Master’s Thesis:

Analyzing drivers, fostering megaregional growth and assessment their role in urban enlargements

The comparative analysis of three cases: the BosWash Corridor (United States), the Central Economic Core (European Union) and the Greater Pearl River Delta (PRC)

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Abstract
This study examines a particular set of drivers and triggers that inevitably lead to the transformation of pre-integrated urban areas into coalesced polycentric megaregions, and key actors, by analyzing three different cases of the Boston-Washington (BosWash) Corridor, Central Economic Core and Greater Pearl River Delta.

The objectives are to contribute to scientific literature on megaregional studies and, in each case above, give an assessment reporting transport development, socio-economic issues and policy both at national and international levels.

*Keywords*: Megaregion, BosWash, RPA, Blue Banana, Central Economic Core, GPRD, Interreg, CPC, Pearl River Delta

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I. Introduction and problem statement

Rapid population growth and correlated urbanization started in the 2nd half of the XX century and has transformed modern societies in such a way that more than half of people of our planet now live in urban areas. This share will steadily increase to 2/3 by the middle of this century. The rural-urban dichotomy will not only remain, but will further increase as relocation to urban areas become the only chance to escape poverty for billions of people within very poor rural areas of the under developed world (either this statement is true or not). While in the developed world, where more or less stable and evenly distributed quality of life is independent from the place of living, the opposite tendency of de-urbanization and desire to live in distant and calm suburbs is becoming increasingly popular as a result of massive sprawling. This presents other issues like improvement in the efficiency of existing transport infrastructure, improved rural-urban planning or re-distribution of economic activity. Regardless of the country economic status, further urban growth must be smarter, more efficient, more environmentally friendly and sustainable.

Meanwhile, some areas, due to an ever-growing concentration of people, business and government activity, achieved the stage of megacities, exceeding the threshold of 10 million people (according to the UN HABITAT) or the level of global cities with significant influence on the world economy. This process is accompanied by the gradual integration of the nearest towns and cities which become the hinterland of the core. Progress in information and communication technologies, coupled with further improvement of transport infrastructure, bind these areas and bring a principle new feature – socio-economic coalescence with common labor market and free circulation of tangible and intangible assets. Due to increased growth, megacities consume large metropolitan areas as intermediary steps toward the next enlarged urban form of human settlements – the megaregion. Megaregions unify several urban clusters into one integrated area. Given this trend, increasing proportions of Earth’s population will be urbanized by the middle of this century. There is no chance to escape the megaregion’s concentration, their megastructures or their respective consequences (both problems and mitigations).

To some extent it can be argued that the future world will not be led by nations but by cities; particularly major urban cores with own hinterland within megaregional boundaries, competing in the global economy at global while having to cooperate in other spheres like environmental protection, migration, and mitigation of global risk. This shift toward megaregional influence over national leadership is already happening. Such kind of city networks like C40 cities foundation for climate actions, the Global Parliament of Mayors or the Strong Cities Network, launched by the United Nations (UN), and others. The influence of such horizontal activities and cooperation among urban practitioners throughout the world, escaping national boundaries and high policy would only increase. Simultaneously, megaregions too vast for their own regional boundaries are starting to play at national and even international levels since some of megaregions overlap national boundaries to say nothing of those that enclose smaller regions and municipalities. This makes the issue of coordination efforts of political and functional
entities at different vertical levels even more complicated. As a rule, the study of such forms of political cooperation upon urban development are quite common among scientist and play significant role in megaregional growth indeed (or brings opposite results hindering development).

The main driver for megaregions always presumed to be economic growth and globalization since concentration of capital, goods and ideas at one place increases overall productivity and efficiency due to decreasing transactional costs. The rise of Asia as a global powerhouse and assembly lines were the prime circumstance of rapid growth of world economy within the 2nd half of XX century, accelerated by progress in ICT. It is unlikely to lose this achieved status even when taking account of the desire of major players to return industry at home. China, being a major economic player, already increased consumption which highlights a distribution shift of middle-class consumers from West to East. China’s rise is correlated to economic development, social aspects of urban growth at new levels (in developed world, economic prosperity was more or less achieved at the end of Industrial Revolution), and Asia’s significant share of world population. Additionally, private wealth in China is a particularly new phenomenon itself and it raises new questions such as what would be the local national and even global effects of overrunning infrastructure development, advancing manufacturing and shifting from production to consumption aided by the current, political circle of western democracies. To gain knowledge from this region we decided to study Greater Pearl River Delta megaregion (Hong Kong and Macau SARs, Shenzhen & Guangzhou with several others nearby cities within Guangdong Province).

Will megacities in the United States and Europe be able to withstand and maintain their competitiveness in the future if faced with struggling investment, evolving labor force dynamic and shifting political influence without consolidating a powerful and influential form of megaregions? Especially taking into account the current split and confrontation among American elite and compromising the European unity by Brexit. It also raises new questions of their adherence to former courses and future ability to pay attention to particular development of own megaregions as main weapons in prospect trade and economic wars. This analysis focuses on the BosWash corridor in the US and the Central Economic Core in Europe. In the BosWash corridor, New York City as a global alpha, assumed among researchers as the first and the most studied example of megaregion. The Central Economic Core in Europe, also known as “Blue Banana” is comprised of several megaregions with smaller scale – Randstad in Netherlands, Flemish Diamond in Brussel, Luxemburg, North part of France and Rheine-Ruhr conurbation in Western Germany plus North Italy with transport axis through Swiss mountain passes.

All drivers mentioned above (socio-economic, transportation, political) are common at all levels of urban development, are well studied and pertain to megaregional phenomenon. What is the particular set of real drivers for megaregional growth for each particular case? What is the role of political institutions at different levels, local and global businesses, etc.? Who stands to gain economic benefits? Most importantly question, what is the tipping point or final trigger that makes possible the leap from plainly proximate urban area to coalesced polycentric territory.
This topic seems to be understudied, so this work will try to fill some scientific gaps. All three chosen megaregions have own history, particular features and specificity. It could be worth comparing their histories to answer the question if their particular drivers differ one from another and to what extent they are similar or differ from common well-studied aforementioned drivers; and what lessons could be extracted. Furthermore, it could be interesting to assess the drivers and triggers with respect to short events in historical terms then define their particular role in megaregional history. Let’s say value chain as well as to trace their roles over the history.

**Methodology**

This study will be qualitative and exploratory since there is neither common definition of megaregion nor uniform approach for its researching and complicated by the broad variety of different factors. The qualitative part of research will be mainly based on analyzing published books and academic journals for the topic of megaregional studies whereas exploratory part would be defined by analyzing official documents, sources, programs as well as strategic reports, documents of national, subnational and international political institutions and other accessible sources.

To conduct this research, literature review defines this scope of research and main drivers for megaregional appearance and growth. The first part will be devoted to history of the study of large urban settlements, evolution of term and finding current definition of megaregion as well as structuring different forms of large urban settlements and allocating the precise place of megaregion among them. The second part of literature review explores the role of infrastructure and precisely transport development in emerging coalesced land from previously not connected ones. A sub-topic of this part is the technological development, already spurred the last wave of globalization and still evolving the global economic towards dominant role of digital services. The third and main part is divided by two highly interrelated sub-topics: the role of rapid economic development both at global and national/regional levels and its social implications and vice versa for megaregional formation. And the last part of literature review devotes to analyzing the broad range of political factors either at global or local scale like geopolitical project formations, national strategies, and different approaches for planning at megaregional scale or governance issues.

Lastly, the BosWash corridor, Central Economic Core and GPRD are explored by structuring those cases through drivers, derived from literature review. This research will also try to define real drivers for megaregion development along with seeking the hidden actors, obscured by official ones, through analyzing obtained results.

**II. Literature review**

This review involves analyzing several streams of literature: the rise and history of Megaregion phenomenon itself, socio-economic drivers, political issues (both national and international) as well as role of transport/infrastructure and technological development. The literature review
builds a framework that will then be used to structure our three cases by particular pillows of drivers.

The first part of literature review represents the analysis of historical evolution of urban studies that led to such huge form of urban enlargement and explore concepts like conurbation, megapolis, global/world cities, network cities or mega-urban city regions, and urban corridors. Literature in the historical evolution of urban studies tries to give a particular definition of megaregion and its distinctive features. Since there are different approaches to the topic among global players with accents on particular kinds of cohesion (territorial/transport in the USA, socio-economic functions in the EU and aspects, related to population density in China). And it is important to draw attention to its origins as well. It defines all further regional urban studies including megaregional phenomenon.

Then we will move to analysis literature upon particular drivers, starting with transport/infrastructure development. Since historically, consecutive construction of transport links from local level determined the socio-economic coalescence of the earliest and most studied megaregion – BosWash corridor in the USA. It would be interesting to compare the role of transport in forming other two megaregions. Co-related issues are technological progress and its influence on urban ecosystems.

The second part will be broken to subtitles about studying social issues and their economic consequences. Since the inequality, especially in underdeveloped and developing world and urban-rural interrelations are the major sources of migration and city growth. Concerning economics, this paper does not go in depth on the global economy and well-studied areas of pricing influence of global cities and alpha-cities but will concentrate on economic principles of concentration of goods, ideas and capital at one place and overall impact. Comparing this concept of global influence of cities, and in the developed world, mega-cities, is to some extent opposite since it appeared in developing world. Such kind of cities has minor influence on global economy (at least in the past) but rapidly growing population. This again refers us to social issues and their interrelations with economic development within urban context.

And political part of literature review, preceding next chapter with detailed case analysis, will include analysis of literature, already dedicated to each particular megaregion, taking into account three different approaches to megaregions aforementioned above. Without diving into particular details with each region it would be tough already to draw the overall picture of regional planning and governance. This also brings us to the interrelations between economics and policy since in modern world such megaregions, often thought of the faces and gateways of global players, are presumed to appear and construct as a main economic weapon in global trade wars and geopolitical competition.

A. The history of megaregional research and definitions

The new dimension of human settlements landscape, comprise of several big coalesced cities, has been known and studied since the beginning of XX century, although it passed through a lot of definitions (conurbation, megalopolis, city-region, megalopolitan area, megalcity region, megaregion, urban corridor and many others outside the scope of this work). The key idea
remains the same – whatever term we use we mention more or less integrated urbanized area with huge economic output and without precise administrative boundaries. And within last decades it was even more facilitated by rapid development of globalization as well as the economic role of such global cities and surrounding areas. Nevertheless, the economy was a key sphere in the overwhelming majority of studies and explain megaregion phenomenon.

1. The history of the definition and its forms

The definition of conurbation was more or less the first one, precisely related to this rapid urbanization phenomena and was invented by Patrick Geddes in 1915. He applied this definition to describe the phenomenon of economic integration of proximate settlements when different cities and towns between them start to play their own roles (ports, factory districts, markets etc.) and hence – emerge single urban coalesced area, integrated by transport system. The first and largest conurbation he exampled was “Lancaston” (Lancashire, Manchester, Liverpool, Oldham, etc.) which exceeded even Greater London whose population, were spreading out in all directions that time. Interestingly that even at this initial stage of studying large form of human settlements Mr. Geddes raised questions of its governance, planning and administration (Geddes, 1915).

In his book titled “World-cities and their opening competition” Geddes writes about city-regions rapid development based on resource mining (coal primarily) and corresponding increase of population as well as competition between such cities. Being inspired by Geddes’ work, Lewis Mumford concentrated on his own city and region – New York City. Based on historical approach, Mumford came up with evolutionary stages of human settlements. The ladder begins with 

   *eopolis* (village), evolving into *polis* (city) and finally merge to *metropolis* or capital city. Here the positive evolution ends and city starts to decline through next three steps: *megalopolis* (exaggerated city’ size), *tyrannopolis* (overexpansion causing rapid decline with “naked exploitation of hinterlands and colonies”) and *nekropolis* (city abandonment due to war, famine and disease). According to Mumford, *megalopolis’* stage was the breaking point in urban settlement growth, and the further expansion and crossing this human-scale size inevitably leads to unsustainability and death (Mumford, 1938).

One way or another, but this un-enviable future didn’t prevail Jean Gottmann in later 1950s from turning back to the research of Boston - New York - Washington corridor and named it *megalopolis*. “The density of great cities along this coast” was the first and the most striking impression after Gottmann’s trip from Boston to Washington in 1942. No doubt that transport development as well as economy growth, manufacturing activities as well as proximate to major national seaports were the main reasons for emerging such a stretched chain of metropolitan areas. According to Gottmann, megalopolis is a polynuclear urban system in which the individual metropolitan areas are coalescent while separated from other urban systems by less urbanized spaces. “The size of its principal urban nuclei, especially New York and Philadelphia, caused the subsequent mushrooming of suburbs filling in the spaces between the larger cities” (Gottmann, 1957).
BosWash, with more than 30 mln inhabitants that time, became a golden standard for all further international studies of mega-... problems. Gottmann also was the first scientist who besides problems in legislation, governance and infrastructure development, touched the problem of psychological changes in consciousness of megapolis’ inhabitants, who technically already lived in one single mega-city, which remains political separating by several states. “...People have more difficulty thinking along the traditional lines of division into states when megalopolitan sections of different states are much more integrated in daily life...”.

In his later research “Megalopolitan systems around the world” (Gottmann, 1976) he referred the definition megalopolis and its surround area (megalopolitan regions) to very large interconnected perinuclear urbanized systems (composed of several metropolitan areas each) with 25 mln population threshold. Only six urban constellations on the planet met such requirements that time, including two areas, which our research is dedicated to: American North-Eastern Megapolis (current BosWash) and Central Europe, “extended from Amsterdam to the Ruhr and to the French northern industrial conglomeration”. According to Gottmann, density of physical, visible and metaphysical linkages is one of several key features of megalopolitan region (along with population density, huge social, economic, political and government mosaic).

Gottmann divided it on physical infrastructure (highways, railways, waterways, telephone lines, pipelines, water supply and sewage systems, etc.) which crisscrossing the whole area, visible and measurable linkages (the flow of traffic, he movement of people and goods, the flow of telephone calls, mails and financial instruments) and more abstract and invisible ones (common interests and concerns, rivalries or cooperation, information exchanges or human relations). Most important the central position of such megalopolitan regions in linkage of its country with the rest of the world enables the inner country’s transport infrastructure and gates to abroad (seaports, airports, etc.).

Jacques Robert, working in European Research Institute for Regional and Urban Planning (ERIPLAN) in Hague, wrote his fundamental work, dedicated to particular Central European megalopolis (Robert, 1976). According to Robert, this highly urbanized area developed across the national borders of five countries and its overall population exceeded that time 80 million people. Its core area includes not only Netherlands, Belgium, Nordrhein-Westfalen (Rhine-Ruhr conurbation) and Nord-Pas-de-Calais (Paris/North France) but South-East England too (Greater London/Central South-East England). He defined the territory of Central European megalopolis by applying interesting methodology, based on dependence of urban regions upon open spaces (megalopolitan open spaces between central cores). These open spaces play critical role in further growth, able for irreversible conversion into urban land due to suburbanization process around the metropolitan areas and strengthening of transport infrastructure linkages between them.

Central European Core, being in fact megaregion became famous because of “Blue Banana”-urban corridor and economic axis stretching along the Rhine River from the North Sea to North Italy (Brunet, 1989). The definition of urban corridor was introduced by Canadian geographer Charles Whebell who applied it to describe urban system of Southern Ontario (Whebell, 1969)
as “linear system of urban places together with the linking surface transport media”. Despite the fact that solid definition of the definition is still missed, such urban corridor is 400–1200 km long, 70–200 km wide and covers 10,000–50,000 km² (Georg et al., 2016). But researchers agree that such spatial liner pattern of massive urbanized area, crisscrossed by high-speed surface transport infrastructure, definitely distinct from other types of large human settlements.

Following the historic evolution of urban landscapes, a stop is made at network cities of David Batten (Batten, 1995), skipping such extremely important definitions as world city of Peter Hall (Hall, 1966) and John Friedmann (Friedmann, 1986) as well as global city of Saskia Sassen (Sassen, 1991) with deep focus on cities’ connection to the world economy since “they concentrate on singular city dominating an agglomeration spatially and economically despite more broad concepts of network of (economically) linked cities, more or less coalesced spatially polycentric pattern at an interregional scale beyond limits of individual cities like megaregion and urban corridor” (Taubenböck, 2015).

Meanwhile, network cities concept was the first attempt to merge Friedmann’s approach of huge role of few yet single and extremely important cities for global economy with more broad polycentric coalescence and urban corridor approaches. David Batten describe this evolution in 1995 as “two or more previously independent cities, potentially complementary in function, strive to cooperate and achieve significant scope economies aided by fast and reliable corridors of transport and communications infrastructure” (Batten, 1995). He opposed alpha central place cities with limitation of “one-hour rule” (an average time urban traveler wills to spend on commuting) to such Network cities with several proximate polycentric nodes (more diverse, creative, functional, R&D), deeper integrated to each other by denser infrastructure. Probably, he was simply a witness how several global beta-cities were trying to catch up and even cope with the alpha ones that time, giving two examples (Randstad Holland versus London/Paris, we guess, and Kansai region (Osaka, Kobe, Kyoto) versus Tokyo).

2. Different approaches for megaregional studies

The concept, enriched by the blossoming of globalization within 1990s, influenced on evolution of world city concept into mega-city and later into polycentric mega-city regions (MCR). Although the concept was presented by Peter Hall and Kathy Pain (Hall & Pain, 2006) within the EU Interregional IIIB North-Western Europe research project (POLYNET), the researchers’ attention indeed shifted to Asia for examples. They defined MCR as a constellation of 10-50 cities and towns (clustered around at least one First-class global city or second tire Sub-Global one), physically separate but functionally connected (dense flows of labors, goods and information), resulted in enormous economic output and stretching up to 150 kilometers from the center. “The phenomenon of Polycentric Mega-City-Region was originally identified in Eastern Asia, in areas like the Pearl River Delta and Yangtze River Delta regions of China, the Tokaido (Tokyo-Osaka) corridor in Japan, and Greater Jakarta” (Hall, 2007).

The actual striking difference in approach to defining centers of global urban growth between researchers was arisen by Ananya Roy who distinct mega-cities as big in terms of population
but economically powerless from *global/world cities* as a node of globalization and mainly
driven by finance capital. “There is an enduring divide between ‘First World’ cities (read: global
cities) that are seen as models, generating theory and policy, and ‘Third World’ cities (read: mega-cities) that are seen as problems, requiring diagnosis and reform” (Roy, 2009). Earlier,
Jennifer Robinson launched a furious critique of so-called Euro-American hegemony in urban
theory, firmly based on experience of North America and Western Europe and with
asymmetrical ignorance of the Third World’ cities. “I have suggested that in place of world,
global-, mega-, Asian, African, former Socialist, European, third-world etc. cities, urban studies
embark on a cosmopolitan project of understanding ordinary cities. A second step must be to
decolonize the field of urban studies” (Robinson, 2002).

Asian urbanists also argued to draw more attention to the local context and origins as well as
historical roots, leading to the concentration population in MCR (Zhang, 2015), since it may
result in so different from classical approach - development patterns, fiscal capacities,
managerial abilities, experiences in regional governance and planning, etc. (Xu & Yeh, 2011).
For instance, Jiawen Yang defines megaregion, considering the Chinese perspective, as
“integrated sets of cities and their surrounding suburban hinterlands across which labor and
capital can be reallocated at relatively low cost”. He also explained the political and governance
drivers in megaregional approach since “the central government raised several of its largest
cities to provincial status, which has enabled them to coordinate integrated transportation
networks on large scales” (Yang, 2009). And while administrative and political boundaries
become less and less important but yet the vertical and horizontal integrations beyond
boundaries of metropolitan cities is great issue while policy vacuum over cross-border planning
remains (Yang, 2015).

As the main distinct feature of Asian *mega-city regions* remains its dense population and urban
sprawl, John Harrison and Michael Hoyler suggested that *megaregions* could be read as the
attempt to weave the population-inspired *mega-city region* and functionally dominated *global
city-region* concepts together (Harrison & Hoyler, 2015). This functionally dominated concept is
mainly rooted in Europe since above mentioned POLYNET project, being study eight mega-city
regions of North-West Europe, divided it on *Functional Urban Regions* (FURs). According to
OECD definition (OECD, 2012) FUR is one or several cities with their commuting zones (10-20% commuter threshold for Europe and 15-25% for USA/Canada). OECD and EU later developed a
harmonized definition of urban areas as *Functional Economic Units* (FEUs) based on different
socio-economic indicators.

It was a step back in terms of further territorial enlargement of the scope of European urban
studies in spite of the USA and Asia, but if in the latter case researchers based their works on
*population*, American urban studies were initially concentrated on *form-dominant* approach,
based on *territorial cohesion* (if only) and rapid urbanization. It explains why the first
beneficiary of such global scale planning was transportation and the United States Department
of Transportation (USDOT) which stands exclusively behind American Regional Plan Association’
studies and almost all others megaregional researches in the USA. RPA elaborated the
conception of Megaregions, launched “America 2050” project and dedicated 11 megaregions throughout the United States like Northeast Megaregion, Great Lakes or Texas Triangle (Regional Plan Association, 2006). There is quite recent study of U.S.’ commuter flows as an identification of those megaregions’ boundaries (Nelson & Rae, 2016), proving the leading role of USDOT.

From global perspective, it was 2008 when UN-Habitat report first time provided a global map of mega-regions although introduced it along with two new other types of urban configurations (urban corridors and city-regions). The UN report (UN-Habitat, 2008) defines mega-regions as “natural economic units that result from the growth, convergence and spatial spread of geographically linked metropolitan areas and other agglomerations. They are polycentric urban clusters surrounded by low-density hinterlands, and they grow considerably faster than the overall population of the nations in which they are located”. Urban corridors “characterized by linear systems of urban spaces linked through transportation networks” and city-regions are “dynamic and strategic cities, extending beyond their administrative boundaries and integrating their hinterlands”. As we see, UN-Habitat approach quite close to Asian studies, based on population approach and enabling it to justify its ambition for leading role in development, megaregions offered in countries across the Global South (Harrison & Hoyler, 2015).

It is proven by explanations and example in UN’s report. Despite the fact it recognizes territorial and functional cohesions of all three new types of urban forms, it emphasizes on its population, which exceeding any mega- or meta-city (> 20 mln inhabitants, according to UN-Habitat). The report also stressed the fact of rapid development in Asia and other parts of the 3rd world (Nile valley or Ibadan-Lagos-Accra). For instance, the UN report introduced the Pearl River Delta in China with population above 120 mln people and major nodes in Hong Kong, Shenzhen and Guangzhou. The other two examples of UN report are Tokyo-Nagoya-Osaka-Kyoto-Kobe mega-region (60 mln people) and Brazil’s São Paulo to Rio de Janeiro stretch (43 mln people).

The table below shows the differences between major conceptions of global cityscapes, collected by Isabel Georg (Georg et al., 2016). In sum, it can be said that the history of studying of large urban forms has at least more than one century and, so far, there is no single definition of megaregion yet. To substitute, a single definition is preceded by many other different forms like conurbation, megapolis, global/world cities, network cities or mega-urban city regions, etc. Despite the definition, all that commonly describes large polycentric urban settlements with any kind of cohesion include: territorial/transport, socio-economical, dense population, leading global economic player, etc.
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<th>Number of cities or centricity</th>
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<td>Metacity</td>
<td>Greater Tokyo, Delhi, New York-Newark, Shanghai</td>
<td>&gt; 20 million</td>
<td>1</td>
<td></td>
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<td>UN-Habitat, 2006; McGrath &amp; Pickett, 2011</td>
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<tr>
<td>Informational/Network City</td>
<td>Randstad, San Francisco</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>ICT infrastructure</td>
<td>Castells, 1989 &amp; 2002; Batten, 1995</td>
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<tr>
<td>Conurbation/ City region</td>
<td>Greater London, Lancashire, Midlands, Greater Paris</td>
<td>&gt; 1 million</td>
<td>One hour travel time</td>
<td>Polycentric</td>
<td>Transport infrastructure, few open spaces between cities</td>
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<td>&gt; 500,000</td>
<td>1</td>
<td></td>
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<td>OECD, 2012</td>
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<tr>
<td>Functional Urban Region/Area (FUR/FUA)</td>
<td>Vancouver, Vienna, Paris, Dublin, Madrid</td>
<td></td>
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<td>Rhine-Ruhr, Randstad, South-East England</td>
<td>Main city: &gt; 10 million</td>
<td>10-50</td>
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<td></td>
<td>Hall &amp; Pain, 2006; Halbert, Pain &amp; Thierstein, 2006; Soja &amp; Kanai, 2007</td>
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<td>&gt; 25 million</td>
<td>Polycentric</td>
<td>Transport infrastructure</td>
<td></td>
<td></td>
<td>Gottmann, 1957 &amp; 1976</td>
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<td>Megaregion (USA)</td>
<td>Midwest/Great Lakes, Piedmont Atlantic, Southern California,</td>
<td></td>
<td>Polycentric</td>
<td>Formed of megapolitans</td>
<td></td>
<td></td>
<td>Lang &amp; Dhavale, 2003; Morrison Institute, 2008;</td>
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<tr>
<td>Mega-region</td>
<td>Texas Triangle</td>
<td>Larger than mega- and metacities</td>
<td>Polycentric</td>
<td>UN-Habitat, 2008; Florida, Gulden &amp; Mellander, 2007</td>
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<td>Pearl River Delta, Tokyo-Kobe, São Paulo-Rio de Janeiro; Nile Valley</td>
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<th>Urban corridor</th>
<th>BosWash, Blue Banana, BESETO</th>
<th>Several 100 km long</th>
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<th>Whebell, 1989; Li &amp; Cao, 2005; Chapman et al., 2003; Choe, 1996</th>
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*The source: Georg I. et al.: New spatial dimensions of global cityscapes, 2016*

**Figure 1. Spatial juxtaposition of different concepts for large urban areas.**

![Diagram showing spatial juxtaposition of different concepts for large urban areas.](image)

*The source: Georg I. et al., 2016*
B. Infrastructure, Transport & Technologies

The role of infrastructure and especially transport in creation of megaregions is difficult to overestimate since it became a capstone element for any city growth and baseband for freely movement of people, goods and information. No matter how big the scale of urban settlement is (metropolitan region, meta-city or megaregion), mono or polycentric, all researchers pay attention on transport linkages. For instance, Catherine Ross wrote that “transportation networks form one of the key links between the major metropolitan centers that compose the megaregion...” (Ross et al., 2011). Could its outrunning development be a driver or even reason to facilitate the emergence of megaregion or its highly developed level is just one of several constituencies of megaregion development?

This is a rather complicated question but a simple answer presents before analyzing literature on this topic – for two mature cases from developed world (BosWash and Central Europe) the utmost level of transport linkages and development was inevitable considering people lived in these areas for several centuries. Here the question of path dependency in future megaregion development arises. For the developing world (Perl River Delta in our case) the outrunning transport development could be a main driver for emerge such megaregions since they facilitate natural growth almost from the scratch and linkages between proximate urban settlements.

1. The role of transport development in emerging of megaregions

There is one fundamental European research, comparing so-called “magnitude of connectivity” among different world megaregions, including two, the most interesting for us – North-Western European part of “Blue Banana” and the Pearl River Delta. The result of measurement proved the definition of megaregion as “more or less coalesced spatially polycentric settlement pattern at an interregional scale beyond limits of individual cities”. Moreover, the authors found that Pearl River Delta megaregion has the longest uninterrupted connection as well as the fastest spatial development since it turned from a generally disconnected area in the 1970s to a megaregion. While European Megaregion, being also described as spatially connected polycentral area, still heterogeneous and fragmented.

Indeed, according to Chinese researches great investments in transport development was used to “redefine the relative advantage of each part within a megaregion” since it helps to established greater links concerning key urban nodes within megaregion and between them. As a result – non-centers and second-tier centers, laying on the new transport axes, are able to grow into major urban centers with corresponding acceleration in economic activity (Yang, 2015). Simultaneously it leads to appearance of new centers of development around such nodes of transport infrastructure like High Speed Rail Systems (HSR) stations or intermodal hubs with rise of both house pricing and density (Yang et al., 2013).

