

### Without Planning? Incremental Emergence of High Density Mixed Use Centres in Mega Manila

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## 1 SUMMARY: EMERGENCE OF MULTI-TIERED POLY-CENTRAL AGGLOMERATION BY MARKET FORCES

Regional Growth patterns. Metro-Manila, also referred to as the National Capital Region (NCR) of the Philippines, is composed of 16 cities and one municipality and is home to about 12 million residents. The conurbation Mega-Manila includes Metro-Manila and several provinces in its periphery. It has been the traditional focus of the national economy and is continuing to grow beyond 26 million, more than one fourth of the country's population. Its recent spatial development patterns can be described as: 1. Expansion at the peripheries mainly north and south due to topographical context, 2. Growth of higher density areas from the core out into the region and increases in densities of centre cities 3. Growth of regional cities skewed towards the direction of Manila, 4. Land use segregation and primarily horizontal developments at the periphery - but notably with heightened densities for the various typologies, 5. Expansion of urban centres with increasing compactness, densities and land use mix, 6. Emerging new centres and centre clusters at locations with preferential access. (For 1-3 compare: Corpuz, Art 2010).

New, distributed compactness. Urban centres are increasing in density and expanding geographically, and high-density integrated clusters are starting to develop at transit stations. Pedestrian circulation and the acceptance of public transit, especially of the younger middle class, are increasingly significant. Despite high temperatures and tropical rains, outdoor activities for public gatherings, festivals, markets, concerts and daily activities such as al-fresco dining, taking a stroll along a shopping street and a park, children's play in parks and playgrounds, jogging etc. are becoming more visible. This seems true for all strata of the broad low-middle-high middle class and has a tangible impact on the urban environment. Commercial, entertainment areas and malls are starting to add multi-level outdoor spaces, plazas and pedestrian streets and landscaped sidewalks with shops at ground floor levels. The desire to live in these mixed use centres, being able to avoid traffic congestion, as well as a new young middle class that can afford small condominium units and investments by overseas workers are drivers of residential high-rise and integrated developments.

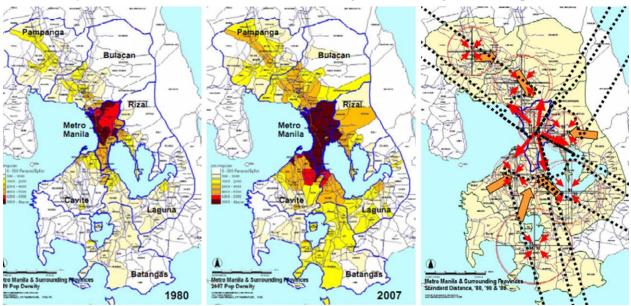


Image 1: Mega Manila population density and spatial development trends. Source: Corpuz, Art 2010.

A multi-tiered, poly-central region is emerging one could almost say 'naturally' following market demand. This appears consistent with a more compact and eco-efficient land use pattern. Market forces, however, inefficient, seem to be the primary driver with private sector initiatives guiding as well as following lifestyle preferences in their competition to attract customers. Although individual city and land use plans exist, formal, institutionalized planning seems to play a marginal role due to a weakness of implementation as well



as the lack of an effective metrowide plan. But there appears to be a renewed recognition for inter-municipal coordination e.g. the recently announced Metro-Manila Greenprint 2030 initiative in March 2012. Metro Manila and its surrounding provinces continue to face many pressing problems (e.g. traffic congestion; lack of affordable housing, open space and recreational areas; increasing risk from natural and man-made disasters; poor air quality). But thepotential for more active and purposeful planning to guide and support current development trends and opportunities is increasing even as it remains unfulfilled.

## 2 PLANNING SYSTEM: DEVOLUTION VERSUS CENTRALIZATION, PLANNING VERSUS IMPLEMENTATION

Devolution following centralization. To understand why governmental, institutionalized planning at the regional level is relatively weak, one must understand a basic aspect of administrative culture and look at a specific piece of history following the ouster of former President Marcos in 1986. The landmark Local Government Code of 1991 devolved administrative powers to local government units. That included selected tax resources and responsibilities for providing a defined set of comprehensive services to the local community. The result has been unprecedented local autonomy, particularly for cities and municipalities, at the expense of metropolitan and regional institutions. The benefits accruing from local autonomy are clear—including greater local participation and stewardship and potential for bottom up innovation—although it has also led to a fragmented planning and governance structure to the extent that a federal system has been proposed as an intermediate level to overcome the challenges that have risen from devolution.

