55TH ISOCARP
WORLD PLANNING
CONGRESS
Beyond the Metropolis
JAKARTA - BOGOR, INDONESIA
9 - 13 SEPTEMBER 2019

CONGRESS RECAP

ISOCARP
Knowledge for Better Cities

55TH ISOCARP
WORLD PLANNING
CONGRESS
Beyond the Metropolis
JAKARTA - BOGOR, INDONESIA
9-13 SEPTEMBER 2019

Recap of the 55th ISOCARP Congress
Jakarta/Bogor, Indonesia,
September 9-13, 2019

Beyond the Metropolis

Content

Introduction

The 55th ISOCARP World Planning Congress took place in the capital of Indonesia, Jakarta, and in the nearby city of Bogor, between 9-13 September 2019. It gathered people from all continents of the world to explore the role of megacities in the future of humanity.

Jakarta

Bogor

With climate change and sustainable development permeating all contributions, the Congress explored specifically the theme of 'megacities': the urban agglomerations that appear to be without limits, and offer great opportunities to consider the potential of scale in promoting sustainable development, the emergence of new models of governance and the evolving dynamics of their economic influence from global to very local level.

Jakarta and Bogor provided the perfect setting for the theme, particularly as the announcement of a new capital city for Indonesia came just before the Congress and opened another perspective to the discussions: the relationship between old and new cities and the way to promote well-being in both.

As megacities have an economic and political influence that is becoming stronger than the states, issues of governance and power balance are urgently raised. Also, with size, comes the capacity for leadership towards exemplary responses to sustainability, liveability and innovation.

Bambang P.S. Brodjonegoro, Minister of National Development Planning, leads the Gong Beating Ceremony during the Opening Plenary at the Bogor International Convention Center.

Congress delegates enjoy the flavours of local street food at the Sabang Culinary Street.

Jakarta Governor Anies Baswedan gives a brief introduction of the City to the delegates.

Jakarta Governor Anies Baswedan (center), together with ISOCARP President Martin Dubbeling (left) and IAP Secretary General Hendricus Andy Simarmata (right), welcomes the delegates during the Introduction to the Technical Tours of the Congress.

This overall theme was articulated in seven sub-themes, all interrelated, exploring the reasons, needs and capacity of megacities, the relationship with their territory, the importance of putting people at the centre of a strong liveability agenda, and culture, environment and governance aspects.

Local perspectives were offered through technical tours and multiple keynote presentations by the ministers, governors and mayors of Indonesia, with local experts taking active part in all sessions and debates.

Around 320 planning experts travelled to Indonesia to join the Congress, and 400 nationals from Jakarta, Java and further afield in the country. Overall this was the best attended World Planning Congress in the history of ISOCARP:

- We hosted a caucus of 22 Mayors of the key cities of the country and a national-scale debate on the issues related to the foundation of the new capital city, attended by over 150 people and the national media.

- We enjoyed the hospitality of the Governor of Jakarta and the Mayor of Bogor and had the opportunity to hear about the plans for this important part of the world from 19 between ministers, city leaders and high officials.

- 200 presentations were made, covering research, case studies, innovation, with additional 19 special sessions and debates.

- We heard about the progress of the Sustainable Development Goal from UN Habitat and UNICEF arranged a training on child responsive planning.

- Speakers from the best professional companies, universities and research groups contributed their ideas and aspirations.

Delegates listening attentively to one of the keynote speakers during a plenary session

Very importantly we had a significant number of young planners from 49 countries actively participating in the Congress: as leaders of the tracks, engaged in special projects presented to officials, as participants and volunteers.

Jakarta and Bogor were also the setting for evening dancing, exploration of street food, evening runs and many 'meetings' by the pool. The Congress turned out to be rich in content, socially open and generally a lot of fun.

