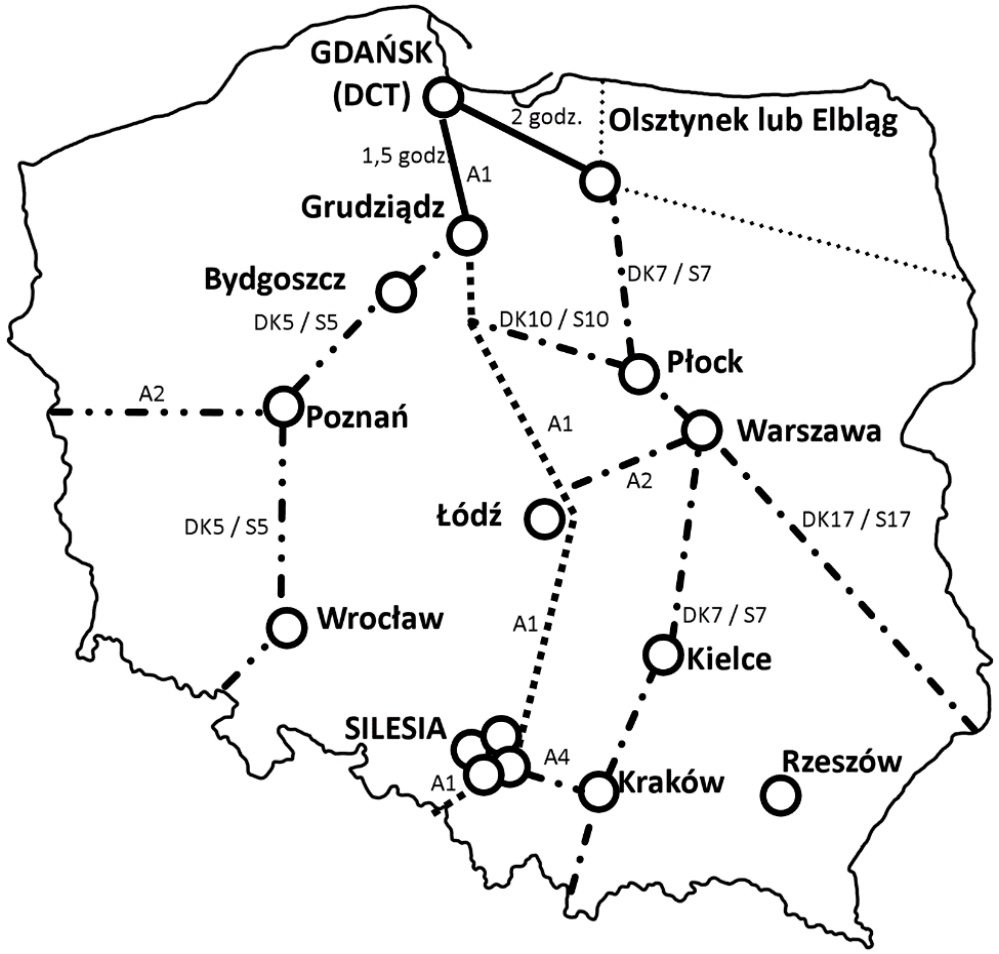
Legend:
The character of collaboration of the external object/area with ports' container terminal:
- The external part of ports' container terminal structure
- The object/area directly functionally tided with a ports' container terminal
- The object/area collaborating with a ports' container terminal
- Synchro-modal transportation

Spatial forms of logistic activities create a **complex multiscale network of logistic supply chains**!

Krośnicka, K. A. (2019). Container port expansion towards the sea in the context of maritime spatial planning, Europa XXI, 36, 107-115. https://doi.org/10.7163/Eu21.2019.36.9

Transport and logistics network. Polish - dryports

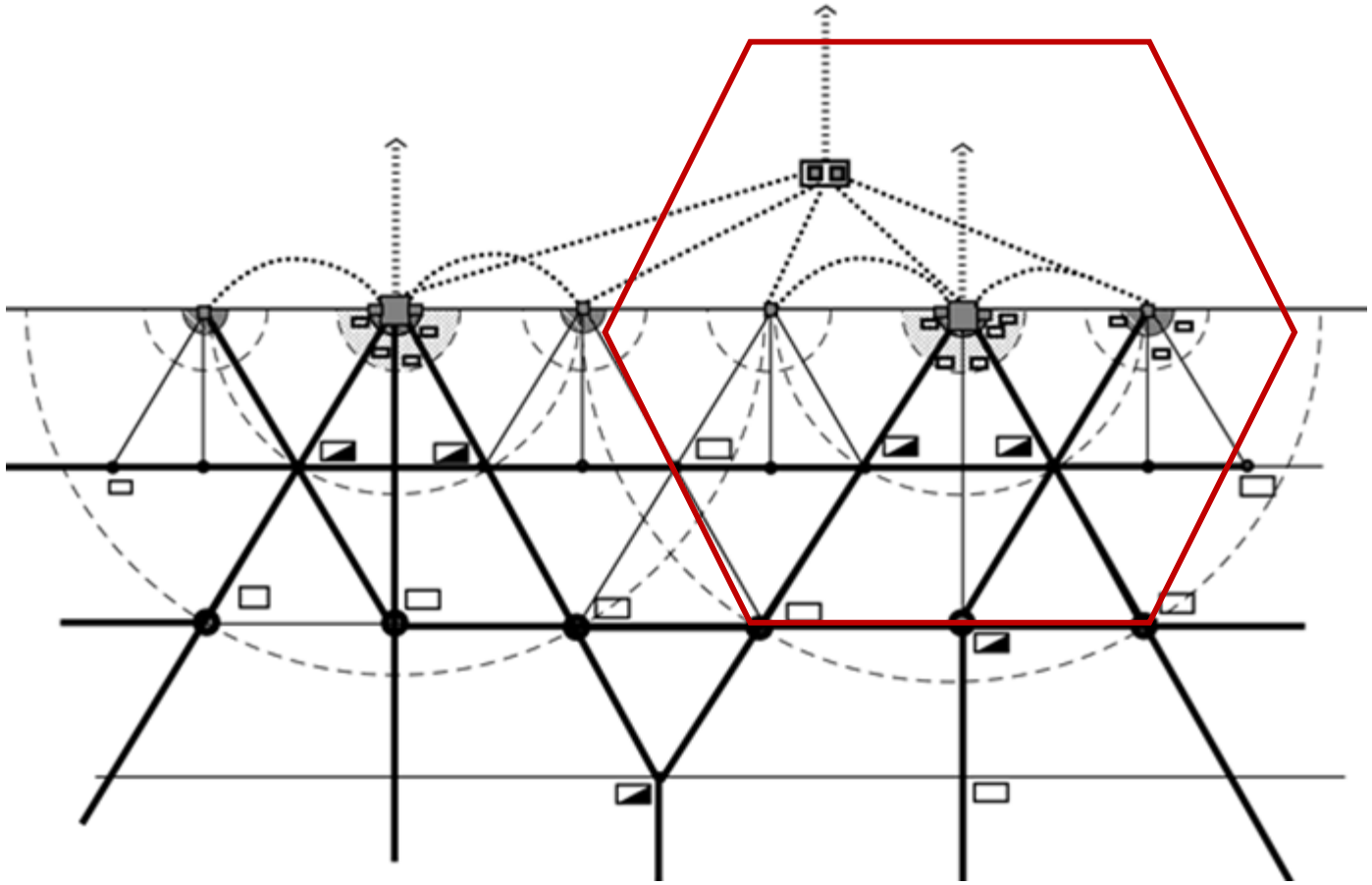




Location of the largest concentration of transport and logistics facilities in the Gdańsk-Gdynia-Sopot metropolitan area (left)

Tankiewicz M., Krośnicka K. (2018). Możliwości aplikacji teoretycznych modeli obiektów transportowo-logistycznych współpracujących z morskimi terminalami kontenerowymi portów Trójmiasta, (6), 429-441.

A theoretical model of the container system in Europe



Nodes and objects:

- City
- Container terminal
- *Gate-way* terminal in foreland
- Inland logistic centres
- Dry port
- External objects associated with container terminals in the metropolitan zone (up to 50 km)

Zones of hinterland:

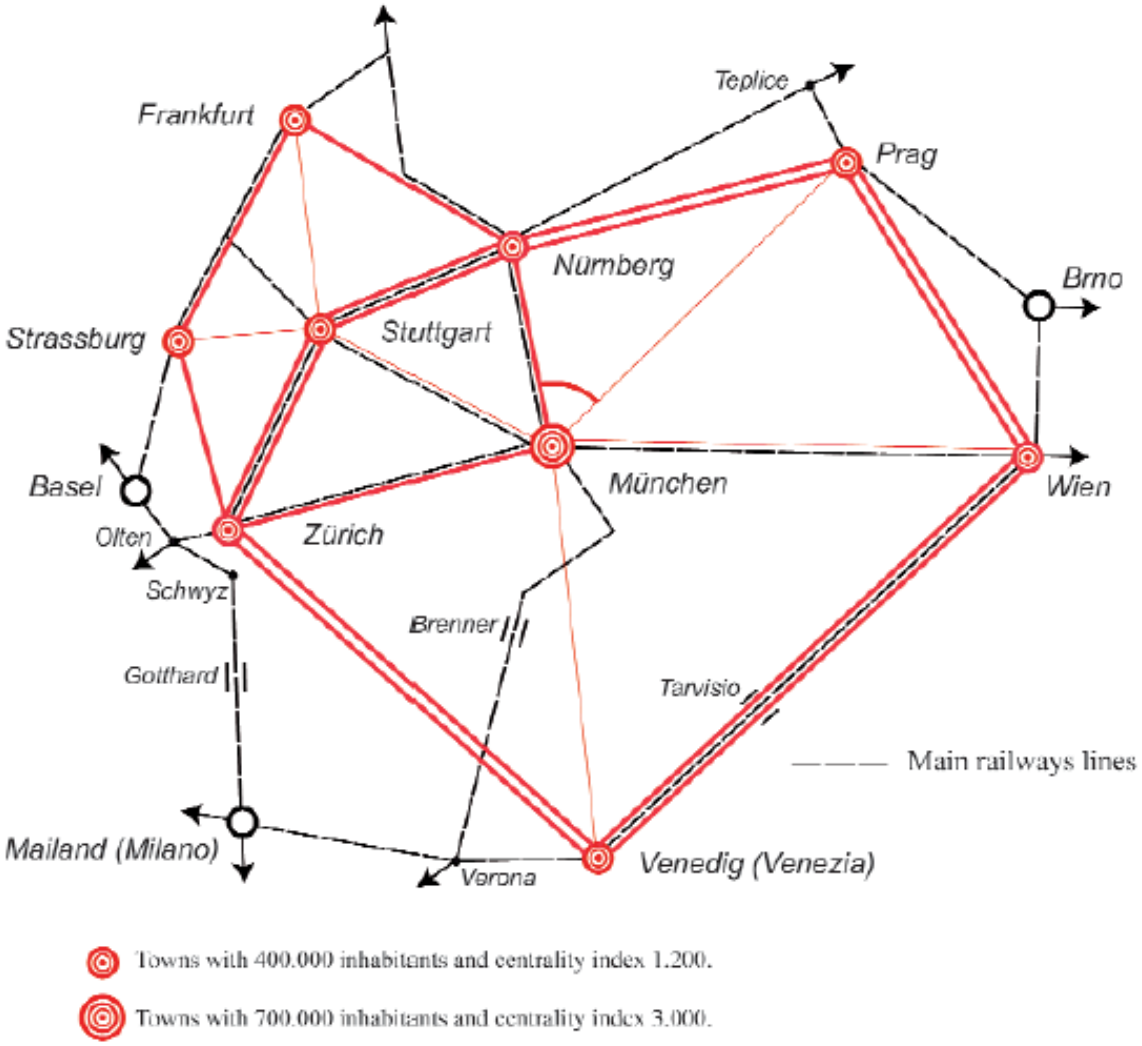
- Direct (up to 5 km)
- Metropolitan (up to 50 km)
- Regional (up to 150 km)
- Further hinterland (up to 300 km)
- Far hinterland (over 500 km)

Transportation connections

- Ocean connections
- Feeder connections
- Inland transport corridors
- Inland secondary connections

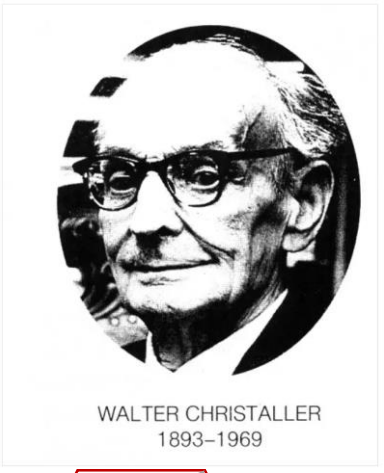
Krośnicka K. A. (2018). Spatial Evolution of the European Container Ports' System in Perspective of the Location Theory, *58, 2018*(SHS Web Conf.), 1-12. https://doi.org/10.1051/shsconf/20185801016

Central place theory

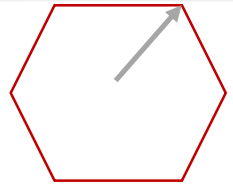


„Die Zentralen Orte in Sueddeutschland” (1933)

Threshold and range acts as laws that govern the number, size and distribution of settlements

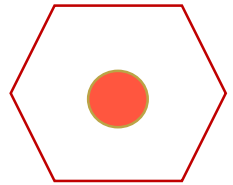


Range – the maximum distance people are willing to travel to use services/goods (**economic reach is a measure of centrality and a rank of services** (grocery/shopping center/shopping mall)

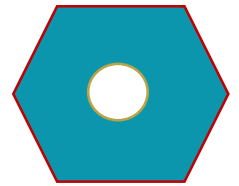


The higher rank of a service/goods the bigger distance people are willing to cross

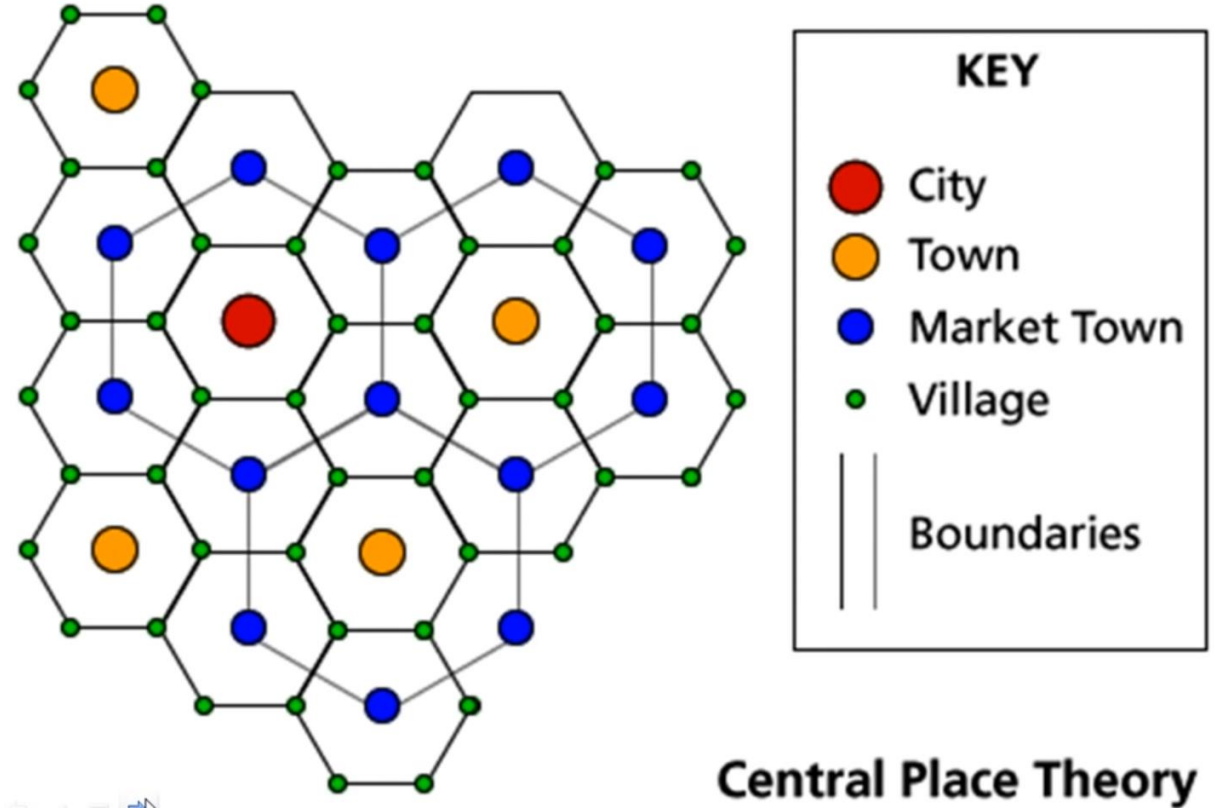
Threshold – the minimum number of people to suport a service/goods



Hinterland - the area surrounding the city that interacts with the market in regards to a service/goods (the area from which consumers of a service/goods are drawn)