Barangays. Below the city level and sometimes only a few blocks in size, is the Barangay level, which can translate into the local village or neighbourhood level. Barangay administrative authority is limited to its relatively small area of jurisdiction but its leaders (Barangay Captains) can sometimes wield significant political power especially if they are closely allied with the City or Municipal Mayor. In some cases this leads to fragmentation of planning and implementation, which tend to fall along local political alliances and corresponding decision making processes.

Cities/Municipalities. Formal planning authority, particularly land use planning and zoning, lies with cities and municipalities. Local plans are ratified by provincial and regional committees and in some cases the national level Housing and Land Use Regulatory Board, but as a whole, cities and municipalities enjoy substantial autonomy in local governance and planning. Nonetheless, local land use and development plans appear to have had limited impact on development. Only a minority of plan, projects and activities identified in local plans (about 15%-30% according to one provincial level study) have been budgeted and implemented. And the key contstraints relate to inconsistent planning practices and processes, lack of enforcement and political interference. Typically, the weak planning and implementation role of government has allowed private developers, especially those with relatively large landholdings, to drive urban growth trends and directions with their large scale developments. These include the provision of public transportation and other infrastucture, land use management, and other quasi-public services.

Metro-/Mega-Manila. One of the major casualties of local autonomy is the Metro Manila Development Authority (MMDA). Once at the leading edge of metro-level governance, planning and management (prior to the passage of the Local Government Code), the MMDA now has limited legislative and executive authority, with jurisdiction only with respect to a few metro-level concerns such as selective transportation management, waste management, flood control and a few other tasks. Current plans to extend two light rail lines and the addition of another line are in place but these are under the jurisdiction of national agencies (i.e. Departments of Transportation and Finance). No substantive strategy exists as far as the structure of Metro Manila is concerned and it appears that without further major intervention, it will develop according to the incremental impacts of various uncoordinated and separate sectoral investments (i.e. public works, transportation and communication, tourism, etc.) driven by national level agencies and the private sector. Mega Manila, meanwhile, has no formal status and authority or organizational body and is used solely for statistical purposes and planning considerations.

Provinces and Regions. Formal planning exists at the provincial, regional and national levels. The National Economic and Development Authority (NEDA) is responsible for making long and medium term national development plans and, through their regional development offices and councils, regional development plans. Each of the 14 regions of the country includes clusters of the provinces. Regional councils are



administrative and planning organizations without political mandates and are governed by representatives of local governments and national agencies, with the regional NEDA office serving as technical secretariat.

Mega-regions. Like other administrative regions, Regions 3 and 4 have their own regional development plans and each of their component provinces have provincial development plans. Because Regions 3 and 4 surround Metro Manila, they are collectively referred to as "Metro- Luzon"--one of four so-called Mega-regions in the country. Metro Luzon forms the economic core of the country, accounting for the bulk of national economic output. Metro Luzon is used only for planning and statistical purposes, primarily by NEDA.

Opportunity of alliances for planning? It seems that key challenges for Metro and Mega Manila are the coordination of fragmented plans of their constituent local governments and with implementation. Many local government units have limited financial resources to provide for relevant infrastructure. At the regional and national levels, enforcement of regulations, successful financing mechanisms, implementation of plans and cohesive decision-making through the various administrative levels and lining up budgets and financing of projects following integrated plans is severely constrained. And yet despite these challenges, there is a discernible trend within Mega Manila towards a consolidation of a multi-tiered spatial structure with higher densities, compact centres and public transit links. If inter-municipal cooperation as well as coordination among large private sector players and involved institutionals can be organized effectively, then the opportunities to build on and enhance this trend through more efficient planning, financing, implementation and enforcement are likely to produce even much greater results.

