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Success and Failure of New Cities as Drivers of Urban Growth

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1 ABSTRACT

This paper builds on the findings of our REAL CORP 2024 paper: "Sustainable, Smart and Humane Cities: from utopia to reality. On the purpose and meaning of urban planning today: lessons from the New Cities". Based on publicly available data, we found some 80 new settlements, loosely defined as „New Cities" (NC), planned and/or under development. Most of them took place in fast urbanising Asia and Africa, fewer in South America, North America, Russia, and none in Europe, likely due to the smaller scale of its urban settlements and its own tradition of new towns.

Our analysis found five categories of NC depending on their key drivers: creating new seats of government (national and regional capital NC); stimulating and transforming national economies (productive NC); global corporate wealth seeking new lucrative investment opportunities (real estate NC); companies accommodating themselves (business NC) and satisfying ecological and social needs (green NC). International design consultancies seeking commissions of masterplans, combining ecocity and smart city design principles into increasingly futuristic images – are also an important part of NC drivers.

Studying the implementation progress of NC was more difficult. Although NC aimed at rapid development many of them did not progress quickly and some stalled altogether. Often kick-started by the public sector with investment in infrastructure, relaxed regulations and availability of cheap land, a first phase took place. However, subsequent development expected to be provided by private investment slowed down or stopped altogether, leading sometimes to ghost towns. Despite their often idealistic objectives, NC were accommodating the growing local middle class, excluding the low income population, and sometimes specific ethnic or religious groups. In some cases, smart technology was used for surveillance of inhabitants' activities.

After our initial review and analysis of the NC phenomenon, we aimed to understand the dynamic of these settlements better. We refrained from dwelling on the concept of "New City", as it amounts de facto to a very broad typology of urban settlements at diverse scales, mainly in developing countries, and in particular those with dynamic economies. Thus we focused on whether and how these NC-tagged settlements progressed over time.

We found that information in the public domain on emerging NC, embellished by starchitect generated images in pursuit of meeting client demands and attracting private investors was abundant, but their development tended to diverge from real-time progress. We opted to use information from Google Earth images to detect the current situation of the NCs on the ground. This method enabled us both to locate them in their physical context – not always an easy task – and to approximate the degree of compliance of NC realisations with their initial intention over time.

Keywords: urbanisation, population growth, new cities, urban growth, case studies

2 RESEARCH METHODOLOGY

We structured our analysis of the degree and pace at which the original NC proposals had developed into the following three approaches:

(1) synthesising the current situation of these NC according to the five categories of the typology we had developed in our previous paper: capital, productive, business, real estate and green NCs.

(2) analysing the spatial characteristics of these NC

(3)detecting the degree of compliance with the planning proposals of the analysed NC by comparing them with the images provided by Google Earth.

The data search focused on the following aspects:

- location, year of proposal, size, projected population and completion date
- masterplan and physical characteristics

- level of compliance with the original proposal
- evolution of NC, size and pace
- impact on natural environments
- non-physical, economic, environmental, social and cultural aspects.

The data sources were limited to publicly available information on the websites of public administration, consulting designers and developers, as well as the information provided by Google Earth corresponding mostly to the year 2024. It should be noted that in many cases the written information is neither dated nor updated, while several masterplans are mere computer-generated perspectives.

3 CURRENT SITUATION OF THE SELECTED NC

3.1 Capital NC

The Capital NC are usually initiated by governments, or more likely leaders of governments. From our sample of ten capitals – the reasons of both national and regional capitals to succeed or fail depend on who initiates them, the uncertainties of the global economy and the willingness of those designated to inhabit them to move there.

"Vanity projects" of presidents can succeed (Arkadag Turkmenistan), have their ups and downs (Ordos Kangbashi China) and tend to stall when they are disowned by their successors (Nusantara Indonesia, Amaravati India, Olaya-City of Peace Equatorial Guinea). Moreover, those remote from existing capitals tend to do ecological damage, such as intense jungle deforestation (Nusantara Indonesia, Olaya-City of Peace Equatorial Guinea).

Capitals planned as Economic Free Zones to boost the national economy (New Clark City Philippines, Dompak Ecocity Indonesia), even when supported by successive presidents, but left to foreign finance and developers to realise (Kilamba Kiaxi Angola, New Administrative Capital Egypt) tend to slow down. They also lack incentives for officials (Nasantara Indonesia), and the middle class to move there (Kilamba Kiaxi Angola), due to excessive property prices (New Administrative Capital Egypt) and lack of amenities (New Clark City Philippines), besides reluctance to leave behind urban life.

Capitals created by nationalistic, often anti-colonial motivation of autocratic leaders work, due to strong top down implementation (Naypyido Myanmar), or support by international corporations, albeit sometimes affected by fluctuations of the global economy (Putrajaya Malaysia).

Overall, not all these planned and/or enforced capitals seem to fulfil the expectations of their initiators. However, Putraya is in use, and Egypt's New Administrative Capital, Arkadag and Kilamba New City are progressing.

3.2 Productive NC

Productive NC aim essentially at economic growth and diversification to attract international high-tech companies, sometimes along new universities, and also foreign direct investment. They are State-led and often given status of Special Economic Zones. The State is securing land assembly, initial infrastructure provision, while seeking cooperation from large scale international developers and investors. Many productive NC claim also smart and sustainable city status with focus on net zero energy and sometimes food self-sufficiency.