Congress in Numbers

720
Participants

322
International

398
Local

7
Tracks

19
Special Sessions
and Debates

102
Scheduled
Sessions

200
Presentations
Given

600
Abstracts
Submitted

Middle East
3.2%

Europe
12.2%

Asia
76,9%

North
America
2.2%

Latin
America
0,6%

Africa
2,9%

Australia 1,9%

1 ▭▬ 396 participants
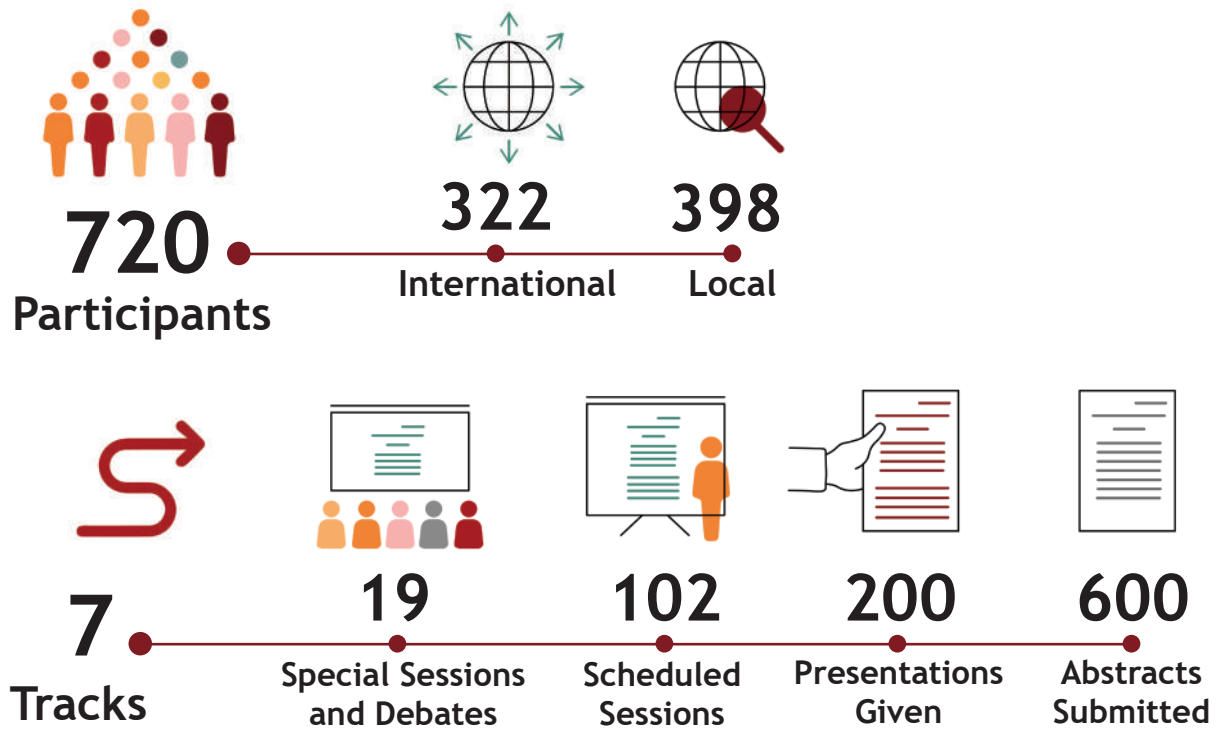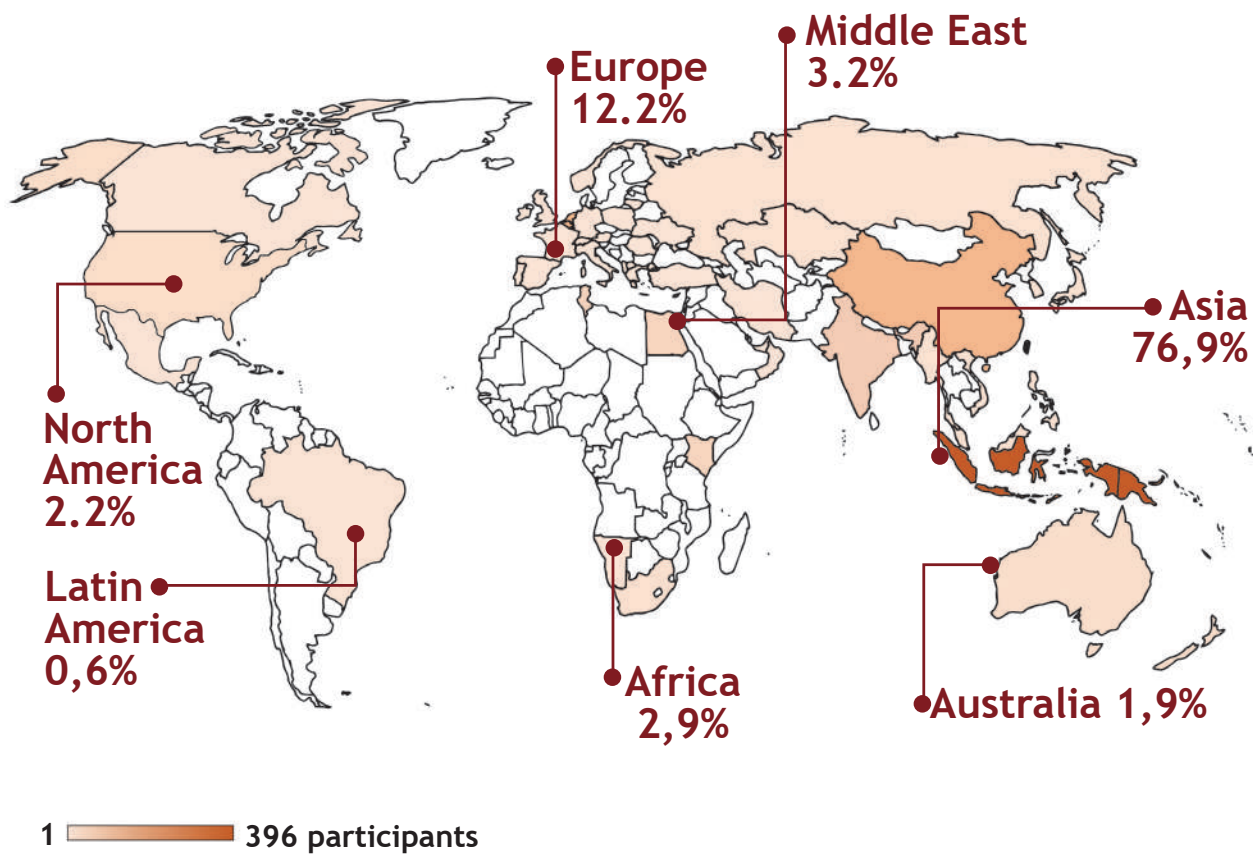
Jakarta and its Region