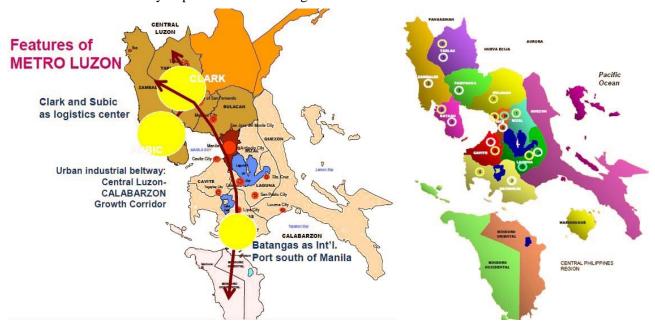


Image 2: Metro-Luzon "Super-Region". IT parks and SEZ's. Source: NEDA 2006.

## 3 CONTINUED GROWTH OF METRO- AND MEGA-MANILA AND METRO-LUZON: THE NATION'S FOCUS

Economic growth. Following the Asian crises in 1997 the Philippine economy has fully recovered and grows at a rate of 4%-7% annually. Selected sectors are driving the country's income namely BPO (business process outsourcing often referred to as call-centres), manufacturing of consumer electronics for export, tourism, mining, agriculture, furniture, trade, logistics. Also the growing number of Overseas Filipino Workers (OFWs) and their remittances to their families have become a significant contributing factor to the national economy and domestic consumption. All these promote urban development and, in particular, the real estate business industry in the capital region.

Concentration of economy in Manila Region. Most of the economic activities continue to locate in the larger Manila region creating jobs and attracting new residents. One third of the country's GDP is generated in Metro-Manila, even more than one half in Metro-Luzon and 26% of the 102 million Filipino population reside in Mega-Manila. This trend allows for a regional economy of significant scale with synergies and efficiencies as various economic sectors cluster in this region. The flip-side is that such concentration

burdens technical and transportation infrastructure as well as the integrity of the physical environment. Social disparity and spatial polarizations are also more apparent. These are severe challenges which require solutions at the regional and local levels.

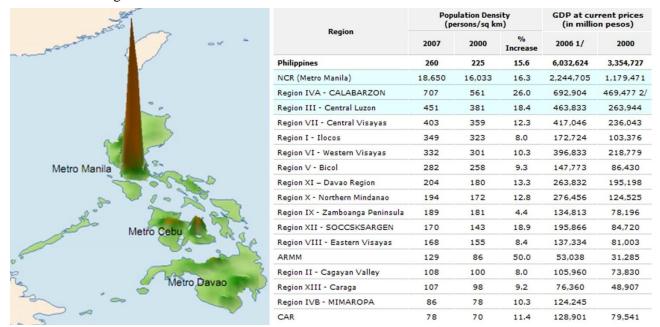


Image 3: Visualizing Economic Density in the Philippines. Source: Corpuz, Art 2010 / World Bank. Population and GDP per region. Source: http://www.nscb.gov.ph/factsheet/pdf08/FS-200806-SS1-01.asp

## 4 SPATIAL DEVELOPMENT AND LOCATION PATTERNS IN METRO MANILA: DENSER, HIGHER AND MORE MIXED IN THE CORE

Expansion with higher densities and centre-clusters at the periphery. Compared to previous peripheral developments in the region, recent growth at the fringes are of higher densities. Even with single family subdivisions, lots tend to be smaller and thus lead to higher density developments. Mid-rise and in some cases even high-rise residential and office developments are now visible in new clusters at the periphery, e.g. the consolidation of Alabang Town Center in Muntinlupa City as it expands as a commercial and business centre with some high-rise office and housing. The average density of Metro Manila is about 20,000 people per square kilometer and some of the higher density core areas are twice to three times this level.

Expansion, densification and completed mix in existing centers. Mature centres, including the largest in the country (Makati and Ortigas) as well as others such as Binondo (Chinatown), Ermita/Malate etc, are likewise evolving with new developments that have a wider mix of uses (residential condominiums, offices, hotels, and entertainment and cultural facilities), higher densities (due to the continuous appreciation of land values) resulting in more compact urban forms.

New centre-clusters in the region's core at transit stations. High density mixed use clusters are emerging along the main arterial corridors of Metro Manila especially the ring roads EDSA and C5 and in proximity to transit stations. Typically developed with high-rise condominiums and shopping malls, these clusters are also attracting high-rise offices mostly catering to the BPO industry and leisure facilities. Examples are Pioneer Highlands, East Avenue Station, Magallanes Station and the Taft Avenue Corridor along the LRT2 line.