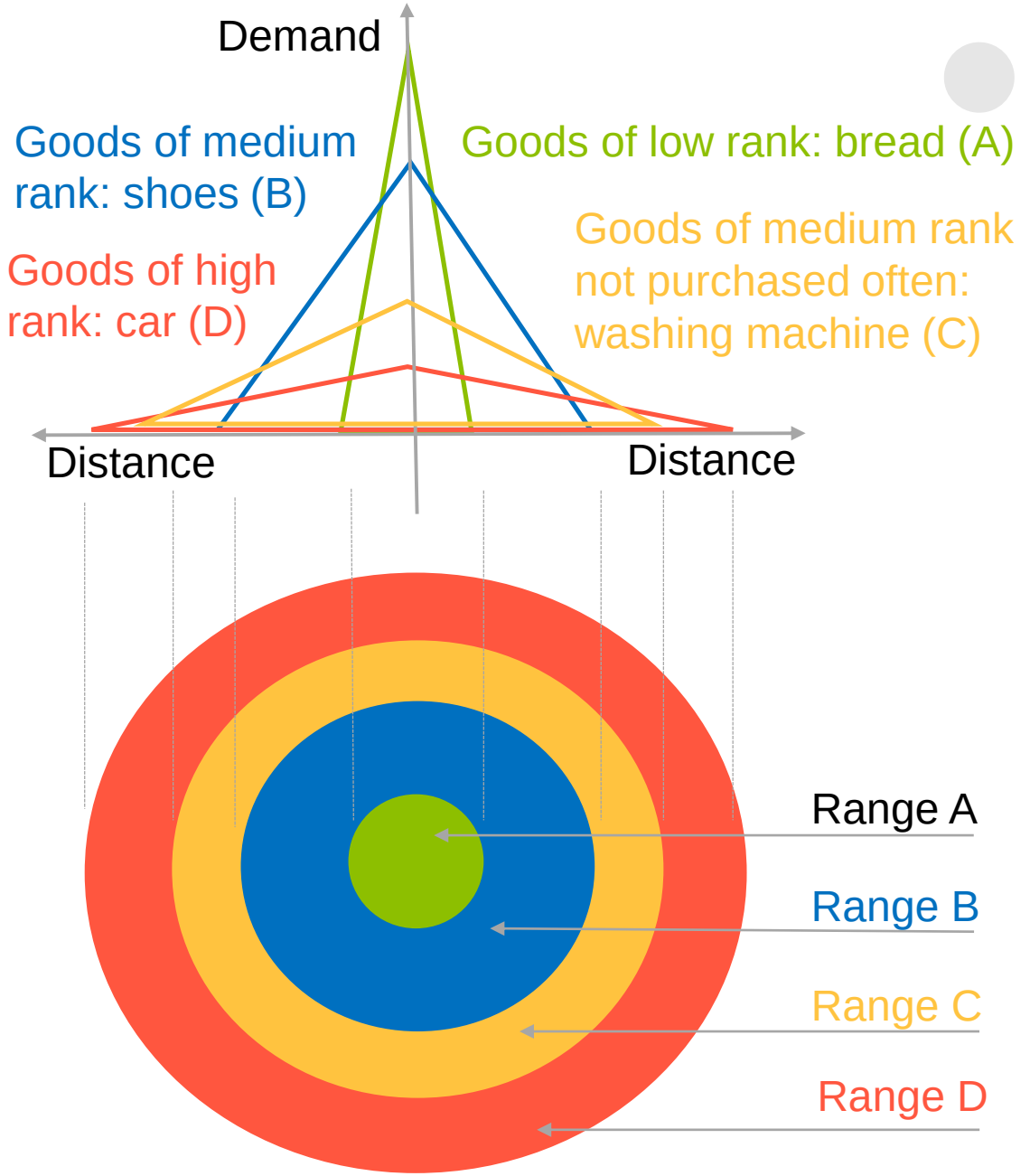


Central place theory



https://www.youtube.com/watch?v=59K1pcw-oJk

Hexagons - to cover all the space without rests
Describes urban hierarchy
1 C- city
6 T – town
6 MT – market towns
12 V - villages

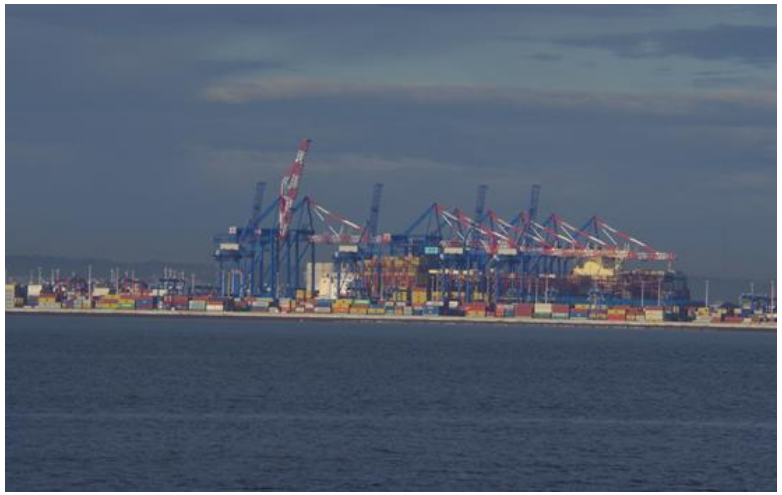


The higher rank of a service/goods the bigger distance people are willing to cross

Concept of hinterland and forelend

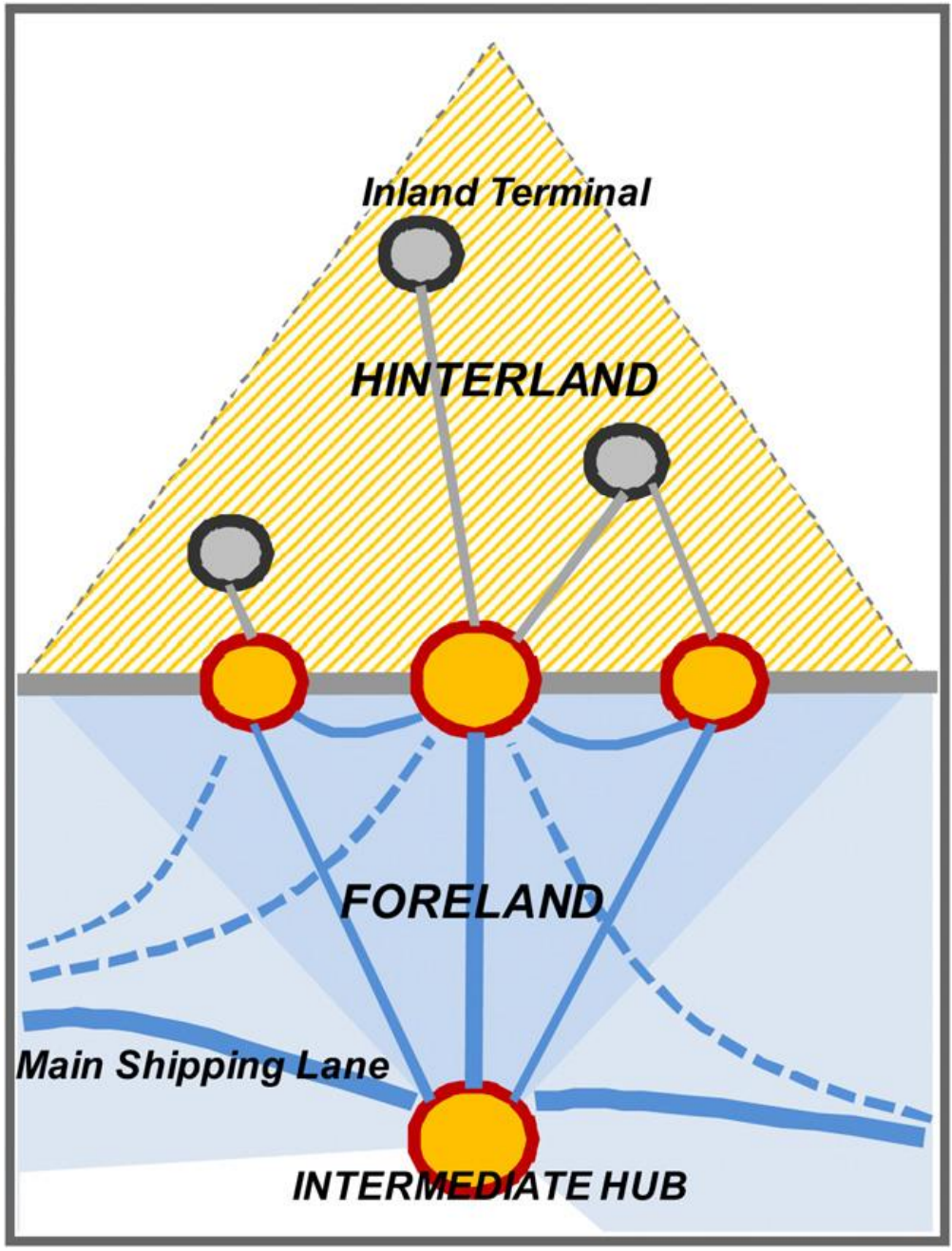
Industry, Production and Logistics usually create clusters along transport routes,

which are **functionaly tided together by transport system in a global**



Baltic hub Gdańsk

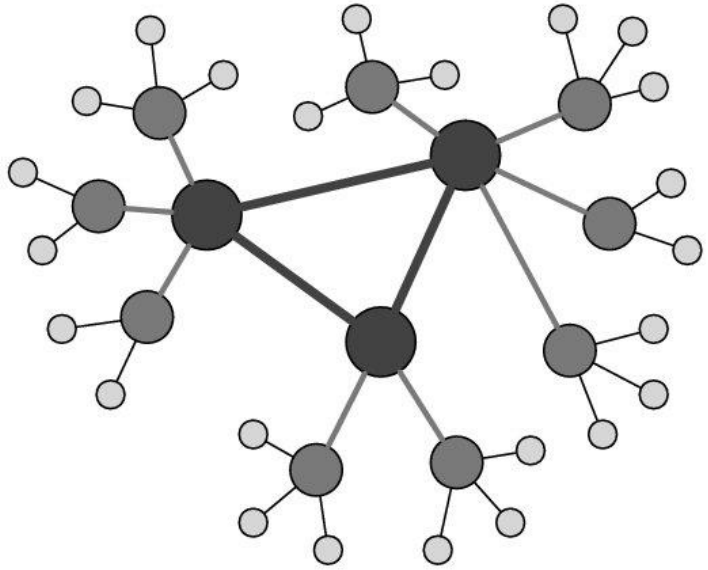
Container port Hong Kong



J-P. Rodrigue, Th.Notteboom, Foreland-based regionalization: Integrating intermediate hubs with port hinterlands, Research in Transportation Economics 27 (2010) 19–29