Jakarta is a megacity of 10.2 million resident people and a daytime working population of around 18 million. Grown at the centre of the fertile island of Java, it historically flourished on agriculture and trade, thanks to its strategic position in Southeast Asia at the centre of the maritime routes from China to India and Australia.

Jakarta Skyline

Today the city is still leveraging this strategic position as a diplomatic centre, host to the ASEAN Secretariat and a major logistic centre and container port. The city has a dynamic Central Business District (CBD), planned to accommodate high rise blocks, targeting global, national and international companies. Office development floorspace is expected to grow by 5.5% a year between 2018 and 2021.

Economic growth has been accompanied by increased diversity of population and expansion of multicultural facilities and opportunities for leisure. Growth has been substantial: around 1.5 million every 10 years, from around 4 million people in the 1970s.

This has resulted in rapid expansion at the fringes, regional migration towards overcrowded informal areas in the central city and a 40km radius of supporting towns, many of them with over 2 million residents each: Tangerang, South Tangerang, Bogor, Depok, Bekasi and others forming the Greater Jakarta Metropolitan Area. With the upcoming development of high-speed rail service and the planning of privately-led new districts, Jakarta is now at the centre of a mega-urban region extending to Bandung some 100km away.

TOD Dukuh Atas Interchange

Museum Bahari, Akuarium Village Technical Tour, photo: Martina Juvara

Rapid urbanisation has overtaken the capacity of the city's infrastructure. The three freeways built in the 1990s to support growth have further encouraged the development of peripheral industrial areas and middle / high income suburban districts, prompting many families to move to the suburbs, leaving the centre open to immigration. As in many other parts of the world, suburbanisation has increased congestion and progressively led to significant air pollution in most of the central area. Water abstraction increased and became one of the causes of urban subsidence, which in turn has been leading to more frequent flooding. Waste and wastewater infrastructure has been unable to keep pace and resulted in the pollution of land and especially of the 13 main rivers crossing the city.

Expansion has also meant loss of prime agricultural land and made green open space sparse within the wider region.

Within this context, mid-term and long term strategic planning has not been without ambition: the development of massive and integrated public transport infrastructure is still at the early stages, but already shows significant impact: the delivery of the Mass Transit System (MRT) is underway, and linked in the CBD to increased densities in exchange for public space improvement, pedestrianisation and better access to public transport with a Transport Oriented Development approach. MRT lines are expected to be expanded from 16km to 223km by 2030. This is to be accompanied by Light Transit to serve east-central connectivity, 11 long-distance protected bus routes (the TransJakarta network, now 20% complete) and a suburban Commuter Rail Line. Smart ticketing is being introduced, and the network is complemented by mobile app-enabled car and motorcycle services.