The deep port developments, mainly along the Chinese Belt and Road Initiative (BRI) are located in Asia and the Middle East. They are foremost industrial projects providing logistics for international goods transport and distribution. These ports are highly automated, thus usually without population projections or adjacent new settlements. Economic diversification aims to reduce fossil fuel dependency and to attract tourism with entertainment and leisure facilities.

The Deep Sea Ports on the Chinese Belt and Road Initiative seem to be planned as purely logistic productive ports without a new city to accommodate workers (Khazaen Economic City Oman, Patimban New City Indonesia). Nevertheless, other new port cities are including settlements with productive industrial parks (Lingang New City-Nanhuiat present- China, Colombo Port City Sri Lanka, King Abdullah Economic City

Saudi Arabia). All of them tend to displace the local rural population and gain extra land through sea reclamation.

Countries aiming at accelerating economic growth consider that Free Trade Zones will assist (Binhai Tianjin China, Enyimba Economic City Nigeria, Colombo Port City Sri Lanka, Duqm New City Oman, Dholera Smart City India, Nurkent Kazakhstan (BRI), Tatu City Kenya, Alaro City Nigeria. Yet, after initial start-off, their development tends to slow down as foreign direct investment (FDI) is not as forthcoming as expected (Enyimba Economic City Nigeria) or people do not choose to move there (Songdo South Korea) which can lead to real estate glut.

A lot is expected from high-tech industry to accelerate and develop economies, especially in developing countries (Songdo South Korea, Xiong'an China, King Abdullah Economic City Saudi Arabia, Enyimba Economic City Nigeria, Ordos Kangbashi Mongolia China, Technopolis Kenya, Dholera Smart City India, Kanza Technopolis Kenya, Ciberjaya Malaysia, Rublyovo-Arkhangelskoye Russia, Masdar City UAE, Kashiwa-No-Ha-Smart City Japan). This means a global chase to attract successful high-tech industries from the developed world which succeeds sometimes but at a loss of autonomy (Ciberjaya Malaysia). China created NC to accommodate high-tech industries during still rapid industrialisation, especially in its already most urbanised regions (Bibhai China, Xiong'ha China) to create synergy between mega-cities.

In more remote areas growth was envisaged from R&D alongside new university campuses (Ordos Kangbashi Mongolia China, King Abdullah Economic City Saudi Arabia, Ciberjaya Malaysia, Yachay-Knowledge City Ecuador). Investment in knowledge creation was also considered an important general driver of development (Chengdu Future City China).

Diversification was perceived as necessary, especially by the oil rich countries under pressure due to global policies to reduce global warming. Traditionally closed countries aimed to diversify by attracting international tourism by providing leisure and entertainment infrastructure as economic driver (Qiddiyah City Saudi Arabia, King Abdullah Economic City Saudi Arabia, Sultan Haitham City Oman).

A perceived selling point to attract foreign developers and investors was to give NC the credential of smart and sustainable city (Songdo South Korea, Qiddiyah City Saudi Arabia, Dholera Smart City India, Sultan Haitham City Oman, Rublyovo-Arkhangelskoye Russia, Kashiwa-No-Ha-Smart City Japan). This may add to their chance of development which depends on other incentives though, such as Free Economic Zones, accessible, location, favourable climate and relaxed regulation.

3.3 Real Estate NC

The real estate NC aim essentially at making money. They also have some declared purpose like catering for overspill from overcrowded large capitals (Diamniadio Lake new administrative city Senegal, Nkwashi satellite town of Lusaka Zambia, Jaber Ak Ahmad New City Kuwait, New Santa Cruz Bolivia), or for foreign leisure and tourism (Neom Saudi Arabia). Real Estate NC range from mega-fantasies (The Line Saudi Arabia) to contextless fictitious prototypes of "eco-NC" (e.g. designed and marketed by URB Dubai: The Parks South Africa, Net Zero City Al Nama Riyadh Saudi Arabia, Xzero Southern region of Kuwait, Nexgen Eastern Cairo Egypt).

The most realistic and successful Real Estate NC are relatively small new neighbourhoods for several thousand inhabitants, usually gated residential estates for higher income groups (Sharjah Sustainable City UAE, Dubal Sustainable City UEA, Rawabi Palestine) or for tourism (Yiti Sustainable City Oman). Another purpose of real estate NC is to become high tech innovative, sometimes smart or automated city experiments (Ho Chi Minh Innovative City – The Global City at present -Vietnam, Masdar UAE), again in need of FDI (foreign direct investment) and especially venture capital as they tend to be high risk undertakings and may end up as ghost cities (Masdar UAE, Nkwashi Satellite Town of Lusaka Zambia). Other high risk NC are pastiche cities (Tianducheng China which attempts to mimic Paris) and end up as ghost towns as well(Shenyang State Guest Mansions, China)

The much larger real estate NC require the initiation of the state or a political leader (Diamniadio Lake City Senegal, Neom Saudi Arabia) in cooperation with international developers, hoping to attract foreign investment, bank loans, other funds, as well as capital from individual plot purchasers). But even if such countries are contributing substantial initial public investment to such real estate NC, usually for land preparation and infrastructure, it does not guarantee other private investment and development slows down

considerably after the first phase or gets to a halt altogether (Shenyang State Guest Mansions China, Lavasa India). Nevertheless, there are also success stories of NC built to plan and completed (South Sabah Al Ahmad City Kuwait, Sabah Al Ahmad Sea City Kuwait).