Limitations of transport and transit lead to constraints of centre locations. The current public transit system falls short of Metro Manila's requirements. Plans and budgets for two LRT line extensions are currently being worked out. This is a good start, but significantly more rail-based transit as well as BRT are needed, along with more effective management of other public and semi-public transportation services such as buses, minibuses ("jeepneys"), and tricycles. The demand for more transit lines is likely to increase, especially if traffic congestion worsens but even at current growth levels.





Image 4: Metro Manila Transit: One MRT, two LRT and two regional rail lines. Source: www.johomaps.com & www.urbanrail.net

## 5 MAIN DRIVERS FOR DENSITY AND COMPACTNESS: HIGH-RISE RESIDENTIAL AND OFFICE DEMAND

The overall economic growth the country has been experiencing over the past decade has accelerated activities in urban and real estate development and private investments.

Sectoral industry growth, especially the BPO industry, manufacturing of electronics for export, MICE, tourism and generally the service industry continues to create demand for space in various market segments:

- Demand for smaller condominium units by a growing young middle class with jobs in the BPO, manufacturing and services sectors.
- Demand for office space for BPO in lifestyle-themed places that are popular and accessible for young professionals; competition among BPO developers and locators have encouraged deconcentration even as the large metropolitan areas of Metro Manila and Cebu remain the preferred cities of address because of the availability of higher level services and transportation infrastructure.
- Demand for hotel rooms for a growing number of business travellers, MICE participants to Manila as well as recreational tourists visiting the country's abundant and picturesque beach destinations.
- Demand for retail, f&b and entertainment space mostly in integrated locations with higher densities.

OFWs have been sending remittances to their families at home, enhancing purchasing power for commodities and real estate products; Many OFWs directly invest in condominiums preferably in high rise mixed use developments similar to those in the foreign countries where they work.

With savings and cash reserves increasing, well to-do families are buying luxury condominiums in premium locations as investments in light of property price appreciation as well as to add to their personal portfolios a downtown residence in parallel to suburban single family residences.

# 6 EMERGING MULTI-TIERED CENTRES STRUCTURE WITH NEW TRANSIT ORIENTED CLUSTERS IN METRO MANILA

A differentiated centres hierarchy is emerging in Metro Manila following the general trend of increasing densities. Noticeably, the importance and relative weights among centres are shifting according to incremental developments and expansion of the core areas.

At the top of the list are two CBDs that serve as the primary, national-level centres of business in the Philippines: Makati and Ortigas (1A and 1B, with an estimated 3.5 and 1.5 million office gross floor area, respectively). Both have experienced robust growth with Makati clearly leading in terms of quality and coherence of development as well as delivery of services. The "new star" rising among Manila's centres is Bonifacio Global City. This 340 hectare, master-planned mixed-use urban district was developed starting in the mid-1990s and is rapidly becoming the preferred business and residential address of the metropolis; it is



approximately 30% built-up and, because of its proximity to the Makati CBD, may be expected to merge with the Makati to form the largest CBD of the country. A few second tier centres like Binondo Manila's Chinatown and others are in the process of incremental redevelopment through private investors that have added high-rise residential and office developments and upgraded retail malls. A major question mark concerns the future of the large scale reclamation area in Manila Bay that started with much promise many years ago but remains at the functional fringe of the primary CBDs of Metro Manila.

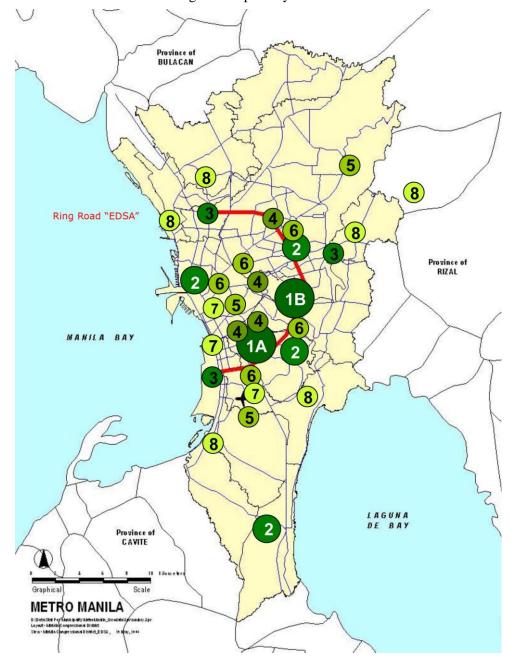


Image 5: Mapping Metro Manila's centres according to the hierarchy suggested above. Source: Art Corpuz

