

Global Connectivity, Spatial Proximity, Multimodal Transport, and Polycentric Urban Regions: UAE Urban Development 2020 - 2030

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Abstracts: At a current world city scale, conurbations interweave complex multimodal systems of logistics, transport, and communications. As this process evolves into a global network of interconnected urban nodes. While diffusing globally, China's One Belt One Road (OBOR) proposal creates an infrastructural framework for global exchange, analogous to the Ancient TransAsian links of Silk Road and Indian Ocean. Linked spatial dimensions and functional regions have always existed at different scales without any synchronized nomenclature for a grid with exact dimensional measurements. The global surface exists as a topological phenomenon of multi scalar dimensions covered by varied surface phenomena from earth to vegetation with fluid elements alternating in liquidity and flows. increasingly the world cities trend divides more advanced urban regions from less well viably connected territories, governments, industries, and commerce. Thus, the world has been experiencing an unequal distribution of trade and associated transport, logistics and handling facilities. In relation to global trade and transport tends to focus on the post-industrialized West and East and so underplays the role of other parts of the world system, including the MENASA (Middle East–North Africa–South Asia) region. In doing so, scholars discount a variety of spatial, morphological, environmental, historical, and socio-political urban patterns particular to these other regions and cities. This article addresses this oversight by examining the United Arab Emirates coastal conurbation (U.A.E.–CC, including Dubai–Abu Dhabi–Sharjah–Ajman), with its unique global positioning and political and economic conditions. The U.A.E.–CC is explored in relation to theories of the world/global city, the airport city or aerotropolis, and the polycentric urban region (PUR). The article demonstrates the emerging formation and potential of the U.A.E.–CC PUR, a member of a world-city network specializing as a transport hub and tourist destination and a global logistics center.

Keywords: Urban Development, Global Connectivity, Sociology, Spatial Proximity, Multimodal Transport, UAE, Political Science.

1. INTRODUCTION

A significant body of urban regional development and transportation research focuses on mobility infrastructure e.g., air, sea road and rail ports or *multiport*, as fundamental elements in urban spatial dynamics. Other elements in urban spatial mobility dynamics encompass material and non-material flows within a range of catchment areas, from local to global. But few such studies address flow issues that directly concern the rapidly expanding Arab Gulf (GCC) states and the United Arab Emirates (UAE) in particular. While the Arab/Persian Gulf exports much of the global oil supply, the cluster of Arab port cities have expanded and diversified economic activities evolving into a multipolar urban industrial region strongly integrated with global trade and political economy. It has become a new mobility core for the Middle East-North Africa-South Asia (MENASA), region.

Earlier studies evolved from a maritime focus to an integration with emerging air transport systems. How a handful British imperial refueling stations proved essential to Mediterranean to the Indian subcontinent and further East. From the mid-20th century /post WWII rise in overall global air transport—Cold War military, more affordable civilian air travel and freight—city and regional planning models began to incorporate air traveler as a primary factor impacting regional and global development demographic and economic growth.

2. LITERATURE REVIEW

Concurrent research and published materials — academic, political, trade and reference, ranged widely across varied themes and scales, from global to local, economics to logistics, physical infrastructure to urban spatial

planning. Future expectations that air transport would dominate globalized flows of cargo and passenger traffic have proved unrealistic, especially Airport-city (Aerotropolis) concepts (Alkaabi and Debbage, 2007; Kasarda, J., 1998; Appold, S., 2013a). In assessing the relevance of Airport-city models to urban development, Stephen Appold (2013b), states that such planning models “go wrong from the start by putting the airport at the center of thinking”. As increasingly unstable global political economies undergo shifts, so to do the transport, industry, trade, and urban development sectors (Janelle, 1995; Rodrigue, 2014). Thus, in addressing planning and governance for airport driven mixed-use development, Freestone and Baker (2011), view “wide-ranging sustainability” as especially critical when global air transport anchors urban regions. Varied spatial, morphological, environmental, and historical urban patterns demand different approaches, (Brueckner, J., 2003).