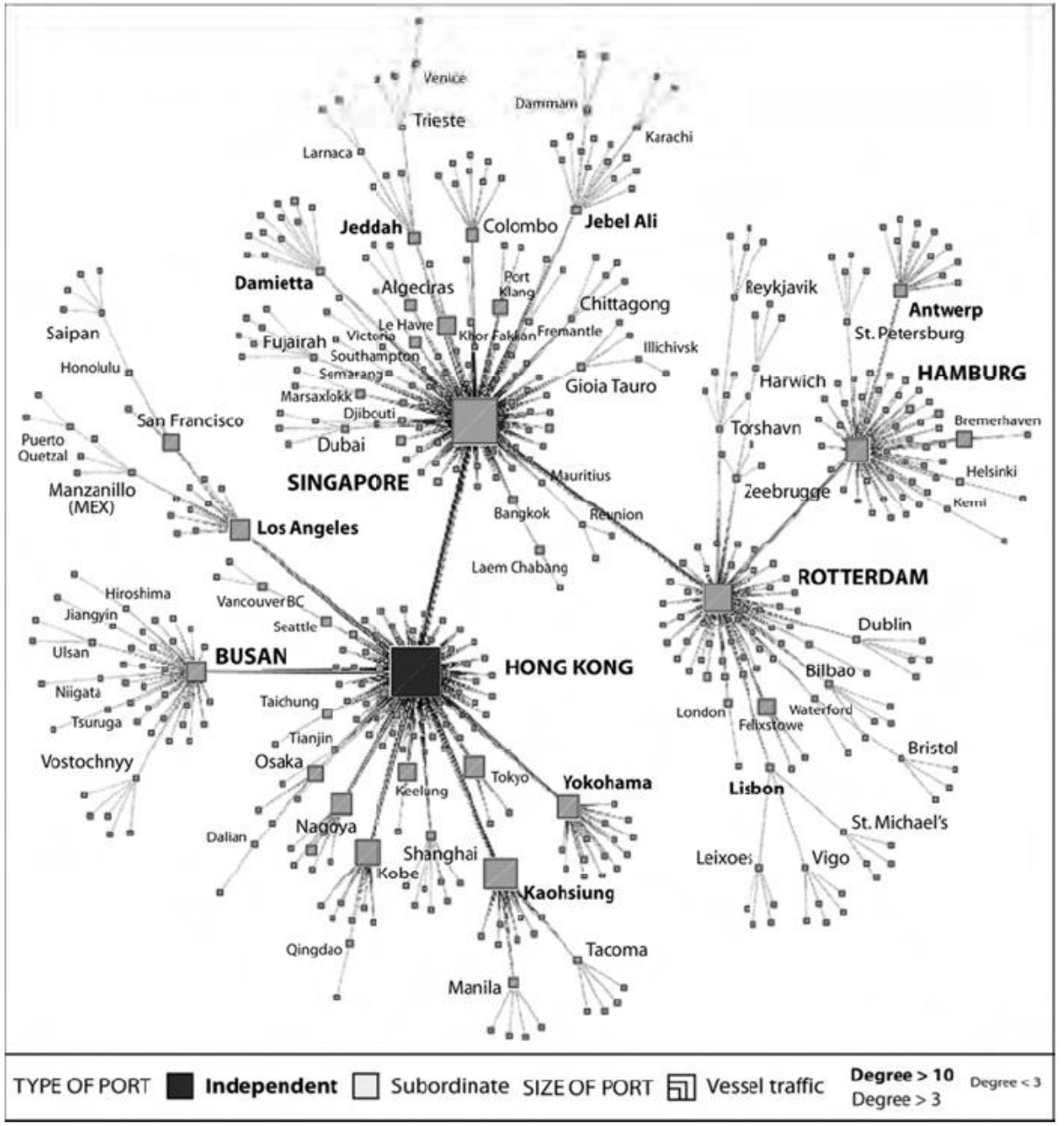
Global supply chain

Organisational and functional binds between the elements of the global network cause that the factors located in a very distant locations strongly influence local landscapes



A hierarchical hub and spoke overlay network consisting of three levels. The nodes at the top level are connected in a mesh-like fashion.

https://www.researchgate.net/publication/228902224_Coordination_in_hierarchical_pickup_and_delivery_problems_using_delegate_multi-agent_systems/figures?lo=1



Ducruet C., Notteboom T., The wordwide maritime nework
Of container shipping: spatial structure and regional dynamics, Global Network 12, 3 (2012) 395-423. https://doi.org/10.1111/j.1471-0374.2011.00355.x

„Universal” global logistic landscapes

Global players in local environment!

Containerscapes in Antwerp, HK, Gdańsk and Rotterdam

„Universal” global logistic landscapes

Global players in local environment!

Petroleumscapes in Berlin, Gdańsk, Rotterdam

Production and logistics landscapes

Functional values

01

Linear transportation infrastructure

The linear transportation infrastructure **cuts the area into pieces** and often decreases the value of land for some functions (housing, agriculture), while increasing this value for other functions (industry, Logistics, large scale services)
The transportation infrastructure **enlarge the catchment area** of industrial clusters.

02

Technology, business culture, economies of scale

Industrial and Logistics **landscapes are strongly determined by means of transportation and technologies** of production and reloading of goods. **Business culture** (size, organisational structure and a type of company) influence strongly the landscape.
Along with evolution of technology the need for bigger size of industrial lots and objects grows - **economies of scale are changing the landscape**

03

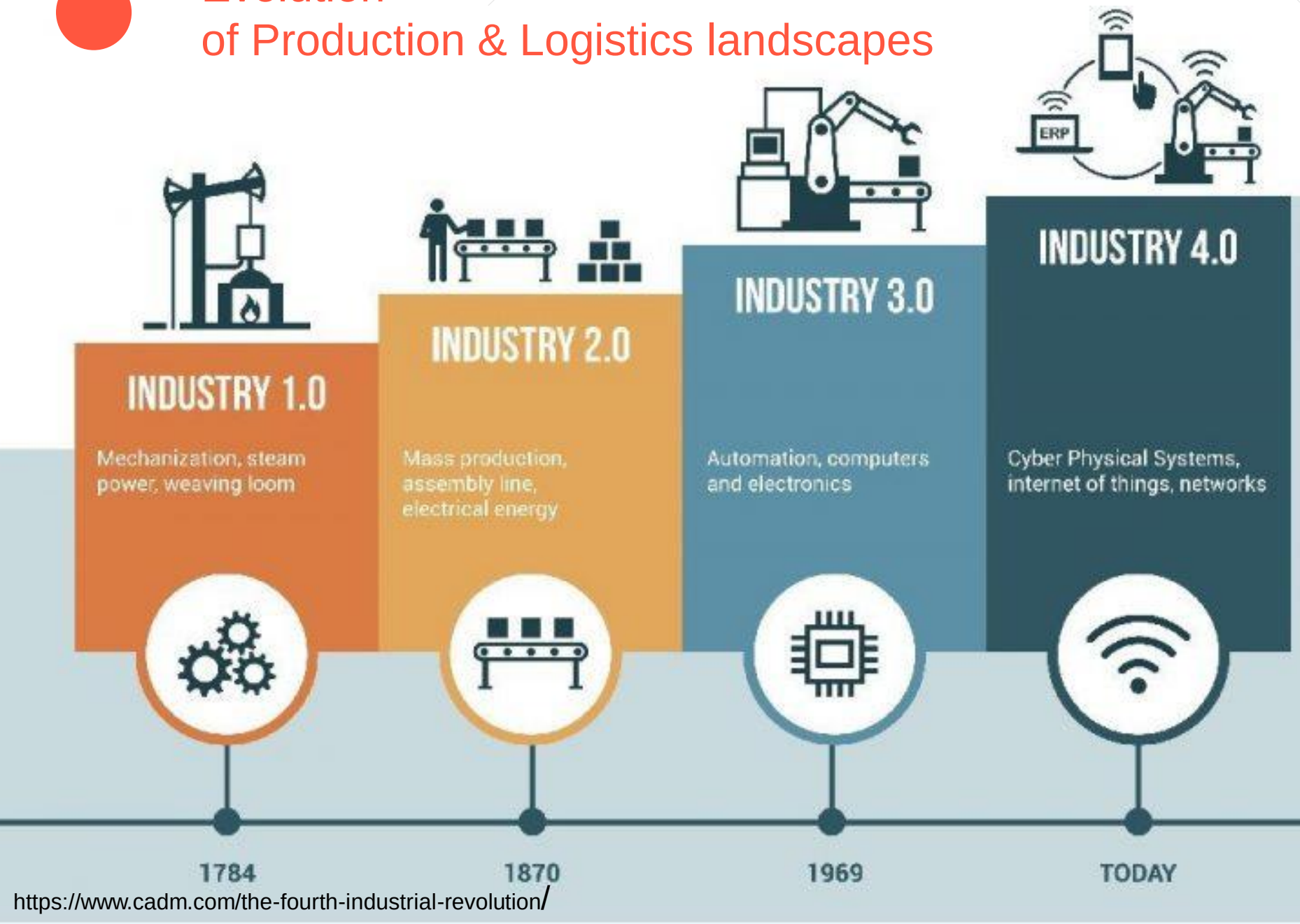
Globalisation of Logistics and Industry

Organisational and functional binds between the elements of the global network cause that some factors, located in a very distant locations, influence strongly local landscapes. **Global players are taking decissions in a local environment**.