The American approach is quite the same. According to Ross & Woo, transport infrastructure forms a literal backbone of the regional and national economy. Transport infrastructure has to be planned at a global scale but rarely adheres to local political boundaries (Ross, Woo & Wang,
One of the main beneficiaries of transport planning at the megaregional level are HSRs since they are able to connect major urban nodes into one socio-economic system with united labor markets in a reliable, efficient manner with great capacity and affordability. As an example of such appropriate rail planning, the authors put the evident correlation between HSR routes in the USA, proposed by U.S. Department of Transportation Federal Railroad Administration and 10 megaregions. (Ross & Woo, 2011).

That project was rejected by Congress since several state governors opposed (Todorovich et al., 2011), despite the fact that transport infrastructure development within megaregion proved to have positive impact on regional economic output (spillover effects of labor and private capital), although highway infrastructure dominates among different modes, followed by public railways, airports and transit (Chen & Haynes, 2015). The other study of infrastructure spending returns concludes that 10% rise in infrastructure assets (weather it could be energy, water, transport, or telecommunications) directly increases GDP per capita by 0.7-1% (Henckel et al., 2010). Luis Servén, studying the real PPP GDP if developing countries estimated that aligning level of infrastructure development to the OECD median level raises the labor productivity in East Asian Tigers, Latin America, South Asia and North Africa by 11.5%, 13.7%. 26.0% and 36.3% respectively (Serven, 2010).

Several studies at the Massachusetts Institute of Technology (MIT) were also dedicated to the role of HSR in large extended functional regions’ formation, especially interesting the study of Sevara Melibaeva (Melibaeva et. al., 2011). It based on the technical and economic analysis of megaregion RSR corridors mainly in Japan (Tokyo-Osaka), France (Paris-Lyon) and Germany (Frankfurt-Cologne). Earlier, Peter Hall also predicted that HSR “will tie much of Europe into a single polycentric Megalopolis by shrinking geographical space, hence would accomplish what motorways failed to do” (Hall, 2009). Obvious reduction in travel time extends boundaries of urban agglomerations, integrates labor and consumer markets, hence forming uninterrupted urban areas along the HRS corridors.

To prove it Sevara Melibaeva gives a very significant example: “Shinkansen HRS for Tokyo-Osaka corridor (Tokaido Megaregion) expanded the commute zone to the cities that are over 200 km away from Tokyo”. Although there is a negative effect also, hence the economic activity tends to concentrate mainly at the ends of such HRS corridors, but not in the intermediate small places (large urban nodes and economies become even larger, sipping the neighbors - French and German HRS examples proved this fact). Or as Diego Puga wrote “cross-border infrastructure projects connecting lagging regions with key markets make it easier for firms there to reach new customers, but also expose them to fiercer competition from firms in more developed areas” (Puga, 2008).

Commuter traffic generated by HSR are not enough to justify the formation of megaregion - Francesca Pagliara used the term “shrinking space” (Pagliara et. al., 2015) for time-space maps representing the interaction between space and time cartographically hence using not physical distance between two places but travel time between them. The idea is not quite new – first time it was used by Daniel Roth, describing social effect of launching TGV to Lyon. “The distance is no longer quoted in kilometers but in hours and minutes, with Lyon being 2 hours away from


*Paris* (Roth, 1990). But what differs Pagliara’ work is an attempt to include into assessment of HSR effect on megaregion shaping many others indicators like social, economic and ecological. 

Europe, being one of the most advanced adopters of HSR conception, also works on the more global approach, shifting from national planning to megaregional one (European Commission use the definition of *transport corridor*). CODE24 (Corridor 24 Development Rotterdam-Genoa) - a strategic trans-national initiative in the framework of the INTERREG IVB NWE Program of the EU¹. Based on the result and achieved level of cooperation the European Grouping of Territorial Cooperation “Interregional Alliance for the Rhine-Alpine Corridor EGTC” was established in 2015. Later HSR was supplemented by freight, intermodal/heavy trucks and urban infrastructure to better link it to the corridor.

The freight movement and intermodal logistics is key issue - as a rule such significant urban settlements as megaregions are country maritime facades too (Rotterdam’ mega port in EU as an example) – this was mentioned already by Jean Gottman pointed out the fact that most of the seaborne foreign trade of the USA that time went through the New York harbor (Gottman, J. 1957). Nowadays the BosWash corridor combines several major gateways important for both the national and international economy (Rodrigue, 2007). The concentration and conjunctions of different types of infrastructure within megaregions (interstate Highways, ocean ports, railroads, and major airports, warehouses and distribution centers) inevitably leads to its importance for private sector logistics and supply chain companies since megaregions concentrates national purchasing power. This research of Peter Hylton reveals the fact that most kinds of freight flows and logistics activity of private sector concentrates in megaregions too (Hylton, 2014).

But to keep economic activities at a high level and facilitate its further development all kinds of multimodal freight logistics planning must be done at megaregional scale too. The last report of Federal Highway Administration “Multimodal Planning at the Megaregional Scale” (FHWA, 2017) concludes that despite the high level of acknowledgment of megaregional concept among U.S.’ metropolitan planning organizations as well as obvious benefits for such high level of planning of freight and supply chains, multimodal connections, economic interconnections and even environmental issues, they still lack of practical works. The main reasons are state boundaries, differences in state regulatory practices and absence of federal approach for resolving megaregional initiatives that cross state borders.

2. Technological progress

Concerning development of new technologies, especially communications and InfoTech (ICT) with Internet, literally a baseband of new wave of globalization started in 1970-80s, it definitely influenced on appearance of global cities or network cities and hence indirectly – later city regions and with their further growth and integration - megaregions around them. "The cost of transporting goods, people and ideas has declined dramatically over the last century. For instance, maritime freight in 1990 was only 1/3 of 1920, revenue per passenger-mile in air-

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travel in 1990 was 1/6 of 1930, and the cost of a three-minute telephone conversation between New York and London fell by 98.7 percent between 1930 and 1990” (Jones, 1997).

But “as production disperses worldwide, services increasingly concentrate into a relatively few trading cities, both the well-known global cities and sub-global (Hall & Pain, 2006) play as a key node for financial services (banking, insurance), being headquarters for major global companies and host major world-power governments as well” (King, 1990; Sassen, 1991). In “The Rise of the Mega-Region” Richard Florida concluded that “despite the advances in transport and communication technology have allowed the world to become flat” or enable the economic activity to spread globally, such “activity continues to cluster and concentrate around mega-regional unit” (Florida et al., 2008).

The so-called service economy, especially important in digital era when industrial supplier produce not physical products but product-service systems (PSS), based on its permanent connectivity and soft modification of its parameters within life-cycle – program updated Tesla supercar for example – plays crucial role in keeping concentration of value, R&D and people in key urban nodes (UNIDO, 2013). Current conception of the 4th Industrial revolution and cyber-physical systems (Industrie 4.0 state program by Germany or U.S.’ “Advanced Manufacturing” and “Made in China 2025”) just facilitate further growth of urban hi-tech sector. Since there is a strong linkage between manufacturing and amount of related business services, associated with production like R&D, engineering, design, accounting, consulting, storage, logistics, technical support, etc. According to EU research, services share in total value of manufactured goods was around 40% in 2014 (Stehrer et al., 2014). The progress in ICT development has not reduced the importance of physical interaction in an economy (relied on relationships, trust and cooperation) and hence the dominant role of key global cities and its megaregions but strengthened it. “When high tech industries and business services (many of them ICT enabled) are the leading sectors, the scale and diversity of an urban region are increasingly helpful. Urbanization economies – arising from the diversity of activities, skills and providers – are more important for promoting new starts in high tech areas and in producer services” (Yusuf, 2007).

To conclude this part, it can be argued that transport infrastructure development as well as technological progress - key facilitators and inevitable part of megaregional concept since it makes all that stretched territories coherent and working as one single market with free movement of people, goods, information. In some cases, outrunning transport development could spur the emerge of megaregion from a bunch of not previously connected to each other territories or stretching the megaregional boundaries to the new level, crossing in some particular cases even several national borders.

C. Socio-Economic Drivers

An economic approach to the megaregions was originally the first to study a large urban system’s phenomenon at all (Geddes, 1915). In the early nineties, Tokyo-based author Kenichi Ohmae argued that “region states” had already replaced nation states as the main economic units of global economy (Ohmae, 1993). There were several reasons for that, including
openness of such regions to the global economy (for capital, labor and resources), local level for important economic decisions and facilitation of distant governance due to ICT development. What resulted is near economic independence of such “region states” and its globally-dependence. Indeed this economic approach was tightly interlinked with social sphere since modern knowledge-based and service economy is highly dependent on not only labor skills, education, services, but to some extent even on social infrastructure or culture – all that makes city attractive for new ideas and people around the globe.

1. Social aspects of global and regional economic growth

The knowledge intensive industries concentrate in areas with skilled and technical workers (Midelfart-Knarvik et al., 2000) with “high presence of research universities and research institutes, either public or affiliated with major local firm or multinational corporation, becoming a sources of consulting services, patents, tacit knowledge and entrepreneurship” (Yusuf & Nabeshima, 2007). In its turn, best world universities tend to concentrate in major urban zones or capital regions in America, Europe and Asia. In the US, Margaret O'Mara examines such phenomena as “suburb of knowledge” when “Cities of knowledge” are not entire metropolitan regions but rather specific subareas “filled with high-tech industries, homes for scientific workers and their families, with research universities at their heart”. It happened due to the American national defense policy for metropolitan dispersal during the 1950s to minimize the negative impact in case of nuclear strike (O'Mara, 2005). Anyway, the ability to compete for the talents and creative class, providing attractive jobs, amenities, social services and housing (as well as venture capital and funds from angel investors), according to Richard Florida, is a key condition for the economic success of such megaregions (Florida, 2005).

Antonio Ciccone in its paper “Productivity and the density of economic activity” trying to explain the significant difference in labor productivity within US (up to 2/3) found a solid linkage of it with density. Since doubling employment density increased average labor productivity by 6% (Ciccone & Hall, 1996). Interestingly, that under “density” he meant not only population but concentration of labor, human, and physical capital per square foot. The other study of localization economy concludes that in case of Korea, for instance, every percent in industry employment leads to the rise of productivity by 0.08%. For instance in case of growth the city from 1000 to 10,000 jobs the increase of labor productivity would be over 70% (Overman & Venables, 2005). There is a consensus that doubling city in size leads to total factor productivity increasing for 3-8% (wages, local rates of firm creation, employment growth), depending on the city size (Rosenthal & Strange, 2004).

“Co–location of component and module suppliers to assemblers which permit Just-In-Time delivery and reduce time costs as well as the advantages which accrue from collaboration, research and design of products, both favor proximity among producers and suppliers – factors which further strengthen agglomeration effects” (Harrigan & Venables 2006). Labor concentration leads to increasing in productivity and efficiency because of economy of scale’ effect, it arises not only new horizontal business links but also so-cold “long tail” (Anderson, 2006) or new market opportunities though promising niches. “It stimulates interdisciplinary
research and interaction among industrial subsectors and is more hospitable to the emergence of new clusters”.

Plus, market access multiplied by mobility creates a ‘snowball effect’ when large market attracts more companies with people which generates demand for services, goods supply chain, etc. which in its turn generate demand and attract new business and people at this level so the large market becomes even larger (Puga, 2008). So “Large markets are disproportionately attractive for firms producing with increasing returns to scale because, in imperfectly competitive industries where differentiated products are subject to transport costs, each firm typically has a larger market share close to its home location than far away. Consequently, firms with a larger home market have larger sales” (Krugman, 1980). He called it the “home market effect”. His peer Masahisa Fujita, a proponent of so-called “Spatial Economy” or “new economic geography” tried to explain the concentrations of people and economic activity in particular places despite dispersed “backyard capitalism” model. He wrote that “agglomeration economies, in which spatial concentration itself creates the favorable economic environment - supports further or continued concentration” (Fujita, Krugman & Venables, 1999). He argued that in case such concentration and congestion become a serious problem in the original economic center, a new center will emerge near the former one due to the combined effects of both centripetal and centrifugal forces (Yu et al., 2012).

2. The economic drivers

The conception of new economic geography was evaluated by Richard Florida, who introduced megaregions as a key phenotype of competition in globalized interlinked economy. In his book “The Rise of the Mega-Region” (Florida et al, 2008) he urged that urban megaregions were coming simply to relate to the global economy. Florida proposed to consider megaregions as a “parallel macro-structure” to the traditional states for analysis since national boundaries became quite bluer and mega-regions in their turn became more integrated to the global than national economy. They form integrated sets of cities and suburban hinterlands with common labor market. To prove it his team used night-time light emissions of largest human settlements for matching it with population data and regional GDP. As a result, they identified 40 mega-regions weighted more than $100 billion which were in charge of 66% of world output. He also marked that modern mega-regions live in very competitive environment and compete with rivals for capital, creative people, innovations as well as transnational headquarters and investments.

Florida also described several largest mega-regions, including the most interesting to this research. He estimated population of “modern” BosWash corridor in 54.3 million people (18% of US population) and its economic output greater than economy of France or the United Kingdom. In Europe the author defined the Central Europe as the largest one and it comprise of Amsterdam-Rotterdam, Ruhr-Cologne, Brussels-Antwerp, and Lille. It had 59.2 million inhabitants and around $1.5 trillion of economic output. Even Gottmann predicted within next 20 years coalescence of European megapolis, the closest in size and economic power to BosWash corridor - it stretched “from Amsterdam to Paris, including perhaps a bulge eastwards.
as far as the Ruhr and Cologne along the Rhine and Meuse rivers” (Gottmann, 1957). And regarding China he named Hong Kong – Shenzhen - Guangdong (or Hongzhen) as one of just three largest Chinese mega-regions. That time it had 44.9 million people and $220 billion in LRP (light-based regional product - the total value of goods and services produced for every megaregion²).

All that enormous economic growth, being concentrated in large urban settlements leads to any kinds of migration both national and from abroad since big successful cities are much richer and have the highest level of GDP (the reason of high inequality). Especially in case of emerging market these largest economic anchors attract people mainly from rural areas – in turn stimulating development of transport infrastructure. Graham Floater gives an unforgettable figure: “1.4 million people are being added to urban areas each week, roughly the population of Stockholm” (Floater et al., 2014). Michael Hoyler looked at the city as a social ladder for young people from elsewhere; once they climb the social ladder’s steps they move out again. And one of several questions he raised was how this perpetual process relates to the emergence of mega-city regions (Hoyler, Kloosterman and Sokol, 2008). Many U.S. megaregions simply become a Rust Belt, if they block supporting from influx of international job-seekers, - recent national census said³.

The phenomenon of super-commuters (high-skilled employees who leave very far and distant homes for work ones or twice per week if work in office at all due to ICT abilities), which has to convince city planners to stretching metropolitan boundaries from convenient 40 to 100-200 miles away due to mutual inter-connectedness. Otherwise there is no other explanation to the fact that population for instance in U.S.’ BosWash corridor is not growing at the same pace as jobs (Moss & Qing, 2012). According to Eurostat⁴ in 2015, Luxembourg was the most common destination for cross-border commuters in the EU, with 181 thousand cross-border inbound commuters (approximately 42 % of the workforce in Luxembourg commuting from Belgium, Germany and France). This aspect is interlinked with accessibility of CBD from distant neighborhoods and radically decreasing the travel time, facilitating by development of transport infrastructure (for instance by HSR). The definition of “daily accessibility indicator” was invented by Javier Gutierrez for Spanish commuters as “the number of possible business contacts and the touristic market potential and how much population can be reached from a place in a certain travel time limit” (Gutierrez, 2001).

The question concerning the dichotomy of Megaregion linkages, whereas with globe or with inner country/countries, was frequently raised by researches; even for US’ cities global influence there is no obvious answer. Peter Taylor and Robert Lang gave in 2005 very interesting results – they referred to Saskia Sassen’ global cities (Sassen, 1991) as nodes of global network and service economy, interlinked with each other. They found that U.S.’ cities are much more connected to its national than with globe’ mates with only one exception – New York. But even most globally-connected U.S. cities appeared to be more locally oriented than in

² https://hbr.org/2008/03/megaregions-the-importance-of-place
the EU & Pacific Asia. Otherworlds, “the clear supremacy of the U.S. in international relations and military power does not translate into a similar position for American world cities within the world city network” (Taylor & Lang, 2005).

Facilitating economic development was originally the main goal to study the large urban settlements further with new wave of globalization and at the same time regionalization with interconnected growth was complimented by new economic geographical approach. Main critiques of such economic approach argue that the concept of global/local cities and its regions was burned by Euro-American dominance in global urban studies and doesn’t pay much attention on development megacities (or overpopulated but less economic developed) in the 3rd world countries. Although social sphere with quality/inequality issues, migration, commuting, etc., traditionally associated with Global South development, and being in fact, highly interlinked and interdependent from simultaneous economic development, draw significant attention of Western researchers as well. On the other hand, even in such hierarchically organized administrative systems as China, optimized for such a mass population, economic growth was the prioritized goal for megaregion approach, not policy and governance (Su et al., 2017). It has to prove the predominant importance of economy for megaregion development throughout the globe.

D. Political drivers

Political drivers were dominant for megaregional development mainly in China and partly in Europe. European Commission tries to weaken the role of national states within European Union, strengthening regional growth and gaining over through it, using structural and cohesion funds. 34% of 2017 European budget\(^5\) was spent precisely on regional development – around 80% was allocated to NUTS2/Provinces (structural funds for mainly social development) whereas only remain 20% (cohesion funds) goes; yet it has neither lead to formal confession of one or several European megaregions, stretching beyond boundaries of single state nor considering it as a main weapon in global economic competition. Three different approaches to megaregional planning will be examined in this chapter – they perfectly match with three different geopolitical areas, hosting megaregions under analysis. We will amendment it with governance layer. All that will be also finally analyzed at more detailed level in case studies chapter for every particular megaregion.

1. Situation in the USA

The US, being known by its mature tradition of megaregional thinking (Regional Plan Association' national infrastructure planning and policy program “America 2050”\(^6\)), finding new ways to create policies for the new commuting landscape has never been more paramount” (Nelson & Rae, 2016). The last report of USDOT “Beyond Traffic 2045: Trends and Choices” estimates, that current 11 US megaregions, linked by transportation, economics, social, and other factors, host 75% of national population. The report highlights that “These regions span

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\(^6\) [http://www.america2050.org/](http://www.america2050.org/)
counts and states which are often in competition with each other. The growth of megaregions will require greater regional collaboration and integration to ensure regions remain competitive in a global economy” (Beyond Traffic 2045, 2017).

Meanwhile, “current federal transportation structure represents the individual interests of states, cities, and counties; however, it currently lacks the ability to address the nation’s increasingly interconnected megaregions because MPOs cannot generally undertake projects beyond their borders” (Hunn & Loftus-Otway, 2018). “Few established agencies actively guide long-term growth for transportation and land use planning across formal jurisdictional and institutional boundaries, let alone within a single state or multi-state megaregion” (Peckett, Lyons & Daddio, 2014). “Other regional agencies focus on sectoral mandates, typically working neither with one another nor with the localities responsible for the land use decisions that interact with their investment and regulatory decisions” (Kettl, 2005). In general, the notoriously weakness of metropolitan councils of government throughout United States are well known since they “unable to take strong positions that might be seen as harming any of their members” (Jones & Rothblatt, 1993).

Before continue we have to admit that almost all studies of megaregional phenomenon in the USA are backed by the USDOT (Beyond Traffic 2045, 2017). It stands behind both leading research groups, the Regional Plan Association (interesting, based in the New York – one more reason of concentration on Northwestern) and Virginia Tech; this is the reason why megaregional studies here became the synonymous for transport planning at national scale. Hence it is simultaneously the main strength and drawback; no other Federal agency draws the same level of attention to this topic. Why is USDOT still participating? Financial resources. “The planning at megaregional scale moved from the multi-million-pound infrastructure investments commonly associated with planning at the metropolitan scale to multi-billion investment decisions, - sphere, traditionally restricted by national politics” (Harrison & Hoyler, 2015). It is always a genuine tool to attract new wave of attention at the federal level to the problem of long underinvestment in the U.S.’ transport infrastructure. It is evidence of main distinct feature of American approach to megaregional studies - form-dominant spatial planning tradition, taking into account rapid urbanization (or form) and hence transport issues.

2. Current situation in EU

In the case of Europe, the situation with megaregional planning and governance deteriorated with the fact that such massive cohesion urban settlement overlap boundaries of different states (which even within EU’ common market with free movement of people, capital and goods remain supreme control over own territory). This fact labels the EU as a “puzzling socio-political UFO”, simultaneously combining the features of network society and a neo-imperial system (Roche, 2012). The absence of super-state origins as well as no serious reasons for evolution into the United States of Europe leaves no chance for common territorial planning and governance. This fact caused dissolution even among earliest Eurooptimists. “On the issue of European integration, I was naively enthusiastic; the case for overall planning at the level of the then EU12 seemed self-evident to me... Integration of policies within ESDP, established later, at
broader framework implied EU territoriality, marked a clear gulf in interests between national and Commission officials ... potentially dooming the very concept of EU territorial cohesion to failure” (Faludi, 2016).

Andreas Faludi suggests returning back to origins when European integration started from attempts to address functional interrelations (French steel industry relied on coal from the German Ruhr Area). The phenomenon of regionalization or even called glocalization was quite successful among European planners and being a reaction on restrictions for planning at supranational level (Brenner, 2004). In fact, planning at interregional level is happening now in different spheres, as a rule, much more successful in transport sphere (among others – “Blue Banana” or Corridor 24 Rotterdam-Genoa7).

Faludi hoped and conceived that “further European integration might have led to a form of supra-state territoriality: the EU territory as a large box. Territoriality would have meant giving primacy to the joint territory. Elements of this exist: the Eurozone and the Schengen Area. The picture is thus one of EU territoriality as a diffuse form of negotiated territoriality complementing an interconnected world”. Additionally, there is an ability of “soft planning for soft places” approach, including new macro-regional strategies (MRS) under the European Council and Commissions - current fuzzy the Baltic Sea Area, the Danube Area, the Adriatic and Ionian Sea Region and the Alpine Space (European Parliament, 2015), to foster the cohesion and competitiveness across these large spaces mainly funded by European Regional Development and Cohesion Funds (again, beyond the scope of national governments).

Defining European megaregions, not to mention governance and planning at that level, as well as its elaboration as a means for coping with economic stagnation in front of global competitors like China and the US, is a problem needing to be tackled at the highest political level. This “patchwork of 28 still independent states”, which have own contradicting interests, is the EU’s main drawback as well as eternal conflict between European Commission and national states over the territory.

As a result, the largest socio-economic and geographical unit in EU for urban planning and governance so far were only metropolitan areas (if we skip such form of cross-border functional as Euro-regions) defining metropolitan functions like politics, economic, science, transport and culture. It is the main evidence for different approaches to the megaregion’s study in Europe since they concentrate on functionality predominantly with interconnectedness; networks and global economic integration (function) as a starting point. Even in this way, megaregions or the “heart of Europe” can be allocated by concentration of metropolitan functions such as the so-called European Pentagon or Global Economic Integration Zone (CEC, 1999) between London, Hamburg, Munich, Milan and Paris. This allocation by metropolitan function is comparable to the socio-economic power of the BosWash or Greater Pearl River Delta.

3. Chinese perspectives

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7 http://4b.nweurope.eu/index.php
China with its centralized political system looks much more successful and matured. Since late 1990s, mainland China used a historic opportunity to physically integrate just newfound Hong Kong to PRD as soon as possible to gain more control over quite free and open “small plot of economic freedom” (in fact, real integration has started in early 1980s with establishing free economic zones around Pearl River Delta region in China). This uniqueness was proved by Shahid Yusuf, who argued that “the Coming together of Hong Kong and the PRD was impelled by geopolitical and historical circumstances which were unique and would be impossible to replicate” (Yusuf, 2007). Integration of the remainder of the current 20 Chinese megaregions is the key goal of megaregion policy approach was facilitating the economic growth.

According to National New-type Urbanization Plan 2014–2020 of Communist Party of China (CPC) central committee and the State Council (Cheshmehzangi, 2016) as well as recent Five-Year-Plan for Economic and Social Development of the People’s Republic of China (The 13th Five-Year Plan of PRC, 2016), megaregions were adopted as the main form of urbanization strategy in China where “megaregions refer to the clusters and agglomerations of geographically adjacent metropolitan areas or contiguous cities”. It further strengthens the role of megaregion in China’s urbanization development, and introduces the megaregion approach as a national policy since “megaregions are delineated by the central government and their boundaries completely coincide with the administrative divisions. In the other words, megaregion is a concept of both geography and policy in China” (Su et al., 2017).

The reason is clear since China “has not yet to establish a mature socialist market economy and cities have to compete and struggle for infrastructure, domestic and foreign investments, etc.” (Song, 2014). To relieve the tensions among neighboring cities and coordinate them to compete in the global market the central government found megaregional approach quite useful, started to encouraged local and provincial governments to formulate intra-urban and across-regional strategic development (Vogel et al., 2010). Surprisingly, this initiative received very solid respond from the bottom – CPC has already approved 20 local megaregion development plans and establishment of respective megaregions, including five major ones at national level (like Pearl River Delta, Greater Beijing area and Yangzi River Delta in Shanghai). Both parties recognized the real benefits of such approach since strategic planning at megaregion level enhances regional economic competitiveness and gives additional economic and political support, but also strengthens the regulation capacity of the central government. “It can regain governing control and functional significance over the local jurisdictions through implementing megaregion policy” (Jiang Xu, 2008).

However, the governance at megaregion level is still problematic issue in such hierarchically organized administrative systems as China since particular state institute for governing administration at megaregion level with the highest obligation power to force cities to cooperate among or beyond local jurisdictions was not established yet. “It leads to the situation that cities within the megaregions keep administratively independent and they receive rather few incentives from the central government to forge the cooperation. The situation is much worse when a megaregion involves the local jurisdictions across different provinces” (Su et al., 2017). The central government tried to tackle the issue by establishing national ministries (the
National Development and Reform Commission, the Ministry of Housing and Urban-Rural Development, the Ministry of Land and Resources) but so far, they failed to fulfill the role in formulating formal megaregion planning or legislation.

And if in terms of economic growth which was the key goal of China’s megaregion policy, it proved to be successful, the other three declared goals are far from achieving (rational urban growth, environmental protection and social equity). To address this challenge, the Chinese Central Government has to establish “cohesive and single overarching agency” which eliminates duplication in responsibilities and conflicting jurisdictions and will be able to develop megaregion master plan, broad enough to integrate the spatial, social, economic, and environmental issues. Additionally, appropriate official administrations should be established at megaregional level too (responsibility for coordinating among decentralized institutions and agencies, allocating resources). Without such kind of central political body, a current problem situation will remain with its institutional fragmentation, miscellaneous spatial planning and inadequate legislation at megaregional level (Su et al., 2017).

4. The governance aspects

Focusing on the level of megaregional governance, there are three main approaches for collective action in transport, environmental issues, social and economic sphere, etc. Those approaches include hierarchical direction by a government, arrangements relying on the market mechanism and a variety of arrangements in which actors and stakeholders interact or joint decision-making and network governance (New regionalism and shifting from government to governance, Savitch & Vogel, 2000). In reality, collective action arrangements consist of a mix of these three types. The study analyzes collective actions (regional government establishment, rail infrastructure provision and protection of open space) within five MCR: the Randstad, the Flemish Diamond, the Rhine-Ruhr region, London/the South-East of England and the San Francisco Bay Area (Evers & de Vries, 2012).

The main result is quite unpredictable since there is neither direct correlation between hierarchical approaches and form of state government nor with legal traditions or political culture (both federal and non-federal states employed hierarchy as an approach). The cases analyzed show that re-establishing hierarchy via consolidation in new governments mainly failed to solve collective action problems but importance of hierarchical intervention always increase as number of involved actors rises. “Despite an image of being somewhat anachronistic, central government intervention can be an effective way to deal with the increasingly complicated scalar-structuration of collective action problems at the MCR level”.