3.4 Business NC

The three "new company towns" we found are single purpose settlements to satisfy the specific needs of their corporations. They tend to be small when they cater for administration, management and R&D (Toyota Woven City, Japan, Fujusawa Sustainable Smart Town, Panasonic) and larger when accommodating also workers to increase production (Net City China, Tencent). In Europe which, unlike the rapidly urbanising countries in the developing world, has been built up slowly with smaller cities and towns, such company complexes tend to remain pure workplaces without residents (e.g. Telefonica and Santander Financing City, near Madrid Spain).

3.5 Green NC

The "green" tag is used ambiguously by NC and covers a broad spectrum of settlements whose intention was to be close to nature but which had also a combination of other motivations. Some link sustainability and smartness by catering for the information age (The Orbit Innisfil Canada, Binhai EcoCity Tianjin China). Some seek a better balance between built up areas and open spaces when providing green new settlements as overspill of densely populated cities (Binhai EcoCity Tianjin China). Others add social housing to the green tag to help lower income people leave overcrowded cities (Ouedo Benin, Kinyinya Hill Pilot Project Kigali Rwanda). Others located in rural areas aim to retain population there trying to curb migration to the cities (Newtown Butanest Amhara region Ethiopia). Often though the green tag is used as a real estate selling point for NC in remote areas, including on reclaimed land (Forest City Malaysia). Large scale NC planned in remote locations were more prone to becoming ghost towns. This happened to Forest City in Southern Malaysia, despite its designation as duty free zone, planned as part of the Chinese Belt and Road Initiative and aimed at Chinese investment in second homes.

The "green" objectives to provide healthier affordable homes for low income groups or to assist populations to remain in their rural settings rather than to leave for overcrowded cities require strong governmental action and investment to succeed with their originally planned intentions. Ouedo built four storey blocks of affordable flats but lacked funding for greening these neighbourhoods and providing basic amenities such as schools, health centres, shops and job opportunities, and Green City Kinyinya improvement and development was slow, shifting towards more expensive housing in the hope to attract the middle class.

Large "green" overspill developments which are extensions of existing cities also require strong government commitment and forceful development companies to succeed. While the central district of Binhai Eco-City China got built only a few expected green settlements were built as scattered neighbourhoods for lack of private investment. Even The Orbit garden city in Innisfil (Canada), planned by the government to take advantage of a new railway station connecting the settlement to Toronto, was slow to take off.

4 SPATIAL CHARACTERISTICS OF NC

Project descriptions by developers and public sector authorities as well as data obtained from Google Earth images allowed the identification of the main spatial characteristics of the NCs analysed.

4.1 Design Criteria

Most of the NC proposals of spatial solutions are based on the principles of "the sustainable city" and "the smart city". A small number of cases are conceived according to traditional/functionalist planning (Ordos Kangbashi China, Tatu City Kenya, Nurkent Kazakhstan, Tianducheng China), New Urbanism (Lavasa India, Putrajaya Malaysia, Kilamba Kiaxi New City Angola), or Garden City rules (The Orbit Canada).

4.2 Geographic Characteristics

The geographic location of NC in relation to other cities varied considerably. We identified 9 different types.

Neighbourhoods/urban districts included within or expanding the existing urban fabric: Woven City (70 ha/2,000 pop) Susono Japan, Fujisawa SST (19 ha/3,000 pop) Fujisawa Japan, Net City (200 ha/80,000 pop) Shenzhen China.

Suburban or ex-urban districts: The Global City-Ho Chi Minh Innovative City (117 ha/42,000 pop) Vietnam, Sultan Haitham City (1,500 ha/100,000 pop) Muscat Oman, Tianducheng, (3,100 ha/100,000 pop) Hangzhou China, Dholera Smart City (92,000 ha/200,000 pop) Dholera India; Eko Atlantic City (1,000 ha/250,000 pop) Lagos Nigeria, Colombo Port City (269 ha/273,000 pop) Colombo Sri Lanka, Shenyang State Guest Mansions (no data, abandoned) Shenyang, China.

Districts included in metropolitan areas: Dubai Sustainable City (46 ha/2,700 pop) Dubai UAE; Sharjah Sustainable City (67 ha/7,000 pop) Dubai, Kashiwa-No-Ha Smart City (273 ha/26,000 pop), Tokyo Japan, Alaro City (2,000 ha/30,000 pop) Lagos Nigeria, Masdar (600 ha/50,000 pop) Abu Dhabi UAE, Ouèdo, (235 ha/60,000 pop) Cotonou/Porto Novo Benin, Jaber Al Ahmad New City (12.45 ha/80,000 pop) Kuwait, Cyberjaya (3,000 has/140,000 pop) Kuala Lumpur Malaysia, Songdo (610 ha/300,000 pop) Incheon South Korea.