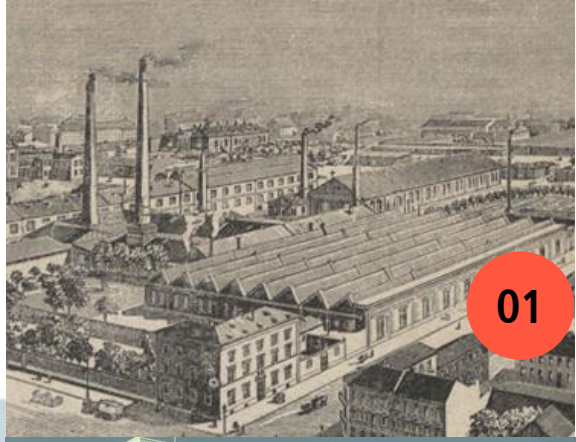
Production & logistics landscapes

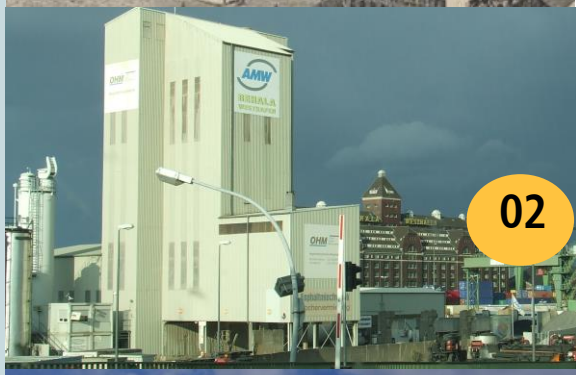
Evolution and heritage

Evolution
of Production & Logistics landscapes



https://www.cadm.com/the-fourth-industrial-revolution/

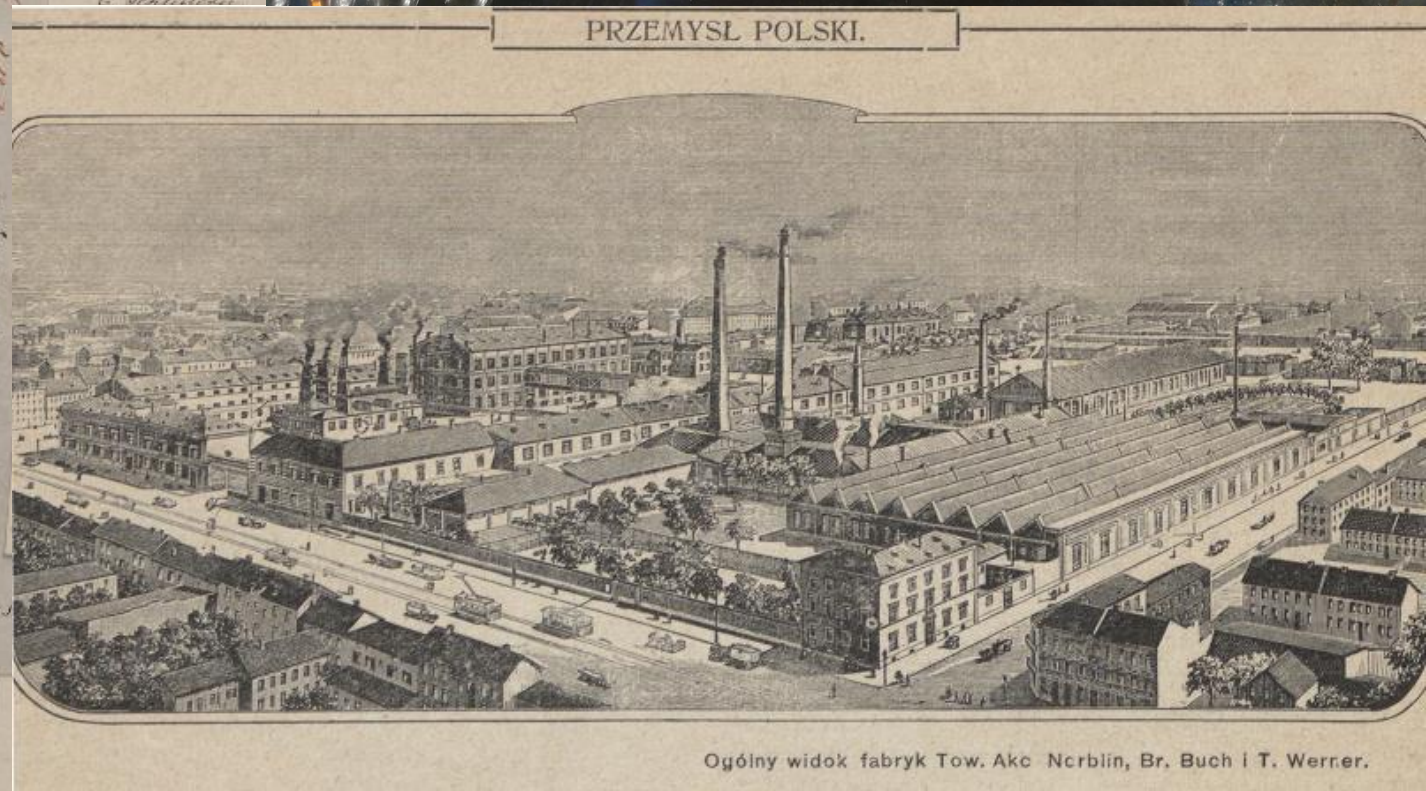




01

Industry & Logistics 01

Silver-plated cutlery factory Norblin in Warsaw (1847)



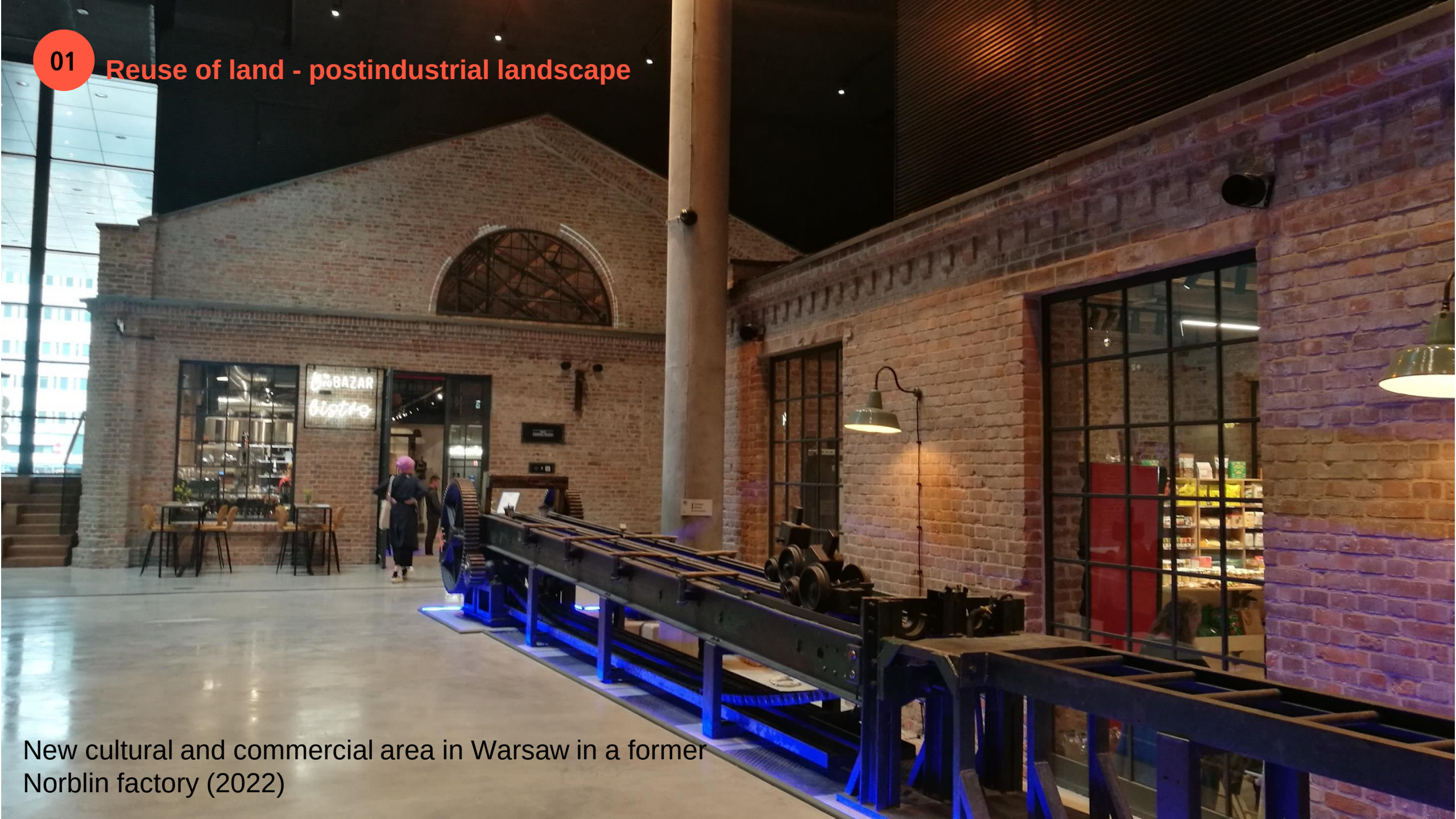
https://wawtech.pl/warszawski-szlak-techniki/norblin/