Manuel Castells wrote that such massive urban regions “without own name, culture and institutions” (Castells, 2002) face a range of serious challenges like political accountability or citizen participation and especially effective management, resulting in disproportion between the scope and institutions of metropolitan management. Castells saw the solution in further development of so-called network-state with supranational institutions, formed by national, regional and local governments, international institutions and NGOs (citizen representatives). In
this vertical hierarchy local government “become a node in the chain of institutional representation and management”.

Other American researchers paid the utmost attention to regional planners’ role in future megaregion governance for designing processes, creating, supporting, and managing multi-actor networks since “the history of Western efforts to establish and maintain broad-purpose metropolitan governments does not offer promise for megaregion government” (Innes et al., 2010). The main critiques of megaregional approach stress that planning at metropolitan level represents already a tough task and there is no evidence that it would be easier at even higher level. “The region/metropolitan area is generally seen as the weakest scale of planning. Institutions are less strong at this level than at local, state, provincial or national scales and face many well-known challenges like local government’s fragmentation or opposing interests, etc. Consolidating local governments can help, but is difficult politically” (Wheeler, 2014).

Even being critique of Megaregion conception, Harrison & Hoyler referred to its geopolitical origins: “Megaregion itself is constructed, mobilized and presented as a coherent space in order to achieve certain political outcomes” (Harrison & Hoyler, 2015). Whereas it is EU with its functional-dominated approach with socio-economic core at Pentagon, highly populated China with 20 different megaregions or American megaregional constructions, yet based on form-dominated spatial planning tradition.

For all three different approaches, geopolitical aims and competition in global economic races are tightly interlinked and spurs one to each other’s. Concerning the governance, despite the fact that it is very complicated at such scale even in highly hierarchical countries like China not even mentioning democratic chaos in the USA, worsened by the complex political construction of EU, it could be based on three different approaches: more or less top down government ruling, bottom-up with leading role of market (no real working examples at all) or mixed approach with so-called network governance. After analysis of literature we could argue that there is no yet any institutional structure or body for planning and governance at megaregional scale neither in Euro-American world nor in the Global South.

E. Main conclusions

To conclude the part of literature review, it can be claimed that there is neither complete and common “portrait of megaregion” nor a definition - see the famous paper “The shock of the new: 100 concepts describing recent urban change” (Taylor & Lang, 2004). Even more, there are at least three different approaches to megaregional planning: form-dominant in the USA, accounting for rapid urbanization (or form) and hence transport. In the EU, it is a socio-economic functional dominance and linkages. In Asia and Global South there is a population-dominant approach determined by city population and the sprawling urban form. Such approaches determine only one, dominant factor and a starting point for research but don’t undermine the importance and role of other drivers (see the table below).

Growth of the global economy, based on global cities nodes and their regions, and further socio-economic integration and population growth in developed and developing markets, is not deniable.
This is an obvious driver, laying on the surface in conjunction to politics, facilitating the life of geopolitical projects and transport development with rapid technological progress. Since Richard Florida claimed that urban megaregion relate to the global economy the same way as metropolitan region serves the national economy (Florida et al., 2008) or planning at this scale raises amount of required investments in infrastructure to new levels, previously allowed exclusively at national level, the megaregional phenomenon discussion always draw attention of a broad scope of players (local and international business, industry leaders, TNC, politicians, Federal and State/regional governments, subnational political institutes, regional planning associations, NGO, private investment funds, real estate developers, etc.). “There is a strong argument that powerful actors mobilize in support of the megaregion concept only where they see the potential for planning at this scale to defend and enable their essential interests to be realized” (Harrison & Hoyler, 2015).

Such large urban constellations as megaregions are most suitable for international business that benefit from global linkages, concentration of capital and talents as well as well-developed supply chain infrastructure. The main concern is that such global economic infiltration into national territory at the expanses of local development leads nowhere and the megaregional concept, being simply unsustainable and part of the status quo approach, has no future.

Governance even at the metropolitan level is quite challenging, and at the megaregional level it would be even harder (Wheeler, 2015). A lot of research was trying to justify the viability of civil, bottom-up approach suited for megaregional governance, but even that such attempts took place there is a lot of improvement and practical work to be completed.

After this literature review the research gap is as follows: what are the real drivers for megaregional development for three megaregions, representing simultaneously different urban studies schools and approaches as well as political systems (BosWash corridor in the USA, the Central Economic Core/European Pentagon and GPRD in China)? What are the historical roles of that drivers and triggers? How are they interdependent, and is it possible to determine a common conclusion about megaregional evolution upon analysis?
III. Case analysis

In the previous section, the history of studying of large urban settlements, their evolution and different forms was presented and described three different approaches for megaregional planning in respective geopolitical areas. Information was drawn regarding different drivers, leading up to megaregions like transport and technological development, national and global economic growth, as well as social factors and political will. Overall, this approach enables the structuring of three cases with greater precision and deeper analysis of each driver.

Starting with Boston-Washington Corridor in the USA, offering the leading example of megaregion in many dimensions like its transport backbone or economic specialization of different urban nodes. Second, - the Central Economic Core or “Blue Banana,” world-famous for its great experience in cross-boundary functional cooperation at very local level. Lastly, a detailed analysis of China around the Greater Pearl River Delta; once long-time, simple PRD megaregion of Mainland China’ cities in Guangdong Province now actively integrated with two Special Administrative Areas, Hong Kong and Macao.

A. BosWash corridor (the USA)

1. History of emergence and current status

Jean Gottmann named Boston - New York - Washington corridor as Megalopolis in later 1950s, being impressed by "the density of great cities along this coast" (Gottmann, 1957). We are talking about New England - the oldest and the most developed historical part of the USA. Already by 1800, the region included the only four U.S. cities with populations of over 25,000 (Philadelphia, New York, Baltimore, and Boston). By the middle of XIX century approximately, there was already a form of economic macro-region, based on rail network, linking all major industrial nodes. Since Gottmann’s time, the BosWash corridor has become a golden example for megaregional studies. In his further research, he expends the definition to the surrounding area and named it Megalopolitan regions as very large interconnected perinuclear urbanized systems, composed of several metropolitan areas each, with 25 mln inhabitants. Nowadays, this megaregion also known under following names: Bos-Wash corridor, East Coast Metroplex, Northeast Megaregion I-95 Corridor, or just BostWash.

Today, BosWash occupies some parts of the territories of 11 Northeastern States and the District of Columbia. It has a population of over 50 mln inhabitants (in 2007 it was almost 18% of total US population) and produces around 20% of national GDP or $2.9 trillion which is similar to Brazil’s (Kotkin & Schill, 2013). Its average wages is $76,000 which $19,000 higher than the US average (Georg, Blaschke and Taubenböck, 2018). Meanwhile it occupies only 2% of the national land area (School of Design/UPenn, 2005) or the territory of 61,946 sq. miles with the highest national population density as 390 people/km², comparing to national average 31 people/km² (Short, 2007). “No other section of the United States has such a large concentration of population, with such a high average density, spread over such a large area. And no other section has a comparable role within the nation or a comparable importance in the world” (Gottmann, 1961). The importance of BostWash to the US should not be
underestimated since it houses the country’s economic and political capitals, New York and Washington D.C. respectively. The second largest megaregion of the USA, which could match it more or less, is California State, playing as union entity itself (40 million people, $2.5 trillion GDP)

*Figure 2. Map of BosWash. Gotmann, 1957 (to the left) & Regional Plan Association, 2007*

Two major US thinks tanks, presenting the most influential national studies, delineate the boundaries of BosWash differently. The classical variant, recognized by the majority of researchers throughout the world, was created by Regional Plan Association (RPA, 2009). The second variant of Virginia Technical University predictably divides it by excluding Richmond and Norfolk (Lang & Dhavale, 2005). Despite RPA’s consistent approach in defining megaregions, there are a lot of discussions around where particular boundaries of megaregions should be and how far beyond the NEC axis they should stretch. “There is a multitude of terms describing and conceptualizing larger multi-nuclei urban areas, the boundaries of such larger urban areas are often fuzzy and the terminology is ambiguous” (Georg, Blaschke and Taubenböck, 2018).

**2. The role of transport**

Transport system was always the main mean of New England territory’s mastering – the oldest and yet the most mature and developed part of the country. According to Michelle Oswald, BosWash presents the oldest transportation corridor of the USA, since it “was developed based on the strategically placed rail lines rather than as a result of the overlapping suburban areas”

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(Oswald et al., 2009). At the early beginning of studying BosWash corridor, Jean Gottmann also gave the paramount importance in its emergence to transport and physical infrastructure development (measurable and even invisible linkages and flows). “The superimposed networks of linkages help to make the region more united and more intricately intertwined, creating interdependence of the various components within the megapolis” (Gottmann, 1976). Now it stretches for 455 miles from Boston to Washington D.C., crossing the boundaries of 11 states.

The process started long before the development of rail networks that began to overlap the region by the 1830s due to rapid industrialization (Eckardt, 1964). By 1870 the locally operated railroads consolidated with the regional system (Claiborne, 1966) and from then on rail companies managed to strategically place rail lines right between Boston and Washington D.C. for maximizing their profit since the connected major populated areas (Ward, 1986). Initially “the strategic planning of the rail system throughout the corridor connected pairs of cities such as Baltimore to Philadelphia and Philadelphia to New York City. Because train stations were built in and around cities and typically provided service to regions of similar characteristics” (Pell, 1966).

This pattern was the reason for an emerging “string of cities” throughout the Northeast which later became a single railroad backbone of megaregion. Later this level of interconnectivity within BosWash was complimented by alternative transport modes – rapidly developed automobile and air travel at the middle of XX century. “The automobile was preferred for short intercity commutes while air travel began to dominate long distance travel” (Oswald et. al, 2009), which resulted in massive decrease in rail ridership. The Federal Housing Act of 1949 dramatically increased the availability of the Federal Housing Administration (FHA) mortgage insurance for millions of Americans; simultaneously, the Federal Aid Highway Act of 1944, supplemented by the Federal Aid Highway Act of 1956 established the Highway system and facilitated car-oriented growth. Overall, the introduction of the automobile created massive suburban areas around all cities of BosWash.

In the early American history, the government gave major support to the railroad companies by funding land acquisitions and giving tax incentives to private businesses since private enterprise was the major instrument for exploiting newly acquired, vast territories (Long, 2016). By the 1950-1960s, rail had been left alone against the new emerging competitor, the family car and the newly created interstate highway system heavily supported by government (The National Interstate and Defense Highway Act of 1956 prioritized federal subsidy of highway construction across the country). Federal Railway Administration (FRA) stated bitterly in 2009 that within previous 60 years the government invested over $1.8 trillion in world’s most advanced highway and aviation systems but completely ignored the development of high-speed intercity passenger rail which at the best case counts less than 3% of Federal investment in intercity transportation (FRA, 2009). The figure below illustrates this car dominance and rail’s oblivion like no others.

Figure 3. US Federal Investments in Intercity transportation, 1949-2008
To show the same Federal approach to the rail network development, it is better to look at funds allocated to the Recovery Act (The American Recovery and Reinvestment Act of 2009 or ARRA) provided by the Obama administration. To stimulate US economic growth during the deepest recession, Congress approved $787 billion in federal tax cuts and pouring money into economy between 2009 and 2019. Its total spending for infrastructure development reached $105.3 bln and approximately half of this money was allocated to transport ($48.1 bln), but only $8 bln belonged to Intercity passenger rail projects, plus an additional $1.3 bln for Amtrak passenger rail\(^9\). The same ration characterizes the fixing America’s Surface Transportation (FAST) Act of 2015, also known as the Transportation Bill, the second largest Federal investment of Obama administration, allocating $233 bln over the following 5 years on highways, $49 bln on transit and $10 bln on Amtrak’s passenger rail\(^10\).

Such exclusive reliance on private vehicles and related infrastructure within last 60 years resulted in correspondent mode distribution when cars and other personal vehicles dominate in trips with 68% (2015) while the second largest transport mode was airplane (over 23%) – Intercity rail operations occupied a meager 0.1%.

\begin{table}[h]
\centering
\caption{US transport mode distribution in 2015 (Person-Miles of Travel, PMT)}
\begin{tabular}{|c|c|c|}
\hline
Transport mode & PMT (thousands) & Share \\
\hline
Light-duty highway & 3,828,301 & 68\% \\
\hline
\end{tabular}
\end{table}

\(^10\) https://abcnews.go.com/Politics/inside-congressss-305-billion-transportation-bill/story?id=35584379
### Vehicles* (Cars)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>1,297,215</td>
<td>23.3%</td>
</tr>
<tr>
<td>Bus</td>
<td>344,073</td>
<td>6%</td>
</tr>
<tr>
<td>Motorcycle</td>
<td>21,118</td>
<td>0.4%</td>
</tr>
<tr>
<td>Transit</td>
<td>55,698</td>
<td>1%</td>
</tr>
<tr>
<td>Intercity rail/Amtrak**</td>
<td>6,536</td>
<td>0.1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5,552,941</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Including wheel base passenger cars, pickup trucks, vans and sport utility vehicles
**Does not include contract commuter passenger miles

Sours: BTS USDOT, 2017

Meanwhile, for BosWash precisely, transportation mode distribution looks different, at least for intercity trips (according to Amtrak classification they are longer than 75 miles). As we can see the data of Amtrak from 2010, approximately 89% of the roughly 160 million annual intercity trips in the Northeast Corridor is represented by highways (included approximately 9% of bus travels), air travel had 6% and Amtrak rail had 5% (Amtrak, 2010). Rail doesn’t represent impressive share yet NEC was and remains the nation’s most congested rail corridor, is served by Amtrak with its 13 million annual passengers as well as 250 mln annual commuter rail passengers and plus 50 freight trains per day. In 2006, 12 of the 20 busiest intercity train stations in the country were in the Northeast (RPA, 2007).

**Figure 4. Share of 2010 NEC Intercity Trips**

Source: Amtrak, 2010
The major shift in transportation towards private cars resulted in massive traffic congestions all along BosWash corridor and deteriorated the quality of life; this influenced so-called super-commuters, or in case of BosWash, mega-commuters. The amount of workers leaving their home county to work in another in the same state or in a different state increased from 23.5 to 40.9 mln between 1990 and 2015 (their share in workforce grew from 20.4 to 27.6%). This phenomenon is known as mega-commuting (defined as a more than 90-minute ride and at least 50 miles distance one-way to and from work). For the 10 US counties attracting the most mega-commuters (at least 5 counties relate to nothing else but Boswash) the distance to work ranges from 60 to over 90 miles and travel time exceeds 2 hours one way (Rapino & Fields, 2013).

It cannot be said that the Government ignored the problem of car dominance at all during the last 50 years. The government had to pass the Rail Passenger Service Act of 1970 just to preserve (not develop) passenger service over a national railroad system, by establishing National Railroad Passenger Corporation (better known as AMTRAK). This for-profit federally sponsored corporation was granted with access to tracks, owned by the private railroads at incremental cost with operational priority over freight trains, in exchange of serving their routes and passengers with associated financial losses. Amtrak heavily relies on annual Federal funding, covering both capital needs and operating deficits, long-term planning was barely possible ant resulted in degradation of rail infrastructure everywhere with only exception of Northeast Corridor. The reason was residual rail financing from Federal side and its unwillingness to cover State’s expenditures, compared to other transport modes. The figure under illustrates how State capital dollars can be leveraged by Federal matching dollars for each mode (FRA, 2009). No additional federal financing for State’s rail projects compared to 5 Federal dollars per one State dollar spent on highways.

![Figure 5. Historical Federal Funding Leverage by Mode](image)

Source: FRA USDOT, 2009
Nevertheless, it appears that Amtrak works quite well. Robert Lang writes that Boston and Washington’s suburbs were converging, making the Northeast a single extended megapolitan space. All of Amtrak’s profitable lines in this megaregion connects big northeastern cities because megapolitan areas have concentrated populations in corridor form. It allows offsetting losses on service to remote rural locals (Lang & Dhavale, 2005). The Northeast Corridor produces 55% of Amtrak's total service revenue as of 2016. Acela Express alone, launched in 2000, the 1st and last US HSR, connected all major metropolitan areas within BosWash, generates 27%.

Today, 91% of U.S. households have at least one vehicle available, but still 4.5% of households with workers had no vehicle in 2014; this percentage represents 6.3 mln workers. They rely on public transport, especially in BosWash corridor, where is the highest national percentage of workers, using public transport (more than 10%). Although rail transit (heavy, commuter, and light rail) comprised only 15% of the transit vehicles, it accounts for 46.5% of public transit trips (BTS, 2017). Northeast Corridor (NEC) occupies the significant part of Intercity Passenger Rail traffic, although ridership is also high around Chicago as well as at several locations in California and the Pacific Northwest. We can see the fundamental difference between New York City with other major metropolitan areas of BosWash corridor which more or less rely on public transport and West Coast/Southern metropolitan areas exclusively rely on private cars.

Figure 6. Major U.S. City Commute Patterns, 2008

NEC is still the rail backbone of BosWash, stretching for 457-mile from Boston to Washington, D.C. through New York City, Philadelphia and Baltimore. More than 50 million people live within NEC, the area makes $3 trillion GDP or 20% of national economy, there are 7 mln jobs within 5 miles of NEC stations along the route. Every day it serves 0.75 mln passengers on 2,200 daily
commuter and intercity trains as well as freight operators. It is already the busiest national rail corridor and NEC’s ridership is projected to double by 2040 (Amtrak, 2017). Although Amtrak is majority owner of this line, it is also used by eight commuter rail partners and multiple freight operators. This brings additional challenges for planning and coordination, especially considering decades of underinvestment (Amtrak estimates that Northeast Corridor needs more than $38 billion just to reach the “state of good repair”) and expensive long-term projects like Next-Generation High-Speed Rail.

**Figure 7.** Northeast Corridor (NEC) needs huge investments for eliminating bottlenecks and upgrading aging bridges and tunnels

![Northeast Corridor Map]

Source: Rebecca Reyes-Alicea, FRA/USDOT, 2017

To facilitate the cooperation and cohesion planning Congress established the Northeast Corridor Commission (NECC) as part of the Passenger Rail Investment and Improvement Act (PRIIA) in 2008. In 2017, FRA issued the Record of Decision (RoD) for NEC FUTURE, which describes the Selected Alternative that will guide future investments on the NEC through 2040 and beyond (construction of completely new two-track dedicated system for conventional and two-tracks for new HSR segments)\(^\text{11}\). So now Amtrak works with all regulators and stakeholders

\(^{11}\) [https://www.fra.dot.gov/necfuture/alternatives/selected/](https://www.fra.dot.gov/necfuture/alternatives/selected/)
to find an acceptable way to fund NEC FUTURE and simultaneously repair current infrastructure as well as unlock major transportation bottlenecks (Top Ten prioritized projects). Those incremental improvements finally prioritized project financing from FAST Act of 2015 mentioned above ($10 bln for 5 years, precisely allocated for Amtrak). Overall capital costs for upgrading NEC infrastructure, improving rail service and expanding rail capacity are estimated according to FRA at $120-150 billion over next 25 years\textsuperscript{12}. But the project will reduce travel time from Boston to Washington D.C. to 3 hours and 8 minutes from the current 7 hours (more than 60% decrease in time). It also results in dramatically increasing amount of jobs, available within 45 min rides by HSR, which theoretically will lead in decreasing private car use among all major metropolitan areas along BosWash.

Figure 8. NEC FUTURE’s economic effect on labor market within BosWash

The transport was the main mean of the development the territory, now known as BosWash corridor since the beginning on industrial revolution. That time it exclusively relied on rail network, been spurred by Government’s privilege and formed for primarily economic purpose and industrial activity – to transport sources and goods between key industrial nodes of Northeast. Only by the end of XIX century it became an axis for public transport – since that time it can be argued that union Megaregion was already formed. Since the middle of XX century it has been transforming into coalescent suburban territory, spurred again by Government (preference to private cars, highway system and affordable housing). Yet the Northeast Corridor (NEC) based on rail network plays the key role to connect the whole territory of Northeast Megaregion together, although it suffers from long period of underinvestment.

\textsuperscript{12} https://www.fra.dot.gov/eLib/details/L19323#p1_z50_gD_lOP
3. Socio-economic drivers

Being a historical cradle of the great American Industrial Revolution and main national powerhouse for the last two centuries, BosWash has undergone huge decline in industrial sector within last 50 years (became a part of so-called rust belt). The industrial sector has been substituted by a rapid increase in the service sector and managed to perfectly adjust to new globalized digital world. There is not a particular statistic to estimate the service sector’s overall growth within last forty years, but instead a figure to demonstrate the tragic atrophy of BosWash’ industrial share (see table below). Today megaregion mainly specializes in five key “super-sectors”: information tech, financial activities, professional and business services, education, health services. For some particular sub segment of the service sector, Northeast Megaregion played the leading national role in 1997, for instance it held more than 80% of national jobs in sphere of Securities intermediation.

“One of the characteristics of the Northeast’s economy is the existence of networks of industry clusters that rely on the connectedness of the entire megaregion. One example of this tendency is the pharmaceutical sector, which has a larger presence in the Northeast than anywhere else in the world. Corporate headquarters are clustered in and around New York City and northern New Jersey, as they have been for several decades” (RPA, 2007).

Table 3. Shifting the job distribution in BosWash for the last 40 years

<table>
<thead>
<tr>
<th>The jobs</th>
<th>1958</th>
<th>% of nation</th>
<th>1997</th>
<th>% of nation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production workers</td>
<td>3.1 mln</td>
<td>27%</td>
<td>1.5 mln</td>
<td>12.3%</td>
</tr>
<tr>
<td>Service sector overall</td>
<td>?</td>
<td>?</td>
<td>5.6 mln</td>
<td>?</td>
</tr>
<tr>
<td>Subcategory of Finance and insurance</td>
<td></td>
<td></td>
<td>2.5 mln</td>
<td>43%</td>
</tr>
<tr>
<td>Securities intermediation</td>
<td></td>
<td></td>
<td>0.57 mln</td>
<td>81%</td>
</tr>
<tr>
<td>Information and data processing</td>
<td></td>
<td></td>
<td>0.113 mln</td>
<td>33%</td>
</tr>
<tr>
<td>Professional, scientific and technical</td>
<td></td>
<td></td>
<td>3 mln</td>
<td>57%</td>
</tr>
</tbody>
</table>

Source: Vicino et all, 2007

Interestingly, being tightly integrated within whole megaregion in terms of service economy, each major metropolitan area has some particular specialization which only increases the economic interdependence. Washington D.C., being the national capital, plays as a megaregional political headquarter with all related industries (law and lobbying firms, nonprofit policy and advocacy, information technology). New York is famous worldwide for its financial services sector, large investment banks, corporate law, vast range of media and cultural enterprises. Boston, in rivalry with New York City, holds its position as a national educational center with world-class colleges and universities, supplemented by strong medical research
industry (biotech, and health care). While Baltimore and Philadelphia both have strengths in
health care and education (although the latter one plays as cheaper alternatives to New York
for financial services). In rivalry with New York City, holds its position as a national educational
center with world-class colleges and universities, supplemented by strong medical research
industry (biotech, and health care). While Baltimore and Philadelphia both have strengths in
health care and education (although the latter one plays as cheaper alternatives to New York
for financial services).

**Figure 9. Change in BosWash specialization 1990 – 2004**

<table>
<thead>
<tr>
<th>Northeast Supersectors</th>
<th>Workforce Specialization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Resources</td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td></td>
</tr>
<tr>
<td>Trade, Utilities &amp; Transportation</td>
<td></td>
</tr>
<tr>
<td>Information</td>
<td></td>
</tr>
<tr>
<td>Financial Activities</td>
<td></td>
</tr>
<tr>
<td>Professional &amp; Business Services</td>
<td></td>
</tr>
<tr>
<td>Education &amp; Health Services</td>
<td></td>
</tr>
<tr>
<td>Leisure &amp; Hospitality</td>
<td></td>
</tr>
<tr>
<td>Other Services</td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td></td>
</tr>
</tbody>
</table>

Source: RPA, based on Bureau of Labor Statistics Current Employment Statistics Survey 1990-
2004.

Such major shift in job distribution from industrials towards the service economy like health
care and information technology with corresponding demand for higher education and
specialized skills increased housing prices recent years especially in Boston, New York, and
Washington. On the other hand, demand in low-end service sectors like retail and food service
experienced no chance in prosperity, decreasing hopes of escaping poverty for countless
immigrants and African-Americans, who massively entered the Northeast within the first half of
the XX century. At that time, it was easier to find a decent job in factories, docks and other
enterprises in the industrial economy. Although a significant part of those newcomers finally
rose to the middle class and left the cities, poverty in the Northeast is still highly concentrated
in urban areas. According to Regional Planning Associations, all five major metropolitan areas in
BosWash have median poverty rate 7-10% higher than the national average, while overall
megaregion-wide rate remains below average figure.

**Figure 10. Poverty Rates in Northeast Cities and U.S.**
The loss of manufacturing jobs is not only a sectoral shift; it also results in major social change. Deindustrialization is as much a social process as an economic shift” (Vicino et. all, 2007). As a result, the increasing amount of high-paid and extremely wealthy people made affordable housing so rare along with goods and services that severe influenced on low-income and middle-income families to leave the city center into further and further suburbs (here the phenomena of super commuter appear). The so-called housing cost “burden” when family spend more than 35% of their income on housing, present one quarter of whole households in BosWash (including 15% of those families who pay even more than 50% on housing).

The ultimate result of that major shift towards specialization in financial services is BosWash’ dwindling middle class – the vital center of any healthy economy. “The continuing erosion of the middle class threatens the fiscal stability of cities and suburbs alike by taking away the strongest element of their tax base. From 1970 to 2000, the five metros lost middle-income families, while the number of neighborhoods with middle-income character declined even faster” (RPA, 2007). See the brown pieces of land, mainly stretch to the city center and near suburbs, marking the most ones losing the middle-class families toward distant suburbs (green). This slide demonstrates the polarization in incomes in the cities (high-income as owners and low-income families with renting are on the rise) and suburbs (middle income families as owners are seeking the affordable prices increasingly further away from metropolitan core).

Figure 11. Percent Change in Middle Income Families from 1990–2000.

Source: RPA, based on U.S. Census 2000
According to Thomas Vicino, Middle America was still one of the two largest clusters in megaregion (36% of the total population) but it shared the same percentage figure with immigrant gateways (mainly result of New York City’s large population). Poverty clusters occupied only 8% of all places while Black middle class (new emerged class, mainly concentrated near Washington) had 5% (Vicino et. al, 2007). Median household income of Middle America in BosWash megaregion was significantly higher than national median ($56,227 versus $41,994) as well as median household income in Black middle-class households ($60,316 versus $42,316); but consider higher tax burdens as well as a low ratio of federal expenditures. Tax burdens are far higher than national averages and the Northeast Megaregion’s states often pay dozens of billion dollars more then get from federal spending.

“For a family of four with an annual income of $75,000, 7 of the top 12 highest tax burdened cities in the U.S. are in the Northeast (Bridgeport, Newark, New York, Philadelphia, Providence, Baltimore, and Boston). Most important, the taxpayers in the Northeast Megaregion subsidize most other states across the country. The state of New Jersey, for instance, has the lowest federal expenditure ratio in the country. The state receives 57 cents for every dollar paid to the federal government” (School of Design, Penn, 2005).

*Figure 12. Federal Tax Expenditures per $1 (2004)*
Due to inadequate federal tax expenditure, communities of all sizes throughout the whole BosWash megaregion face the same problem: over-reliance on local revenue sources, especially property taxes that only spur inequality and further sprawling. “Pressed for funds and desperate to reduce taxes, local governments feel compelled to pursue the kind of growth that will generate the most tax revenue. This leads to the infamous “ratables chase,” also known as fiscal zoning, wherein municipalities zone open land for commercial and high-end residential development in the hope of yielding maximum revenue with the least associated cost in services. The new development consumes farmland and open space while increasing pressure for housing, causing the cycle to begin again” (RPA, 2007).

