363

Interiorised Enclosure and Long-Range Connectivity

Understanding Metro Manila's patchwork of privatised Central Business Districts

LEANDRO NICHOLAS RAÑOA POCO

UNIVERSITY COLLEGE LONDON

ABSTRACT

Metro Manila's edge defined by Circumferential Road 4/Epifanio Delos Santos Avenue (C4/EDSA), is characterised by its string of private mixed-use enclaves, central business districts and exclusive gated villages. This is a legacy of the parcellation of land following the Spanish colonial rule's encomienda system, American colonial expansion of the city, and post-war privatisation of Metro Manila's urban fabric. This study uses the quantitative methods of space syntax to understand how Manila's post-war expansion created the edge city commercial suburbs that have evolved to become Metro Manila's new Central Business Districts outside of the traditional Manila downtown. This study uncovers that these commercial private enclaves are configured for vehicular/global-range movement, and not for pedestrian/local-range movement. This can be characterised as an interiorised "un-natural" movement economy within these enclaves, as consumption (retail/services, catering/F&B) points-of-interest locations deviate from space syntax's traditional movement economies of commercial co-location along portions of the network which are accessible, and is instead internalised within large, air-conditioned building footprints (shopping malls and deep floorplate office blocks) with large car parking capacities. This highlights the recurring pattern of global private development wherein city and suburb making is configured for privatised enclosure, rent-seeking, and 'catchment control' of resident and car-commuter populations and vehicular traffic flows.

KEYWORDS

Metro Manila, Edge Cities, privatised CBD, un-natural movement economy, shopping malls

1 INTRODUCTION

1.1 Background

1.1.1 Suburbanisation, Edge Cities, and shopping malls

The world is expected to grow toward a 66 percent urban population majority by 2050 (UN, 2015, p.7). Cities densify and sprawl out, overrunning agricultural land and creating new suburbs (Torrey, 2004). Locally, Metro Manila's rapid suburbanisation into its rural fringes is documented and described by Ortega (2016, 2018).

Bourne (1996, p. 163-184) interrogates suburbs as they are traditionally defined, by discussing the different socio-economic lenses suburbs are understood. In doing so, he proposes that suburbs are not monolithic, sterile, solely residential, nor beneath the urban. In the contemporary Philippine context, this rings true with the rise of private commercial, industrial and mixed-use districts in the outskirts of metropolitan areas. These reflect the nuance being discussed by Bourne, but also threaten to echo and reproduce the same ills and dysfunctions traditionally associated with the suburban realm, as it sprawls out and covers more territory.

Garreau (1992, p.7) defines suburban Edge Cities as privately developed and managed commercial centres rivalling traditional American downtowns. These are accessible primarily through major highways and planned around the scale of the car. Sultana (2011, p. 1071-1088) questions the environmental and economic sustainability of Edge Cities as demographic shifts and lack of transit infrastructure are increasingly turning people off from the suburban lifestyle. The development of Metro Manila's post-war Edge Cities is documented and discussed by Pante for Quezon City (2017), and Garrido for Makati (2013).

Shopping mall complexes grew to anchor the post-war Edge Cities and suburban towns in the US. These were developed by Victor Gruen and Associates (Gruen and Smith, 1960; Gruen, 1964) as distillations of European civic squares and streetscapes. The mall was copied throughout the world, but signs of the decline of the Shopping Mall typology are widespread in the west with e-commerce and the rise of logistics leading to mall closures (Sanburn, 2017). In tropical countries like the Philippines (Connell,1999), malls remain dominant as they provide airconditioned comfort and a taste of the good life and abundance to their patrons.

1.1.2 Globalisation and Privatisation

Sassen (1990, 1991) discusses how cities become engines of global connectivity. Cities transmit and receive global movements of people (Urry, 2016), and are the nodes that form an extranational infrastructure (Easterling, 2014). Both funnel opportunity and economic advantage, making cities a contested territory. This happens in parallel to the neoliberal shift described by

Theodore (et al, 2011) wherein the privatisation of government assets privileges the private sector, thereby enclosing the previously public domain. This contestation of cities has led to gentrification (Smith, 2002) within cities and outside them as well through private and commercially led suburban redevelopments, branded and expounded on by Dunham-Jones and Willamson (2008) as tactical greyfield suburban redevelopment. As cities become more and more highly contested, enclavisation and privatised enclosure occur, not just in the suburban residential subdivisions that Luymes (1997, p. 187-203) examines in the US, but in the form of vertical enclaves, discussed in the local (Metro Manila) context by and Connell (1999), Kleibert (2014, 2018), Kleibert and Kippers (2016).

1.2 Statement of the Problem

Metro Manila's Central Business Districts (CBDs) and similar commercial enclave developments are major attractors of population and traffic. Metro Manila's aggregate night-time population of 12.87 million residents (PSA, 2016), swells up into an approximate daytime total of up to 15 million people, the difference of which, mostly commute in from surrounding suburban and exurban fringes. Metro Manila's scarce rail infrastructure is heavily saturated and do not extend outside its limits into its surrounding carpet of low-density bedroom suburbs.

This necessitates the use of road-based mass transit or private vehicles (as soon as one could afford it) to get from Metro Manila's peri-urban edges into the urban core. Majority of this influx of vehicular traffic is channelled through the Circumferential Road 4 / Epifanio Delos Santos Avenue (C4/EDSA) corridor, which also connects the various enclaves around the core of Manila. C4/EDSA has reached peak volume capacity ratio (VCR) levels and is expected to get worse without intervention (ALMEC Corp., 2014).

These private commercial enclaves are themselves what has become Metro Manila's engines for urban economic growth, becoming the Philippines' base for global business process outsourcing and knowledge outsourcing from the west. But these CBDs have also compounded the hollowing-out of Manila's traditional downtown and have shifted Metro Manila's integration centralities from the historical colonial core out to the edge defined by the Epifanio Delos Santos Avenue.

Similarly, this pattern of privatised commercial enclave development is repeated by the Philippines' ecosystem of large-scale full-line private real estate developers, bringing the branded corporate landscape outside of the urban centres of Manila, Cebu, and Davao, to found new suburban edge cities that plug into similar circumferential or bypass road infrastructure like Epifanio Delos Santos Avenue that are likely to replicate the car-centric congestion, traffic and socio-spatial inequities elsewhere.

1.3 Research Intentions / Significance of the Study

While this decentralisation and distribution of this sort is welcomed by regionalists hungry for development away from what is popularly deemed 'Imperial Manila', it becomes more imperative for academia and practice to understand the underlying patterns of spatial reproduction in order not to repeat and further magnify socio-spatial dysfunctions and inequities that these CBDs inevitably bring. There is a need to critically understand and reflect on this privatised enclosure of commercial activity, for the public to be able to begin to exercise and reclaim some degree of agency over the built environment and the receding public realm. This study intends to provide a configurational analysis of the above historical and contemporary phenomena, to show how Metro Manila's post-war expansion and privatised growth affects its spatial network.

1.4 Research Questions

a. How did Manila's post-war expansion change the centralities of its spatial network?

b. What are the characteristics of the spatial network within Metro Manila's CBDs?

c. What are the characteristics of the movement economies that form within Metro Manila's privatised CBDs? How does this differ from the rest of the study area?

2 THEORY

2.1 Space Syntax – Axial Lines and Graphs

This paper examines Metro Manila's post-war expansion and contemporary spatial phenomena, using the methods that form space syntax theory's analysis of spatial configuration. Hillier and Hanson (1984) discuss the fundamental derivation of space syntax methodology. They present how settlements have organically developed, and how certain spatial phenomena take shape. They then propose the use of Axial Lines to represent and analyse these settlements as an interconnected network of spaces.

Axial lines represent the longest, straightest lines that pass through any system of spaces, as abstractions, they are useful in simplifying the underlying spatial system through the built environment. Emo (2014), has tested and illustrated the soundness and the cognitive roots of the axial lines as a method of representing space through a city, by testing and showing how humans visually perceive space, through the axial lines. Each street or path through a public space is represented as an axial line, and is then counted as a node, which, when grouped together according to their adjacent connections, for a network that can be mathematically analysed (Hillier and Hanson, 1984).

2.2 Space Syntax's Key Discourse, Order and Structure

Foundational to Space Syntax is the concept of Natural Movement (Hillier et al, 1993)— in which all things being equal, how space is configured influences its probability to generate pedestrian and vehicular movement, and correspondingly, social copresence and behavior. The potential for movement in cities is categorised according to two kinds of applied graph theory centralities.

The closeness centrality, also known as integration, measures the probable capacity of the spatial network to foster movement towards specific close or integrated locations. The second is the betweenness centrality, also known as choice, which measures the probable capacity of the spatial network to generate through movement between any 2 points (Hillier et al, 1993). These concepts are then used to describe cities as Movement Economies (Hiller, 1996), wherein cities also probabilistically create parts vs. whole relations, by virtue of the variances of activity in (closeness/integration), and movement through (choice/betweenness) certain places which spatial configuration encourages or discourages. Naturally – configuration, creates areas which are more vibrant and active, alongside other areas that are relatively quiet. The city as a whole has these separate areas as unique parts.

This describes the formation of a generic Dual-Network (Hillier and Vaughan, 2007) composed of the foreground network on which generative micro-economic activity fosters exchange and interaction, and the background network, which is conservative in how it maintains social and cultural relations within residential communities. This adds nuance to Hillier's (1999) discussion of Centrality as a Process, wherein he not only relates the relationship between land use and other factors to the idea of configurational centrality in cities, but also highlights that centralities grow, migrate, shift or diffuse over time as the foreground and background networks grow and develop.