01

Reuse of land - postindustrial landscape

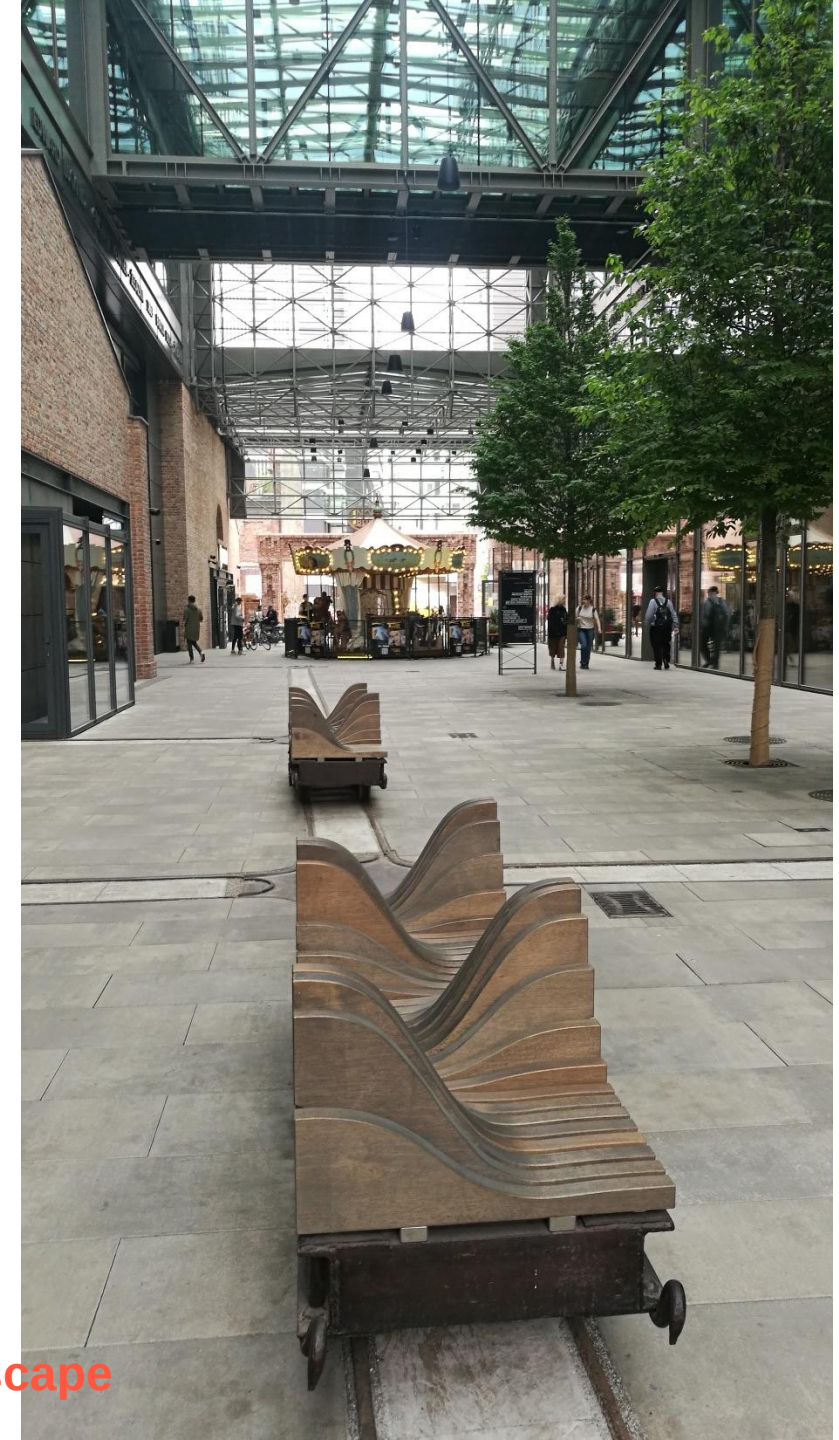
New cultural and commercial area in Warsaw in a former Norblin factory (2022)

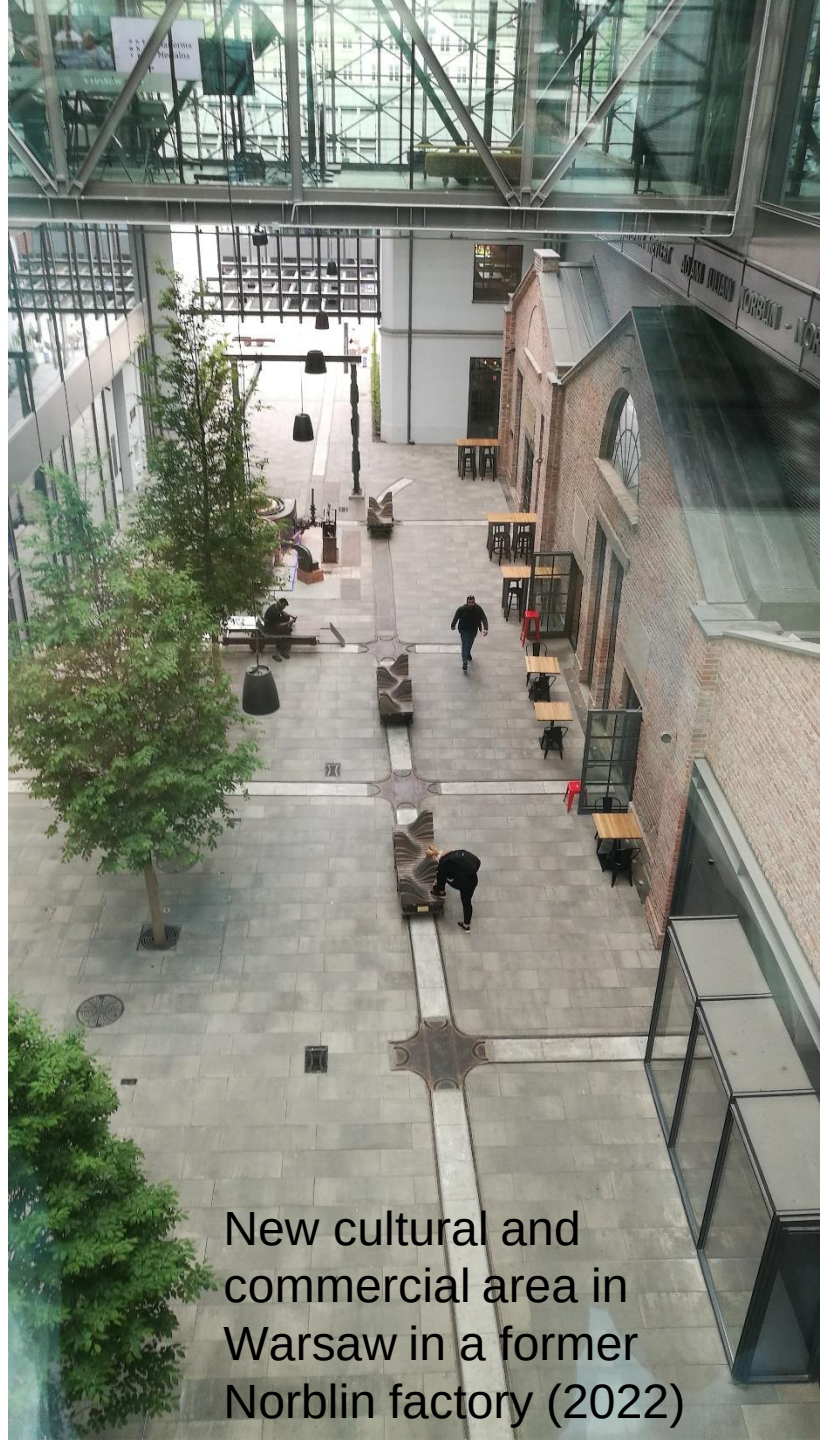
01 Reuse of land - postindustrial landscape



New cultural and commercial area in Warsaw in a former Norblin factory (2022)

01





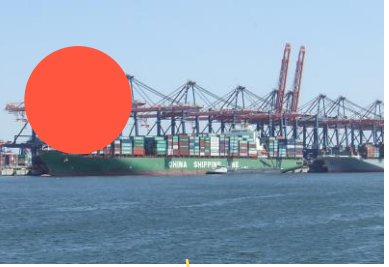
Reuse of land - postindustrial landscape

New cultural and commercial area in Warsaw in a former Norblin factory (2022)