As a result, communities are competing with each other for fiscally desirable development, spending precious funds on incentives, but often oppose the much-needed affordable housing projects. They simply fear that such social projects are not able to generate enough property tax revenue to cover their current expenses on social infrastructure and services like schools, etc.

The result of such shortcoming view position is clear and was perfectly described by Myron Orfield, is that “people with the greatest need for public services are concentrated in communities that are the least able to fund those services” (Orfield, 2002). This statistic throughout BosWash proves it since megaregion, being the high-end world-class education hub simultaneously, has the least affordable universities and colleges in the country. “Only 44% of African-Americans in the Northeast and 32% of Hispanics attend college, compared to 57% of whites” (RPA, 2007). Edward Glaeser in its book “Triumph of the City” (Glaeser, 2011) tackled this issue, blaming school districts in the USA as one of the main reasons for so-called white flight.
Racial segregation existed in the USA up to 1950s, and in 1954 the U.S. Supreme Court made a historical judgment making racial segregation in public schools unconstitutional. The solution was found in the desegregation public transport like busing (forced busing or simple busing of black students to predominantly white schools). It is the practice of assigning and transporting students to schools so as to redress prior racial segregation of schools, or to overcome the effects of residential segregation on local school demographics. In fact, assignment of school-district boundaries had led to the transportation millions of pupils every day many miles away from their homes and their neighbor schools. Overall the US has around 480,000 school buses in 2014\textsuperscript{13} which transported 26 mln elementary/secondary students daily. According to the American School Bus Council (ASBC) the average one-way school bus trip was five miles, which means that pupils traveled approximately 50% more than average national transit passenger.

“In the United States, the public school a student attends is still primarily determined by where their family lives. Most children are enrolled in district schools that receive, on average, nearly half of their funding through local property taxes. This system ties school budgets to the value of local property wealth and incentivizes boundaries between upper- and lower-income communities. Intentional or not, these invisible walls often concentrate education dollars within affluent school districts, and ensure that low-income students are kept on the outside”\textsuperscript{14}.

Due to the influence of property values on schools, affluent communities are incentivized to leave low-income students trapped in their poor districts, which creates socioeconomic segregation. For instance, Camden City School District (NJ) serves over 16,000 students (45% of them live in poverty and 90% are eligible for free- or reduced-price lunch) but within five miles of Camden, there are 32 other school districts (many of them serving less than 3,000 students, less than 13% student on poverty, generated more than 20 times Camden’s local property taxes to fund their schools).

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{Figure_13.png}
\caption{Camden City School District, NJ}
\end{figure}

\textsuperscript{13} http://www.newgeography.com/content/004801-school-buses-americas-largest-transit-system
\textsuperscript{14} http://maps.edbuild.org/DividingLines.html
Considering the size of the New York Metropolitan area, it occupies significant portions of these school commuters: State of New York had 45,000 school buses which served 4 mln pupils every day, while New York City school district carries more passengers than any other, with nearly 310,000 daily trips. Many families were understandably angry about having to send their children miles to another school in an unfamiliar neighborhood when there was an available school a short distance away. It resulted in the massive movement of white families to suburbs of large cities, where population (and consequently the schools) were predominantly white. And where from, according to the U.S. Supreme Court decision of 1974 (Milliken v. Bradley), suburban students could not be used to desegregate inner city schools. Such “safe harbors” became one of the main reasons for white flight throughout the core cities of Northeast Corridor too. It revealed so-called “Shopping for schools” phenomenon when middle- or upper-class families tend to move to areas with better local school districts, as a rule, in suburbs, for the sakes of their future (Zhu, 2017).

Figure 14. Urban Clusters in Northeastern Megaregion (NY/NJ & Washington)
The massive shift in transportation towards private cars since 1950s and suburbanization resulted in social and economic restructuring of the BosWash corridor; people, who were not able to afford the car had to rely on public transport. They concentrated within a close distance of their workplace, typically in urban districts where passenger rail was heavily relied upon for mobility between cities (Vicino, et. al, 2007). This social segregation remains nowadays too since mass transit system mainly is non-reliable and provides the service mainly to those who simply cannot afford personal vehicles. As a result, limited mobility traps poverty, this phenomenon is also known as transit desert, which happens not only in BosWash but throughout the country where poor people are forced to move to far distant suburbs. “The dismantling of public housing and increasing housing costs are forcing a shift in migration of lower income and transit dependent populations to the suburbs. These suburbs are often missing basic transportation, and strategies to address this are lacking. This absence of public transit creates barriers to viable employment and accessibility to cultural networks, and plays a role in increasing social inequality” (Allen, 2017).

BosWash, being once a national industrial powerhouse, managed to cope with declining traditional sectors and avoided the fate of rust belt cities. It successfully substituted it with service sector, became a world class financial and headquarters’ hub. But it had negative circumstances too since significant concentration of rich people resulted in exacerbating of housing prices and all related services and goods. Within last 20 years key metropolitan areas of BosWash lost significant part of their tax base pushing middle class and business enterprises out the center further to the suburbs due to rapidly increasing land price and housing.
The other side of problem is in federal underinvestment in Megaregions, compare to the other States, which causes over-reliance on local revenue sources especially property taxes of variant communities. They compete for commercial and high-end residential development and always discharge much-needed affordable housing. All that resulted in sprawling and emergence of very particular phenomena of super commuters, who spend over 90 minutes each way. Bear in mind the school districts’ desegregation policy and school bussing that only intensified white flights from the city centers to suburban areas. Overall it spurred the further growth of megaregion, particularly in the suburbs around small and middle towns between major metropolitan areas

4. Political drivers

Government incentives

The USA gives a perfect example how government incentives intentionally or occasionally but lead to megaregion growth. Right after the end of Great Depression (due to industrial recovery within IIWW) the Roosevelt administration started and Truman unwillingly followed two major programs which define US’ cities development for the rest of XX century. Serviceman’s Readjustment Act of 1944 (or G.I. Bill)—coupled with Federal Housing Administration insurance, among other benefits provided low-cost mortgages hence minimize risks for developers and financial institutions, facilitating rapid development of single-family houses on the outskirts of cities across the U.S. for veterans’ families. Federal Housing Act of 1949 achieved this for the rest of American middle-income families, dramatically increased the availability of the Federal Housing Administration (FHA) mortgage insurance for millions of American.

Simultaneously, the Federal-Aid Highway Act of 1944 established the concept of a national network of express highways, mainly without coordination of highway development with other public and private facilities in metropolitan areas (Weingroff, 2000). It established a 50/50 ratio for subsidizing its construction, which later increased 90% after The National Interstate and Defense Highway Act of 1956\(^\text{15}\) (41,000-mile network of interstate highways with overall budget of $26 bln, coming from Highway Trust Fund based on gasoline tax).

Federal Housing Act of 1949 also announced a massive public housing program along with inner-city slum clearance, that time better known as “Negro removal” as a first decade of FHA policy was quite racist (Hoffman, 2000). “By providing opportunities to some while denying them to others, the FHA helped to dramatically segregate metropolitan America. Middle-income whites left the cities in droves, thereby diminishing urban tax bases and concentrating poverty. By the time the FHA eventually reformed its policies, the damage was already done—the region was divided” (Lang & Sohmer, 2000).

The result of suburbanization of the BosWash corridor was the highest share of white population among US’ megaregions, closed to 70%. No wonder the first so-called Levittown by Levitt & Sons, a mass-produced trendsetting suburb with thousands of typical single-family

\(^{15}\text{https://www.gpo.gov/fdsys/pkg/STATUTE-70/pdf/STATUTE-70-Pg374.pdf}\)
houses for returning World War II veterans, was built on New York’ Long Island between 1947 and 1951. “The 1950-1970 period was also one of large-scale in-migration of blacks fleeing the more discriminatory South, which in turn precipitated large-scale white flight to the suburbs, notably around Washington, Baltimore, Philadelphia, and New York” (Morrill, 2006). “These commutersheds created the overlapping urbanized regions that connect the major cities of the Northeast into one continuous corridor” (Miller, 1975). To illustrate this significant shift in urban pattern, see the table of Thomas Vicino below – the population of key urban nodes of BosWash remains the same within last 50 years, whereas population in suburban outskirts areas increased fivefold.

**Table 4. Growth of Megalopolis 1950–2000**

<table>
<thead>
<tr>
<th>Year</th>
<th>Population (Megalopolis)</th>
<th>Population (Metro) *</th>
<th>Population of Metro Centers</th>
<th>Population of Suburban Counties</th>
<th>Area (sq. mi) (Megalopolis)</th>
<th>Density (Megalopolis)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>48,720,108</td>
<td>47,681,719</td>
<td><strong>16,453,217</strong></td>
<td><strong>31,228,502</strong></td>
<td>52,310</td>
<td>931.3</td>
</tr>
<tr>
<td>1950</td>
<td>31,924,488</td>
<td>22,720,346</td>
<td><strong>16,435,953</strong></td>
<td><strong>6,284,393</strong></td>
<td>52,310</td>
<td>610.2</td>
</tr>
</tbody>
</table>

*Source: Georg, Blaschke and Taubenböck, 2018 based on Vicino, Hanlon and Short, 2007*

BosWash, being a coalesced socio-economic urban territory with single labor market overlaps the political boundaries of eleven states and lacks the holistic union approach to urban planning and governance. “All current planning efforts share a common limitation: Sprawl does not respect state lines, especially in the Northeast, where metro areas frequently include parts of two or more states. In order to avoid a balloon effect – push down in one place, and it pops up somewhere else – the megaregion’s various state and metropolitan planning bodies may need to pursue a more coordinated approach” (Orfield, 2002).

Additionally, the Regional Planning Association emphasizes the fact that due to slight but steady depopulation, especially comparing to booming South and West, Northeast’s political influence at the federal level has declined. If in the 1950s, representatives of overall Northeastern States had occupied 129 out of 435 seats in Congress, it reduced to 100 after 2000 and likely would decrease further. It leaves fewer chances for BosWash delegations to compete successfully for federal funding for transportation infrastructure & other spending categories. “The megaregion’s cities and states face a steady ebb in their influence over critical spending decisions in Washington, along with counterproductive competition between local governments for scarce revenues and a relative lack of strong institutions to address issues of common concern” (RPA, 2007).

The role of MPOs

Nevertheless, as was mentioned before, the US heavily counts on Metropolitan Planning Organizations (MPOs) as a mediator between local municipalities (which too weak and relatively selfish) and some bigger in terms of planning and coordination, but yet not exist at federal or supra-regional level. MPOs were created in 1970s by Congress and have been strengthened by successive federal transportation acts. They successfully play as a conductor
for spending federal funding for better integrated regional transportation systems (in some exception manage to use of highway constructions’ “flexible funds” for recreational trails or transit projects), sometime they also may intervene into economic development and land use planning but with limited scale. In general, MPOs lack the official mandate for implementing long vision strategy for their metro area but helped the federal funds successfully encourage strategic planning on a new scale.

American authors suggest strengthening abilities of MPOs at local level for undertaking projects outside their jurisdictions (transport) as well as to facilitate coordination between governmental organizations. Creating flexible cooperative subdivisions at the MPOs level for specific projects and initiatives will likely solve current problems. Moreover, the adjusting MPOs’ boundaries to better accommodate geographic changes in urban demographics is quite easier than in case of counties and municipalities (but for that Federal Government must better define the boundaries of existing megaregions).

What compulsory steps are required to adjust MPOs’ abilities to megaregional scale planning? First and foremost, MPOs need a fresh funding stream (increasing the gas tax by Congress or find alternative ways – now it is 3%) with strategically allocation particularly for cooperation and strategic long-term infrastructure investments. “Moreover, a solid stream of funding should be set aside into a “Multijurisdictional Project Grant”, specifically for use on projects undertaken by at least two MPOs to facilitate inter-jurisdictions developments. To facilitate this process Congress should also relax current restrictions for MPOs’ authorities to work outside their individual jurisdictions. And finally, the country needs an objective authority positioned above the constituent units of megaregions which would be able to coordinate and control achieving intercity and regional transportation goal – such leading role must be taken by USDOT” (Hunn & Loftus-Otway, 2018).

While RPA straggles for adjusting MPOs’ abilities for current needs at megaregional scale, there are already at least two examples of successful cooperation among BosWash states. The first one is the Regional Greenhouse Gas Initiative (RGGI)\(^\text{16}\), a cooperative agreement between 10 Northeastern states to reduce CO2 emission, based on cap-and-trade system. Second, the I-95 Corridor Coalition\(^\text{17}\), comprise of state departments of transportation, MPOs, federal agencies, law enforcement, and transportation industry groups to solve the current problem of congestion on Interstate 95 - the highway, another backbone of BosWash, stretching from Boston to Washington and follows further south to Miami, Florida. It was formed in 1993 and mainly focused on collaboration at digital level to relief current gridlock levels (intelligent transportation systems, E-ZPass, highway management based on real-time data, etc.).

To some extent we can consider fragile cooperation between The Port Authority of New York and New Jersey as another example of coordination at much broader than Metropolitan level scale, taking into account the size and meaning NYC to BosWash (but observe that NYC Metropolitan transport authority has no real power). It can be considered as supra-regional common action three inter-states programs for protection and preserving natural places in

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\(^{16}\) https://www.rggi.org/

\(^{17}\) http://i95coalition.org/
Government’s incentives could be major drivers for megaregional growth, weather the pursued such goals or not. Fundamental US Acts in highway’s subsidizing and facilitating housing affordability in 1950s defined the logic of suburban car-oriented development for the next 50 years and led to current coalesced Northeast landscape with the highest level of so-called super-commuters. The lack of common institutional body and union efforts of all 11 Northeast States decreased their ability to lobby interests and major infrastructure projects at Federal political level notwithstanding the national capital was on the territory of megaregion. But still there is a hope that strengthening Metropolitan Planning Organizations (MPOs), currently focused on transport development, could be a solution for planning at broader scale. At least, there are already several examples of successful cooperation at megaregional scale in some particular areas like environmental issue and transportation.

B. The Central Economic Core (EU)

1. History of appearance and current status

The history of European integration in North-Western Europe roots deep in history probably extending back before Dutch Revolt and its Golden Age or following Industrial Revolution in the UK and neighborhoods. We can begin at the current stage since European Coal and Steel Community back to 1951, which aimed to bind the German economy and to prevent its traditional hostile policy to France (Klinke & Perombelon, 2015). The other reasons were a mutual desire to cooperate after devastating war as well as neediness to find the own place and balance between two Superpowers. Or it could be considered by euro-optimists as beginning of functional integration (Faludi, 2016). Since then, France played the first violin in European integration as a political head and Germany played second as an economic powerhouse.

The European Economic Community, set few years later between Belgium, Germany, France, Italy, Luxembourg, and the Netherlands, established the solid ground for further integration in other spheres and followed European Act in 1986-1987, Maastricht Treaty 1992, Amsterdam Treaty 1997, Treaty of Nice in 2001 and Treaty of Lisbon in 2009 along with waves of EC enlargements. Yet the economic core of the EU remains stable (Benelux plus parts of Western Germany, North France and partly Great Britain which always plays a bit flirty).

Under French Jacques Delors, President of the European Commission from 1985 to 1995 European Commission worked on its Communication “Europe 2000” and in 1989 Directorate General for Regional Policy (DG XVI) called on consultants who revealed two famous worldwide but radically different concepts (not mentioned here are few others’ concepts like House with seven apartments (Lutzky, 1990) or Red Octopus (Van Der Meer, 1998). Commissioned by the French Interministerial Delegation for Regional Planning and Regional Attractiveness (DATAR), the research of Roget Brunet was mainly concentrated on France itself rather than on Europe.
due to concerns over the strengthening of Germany after unification and fall of the Iron Curtain. Analyzing towns and cities with 200K inhabitants within that time boundaries of European Community with Switzerland and Austria the study identifies the core socio-economic area, stretching from London to North Italy, which was named *Dorsale européenne (European backbone)*, and almost didn’t include French territory at all.

Klaus Kunzmann and Michael Wegener opposed their concept of European Bunch of Grapes to Blue Banana, based on German predilections for polycentric development in Europe, been always criticizing Brunet that his conception generates too many disparities between the Centre and peripheries (outside the Core). In fact, they also predicted the spatial polarization (North-South, East-West and Center-Periphery) along with functional on (Kunzmann & Wegener, 1991). Two decades later, German researcher Michael Loriaux, found another way to describe major European axis as Rhineland Frontier, surrounded by the territories of Belgium, Luxembourg and parts of the Netherlands, France, Switzerland and Germany - largely, but not entirely the same as Blue Banana (Loriaux, 2008).

“Brunet portrayed the Dorsale as a polycentric urban network with features similar to those which Kunzmann and Wegener ascribe to their Bunch of Grapes. So the implications of the two concepts for European development are the same: Much like the Bunch of Grapes, the Dorsale celebrates, if not urban networks as such, then the particular network in the Rhineland for forming the basis for its prosperity” (Faludi, 2015).

*Figure 15. Dorsale européenne (Blue Banana) and European Bunch of Grapes*

Brunet found that Paris with almost all French territory was excluded Blue Banana or Europe’s economic core and discontinuous urbanized corridor. The problem of Paris dominance and its developing mainly at the expense of the rest of the country is well known at least since the beginning of the XX century. But Jean-François Gravier brightly formulated it in 1947 as “*Paris et le desert français*” or Paris and the French Desert (Gravier, 1947). But the reasons for that
not only lay in French traditional political centralization. “Dorsale européenne showed that Paris was in danger of becoming marginalized. The reason is that for strategic reasons Paris has for long time in history preferred to be protected eastwards and northwards by less developed areas in the Champagne and Picardie, areas that still show low population densities” (Faludi, 2015).

To tackle the issue a bit later, the foundation for the European Spatial Development Perspective (ESDP)\(^\text{18}\), also established by France and with main idea of further polycentric development modified Blue Banana into Pentagon and positioned it as a global economic integration zone - in effect, a megaregion (Commission of the European Communities (CEC), 1999), but already with Paris. Since then, the European Pentagon is alive, migrating from one European study to another, revealing the strength of geopolitical will and power of political drivers in megaregional conceptualization.

On the picture below there are metropolitan areas in Europe defined according to accessibility model (car travel-time isochrones of 60 minutes are drawn around the cores of important locations), conducted by Federal Institute for Research on Building, Urban Affairs and Spatial Development. The 184 most important metropolises close together are merged into a polycentric territorial unit so that the number of metropolitan areas is reduced to 125. “All in all, the most significant metropolitan areas are concentrated in the European core area, Central Europe or Pentagon, formed by London, Hamburg, Munich, Milan and Paris” (BBSR, 2011).

**Figure 16. Concentration of metropolitan areas inevitable forms a pivotal megaregion at the heart of Europe (Pentagon)**

![Concentration of metropolitan areas inevitable forms a pivotal megaregion at the heart of Europe (Pentagon)](http://ec.europa.eu/regional_policy/sources/docoffic/official/reports/pdf/sum_en.pdf)
To some extent the European Pentagon, coalescing the polycentric bunch of urban cores along the “Blue Banana” economic axis, plays a role of megaregion with its common labor market (at least at its Benelux’ heart with border regions of Germany and France) and union multimodal transport infrastructure along the Rhine with its own Rotterdam Megaport. Very few people use megaregion term to define the level of achieved integration in the European economic core. In fact, the territories along the Rhine-Alpine Transport Corridor (the same “Blue Banana” axis) comprises of more than 70 million people\textsuperscript{19} or 13% of overall EU population\textsuperscript{20} (2017) and produces EUR 2.7 trillion or 19% of EU's total GDP (2010)\textsuperscript{21}.

2. The role of transport/infrastructure

**Political Framework**

The Innovation and Networks Executive Agency (INEA), a successor of the Trans-European Transport Network Executive Agency (TEN-T EA), created by the European Commission for managing TEN-T program 2007-2013, now implements several EU programs. These include Connecting Europe Facility (CEF); aspects of Horizon 2020, a Smart, green and integrated transportation plus secure, clean and efficient energy; and legacy programs (TEN-T and Marco Polo 2007-2013). Such high level of cooperation is rooted in the first “Community Guidelines” for trans-European network was adopted by the European Parliament and the Council in 1996\textsuperscript{22}.

Currently, the CEF is a key EU funding instrument to realize European transport infrastructure policy through facilitating of development three major infrastructure sectors: CEF Transport; CEF Energy; CEF Telecom. One of the main goals for CEF Transport\textsuperscript{23} is to complete the Core Network, comprise of nine multimodal Core Network Corridors by 2030 through eliminating cross-border bottlenecks and developing missing links in various sections of the of the Core Network. The total budget of CEF Transport for the period 2014-2020 is Euro 24.05 bln. Grants for this sum is an INEA’s responsibility, and two others CEF divisions are less significant in terms of financing (Euro 4.7 bln is allocated for Energy and Euro 0.3 bln for Telecom).

INEA is also responsible for funding and management of two particular programs (Smart green & integrated transport; Secure, clean and efficient energy) with Euro 5.3 bln budget for 2014-2020. Both streams are part of broader scale Horizon 2020\textsuperscript{24}, the EU’s main program for the research area, aimed at securing Europe's global competitiveness. Two others, currently legacy programs from previous development stage (2007-2013), are still under INEA management are: TEN-T (Transport infrastructure) and Marco Polo (Freight performance). The Trans-European Transport Network (TEN-T)\textsuperscript{25} was a European Commission policy for development of cohesion Europe-wide network of roads, railway lines, inland waterways, maritime shipping routes,

\textsuperscript{19} https://ec.europa.eu/transport/themes/infrastructure/rhine-alpine_en
\textsuperscript{20} https://ec.europa.eu/transport/sites/transport/files/delivering_ten_t.pdf
\textsuperscript{21} https://ec.europa.eu/transport/sites/transport/files/2nd_workplan_ra.pdf
\textsuperscript{22} https://ec.europa.eu/transport/themes/infrastructure/ten-t-policy_en
\textsuperscript{23} https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport
\textsuperscript{24} https://ec.europa.eu/inea/en/horizon-2020
\textsuperscript{25} https://ec.europa.eu/transport/themes/infrastructure/about-ten-t_en
ports, airports and rail-road terminals. Its main pillar was a development of the Core Network of EU Member States determined according to the program by nine Core Network Corridors; TEN-T had an 8 bln Euro overall budget. The Marco Polo program\textsuperscript{26} was created to spur shifting freight from road to rail or short-sea shipping routes and inland waterways and had Euro 0.45 bln budget in grants for financing such kind of projects.

\textit{Rhine-Alpine Corridor}

We are especially interested in one of the CEF "Core network corridors" - Rhine-Alpine Corridor\textsuperscript{27}. The multimodal corridor runs through the so-called “Blue Banana”, which comprises of major EU economic centers (Brussels & Antwerp in Belgium), the Randstad in the Netherlands (along with European Megaport in Rotterdam), the German Rhine-Ruhr and Rhine-Neckar regions (key inland waterway and ports like Zeebrugge & Duisburg), the Basel and Zürich regions in Switzerland (through flagship Gotthard Base tunnel) through North Italy with Milano & Genoa port. Rhine-Alpine Corridor is the busiest freight corridor of EU where more than 1 bln tonnes of goods are transported annually and includes 8 seaports and 22 inland ports, 13 airports, 72 core intermodal terminals and 13 core urban nodes.

\textbf{Figure 17. Rhine-Alpine Corridor is one of the busiest freight routes in Europe}

![Rhine-Alpine Corridor map](image)

Source: CEF Core Network Corridors

Rail is the backbone of the Corridor, holding 3,000 km while road accounts for 1,500 km and Inland Waterways (IWW) has remain 1,700 km. According to Second Work Plan of the European Coordinator in Rhine Alpine (Wojciechowski, 2016), cross-border rail traffic occupied 12%, road 34%, and inland waterways 54%. If we step down one level, the Corridor shows the strong links between Germany, the Netherlands and Belgium, overall comprises of 83% of the total international freight activity (at least half of that is between Germany and the Netherlands). For

\textsuperscript{26} http://ec.europa.eu/transport/marcopolo/

\textsuperscript{27} https://ec.europa.eu/transport/themes/infrastructure/rhine-alpine_en
passenger demand, the research estimated three main pairs: Belgium - the Netherlands (25% of all traffic); Germany – Switzerland (23%) and Germany - the Netherlands (19%). Overall it holds 87% of the total passenger trips along the Rhine-Alpine Corridor. As for rail it represents almost 9% of the total international traffic flows (main routes lay between Italy & Germany with Switzerland).

Being the core transport axis of “Blue Banana”, Rhine-Alpine Corridor has undergone massive capacity bottlenecks, especially around agglomerations, for both rail and road. To overcome it 318 infrastructure projects were identified by 2030 with overall investment requires Euro 97.3 bln. Among those projects 110 concern rail, 41 projects concern inland waterways and 37 projects are in Switzerland. Additionally, the follow issues are critical: eliminating rail capacity bottlenecks & road congestion, deployment of The European Railway Traffic Management System (ERTMS), efficient navigability on the Rhine River, vast maintenance issues of existing infrastructure²⁸.

Figure 18. Rhine-Alpine Corridor is a core transport axis of “Blue Banana”

HSR as part of TEN-T program and EU Cohesion Policy

Despite the fact that Europe was always one of the most advanced adopters of High-Speed Rail, it still requires further improvement, lying in coalesced cross-border routes since now unrelated national schedules resulted in massive delays. “In China, the distance between Rotterdam and Genoa is covered, according to schedule, in about three hours” (EGTC, 2017). CODE24 (Corridor 24 Development Rotterdam-Genoa) – was a strategic trans-national initiative in the framework

of the previous INTERREG IVB NWE Program of the EU. The project “Increasing Network Accessibility by Including High Speed Rail” was run within 2010-2014 by 18 members, including regional and local authorities from Netherlands, Germany, France, Switzerland and Italy. The main idea was to Blue Banana) as a part of TEN-T, mentioned above. “The EU’s key political agenda is to strengthen economic, social and territorial cohesion towards the creation of a European single market. To ensure seamless connectivity for the regions HS and LD rail need to be integrated with regional services” (Simon et al., 2015).

Figure 19. Current HSR network in Europe, divided by national rails with Rhine-Alpine Corridor

Based on the result and achieved level of cooperation the European Grouping of Territorial Cooperation “Interregional Alliance for the Rhine-Alpine Corridor EGTC” was established in 2015. Later HSR was supplemented by freight, intermodal/heavy trucks and urban infrastructure to better link into the corridor within current CEF program – the Core Network Corridors.

Transport development at Pan-European level is one of central pillow of Cohesion Policy, although it requires huge investments. In case of The Trans-European Transport Network (TEN-T) only for 2014-2020 program period, it allocates EUR 500 bln. The future economic effect of holistic integrated updated network will probably outnumber it, especially in particular areas like Multimodal Rhine-Alpine Corridor. Existing within 9 of the European Core network corridors it is not only the main freight axis of “Blue Banana” and whole Europe but also connects its different polycentric cores into one coalesced megaregion. More than 70 mln people (13% of EU) live along its route and it generates EUR 2,700 bln (19% of EU’s total

29 http://4b.nweurope.eu/index.php
GDP). Stretching from North Sea to Italy through Swiss mountain passes along the Rhine basin, passing through. Freight flows predominantly concentrate at the North-Western end of the corridor, between Germany, the Netherlands and Belgium, while in case of passenger flows the same three leaders complemented by Switzerland (upcoming development of union integrated long distance HSR seamless network will change it dramatically).

3. Socio-economic drivers

European Cohesion Policy, firstly defined as economic and social in the 1986 Single European Act (SEA)\(^ {30}\) as “reducing disparities between the various regions and the backwardness of the least-favored regions”, and supplemented by territorial cohesion after Lisbon Treaty 2009\(^ {31}\), lies on different financial instruments. European Regional Development Fund (ERDF) exists since even 1975 and provides funding for all EU regions (EU is currently divided into 274 NUTS2\(^ {32}\) level regions with 0.8-3 mln inhabitants), categorized into three groups: less developed (GDP per capita <75% of median EU level), transition (75-90%) and more developed regions (>90 %). It manages so that less developed regions receive the highest percentage of funding (main accents are R&D, ICT, SME and low-carbon economy).