New capitals: Olaya-City of Peace (8,150 ha/260,000 pop) 290 km Malabo Equatorial Guinea, Putrajaya (4,931 ha/350,000 pop) Kuala Lumpur Malaysia, Naypyidaw (705,400 ha/925,000 pop) 400 km Rangoon Myanmar, Nusantara (256,142 ha/1,900,000 pop) 1,400 km from Jakarta Indonesia, New Administrative Capital (NAC) (73,000 ha/6,500,000 pop) 45 km from Cairo Egypt, Dompak Eco City (925 ha/no pop data) 10 km from Tanjung Pinang Indonesia, Arkadag (1,000 ha/70,000 pop) 30 km from Ashgabat Turkmenistan, Kilamba Kiaxi (5,400 ha/500,000 pop) 20 km from Luanda Angola, New Clark City (9,450 ha/1,200,000 pop) 120 km from Manila Philippines, Amaravati (21,700 ha/3,500,000 pop) 280 km from Hyderabad India.

New towns near capital cities(less than 50 km): Chengdu Future City (469 Ha/no data pop),50 Km from Chengdu China, Trans-Ganga Hightech City (463 ha/no data pop) 10 km Kanpur India, Qiddiyah (33,400 ha/no pop data) 40 km Riyadh Saudi Arabia, Rawabi (630 ha/40,000 pop) 10 km from Ramallah, Palestine, Nkwashi (1,300 ha/60,000-100,000 pop) 36 km Lusaka Zambia, Tatu City (1,000 ha/80,000 pop) 20 km from Nairobi Kenya, Tianjin Eco-City (3,000 ha/350,000 pop) Tianjin, China, Nueva Santa Cruz (6,000 ha/370,000 pop) 20 km from Santa Cruz de la Sierra Bolivia, Yovo-Arkhangelskoye (460 ha/66,500 pop) 20 km Moscow Russia, Diamniadio Lake City (1,644 ha/350,000 pop) Dakar Senegal. 10

Isolated new towns: Khazaen (no data) 60 km from Muscat, Oman; Yiti Sustainable City (1,1000 ha/10,000 pop) 50 km from Muscat, Oman; Nurkent (6,895 ha/110,000 pop) 3,000 km to Beijing, China; Yachay (4,500 ha/120,000 pop),120 km from Lima, Ecuador; Lavasa (10,000 ha/200,000 pop) 70 km from Pune, India; Sabah Al Ahmad Sea City (800 ha/250,000 pop) 100 km from Kuwait; Duqm (15,000 ha/250,000 pop) 480 km from Muscat, Oman; Konza Technopolis (2,000 ha/250,000 pop) 64 km from Nairobi, Kenya; South Sabah Al-Ahmad City (6,150 ha/280,000 pop) 80 km from Kuwait; Lingang New City (7,000 ha/600,000-800,000 pop) 60 km from Shanghai, China; Ordos Kangbashi (35,000 ha/1,000,000 pop) 750 km from Beijing, China; Enyimba Economic City (9,803 ha/1,500,000 pop) 500 km from Lagos, Nigeria; King Abdullah Economic City (17,300 ha/2,000,000 pop) 1,100 km from Riad, Saudi Arabia; Xiong 'An (9,803 ha/5,000,000 pop) 105 km from Beijing, China. 15

Isolated mega-cities: Neom, including Trojena, Sindhala and Oxagon (2,650 km of coastline) and The Line (3,400 ha/9,000,000 pop) Saudi Arabia.

Experimental models: Kinyinya Hill Pilot Project (16 has/8,000 pop)Kigali Rwanda; Nestown Buranest (no data) Adiss Zemen Ethiopia.

In the pipeline: The Orbit (800 ha/150,000 pop) Innisfil Ontario Canada; XZero City(1.600 ha/100.000 pop) KWAIT, The Parks (1,700 ha/150,000 pop) South Africa, Alnama Smart City (1,000 ha/44,000 pop) Riyadh Saudi Arabia, Nexgen (580 ha/35,000 pop) Cairo's Eastern district Egypt.

4.3 Site Conditions

Most NC are located on flat land, even though there are cases in which their construction has substantially modified the environment, causing environmental alterations that contrast with the sustainability objectives they claim. Examples are:

Land reclamation from the sea: Net City, Forest City, Lingang New City, Songdo, Colombo City, Port Sabah Al Ahmad Sea City

Occupation of sensitive islands: Dompak Eco City

Destruction of vegetation cover: Nusantara, Olaya-City of Peace

Hill erosion: Rawabi.

4.4 Project Areas

The site sizes of NC are determined by the objectives of the NCs and vary according to whether they are neighbourhoods, urban districts or independent cities.

Small

less than 100 ha: Fujisawa SST; Kinyinya Hill Pilot Project, Jaber Al Ahmad New City, King Abdullah Economic City, Sharjah Sustainable City.

100 – 500 ha: Net City, Ouèdo, The Global City, Kashiwa-no-Ha Smart City, Trans Ganga Hightech City, Yovo-Arkhangelskoye, Chengdu Future City, Colombo City Port.

Medium

500 – 1,000 ha: The Orbit, Masdar, Rawabi, Dompak Eco City, Arkadag, Songdo, Tatu City, Eko Atlantic City.

1,000 – 2,000 ha: Shenyang State Guest Mansions, Nkwashi, Diamniadio Lake City, Forrest City, Yiti Sustainable City, Konza Technopolis.

2,000- 5,000 ha: Tianjin Eco-City, Tianducheng, South Sabah Al-Ahmad City, The Line, Putrajaya, Cyberjaya, Yachay.