In parallel, there is a programme of regeneration of the historic areas, starting from the old port area of Batavia, clean up and naturalisation of the river corridors, protection and planting of new coastal mangrove park and inland forests, plus localised initiatives for community greenery and neighbourhood urban food production.

Technical tours, photo: Martina Juvara

Most impressive of all is the commitment of the Governor and of the Mayors of the cities of the region to really make a difference in the quality of life of all citizens, with the liveability agenda focused on accelerated investment in piped water distribution and public services, gradual inclusion of citizens in the enhancement of public spaces and the improvement of the old neighbourhoods (*Kampungs*). New initiatives also include increased use of the available green areas with concerts, events and organised youth sport. Overall, the Governor mentioned 60 priority programmes aimed at transforming the city over the next 10-15 years. Of course, the potential impacts of moving the capital will also generate an additional set of trends for which effective planning will be essential.

Closing Reflections

Martina Juvara
General Rapporteur

Presentation by Urban Sustain Architect and Frame Art, 2019 Grand Award for Excellence Winners.

According to UN Habitat, cities account for 2% of the land, 55% of the population and 70% of the wealth (GDP) of the world[1]. Some larger metropoles are wealthier than entire nations[2]: Tokyo and New York, for example, produce (each) more wealth than the whole of South Korea; London generates roughly the same amount of money of Saudi Arabia, and Madrid more than Greece. This pattern is repeated across the globe and means that, wherever there is a megacity, if the city does not work, the country cannot work either; and that there is no future prosperity without good urban development.

This huge responsibility shouldered by cities is not limited to economics: already in 2015, Jan Eliasson, then UN Deputy Secretary-General, stated: "*The battle for sustainable development will be won or lost in cities.*" As most of us now live urbanlives, our own battle for survival on this planet, our well-being and our humanity is at play in our cities. There will be no resilience to a changing climate and no inclusive future with opportunities for all if there is no investment in cities.

Cities are a tool of development: their planning, their governance and their institutions are the essential executive functions that can make a country successful, yet they not often have the lean management systems, effective decision making, and outstanding skills and capacity they need.

Commitment to humanity

Statistics, data and technical benchmarking are obviously an essential way to understand what is happening, but a strong focus should also remain on what city living means for each single individual. We should never hide behind statistics and dashboards and forget that cities are made of human beings with needs, aspirations and desires that should find their fulfilment in cities.

Besides looking at the global scale, we must retain unrelentless commitment to the local setting of individuals who should feel at home in a city of millions, and whose identity, history and culture should not be lost with migration and urban transformation.

The larger the city, the stronger the commitment must be to liveability and to investment in cultural identity and heritage preservation: in Jakarta this is translating, for example, to

---

1   From the keynote speech of Shipra Narang Suri, quoting The New Urban Agenda – Habitat III, 2016
2   From the keynote speech of Petro Ortiz, quoting his own research http://pedrobortiz.com/display-articles/listforcity/city/220

Basuki Hadimuljono, Minister for Public Works and Housing, delivers a presentation about integrated urban infrastructures provided through Public Private Partnerships (PPP).

parallel efforts at the regional scale (with the planning of the mass transit system) and at the very local scale with the regeneration of the older *Kampungs*.

"*Planning for metropolitan growth calls for equitable investments on the smallest scale of the neighbourhood, where public spaces and collective facilities turn into places, when co-designed, co-produced and managed with the citizen themselves, particularly with children*."[3]

Children are particularly vulnerable to poor urban environments: their physical and mental health is being compromised, unless cities are planned with attention to their well-being and future opportunities: after all if *"we can build a successful city for children, we will have a successful city for everyone"*[4]. UNICEF's handbooks on children-responsive planning suggest that respect and dignity, freedom from risk and capacity of expression in the physical environment are key to safe urban places for children: these principles are clearly transferable to everyone.

Culture and heritage – and contribution to future heritage – are equally important and at the foundation of successful cities. Without knowledge and expansion of culture, we run the risk of destroying our own identity and sense of self. This would inevitably lead to alienation, sameness and inability to innovate.

Planning the metropolis and working at the mega-scale should never forget the human scale, the child dimension, the need for identity and culture: these are at the very foundation of good urbanisation.

City growing faster than a human life

In history, there have been other periods of fast growth. But never before did we have the means to know and measure urban development on a global scale as we do today. With this comes the awareness that we are in a period of big transformation and expansion.