The Cohesion Fund (CF) has worked since 1994, aiming to support environmental & transport infrastructure projects in less developed EU Member States. European Social Fund (ESF) invests in people with a focus on improving employment and educational opportunities. Together with the European Agricultural Fund for Rural Development (EAFRD) and the European Maritime and Fisheries Fund (EMFF), they make up the European Structural and Investment (ESI) Funds. For current period of seven years (2014-2020) ESI Funds have overall amounts of EUR 351.8 bln or almost a third of the total EU budget for this period.

Despite the European Cohesion Policy and massive funding of less developed regions, the economically active population keeps moving to Dorsale européenne (European backbone). Look at the map of the 7th Cohesion Report (EC, 2017), mobility on regional population are spurring by big differences in unemployment and income. The flows of people, seeking better jobs and escaping unemployment with poverty, predominantly are from the EU13 to the EU15 (although we have to bear in mind the flow of northern European rural retirees to Mediterranean coast). Overall, seven EU-28 states have produced more than one million or more emigrants to other EU-28 states (DG IPOL, 2016) with largest migration from Romania (2.8 mln people) and Poland (2.6 mln). Meanwhile the major recipients were Germany (3.7 mln people from other EU-28 states) and UK (2.7 mln).

Table 5. EU host states with immigrant populations exceeding one million


\(^{32}\) http://ec.europa.eu/eurostat/web/nuts/background
The EU Cohesion Policy has been existed since late 1980s, from the early beginning of formal integration process and yet was not able to overcome the gap in GDP between economic developed and developing regions. The researches warned that time – the polarization between North & South and West & East will remain, the population will be concentrating in richest core urban regions while poorest regions will not be able to get out the trap. “Today the ratio between the GDP of the richest and poorest region in the Community is more than 5:1, about three times as high as in the United States. It is apparent that the major winners were large urban regions such as Brussels, Frankfurt and Munich, whereas with few exceptions the poorest regions (with the poorest cities) continued to become relatively poorer. These numbers refer to a period before the Single European Market and Maastricht. It is reasonable to expect that polarization in the urban system will accelerate during the rest of the century, following three dimensions: Core v. Periphery; North v. South; West v. East” (Wegener & Kunzmann, 1996).

Table 6. EU-28 emigrants numbering at least one million in other EU-28 states

<table>
<thead>
<tr>
<th>Host state</th>
<th>Germany</th>
<th>UK</th>
<th>France</th>
<th>Spain</th>
<th>Italy</th>
</tr>
</thead>
<tbody>
<tr>
<td>World total</td>
<td>9.8M</td>
<td>7.8M</td>
<td>7.4M</td>
<td>6.5M</td>
<td>5.7M</td>
</tr>
<tr>
<td>EU-27 total</td>
<td>3.7M</td>
<td>2.7M</td>
<td>2.2M</td>
<td>2.3M</td>
<td>1.9M</td>
</tr>
</tbody>
</table>

| Immigrant populations by origin: |
| 1M+ | PL |
| 300K+ | PT, RO |
| 200K+ | IT, RO, IE, DE, IT, UK |
| 150K+ | FR, BE, BG, FR, PT |
| 100K+ | FR, CZ, PO, HU, FR, IT, LT, RO, NL, PL, PT |
| 50K+ | ES, EU, SL, UK, SE, RO, IT, PL, NL, UK, BG, BE |

Source: DG IPOL, based on United Nations (2013)

Figure 20. Total Population change in NUTS 3 regions, 2005-2015
From the beginning of EC, disparities have only widened because of two waves of EU’ enlargements to the East. The map below shows the Gross domestic product (GDP) per inhabitant in purchasing power standards (PPS) in relation to the EU-28 average, by NUTS 2 regions, 2015 (% of the EU-28 average, EU-28 = 100). “Comparison between the NUTS level 2 regions recording the highest and lowest levels of economic activity reveals the wide disparities in wealth creation between regions. Average GDP per capita in Inner London - West (580 % of the EU-28 average) was 20 times as high — having taken account of differences in price levels — as in Severozapaden (Bulgaria) where the lowest level of GDP per capita was recorded (29 % of the EU-28 average)” (EC, 2017).

Figure 21. GDP PPS in 2015 (% of the EU-28 average, EU-28 = 100)
In 2007, the European Commission issued very interesting research called “Scenarios on the territorial future of Europe” (ESPON, 2007) where evaluated three different territorial and socio-economical ways of future development of EU until 2030. “Trend scenario” without major changes in policies (neutrally the impacts of trends and of unchanged policies) was recognized as unable to cope with upcoming challenges, requiring intensive development of all types of infrastructures, elimination fragmentation of the European economy along with more homogeneous integration policies.

According to this scenario, the Pentagon area would increase in different dimensions but remain Central economic core of the Union. All metropolitan areas within new enlarged polycentric Pentagon will be connected by HSR, spurring cohesion economic growth, R&D activity and common competitiveness. Hence the EU global cities like Paris and London will be able to modernized their economic and technological base for successful competition with its global rivals in the US and Asia.

Two others scenarios were quite opposite. The competition-oriented scenario suggested that economic activity will largely concentrate in EU global cities to better compete at world scale. It is likely to generate stronger economic growth and higher competitiveness but it will happen at the expense of less developed and less competitive regions and result in uneven economic growth, territorial imbalances and social segregation. Hence even current Pentagon areas will be shrunk while some remain extension corridors. The opposite cohesion-oriented scenario suggested concentrating not on global competitiveness but on a more homogeneous, equal and justice society based on territorial cohesion and balance, demographic revival, socio-cultural
integration and better balance between life in more and less developed regions. EU economic and technological performance will probably be lower but Pentagon will extent significantly in all directions, plus several new areas of economic integration will be able to rich a critical mass and play significant role on Pentagon’ periphery.

**Figure 22. The opposite cohesion-oriented (to the left) and the competitiveness-oriented scenarios for EU 2030**

None of all those scenarios were recognized as fitting to upcoming changes but any of them had chance to happen depended on global changes and inner political approach. The general idea of European social model should be realized one way or another through cohesion policy with more balanced development between richest and poorest regions (not necessarily totally equal but at least being adopted to local realities with meeting minimum solid standards). At a global view, European policy should concentrate on those areas, where a common transnational approach provides significant values like environment issues, migration (internal and external), energy and transport infrastructure to overcome the current fragmentation of European economy. Nevertheless, the research emphasized the importance of Pentagon with its largest metropolitan areas for any scenario of further EU development, although urge to pay more attention on its periphery and hinterland.

“The main objectives should be to support agglomeration economies within Pentagon to allow them to stay “ahead of the game” in the global race. Smaller city and town regions either have to position themselves in relation to a nearby metropolitan area or to specialize in very specific fields. In Pentagon and other richer areas of Western Europe, these regions are often already part of functioning systems and it is important to ensure that their place in such environments is sustainable over time” (ESPON, 2007).

Despite the massive funding of less developed regions, European Cohesion Policy has not reached its goals so far, the gap and disparities between economic core of the Pentagon and
Periphery only widening. Economically active population keeps moving from the East, seeking the jobs and better life in major urban cores of EU economic axis around “Blue Banana”. Any scenarios of future European territorial development, weather based on cohesion and better balance or competitiveness with higher segregation; imply the highest role of Pentagon as a basement and axis of social and economic development. Although in very optimist scenario it will be supplemented by few others, less meaning, clusters on Periphery too.

4. Political drivers

The history of EU cross-border cooperation: from Euroregions through INTERREG to the EGTC and Macro-Regions

Euroregions were the first form of local enlargement in post-war Europe and can be characterized by more or less institutionalized cross-border collaboration. It has rooted in certain areas, especially along the Germany-Benelux border where the first EUREGIO was founded in 1958. Later in 1971 the Association of European Border Regions (AEBR) was founded by that “old” nine border regions with cross-border entities along the Rhine axis. By the beginning of 2018, there were more than 80 initiatives in Europe that named as Euroregions, Euregios, Euro Districts or have similar names. Typically, Euroregions range from 50 to 100km in width and has a population of around 2 mln people.

Their main purpose was solving administrative matters along and cross-border on common local issues like spatial planning, transport and environmental. Recently, it also started to focus on economic policy, the labor market, social & cultural issues, although, as a rule their budget does not exceed 0.1 % of the GDP of the covered territory (Perkmann, 2002).

In the beginning, the problem of local cross-border cooperation was raised primarily by the Council of Europe (CoE) and so-called Madrid Convention 1980, initiated by the CoE, established a legal framework for such multinational agreements. In 1990 the European Commission endorsed the EUREGIO model (broadly promoted by AEBR as a flagship successful project for cross-border collective tasks) de facto as best practice in implementation of INTERREG Community Initiative, launched as part of European regional policy. Since that time INTERREG became the major funding source for most Euroregions initiatives, spurred by so-called “glocalisation” with correspondent re-scaling of urbanization and state territorial power followed transformation of geographical organization of world capitalism itself (Brenner, 1999).

Figure 23. Cross-border co-operation in Europe (Euroregions). Including members of AEBR, non-members, partly membership & planning to join

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33 European Outline Convention on Transfrontier co-operation between Territorial Communities or Authorities https://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/106
European Territorial Cooperation (ETC), better known as INTERREG, launched in 1989 by The European Commission, became an important instrument for across borders cooperation through project funding. It was first time that common organizational, administrative and financial structures covered such large areas of transnational co-operation on spatial development. It had three pillars of cooperation: cross-border (INTERREG A), transnational (INTERREG B) and interregional (INTERREG C). It fostered activities within previous developed Euroregions, for instance, in the Greater Region/GroBregion and the Upper Rhine region/Rhine supérieur-Oberrhein. Later they will be chosen as primary examples of European cross-border polycentric metropolitan regions (CBPMR) within ESPON’ METROBORDER35 project (INTERREG IV C), based on assessment of polycentricity and metropolitan quality, supplemented by functional and institutional integration with governance.

To compare cross-border metropolitan regions on a European level to classical ones, the researchers used category of Functional Urban Areas (FUAs), developed from them polycentric systems of neighboring and surrounding FUAs. The overall map shows the concentration of such CBPMRs along the borders between the Benelux-French-German-Swiss areas. “They are

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localized in the shadow of the most prominent and internationally renowned metropolitan regions such as Randstad, Rhine-Ruhr, Frankfurt-Rhine-Main, Zürich, Milan or Paris (European Pentagon)” (UoL, 2010).

Figure 24. Maps of INTERREG IV cross-border polycentric metropolitan regions

The Greater Region comprises of Luxembourg, Saarland and Rhineland-Palatinate (Germany), the Lorraine region (France), Wallonia and Ostbelgien (Belgium). And it shows a clear functional, demographic, and morphological polycentricity that is the basis for the overall functioning of the region. Cross-border cooperation in the Greater Region dates back to the early 1970s as a response to the crisis of iron & steel industry in the area, well-known as mining triangle36. By now it was already institutionalized by forming regular Summit of the Executives of the Greater Region and several others institutions.

The Upper Rhine region, comprises of Grand Est Region (France), Länder of Baden-Württemberg, Rheinland-Pfalz (Germany) and Cantons of Basel-Stadt, Basel-Landschaft, Solothurn, Jura, Aargau (Switzerland), being stretched along the valley, also shows a high level of cross border polycentricity. In order to facilitate any form of cross-border cooperation the involved actors decided to establish “Tri-national Metropolitan Region of the Upper Rhine”37 in 2010 as a framework for enhanced cooperation. Later it appeared in INTERREG V-A as the Rhine supérieur-Oberrhein cross-border program.

Current INTERREG V has overall EUR 10.1 bln budget or 2.8% of the total of the European Cohesion Policy budget for 2014-2020 period38. It has 60 cross-border programs, 15 transnational programs and 4 Interregional ones39. Several cross-border programs of INTERREG

39 https://interreg.eu/about-interreg/
V-A overlap the European Pentagon too, funding projects facilitating common cross-border labor market, transport/mobility, services and facilities, environmental, tourism, SME, heritage, etc. They include the Greater Region/GroBregion\textsuperscript{40} (mentioned above); France-Wallonie-Vlaanderen\textsuperscript{41} between four border regions of France and Belgium; France-Switzerland\textsuperscript{42} (cooperation on territory divided between two countries); Italy-Switzerland Co-operation Programme\textsuperscript{43}; the oldest programm Rhine supérieur-Oberrhein\textsuperscript{44} (mentioned above); Vlaanderen-Nederland\textsuperscript{45} (cooperation between southern provinces of Netherlands and Flander region in Belgium); Deutschland-Nederland\textsuperscript{46}; Meuse-Rhine Euroregion\textsuperscript{47} (firstly established in 1976 it covers 7 regions of Belgium, Germany, Dutch and the Netherlands); France (Channel) England\textsuperscript{48} (cross-border program between the north of France and the south of England) and several others.

Figure 25. Maps of several INTERREG V-A cross-border programs, completely overlapping the Blue Banana

\begin{figure}
\centering
\includegraphics[width=\textwidth]{maps.png}
\caption{Maps of several INTERREG V-A cross-border programs, completely overlapping the Blue Banana}
\end{figure}

\textit{Source: interreg.eu/}

\begin{enumerate}
\item \url{https://interreg.eu/programme/interreg-grande-region-grosregion/}
\item \url{https://interreg.eu/programme/interreg-france-belgium/}
\item \url{https://www.interreg-francesuisse.eu/}
\item \url{https://interreg.eu/programme/interreg-italy-switzerland/}
\item \url{http://www.interreg-rhin-sup.eu/}
\item \url{https://interreg.eu/programme/belgium-the-netherlands/}
\item \url{https://www.deutschland-nederland.eu/home/}
\item \url{https://www.interregemr.eu/}
\item \url{https://interreg5a-fce.eu/}
\end{enumerate}
The largest territory is covered by North-West Europe Program, firstly appeared in (INTERREG II-C 1994-1999) as North Western Metropolitan Area or NWMA. It was created to promote cooperation in spatial planning and development of a long-term spatial vision between Belgium, France, Germany, Ireland, Luxembourg, the Netherlands and the United Kingdom. The outcome was “A Spatial Vision for North-West Europe: Building co-operation” (UoWE, 2000) which outlined the comprehensive territorial strategy for the whole North-West Europe to serve as reference modal for upcoming European Spatial Development Perspective (ESDP).

At that glory time euro-optimists were full of hopes that such form of cooperation and common approach to spatial planning at pan-European level would work in some form or another. “The NWMA program seemed to be operating at the cutting edge of European spatial planning. Major players in the ESDP process were involved. The NWMA was a model for others which itself was a demonstration of the community method of allowing experimentation, picking out the arrangements that succeed, and formalizing them at the first opportunity. So, going by its application in the NWMA, and considering the short history of European spatial planning, it would be wrong to dismiss the ESDP as a paper tiger” (Faludi, 2001).

“Since the mid-1980s, a gradual Europeanisation of domestic policies has taken place, allowing the European Commission more direct access to sub-regional levels and, by the same token, allowing sub-national actors a greater say in European policy implementation. Partnership implies a challenge to the authority and sovereignty of the nation-state by establishing direct links between sub-national and supranational levels in the definition of interests, strategies and objectives” (Scott, 2002).

Current NWE within INTERREG V-B 2014-2020 occupies the significant part of Central Capitals Region or European Pentagon with a triangle between Paris, Brussels and London with the territory of 845,000 km² and 180 mln people (33% of overall EU population). NWE approaches three spheres: innovation; low carbon emissions from economic and transportation activity, and efficient use of resource and materials. Ambition defined by the Member States for the NWE is clear and quite competitive for the flagship European Pentagon: “To be a key economic player in the world and create an attractive place to work and live, with high levels of innovation, sustainability and cohesion”.

Figure 26. The map of current North-West Europe Program of INTERREG V-B

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51 http://www.nweurope.eu/about-the-programme/the-nwe-area/
The next step of empowering of cross-border entities and fostering territorial, social and economic cohesion at local level was caused by EGTC and the Committee of the Regions (CoR). The Committee was established by Maastricht Treaty 1992\(^{52}\) as a mandatory consultative assembly for the European Commission and the Council of the European Union in case of any regional issue. The CoR comprises of six thematic commissions, including COTER, playing crucial role in supranational institutionalization and cross-border cooperation through EGTC. The European Grouping of Territorial Cooperation (EGTC) is a European legal framework and powerful instrument for territorial cooperation throughout the EU, based on functional cross-border interdependencies and the multi-level governance.

It was established by Regulation (EC) No 1082/2006, amended by Regulation (EU) No 1302/2013\(^{53}\) and for the first time entitled not only national but also local and regional public authorities in Member States with the rights to set up joint structures for more efficient cooperation with full legal personality (INTERRACT Handbook, 2008). An EGTC must be formed by entities of at least two Member States (local and regional authorities, other public entities or public-equivalent bodies, associations of public entities and Member States itself). The Secretariat of the Commission for Territorial Cohesion Policy and EU Budget (COTER, one of six Commissions of Committee of the Regions, CoR) is responsible for the official register of the EGTCs and managing the EGTC Platform, bringing together political and technical representatives of all the existing and upcoming EGTCs.


In comparison, the EGTC Euroregion is a quite fuzzy type of cooperation and even in case of institutionalizing doesn’t cope with traditional constraints (legal status remains regulated under national law, thus hindering its cross-border nature). In the case of EGTC, its legal personality was the main novelty since it has its own budget, can employ staff, send and receive calls for tenders; participate in projects relating to territorial cooperation and is responsible for its debts. The regulation also imposes the EGTC to establish its own member’s assembly with a director. Upon establishment, an EGTC’s sub-state authorities de facto institutionalize their cooperation. Taking into account official mission to facilitate cross-border economic, social and territorial cohesion, it opens wide spectrum of possible tasks to be undertaken by an EGTC, although with several exceptions like police, regulations, justice and foreign policy.

Figure 27. Map of EGTCs by the end of 2016

EGTC’s legal framework allows supporting territorial cooperation with or without implementing EU projects and programs. From the beginning, it became the main instrument for supraregional institutionalization of INTERREG programs that existed before. “Until the end of the programming period 2000-2006, very few INTERREG programs were directly managed by a joint integrated management body, e.g. in the form of Euroregion or other cross-border structures with legal personality (6% of all INTERREG IIIA programs). The first EGTC officially registered was the Eurometropole Lille-Kortrijk-Tournai, bringing together 14 partners from French-Belgian border area around Lille (France), Kortrijk (Belgium, Flemish Region) and Tournai (Belgium, Walloon Region). It was created on 28 January 2008” (Evrard, 2016). By July 2018 COTER counted 72 EGTCs.55

55 https://portal.cor.europa.eu/egtc/Pages/welcome.aspx
The last layer of European integration is a **Macro-regional strategy**56 – an integrated framework endorsed by the European Council, which also may be supported by ESI Funds among others, and aims to strengthen cooperation in solving common problems (e.g. pollution, navigability, worldwide business competition, etc.) between Member States and third countries located in the same geographical area. Currently there are four EU macro-regions which comprise of 19 EU member-states and 8 non-EU countries with population over 340 mln people57. Germany and Slovenia are involved simultaneously in three strategies while Croatia, Italy and Austria are in two. The European Commission plays a leading role in the strategic coordination too. Four EU Macro-regions include the EU Strategy for the Baltic Sea Region or EUSBSR (2009)58; the EU Strategy for the Danube Region or EUSDR (2010)59; the EU Strategy for the Adriatic and Ionian Region or EUSAIR (2014)60 and the EU Strategy for the Alpine Region or EUSALP61 launched in 2015.

"**Globalisation has made countries more interdependent and problems must now be addressed across borders. This calls for a reflection on how macro-regions, as new functional areas, can contribute to improving the implementation of EU policies and programmes and to the**

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61 [https://www.alpine-region.eu/](https://www.alpine-region.eu/)
achievement of territorial cohesion. The macro-regional strategies (MRS) have strengthened cooperation in certain policy areas, e.g. the Navigability Danube master plan, the extension of the Baltic Energy Market Interconnection Plan (BEMIP), the Strategy on Adaptation to Climate Change in the Baltic Sea Region, or the Core Network Corridors and its links with key cross-border infrastructures... Macro-regions can become an important instrument in the pursuit of territorial cohesion across different policy areas, and can also inspire similar approaches as the EU Urban agenda” (EC Report, 2016).

Current Legal framework & Cohesion Policy

Strategic program document “European Spatial Development Perspective” or ESDP, jointly accepted by the European Commission and Member States was the first and significant achievement towards common planning policy across national boundaries for the sake of three main purposes of EU: economic and social cohesion; conservation of natural resources & cultural heritage; more balanced competitiveness of the European territory. And development of polycentric and balanced urban system was the main guideline for that.

“At present, there is only one outstanding larger geographical zone of global economic integration: the core area of the EU, the pentagon defined by the metropolises of London, Paris, Milan, Munich and Hamburg. This zone offers strong global economic functions and services, which enable a high income level and a well-developed infrastructure. In view of the enlargement of the EU, a further concentration of spatial development in just one single globally outstanding, dynamic integration zone would not lead to a reduction of the disparities between the central part and an increasingly large periphery. A new strategy for spatial development is therefore necessary” (CEC, 1999).

The document suggests several policy options for polycentric global EU future like strengthening other larger zones of global economic integration or facilitate cross border cooperation on particular topics. One of such form could be development of Euro corridors, which are able to strengthen not only the spatial cohesion but spur cooperation in different spheres from transport, infrastructure and economic development to urbanization and environment. ESDP suggested ranging policy options across three levels: community, transnational/national and regional/local.

The document, having convinced cooperation at the transnational level, has the paramount importance from the EU’s perspective. ESDP was not a legally binding document encouraging ministers responsible for spatial planning in the Member States to discuss, rather than implement, strategies with formal instruments. Rooted in the ESDP, the first Territorial Agenda of the EU (TAEU2020) was presented by the ministers responsible for spatial planning in 2007. A follow up territorial agenda was agreed on in 2011 acting as a policy guideline to contribute to the Europe 2020 Strategy at the same non-binding principle (Dallhammer at all, 2018).

The two decades after ESDP’s announcement, and first attempts to cooperate in special planning at Pan-European level, even euro-optimists had to confess that any common initiatives failed due to saving the state sovereignty over territories. “A view of macro-space being filled with territories-as-containers, what is described as territorialism, is unfortunately underlying a widespread appreciation of the European construct as a combination of nation-states, each with its own territory. Nation-states are characterized by exercising control of territories, what is called territoriality, but in the EU territoriality becomes the object of negotiation and compromise. As a consequence of such developments, territorial configurations change. Nowhere is this more evident than in the area covered by the Blue Banana” (Faludi, 2015).

Nevertheless, all three strategies now form a European policy framework in territorial planning for the sake of cohesion policy. Economic and social cohesion, defined in the 1986 Single European Act (SEA)64 as “reducing disparities between the various regions and the backwardness of the least-favored regions”. The EU’s most recent Lisbon Treaty 200965 added to this goal a territorial cohesion. Nowadays, overall European policy framework consists of three main pillar (the overall master strategy of the Union): the Europe 2020 strategy, the Territorial Agenda of the European Union 2020 (TA2020; territorial cohesion or integration by sustainable enlargement of markets for workers, consumers, SME, private/public services) and the Common Strategic Framework or CSF66 (coherence between all structural funds); other European programs, policies and strategies and the country specific recommendations.

Next Cohesion Policy for 2021-2027 period will be concentrated on five “policy objectives” (POs): a smarter Europe (innovative & smart industrial transformation); a greener, low carbon Europe; a more connected Europe (mobility & regional ICT connectivity); a more social Europe; Europe closer to citizens (sustainable & integrated development of urban, rural and coastal areas through local initiatives). The ERDF will support all these policy objectives but, due to budget reduction after Brexit and overall uncertainty, the majority of ERDF resources will be concentrated on PO1 & PO2 or smart and green economy (EPRS, 2018)67.

Historically, Euroregions were the first form of local cross-border enlargement in post-war Europe, based on bottom-up functional approach for solving common local issues like spatial planning, transport and environmental. Euroregion model with its best practice later became a basement for INTERREG program, which currently is the major institutionalize framework for funding such cross-border projects, fostering labor market, transport/mobility, services and facilities, environmental, tourism, SME, heritage, etc. Significant part of them, being local, simultaneously encompass and overlapping the whole territory of The European Pentagon, while North-West Europe (NWE program) pretends to even eclipse and replaced it by self.

The European Grouping of Territorial Cooperation (EGTC) at its turn became a legal framework for institutionalization INTERREG programs existed before (and hence Euroregions, which they based on). For the first time it entitled not only national but also local and regional public authorities in Member States with the rights to set up joint structures with full legal personality (own budget, staff, tenders, participate in projects relating to territorial cooperation, response for own debts, own members’ assembly with director, etc.). The last step of European functional integration is a Macro-regional strategy to strengthen cooperation in solving shared problems (pollution, navigability, worldwide business competition, etc.) at more broad territory between Member States and 3d countries the same geographical area. Now EU has four such Macro-regions: Baltic Sea Region, Danube, Adriatic & Ionian, Alpine.

Although such kind of strategic program document as “European Spatial Development Perspective” (ESDP) and followed Territorial Agenda of the EU and Europe 2020 Strategy, being not a legally binding documents has failed to achieve Pan-European level of common territorial planning due to Member State’s reluctance to lose territorial sovereignty, the EU with its functional bottom-up approach has achieved very significant results at local cross-border and supraregional levels. Such kind of local functional cooperation boosted broader integration in social-economic, transport and finally in political sphere (so-called spill-over effect), especially at the most developed part – the European Pentagon which to some extant can play a megaregion role, coalescing polycentric urban cores along the Blue Banana’ axis plus Paris.

C. Greater Pearl River Delta (China)

1. History of appearance and current status

For most of the PRD’s history Guangzhou has been a dominant city, major port, and foreign and regional trading center of Guangdong province and Southern China at all (Bie, Jong and Derudder, 2015). Even the establishment of newer settlements of Macao (occupied by Portugal) and Foshan, near the genesis of capitalism in XVII century, didn’t change Guangzhou’s dominant position. Neither did Hong Kong which emerged around straight territories, and seized by Britain in the middle of XIX century, despite outpacing Macao and Foshan in their economic importance. Hong Kong became a powerful trading outpost for Guangzhou after establishing direct Guangzhou-Kowloon railway.

This integrated economic axis stopped working in 1949, after founding of the People’s Republic of China when all key urban nodes were separated by political boundaries. Nevertheless, Guangzhou as a main economic powerhouse of Southern China with surrounding smaller urban nodes managed to remain its importance even within first several dramatic decades of Communist history, meanwhile Hong Kong became major industrial and international trade city (under British), accompanied by much smaller Macao (under Portugal).

In 1978, the Third Plenary Session of the 11th Central Committee of the Chinese Communist Party under leadership of Deng Xiaoping declared new course, political reforms and start the
process of gradual openness towards world capitalism and Foreign Direct Investments (FDI). Taking into account paramount importance of Guangdong province for economic development, it enjoyed the freedom of being allowed to often move one step ahead of the others (Vogel, 2008) when in March 1979, the central government approved Baoan County near Hong Kong to become Shenzhen City, a special export zone. The same year three more export zones were established along the South-East Coast (Xiamen in Fujian province, Shantou and Zhuhai in Guangdong province), so the GPRD got two special zones: Shenzhen near Hong Kong and Zhuhai near Macao (Loo, 2004). A year later all them were renamed into Special Economic Zones (SEZs), resulting in substantial tax holidays to their companies. Later Guangzhou listed as a coastal open city and in 1985 the Pearl River Delta economic open zone was established, rejoined again all core players and historic urban nodes in a union economic entity.

Two SEZs, established near Hong Kong and Macao, attracted capital from and drove a transfer of manufacturing industry to mainland PRD. In fact, the physical reintegration between Hong Kong and Pearl River Delta started already at the beginning of 1980s, because the city economy, based on light manufacturing that time, mainly textile and electronics (24% of GDP) reached all limits (lack of workers, increasing of wages, rise of rent price and on housing market, physical boundaries, etc.) and was eager to pour into just opened nearest Chinese territory, offering cheap labor, land and incentives in a geographically adjacent location – in special economic zones (SEZ). While higher value added and skill intensive activities remained in Hong Kong like finishing, packaging, distribution, marketing, insurance, finance, shipping and sophisticated manufacturing (Yusuf, 2007).