Large

5,000 – 10,000 ha: Lavasa, Nueva Santa Cruz, Kilamba Kiaxi, New Clark City, Lingang New City, Nurkent, Khazaen, Olaya-City of Peace.

More than 10,000 ha: Naypyidaw, New Administrative Capital (NAC), Nusantara, Amaravati, Ordos Kangbashi, King Abdullah Economic City, Dholera, Duqm, Qiddiyah.

4.5 Planned Number of Population

Most NC stated the expected numbers of inhabitants, and sometimes of workplaces, except for the highly automated sea ports which were planned essentially as industrial-economic developments relying on existing neighbouring cities to accommodate their workforce. Often the development of NC involved displacement of existing populations without any replacement for them. The majority of NC are planned as medium size cities.

Small

Below 10,000 pop: Fujisawa SST, Woven City, Kinyinya Hill Pilot Project, Dubai Sustainable City, Sharjah Sustainable City, Yiti Sustainable City.

10,000 – 50,000 pop: Alaro City, Rawabi, Masdar, Kashiwa-No-Ha Smart City, The Global City.

Medium

50,000- 100,000 pop: Net City, Ouèdo, Tianducheng. Nkwashi, Jaber Al Ahmad New City, Arkadag, Tatu City, Yovo-Arkhangelskoye, Sultan Haitham City.

100,000 – 500,000 pop: The Orbit, Lavasa, Shenyang State Guest Mansions, Diamniadio Lake City, South Sabah Al-Ahmad City, New Santa Cruz, Putrajaya, Olaya-City of Peace, Kilamba Kiaxi, Ciberjaya, Songdo, Konza Technopolis, Dholera, Eko Atlantic City, Yatay, Colombo City Port, Duqm.

500,000 – 1,000,000 pop: Neom, Naypyidaw, Ordos Kangbashi, Lingang New City, Forest City.

Large

1,000,000 – 2,000,000 pop: Nusantara, King Abdullah Economic City, Enyimba Economic City.

Over 2,000,000 pop: The Line, New Administrative Capital (NAC), Amaravati, New Clark City, Xiong'An.

4.6 Gross Densities

From these population projections and the masterplan briefs and design it is possible to impute expected densities of NC. This estimate does not take account of real numbers of inhabitants which are not

surprisingly difficult to establish as it is not in the interest of NC developers to reveal real estate overproduction. Densities are key to assessing the level of sustainability of NC planning proposals.

Low, less than 100 people/ha

Woven City, Lavasa, Masdar, Tianducheng, Rawabi, Dubai Sustainable City, Nkwashi, South Sabah Al-Ahmad City, New Santa Cruz, Yiti Sustainable City, Putrajaya, Naypyidaw, New Administrative Capital (NAC), Olaya-City of Peace, Kilamba Kaxi, Nusantara, Amaravati, Arkadag, Cyberjaya, Lingang New City, Kashiwa-No-Ha Smart City, Tatu City, Dholera, Yachay, Nurkent, Duqm, Alaro, Sultan Haitham City.

Middle,100-200 people/ha

Diamniadio Lake City, New Clark City, King Abdullah Economic City, Konza Technopolis, Yovo-Arkhangelskoye, Enyimba Economic City.

High, more than 200 people/ha

Fujisawa Sustainable Smart, Net City, Tianjin Eco-City, Ouèdo, The Orbit, Kinyinya Hill Pilot Project, Shenyang State Guest Mansions, Jaber Al Ahmad New City, Forest City, Neom, The Line, The Global City, Sondo, Eko Atlantic City, Colombo City Port, Xiong´An.

NC name, NC Area	Population Planned numbers (year)	Population Actual size	NC category	Location, Nearest existing settlement
Mega-cities				
The Line 3400ha	9 million (2021)	Completion (2050) 300,000 (2030)	Real Estate 715km long skyscraper 2.4km by 2030	Saudi Arabia Red Sea to desert 1584km from Riyadh by road
New Administrative Capital 73,000ha	6.5 million (2015)		Capital national	Egypt 45km from Cairo
Amaravati 21,700ha	3.5 million (2014)	Completion (2029)	Capital regional	India Andhra Pradesh State 275km from Hyderabad
Diamniadio Lake City 16,500ha	3 million (2014)	Completion (2045) 280,000 (2014)	Real estate business park administration luxury housing	Senegal 30km from Dakar
Xiong'an 177,000ha	2-3 million (2017) 25 million share of triangle (2046)	Completion 2035) 1.2m existing (1950) 30,000 extra (2024)	Productive "City of the Century" high-tech	China Beijing Hebei Tianjin triangle 105km from Beijing
Binhai 119,900ha	2,998,600 (2019)	2.067m existing decrease (2020)	Productive Free Trade Zone	China Tianjin 170km from Beijing
King Abdullah Economic City 17,300ha	2 million (2005)	slow development	Productive port (inter)national advanced industry, tourism	Saudi Arabia On Red Sea Mecca Province 100km from Jeddah
Nusantara 256,142ha	1.9 million (2019)	153,000 in existing villages (2022)	Capital national government administration	Indonesia Balikpapan port city, Kalimantan, Borneo 400km from Jakarta
Enyimba Economic City 9803ha	1.5 million (2018)	Start (2023)	Productive Special Economic Zone	Nigeria Abia State 14km from Lagos
New Clark City 60ha Economic Zone 9450ha	1.2 million (2015)	Start (2016) Displacement 65,000 SEA games (2019)	Capital national	Philippines 120km from Manila
Neom 26,500ha	1 million (2017)		Real Estate Leisure, tourism	Saudi Arabia 1,426km from Riyadh
Ordos Kangbashi 8,700,000ha	1 million (2001)	30,000 (2009) 153,000 (2017) 2.15 million (2020)	Productive ex-coal mining town techno parks, universities	China Mongolia 716km from Beijing
Ho Chi Minh	1 million		Real Estate	Vietnam