Hanson (1998) for London after the great fire of 1666 and Karimi for Persia's ancient cities (2012) discuss how top-down imposed localised Order differs from global, or bottom-up Structure and how the two concepts intertwine and recede as one surfaces. Both discuss how attempts to impose order on seemingly disorderly spatial fabrics fall apart as underlying centralities reemerge, forming a spatial structure to the network that serves to underpin socio-economic phenomena.

2.3 Space Syntax, Edge Cities / New Towns and Circumferential Roads

Karimi and Vaughan (2017) analyse English New Towns and consolidate consistent findings from the range of cases investigated. New Towns are usually disconnected from their surrounding fabric and contrast starkly to the cores of traditional, historically grown old towns, which have strong local accessibility forming clear integration cores that correlate with traditional high streets and commercial spines for their communities.

New towns are more accessible to high-speed roads geared for global accessibility for cars, and not for pedestrian access. Most planned centres for New Towns end up being spatially segregated, requiring access by car from the surrounding catchment population. In the segregated residential zones of new towns, most have interior local pedestrian networks that are accessed only by a larger grid of vehicular accessibility. This creates virtual dead zones with little foot traffic and unsafe, unsurveilled space. Land uses within these new towns are segregated and homogenously zoned in large monolithic blocks and parcels that are distanced quite far from each other. Density is usually diffused across a broader area, usually centred around a big-block district that serves as the critical mass of usually one type of social activity – shopping. This contrasts sharply to how Old Towns are quite finely zoned with multiple uses, densely populated and permeable to foot traffic and providing a range of uses, services, amenities, and open spaces to people.

In the Asian context, Ye and van Nes (2014) find similar results using a multi variate approach combining space syntax (for spatial accessibility), space matrix (for building density), and mixed-use index (for land use) through geographic information system (GIS) in studying Songjiang Old and New Towns. The flaws of Songjiang New Town echo the problems in English New Towns. Planned centres as inward-looking shopping streets, poorly connected street structure, closed loops creating more segregation that prioritises vehicular traffic over pedestrian circulation. The typological use of the point tower block also reduces the 'length' of street frontage which could be activated, and the restrictive control over building ground floor zoning both limit the pedestrian activation of frontages for the New Town.

Van Nes (2021) discusses the effect of Ring Roads on the locations of shops in town and city centres. Van Nes documents how the shift in accessibility introduced through new ring road construction has led to the hollowing-out of towns and city centres as shops organically try to relocate themselves to the most integrated streets. What makes this problematic is that most ring roads, even if they are called boulevards or avenues, are designed and optimized for vehicular movement, thus changing the nature of the shopping activity from pedestrian and fine-grained, connected walking experience in the city centre, to a more car-centric experience around or outside of it.

The above previous studies are relevant to the unique context of the Philippines, which saw the post-war suburbanisation outside of Manila paired with the construction of the Epifanio Delos Santos Avenue circumferential road. This created a belt of enclaved car-centric new towns or edge cities outside of Manila's core. Unfortunately, this same phenomenon is repeated throughout the country as new bypass roads are planned outside of traditional *poblaciónes* or towns, linking new suburban edge cities and gated residential subdivisions by car. Accessibility, land use (as represented by points-of-interest) and building form or density can be combined to highlight patterns in Metro Manila's CBDs.

3 DATASETS AND METHODS

3.1 Study Area / Historical Timeframes

This study will focus on the spatial network within the region defined by Metro Manila's Circumferential 5 (C5) Road (See white bordered region in Fig. 1, below). This area has emerged as the Metro Manila Region's Integration Core. Specifically, this study will be using the 1967 map of Manila (as drawn/graphed in Fig. 2, p. 8) as it marks the first instance wherein the region of Metro Manila (outside the original core of Manila) is documented as a whole. This study will also be using the 2019 map of Metro Manila's core (traced from Open Street Map and the Philippine Geoportal) to analyse the contemporary condition of existing business districts and points-of-interest. The spatial networks documented in these maps are encoded into a consolidated spatial graph composed of axial lines and layered points of interest which is then used as the basis for space syntax analysis.

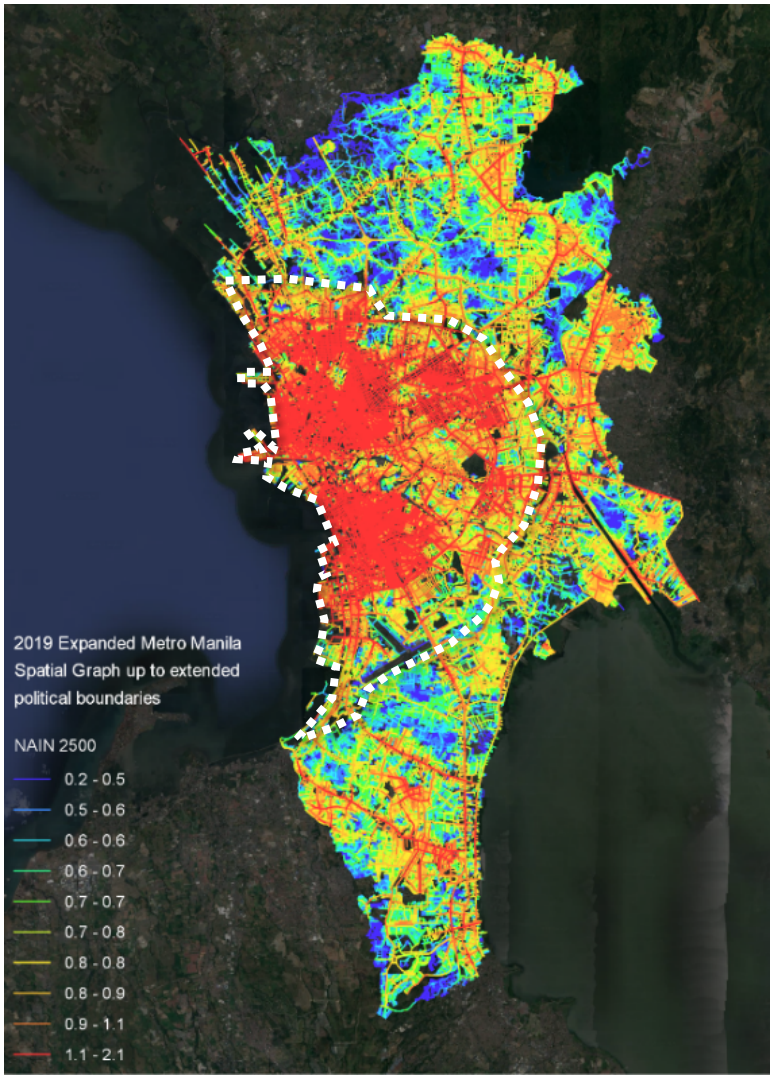

Figure 1: 2019 Spatial Graph of Metro Manila expanded: NAIN 2500, white border showing extent of spatial network analysed for this study. Analysed using Depthmap X by depthmap X development team, UCL. Drawn by author using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>

3.2 Methodological Framework

This study uses different methods of investigation/analysis tailored to the specific research questions. To respond to the first research question, this study uses space syntax's method of angular segment analysis (Turner, 2000; Turner, 2001; Turner, 2005; Dalton, 2001; Turner, 2007; Charalambous, N. and Mavridou, M., 2012) to produce measures of Normalised Angular Integration (NAIN/closeness centrality) and Normalised Angular Choice (NACH/betweenness centrality) (Hillier et. al, 2012) for local/pedestrian (400m, 800m, 1200m) to macro/vehicular (2000m and up) ranges of the traced historical (1967) and present-day spatial network. The comparison of historical and contemporary values will show how centralities shift over time from within Metro Manila's colonial core, outward to the corridor defined by Epifanio Delos Santos Avenue (EDSA).

For the second research question, this study then uses points-of-interest (POIs), as aggregators of NAIN and NACH values. This expands on the method that Yang (2015) previously used, by identifying CBD enclave entrances/thresholds (defined by CBD estate boundaries in maps or verified/inspected using Google Maps' Street View) as POIs. These enclave CBD threshold POI values are analyzed and correlated vs. the mean aggregate values of the street networks within and outside these commercial enclaves to understand the spatial network of Metro Manila's CBDs.

For the third research question, this study uses Commercial points-of-interest (POIs) as previously used by Yang (2015) to aggregate NAIN and NACH values. These POIs include marked places used for catering/F&B, banking, retail, services, etc. as indicators of commercial (also proxies for social) exchange that constitute the movement economies within and outside Metro Manila's CBDs. The Commercial POI values are correlated with accessibility values within the CBD enclaves and compared to the correlations found for Commercial POIs outside of these CBDs. This is to highlight how inherently different CBD commercial POIs are from the natural movement economies formed over time outside Metro Manila's CBDs.

Taking its cues from the inherent privatisation and enclosure of Metro Manila's CBDs, this study then compares the locations of the Commercial POIs and correlates them with building footprint areas derived from Open Street Map's buildings layer and compares the correlations between POIs within and outside the privatised CBDS. These findings point to the inherent internalisation and enclosure of commercial activity within Metro Manila's CBDs. Unnaturally drawing people from the accessible street network, into interiorised and architectural spaces.