The current multi-tiered hierarchy of centres may be described as follows:

- (1) Primary CBDs with international and national businesses and linkages, shopping, F&B, entertainment, residential, medical, government, hospitality, culture (Makati: 1A, Ortigas: 1B Future: Makati + Bonifacio Global City 1A+, Ortigas 1B)
- (2) Second tier CBDs (Bonifacio Global City (at present), Binondo-Divisoria, Cubao, Alabang)
- (3) Centers with critical mass and mix that are focused on commerce (Manila Bay Reclamation with Cultural Center and Mall of Asia, Eastwood, Monumento, etc.)
- (4) Mixed-use clusters and -developments as satellites to first tier CBDs or at arterial roads (Jupiter, Rockwell, Greenhills, North Triangle, etc.)

- (5) Centres focused on government and institutions (Batasan Government Center in Quezon City, University Belt, NAIA Airport Complex, etc.)
- (6) Emerging transit-based high-density mixed-use clusters (Pioneer/Boni Avenue, East Avenue Station, Quiapo, Magallanes Station, Banawe-Sta Mesa, etc.)
- (7) Centres focused on entertainment, commerce, hospitality (Newport-Resorts World, EDSA / Roxas Ermita-Malate, etc.)
- (8) Mixed-use districts and city centres, typically mid- and low-rise higher density (City centers of Taguig, Pasay, Pasig, Antipolo, Marikina, Valenzuela, Malabon, etc.)

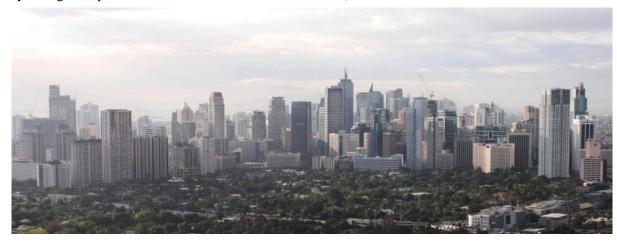


Image 6: Makati CBD Skyline. The Nation's first and primary address for national and international businesses. Source: Stefan Rau.



Image 7: Ortigas Center. Metro Manila's second top tier CBD anchored by ADB, San Miguel and major malls. Source: Stefan Rau.

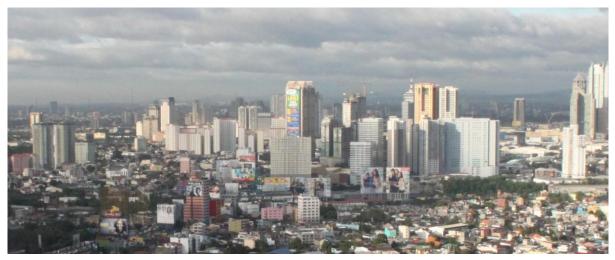


Image 8: Pioneer / Boni Avenue at EDSA. Emerging mixed-use cluster based on transit station of MRT line. Source: Stefan Rau.

## 7 METRO MANILA'S SHOPPING MALLS: COMPLETE INTERNALIZED CITY CENTRES – FOCUS OF URBAN LIFE

In discussing Metro Manila's centres, one needs to note the special relevance of shopping malls to the local culture in order to understand their extraordinary importance to public life compared to other countries. Local governments, through devolution, are tasked to provide a variety of public services and yet in many cases they have been unable to deliver—because of lack of funds, capacity and other resources. One key element that has not kept up with the increasing demand brought about by the increasing population and affordability is contemporary public spaces that can serve as centres of civic activity and public services. In its place, privately owned and operated shopping malls have become urban and civic centres in their own right where retail and other events that would typically happen in public spaces take place. Further, these malls are air-conditioned, an aspect that shouldn't be taken too lightly given the tropical climate. More important, the malls have become increasingly complex and complete in their mix of retail, food and dining, entertainment, professional, medical and educational services, cultural activities, and even religious worship. Undisputably, they have become the location of choice for all kinds of service providers, both public and private.