Although terms vary, urban region, megacity, and world city labels attach to similar phenomena, all of which apply to the *UAE Coastal Conurbation as Multipolar or Polycentric Urban Regions (PUR)*, (al Qassemi, 2014; Meijers and Romain, 2003). This study thus situates the UAE-PUR within a globalized system of flows, while examining interdependencies among the UAE-PUR's factors of geographic location, morphology, development policies and planning for transportation and urban systems.

Yet as multimodal transport development expanded into networks and hubs with increased logistical efficiency especially with digital communications interface among commerce, industry, sociotechnics and governance systems enhancing flows of material and non-material information. The latest socio-technical shift to influence development of global flows, exchanges and data management combines a chain of rapid innovation and globally diffusing sequences from Big Data to IoT (Internet of things) to G5 communications, which integrated promise a monumental shift across all aspects of human society, economies, environments, and geopolitics. When coupled with global warming, climate and biosphere changes we are marching into unknown territory with immense challenges to regional planning?

The complex dynamics involved in the UAE-PUR's transport oriented urban and economic development thus demanded a broadly inclusive approach to both the theoretical and empirical literature and field studies. Impacts of international political economy and global transport system on the UAE-PUR thus led to its development as a global city within the globalized network of material and informational flows. Recent theoretical literature on flows equally distributes between transportation and information systems, and a global network of transfer and transmission among major cities or urban areas and encompasses theories of time-space compression. In the modern world system (Wallerstein and Williams, 2013) the enormously advanced speed of transferring and transmitting physical objects and information coincides with greater mobility of human capital and labor. Much of the globalization discussion around flows, nodes and networks among urban places, e.g., GaWC, predicates upon digital transmission and physical transport, air and high-speed rail in particular (Castells 2010; Sassen, 2004; Hall,). Given a global shift that diminishes center-periphery theory, e.g., emerging economies (BRIC), shifting resources, capital flows, and industrial production, enhances the dynamics of once peripheral locations such as the UAE-PUR and other Gulf cities. Given the global importance of gas and oil, its location and transport from the Gulf, brings enormous financial returns to GCC states creating sovereign wealth funds to invest in development. Thus, despite small indigenous populations these Gulf state cities have rapidly exploded across all sectors, in particular transportation infrastructure, especially in air traffic, state owned airlines and airports. This fact prompted a boom in Aerotropolis oriented discourse and plans. But given the immense importance of international maritime shipping, and the historical seaport orientation of urban morphologies, air transport occupies a niche within multiple transport modes, all of which affect urban development. With significant road traffic for regional distribution from Gulf ports, the multi-modal (inter-modal) transport and logistics sectors have developed correspondingly. Although an international GCC rail service remains a decade away, the UAE's Etihad Rail system has already started priority industry-to-seaport cargo service, and will soon expand the system nationally, thus rounding out the multimodal system.

Already the most important Gulf mixed cargo seaport, Dubai not only exports, but also re-exports and distributes cargo, from containers to vehicles, throughout the GCC and beyond. When Abu Dhabi's multibillion-dollar investments in the Abu Dhabi International Airport, Mina Zayed seaport, Khalifa container Terminals facility,

along with logistics and ancillary facilities are complete it will double existing cargo handling and passenger capacity. When combined with the Dubai International Airport and al Maktoum Airport, as well as the smaller Sharjah International Airport, the UAE-PUR (coastal conurbation) will far exceed the capacity of any other GCC air transport system, and rank near the top for all MENASA urban regions. But when comparing global multiport, the near completion of a super multimodal port, Dubai World Central (DWC), integrating the Al Maktoum Airport city, Jebel Ali Seaport, and Duty Free Industrial zones, the UAE-PUR will dominate the Arab Gulf and MENASA regions, in line with much larger PURs / Polycentric Mega-City-Region's (P/MCRs), such as the Randstad (Notteboom, 2013), Paris-Bassim (Halbert, 2013), Frankfurt/Rhine-Main (Hoyler, Freytag, and Mager, 2006).

Within the global cities network model (GaWC), those representing large PUR/MCR conurbations share multiport/multimodal transportation hubs, gain a clear advantage in development over single modal hubs (Freidmann, 2005; Hall and Pain, 2006; Halbert, 2008; Burger, van der Knaap, Wall, 2013). Transnational PUR /MCRs, however, may range across flexible distances, as the London-Paris axis, which has been proposed as a single unit, which opens discussions over functional versus spatial criteria, as polycentricity can mean different things at different geographical scales" (Kloosterman and Musterd, 2001, Meyers et al., 2007; Vandermotten et.al., 2008).