The city taught low skilled workers and supplied its new hinterland with capital (during the 1980s, 3/4 of FDI in China went from Hong Kong). Such a relief enables Hong Kong to take advantage of the moment, concentrating on services, transportation and finance which later made it one of the world largest financial hubs. Two decades later Hong Kong remained its primary supplier of services to PRD firms, despite the competition from Shenzhen and Shanghai; it was mainly trade, transportation, tourism, finance and business services (Sung, 2006).

In 1997 Hong Kong was returned to China, so as Macao two years later – they both became Special Administrative Regions (SAR) under the sovereignty of the People’s Republic of China, remaining their own British and Portuguese-inspired legal systems for at least next 50 years. Meanwhile, neighbor Shenzhen grew enormously, both in population and in GDP growth, while the Zhuhai near Macao was also undergone to rapid development, although, with weaker pace. Within the last two decades, along with rapid impressive urbanization throughout the whole country, a great number of larger cities and smaller towns appeared around Guangzhou, Foshan, and Shenzhen in PRD, made this global city-region truly polycentric (Bie, Jong and Derudder, 2015). The other socio-cultural aspect and driver of emerging common socio-economic market within PRD is that majority of people in Guangdong province speaks Cantonese (the same dialect used in Hong Kong and Macao) – main source of some kind of socio-cultural and hence economic independence of Southeastern China from the North.
Further business cooperation was one of key drivers for further cooperation between Mainland China and Hong Kong, finally leading to the emergence of Greater Pearl River Delta megaregion: Guangdong (Guangzhou), Shenzhen, Hong Kong, and Macao Bay Area. It got its official name GPRD or simply Greater Bay Area, according to the 13th Five-Year Plan for Economic and Social Development of the People’s Republic of China (The 13th Five-Year Plan of PRC, 2016). It combines GDP of $1.54 trillion in 2017 (11% of national GDP in 2015 or comparable to South Korea), covering the territory 54,744 km², with more than 66 million people (2017) concentrating in three core centers Guangzhou, Shenzhen, and Hong Kong, surrounded by Zhuhai, Huizhou, Dongguan, Qingyuan, Zhaoqing, Foshan, Zhongshan, Jiangmen, and Macao.

2. The role of transport/infrastructure

The transport development in GPRD is an essential part of broader planning divided by three levels: National level (13th Five Year Plan 2016-2020); Provincial level (Guangdong activities); city level plans itself (Hong Kong 2030+ Strategic plan, Shenzhen, Macao, etc.). It is interesting, but in case of GPRD the most important practical role belongs to Guangdong province since it was always quite isolated from the rest of the country which “had loose contact with the ancient cradle of Chinese culture”. It means more prioritized intra-provincial integration and relatively independent transport planning at “local” megaregional level - current Intercity Rail System under construction was originally planned not to be connected to national railway...
network at all (Xu, 2008). Meanwhile at the “global” level, Central Government seeks any chance to better integrate Guangdong province and hence GPRD into national transport system. One of objectives of 13th Five Year Plan 2016-2020 is deeper cooperation between the mainland and Hong Kong, Macao and Taiwan. To do so it is supposed, among others, to complete several HSR lines through/from Guangdong: Harbin-Beijing-Hong Kong (Macao), Guangzhou-Kunming along with speeding-up the construction of Lanzhou (Xining) – Guangzhou HSR long-haul corridor.

As for strategic planning at provincial level, in 2004, Guangdong Province and the National Ministry of Construction introduced the Pearl River Delta Urban Agglomeration Coordinated Development Plan (2004-2020), emphasizing its dual-core, poly-centric (Guangzhou-Shenzhen-Zhuhai), multilevel hierarchical urban structure. Further GPRD regional economic cooperation is planned to occur by establishing three functional horizontal belts (South to North) and five economic vertical agglomeration axes (East to West). In 2008 Guangdong province issued the Reform and development planning outline for the Pearl River Delta region 2008-2020 (NDRC, 2008) or GPRD Coordinated Development Plan, in the early 2009 approved by central government. It covers all Pan-Pearl River Delta Region, taking into account convergence with Hong Kong and Macao in urban planning, rail transit networks, ICT infrastructure, energy and urban water supply.

“Guangdong province took two steps to promote the PRD’s regional integration. First, it divided the PRD into three metropolitan areas with the goal of strengthening their internal integration: the Shenzhen-Dongguan-Huizhou metropolitan area (SDH), the Guangzhou-Foshan-Zhaokong metropolitan area (GFZ) and the Zhuhai-Zhongshan-Jiangmen metropolitan area (ZZJ). Second, it was hoped that these three metropolitan areas would, in turn, gradually co-evolve into an overall integrated PRD” (Bie, Jong and Derudder, 2015).

To accelerate the integration of three metropolitan areas into one coalescent megaregion, supplemented by two Special Administrative Regions it was planned, according to GPRD Coordinated Development Plan to build open, modern and integrated transportation system by 2020. The list with several megaprojects includes the loop expressway of the Pearl River Delta, the Zhongshan-Shenzhen passage across the estuary of the Pearl River, the Hong Kong-Zhuhai-Macao Bridge, the express railway from Guangzhou via Shenzhen to Hong Kong, as well as Intercity rail systems of Guangzhou, Shenzhen, Foshan & Dongguan, better cooperation between airports of Shenzhen and Hong Kong. Overall funding for 80 key construction projects reached $180 billion for the sake of formation a «one hour rail life-cycle network» in the GPRD, boosting the density of the GPRD’s regional connections (Bie, Jong and Derudder, 2015).

Figure 30. The role of Hong Kong-Zhuhai-Macao Bridge for integration of GPRD Megaregion
The Hong Kong-Zhuhai-Macau Bridge (HZMB) is a primary and strategic megaproject with the total length of about 42km and correlated expressway/driveways/boundary crossing facilities and overall construction budget $15.9 billion is expected to open in 2018. The other important supplementary project is Shenzhen-Zhongshan Rail Bridge along the second horizontal axis according to GPRD Coordinated Development Plan – the construction started last year and overall budget is estimated at $6.6 billion.

Connecting Hong Kong to the strategic highways at West Bank of Pearl River Delta is extremely important for Megaregion not only because it finally closes the infrastructure loop but also because Hong Kong was historically always better connected and integrated with East Bank through Shenzhen (Guangzhou-Shenzhen Expressway, Guangzhou-Shenzhen Railway, No.107 and No.205 national roads). It resulted in the predominant concentration of Hong Kong FDI, technological and high-tech transfer as well as overall socio-economic development in the Eastern part of the PRD (Bie, Jong and Derudder, 2015). It reflects in density as well. According to a study of Lincoln Institute (Yang, Song and Lin, 2012), the Greater Pearl River Delta megaregion has the second highest density among 10 largest Chinese mega-regions (691 people per sq km) and simultaneously had very low polycentricity index just because of the concentration of coalescent urban growth and development almost exclusively on one bank of estuary.

*Figure 31. A densification map of GPRD. Eastern part dominates due to proximity of Shenzhen to Hong Kong (2012)*

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Connecting both banks of the PRD with HZMB and rail bridge, while significantly reducing transportation costs and travel duration for travelers and goods to and from Western part of PRD (3-hour commuting radius of Hong Kong), will enhance the attractiveness of the Western bank external investment while Hong Kong will benefit from new economic hinterland\(^{69}\). For instance travel time from Macao and Hong Kong will be 45 min instead of 4 hours\(^ {70}\). The connectivity through HZMB will also benefits other sectors in Hong Kong like tourism, finance and commerce, enhancing position of Hong Kong as a trade and logistics hub for all Western bank of PRD. It will spur the overall development of West bank and link the whole GPRD megaregion into one transport loop.

Two other megaprojects are Guangzhou-Shenzhen-Hong Kong Express Rail Link (XRL) and the Liantang/Heung Yuen Wai Boundary Control Point. Short 26 km underground XRL with overall budget $10.7 billion will connect center of Hong Kong (West Kowloon) with Shenzhen on the other side of board (19 min) where it further continues through Mainland section of XRL to Guangzhou South (142 km, short-haul line, 47 min)\(^ {71}\). Hence from there or from Shenzhen it will connect with 44 destinations throughout the Chine with over 25,000-km National HSR Network (long-haul). The Hong Kong West Kowloon Station is designed to allocate over 109 thousand passengers daily and has its own Customs, Immigration and Quarantine (CIQ) facilities. At the beginning of operations, there will be 114 pairs of short-haul trains daily within rush hours (Futian, Shenzhen North, Guangmingchen, Humen, Qingsheng and Guangzhou South) and 13

\(^{69}\) http://www.hzmb.hk/eng/benefits_economic.html
\(^{70}\) http://www.hzmb.hk/eng/benefits_transportation.html
\(^{71}\) http://www.expressraillink.hk/en/project-details/key-information.html
pairs of direct long-haul trains (three verticals towards Beijing, Hangzhou, Guiyang and one horizontal trunk lines Shanghai-Kunming)\textsuperscript{72}.

**Figure 32. XRL’ short-haul connection of Hong Kong with nearest destination of Guangdong**

Source: MTR Corporation, 2018

XRL will cut the trip from Hong Kong City center to Shenzhen by two thirds to 19 min and to Guangzhou by half to 47 min which definitely results in demolishing properties in Tsim Sha Tsui district near West Kowloon station and spur the cross-board business cooperation between Hong Kong, Shenzhen and Guangzhou. The main idea of acceleration XRL operation and decreasing lead time was to put all custom operations right inside the West Kowloon station. To do this Hong Kong Legislative Council had to pass a special bill to establish significant parts of terminus under the jurisdiction of mainland China (immigration counters on departures level, the platforms and compartments on moving trains). That was a rather complicated and long issue and legal precedent\textsuperscript{73}.

**Figure 33. XRL’ long-haul connection of Hong Kong to Mainland HSR network**

\textsuperscript{72}https://www.legco.gov.hk/yr17-18/english/panels/tp/papers/tpcb4-1500-1-e.pdf

Another strategic project of Guangdong Province to coalesce the three metropolitan areas into union Megaregion is intercity railway (ICR) network which was positioned from the beginning as a key policy instrument to enhance regional cooperation and to promote investment-induced growth (Xu, 2008). Despite several challenges in funding, planning and intercity relations it keeps the construction on to connect major cities in the delta. Initially after two years of quite difficult negotiations and planning, joint venture for developing ICR PRD was established in 2005 between Guangdong province and Ministry of Railways (MOR) for financing and its integration into national HSR network. A few years later, Guangdong, being dissatisfied by pace of MOR’s construction, decided to leave JV and continued the ICR project on its own. It faced significant difficulties due to lack of finances and experience in rail construction. Finally, it signed with MOR another agreement for further development.

Due to the different interests of the major actors, the bargaining process was very complicated. The MOR cared about economic efficiency, trying to minimize the costs through building elevated lines and placing station at the city centers to maximize the profits by collecting as many passengers as possible. Cities had opposite interests since they wouldn’t develop for better intracity accessibility while opposed to elevated lines due to evident destructive effect on the city cohesion. On its turn, Guangdong province was interested in spurring socio-economic development of Guangzhou as a regional capital, making it the central transport hub and better connecting it with the rest of the country through maximizing time schedule. The final result for each particular urban node was different, depended on bargaining outcome between MOR, Provincial government and neighboring cities. The Pearl River Delta Rapid Transit system increased from 600 to 1478 km for 16 lines, project speed at 140–200 km/h and
budget of $54 billion. The overall length of Pearl River Delta Rapid Transit system increased from 600 to 1478 km for 16 lines, project speed at 140–200 km/h and budget of $54 billion.

Figure 34. The overall map of future Intercity Rail (ICR) network in GPRD

So far only three lines have been constructed: Guangzhou–Zhuhai; Dongguan–Huizhou; Guangzhou–Foshan–Zhaoqing. Another separate line, intercity express railways Guangzhou–Shenzhen–Hong Kong, was launched in 2011 which raised questions of redundant transport supply and project competition. It is common situation for all transport corridors in the GPRD but was simply exaggerated for the most developed one Guangzhou – Shenzhen. Here there are at least four different rail modes: ordinary railway, GZ–SZ–HK high-speed rail, planning intercity rail and upcoming metro lines extension which merge the public transport systems of two major urban cores. “Between Guangzhou and Shenzhen, there are at least four different modes of. There are also several planned. The main problem is the possible competition between subway and intercity rail system, which are in the same corridor occasionally, yet not compatible with each other and have different design specifications” (Chen, 2018).

All aforementioned megaprojects play key roles also in “local” Hong Kong 2030+ Strategic plan (“Hong Kong 2030+: Towards a Planning Vision and Strategy Transcending 2030”)74. Taking into account the size, importance and economic power of every urban nodes in GPRD the most important should be mentioned: Overall Transportation Planning of Shenzhen (May 2008), Master Plan of Zhuhai (2001-2020), Master Plan of Zhongshan (2004-2020), the Optimization Scheme of the Rail Transit System in Macao and several others75.

Transport development plays a paramount role in connecting both banks of Pearl River Delta megaregion and fostering development of union coalescent socio-economic market and

74 https://www.hk2030plus.hk/about_a.htm
urban landscape. Recent transport planning at local city level in GPRD thanks to coordination of Guangdong province and Central government affords started to resemble a kind of coordination but yet there is a lot of work ahead to overcome the legacy of city competition period of 1990s and find a way to use repeatedly duplicated infrastructure. Meanwhile Central Government supports the efforts of better connection HK and Macao with Mainland China through megaprojects like HZMB, Rail Bridge through estuary and connection of HK with national HSR system. The main goal of Guangdong province is construction a solid transportation loop around delta, facilitating overall connectivity, spurring economic growth on historically less developed Western bank and make the GPRD megaregion working as union socio-economic market.

3. Socio-economic drivers

Despite the fact that the Great Pearl River Delta is only one of three key national megaregions and urban nodes (the other ones are Capital Economic Zone around Beijing and Yangtze River Delta around Shanghai), it plays exceptional role in export, being the national largest export base (26% of China’s trade while Shenzhen and Hong Kong are the 3rd and the 5th busiest harbors in the world), in finance (Shenzhen Stock Exchange ranks 5th in the world while in case of combining with HKSE – the 3rd place76), in R&D and Advanced Manufacturing, having Shenzhen as a “Chinese Silicon Valley”. Traditional historical linkages, linguistic and cultural unity around Delta, along with deepening of economic integration since 1980s between Hong Kong under the UK’ governance with special economic zones on the banks of Mainland China’s Pearl River made this place the first opening gate of Communist China towards the Capitalist world and the earliest adopter not only FDI but also middle tech industries, which defined the development of GPRD as a world factory for the next three decades and its leading role in socio-economic development among others Chinese provinces. Even now industrial sector holds 43% of regional GDP (2014, up from 36% in 1980), although service sector doubled (from 25.7 to current 49%).

Figure 35. Traditional Industries of GPRD back to 2000s

Guangzhou and Shenzhen experienced huge growth in GDP (more than 750%) since opening to Western markets in the 1980s. A major task for Guangdong province’s Government is to substitute declining low skilled manufacturing which moving further inland into Mainland China with high-tech industrial development and converting former industrial territories into world-class logistics parks and infrastructure. It is inevitably taking into account a slowdown of the global economy and demand for traditional low-skilled manufacturing exports. Additionally, a cooling-down of the Chinese economy to a “new normal”, based “not on speculative investment and low value added manufacturing but on organic growing domestic consumer demand and more innovative, higher value added manufacturing” (Arcadis report, 2014). A cooling-down of the Chinese economy to a “new normal”, based “not on speculative investment and low value added manufacturing but on organic growing domestic consumer demand and more innovative, higher value added manufacturing” (Arcadis report, 2014).

In some areas such high-tech conversion has already taken place within GPRD. It was one of the key points for establishing aforementioned Guangdong Pilot Free Trade Zone (GDFTZ) with deep specialization in advanced manufacturing (automobile, shipping and marine engineering, high-end equipment and information technology industries) and professional services (R&D, financial services, modern logistics, exhibitions, etc.). The main purpose of the three pilot zones (Nansha Area near Guangzhou, Qianhai & Shekou Area near Shenzhen and Hengqin Area near

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Zhuhai) was to strengthen further economic integration between Guangdong, Hong Kong and Macao to the crucial hub of maritime Silk Road as well as to establish next round of economic reforms nationwide\(^\text{78}\). The economic transformation of GPRD could be also seen through steady growth of logistics stock (41.78% over the three years before 2014) as well as strong demand for office space particularly in Shenzhen and Guangzhou since a half of regional GDP already based on tertiary sector. According to HSBC forecasts, Shenzhen with Hong Kong will become the world largest banking cluster by 2025, spurring the further demand for office space (HSBC, 2016).

**Figure 36. Current and future Advanced Manufacturing specialization of GPRD**

<table>
<thead>
<tr>
<th>City</th>
<th>Develop new industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guangzhou</td>
<td>Intelligent Equipment &amp; Industrial robots</td>
</tr>
<tr>
<td>Shenzhen</td>
<td>Intelligent robotics &amp; wearables</td>
</tr>
<tr>
<td>Dongguan</td>
<td>Motion control systems, Specialised 3C industries</td>
</tr>
<tr>
<td></td>
<td>robots</td>
</tr>
<tr>
<td>Foshan</td>
<td>Numerical control systems, Additive manufacturing</td>
</tr>
<tr>
<td>Zhuhai</td>
<td>Smart grid systems, Unmanned ships, Port systems, Medical devices</td>
</tr>
<tr>
<td>Jiangmen</td>
<td>Railway equipment, Special-purpose ships, Nuclear equipment</td>
</tr>
<tr>
<td>Zhongshan</td>
<td>Solar, wind power &amp; satellite equipment</td>
</tr>
<tr>
<td>Zhaoqing</td>
<td>Instrument &amp;meters, New sensors, Industrial robots</td>
</tr>
</tbody>
</table>

*Source: HSBC, 2016*

The central government supports further transferring commoditize industries, financial and professional services from Hong Kong, Macao, Shenzhen and Guangzhou through the less developed areas of GPRD, simultaneously encouraging and letting them to move up the value chain. The process reminds the first wave of economic integration of Hong-Kong with special economic zones in 1980s when it revived from traditional industries (textile, electronics, etc.) and concentrated on professional services. Nowadays, the first line of that adopters is ready to substitute Hong Kong in remain high-tech, R&D and professional services, take this role and transfer own operations, which already had become middle- and low-end for them, further. It is already happening, Shenzhen, already outpaced Hong Kong in GDP, becoming China’s Silicon

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Valley – 5 out of 6 Chinese enterprises in the list of Top-50 global corporate patent activity based there (Tencent, Huawei, ZTE, DJI, etc.). Next year, probably Guangzhou will outpace Hong Kong too.

**Figure 37. Shenzhen already outpaced Hong Kong in GDP**

Meanwhile Hong Kong remains its leading role in GPRD economy, holding roughly half of overall megaregional trade, although its share steady decreasing due to enforcing economic activities by Central government in mainland China’s part of megaregion and active development of tertiary service sector thereafter 2005 for the expense of decreasing traditional industrial one. And the new niche for Hong Kong, according to the plans of Central government is more influenced and strength global offshore RMB business hub and international asset management center, which must felicitate its finance, trade, logistics, and professional services move toward the high-end and high value-added level.

**Figure 38. Uneven economic development of largest urban cores of GPRD in 2014**

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79 https://www.ft.com/content/fe5976d8-ab81-11e8-94bd-cba20d67390c
Broader cooperation at GPRD scale is quite important since the key challenge for the Megaregion is bringing all previously underdeveloped areas in line with the standards of its leading cities. For instance, both Zhuhai and Shenzhen were amongst the first Special Economic Zones in 1980 but by the 2013 Shenzhen, because of proximity to Hong Kong, had skyrocketed to $395 billion GDP, while Zhuhai near relatively small and isolated Macao – only $45.6 billion (Arcadis report, 2014). Hence the West Bank of the GPRD, with historically poor transportation options, will definitely benefit from improved connectivity (Hong Kong-Zhuhai-Macao Expressway Bridge and upcoming Shenzhen-Zhongshan railway bridge), and can expect to see a boom in industrial and commercial investment. The overall goal of Guangdong province is to double GDP per capita by 2030 from $15,000 to 36,000 (almost to the same level as GDP per capita in Hong Kong in 2013 with $38,000).

Concerning social alignment within whole Megaregion, Guangdong province government had progressive plans to integrate household registration system (Hukou) across the PRD (it was declared in 2013, but there is no evidence so far). It is a very broad step since Hukou allows an excess to social services, including education, healthcare and pensions only in an individual’s city of origin and birth. The province wants to break this governance tradition and make the social service equally open anywhere within the whole Megaregion (with exception of Hong Kong and Macao as SARs80), including the excess for migrants who previously were excluded. It has to spur development of social sphere and facilitate the quality growth among cities of GPRD. According to state news agency Xinhua, Government of Guangzhou province finally granted the same equal access to local education to tenants as for homeowners (with local Hukou) in summer 201781.

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80 https://urbanland.uli.org/industry-sectors/infrastructure-transit/chinas-pearl-river-delta/
81 http://www.xinhuanet.com/english/2017-08/28/c_136562915.htm

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Source: HSBC, 2016 based on Guangdong Statistical Yearbook 2014
promised to seize work permit requirements for them in mainland and allow using state healthcare and education (without hukou).

Another important issue, associated with hukou is housing. So far rural migrants were excluded from national housing provision system, designed only for households with urban hukou. This is the main reason for informal private rental for housing needs, resulting in chaotic and ungoverned expansion of so-called “urban villages” (Chen, 2016). These are private living quarters constructed by rural residents at urban fringes for migrant workers, despite rules prohibiting the lease of rural private rental housing built on land allocated to farmers (Wu, 2002). There are a lot of them both outskirts mainland China and GPRD cities, especially around Shenzhen, Guangzhou, Foshan.

Pearl River Delta was among first places in the country facing this problem. In 1982 there were 80,000 transients (non-local residents without local hukou) and by 2014 their numbers skyrocketed to 25.55 million or at least 40-45% of overall population of GPRD. As always, urban villages are associated with poor housing, severe infrastructure deficiencies, serious social disorder and unsanitary living environment (Song, Pan and Chen, 2016). While, like Baishizhou village in Shenzhen or Xiancun village in Guangzhou due to rapid growth, are now in the downtown, neighboring CBD, metro lines, skyscrapers and luxury hotels.

**Figure 39. Xiancun village in the downtown of Guangzhou**

To better understand the origins of urban village phenomenon we should remember that after Chinese revolution all urban land became state-owned and rural land got collective ownership (but no rights to lease or sell). And before economic reforms state exploration was the only way

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82 https://u.osu.edu/mclc/2017/05/30/the-fall-of-guangdongs-urban-villages/
to shift land from the rural collective sector to the urban state sector. So current urban land regime in China is based on two fundamental principles: the land ownership is separated from land use rights (exclusively belongs to the State while use rights can be privatized) and so-called dual-track land supply system when administrative allocation of land-use rights for state-owned and non-profit users exists simultaneously with market schemes (transferring land-use rights through conveyance to commercial users with negotiations, tenders, auctions, quotations and sort lease). Transactions of land-use rights from farmers and administrative land users are prohibited; before selling they need to be expropriated by a city government and converted to urban land.

So “municipalities are the sole agents to acquire rural land on behalf of the state by paying the collective's necessary compensation fees and then selling the requisitioned land at a much higher market-determined conveyance price. The huge difference between the compensation fees and the conveyance price incentivizes local governments to amplify local income through land leasing” (Xu, 2018). According to a former calculation, the amount of money from acquiring and selling land increased from $7.46 billion in 1999 to $231 billion in 2009 or up to 40-60% of the local budgetary revenue (Wu et al., 2014). Local government always prefer to expand at the expenses of rural lands since it is cheap and easy while requisition of urban land is more expensive and burdensome, because “urban residents and enterprises have stronger property rights” (World Bank, 2014).

The best case is approximately 30% of the cost of replacement housing because compensation payments do not always cover the full cost of resettlement according to some estimations (Wilmsen, 2016); a solid reason for a black market for land. Farmers and collectives prefer renting their lands to either foreign or domestic investors directly in the urban fringe since the price is higher than the compensation paid by the municipal governments through land acquisition (Xu, 2018).

There are two such deemed illegal schemes of rural land transaction, set spontaneously at the beginning of reforms in the 1980s; ordinary officials close their eyes to illegal transactions due to their role in relieving land shortages and attracting investment. So-called Guangdong model, rooted in PRD Megaregion, when farmers firstly transferred their land use rights to joint companies, established by themselves. Next, those joint companies leased land to factories on behalf of farmers (Zhou, 2013). The Jiangsu model, near the Yangtze River Delta Megaregion around Shanghai, collectivized and transferred rural land to farmers, who independently constructed factory buildings and warehouses for rent. It looks like PRD, being an experimental zone for China in 1980s for economic opening up with appearance of associating urban village phenomenon, became a test bed for solving the problem too. On 20 December 2013, the use right of a collective-owned rural construction land parcel in Shenzhen was officially sold in the market, which became the first trial of the marketization of collective-owned rural land nationwide (Zou, Zhao and Mason, 2014).

Figure 40. Rural land transaction procedure within traditional dual-track scheme (left) and experimental in Shenzhen
Furthermore, in 2014 the central government announced the reform of rural acquisitions at national scale. According to The Communiqué of the 18th Congress will be allowed (as opposed to farmland or unutilized land) to be sold, leased and appraised for construction of factories and commercial real estate, but not housing (Qu, 2017). Additional steps were made last year when the Central government launched pilot program till 2021 in 13 major cities, including Guangzhou, Beijing and Shanghai, to start developers’ projects with rental housing in rural areas without expropriating and converting them into urban first.

Tenants of these rental houses on rural land will get access to basic public services hence first movement toward breaking the Hukou system.

The land issue is also quite important for Hong Kong because the office vacancy rate was only 4% in 2014. The lack of space leaves no chance for further economy growth since companies cannot afford to expand while residential prices remain among the highest in the world. According to Global Property Guide, the Hong Kong now ranks the 3rd among world most expensive cities. The buying price per sq. m is $28,570 while in Shenzhen on the other side of border $12,000-15,000 and in Guangzhou already $2600-3400. The key reason is a shortage of vacant land in Hong Kong, suitable for construction - residential land use accounts only 7% of overall land while country parks with inaccessible slopes – 40%. As a result - extremely high

Source: Zou, Zhao and Mason, 2014
land prices, which could be 60-70% of overall construction cost, which is twice as much as outside Hong Kong\(^86\).

The other reason is developers’ capital flight from Mainland China due to tightening control measures on property market there (and hence reduced profits for land investment in Mainland China), the weakening RMB and Hong Kong’s lower corporate tax rate\(^87\). Due to bidding auction procedures for selling land to developers, Hong Kong’s government realized a surplus of $11.8 billion in 2017 (instead of originally forecasted $1.4 billion). In 2013 Mainland developers won one out of 10 residential land sales while in 2017 they won already one out of every three\(^88\). The same situation in office space – Knight Frank’ July 2017 report put office space in Hong Kong at $8,000 per sq. foot which 60% higher than Tokyo and more than double the Manhattan average\(^89\).