4 RESULTS

4.1 Post-War Reconstruction / Suburbanisation (1967)

4.1.1 Fracturing of Metro Manila away from the core

The tail end of World War 2 also coincides with the end of American colonial rule over the Philippines, which was liberated from the US on 4 July 1946. American expansion outside of Manila's core saw suburban infringement into areas originally zoned by Manila's original planner, Daniel Burnham, to be open spaces (parks and playfields).

These areas were composed of privatised farms or *haciendas* owned and controlled by elite families through centuries of colonial policy and exchange. With diffuse political jurisdiction and agency, Burnham's open spaces could no longer be enforced on the private Tuason, Ortigas and Roxas / Zobel de Ayala Haciendas. The development of these haciendas as Manila's suburbs was spurred by Pres. Quezon's pre-war plan to transfer the capital of the Philippines to Quezon City, which was to be sited on land purchased from the vast north-east Tuason Hacienda (Pante, 2018, p. 15-38). This was then followed by the development of the Roxas / Zobel de Ayala hacienda south-east of Manila's core into Makati. Effectively, the hacienda edges closest to the core of Manila – were developed as suburban or commuter catchment for the old core's population (Pante 2018, p. 15-38; Garrido 2013, p. 171-172).

By 1967, Metro Manila's suburbanisation has reached the edges of the planned Circumferential Road 4/Epifanio Delos Santos Avenue (C4/EDSA) and compounds a pattern of fragmentation into two separate integration cores started during the implementation of the Burnham Plan and magnified by outward expansion of the city region (See NAIN 2500 graph, Fig. 2, below). One can notice how the warmer integration cores virtually abandon and shift away from Intramuros and Binondo, and toward the north and south banks of the Pasig River, which creates a void of inaccessibility that is spanned only by few discontinuous crossings.

The fragmentation of Metro Manila points to the emergent dualities of Manila's former surrounding private haciendas as they undergo development as suburbs. The new capital to the northeast, became Quezon City with its workers housing projects (Pante, 2017). And Makati to the southeast, was developed as a private estate under the Ayala Corporation. Makati catered to the old-rich and middle-class families seeking to leave Manila's devastated waterfront districts (Garrido, 2013).

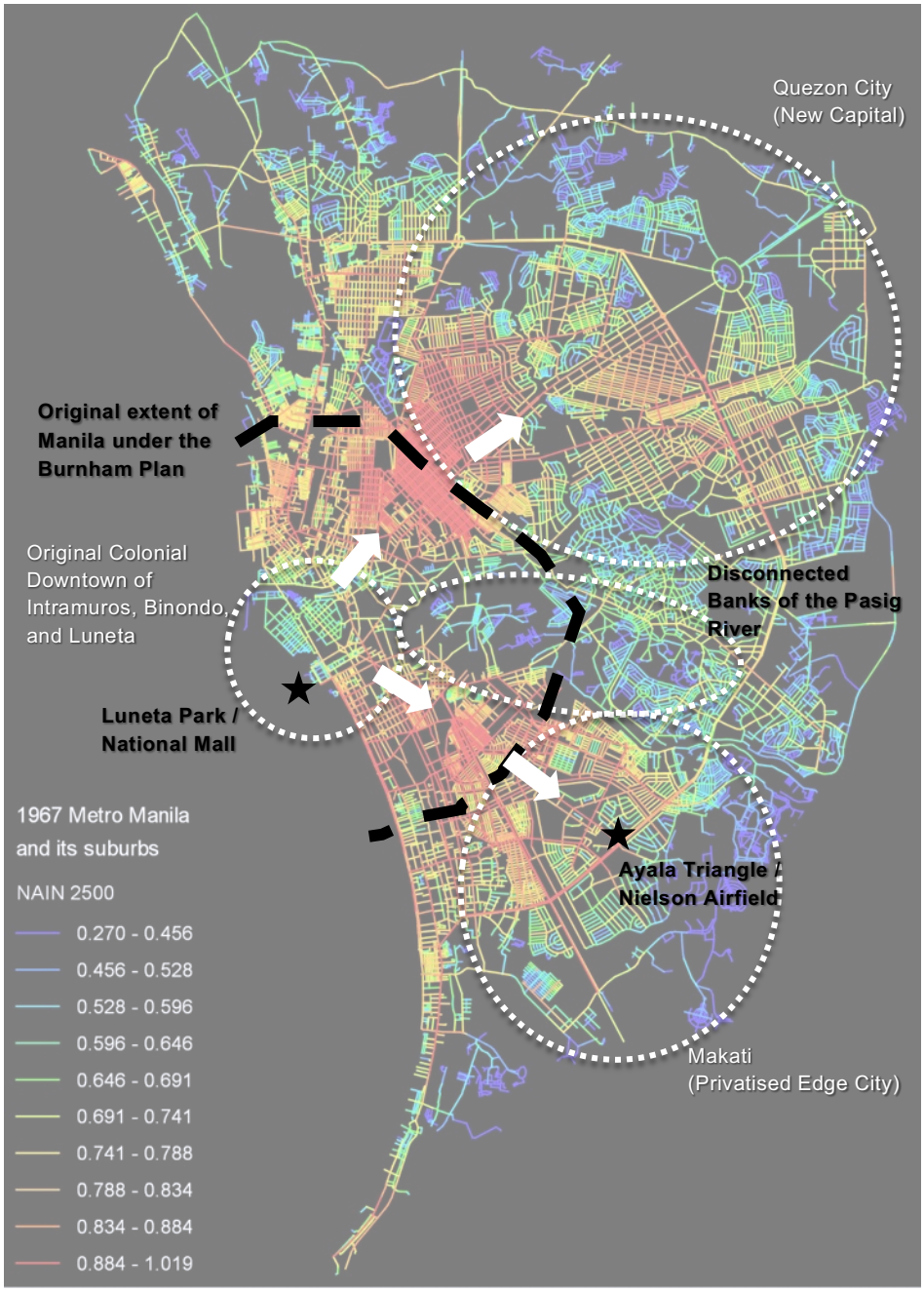

Figure 2: 1967 Spatial Graph of Metro Manila, NAIN 2500, showing fragmentation into north and south integration cores. Analysed using Depthmap X by depthmap X development team, UCL. Drawn by author using QGIS from: Metropolitan Manila 1967 – Land-use and Road Networks overlaid on Topography. North and south halves of Metro Manila. Published by: Board of Technical Surveys and Maps, Republic of the Philippines from: British Library Map Room. accessed 23 July 2019.

Murphy and Hogan (2012, p.26) point out that past catastrophic events leading to the destruction of cities, such as the Great Fire of London (discussed by Hanson, 1989; and expounded on by Karimi, 2012) and the fires that devastated San Francisco and Chicago (both re-planned afterwards by Daniel Burnham) have been impetus for a flowering of civic spirit amongst wealthy private interests to rebuild and improve on their cities – Manila's elite, on the other hand, in an exercise of private interest, sought to move away from the devastated heart of Manila, and leave rebuilding it to the government.

4.1.2 Epifanio Delos Santos Avenue (EDSA) as a spine for Edge Cities

The 1967 graph of Manila highlights the length of the EDSA ring road. What was planned as a north-south bypass road going around Manila, emerges as a centrality that rivals the old business district of Binondo and downtown Manila in terms of global angular integration (NAIN Rn; See Fig. 3, p. 10). Along its length, global integration values overtake the values in the core of Manila. This signals how Manila's life and vitality from the 1960s up to the present day has moved out to the various developments on the edge of EDSA.

Quezon City to the north-east (see Fig. 2, p. 8) was planned with grand avenues, and outsized super-blocks scaled for cars. Officially dedicated in 1948, with initial plans laid out before World War 2. It predates the new postwar capitals of the world (such as Brasilia and Abuja), and attempts to cast aside the colonial elitism of Intramuros and Manila by becoming a city for workers (Pante, 2017). The modern capitals it preceded have similar socialist and modernising intentions and were likewise grandly scaled for vehicles.

Moving down from Quezon City, the former site of America's Camp Murphy, gets renamed as bases for the Philippine Constabulary - Camp Crame and Armed Forces - Camp Aguinaldo (See Fig. 3, p.10). These camps were located on Manila's fringes to project power against the provincial communist insurgency. These fringe outposts become prime land with EDSA becoming more spatially integrated. These camps were central during Marcos' Martial Law dictatorship, as bases for subduing dissent and projecting power over Manila's populace. During his downfall in the 1986 EDSA People Power Revolution, EDSA became the stage for protests against Marcos. The revolution symbolises how the civic and political life of Manila and the broader nation migrated from the core of Manila to the edge of EDSA. Formal ceremonial public spaces like Manila's Luneta Park (See Fig. 2, p. 8), planned by Burnham and patterned after Washington DC's mall (also used for rallies) were bypassed by protestors, preferring EDSA, a non-pedestrian friendly, suburban circumferential highway. This presents how the edge has superseded the centre of Manila's National Mall for civic action (Porio, 2009).

Makati to the southeast of Manila becomes the opposite of Quezon's city for workers. Makati's exclusive villages were planned around the Ayala shopping centre and the office business district of Ayala Avenue, Makati Avenue and Paseo de Roxas formerly Nielson Airfield's runways (See Fig. 2, p. 8).