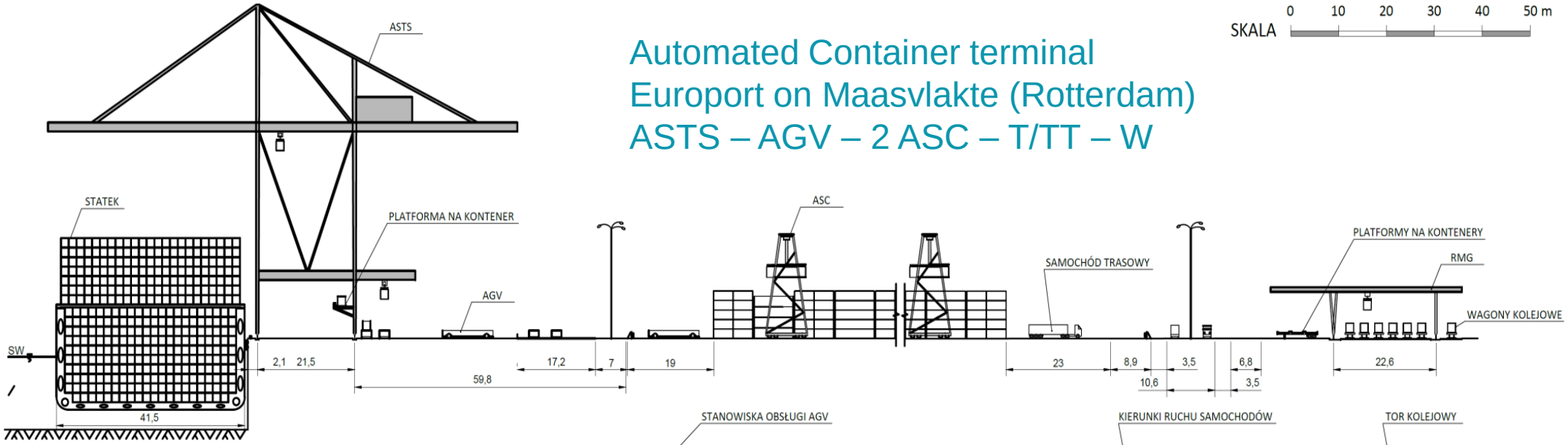
Industry & Logistics 4.0

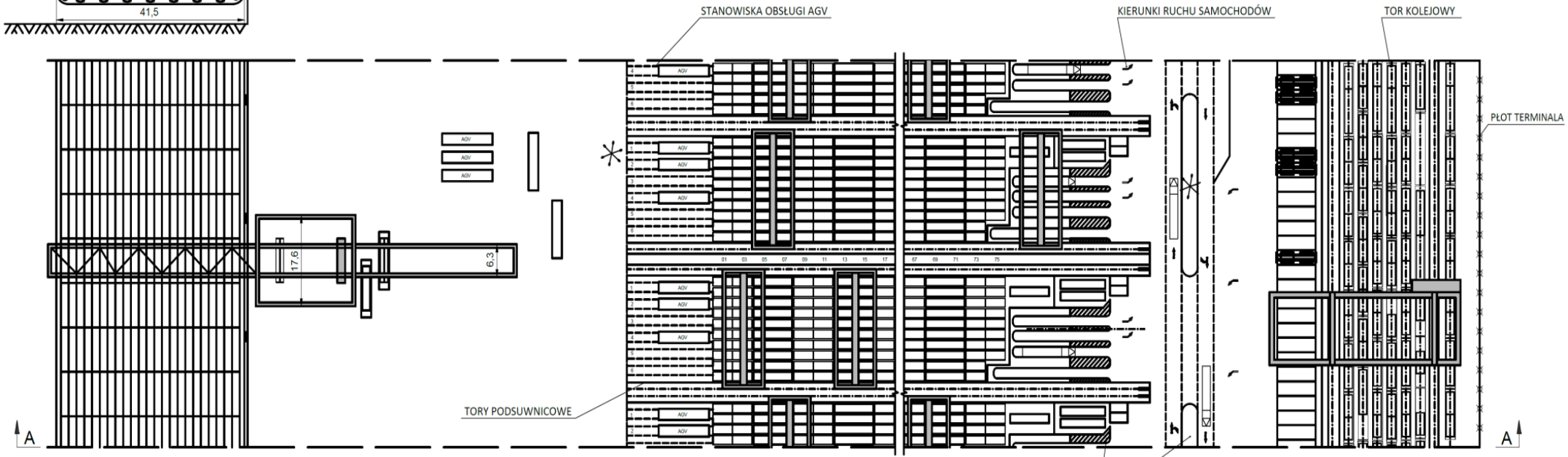
https://www.nauticexpo.com/prod/konecranes/product-30447-509147.ht

Industry & Logistics 4.0



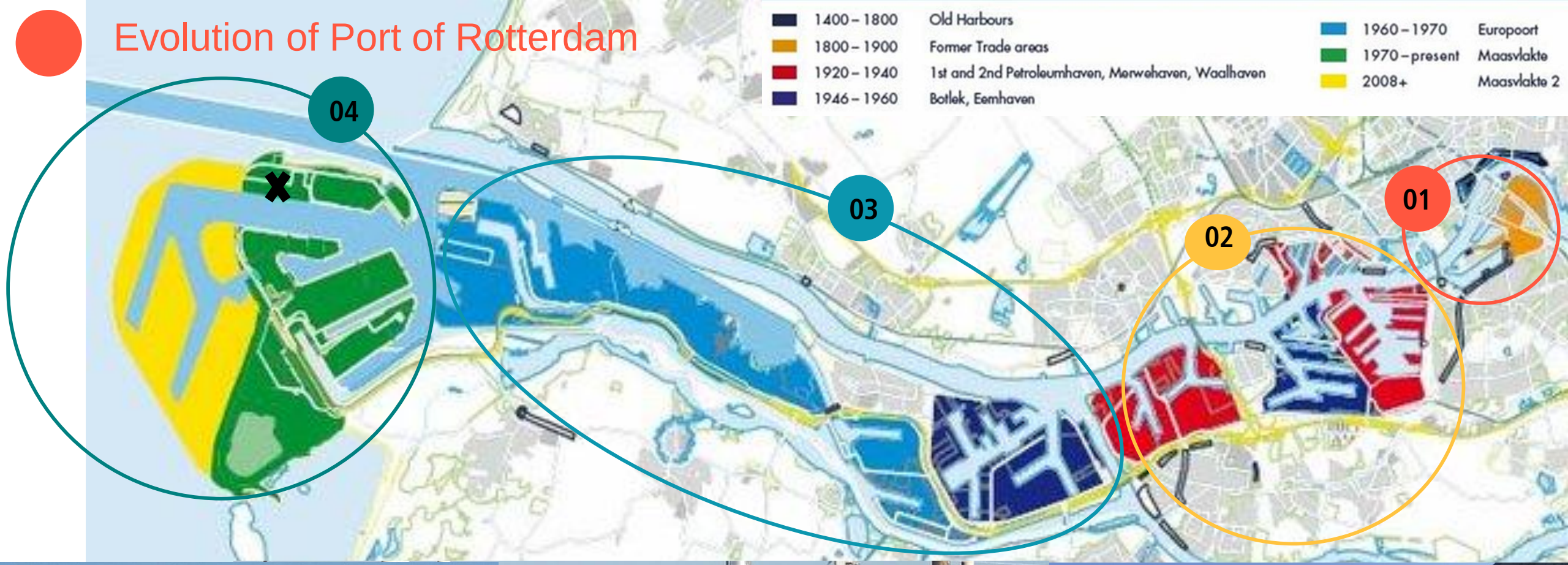
Automated Container terminal
Europort on Maasvlakte (Rotterdam)
ASTS – AGV – 2 ASC – T/TT – W





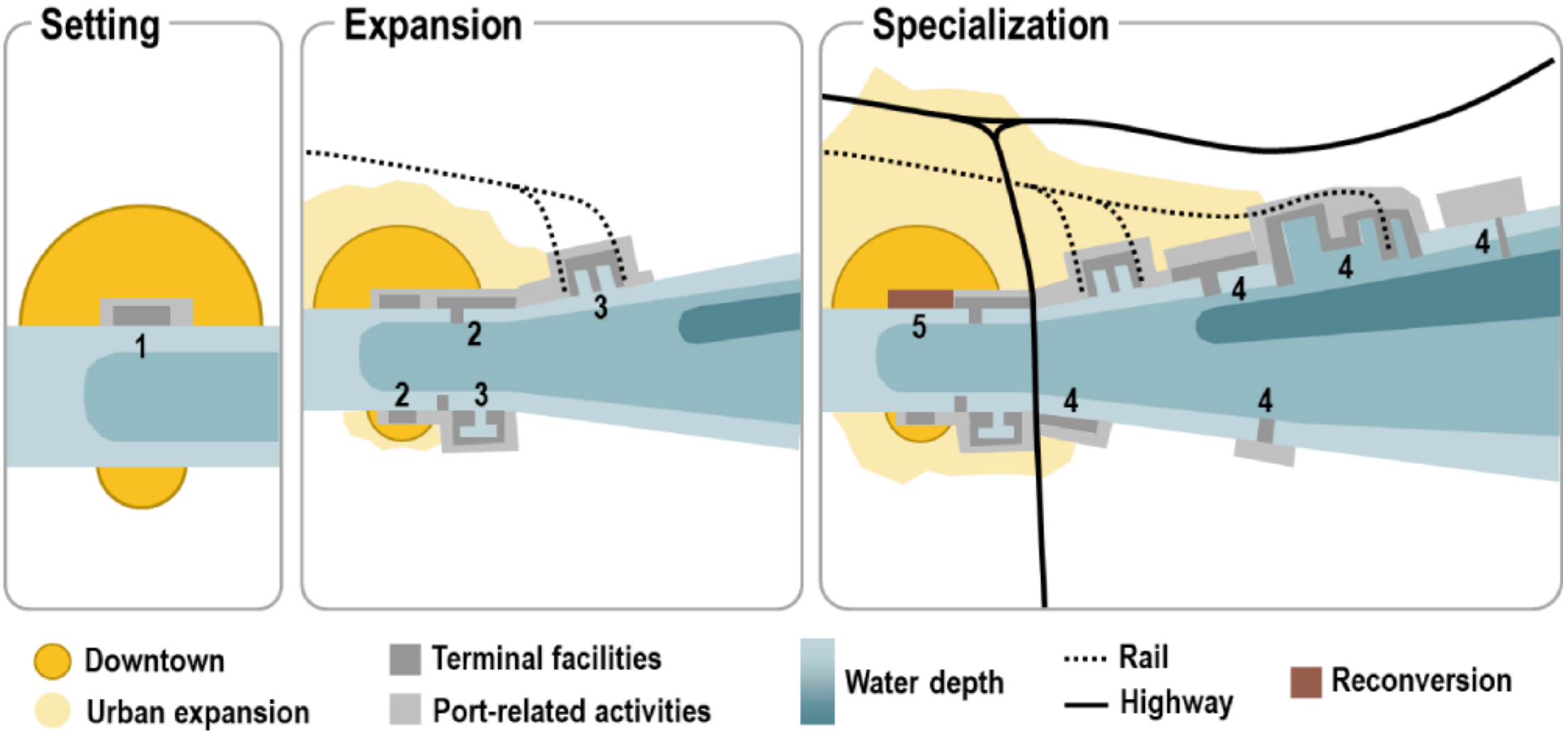
RZUT Z GÓRY

Evolution of Port of Rotterdam



Gijt J. G. de, Kleef van J.M. Taneja P.,Ligteringen H. (2010), The development of container handling in the Port of Rotterdam, Jahrbuch HTG 2010