Innovative City 117ha	(2022)		High-tech	District of Ho Chi Minh City
Naypyidaw 705,400ha	1 million (2000)	925,000 (2018)	Capital national	Myanmar 400km from Rangoon
Lingang New City 7400ha	600,000-800,000 (2003)		Productive new deep sea port	China Pudong 60km from Shanghai
Forest City 1400ha	700,000 (2014)	Completion (2035) 500 (2019) 9000 (2023)	Green high rise buildings on reclaimed lan	Malaysia Johor State 2km from Singapore
Qiddiyah City 33,400ha	500,000 (2019)	(2030) 1st phase 2023	Productive leisure and tourism sustainable city	Saudi Arabia 40km from Riyadh
Ecocity Dompak 925ha	500,000 (2006)	(2010) existing pop 2679 (2002)	Capital regional	Indonesia Riau Province 12 km from Tanjung Pinang (existing regional capital)
Kilamba New City 5400ha	500,000 (2008)		Capital regional	Angola Luanda Province 20km from Luanda
Shenyang State Guest Mansions 1700ha	500,000 (2010)		Real Estate State supported speculative development	China Shenghang 400km from Beijing
Medium Size Cities				
Nueva Santa Cruz 3000ha	370,000 (2022)		Real Estate Speculative design	Bolivia District of Santa Cruz
Binhai Eco-City, Tianjin 20.24ha	350,000 (2008) Competition HAO (2014)		Green on reclaimed land	China 35km from Tianjin
Putrajaya 4931ha	350,000 (1995)		Capital National administrative	Malaysia Sepang District 30km from Kuala Lumpur
Songdo 5336ha	300,000 (2000) (2003) 3m; (2015) 167,000	(2003) start (2015) 30,000 (2021) 80,000	Productive high-tech Smart and sustainable city Free Economic Zone	South Korea Incheon transport hub 30km from Seoul
Lavasa 100km2 10,000ha	300,000 (1999)	10,000 (2010) temporarily revoked (2012)	Real Estate developer led	India Maharashtra Pune District 188km from Mumbai
South Sabah-Al-Ahmad City 61,500ha	280,000 (2016)	Completion (2040)	Real Estate From public to private housing production	Kuwait 80km from Kuwait City
Colombo Port City 269ha	273,000 (2016)		Productive Special Economic Zone	Sri Lanka 3.5km from Colombo
Olaya-City of Peace 8150ha	260,000 (2017)		Capital national	Equatorial Guinea Djibloho Province 286km from Malabo capital (Bioko Island)
Sabah Al Ahmad Sea City 800ha	250,000 (1993) 460,279 (KEO est)	Completion (2040)	Real Estate Purely private speculative	Kuwait 151km from Kuwait City
Duqm New City 15,000ha	250,000 (2014)	2nd masterplan (2017)	Productive Special Economic Zone	Oman 547km from Muscat
Eko Atlantic City 1000ha	250,000 (2009)	(2009) start	Real Estate high income overspill	Nigeria Lagos 7.7km from Lagos centre
Technopolis 2000ha	250,000 (2008)	(2030) completion]1st phase (2013)	Productive high-tech	Kenya 60 km from Nairobi
Small towns				
Dholera Smart City 92,000ha	200,000 (2008)	(2024) completion	Productive smart city Special Innovation Region	India New Delhi Mumbai corridor 552km from Mumbai
Kanza Technopolis	180,000		Productive high-tech	Kenya 64km from Nairobi
Green City Kinyinya Hill 600ha	150,000 (2024)		Green Social housing planned but high income overspill	Rwanda district of capital Kigali
The Orbit 180ha	150,000 (2017)	completion (2050) 43,326 (2021)	Green new agro-tech and wilding	Canada Innisfil Ontario 106km from Toronto
The Parks 1700ha	150,000 (2022)		Real Estate Speculative design	South Africa (no location)