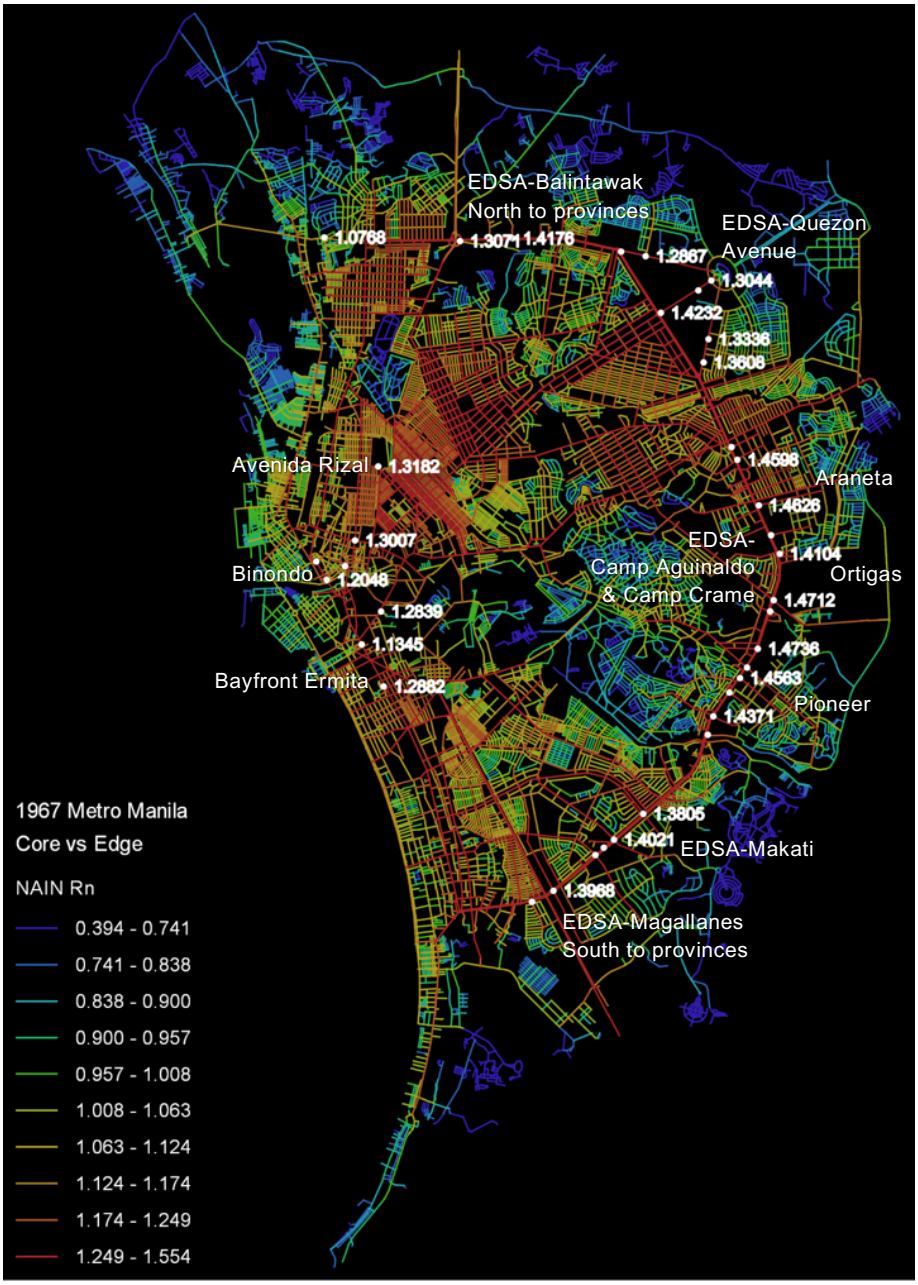

Figure 3: 1967 Spatial Graph of Metro Manila, NAIN Rn, showing higher global integration values along Circumferential Road 4/Epifanio Delos Santos Avenue compared to Manila's original business district of Binondo, American Waterfront district – Ermita, and shopping district of Avenida Rizal. Analysed using Depthmap X by depthmap X development team, UCL. Drawn by author using QGIS from: Metropolitan Manila 1967 – Land-use and Road Networks overlaid on Topography. North and south halves of Metro Manila. Published by: Board of Technical Surveys and Maps, Republic of the Philippines from: British Library Map Room. accessed 23 July 2019.

Makati was the Edge City that came to define Metro Manila's EDSA commercial corridor, it was followed by similar districts developed by the successor corporations of the family-owned haciendas. The Araneta Centre in Quezon City; and later on Ortigas Centre in Mandaluyong (See Fig. 3, p. 10).

Manila's post-war private edge city commercial districts implemented strict rules and guidelines limiting the design and use of commercial buildings, the character of the streetscape, and actively

kept out vagrants, beggars, and other deprived persons. These commercial districts formed their own associations that served as proto-government entities that served to take over what used to be government's traditional role as city maker and maintainer. Instead of Manila's urban structure resurfacing with clarity from the rubble of destruction, what emerged was the indelible mark of the privatised order imposed on the land in the form of the Spanish colonial encomienda/hacienda system (Murphy and Hogan, 2012; See Fig. 4.57).

4.2 Contemporary Metro Manila

4.2.1 Edge Cities become Central Business Districts (CBDs)

The growth of Business Process Outsourcing (BPO) sector in the past two decades (Mitra, 2013, p. 6-8) transformed Metro Manila's edge cities. Differing time zones between the Philippines, North America, and Western Europe, remade previously sleepy after-hours office districts in Makati and Ortigas into 24-7 cities tethered by extranational telecom infrastructure (Easterling, 2014) to the different overseas clients they serviced.

This has compelled the same enclave developers to intensify uses within their estates, implementing grayfield suburban retrofits (Dunham-Jones and Willamson, 2008), upgrading utilities, increasing plot ratio densities, and transforming the edge cities (Sultana, 2011) of Makati, Ortigas, and Araneta into full-blown Mixed-Use Central Business Districts and Vertical Enclaves (see Fig. 4, p. 12) combining exclusive residential condominiums, amenities, global brands/retail, with office towers as the de-facto building typologies in these CBDs.

This happens in parallel with the neoliberal shift described by Theodore et al (2011), wherein the Philippine government privatises large tracts of state land in and around Metro Manila. This led to a mix of public-private partnerships and privately led mixed-use enclave projects from land re/development (Ortega, 2016; Shatkin, 2004, p. 391-394; Murphy and Hogan, 2012, p. 19; Kleibert, 2018, p. 477-480).

Examples of these include Bonifacio Global City, McKinley Hill and McKinley West in Taguig (from the redeveloped Fort Bonifacio military base), Rockwell Centre (brownfield redevelopment of former powerplant), the SM Mall of Asia Complex and PAGCOR Entertainment City, which are mixed-use and casino/gaming developments built on land reclaimed from Manila Bay (See Fig. 4., p. 12). These CBDs became engines of investment, attracting retail and institutional investors to buy real estate, which promised higher rates of rental return compared to the low interest rates which has been a fixture of post-2008 fiscal policy.