3. DISCUSSION

It further examines theories and constructs of global/world city, major polycentric urban regions. But the economic strength of such conurbations depends on integrated multimodal transport systems serving both international and regional catchment areas. The research then questions to what extent service areas that support transport, trade and logistics affect urban regional morphologies and economies. Such regions also require sustainable urban development policies, quality governance, infrastructure that supports innovation and knowledge capital, and global connections to information flows and circulation. Such regions also require adequate financial investment to maintain and develop facilities, infrastructure, and amenities that attract and retain the intellectual capital required for a 21st century, knowledge-based economy. Thus, research into specific urban regions must address some aspects of these issues.

In the case of the GCC, this research assumes that while each member state's primary urban regions share adequate capital to finance such development, only the UAE has the transport and technological infrastructure, and overall capacity to become the Arab Gulf's primary megacity. Therefore, while this research draws on theoretical applications and global empirical comparisons of similar transport dependent urban regions, it also uses localized information from fieldwork and media. In concluding that the UAE plays a pivotal role for both the Arab Gulf and the larger Middle East-North Africa-South Asia region (MENASA), it also examines current and future development policies and plans of the UAE, Abu Dhabi, and Dubai. To obtain the necessary information for this research required inquiry into literature that spanned academic, government, professional, industry and news media publications. It also drew from multiple fields of geography, transportation, urban planning, global development, and related engineering and social science sectors. Thus, it represents an interdisciplinary process integrating information from multi-disciplinary and multi-sector sources. But if any single thread follows through to the conclusion, it will refute the author's previous thesis on the value of an Aerotropolis model for the UAE, to support Appold's (2013a, 2013b) critiques of airport centered urban development models as overly one-dimensional for contemporary urban regions with multiple complexities. The research now supports a multimodal transport orientation as crucial for spatial planning of the UAE's coastal conurbation as its primary locus for international and national development.

3.1. Situating the UAE's Coastal Conurbation in a Global, MENASA, and Arab Gulf Context

A general assessment of transport oriented global urban development models finds the United Arab Emirates (UAE), and other coastal urban formations in the Arab Gulf (GCC) region all highly dependent on international transport and trade. Focusing on these Gulf cities as transportation hubs and nodes on a world-city network, i.e., GaWC, (Taylor, 2004; Wall, 2010), the research assesses their potential development relative to a global urban

network. The UAE and other Arab Gulf cities anchor urban development through multimodal hubs that export, transfer and redistribute international cargo among their airports and seaports, (Wall, 2011). The research compares the development potential of these cities by situating them within a global network of urban regions and flows. The result indicates how relevant air transport is to their overall development along with other physical and information flows within the global economic system (Ducruet, Ietri and Rozenblat, 2011; Hesse, M, 2013; Sieverts, 2010). This approach to transport as part of a system of flows among urban centers that affects their development follows both a global cities approach as nodes in a information and transportation network of flows (Castells, 1996; Friedmann, 2005; Hall, 1984; Sassen, 2006; Taylor, 2004), examines the underlying theories as they apply to the UAE and GCC.

Although Dubai and Abu Dhabi co-anchor the UAE political economy, serve as its main portals into global networks, and fill its coastal conurbation, their GaWC rankings differ (Taylor, et. al., 2012). While GaWC cumulative index ranks Dubai in the world's top ten as of 2012, well ahead of even larger Arab cities, it is unclear whether that ranking is based on the municipality, the Emirate as a whole, or the Dubai-Sharjah-Ajman (DSA) secondary conurbation. But given the global economic shift (Dicken, 2011), Dubai and Abu Dhabi's rapidly developing exchange power as a united coastal conurbation flows across a global network to affect other economies and political systems. Integral to the dynamics of this global urban network, the individual political systems of national, regional, and local governance affect investment policy, planning and regulation. While this conurbation concentrates around a Dubai-Abu Dhabi metropolitan corridor, it sprawls across local political boundaries like many other polycentric urban regions. Situated within a rapidly developing emergent Federal system, it faces challenging issues of governance affecting policy, planning, and finance for transportation, and a complex array of infrastructure issues. While underwritten by petrodollar sourced sovereign wealth funds, both Dubai and Abu Dhabi have adopted a public-private governance model that adapts to a global shift from managerial to entrepreneurial governance, (Harvey, 1989; Bock, 1998; DiGaetano, 2013; Macleod and Goodwin, 2013).