Ciberjaya 3000ha	140,000 (1997)		Productive IT global	Malaysia Sepang 25km from Kuala Lumpur
Yachay Knowledge City 4,489ha	120,000 (2014) 15,000 (2017)	Start (2015) 2000 (2022)	Productive Tech experimental university high tech SMEs	Ecuador Urcuqui 122km from Quito
Nurkent 6895ha	110,000 (2012)	Masterplan approved (2017)	Productive Economic Zone of Chinese Belt and Road Initiative	Kazakhstan Almaty region on old Silk Road 14.6km from Chinese city Khorgos
Sultan Haitham City 14,800ha	100,000 (2023)	completion (2045) 1st phase (2024)	Productive smart and sustainable city (model city) high income housing	Oman 45.7km from Muscat
Nkwashi Satellite Town 1300ha	60,00-100,000 (2013)		Real Estate Private speculative overproduction	Zambia 36km from Lusaka
Tianducheng 3100ha	100,000 (2007)	30,000 (2024)	Real Estate pastiche Paris	China 27km from Hangzhou
XZero City 1600ha	100,000 (2024)		Real Estate designer led	Kuwait (no location)
Ouedo 235ha	100,000 (2013)	3500 units built (2024)	Green social housing without green or amenities	Benin 35 km from Porto-Novo
Jaber Al Ahmad New City 1245ha	80,000 (2014) 18,287 (2015)	Masterplan SUF concept Low density (2007)	Real Estate Purely private speculative lacking investors	Kuwait 25km from Kuwait City
Net City (Tencent) 200ha	80,000 (2019)	completion (2027) 26,400 (2025)	Business IT company town, production, HQ, R&D	China Car free district Shenzhen
Tatu City 1000ha	80,000 (2008)	completion (2030) 1st phase (2012 start)	Productive Economic Zone	Kenya Ruiru Kiambu 21km from Nairobi
Arkadag 1000ha	70,000 (2018)	64,086 (2022) Inaugurated (2023)	Capital regional	Turkmenistan Ahal Province 30km from capital Ashgabat
Rublyovo-Arkhangelskoye city/district 460ha	66,500 (2019)	Competition (2918) Not implemented	Productive smart city, high tech	Russia Moscow Western suburb of Moscow
Masdar City 600ha	50,000 (2006)	1/4 built (2013) little inhabited (2020)	Real Estate high-tech	UAE 28km from Abu Dhabi
Al Namas 1000ha	44,000 (2022)	existing villages	Real Estate designer led	Saudi Arabia (no location)
Rawabi 6300ha	40,000 (2007)	1st phase 3000 (2012) built, not occupied no water 710 (2017) 5000 (2015 est)	Real Estate High income	Palestine 17 km from Ramallah
Nexgen Eastern District Cairo 580ha	35,000 (2023)		Real Estate designer led	Egypt (no location)
Alaro City 2000ha	30,000 (2019)	(2019 start)	Productive Free Customs Zone	Nigeria 89km from Lagos
Kashiwa-No-Ha-Smart City 273ha	26,000 (2005)	completion (2030) 1st phase completed (2024)	Productive smart sustainable city with renewable energy and high-tech incubator firms	Japan Tokyo metropolitan area 49km from Tokyo
Nestown Buranest 1600ha	20,000 (2012)	600-950 (2013) 8000 replica expected	Green social housing (model city) for reproduction, not achieved	Ethiopia Amhara rural region Addis Zemen 560km from Adis Ababa
Yiti Sustainable City 1100ha	10,000 (2022)	completion (2025)75% built (2024)	Real Estate tourism	Oman 37km from Muscat
Sharjah Sustainable City 67ha	5000 (2019)	Completed (2024)	Real Estate residential gated	UAE Sharjah 22.4km from Sharjah centre
Fujisawa Sustainable Smart City	3000 (2008)	Completed (2018)	Business Panasonic company	Japan Fujisawa

Panasonic company town 19ha			town R&D	48.2km from Tokyo
Dubai Sustainable City 46ha	2700 (2013)	Completed (2019)	Real Estate residential high income gated	UAE 29.3km from Dubai
Toyota Woven City, Japan 70ha	2000 (2021)	100 staff (2025)	Business Toyota HQ tech R&D (+ 50 visiting countries)	Japan Higashi, Fuji mountain 14km from Tokyo
NC without population data				
Khazaen Economic City 5200ha	Pop? (2019)		Productive port Free Zone	Oman 70km from Muscat
Trans-Ganga High-tech City	Pop? (2014) (1994?)	Plot sale auction not started	Productive industrial park for high-tech companies not happening	India 160km from Uttar Pradesh
Chengdu Future City 4600ha	Pop? (2019)	Latest info 2023	Productive university education based	China 50km from Chengdu
Patimban New City 350ha reclaimed land 334ha from existing owners	Pop? (2018) were displaced from 334ha	(2029) EIA social monitoring (2019-2023)	Productive new deep sea port and highway access	Indonesia Subang regency, West Java 145km from Jakarta

Table 1: NC Consolidated Data (rank ordered by population size).

5 COMPLIANCE OF BUILT NC WITH PLANNING PROPOSALS IN MASTERPLANS

The analysis of the spatial proposals contained in the masterplans of the new generation of NC enables us to detect significant aspects that, interrelated, help to describe the complex panorama of this singular planning practice.

5.1 Degree of Compliance and Pace of Development

Updated existing information, together with images of Google Earth – corresponding to the years 2023 and 2024 -were used to analyse the degree of compliance between effectively implemented NC and the initial urban planning proposals. The satellite photos provided relevant information to identify compliance of the built NC with the initial masterplans at two levels: urbanisation infrastructure (new street networks) and buildings (building blocks). The start date of the projects enabled us to detect the pace of the NC development. Finally, cross-referencing information on project design criteria, geographic location, assigned area, expected population, resulting gross density, percentage of effectively urbanised and built land formed the basis of our conclusions.