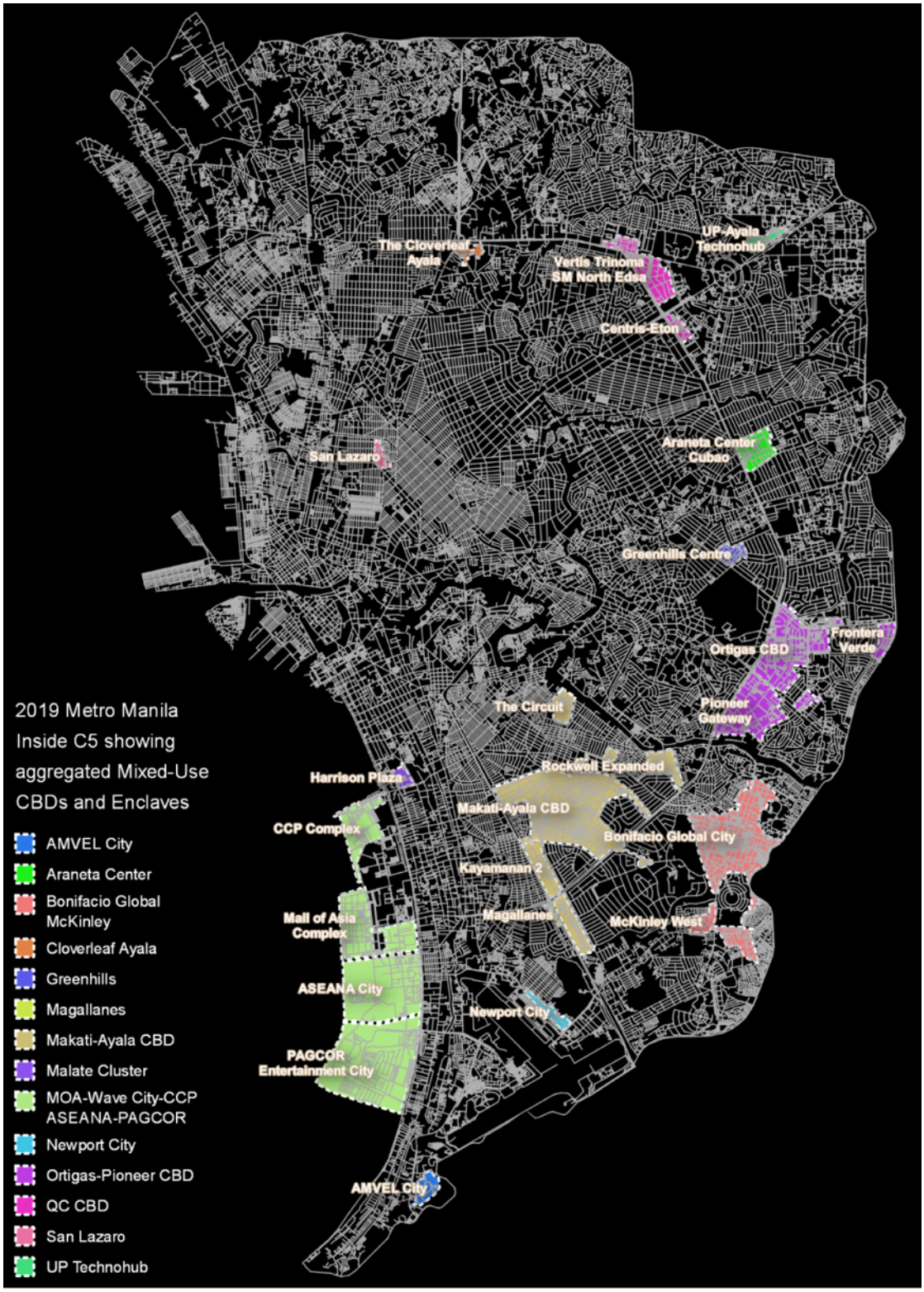

Figure 4: 2019 Spatial Graph of Metro Manila within Circumferential 5 Road, showing Mixed-Use Central Business Districts and Enclaves aggregated by location. Drawn by author using QGIS from: OpenStreetMap. accessed 20 February 2019 Source:<http://download.geofabrik.de/asia/philippines.html#>

4.2.2 Car-Centric Vertical Enclaves

Looking closer into the mixed-use enclaves/CBDs, their respective "gates" or entrance thresholds and markers/signage are at locations (see Fig. 5, below) that correlate with higher vehicular / global-range choice (NACH Rn) and integration values (NAIN Rn) (See Table 1 and 2, p. 14). This is an indication that entrances and thresholds to these mixed-use enclaves / CBDs are planned around vehicular movement.

Figure 5: 2019 Metro Manila (inside C5) spatial graph, with overlay of points representing Entrances/Thresholds to Mixed-Use Enclaves/CBDs. Drawn by author from manual street-view survey of Google Earth using QGIS. from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>

Correlations

		EntryPOI	gxCH0400	gxCH0600	gxCH0800	gxCH1000	gxCH1200	gxCH1500	gxCH2000	gxCH2500	gxCH3000	gxCH3500	gxCH4000	gxCH4500	gxCH5000	gxCH Rn
EntryPOI	Pearson Correlation	1	.192**	.306**	.344**	.369**	.386**	.394**	.401**	.404**	.405**	.405**	.404**	.403**	.402**	.393**
	Sig. (2-tailed)		.006	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199

Table 1: Correlations for Mixed-Use Enclave/CBD entrance POIs with their corresponding location's NACH Values. This shows statistically significant, moderate positive correlations with global/vehicular NACH values. NACH values analysed using Depthmap X by depthmap X development team, UCL, and processed using IBM SPSS Statistics 25, by IBM.

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		EntryPOI	gxIN0400	gxIN0600	gxIN0800	gxIN1000	gxIN1200	gxIN1500	gxIN2000	gxIN2500	gxIN3000	gxIN3500	gxIN4000	gxIN4500	gxIN5000	gxIN Rn
EntryPOI	Pearson Correlation	1	.129	.188**	.222**	.252**	.272**	.287**	.300**	.296**	.288**	.283**	.278**	.283**	.291**	.362**
	Sig. (2-tailed)		.069	.008	.002	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199

Table 2: Correlations for Mixed-Use Enclave/CBD entrance POIs with their corresponding location's NAIN Values. This shows statistically significant, moderate positive correlation with the NAIN Rn value. NAIN values analysed using Depthmap X by depthmap X development team, UCL, and processed using IBM SPSS Statistics 25, by IBM.

Contrasting against the rest of the spatial network (graphed in white, See Fig. 6, below), these CBD enclaves have higher mean NAIN values for vehicular movement (1500m and higher ranges of movement - graphed in red, See Fig. 6, below); Yet are locally segregated, with low mean NAIN values for pedestrian movement (400m - 1200m ranges of movement – graphed in red, See Fig. 6, below). These enclaves are isolated islands of production and consumption (Corpuz, 2000; Smith, 2002), which according to Corpuz (2002) embody an implant-bypass mode of urbanism that involves implanting new developments that bypass their surroundings configurationally, infrastructurally, or financially – erecting real and perceived walls and limiting access to people who are not their target market or user.

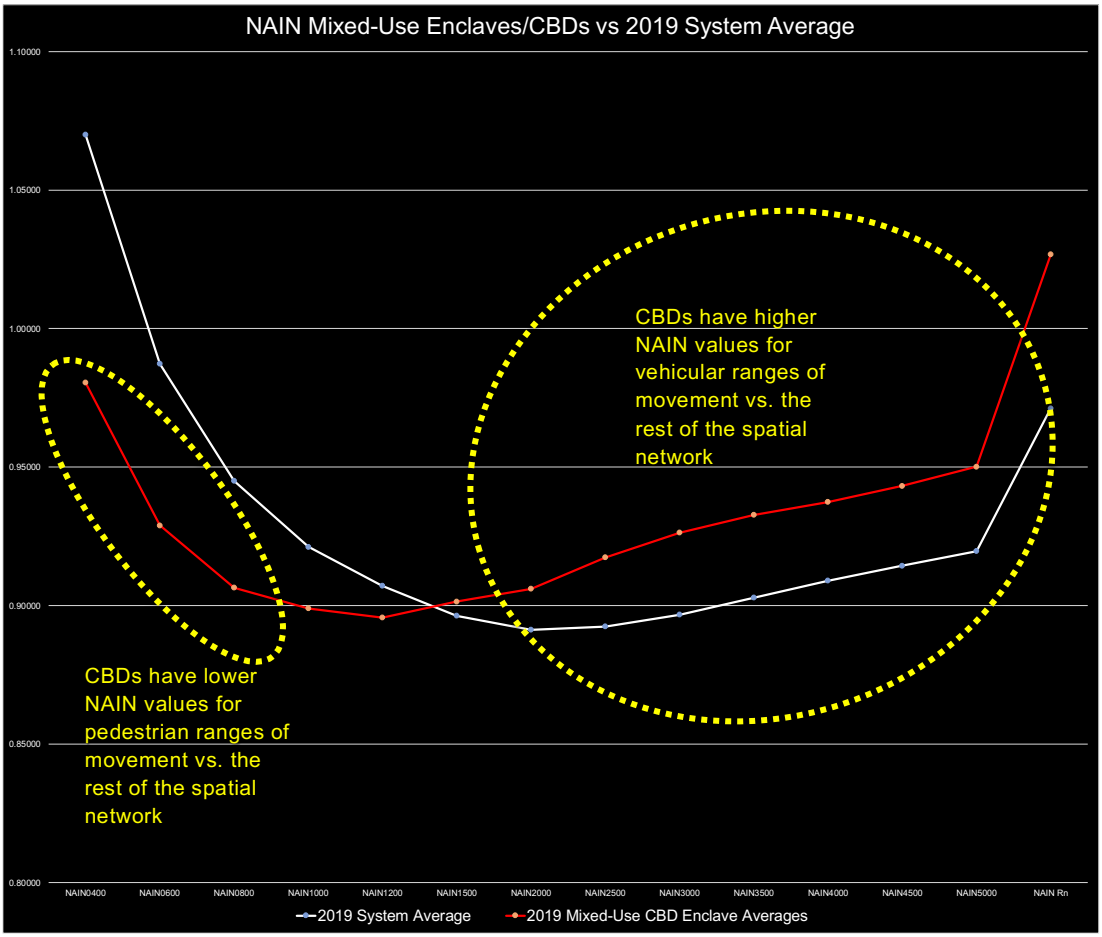

Figure 6: Chart Comparison: 2019 Spatial Graph of Metro Manila, average NAIN Values for Mixed Use Commercial Enclaves / CBDs vs 2019 System. showing how the Mixed-use enclaves/CBDs have on-average lower pedestrian/local integration values (from NAIN 400 – 1200) compared to the rest of Metro Manila, and then conversely, higher vehicular/global integration values – this indicates how these Mixed-Use CBDs and Enclaves are skewed toward attracting vehicular traffic. Analysed using Depthmap X by depthmap X development team, UCL.

4.2.3 "Un-natural" Interiorised Movement Economies

Metro Manila's patterns of mass consumption show Catering/F&B, Retail/Services, and Hotel/Accommodation Point-of-Interest (POI) data (from Open Streetmap) cluster strongly (See Fig. 7, p. 16) within these enclaves, alongside the historical business districts of Binondo and Ermita.