In that shift during "a time of economic and political instability . . . mechanisms of inter-urban competition shape outcomes and generate micro-economic consequences ..." (Harvey, 1989). But commercial air transport generates an external governance (IATA) that regulates much of on the ground facilities as well as in the air as entrepreneurial city systems, their governance issues affect decisions over economic development investment in trade and transportation, export, and tourism industries.

While most all world cities share some political and economic factors, governance may differ as much as landforms and geographical location. But an emerging research literature focuses on the specific role of governance in regulating all modalities of transport, cargo and passenger carriage, facilities, and infrastructure, the larger the mix and quantities of flow, the more complex the relationships. As well, cooperation and competition among major seaports, airports, and surface transport hubs.

On the ground, however, locations, geographical, economic, political, social, and morphological realities have challenged airport centric development models at both municipal and urban regional scales. Multimodal urban hubs, however, have proven successful models for urban regional development, especially as multiport that encompass seaport anchors for polycentric conurbations.

This study also addresses conceptual issues less well represented in the Arab Gulf urban transport related development literature. It applies the concepts of polycentric conurbation toward situating UAE cities as components in a coastal urban regional formation. This rapidly expanding coastal conurbation increasingly links the seven Emirates and their respective cities. Although each Emirate remains a semi-independent political-economic unit, they increasingly function within a federal national system. The study thus makes a case for the UAE as a set of polycentric urban systems uniting national and sub-national units. One central question arises, however, what impacts will this expanding national transport infrastructure have on urban development across the Emirates as a whole. What effect will the new Dubai World Center (DWC) multiport facility have on distribution of economic flows among the other Emirates and Cities. Furthermore, within the UAE's polycentric conurbation, how

will the DWC multiport and the Etihad National Rail system (currently under construction) shape development among existing cities. Finally, will a more integrated national transport system allow Dubai to hold its current edge over Abu Dhabi's investment power and steady multi-sector development as the national capital. Moreover, will the smaller Emirates be able to benefit from enhanced national trade and transport given the disproportional scale and proximity of Abu Dhabi and Dubai at the center of the coastal conurbation. Already UAE policy experts are discussing a secondary conurbation of Dubai-Sharjah-Ajman (DSA) as a single metropolitan unit so tightly integrated that many municipal services and urban land use planning would benefit from some form of functional and administrative integration, (al Qassemi, 2014).

From the outset, this research predicated on a qualitative analytical approach, of necessity critically reviewing and discussing the theoretical and policy issues involved in the empirical situations. First, how well do concepts of megacity polycentricism fit the UAE in comparison to larger, more populated, industrialized world-cities, and or multiport regions, such as Europe's Randstad or Paris. Second, Dubai already ranks in the GaWC top ten world cities, the DSA metropolitan population of 3.25 million puts it among the top 10 Arab cities, and with "a combined GDP of over \$100 billion, makes the DSA conurbation the eighth biggest Arab economy," (Al Qassimi, 2014). Already discussed among transport experts, the extension of the Dubai Metro as a DSA Metropolitan Transit System has been compared with the US Atlanta or Washington D.C., (WMATA), regional transit systems.

A number of theoretical constructs apply to the UAE and its coastal urban region and are examined for clarity of focus on the role of transportation in national and regional development. Globally, the UAE situates as both a midpoint and final transit destination between Europe and East Asia. Moreover, economic analysts increasingly recognize the UAE as a central locus of trade, transport, and communication within the emerging Middle East-North Africa-South Asia (MENASA) economic region. With a population of 1.6 billion, and GDP of US\$ 3.1 Trillion, MENASA economic power equals China's, (De Boer, K., et. al., 2008). A significant amount of global maritime cargo transits MENASA through the Mediterranean-Indian Ocean corridor. Factoring in air transport routes that converge around GCC cities, break-port trucking, and emerging rail cargo links, means that the transport sector secures an economic centrality for the UAE. Aside from those physical factors, related information, and communication technologies (ICT), logistics and flows (soft sectors), add knowledge capital that enhances the UAE's economic status. Together with political stability, entrepreneurial oriented governance, and receptivity to commerce and industry with incentives for financial investment (FDI), all enhance the UAE's potential for continued urban development.