5.2 New Classification of NC, Based on Generic Simplification

Considering the enormous diversity of cases, a generic simplification was needed and led to the following classification:

Fully developed: Fujisawa SST (2008), Putrajaya (1995), Cyberjaya (1997), Songdo (2003), Tianducheng (2007) Dubai Sustainable City (2013)

Highly urbanised and built: Sabah Al Ahmad Sea City (1993), Ordos Kangbashi, (2001), Lingang New City (2003), Kashiwa-no-Ha Smart City (2005), Kilamba Kiaxi (2008), Shenyang State Guest Mansions (2010, abandoned), Jaber Al Ahmad New City (2014), South Sabah Al-Ahmad City (2016), Net City (2019), Sharjah Sustainable City (2019), Yiti Sustainable City (2022), Sultan Haitham City (2023)

Highly urbanised, partially built: Tianjin Eco-City (2008), Ouèdo (2013), New Administrative Capital (NAC) (2015), Nurkent (2017), Arkadag (2018)

Partially urbanised and built: Lavasa (1999), Masdar (2006), Rawabi (2007), Tatu City (2008), Eko Atlantic City (2009), Forest City (2016), Xiong'An (2017), Yovo-Arkhangelskoye (2019), Qiddiyah City (2019) Woven City (2021), The Global City (2022)

Scarcely urbanised and built: King Abdullah Economic City (2005), Dompak Ecocity (2006), Konza Technopolis (2008), Dholera Smart City (2008), Neston Buranest (2012), Nkwashi (2013), Yachay (2014), Diamniadio Lake City (2014), New Clark City (2015), Colombo City Port (2016), Olaya-City of Peace

(2017), Neom (2017), Duqm (2018), Nusantara (2019), Khazaen (2019), Nueva Santa Cruz (2022), Kinyinya Hill Pilot Project (2022)

Partially urbanised, not built: Amaravati (2014), Trans Ganga Hightech City (2014), Alaro City (2019), The Line (2021)

6 CONCLUSION

The analysis of the objectives, locational, spatial and design aspects of the selected New Cities (NC) confirms the elasticity of the concept of NC and its distinction from the term "new town" coined in the 1960s in Europe. Initially, the new towns referred to independent settlements, built from scratch according to the guidelines of a masterplan or, where appropriate, supported by small existing settlements to which planning imposed a significant urban expansion. Two criteria ensured their development over time: being sufficiently distant from the main urban centres to create both local population and economic activities, and the support of the public administration to ensure infrastructure investments. The generation of NC that emerged at the end of the twentieth century to respond to the demands of globalised societies is based on other aspects which dilute the original meaning of “new towns” to make room for a more flexible concept including other aspects associated with the concepts of “city”.

Versatility is a key feature of NC used during the last 20 years to name different types of developments. Genuine “new cities” built to fulfil specific objectives, as well as a wide range of urban neighbourhoods, suburban or metropolitan districts, pilot projects and model designs have adopted this denomination to distinguish themselves from traditional cities and their urban interventions. Another characteristic of NC is to confound the terms “sustainable city” and “smart city” when applied to the planning and design of NC, notwithstanding that sustainability and smartness have become claims of both conventional planning and the real estate industry. Adequate management – public or private – to ensure the permanent supply of the necessary investments – domestic or foreign – is possibly the factor which differentiates NC most from traditional city development. An added aspect associated exclusively with the material conditions of NC projects is the attraction or rejection by the expected population to move, purchase a home or take a job in these NC which had a considerable impact on the success or failure of many NCs. The combination of these factors fixes NC masterplans in the territory through infrastructure development and subsequent construction, and is defining their delay in time (unfulfilled stages) or their permanence in the pipeline, their failure (incomplete projects or ghost cities) but also the success of these proposals (fully completed or in progress).

Although there has been a significant increase in NC in recent decades – particularly in Asia, Africa and the Middle East, driven by rapid urbanisation, population growth, economic expansion and investment opportunities for foreign capital – there is no database that tracks these new urban developments on a global scale. The lack of a universal definition of NC makes it difficult both to classify them and to monitor and compare projects which would contribute significantly to knowing the factors that inhibit, delay or promote their development and thereby facilitate the tasks of managers, planners, designers and promoters.

What are the significant aspects of the NC experience?

Leaving aside the cases of new settlements conceived as autonomous units, strategically located in the territory with the aim of building permanent communities, most of the examples reviewed in this paper refer to urban interventions of different scales and purposes that aspire to differentiate themselves from the traditional city by providing new ways of life. What they have in common is a top-down approach devoid of public participation. Regarding their chances to succeed, it is worth noting that the most successful NC tend to be rather small settlements or neighbourhoods with a clear objective and secure financing.

The creation of NCs in the 21st century is an undeniable fact. The large number of cities built from scratch, of punctual interventions in existing urban fabrics and of suburban or metropolitan neighbourhoods and districts are evidence of the dynamic of this phenomenon. Even when it comes to proposals centred on the dual “sustainable” and “smart” concepts, albeit not always delivering their principles – the contribution of NC to the planning and design criteria of cities is undeniable.

7 REFERENCES

As mentioned in the introduction to this paper the data used for its elaboration come from a multitude of sources freely available on the Internet. The material used was retrieved mainly from three sources. Firstly, the information provided by the authors of the masterplans, such as date, location, surface area, objectives, number of dwellings, social facilities, spaces for productive activities, as well as the theoretical principles that guided their planning and design and the images of the expected urban future. Secondly, data published by developers: public administrations, non-governmental organisations or private investors selling their real estate products. Thirdly, open source and often short articles from various sources that helped to update the degree of spatial development of the selected case studies. There are too many to enumerate all of them here. Examples are:

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