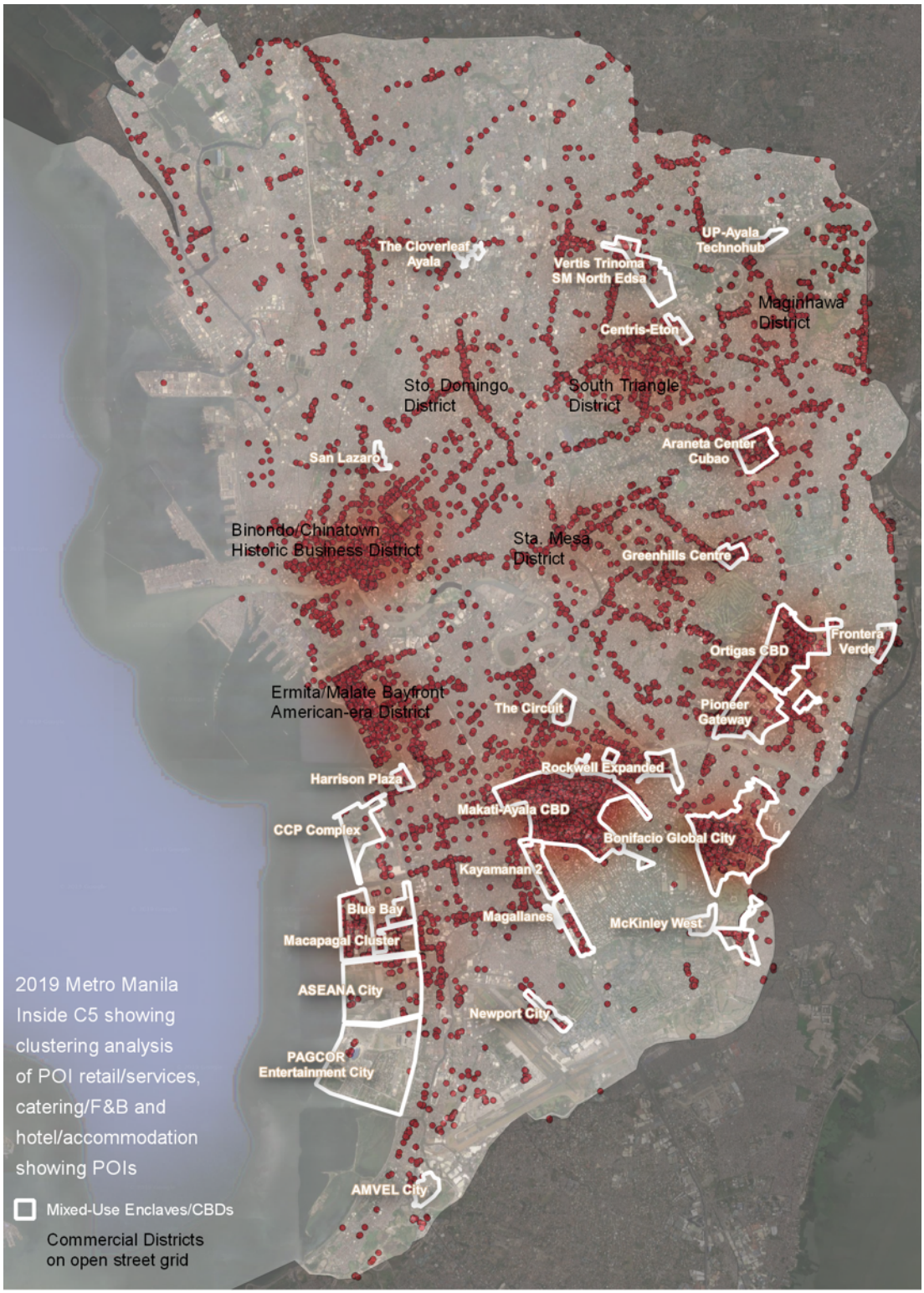

Figure 7: Catering/F&B and Hotel/Accommodation POIs (overlaid on clustering analysis). from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>

However, when comparing these POI locations vs spatial accessibility using local/pedestrian integration (NAIN 400, see Fig. 8, p. 17), it becomes apparent how consumption within these mixed-use enclaves don't adhere to Hillier's (et al, 1993) natural movement or movement economies (Hillier, 1996).

The POIs **within the CBDs** (See cooler points within the CBDs boundaries, Fig. 8, below) have lower pedestrian integration (NAIN 400) values when compared to POIs **outside the CBDs** whose pedestrian integration (NAIN 400) values are higher because they are located to serve foot traffic by locating in pedestrian centralities (See Fig. 8, below, and Tab. 3 and 4, p. 18).

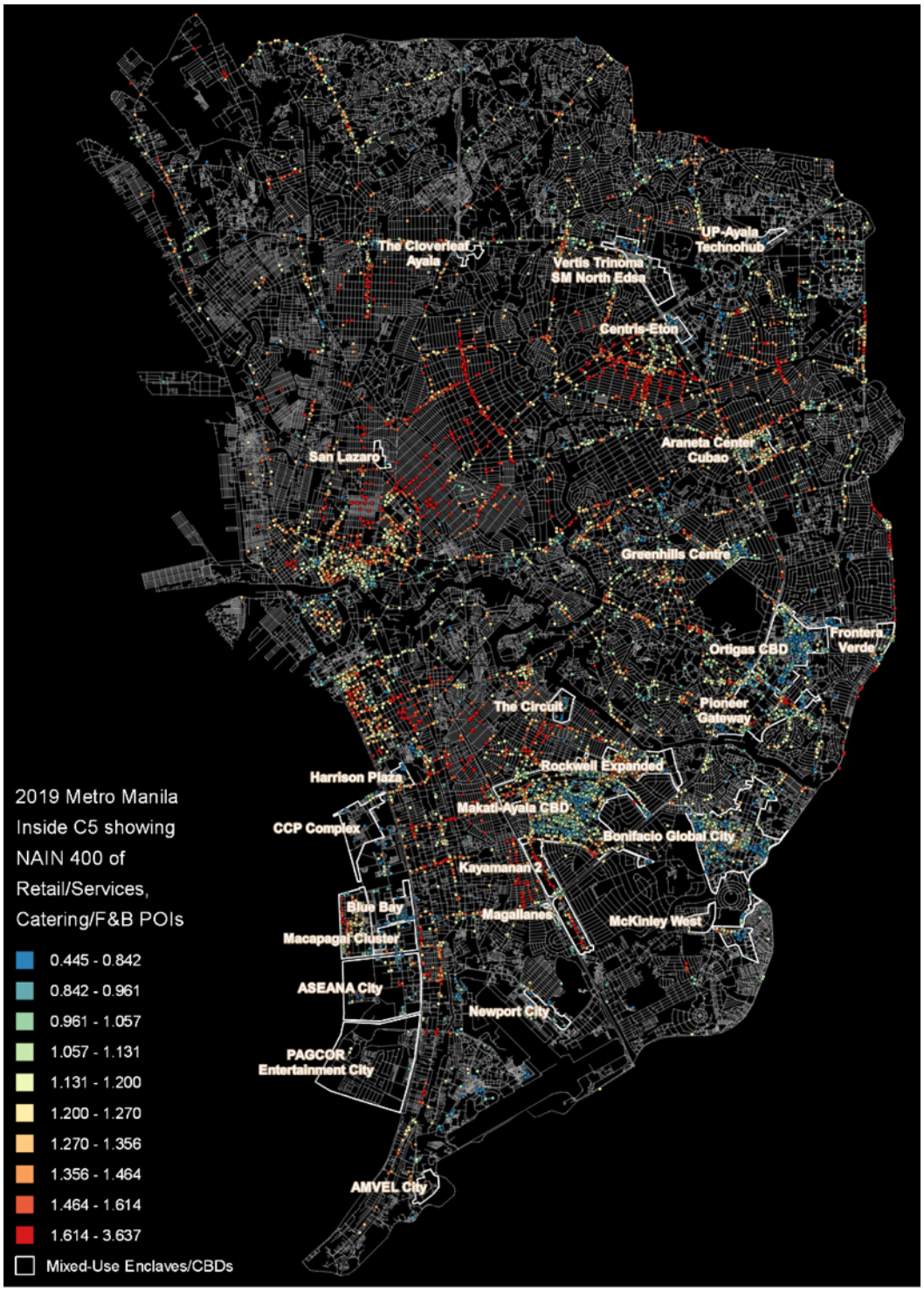

Figure 8: 2019 Metro Manila (inside C5) spatial graph, with overlay of Retail/Service, Catering/F&B and Hotel/Accommodation POIs showing their location's NAIN 400 values. This shows high local/pedestrian integration for POIs outside the enclaves, but low local/pedestrian integration for POIs inside the Mixed-Use Enclaves and CBDs. Analysed using Depthmap X, by depthmap X development team, UCL. from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>

Correlations

		Outsidels1	gxCH0400	gxCH0600	gxCH0800	gxCH1000	gxCH1200	gxCH1500	gxCH2000	gxCH2500	gxCH3000	gxCH3500	gxCH4000	gxCH4500	gxCH5000	gxCH Rn
Outsidels1	Pearson Correlation	1	.125**	.198**	.222**	.231**	.241**	.255**	.266**	.276**	.279**	.284**	.289**	.292**	.296**	.283**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	8776	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397

Table 3: Correlations for Retail/Service and Catering/F&B POIs outside the CBDs with their corresponding location's NACH Values. This shows statistically significant, weak positive correlations with global/vehicular NACH values for these POIs representing urban consumption. NACH values analysed using Depthmap X by depthmap X development team, UCL, and processed using IBM SPSS Statistics 25, by IBM.