In short, the greater the UAE investment in transportation sector development, enhanced material and information flows will increase value added spin-off opportunities.

NOTE: Does Dubai constitute a mega-city by itself, or does the whole coastal conurbation inclusive of Abu Dhabi, Sharjah, and Ajman, assume such a status? If it takes the entire conurbation to constitute such a polycentric mega-city region, what do we label such a place that has no single center? Here politics enters, as Abu Dhabi demands as much recognition as Dubai. Do we construct an acronym such as ADDSA (Abu Dhabi-Dubai-Sharjah-Ajman)? Whatever the final choice, for the purpose of this research we use the acronym ADDSA.

Does ADDSA constitute a regional portal or gateway city? If for the UAE, the answer is obviously yes. If for the Arab Gulf region, the answer is also yes, as no other coastal urban formation, i.e., Kuwait, Manama (Bahrain), Doha (Qatar), or the Saudi Gulf Coast port-cities, comes close to matching ADDSA's flows, infrastructure, social and knowledge capital.

Therefore, both globally and for the MENASA global region, ADDSA constitutes a megacity gateway region and convergent transit and destination multiport.

These designations represent both opportunities for and constraints to development. When we further situate the ADDSA urban region in relation to the well-established polycentric mega-city, multiport regions e.g., Randstad (NL), Paris (Bassin Parisien), Frankfurt-am-Main, c.f., the initial criteria assumed an enlarged metropolitan region encompassing overlapping coalescent urban areas within easy commuting distances, (Halbert 2007; Hall and 2528

Pain, 2006; Koosterman and Musterd, 2001). While more densely settled regions in Europe, parts of Asia and the Americas, facilitate such city clusters to meet those criteria, the MENA mega-regions more sparsely settled desert environments, especially the Arab Gulf, hold few such large-scale clusters. Thus, assessing ADDSA as a conurbation, however polycentric, raises questions over a threshold of well-developed secondary cities in close and easy commuting distances. In this case it is necessary to stretch the spatial criteria and include air transport in the equation. That is, UAE airport catchment areas encompass several major Arab and Iranian cities within one to two hours flying time, which raises the importance of the numbers of carriers and flights between regional destinations. Secondly it assumes a quantity, quality, and proximity of facilities and services that meet the needs of air commuters, especially business travelers. Thus, under the geographical and locational conditions of the Arab Gulf, air travel among cities is of greater importance than in Europe or more densely populated regions where road and rail may compete in time and cost with air. That said, many regional residents still prefer vehicle transport for traveling with families, flexibility, and privacy, thus culture mediates against rational choice of lower cost and time for air travel.

Another set of factors reduces scale from global and meta-regional, i.e., MENA/NENASA, and mid-range regional, i.e., the GCC, to the self-contained UAE conurbation and outer cities, such as Fujairah, Al Ain, and the newly developing cities of Abu Dhabi's Western Region. On this national scale, enhanced transportation creates a cohering affect, although competitive push-pull and win-lose factors remain. For example, the Ras Al Khaimah (RAK) airport has long struggled against more competitive centrally located and better serviced airports, and its carrier (rakairways) has currently suspended services. Etihad Rail will be opening a high-speed link between Dubai and Abu Dhabi by 2018

(Arabian supplychain.com, 2012), but when it establishes passenger services to the outlying cities (date unannounced), intercity travel should significantly reduce road time, and given logistics, should compete favorably with air travel time. Thus, as enhanced transport options and services multiply, domestic intercity air travel, especially shuttles to the major international airports of Abu Dhabi, Dubai, and Sharjah, these secondary airports may be the losers. If that might be the case, what kind of secondary multimodal port developments — rail, road, sea, and air— could revive these smaller urban centers within the larger conurbation, even if peripheral.