Figure 41. The price of Sq.m in Hong Kong, compared to the world Top

<table>
<thead>
<tr>
<th>Country/City</th>
<th>Buying Price US $ per Sq. M</th>
<th>Price/Rent Ratio (x)</th>
<th>Rent per Month ($ or €)</th>
<th>Gross Rental Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monaco</td>
<td>$ 55,207</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>UK, London</td>
<td>$ 29,676</td>
<td>37x</td>
<td>€ 6,606</td>
<td>2.71%</td>
</tr>
<tr>
<td>Hong Kong, Hong Kong Island</td>
<td>$ 28,570</td>
<td>43x</td>
<td>$ 7,267</td>
<td>2.35%</td>
</tr>
<tr>
<td>US, New York</td>
<td>$ 17,191</td>
<td>34x</td>
<td>$ 4,942</td>
<td>2.91%</td>
</tr>
<tr>
<td>Israel, Tel Aviv</td>
<td>$ 17,149</td>
<td>37x</td>
<td>$ 4,591</td>
<td>2.68%</td>
</tr>
<tr>
<td>Japan, Tokyo</td>
<td>$ 16,322</td>
<td>38x</td>
<td>$ 4,346</td>
<td>2.66%</td>
</tr>
<tr>
<td>France, Paris</td>
<td>$ 15,867</td>
<td>36x</td>
<td>€ 3,564</td>
<td>2.79%</td>
</tr>
<tr>
<td>Russia, Moscow</td>
<td>$ 14,714</td>
<td>31x</td>
<td>€ 3,820</td>
<td>3.22%</td>
</tr>
<tr>
<td>Austria, Vienna</td>
<td>$ 14,333</td>
<td>51x</td>
<td>€ 1,986</td>
<td>1.96%</td>
</tr>
<tr>
<td>Switzerland, Geneva</td>
<td>$ 14,230</td>
<td>30x</td>
<td>€ 3,827</td>
<td>3.33%</td>
</tr>
</tbody>
</table>

The source: Global Property Guide, 2018

Finishing of strategic bridge from Hong Kong to Zhuhai and Macao on the other bank of Pearl River, planning another intercity rail bridge and construction HSR to Guangzhou and new railway terminal with custom facility aim to relive the land burden of Hong Kong and allow to take part its own developers in housing projects in previously forgotten parts of PRD on the

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\(^{87}\) http://vigers.com/website/2017/06/09/hong-kongs-land-price-high/


\(^{89}\) https://www.ft.com/content/a6d33890-11a8-11e8-a765-993b2440bd73
West bank of estuary. The same goals targets Guangdong province’s government trying to construct “three hours” transport loop around GPRD as well as Central government’s Free Trade Zones within Megaregion, including Qianhai within half-hour commuting radius from Shenzhen and Hong Kong. It also offers both physical and business space for its financial services companies to expand. For instance, Hong Kong investors already were suggested to build housing for Hong Kongers in Guangdong, ripping the advantages of lower land and property prices. While Tencent works under electronic ID to facilitate cross-border passing of residents in Hong Kong and Macao with mainland. MTR Corporation (MTRC), owing Hong Kong metro system and real estate business is planning to further expansion its operations in mainland China. Link REIT, Asia’s largest real estate investment trust, also is ready for the jump and expenditure into PRD.

There are a lot of problems yet to be resolved. First of all, the problem of border crossing since even having great infrastructure to make this loop you have to pass several borders between Mainland China and two SARs. For instance, for crossing the bridge from Hong Kong to Macao car driver must “obtain three separate permits from the Hong Kong, Macau and mainland Chinese governments, buy special car insurance for the mainland and Macau, and register their documents with the government of the mainland city of Zhuhai — a process that will take at least 12 working days” 90. It illustrate the scope of different problems and legal issues the Beijing faces. Because, being in fact economically integrated, the GPRD megaregion is still crossed by international boundaries with different customs, legal systems and tax rates.

Meanwhile, resistant of native dwellers in Hong Kong against Mainland China’s “occupation” through its investors, developers and crowds of tourists which are blamed in skyrocketing prices on housing and retail, is as high as it has ever been 91. There are also some restrictions for developing other parts of Hong Kong SAR territory – for instance HK government’ plans of 2012 to build three new towns near the border with Shenzhen to relief city’s housing burden faced mass protests due to fear that Central Government have long-term plan to merge Shenzhen and Hong Kong, seized the SAR autonomous status 92. The same fear took place upon plans to enact Mainland law at custom facility in Express Rail Link terminal in Hong Kong to speed up and facilitate the process of cross-boarding 93. The so-called Umbrella Revolution of 2014 took place after Central Government announced changes in Hong Kong electoral system (pre-screening candidates for HK leader election).

Traditional historical linkages, linguistic and cultural unity around Pearl River Delta made the economic integration of Mainland China’s part of Delta with that time independent Hong Kong and Macao inevitable in 1980s. Cheap land and labor in nearest SEZs, revived Hong Kong from low margin traditional industries and allowed the concentration of professional services and finance. Nowadays, the Guangdong province, achieved the next level of

90 https://www.ft.com/content/a6d33890-11a8-11e8-a765-993b2440bd73
91 https://urbanland.uli.org/industry-sectors/infrastructure-transit/chinas-pearl-river-delta/
development, aims to substitute higher level of HK’ professional services, developing high-tech industry and world class logistics, laying-off the previous generation of industrial production further inland China. For Hong Kong it means next wave of relives since current office occupancy rate and lack of land hinders further growth since it remains the position of major economic engine for whole GPRD.

It is important that economic drivers were at the basement of integration GPRD, but nowadays it aims to cover broader spheres, including common social development and environmental issues. Shenzhen and GPRD itself always was a test bed for many government initiatives like land and economic reform in 1980s. This time it shows the movement towards common excess to public services (education, healthcare, pension and partly housing) within GPRD megaregion regardless of hukou or direct rural land acquisition – a big issue that hindered the city growth and common rural-urban planning for decades. Meanwhile, land shortage and skyrocketing housing and office prices hinder the further growth of Hong Kong business. Shenzhen already outpaced it in GDP and probably Guangdong will do the same. So main hopes of Hong Kong business are associated with facilitating transport access and developing previously less developed lands on the West bank of Pearl river as well as with relocation to FTZs.

4. Political drivers

Since the economic reform of 1978, China has experienced overwhelming urbanization with total urban area sixth fold growth, from 7438 km² in 1981 to 45566 km² in 2012 (Chen et al., 2016), with further rapid increasing. Along with evident benefits such unprecedented pace brings a lot of drawbacks like inefficiency in land use (urban land growth outpaced the pace of urban population because local governments amplify local income through land leasing), widespread immigration with inadequate social welfare system (because of hukou, only in Shanghai around 500,000 school age children live with parents from the countryside, without excess to city’s education system94), redundant infrastructure construction along with overall environmental degradation (Vogel et al., 2010).

To tackle the issue, the Chinese central government launched a series of strategies and policies within the Five-year Program for National Economy and Social Development (so-called Five-Year-Plan) to guide, intervene, and plan the urbanization development (Su et al., 2017). Moreover, former mistakes and negative costs of outpaced urbanization were also officially recognized recently by the Chinese government in the “National New-type urbanization Plan 2014–2020” (Zhu, 2014). This shifts government efforts from land-centered towards people-oriented urbanization (Long, 2014), drawing its attention on primary development not megacities but it’s out skirts - small and medium-sized cities with rural surround with extending industries and service chains into hinterlands, enhancing the functions of cities and increasing quality of life (Chen, Liu & Lu, 2015).

94 https://www.theguardian.com/cities/2017/may/05/megaregions-endless-china-urbanisation-sprawl-xiongan-jingjinji
Different form of coordination at regional level around coastal zones became distinct feature since the early 1980s but formally megaregion appeared first time in the 12th Five-Year-Plan (2006-2010) as a main form of urbanization strategy. Since that time the Central Government gradually approved already 20 megaregions of three categories: 5 megaregions of national level (including 3 paramount and symbolic ones around Beijing, Shanghai and Pearl River Delta); 9 megaregions of national secondary level and 6 regional level ones. The reasons why megaregion approach became so important for China could be explain in three ways.

First and foremost, such strategic planning at the mega-city region level helping the central government to regain their governing capacity due to decentralization tendencies. After economic reform of 1979 the traditional vertical organization and coordination of planned economy along with hierarchical control had weakened significantly resulted in city-based entrepreneurial governance and fierce intercity competition for developing projects inside their territory to expand the tax base (Wu & Zhang, 2010).

“The major shift, related to economic decentralization and market reform, is characterized by the eroding power of the central state and the rise of cities and regions as new centers of capital accumulation, state regulation, and political compromise. Some former state functions are thus transmitted to nonstate actors, as part of the transformation from state socialism to market-oriented neoliberalism” (Xu & Chen, 2014). As a result, there are a lot of examples of redundant infrastructure and industries projects. For instance, in GPRD megaregion there are five international airports including Hong Kong International Airport – the evidence of infrastructure duplication due to inter-city competition (Song, 2002).
Theoretically a megaregional approach can tackle the issue of fierce intercity competition and foster their coordination. The second reason why such global approach became very essential for the country is that planning at mega-city regional level helps provincial government to play more important role both at national and global level. And the last reason - obtaining more solid central policy support after establishing mega-city regions which becoming extremely significant for local development (Xu & Yeh, 2009). “In China, the vertical and horizontal linkages across regions are not well established; functional integration at the mega-regional level is still inadequate; and there is a policy vacuum over cross-border issues and a lack of national vision. A mega-regional approach to planning has been identified as one of the key instruments to promote a more balanced regional and national development pattern in China” (Yang, Song and Lin, 2012).

Under state socialism, horizontal linkages among municipalities were not considered important and regions still deeply dependent on the center. Nowadays Chinese government is hierarchically organized at the central, provincial, prefecture, county, township and village levels. So far there is neither formal government structure at the megaregional level nor any kind of incentives to foster cooperation at local level between different cities. But in case the
The territory of megaregion is limited with boundaries of one province (GPRD to some extent) – its government becomes a key player to facilitate regional coordination. If it crosses several provinces (the Yangzi River Delta megaregion around Shanghai) – no coordination is possible without Central government’ intervention. But taking into account overlapping the functions of different ministries this approach also faces significant problems.

National Development and Reform Commission (NDRC) is the central agency, making socioeconomic plans and being “a half-level higher than other ministries, due to historical reasons”. It is able to guide and constrain spatial plans of other ministries. NDRC provides blueprints for priority development areas along with solutions for problems difficult for one city or one province to solve (Hu, 2006). The second major player is the Ministry of Housing and Urban-Rural Development (MOHURD) with its local subsidiaries like construction commissions and municipal urban planning departments responsible for physical planning and spatial coordination (functional relationship between cities, distribution of regional infrastructure, environmental, social and economic issues etc.). Finally, the Ministry of Land and Resources (MLR) with local land departments is responsible for preparation of land use plans at all levels. We should take into account several ministries like Ministry of Transport or Environmental Protection with their own regional plans for sectoral developments.

“The fragmented functions of regional planning are attributed to inter-ministerial conflicts. The MOHURD (Ministry of Housing and Urban-Rural Development) dislikes the idea of two rival departments competing in the regional planning market; the NDRC (National Development and Reform Commission) and the MLR (Ministry of Land and Resources) each claim that their plans have spatial elements and belong to upper level spatial plans” (Xu, 2008).

This tension and the overall political framework are worsening in case of GPRD megaregion since it is one of Chinese regions with the highest administrative complexity and degree of fragmentation. The first reason is laissez-faire economic culture mentioned above with strong delegated decision-making abilities in economy for cities, towns and villages resulted in fierce competition for investments, projects and central support. Another reason is a very complex governance structure itself since GPRD comprises not only two special administrative self-governing regions under “one-country, two systems” (Hong Kong and Macao) but also Guangdong province with own capital (Guangzhou) and two special economic zones (Shenzhen and Zhuhai) with sub provincial level and high degree of autonomy, supplemented now with three Free Trade Zones (FTZ). This complex structure puzzled by 7 prefecture-level cities, 8 county-level cities with two counties and 31 urban districts and at the very low level there are also more than 230 “simple” towns with countless villages.

Figure 44. "One Environment, Multiple Systems" in the Hong Kong-PRD Megaregion
Since economic decentralization is very widespread in the GPRD, many planning decisions being delegated to towns and villages, resulting in discoordination (Xu, 2008) while all players regular try to even it. “The high-level fragmentation leads to tremendous difficulties for the provincial government, nevertheless from the late 1980s to 2008, seven regional strategic plans were produced for better coordination in the PRD. They were formulated by the Guangdong Provincial Government in collaboration with four different ministries—the NDRC, the MLR, the MOHURD, and the Ministry of Environmental Protection or MEP” (Xu & Yeh, 2010).

Indeed, the socio-economic cooperation of Hong Kong with neighboring Pearl River Delta rooted back to early 1980s. But since 1997 official of two municipalities established official intergovernmental mechanism to manage cross-boundary issues like economic development, infrastructure and public health; the high-level Hong Kong/Guangdong Cooperation Joint Conference or HKGDCJC (Cheung, 2006). Along with horizontal cooperation with Guangdong province, the Hong Kong government started to establish vertical coordination, seeking the direct assistance from Beijing to solve competing interests between Hong Kong and Guangdong Province (Cheung, 2010).

Beijing is fostering common integration in social-economic field within GPRD, according to resent Five-Year Plan. “We will deepen mainland exchange and cooperation with Hong Kong and Macao in relation to social development, living standards, culture, education, environmental protection, and other areas, support cooperation in relation to innovation. We will encourage Hong Kong and Macao to play an important role in promoting cooperation in the Greater Pearl River Delta region, and advance the development of the Guangdong-Hong Kong-Macao Greater Bay Area and major transprovincial cooperation platforms science, and technology” (Chapter 54, The 13th Five-Year Plan of PRC, 2016).

To realize this initiative National Development and Reform Commission (NDRC), Guangdong Province and Chairmen of Hong Kong and Macau SARs signed in July 2017 a Framework

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95 http://www.gdstats.gov.cn/tjnj/table/20/e20_3.htm

Agreement on Deepening Guangdong - Hong Kong - Macau Cooperation the Development of the Bay Area to establish a framework for convergence and coordination in policy and planning within GPRD Megaregion through infrastructure connectivity, further market integration (Closer Economic Partnership Arrangement or CEPA)\textsuperscript{96}, technology and innovation, coordinated industrial development (towards the high end of the global value chain), strengthening international cooperation (taking into account “Belt and Road” Initiative) and social spheres. Four parties agreed to improve the coordination mechanism through annual consultation meetings and annual work plans on consensus base\textsuperscript{97}.

Overall, HSBC experts estimate almost doubling GDP to $2.8 trillion by 2025 within GPRD megaregion but to realize such opportunity and secure the growth, “Beijing will have to lower barriers of movement people, capital and information”. The toughest challenge is to better integrate Hong Kong with its own customs regime and a semi-democratic system, into mainland China. While the major part of Hong Kong’ population fiercely oppose any further pressure of Central Government, fearing to lose of their own uniqueness and political independence. It is inevitably since Guangdong province was always cradle of reforms in China and now is perceived from Beijing as single economic and high-tech weapon in the uprising competition with US, Japan and EU. Now it is merging with Hong Kong’s world financial center, disrupting its already weak independence within “one country two systems” scheme. “A senior Hong Kong official, who asks not to be named because of the sensitivity surrounding the issue, admits that it will be very difficult to improve the “flows of information and capital” between the city and the mainland without the city losing its uniqueness”\textsuperscript{98}.

Megaregional approach in China became a method to overcome economic decentralization tendencies of last decades and regain Beijing governing capacity to stop or at least to relief so-called city-based entrepreneurial governance and fierce intercity competition at regional level. Yet there are neither formal government structures for governance at megaregional level nor any kind of incentives to foster cooperation at local level between different cities. But in case of PRD its boundaries limited by one Guangdong province hence its Government plays a key player to facilitate regional coordination. The problem is that GPRD has very complex political structure, having besides Hong Kong and Macao as two SARs, along with two SEZs and three FTZs.

To foster further economic growth, provincial and central governments have to eliminate or at least reduce barriers to the movement people, capital and information. Doing it without further political intervention into Hong Kong independent life is assumed impossible. While a degree of dissatisfaction of its dwellers by actions of Central Government already broke the top historic level. The economic future and prosperity of Megaregion hangs on the ability of Central government to jangle and save balance between pursuing own strategic interest (GPRD is considered by Beijing as paramount hi-tech weapon in upcoming economic wars with other super powers) and saving fragile political independence of SARs (probably already without or with maximum rate unified customs, legal systems and tax rates).

\textsuperscript{96} http://gia.info.gov.hk/general/201707/01/P2017070100409_262244_1_1498888409704.pdf
\textsuperscript{97} https://www.info.gov.hk/gia/general/201707/01/P2017070100409.htm
\textsuperscript{98} https://www.ft.com/content/a6d33890-11a8-11e8-a765-993b2440bd73
IV. Analysis

A. Summary upon each case

1. The BosWash corridor (the USA)

The BosWash Corridor occupies various territories of 11 Northeastern states and the District of Columbia. It has a population over 50 mln inhabitants (18% of total US population in 2007) and produces around 20% of national GDP or $2.9 trillion. The importance of BosWash for the country should not be underestimated since simultaneously it contains the country’s economic and political capitals – New York City and Washington D.C. respectively. The transport infrastructure was the main means of developing BosWash at the beginning of the Industrial Revolution. At that time, it exclusively relied on rail networks, spurred by government’s privilege and formed for primarily economic purposes and industrial activity in transporting resources between key industrial nodes of Northeast.

Only at the end of XIX century did it become an axis for public transport; at that time, it can be argued that union Megaregion was already formed. Since the middle of XX century it has been transforming into a coalescent suburban territory (preference to private cars, highway system and affordable housing programs). Nowadays, the transport is predominantly private (89% of annual intercity trips within Northeast Corridor is highways modes, including 9% of bus travels while air travel Amtrak rail have 6% and 5% respectively) while NYC still concentrates a major share of national public transport commuters.

Concerning socio-economic drivers, BosWash, being once a national industrial powerhouse, managed to cope with declining traditional sectors and avoided the fate of other rust belt cities (the share BosWash in national production workers dropped from 27% in 1958 to 12.3% in 1997). Traditional sectors were successfully substituted with service sectors and became a world class financial and business headquarters hub. This carries some negative circumstances in the significant concentration of wealth that exacerbates the high cost of housing prices and all related goods and services. Within the last twenty years, key metropolitan areas of BosWash lost a significant part of their tax base pushing middle class and business enterprises out the center further to the suburbs due to rapidly increasing land price and housing.

Furthermore, problem is compounded by federal underinvestment in Megaregions compared to the other states which causes over-reliance on local revenue sources, especially property taxes, in various communities nationwide. They compete for commercial and high-end residential development and always discharge much-needed affordable housing. This resulted in sprawling and the emergence of a very particular phenomenon: mega-commuters who commute over 90 minutes each way. Additionally, bear in mind the school district’s desegregation policy and school bussing that only intensified so-called white flights from the city centers to suburban areas. Overall it spurred the further growth of megaregion, particularly in the suburbs around small and middle towns between major metropolitan areas. It also explains why, according to RPA, all five major metropolitan areas within BosWash have median poverty rate 7-10% higher than the national median.
The USA gives us a perfect example how government incentives intentionally or occasionally lead to megaregion growth. Fundamental US Acts in highway’s subsidizing and facilitating housing affordability in 1950s defined the logic of suburban car-oriented development for the next 50 years and led to current coalesced Northeast landscape. It resulted in massive suburbanization – comparing to 1950, the population of key urban nodes remains stable (16.4 mln) while all growth by 2000 has concentrated in suburban counties (from 6.2 mln to 31.2 mln).

The lack of common institutional body and union efforts of the affected 11 Northeast states decreased their ability to lobby interests and major infrastructure projects at the Federal level notwithstanding the national capital was on the territory of megaregion. Still there is a hope that strengthening Metropolitan Planning Organizations (MPOs), currently focused on transport development, could be a solution for planning at a larger scale. There are several examples of successful cooperation at megaregional scale in some particular areas like environmental issue and transportation.

2. The Central Economic Core (the EU)

The history of integration in Northwestern Europe roots deep in history (probably even before Dutch Revolt and its Golden Age or following the Industrial Revolution in the UK and her neighborhoods); but the contemporary stage initiated with the European Coal and Steel Community back in 1951. Euroregions were the first form of local cross-border enlargement in post-war Europe, based on bottom-up functional approach for solving common local issues like spatial planning, transport and environmental sustainability. This Euroregion model, with its best practice, later became a basement for INTERREG program, which currently is the major institutionalize framework for funding such cross-border projects, fostering labor market, transport/mobility, services and facilities, environmental, tourism, SME, heritage, etc. Significant part of them, being local, simultaneously summing up and overlapping the whole territory of The European Pentagon or Central Economic Core along with Rhine-Alpine Transport Corridor (or “Blue Banana” axis).

To some extent the European Pentagon, coalescing the polycentric bunch of urban cores along the “Blue Banana” economic axis, plays a role of megaregion with its common labor market (at least at its Benelux’ heart with border regions of Germany and France) and union multimodal transport infrastructure along with Rhine with its own Rotterdam Megaport. Although, very few scientists and officials use megaregion term to define the level of achieved integration in the European economic core. In fact the territories along the Rhine-Alpine Transport Corridor comprises of more than 70 million people or 13% of overall EU population (2017) and produces EUR 2.7 trillion ($3.6 trillion) or 19% of EU’s total GDP (2010).

Freight flows within Economic Core predominantly concentrate at the North-Western end of the corridor, between Germany, the Netherlands and Belgium, while in case of passenger flows the same three leaders complemented by Switzerland (upcoming development of union integrated long distance HSR seamless network will change it dramatically).
Despite the massive funding of less developed regions, European Cohesion Policy (firstly defined as economic and social, supplemented later by territorial cohesion too), has not reached its goals so far, the gap and disparities between Economic core of the Pentagon and Periphery only widening. Economically active population keeps moving from the East, seeking the jobs and better life in major urban cores of EU economic axis around “Blue Banana”. Any scenarios of future European territorial development, weather based on cohesion and better balance or competitiveness with higher segregation; imply the highest role of Pentagon as a basement and axis of social and economic development. Although in very optimist scenario it will be supplemented by few others, less meaning, clusters on Periphery too.

Although such kind of strategic program document as “European Spatial Development Perspective” (ESDP) and followed Territorial Agenda of the EU and Europe 2020 Strategy, not being a legally binding document has failed to achieve Pan-European level of common territorial planning due to Member States’ reluctance to lose territorial sovereignty, the EU with its functional bottom-up approach has achieved very significant results at local cross-border and supraregional levels. Such EU nature as “socio-political UFO” (simultaneously combining the features of network society and a neo-imperial system) leaves no chance for common territorial planning and governance and European Institutions, especially the European Commission remains the only one political body interested in developing the European Union as a united entity. This explains the appearance of Macro-regional strategy, the next level of coordination, by pursuing EU’s global strategic goals.

3. The Greater Pearl River Delta (China)

Traditional historical linkages, linguistic and cultural unity around Pearl River Delta roots in history, made the economic integration of Mainland China’s part of Delta with that time independent Hong Kong and Macao inevitable in 1980s. Cheap land and labor in nearest SEZs, revived Hong Kong from low margin traditional industries and allowed the concentration of professional services and finance. Nowadays, the Guangdong province, having achieved the next level of development, aims to substitute higher level of Hong Kong’s professional services, developing high-tech industry and world class logistics while transferring the previous generation of industrial production further inland China.

For Hong Kong, it means the next wave of development since current office occupancy rate and lack of land hinders further growth. Overall, the Greater Pearl River Delta megaregion, encompasses two Special Administrative Regions (Hong Kong and Macao) and key urban clusters of Mainland China’s part of estuary (Guangzhou, Shenzhen, Foshan) combines GDP of $1.54 trillion (11% of national GDP in 2015 comparable to South Korea), covering the territory 54,744 km², with more than 66 mln people.

Transportation development plays a paramount role in connecting both banks of Pearl River Delta megaregion and fostering development of union coalescent socio-economic market and urban landscape. Recent transport planning at local city level in GPRD is thanks to coordination of Guangdong province and Central government affords started to resemble a kind of coordination but yet there is a lot of work ahead to overcome the legacy of city competition
period of 1990s and find a way to use duplicated infrastructure. Meanwhile, the Central Government supports the efforts of better connection HK and Macao with Mainland China through megaprojects like cross-estuary 42 km bridge, rail bridge through estuary and connection of Hong Kong with national HSR system. The main goal of Guangdong province is construction a solid transportation loop around delta, facilitating overall connectivity, spurring economic growth on historically less developed Western bank and make the GPRD megaregion working as union socio-economic market.

It is important that economic drivers were at the basement of integration GPRD, but nowadays it aims to cover broader spheres, including common social development and environmental issues. Shenzhen and GPRD itself always was a test bed for many Chinese initiatives like land and economic reform in 1980s – this time it shows the breaking movement towards common excess to public services (education, healthcare, pension and partly housing) within GPRD megaregion regardless hukou and direct rural land acquisition – big issue, hindered the city growth and common rural-urban planning for decades. Meanwhile, land shortage and skyrocketing housing and office prices hinder further growth of Hong Kong businesses; Shenzhen already outpaced it in GDP and probably Guangzhou will do the same soon. The main hopes of Hong Kong businesses are set on facilitating transport access and developing previously less developed lands on the West bank of Pearl river as well as with relocation to Free Trade Zones (FTZ).

Megaregional approach in China became a method to overcome economic decentralization tendencies of last decades and regain Beijing governing capacity to stop or at least to relieve so-called city-based entrepreneurial governance and fierce intercity competition at regional level. Yet there are neither formal government structures for governance at megaregional level nor any kind of incentives to foster cooperation at local level between different cities. In the case of GPRD, its boundaries are limited by one Guangdong province hence its Government plays a key role in facilitating regional coordination. The problem is that GPRD has a very complex political structure, having both Hong Kong and Macao as two SARs, along with two SEZs and three FTZs.

To foster further economic growth, provincial and central governments have to eliminate or at least reduce barriers for movement people, capital and information. Doing it without further political intervention into Hong Kong independent life is assumed impossible. While a degree of dissatisfaction of its dwellers by actions of Central Government already broke the top historic level. The economic future and prosperity of Megaregion hangs on the ability of Central government to jangle and save balance between pursuing own strategic interest (GPRD is considered by Beijing as paramount hi-tech gear in upcoming economic wars with other super powers) and saving fragile political independence of SARs (probably already without or with maximum rate unified customs, legal systems and tax rates).

B. Comparison

Common and particular drivers for each case
Comparing all three cases, we can see that fostering economic development within megaregions due to harness the benefits of concentration of capital, goods and ideas is the main driver for further urban growth around polycentric coalesced agglomerations. All three cases show us a single leading influence of each megaregion for particular national/union economy, each one has at least one megaport for global trade (NYC, Rotterdam, HK/Shenzhen) and world class logistics hubs, as well as dominates on financial market (NYSE, HKSE/SZSE and to some extent FWB). Yet transport and infrastructure development, being in fact a leading coalescing factor to spur the development of union socio-economic market, is a basement for all three megaregions, especially taking into account that BosWash is stretching along Northeast Corridor and Central Economic Core – along Rhine-Alpine Corridor. While in case of GPRD it fringes the both banks of Pearl River’s estuary and main efforts were concentrated on building united transport loop around.

The economy is supplemented by a political driver with particular features in each case. If in the USA it took a form of regulation, which intentionally or occasionally caused the sprawling within the entire Northeastern coast after 1950s. In the case of the EU, it plays an evident, leading role of European Commission in coalescence with corresponding resistance of national states. Hence scientists and politician in EU tend to prevent using the term of megaregion since it inevitably appeals to the territorial sovereignty of many countries within the Central Economic Core. They prefer to concentrate on more local regional and functional cross-border levels or more abstract and conceptual vast macro-regional one.

In China, political drivers appear at two levels. On a national level, it uses Megaregion as a framework to regain administrative power, lost within last four decades of economic reforms and orchestrate the uneven development at least at provincial level, simultaneously reducing the level of city-based entrepreneurialism and fiercely competition. At the regional level of GPRD, political drivers play a leading role since Mainland China is eager to integrate and connect Hong Kong. By default, this has already occurred in physical terms due to advanced efforts in transport infrastructure development; this has yet to happen in a political dimension. Nevertheless, only China among all three cases under analysis applies megaregional approach at top national level, declared in official strategic documents. Although it still lacks of particular institution for governance at megaregional level, like in other two examples of the USA and EU.