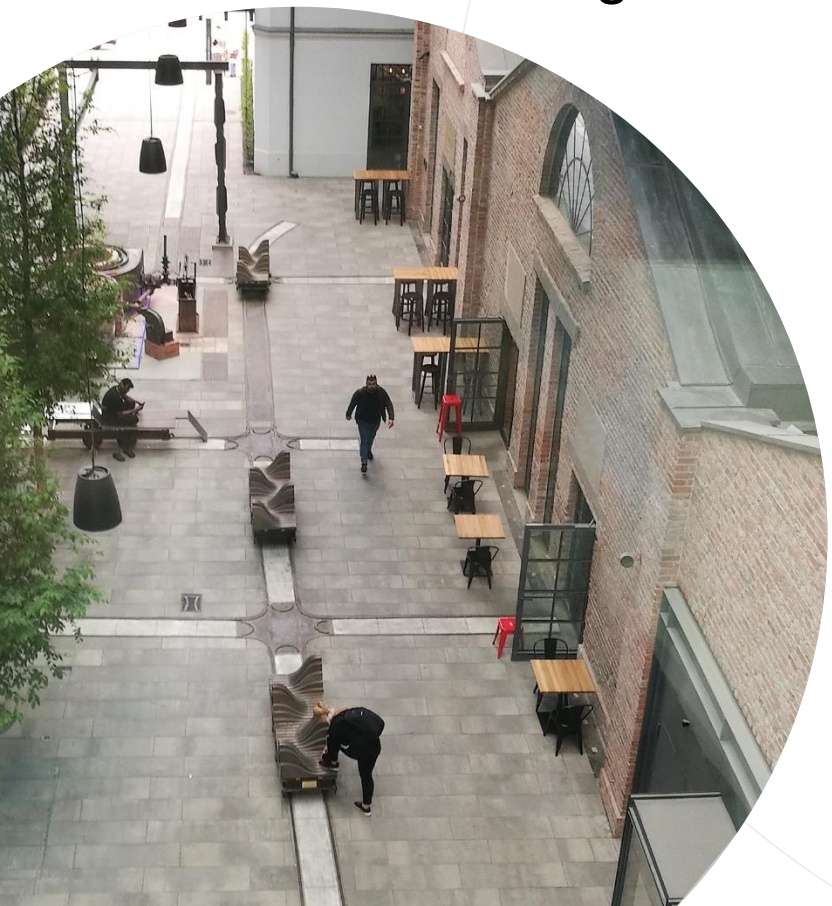
„Evolution of port infrastructure - Anyport" model of J. Bird (1969)



Rodrigue J-P (2017), The Geography of Transport Systems , fourth ed., New York: Routledge, pp. 440 , ISBN 978- 1138669574 https://transportgeography.org/?page_id=3388

Production and logistics landscapes

Evolution and heritage values



01

Industrial landscapes – pioneers of future

Depending mostly on technology, the industrial and logistic landscapes **indicate directions of future changes**.

02

Industrial landscapes - migration of function

Along with changing technology and economies of scale, industrial and logitics activities migrate outside a city in search of larger lots and less conflictogenic locations. This type of investment is called „**greenfield investment**".

03

Postindustrial landscape

People, with a time, accept an oversized scale of industrial and Logistics landscapes and after their „technological death" reuse them, treating them as heritage – **reuse of industrial landscapes**.

Discussion?

Economies of scale in production and logistics landscapes

01 Do you know any spatial exemplifications of economies of scale in the production & logistic landscapes in your city?

02 Do you know any ways of limiting the usage of land devoted to industry and logistics to reduce the impact of economies of scale on landscape?

Some possible answers…

- Multifunctional and intensive land use
- Reuse of land
- Distribution (decentralization) of functions in a highly efficient network (synchro modal transportation, put lockers)
- Circular economy
- Long lasting products (culture of repairing)
- Highly efficient organization
- Local products

THE 17 SUSTAINABLE DEVELOPMENT GOALS

https://sdgs.un.org/goals

Problem questions?

- Can the production and Logistics landscape be beautiful, next to being efficient?
- Why do we (as human beings) adopt in time to the scale of production and logistics landscape?
- How to balance the effects of economies of scale in production and logistics landscapes and limit their migration process onto greenfields?
- How to find the path between the local interests and global players while developing the area?
- What are the methods of reuse the postindustrial areas by new industrial uses?

Bibliography:

- Max Roser (2013) - "Economic Growth". Published online at OurWorldInData.org. Retrieved from: https://ourworldindata.org/economic-growth
- **Rodrigue, J.-P. (2020). The Geography of Transport Systems (5th ed.).** Routledge. https://doi.org/10.4324/9780429346323
- Kułak A., Chmielewski T.J., Atlas tożsamości krajobrazu lokalnego jako forma zintegrowanego zapisu cech zespołu wnętrz krajobrazowych, Problemy Ekologii Krajobrazu, T. XXXIII. 245-252. file:///C:/Users/DELL/Downloads/Atlas_to%C5%BCsamo%C5%9Bci_krajobrazu_lokalne.pdf
- Bogdanowski J. 1976. Kompozycja i planowanie w architekturze krajobrazu. Zakład Narodowy im. Ossolińskich. Wydawnictwo PAN. Wrocław – Warszawa – Kraków – Gdańsk: 1 – 271.
  Bogdanowski J. 1994. Metoda jednostek i wnętrz architektoniczno – krajobrazowych w studiach i projektowaniu. Politechnika Krakowska, Kraków: 1 – 36.
- Chmielewski T. J. 2012. Systemy krajobrazowe: Struktura, funkcjonowanie, planowanie. Wydawnictwo Naukowe PWN Warszawa: 1 – 408.
- **Fischer, K. Central places: The theories of von Thünen, Christaller, and Lösch. in *Foundations of Location Analysis. International Series in Operations Research & Management Science* (ISOR 155) (eds Eiselt, H. & Marianov, V.) (Springer, 2011).**
- Bird J., *Seaports and Seaport Terminals*, Hutchinson and Co. Ltd, London, 1971
- Rodrigue J-P. , Notteboom Th. Foreland-based regionalization: Integrating intermediate hubs with port hinterlands, Research in Transportation Economics 27 (2010) 19–29
- Krośnicka K. A., The Impact of Sea-River Ports on Spatial Development of Cities, Logistics and Transport No 2(11)/2010 , pp. 39-44
- Tankiewicz M., Krośnicka K.A. (2018). Możliwości aplikacji teoretycznych modeli obiektów transportowo-logistycznych współpracujących z morskimi terminalami kontenerowymi portów Trójmiasta, (6), 429-441.
- **Hein, C. (Ed.). (2021). Oil Spaces: Exploring the Global Petroleumscape (1st ed.).** Routledge. https://doi.org/10.4324/9780367816049
- Krośnicka K. A. (2018). Spatial Evolution of the European Container Ports' System in Perspective of the Location Theory, *58, 2018*(SHS Web Conf.), 1-12. https://doi.org/10.1051/shsconf/20185801016
- **Krośnicka, K. A. (2021) Migration of container terminals as their natural process of evolution: Case study of Gdańsk and Gdynia ports**. Journal of Transport Geography, Volume 93, 2021, 103045, ISSN 0966-6923, https://doi.org/10.1016/j.jtrangeo.2021.103045.
- Krośnicka, K. A., Lorens P., Michałowska E. (2021). Port Cities within Port Regions: Shaping Complex Urban Environments in Gdańsk Bay, Poland, Urban Planning vol 6, no 3, 2021, pp. 27-42. https://dx.doi.org/10.17645/up.v6i3.4183. DOI: https://doi.org/10.17645/up.v6i3.4183
- https://mazowszestudiaregionalne.pl/images/pdf/24/msr_24_borowska_stefanska_wisniewski.pdf
- Krośnicka, K. A. (2019). Container port expansion towards the sea in the context of maritime spatial planning, Europa XXI, 36, 107-115. https://doi.org/10.7163/Eu21.2019.36.9

THANK YOU

LE:NOTRE Institute
Linking Landscape Education, Research and Innovative Practice

ULB Faculté d'Architecture La Cambre Horta

Sapienza Università di Roma

Politechnika Gdańska

Hochschule für Wirtschaft und Umwelt Nürtingen-Geislingen

Akdeniz University

Co-funded by the Erasmus+ Programme of the European Union