Most of these questions cannot presently be answered within the framework of this research. But to pursue the central questions — what impacts multiport and/or Aerotropolis may have on urban development—turns to the new DWC. Within the multiport DWC, the Al Maktoum International Airport complex was designated as an Aerotropolis model. This state-of-the-art full-service complex integrates rail and road, air, and sea transport, to expand Dubai's multimodal transport capacity, beginning with cargo then phasing in passenger service. While the Jebel Ali urban region encompasses the DWC, it also dovetails with the greater Dubai metropolitan area, which has sprawled along the coast to dissolve any distinct division. While a significant amount of published research on urban development has focused on the role of transportation, ports airports, and multiport (multimodal transport hubs), few studies address the United Arab Emirates (UAE) and Arab Gulf's rapidly expanding urban regions. Across the research literature, multiple scenarios address urban spatial planning, others focus more on transport specifics, from economics to policy, logistics to physical infrastructure. In assessing spatial planning models of airport driven development, for example, Freestone and Baker (2011), point to the necessity of wide-ranging sustainability as underlying governance and planning for mixed-use urban nodes. This is especially critical when global air transport anchors regional socio-economic units. Spatial and morphological dimensions of such units vary, the environmental and historical urban patterns encompassed (Brueckner, J., 2003). Considering a global network of urban regions as nodes in a process of flows that are crucial to any development, Castells (19xx) initial work has been furthered by studies of air transport in relation to physical and information flows (Hesse, M, 2013). While Dubai and Abu Dhabi may currently rate as secondary world cities, the global economic shift (Dicken), flows associated with their rapidly continuing development mark them as significant players in the global network. Governance represents another element affecting investment policy, planning and regulation of urban regions, and in particular, the UAE conurbation concentrated around the Dubai-Abu Dhabi metropolitan corridor. While underwritten by petrodollar sourced sovereign wealth funds, Dubai follows a public-private model of a global shift

from managerial to entrepreneurial governance, (Harvey, D., 1989; Bock, G.R., 1998; DiGaetano, A., 2013; Macleod, G. and Goodwin, M., 2013).

When studying air transport, travel, and airport specific aspects of urban development, two opposing theoretical propositions emerge. The first and larger group view airports as dependent elements within complex multifactorial dynamics of urban areas. A smaller yet significant group propose that airports are pivotal to the overall futures of urban areas, their economic and spatial development, policies, planning and growth. Given the dependence of the UAE on the air transport industry, airports, cargo and passenger traffic, our research intends to assess how relevant the Aerotropolis and Airport city models are to UAE's urban development. Thus, it also initiates a comparison with other urban development and spatial planning models, including related theoretical propositions and empirical studies focused on other urban areas that are significantly dependent on the air industry.

First, it is necessary to examine the issue of universality proposed by these airport centric models. In the air-centric city literature places little emphasis on scale, the physical size of cities in relation to potential air cargo and passenger flows. Second, these models, especially Aerotropolis, assume a universal morphological structure, without considering existing patterns as well as environmental adaptations. In this case the UAE's major airports are in a coastal conurbation at the edge of an immense inland desert, and historically, settlements such as Dubai are seaports, and remain such. Moreover, the UAE conurbation represents a polycentric

Furthermore, these models assume a steady increase in the growth rate of air transport and travel, which currently face challenges relative to a range of changing global conditions, such as fluctuating commodity chains, (Derudder, B and Witlox, F., 2010; Dickenson).