Table 7. Structural elements of megaregional policy for three cases

<table>
<thead>
<tr>
<th></th>
<th>BosWash corridor</th>
<th>Central European Core</th>
<th>GPRD (China)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP (% of national)</td>
<td>$2.9 trillion (20%)</td>
<td>$3.6 trillion (19%)</td>
<td>$1.54 trillion (11%)</td>
</tr>
<tr>
<td>Population (% of national)</td>
<td>&gt;50 mln (18%)</td>
<td>&gt;70 mln (13%)</td>
<td>&gt;66 mln (4.7%)</td>
</tr>
<tr>
<td>Main approach</td>
<td>Form-dominant</td>
<td>Function-dominant</td>
<td>Population-dominant</td>
</tr>
<tr>
<td>Main feature/Key area</td>
<td>Rapid urbanization/transport</td>
<td>Socio-economic network/development</td>
<td>Control/governance overpopulated areas and</td>
</tr>
<tr>
<td>Particular strategic document</td>
<td>America 2050</td>
<td>The Europe 2020</td>
<td>The 13th Five-Year Plan of PRC</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------------</td>
<td>----------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Federal/Subnational entities in charge of Megaregions (even partly)</td>
<td><strong>No</strong> (US DOT, Regional Plan Association)</td>
<td><strong>No</strong> (European Commission, Committee of the Regions)</td>
<td><strong>No</strong> (The National Development and Reform Commission, the Ministry of Housing and Urban-Rural Development, the Ministry of Land and Resources – but all failed to perform)</td>
</tr>
<tr>
<td>Approach to megaregional governance and planning</td>
<td>Bottom-up approach (Plan to strengthen MPOs at local level)</td>
<td>Mixed: Bottom-up approach and centralized mechanisms (tensions between Supra-national institutions of the EC and national states)</td>
<td>Mixed: Bottom-up approach and centralized mechanisms (orchestration of regional development and reducing city competition)</td>
</tr>
<tr>
<td>Examples of common actions with megaregional scale</td>
<td>Regional Greenhouse Gas Initiative, I-95 Corridor Coalition, interstate programs for natural protection</td>
<td><strong>Interregional Alliance for the Rhine-Alpine Corridor EGTC</strong></td>
<td>Transport planning, energy supply, environment protection</td>
</tr>
</tbody>
</table>

Considering particular drivers for each megaregion, it is worth mentioning the USA, besides highway subsidization and massive programs for affordable housing after the IiWW, massive blacks flies from the discriminatory South to the Northern states, which correspondingly resulted the white flies (moving middle class out the city centers to the suburbs), notably around Washington, Baltimore, Philadelphia, and New York within 1950-1970s. The process continued, being spurred by desegregation policy and related school bussing. Later, due to inadequate federal tax expenditure all sorts of communities within BosWash had to over-rely on local revenue sources, especially property taxes. They compete to each other’s, desiring to open land for commercial and high-end residential development, skipping much-needed affordable housing projects. It only created inequality and further sprawling to even more distant suburbs, resulting in very particular US phenomenon as *megacommuters* (at least 90 min ride in each way or 50 miles).

For the EU such particular driver for megaregional growth could be a remaining gap in wealth and overall socio-economic development between East and West Europe, despite Cohesion Policy. Disparities between communities with the highest and lowest average GDP per capita in 2015 has reached 20 times due to two waves of EU enlargements towards the poor East while in 1996 it was only 5 times. It resulted in massive migration of population (firstly in economically active age) towards the Central Economic Core, fostering its further growth and development (whereas this purpose declares or not). Plus, despite the efforts of supranational
institutions like European Commission, to expand basic forms of cooperation at very low cross-boundary level (euroregions) towards much broader scope and scale, it faced irreconcilable position of national states, defending its territorial sovereignty. It became one of several reasons why historically EU concentrates on very particular spheres of integration within Central Economic Core, which less political and sensitive for members’ sovereignty, more technical and practical (transport, energy, ecology, science, etc.).

Concerning special drivers for Chinese GPPD megaregion, remember that Guangdong province and Hong Kong and Macao historically were unified territory with common socio-cultural tradition and Cantonese dialect (the main reason of some kind of independence from the North Beijing and the rest of the country). Moreover, the province was always a test bed for Central Government – SEZs, FDI, direct sales of rural lands and now even planning abandonment of the hukou system within megaregion. All that started here and was expanded nationwide later. Economic integration of Hong Kong with the rest of Pearl River Delta of 1980s now moves toward broader issues like coordinated social development, environmental protection, and energy supply.

Nowadays, the Central Government plans to make the global logistics and financial hub from GPPD since the sea part of Belt and Roads Initiatives, China’s broad scale international project, is planned to start there. Meanwhile, the unrestrainable land price growth in Hong Kong (office space price is more than double the Manhattan average), leaves no chance for local business but expanding beyond the boundaries towards nearest territories of Guangdong province. Simultaneously, the City Government is reluctant to tackle the issue seriously since only reaps the extra taxes for own budget (a surplus set the record of $11.8 billion in 2017 instead of forecasted $1.4 billion) hukou system within megaregion.

**Key Players**

With respect to key players, BosWash conceptualization it is Regional Planning Association, Virginia Tech, and solitary USDOT at federal level. The reason why national megaregional studies in the USA became the synonymous for transport planning and evidence of form-dominant spatial planning tradition (rapid urbanization (or form) and hence – transport issues). Its main activity is to draw attention at federal level to the problem of long underinvestment in the U.S.’s transport infrastructure, especially in rail network. The main beneficiaries of activities around BosWash megaregion are Amtrak and NYC Metropolitan Area (weather intentionally or occasionally) - Regional Planning Association is based in New York while Northeast Corridor (NEC) produces 55% of Amtrak’s total service revenue. For the next generation of HSR - NEC FUTURE project, linking Boston and Washington, it is required $120-150 billion over next 25 years, so the play makes sense. The key role here belongs to the Federal Railway Administration.

In the EU the functions of socio-economic development at global scale predominantly belongs to the European Commission, its several departments (Directorates-General or DG) like Regional and Urban Policy (REGIO) and several others supranational bodies and Associations like Association of European Border Regions. All EU efforts in building common socio-economic
market are based on Cohesion Policy implementation through massive funding. Hence the role of financial institutions like European Regional Development Fund (ERDF) or European Social Fund (ESF) is hard to underestimate. Since there is no clear evidence of megaregional approach at official level for development of Central Economic Core (Dorsale européenne or “Blue Banana”) except transport planners we could consider Interregional Alliance for the Rhine-Alpine Corridor EGTC as one of the main lobbyist group. Members of the North-West Europe Program within INTERREG (initially created in 1990s for common spatial planning and development between Benelux, France, Germany, Ireland and the UK) had also chance to pretend on leading socio-economic role within EU in the past but after announcement of Brexit it has few chances to withstand.

In case of GPRD, beginning in the 1980s the main driver for economic integration was business in Hong Kong. It was eager to lay-off its light manufacturing like textile and electronics (24% of GDP that time) on just opened nearest Chinese territory (special economic zones within Pearl River Delta). It allowed for concentration on professional and financial services. Nowadays, the extremely high land price in Hong Kong due to speculation, influx of Mainland China’ developers and shortage of physical space cause the second wave of local business flies beyond the HK boundaries. Towards nearest Free Trade Zones and new territories on the West band of Pearl River, previously underdeveloped due to transport inaccessibility. But they face there the competition from own Mainland China’s developers and companies who also want to harvest benefits of cheap land before it will skyrocket upon finishing Hong-Kong-Zhuhai-Macao Bridge this year and upcoming rail bridge. Key HK players, much interested in such expanding process are: transportation MTR Corporation, telecom monopolist PCCW, real estate investment giant Link REIT, HK flag carrier Cathay Pacific and several others.

Table 8. Particular set of drivers and key players for megaregional growth within each case

<table>
<thead>
<tr>
<th>BosWash corridor</th>
<th>Central European Core</th>
<th>GPRD (China)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Drivers</strong></td>
<td><strong>Drivers</strong></td>
<td><strong>Drivers</strong></td>
</tr>
<tr>
<td>• Highway subsidization and massive programs for affordable housing in 1950-70s, resulted in “white flies”</td>
<td>• Remaining wealth gap between East and West, massive migration towards the Economic Core</td>
<td>• Common socio-cultural-linguistic traditions, distinct to the rest of the country</td>
</tr>
<tr>
<td>• Desegregation policy &amp; school bussing, led to further suburbanization</td>
<td>• Steady activities of supranational institutions like European Commission and realization of Cohesion Policy</td>
<td>• Experimental test-bed for the whole country (like plans to eliminate the hukou system within megaregion)</td>
</tr>
<tr>
<td>• Municipal overreliance on local revenue sources like property taxes, discharging affordable housing</td>
<td>• Great practice in solving common basic functional issues (transport, infrastructure, labor, socio-economic, etc.)</td>
<td>• Extremely high land price in Hong Kong</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unconcealed desire of Beijing to integrate two SARs in every dimension</td>
</tr>
<tr>
<td><strong>Key players</strong></td>
<td><strong>Key players</strong></td>
<td><strong>Key players</strong></td>
</tr>
<tr>
<td>• US DoT</td>
<td>• European Commission</td>
<td>• Guangdong province</td>
</tr>
<tr>
<td>• Regional Planning Association</td>
<td>• Cohesion Funds (ERDF/ESF, etc.)</td>
<td>Government</td>
</tr>
<tr>
<td>• Amtrak</td>
<td>• Interregional Alliance for the Rhine-Alpine Corridor</td>
<td>• Central Government</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hong Kong and Macao Administrations</td>
</tr>
</tbody>
</table>
Cases and evolution of Megaregional theory

Comparison of three cases shows the follow logic. Cross-boarding cooperation at very local level on very particular issues in post-IIWW period gave the world the first practical examples of functional integration (transport, social issues, environment, etc.), which later was used in concept of Euroregions. Some of them are quite big now and play significant role in European economy like Greater Region/GroBregion or Upper Rhine region. But yet, the Europe was not able to use this experience to extend it to much broader scale and international level since any serious questions, apart from basic functions, and relating to territorial sovereignty like common territory planning caused reluctance and open opposition of member’s states. It is the main reason why megaregional approach (affecting interests and territorial sovereignty of several neighboring states) is not popular in the EU and scientists with politicians prefer to concentrate on more neutral levels for their carriers - either local and regional planning or at much broader and fuzzy macro-region concept.

The USA started to act at the second stage, using the EU’s experience in local cross-border cooperation for conceptualization of Megaregional theory. They used Gottmann’s megalopolis for describing the level of socio-economic integration within US’ North-East, but actively referred to the success of European practice in functional integration at very low level. Thereby they justified the elimination of political states’ boundaries, promoting common efforts for solving important issues. Since that time American approach and scientific school in megaregional studies, as well as BosWash itself, the most famous and studied example are recognized as the most developed and mature in the world. But yet, the leading positions in conceptualization of megaregion theory didn’t help neither to overcome local thinking of politicians nor get significant support at very high political level. So far all attempts of Regional Planning Association to promote and implement strategy of BosWash development as union megaregion failed.

Here China plays at the stage; being an underdeveloped country of the 3rd and then 2nd world, the country simply struggled for survival within last two-three centuries at very hostile environment. After revolution and then economic reforms of 1980s the pace of developing accelerated – and here the role of Guangdong province near Hong Kong with Free Economic Zones in attracting DFI is hard to underestimate. During next two-three decades China has become the 2nd largest economy of the world and approaching the level of consumption, more charactering to developed, not developing world.

But during the epoch of economic liberalization and exponential growth of 1990-2000s the central government lost its power and influence, conceding the rights to make decisions on socio-economic issues to regional and local level. It caused fierce city-based entrepreneurial competitions for FDI and infrastructural projects. Beijing took megaregional approach as salvation since it allowed not only to orchestrate earlier chaotic development at least at
regional level and from the other hand – to regain the power back. Of cause, it turned to study cross-border European practice and American conceptualization of Megaregional theory. And within very short time the China managed to apply all previous European and American experience and theory massively “in fields”.

Table 9. The stages of maturity in megaregional thinking and implementation for three cases

<table>
<thead>
<tr>
<th>First local experience</th>
<th>The EU</th>
<th>The USA</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conceptualization of the theory</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real massive implementation “in the fields”</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

The cynic takeaway is that economy is in fact the first and foremost driver for transformation separated urban nodes into coalescent polycentric megaregion. But at the next stage the economical principle and democracy hinder the implementation of theoretical concepts “in the fields” due to necessity of taking into account the opinions of all sides. And only major authoritarian political regimes like China are able to step over the chasm and rigidly implement it, regardless any complaints.

Table 10. Functional coalescence of each case

<table>
<thead>
<tr>
<th>Type of coalescence within Megaregion</th>
<th>Boston-Washington corridor (the USA)</th>
<th>Central Economic Core (the EU)</th>
<th>Greater Pearl River Delta (the PRC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport system</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Socio-economic</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Megaregional approach at high political level</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Political unity (the same custom regime, legal system, tax rates)</td>
<td>Yes</td>
<td>Almost (except territorial sovereignty issues)</td>
<td>Not yet (boundaries of two SARs)</td>
</tr>
</tbody>
</table>

Nevertheless, GPRD is not a full fledge megaregion yet since it does not function as a coalesced urban area and socio-economic market due to remaining boundaries between its Guangdong province’s part (Shenzhen, Guangzhou, Foshan, Zhuhai, etc.) and two Special Administrative Regions (Hong Kong and Macao). It should not undermine the significant efforts and success in integration both within Guangdong province under Mainland China’s law (planning abandonment of Hukou) and between Hong Kong/Macao and province (infrastructure megaprojects, common regional development and strategic planning). The megaregional
approach of Chinese Central Government towards national urban growth already has already led to appearance of several truly coalesced megaregions (Yangzi River Delta around Shanghai) and it is likely to happen in case of GPRD soon or later, depending on fragile balance between political resistance of dwellers in HK towards increasing influence of Mainland China and opposite eagerness of both business in Guangdong province and Mainland China and Hong Kong to eliminate remaining barriers. Comparing to China, BosWash and European Central Economic Core both show us coalesced urban areas and union socio-economic markets but lack of megaregional thinking and strategy at high political level, deteriorating by reluctance to share territorial sovereignty of member states’ for the sake of common urban planning.

Concerning real drivers for megaregional growth we could argue that behind common principles of economic rules (the productivity rises upon higher concentration of capital, goods and ideas due to decrease of transactional costs), paramount role of transport infrastructure in coalescing territories and political issues like eliminating boundaries, legislative activity and governance, there is must be a simple political will at very high national level for megaregional development. Without such kind of maturity of national/union political elites, readiness to step over local/regional interests and break vicious shortcoming view of current political cycle, no drivers and incentives from both state and market sides are not able to transform already existed pre-integrated vertical functions (transport, economy, social sphere, culture, etc.) into coalesced megaregion.

V. Conclusion

Historical analysis of urban enlargements and its triggers

Analyzing of historical development of particular megaregions leads us to the fact that leading drivers were different at every historical stage. They were also supplemented by special triggers or particular events/phenomenon which spurred the next wave of urban growth and integration. The 1st wave of integration could be referred to the time of the beginning of industrial revolution back to XVIII-XIX century and drivers were even for all three megaregions (rapid industrialization and correlated economic development). The next wave of integration happens after WWII and we can see the differences here. If two main triggers for the USA were establishing interstate highway system and facilitating housing affordability (which led to car-oriented sprawling), for the Europe – it was the initial economic cooperation at very low local cross-boundary level. The communist China, being hindered by initial chaos of 1950-1970s managed to see and set the targets of economic openness towards the rest of the world, by establishing Free Trade Zones on the shores of Pearl River Delta’ estuary at very proximate place to capitalistic Hong Kong and Macao. And the next stage of the same process ended up with their unification with Mainland China as Special Administrative Zones at the end of 1990s.

This 3rd wave of integration was spurred by speculative growth in NYC as the financial capital of BosWash megaregion and whole the USA, while the Europe Economic Core reap the benefits of cheap labor force which massively rushed towards the West from just affiliated post-communist poor East Europe. Current the 4th wave of megaregional growth in China could be characterized by commanding political pressure from Beijing on provinces to regain political
power after decades of laisses-faire approach. In Greater Real River Delta it led to successful coordination between different municipalities under Central government supervision and coherent transport development. The finalizing of such flagship megaprojects like HK-Zhuhai-Macao Bridge or Guangzhou-Shenzhen-Hong Kong Express Rail Link (XRL) will spur the development on the West part of the river and finally close the transport loop, which influences on whole megaregion.

Table 11. The historical analysis of leading drivers and triggers for each case

<table>
<thead>
<tr>
<th>Wave</th>
<th>BosWash corridor</th>
<th>Central European Core</th>
<th>GPRD (China)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st wave</td>
<td>Industrial development and related development of rail infrastructure within North-East Coast of the USA since the middle of XIX century</td>
<td>High density and rapid economic development with further specialization of North-West core since the beginning of industrial revolution (XVIII century)</td>
<td>Initial integration between Guangzhou as a main and traditional economic powerhouse of Southern China with port gates of just seized HK and Macao since the middle of XIX century.</td>
</tr>
<tr>
<td>2nd wave</td>
<td>Interstate expressway system and mass affordable housing program since 1950s</td>
<td>European Coal and Steel Community and political movement towards Common market since 1950-60s</td>
<td>Openness of FTZs within PRD at the beginning of 1980s.</td>
</tr>
<tr>
<td>3rd wave</td>
<td>Eagerness of Multinational corporation to benefit from concentration of capital, goods and ideas at one place. Speculative growth in 1990s-2000s</td>
<td>Massive migration from less developed and just unified South and East towards West and Central Economic core in 2000s</td>
<td>Unification of HK and Macao with Mainland China as SAZs at the end of 1990s</td>
</tr>
<tr>
<td>4th wave</td>
<td>Unsuccessful activities of RPA and US DOT towards popularization of megaregional approach</td>
<td>Initiatives of common transport development within Rein-Alpen corridor, compromised by uncertainty of EU future after Brexit</td>
<td>Finalizing of transport megaprojects within GPRD after 2010s</td>
</tr>
</tbody>
</table>

Despite some troubles in defining leading driver at current stage of development for the USA and Europe we could argue, to some extent, that transport development plays critical role here too. Since there are neither other major triggers nor drivers in the EU and the USA now for megaregional growth. Although it cannot be compared in terms of influence with Chinese example. Current transport initiative in the EU with expected massive investment within Rein-Alpine Corridor is threatened by Brexit which compromises the economic integrity of North-West Europe. And in the USA former worldwide famous activity of Regional Planning Association in the middle of 2010s toward popularization of megaregional approach and planning, backed by US DOT’ administration and AMTRAK’ eagerness to brake with rail
underfunding for the last half a century, has almost ceased, being drowned into severe split after Donald Trump’s election in American elite.

The paramount role of transport

In this context we can highlight beginning of construction interstate expressways in the USA after 1950s which define the pattern of urban development, based on private cars and suburb sprawling. It was critical point after which system of several huge urban nodes, connected but yet independent within the North-East of the USA, started to transform into polycentric coalesced megaregion. When you already don’t have idea in what particular suburb you live in because of advanced transport development, massive housing construction and further sprawling all related infrastructure (shopping malls, park lots, warehouses, industrial sites, entertainments, etc.) on the fringes of any city. Probably next level of development and coalesced market will happen after finishing of perspective NEC FUTURE HSR project which decrease travel time between endpoints (Washington D.C. and Boston) more than by half, from current 7 to 3 hours.

The EU hasn’t finished such kind of supranational transport infrastructure. It is still under development. Of course, on the contrary, it is based on public transport (although the share of private cars is also quite high) but the scope of those projects rarely stretched beyond national boundaries – most know about advanced HSR in France (TGV), Spain (AVE), Italy, Germany, Sweden, etc. But there is no truly interstate HSR system which could be named as efficiently connected all that national destinations and being operated as a union system. That is probably one of several reasons why there is no officially recognized megaregion in the Europe, which could be compared to BosWash or GPRD. Since this megaregion has to have union transport core, barriers free. Likely it will happen when Rhine-Alpine corridor with half a trillion Euro investment will displace current bright patch of non-connected national HSR segments. The same will be made with freight movement. That will be trigger for beginning of the next development cycle of European megaregion and its coalescence with truly single market along the corridor.

At this point Chinese GPRD represents the ideal case when the process of coalescing less connected territories into single socio-economic and labor market around Pearl River’ estuary is happening at real time before us. The finishing of mega-bridge connected Hong Kong with Zhuhai and Macao on the other side of the river, along with perspective Rail Bridge across it and opening direct high speed rail between Hong Kong and Guangzhou through Shenzhen (XRL) this year – the trigger which launches the next circle of GPRD growth. The rapid massive investments in such kind of mega-projects of Chinese Central government, almost inaccessible in the USA and EU due to short political cycle, allow it to transform from developing country lagging behind to the world leader. At least for the next decade while similar megaprojects in EU and in the USA will be finished. Anyway, the China repeats the same transport leap in development that happened in the USA after 1950s and even earlier in the old Europe.

Meanwhile, the transport planning remains only one such kind of spheres in the Europe, where we can see successful cooperation at international level since its even and coherent development and modernization require budgets, unbearable for single country. The same
inter-state coherent transport planning is yet to be happened in the USA but it lacks of such supranational institution, being so heavy to rule the process within the territory of whole 11 Northeastern States. In Chinese GPRD, which is also separated by political boundaries (one Guangdong province of Mainland China with two Special Administrative Zones of Hong Kong and Macao with own customs, tax and political systems), the cooperation at local level under very tough and attentive management of Beijing, however, quite possible and already brought first results. Interestingly that localism in the USA (when municipalities severely compete for developers’ projects) doesn’t allow looking at the whole picture and hinders coherent territorial development within megaregional scale, in contrast, became a driver for megaregional growth in China.

The spiral-like pattern of megaregional development and future prospects

The historical analysis of different stages of development/waves of enlargements of urban territories into megaregions could lead us to the fact that they live and growth with spiral model. The reasons of first wave of enlargement are always economy and social factors. And all three urban constellations of our megaregions under analysis, being in different geographical regions started to growth at the age of early capitalism and industrial revolution (1st wave in the table above). There are no principal differences (except particular time) between the reason of growth in North-West Europe which was the cradle of Renaissance, early capitalism and industrial revolution; New England in the USA (the historical most developed territory and basement of later BosWash); and own South-Western China economic development, multiplied by expenditure of British Empire.

So far the economic growth and related social factors play the utmost role in urban development and enlargements of its form since the knowledge intensive industries always concentrate in areas with skilled and technical workers, which are demanded for high level of social infrastructure (best education, comfort of life, entertainments, amenities, social services and housing, etc.). From the other hand, such best cities attract capital and business abroad and becoming big markets for them itself. Further ‘snowball effect’ when large market attracts more companies with people which generates demand for services, goods supply chain, etc. which generates demand and attracts new business and people at this level so the large market becomes even larger. There is a consensus among economists that doubling city in size leads to total factor productivity increasing for 3-8% and in a global world current megaregions are being too large for national economy starting to replace states in global economy.

Before this stage a lot of inner changes have to be happened and this is where policy gets its reins in spiral development (2nd wave). Eliminating the administrative boundaries or at least minimizing its effect on further socio-economic growth and enlargement becoming a critical factor. And by the beginning of the XX century this problem was settled both in the USA (by applying federal approach to the construction of single interstate expressway system and simultaneous housing development/its affordability, hence erasing traditional state independence and localism. In Europe, laid in ruins after WWII (by beginning of political cooperation with European Coal and Steel Treaty, further leads to further socio-economic unity). In case of the China it happens three decades later because of China revolution in form
of establishing Free Economic Zones at the proximity to Independent Macao and Hong Kong but caused much more intensive integration and restoration of its traditional linkages with Guangzhou, historical epicenter of Southwest China development.

The next 3rd wave of integration in our cases could be named as intermediary and just consolidates the achievements of previous stage. And final wave of spiral development within current circle inevitably lead to transport and infrastructure unification since there are no political barriers (or the minimized) and economic growth continues. And this is very important step which requires certain level of maturity and coalescence when megaregion has already played as a single market (including labor) but yet suffering from lack of transport infrastructure with the same level of coalescence. Getting over this barrier since it requires tremendous amount of money (hundreds of billions), is always a critical milestone for every megaregion. This bifurcation point separates development of several urban nodes integrated to some extent but yet independent from its merging into truly coalescent area. And after passing it the large urban system will enter the next circle of spiral development, already at new level. This time the next wave of enlargement leads already to mega corridors and requiring passing the same stages step by step as it was at previous level (economy>policy>transport).

There is yet no common definition for such urban corridors but they will be 400–1200 km long, 70–200 km wide and covers 10,000–50,000 km². Researchers agree that such spatial liner pattern of massive urbanized area will exclusively rely on high-speed surface transport infrastructure. The time will shows either it happen or with megaregions under analysis not in the near or long-term future, at least the axis-like pattern of territorial development of BosWash Corridor and Central Economic Core will not hinder it. Whereas the loop-like model of Pearl River Delta development, which was always enclosed around certain particular geographic areas of Cantonese dialect, leaves no chance for that. But still in this case we cannot underestimate the importance of political will of Central Government and potentially it can be also merged into larger form.

There are also a few areas in the world, being now at early stages of development but which potentially could merge into mega corridors. It is unprecedented BESETO (Beijing-Seoul-Tokyo), San-Paulo-Rio de Janeiro in Brazil, Delhi–Mumbai in India, Kuala Lumpur-Singapore, etc. But in any case the further movement along the let’s say value chain of mega-corridor growth (economy>policy>transport) requires very concentrated efforts for eliminating barriers and boundaries. It has not yet happened even at megaregional level and will require new level of regional integration (this time), erasing political barriers and cooling down former disputes and cultural debates, as well as transport megaprojects never seen so far.

The main recommendations for future urban planners, mayor offices and supra-regional entities and other key player, taking part in governance and planning would be not to foster transport infrastructure development before achievement certain level of socio-economic integration and tearing down major political/territorial boundaries and barriers. Once it has been achieved (common labor market could be a quite honest indicator for that), they should not delay with bold decisions and huge projects, trying to overcome for the sake of it all former disputes and contradictions.
VI. Further Research

This study gives a holistic view of the current stage of Megaregional development in different geographical areas along with different approaches to territorial planning and governance at such a global scale. It is also useful to understand a “value chain” or process of generation of large urban systems, to structure the whole process and predict directions for their further growth.

Chosen Megaregions for case analysis include the most typical and quite characterized examples for each location, stage of economic development, political system, and socio-cultural tradition. But the number of megaregions in the world is significant and due to the fast-growing urban population, especially in developing and the least developed countries we are witnesses of appearing of even larger urban form – mega corridors. How the process of formation of common labor market happens there, as a main particular feature and condition for socio-economic coalescence, – probably is the most interesting question for further researches. To sum up, the next wave of studies of such large urban forms as megaregions and their next form – mega corridors, should deep in following research streams:

- The detailed analysis of other megaregions in North America (the most interesting is Greater California) in Europe (how so-called Blue Banana will evolve after implementation of coalescing massive transport programs) and Asia (Tokyo-Kobe in Japan, Yangtze River Delta & Beijing-Tianjin-Hebei in China), along with particular attention to formation of Great Asian mega corridors (BeSeTo or Beijing-Seoul-Tokyo, etc.);

- The detailed analysis of reasons, process, and results of the formation of common labor markets within any megaregions. The most descriptive and visual way to do it probably would be drawing commuter traffic flows within megaregions. So far there are just a few detailed studies of commuter traffic, forming the boundaries of megaregions, mainly in the US and China. Implementing this method for studying the large urban forms in other geographical areas would be useful to understand the current phase of megaregional genesis there;

- The study of problems of common planning and governance within such large urban systems itself represent very interesting task and haven’t been touched yet with a detailed analysis of principles and results. Urban planners typically face different problems already at Metropolitan area’ level and how to resolve all issues at even higher layer yet unknown. Moreover, the dependence of this process from the current political cycle when different parties and governments regularly change one another at different levels while long-term planning requires strong strategic vision and continuity, adds a great level of uncertainty to the whole issue. Hence further researches upon seeking the ways to make it independent and steady, simultaneously keeping it within the framework of democratic procedures, would be essential for global urban studies too.
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