		Outsidels1	gxlN0400	gxlN0600	gxlN0800	gxlN1000	gxlN1200	gxlN1500	gxlN2000	gxlN2500	gxlN3000	gxlN3500	gxlN4000	gxlN4500	gxlN5000	gxlN Rn
Outsidels1	Pearson Correlation	1	.427**	.410**	.375**	.346**	.316**	.290**	.273**	.267**	.268**	.284**	.311**	.341**	.370**	.360**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	8776	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397

Table 4: Correlations for Retail/Service and Catering/F&B POIs outside the CBDs with their corresponding location's NAIN Values. This shows statistically significant, weak to moderate positive correlations with both local/pedestrian and global/vehicular NAIN values for these POIs representing urban consumption. NAIN values analysed using Depthmap X by depthmap X development team, UCL, and processed using IBM SPSS Statistics 25, by IBM.

4.2.4 Internalisation of Activity

What could be causing this paradox of commercial point-of-interest inaccessibility within the CBDs? A look at figure-ground building footprint data presents clues. The building footprints within CBDs (yellow polygons, see Fig. 9, below) are in the largest ranges relative to those outside the CBDs (pink to violet polygons, See Fig. 9, below). Could the POIs correspond with larger building footprints?

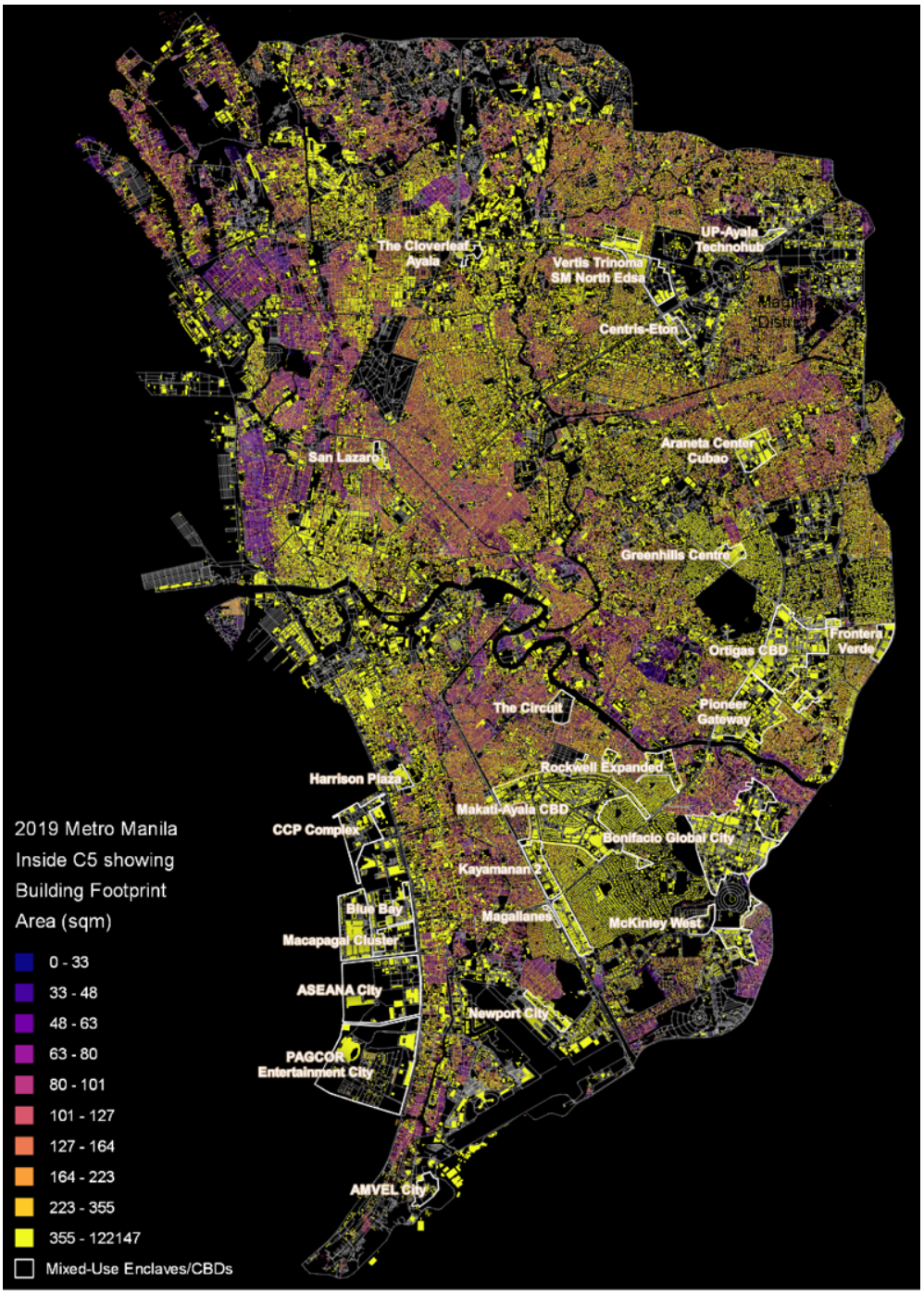

Figure 9: 2019 Metro Manila (inside C5) spatial graph, with overlay of Building Footprints, according to their area in square meters (sqm). This shows a coarser grain of building footprints within the Mixed-Use Enclaves and CBDs. Analysed using QGIS. from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>

Classifying these POIs according to the size of the building footprint they occupy/locate in, visually confirms this correspondence (See yellow POIs, Fig. 10, below) This is also confirmed by a moderate positive correlation between these POIs within the CBDs and the average size of the building footprint they locate in (See Tab. 7, p. 21), similarly a weak to moderate negative correlation with accessibility was found for these POIs (See Tab. 5 and 6, next page).

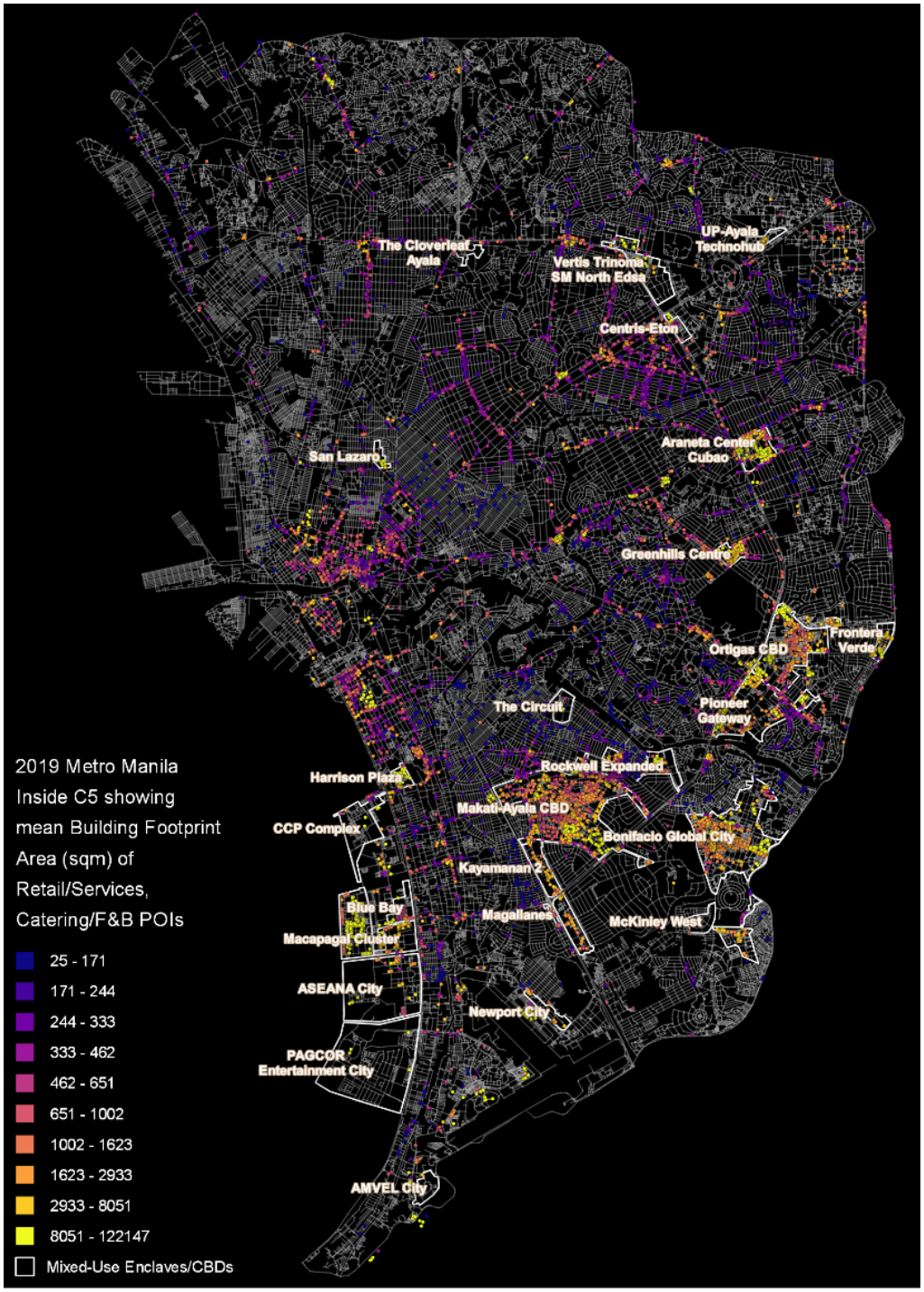

Figure 10: 2019 Metro Manila (inside C5) spatial graph, with overlay of Retail/Service and Catering/F&B POI locations with their corresponding Building Footprints, classified according to their area in square meters (sqm). This shows that the POIs within the Mixed-Use Enclaves/CBDs are within larger building footprints. Analysed using QGIS. from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>

Correlations

		Insideis1	gxCH0400	gxCH0600	gxCH0800	gxCH1000	gxCH1200	gxCH1500	gxCH2000	gxCH2500	gxCH3000	gxCH3500	gxCH4000	gxCH4500	gxCH5000	gxCH Rn
Insideis1	Pearson Correlation	1	-.125**	-.198**	-.222**	-.231**	-.241**	-.255**	-.266**	-.276**	-.279**	-.284**	-.289**	-.292**	-.296**	-.283**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	8776	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397

Table 5: Correlations for Retail/Service and Catering/F&B POIs inside the CBDs with their corresponding location's NACH Values. This shows statistically significant, weak negative correlations with global/vehicular NACH values for these POIs representing urban consumption. NACH values analysed using Depthmap X by depthmap X development team, UCL, and processed using IBM SPSS Statistics 25, by IBM.