How do transport systems, and multimodal ports, relate to complex issues of urban development? More specifically, how do airports impact the morphological, social, and economic development of cities, those in the Arab Gulf region. This research examines convergent development processes among urban regions and transport systems. Such investigations cross academic disciplines and include professional studies, government reports, industry, and news media (Dicken, P., 2011). Topical literature encompasses transportation, urban planning, land use, governance, and economic development, (Taaffe, E.J., Gauthier, H.L., and O'Kelly, M.E., 1996). Pertinent information also derives from geographical, regional studies, and news articles on the United Arab Emirates (UAE), and Gulf Cooperation Council (GCC). Global urbanization concentrates around major cities that offer greater employment, social and economic opportunities (, such urban areas thrive on greater flows of capital, industry, human resources, proximity to other urban areas and multimodal transport links to a global grid of land, sea, and air transport (Ducret, C., D, Ietri, C. Rozenblat, 2011). Of the many factors that influence urban development, geographical location and environment are crucial, and the strength of multiple transport urban nodes fall into two categories, those which are set apart —not in proximity/adjacent to other such ports — and those in close proximity / adjacent to other such ports. Location does make a difference in each mode of transport, and in combination. Globally, most major multiport nodal cities, and their surrounding urban areas share proximity with other major urban areas and/or are located within relatively densely populated regions (Ducret, C., D, Ietri, C. Rozenblat, 2011). Often such regions sprawl across national boundaries, especially among European countries sharing proximity (Notteboom, T., 2007). In the case of the UAE, its sub-national city states (7 Emirates) share a coastal metropolitan region — conurbation / urban agglomeration— that encompasses its two largest cities and smaller adjacent cities that belong to each of the other Emirates. Each city hosts a combination of differentially scaled ports (air, sea, and road), none of which is located more than a 60-minute flight time from each other. As well, both Muscat (Oman) and Doha (Qatar) airports are in the same flight time circle, and also host major seaport facilities. Road links are well developed within the UAE, but less so among other major GCC cities.

Historically, the Arab Gulf cities have all developed as seaport hosting trade, fishing, and pearling industries. The air transport arrived in the Arab Gulf States early on as convenient locations for British Overseas Air and military fueling stations. With independence from under UK Imperial domination, (1972 in the case of the UAE), air travel and transport were already more developed than the actual city states comprising the UAE. It was, however,

this location of midpoint between European and Asian destinations that fostered growth of both air transport and urban development. Beyond the technical and labor demands of petroleum industries, those revenues financed infrastructure and urban development. In addition, expanding global trade, logistics, and warehousing boosted the UAE's demand for international labor in construction, services, commercial and professional fields. Taken together, the internationalization of trade, services, and its labor force opened a mosaic of air travel into the UAE. As the Dubai's commercial and tourism infrastructure grew and attracted greater numbers of visitors and corresponding revenues. Sovereign wealth funds invested in Emirates Air, the UAE's premier air carrier, and its Dubai hub led to a steady growth in routes and destinations with reciprocal agreements for airspace and landing rights. Along with the growth of Emirates Air and the number of other carriers serving Dubai inevitably created demand for a built up in Airport facilities and services. Thus, a combination of passengers from transit to tourism, business, and government, along with air cargo, situated Dubai as the major airport in the UAE and in Arab Gulf Region.

Overall, Dubai's urban development and growth could not have happened without such air traffic, facilities, and services. But this fact also raises questions regarding the role of an allied adjacent seaport (Jebel Ali), with its infrastructure demands, and the role of the larger conurbation encompassing the UAE's second and third cities, Abu Dhabi (the national capital) and Sharjah. The UAE's combined coastal region stretched from Abu Dhabi's desert and offshore petroleum fields adjacent to Saudi Arabia, northward to the tip of the peninsula and Oman, and increasingly constituted a conurbation linked through an advanced highway system. But as competition and demands for development increased among the individual Emirates, secondary airports also expanded with traffic edging upward, although remaining well behind Dubai. As demand for air transport correlated to urban development rapidly increased, Abu Dhabi sought to regain the lead as Etihad, the national carrier and UAE's oldest air service, was based in Abu Dhabi and owned by the rulers of that Emirate. Abu Dhabi's demands for direct air service increased in proportion to its massive investments in industry, commerce, culture, tourism, and status as national capital. But Dubai's response was a planned expansion of its Jebel Ali port facilities, already extensive infrastructure, and logistics, by building the al Maktoum airport, as the world's largest.