The church, the tax official, the car-registration office, the notary public, the attorney, the clinic, the hair-dresser, classrooms are next to the bingo-hall, retail stores, market stalls, supermarkets, food courts, restaurants, bars, movie theatres, farmer's markets, realtors, game-rooms etc. creating a complex, completed world that one hardly needs to leave. Malls have become the primary spaces of public life in Manila. And not surprisingly, malls have become attractors and catalysts for high-density developments with offices, residential and hotels.

### 8 PREFERENCES FAVOUR PUBLIC OUTDOOR SPACES

A fairly recent trend that can be observed is that public outdoor space is re-emerging as accepted places for public life, gatherings, al-fresco dining, cultural and entertainment events, markets, sports and recreation. Despite the unavoidable heat and rain of the tropics, pedestrian-based activities in public parks, plazas and sidewalks are becoming popular across a broad section of the middle class and across ages.

This trend and lifestyle preference is affecting a wide range of urban typologies. Shopping malls are adding outdoor spaces or are being reconfigured altogether to focus on green space. New malls are being designed around open spaces with open galleries blurring inside and outside spaces. Roads and sidewalks are being redesigned from being purely transportation corridors to becoming main-streets with improved sidewalks and added shops and show-windows on the ground floor, sometimes requiring modifications or even in violation of traditional zoning restrictions.



Image 9: Makati "Greenbelt". Open spaces and galleries are focus of new Malls. Source: Stefan Rau.

In new developments pedestrian-friendly design is being planned from the start, e.g. the case of Bonifacio Global City with its "High-Street" providing a heart to the district with a beautifully landscaped pedestrian public space west-to-east including inspirational and interactive pieces of public art and lined by attractive retail, restaurants and services.



Mixed-use developments directly link to transit stations allowing people to walk to public transportation, which is an accepted mode of transportation among the middle class. Throughout the metropolitan area, public transit enhancements are being planned and a BRT line has been proposed.



Image 10: Bonifacio Global City. Pedestrian "High Street" is heart of new district. Source: Stefan Rau.

## 9 CONCLUSION: TRENDS LIKELY TO CONTINUE AND HAVE THE POTENTIAL TO POPULARIZE AND STRENGTHEN PLANNING

The emerging multi-tiered, poly-centred structure of Metro Manila is mainly a result of private ownership and market dynamics following economic growth and social behaviour. Formal planning has not yet had a large impact on this trend. Yet planning does have opportunities to play a more significant role building on two main trends in behaviour: increasing transit popularity and preferences for urban lifestyles and open spaces.

The trend of increasing compactness in locations with critical mass and transit-oriented development is a positive contribution to a more eco-efficient agglomeration. This trend will likely continue; at least two additional transit lines have been approved for implementation and this will only encourage further transit oriented developments. Given the large scale and high density character of Metro Manila, however, many more transit lines have to be planned and implemented in order to increase and improve linkages among existing centres and to create more opportunities for integrated nodes. With their growing popularity, the general public, developers, and other market players will appreciate the introduction of new transit lines.

The renewed acceptance of open, exterior spaces as a venue for a wide variety of activities among an increasing segment of the general public carries a great opportunity for a new understanding and appreciation of planning. Rediscovering the power that good public space offers as an instrument to integrate many aspects of community, sustainability, transportation and urban life can only enhance the value and popularity of urban design.

We wish to propose a few principles of how the profession and practice of planning can make a significant contribution towards the improvement of the quality of life in Metro Manila:

- (1) Planners take the initiative and establish credibility and moral authority for strategic guidance, regional visioning, coordination and action, building on existing professional associations (i.e. Philippine Institute of Environmental Planning Advisory Committee) or creating a new one (e.g. Mega-Manila Planning and Policy Advisory Association)
- (2) Develop and get broad consensus on a vision and principles for Metro Manila's future, recognizing its importance to overall national development and its leadership in establishing models of best practice among national leaders, regional and various competing local leaders and stakeholders as well as competing institutions, political and business players.