		Insideis1	gxlN0400	gxlN0600	gxlN0800	gxlN1000	gxlN1200	gxlN1500	gxlN2000	gxlN2500	gxlN3000	gxlN3500	gxlN4000	gxlN4500	gxlN5000	gxlN Rn
Insideis1	Pearson Correlation	1	-.427**	-.410**	-.375**	-.346**	-.316**	-.290**	-.273**	-.267**	-.268**	-.284**	-.311**	-.341**	-.370**	-.360**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	8776	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397

Table 6:: Correlations for Retail/Service and Catering/F&B POIs inside the CBDs with their corresponding location's NAIN Values. This shows statistically significant, weak to moderate negative correlations with both local/pedestrian and global/vehicular NAIN values for these POIs representing urban consumption. NAIN values analysed using Depthmap X by depthmap X development team, UCL, and processed using IBM SPSS Statistics 25, by IBM.

		Insideis1	meanbldgar	minbldgare	maxbldgare
Insideis1	Pearson Correlation	1	.374**	.321**	.375**
	Sig. (2-tailed)		.000	.000	.000
	N	8776	8653	8653	8653

Table 7: Correlations for Retail/Service and Catering/F&B POIs inside the CBDs with their corresponding location's Building Footprint area. This shows statistically significant, weak to moderate positive correlations with the size of the Building Footprints containing these POIs representing urban consumption. Building Footprint values analysed using QGIS, and processed using IBM SPSS Statistics 25, by IBM.

A linear regression confirms the interrelationships of accessibility and building footprint areas to the presence of these POIs within or outside Metro Manila's mixed-use enclaves/CBDs (See Table 8.a-c, below).

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.605[a]	.366	.366	.375

a. Predictors: (Constant), maxbldgare, gxlN4500, gxlN0400, gxlN1000, meanbldgar, gxlN0800, gxlN5000

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	674.806	7	96.401	684.834	.000[b]
	Residual	1166.523	8287	.141		
	Total	1841.329	8294			

a. Dependent Variable: Insideis1

b. Predictors: (Constant), maxbldgare, gxlN4500, gxlN0400, gxlN1000, meanbldgar, gxlN0800, gxlN5000

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.299	.022		57.975	.000
	gxlN0400	-.495	.025	-.310	-19.471	.000
	gxlN0800	-.436	.067	-.267	-6.560	.000
	gxlN1000	.560	.067	.335	8.362	.000
	gxlN4500	3.513	.145	1.888	24.265	.000
	gxlN5000	-4.010	.146	-2.089	-27.459	.000
	meanbldgar	1.166E-5	.000	.174	7.042	.000
	maxbldgare	7.456E-6	.000	.132	5.342	.000

a. Dependent Variable: Insideis1

Table 8 (a. top, b. middle, c. bottom): Linear regression to predict locations of Retail/Service and Catering/F&B POIs based on spatial accessibility and building footprint area inside and outside the CBDs. A significant relationship [p<.000], with an R^2 of 0.366 was found for the variables listed and the POI locations. Spatial accessibility values analysed using Depthmap X by depthmap X development team, UCL, and processed using IBM SPSS Statistics 25, by IBM.

One could surmise that the internalisation of consumption activity within CBDs happens in the following typologies, with Commercial POIs choosing to locate in:

1. Airconditioned shopping centers and large footprint buildings of these CBDs.

2. Ground floors or podiums of office buildings with deep floor plates optimised for Business Process Outsourcing operations or Corporate Headquarters.

3. Common parking or building parking structures (basements, podiums, etc.) that consolidate large footprints of parking required by local regulation (1 slot per 70-125 sqm of space)

The above typologies are all internally less accessible by virtue of their being private enclosed spaces. Buildings with larger footprints also tend to indicate larger blocks and less permeability on the street network, unless permeability or pedestrian passageways are channeled through internal malls or retail. This is also highlighted by the spatial network analyses, with the CBDs themselves having street networks that are configured more for vehicular movement, and less so for pedestrians. This inherent pedestrian disconnection, among other factors like the lack of transit options, and Metro Manila's tropical climate, induces higher demand for road-based, long-range movement, thus triggering the need for larger parking structures to contain the private vehicles used by workers and executives driving in from outside these CBDs.

5 DISCUSSION / CONCLUSIONS

5.1 Responses to Research Questions

In response to the first research question, this study highlights how Manila's expansion during the height of American colonial rule, and after World War 2, have contributed to the shifting out of its integration centralities in the traditional downtown of Binondo. Initially, centralities migrate to the street grids to the north and south of the Pasig River's banks. Then as the city becomes a bigger regional entity defined by the EDSA circumferential road and its post-war edge cities, centralities move further away from the original core, echoing the actual historical shift in socio-economic vibrancy toward the EDSA corridor.

EDSA was originally planned as a circumferential bypass road meant to connect the northern and southern sides of the city by going around it. In doing so, the length of the EDSA corridor rises with higher integration values than the original core of Manila, signifying the increase in prime value of privatised hacienda lands which were then to become the Manila's private edge cities, and later on, its contemporary mixed-use CBDs.

In response to the second research question, the spatial networks within Metro Manila's privatised CBDs indicate lower mean integration values compared to the rest of the spatial network, for pedestrian-ranged movement (from NAIN 400 to NAIN 1200m), and higher mean integration values for longer-range/vehicular movement (from NAIN 2000m to N). This indicates that these privatised CBDs are not inherently walkable. This is also consistent with the how these CBD entrances are configured on the spatial network, with entrance locations having average accessibility values that are correlated to higher ranges of movement.

Responding to the last research question, while these private CBDs attract a large clustering of commercial points-of-interest (POIs), this study finds that commercial points-of-interest (POIs) within the CBDs have lower mean pedestrian accessibility values than the commercial POIs found outside the CBDs. Tangentially, this study finds that commercial POIs within the CBDs correlate to locating within larger building footprint areas when compared to the relatively smaller building footprint areas for POIs found in the rest of study area.

This indicates that within the CBDs, there is an internalisation of commercial activities within buildings that architecturally enclose space. Larger building footprints would point to larger blocks, and consequently less pedestrian accessibility due to reduced permeability within the CBD street networks.

The above findings consistently show how Metro Manila's private CBDs are inherently designed for vehicular access and long-range movement. Lower pedestrian accessibility into these CBDs confirm that they behave as enclaves, inherently disconnected from their surroundings. Metro Manila's CBDs are a paradox in that businesses choose to locate without the natural movement economies associated with organic cities; instead, businesses favour the car-centric, impermeable, internalised and privatised addresses that Metro Manila's CBDs offer.

5.2 Limitations

All spatial accessibility analysis is undertaken using a combination of QGIS and Depthmap X software (depthmap X development team, 2017), with statistical analysis using IBM SPSS software. Majority of this study was undertaken offsite in the United Kingdom (based in London), for a period of approximately five months. It relies on available historical maps from archival sources online and from the British Library; and remotely collected data sourced from: Open Street Map, Google Earth, and the Philippine Geoportal for checking against the present-day spatial network.

Regarding spatial network analysis, it is a probabilistic method based on applying graph centralities to analyse the spatial configuration of cities. As this is a historical assessment of spatial configuration, this study does not weigh these graphs for historical land use, density, road right-of-way width, and actual vehicular or foot traffic counts. This study instead uses parallel

data as proxies for historical socio-economic behavior and human interaction (enclave boundaries, historic and contemporary points-of-interest from historical and contemporary maps and historiographic narratives) to form a broader methodology in line with space syntax theory. It is by comparing these data with configurational values using descriptive and analytical statistics that this study is able to show how Metro Manila's CBDs have embedded spatial properties that correspond with the underlying current narratives and spatial cultures.

5.3 Conclusions and Reflections

One can see that Metro Manila is a city-region of two realms – an outdoor, public city of streets and fine-grained activity following space syntax's economies of natural movement; contrasting markedly with the enclaved private realm, dominated by car-centric planning focused on long-range movement and connectivity, interiorised within large-footprint buildings segregated from local foot-traffic.

Whilst Manila is just one case, one can intuit the same phenomena in other cities around the world, as similar edge city developments in the US, financial districts (like Canary Wharf) and new towns and cities were developed during the post-war boom brought about by global economic growth and trade.

One could even speculate say that this interiorised enclosure, long-range connectivity, and "un-natural" local movement is itself the spatial signature of global capitalism. As the world moves on from the pandemic and transitions due to the crisis of climate change, demographic shifts, networked commerce, and rising socio-economic inequity, it is imperative to methodically map out how this spatial signature could be retrofitted and turned to adapt to the world's changing needs.

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