As the larger framework for this research focuses on the UAE, this initial investigation specifically addresses Dubai Airport in relation to issues of how air traffic and the airport impact urban development and vice versa. Two theoretical models investigated here assess the interactive impacts of airport, air traffic, and development in relation to the urban core, and within the UAE coastal conurbation, which an earlier IUDRG study labeled the *Black-gold Coast*, (Brownson, J, 2009). The following parts of this research project will address specific development factors of Abu Dhabi, and the rest of the UAE's secondary airports and their respective urban cores. These specific studies will correspondingly apply and critique the same two models, *Airtropolis* (Kasarda, J., 1998) and *Airport cities*, (Appold, S., 2013a), assessing their relevance to the UAE. In a comprehensive economic comparison of these two models, Stephen Appold (2013b), makes a point that both planning models "go wrong from the start by putting the airport at the center of thinking".

Assessing relationships between airports, and multiport urban areas from perspectives of urban spatial geography, several other approaches contradict such airport centric models. Urban economics, for one thing price land values in relation to use and exchange values, the higher the use value, the higher the market value, which determines how the land will be used. Airports occupy large expanses of horizontal spaces, including secondary activities such as warehousing aircraft services and logistics, hence a low value land use. While nearby clusters of hotels and hotel-convention complexes represent exceptions to low density low use value, the value of air passengers to the larger area's economy may offset low value land use costs. When accounting employment in relation to passengers as consumers of airport goods and services, those elements do contribute significantly to overall economic value of airport facilities. Appold (2013b) refers to multimodal transport nodes, such as Europe's *mainports* serving strong polycentric urban regions (catchment areas) as successful versions of Airport centered urban spaces. Poor planning and design largely result in failed attempts at developing an Aerotropolis, in part due to conceptual, political, and economic divisions among the different knowledge sectors involved. Likewise, financial investors may not be able to withstand the length of time before returns accumulate, if adequate or at all, an equal problem for public, private sector, and partnership investments.

CONCLUSION

While Kasarda's Aerotropolis model has been criticized from many dimensions, and even though it is spawned several international applications, its American-centered approach fails to account for multiple differences, from location to culture. The question of whether it fits the UAE-Dubai situation differs from generic models as well as from other locations. First, Dubai's development as a postmodern 'instant' city is inconceivable without parallel developments of commercial cargo and passenger air transport. Second, the greater its economic diversification, the greater Dubai's reliance on air transport, passenger services. Third, Dubai's sovereign wealth funds enabled its investments in both Emirates Airlines and a major airport with world class facilities. Fourth, that investment capital secured its position as a regional entrepot, crossroads for East-West trade, and transfer point for long distance transit passengers. But Dubai has also acted as a pivot within the UAE's *Black Gold Coast*, bridging Abu Dhabi, the largest Emirate and its national metropolitan capital region, with the smaller Northern Emirates. Dubai also represents an iconic multipurpose destination, business, and investment opportunity node in a global urban network of 'world cities. The designation 'world city' derives from the GaWC ...

Regarding the impacts of airport and seaport facilities on urban development, few inland cities, whatever the size of their airports and effective rail and road links, can compete in cargo handling capacity without river links to open seas. Location thus further divides into coastal and/or water linked multiport cities and urban areas without such links. Thus, given conditions of globalized trade, multiport cities or conurbations have competitive advantages over urban areas with less diverse transport interfaces.

The expansion of urban regions starts with their location in relation to local resources and flows of investment, intellectual, and material capital. Current theories of urban growth view cities as, theoretical, and empirical development over the past half century, much has been published across academic, industrial, commercial, and governmental media on the impacts that airports have on urban and economic development. Globally, post WWII economies experienced a rise of commercial air transport eliciting a boom in urban airports as cities sought greater economic development opportunities.

Beyond military and governmental use of air transport, a commercial sector encompassing private carriers, airports, logistics and infrastructure expanded in tandem with increasing cargo and passenger air traffic. Across national, regional, state, and local governmental sectors assistance to airports joined with increased private investment to ride a wave of civilian air transport. As the Cold War ended, the world shared a hopeful vision in the emergence of a truly globalized free market connected by land, sea, and air transport. Pioneering efforts in multimodal transport nodes and networks merged with a rise in duty free ports and zones as public-private partnerships developed to attract global industrial, commercial, warehousing and logistics investment. But natural locational advantages soon contrasted with marketing and competition among cities and states for greater shares in traffic. Land transport faced harsher competition between rail and road, as a globally powerful private sector trucking industry increasingly made inroads into largely government owned rail transport systems.

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