- (3) Prepare structural frameworks for various sectors (leaving local governments to handle detailed land use and master plans). These can include trunk or arterial infrastructure particularly roadway and rail networks, waterways, green network, social initiatives.
- (4) Directly zoom in on a few, doable key projects, build consensus, coordinate and streamline action through all levels national, regional and municipal, identify business heavyweights for PPP to secure funding and timely implementation.

#### 10 REFERENCES

Asian Development Bank 2007: Medium Term Philippine Development Plan 2004 – 2010 - Planning Process. At: http://www.adb.org/projects/DMC-Officials-Orientation-Program/presentations/2007/Nov/wk2/Planning-presentation.pdf

Brillantes, Alex B. & Moscare, Donna Jr.: Decentralization and Federalism in the Philippines: Lessons from Global Community. At: http://unpan1.un.org/intradoc/groups/public/documents/eropa/unpan032065.pdf

Bases Conversion Development Authority BCDA, 2007: Expanding Horizons in Urban Development. In: 15 Years at the forefront of Development. At: http://www.bcda.gov.ph/file\_attachments/0000/0167/BCDA\_AR\_07.pdf

Bonifacio Global City: History, 2012. At: http://www.bgc.com.ph/about/history

Colliers International: Philippine Property Market. Research and Market Report. Q3 2011. At:

http://www.colliers.com/country/philippines/content/RealEstateMarketReport\_3Q11.pdf

Corpuz, Art, 2010: Mega Manila Development

http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan039002.pdf

Department of Transportation and Communications 2012: RA008-02: Formulating a National Transport Plan. At: http://www.dotc.gov.ph/index.php?option=com\_k2&view=item&layout=item&id=128&Itemid=89

Housing and Land Use Regulatory Board of the Philippines 2010: Accomplishment Report 2009. At: http://hlurb.gov.ph/uploads/agency-profile/2009%20Accomplishment%20Report.pdf

Housing and Land Use Regulatory Board of the Philippines 2012: Comprehensive Land Use Planning Guidebook. At: http://hlurb.gov.ph/services/local-government-units/clup-guidebook/clup-guidebook-vol-1/

Housing and Land Use Regulatory Board of the Philippines 1996: Model Zoning Ordinance. At:

http://hlurb.gov.ph/uploads/lgu/book5/MZO1996\_Part1.pdf

Jones Lang Lasalle Leechiu, 2011: Metro Manila and prov'l business districts will continue to grow. At:

http://www.joneslanglasalleleechiu.com.ph/Philippines/EN-GB/Pages/NewsDetail.aspx?ItemID=23854

 $Jones\ Lang\ Lasalle\ Leechiu,\ 2012:\ Philippine\ Property\ Market\ Monitor January\ 2012.\ At:$ 

 $http://www.joneslanglasalleleechiu.com.ph/ResearchLevel1/PMM\_MNL\_Jan2012.pdf$ 

Light Rail Transit Authority: http://www.lrta.gov.ph/

Makati City Comprehensive Land Use Plan 2000. At: http://www.makati.gov.ph/portal/uploads/staticmenu/docs/1.\_introduction.pdf Mercado, Ruben, 2003: Regional Development in the Philippines: A Review of Experience, State of the Art and Agenda for Research and Action. At: http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan005113.pdf

Metro Manila Development Authority MMDA Services - Development Planning. At:

http://www.mmda.gov.ph/MMDAservices.html

Morelos, Miko, March 7th, 2012: Green revival plan for laggard Metro. At: http://newsinfo.inquirer.net/157269/green-revival-plan-for-laggard-metro

National Economic and Development Authority of the Philippines, 2006: Urban Beltway Report. At:

http://neda.gov.ph/econreports\_dbs/mega\_regions/Urban\_Beltway.html

National Economic and Development Authority of the Philippines, 2001: National Framework for Physical Planning.2001–2030. At: http://www.neda.gov.ph/references/Reports/NFPP/execsum.pdf

National Economic and Development Authority of the Philippines, 2011: Philippine Development Plan 2011-2016. At: http://devplan.neda.gov.ph/

National Economic and Development Authority of the Philippines, 2011: Calabarzon Regional Development Plan 2011-2016. At: http://www.neda.gov.ph/RDP/2011-2016/RegIVA\_RDP\_2011-2016.pdf

Urban Rail, 2010: Manila. At: http://www.urbanrail.net/as/mani/manila.htm



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