During my own lifetime, many cities have changed beyond recognition: London was a smoky polluted city coming to grips with the loss of the British Empire, vast unproductive industrial land and extensive poor neighbourhoods. Today, it is no longer losing population, it has a vibrant and

3   From Congress Track 3 summary notes – Jens Aerts, Mahak Agrawal
4   Enrique Peñalosa, former mayor of Bogotá – quoted in Track 3

liberal cultural scene and an economy nearly entirely based on the service sector. Car use has been reducing (in absolute terms) year-on-year and the city expects that in future 80% of all journeys will not involve a car.

Entire cities emerged during the same period: Dubai, for example, in less than 50 years evolved from a palm and earth fisherman village into the emblematic city it is today. Satellite towns all around the world megacities went from plan to fully developed in the same timescale – some of them already in need of conversion and regeneration.

In some cases development is even faster – full cities, particularly in South Asia, are conceived, born and reach 'adulthood' in less than the 18 years it takes for a human being to become an adult. Traditional urban planning is unable to respond to this speed of change: it is like providing the human equivalent of basic schooling with old fashioned tools, when the pupils in the classroom are already i-pad wizards. Slow, bureaucratic and technocratic planning is no longer fit for purpose.

Nor it is possible to extrapolate the problems of today to investigate the future[5], as this will not be in linear progression from the past. This also means that some of the tools and models (from 'predict and provide' approaches to transport modelling) are definitely ready for a radical rethinking.

Pace of urbanisation, technological change and new habits are all indicating that a shift is in the making. In the past 15 years, the widespread use of credit cards, chip and pin systems and now contactless payments have revolutionised the way we buy goods, transforming shopping in cities and paving the way to e-retailing

---

5   From Track 2 - Esther Vlaswinkel: The City of the Future, https://isocarp2019.isocarp.org/paper-platform/abstract/public/363/the-city-of-the-future-a-new-para-digm-a-new-vocabulary

Congress Team 2019 summarising the track results during the Closing Plenary

and global logistics. Cloud servers, enabling remote working and changing office life, started to be in common use just 10-12 years ago. New forms of transport and mobility as a service are just at the very beginning, with great speculations about what difference they will bring.

In addition, climate change is demanding a completely new paradigm for planning a low/zero carbon city that can resist environmental shocks, which we cannot really anticipate with certainty.

Flexibility, agility and adaptability will be the necessary attributes of planning our future.

Who owns planning, then?

The theme of who plans - and for whom - was recurrent at the Congress in Jakarta. Why do it has never been in question.

Metropoles and megacities, straddling boundaries and generating GDP and political power that can destabilize a nation, need new instruments based on institutional collaboration between multiple authorities, ranging from the technical to the political, concerned with strategic and structural coordination at the macro and even global scale.

At the same time, broad participation is essential for success, and not simply in the benevolent interest of fairness and social justice. Residents, community groups, researchers and social organisations must be involved in guiding strategies and developing concrete projects. Without giving people agency it would be impossible to capture the transformative capacity of a place and its people and ensure that real opportunities are actually created.

The big challenge, of course, is bringing together the mega-scale and the micro one and making them accountable to each other.

The 'other side' of the megacity

As Jakarta has continued to expand it has given rise to three complementary phenomena that are frequently found at the edges of many of the megacities of the world:

1. Important functions that require extensive land and no longer find space in the centre of the city are located at the fringes: from shopping malls to hospitals, university and business campuses. This is a common occurrence at the edge of many large cities and metropoles, which creates high value destinations in dysfunctional areas with no urban identity, no cohesive planning and insufficient intensity to be able to mature and adapt to change with time.

2. When the metropolitan area extends in ribbons and then in between its fringe rural spaces, it typically consumes natural resources and all possibilities for maintaining or creating a balanced blue and green infrastructure.

3. When the urban leapfrogs the rural belt, it often results in a series of 'service' villages or townships; dormitory towns with unaffordable development and often aggressive speculation on the land[6], settlements that risk sucking up resources and provide limited energy to the region.

Planning the megacity needs to embrace the fluidity of its boundaries and undefined limits, and address the potential and needs of its fringes, in terms of impact on natural and agricultural resources but also anticipating the pressure of investment and the potential limited lifestyles it could end up creating. Often fringes have poor fiscal balance and reduced capacity to manage the settlements, along with expensive living conditions once the costs of commuting, additional support for families facing extended time away from home and poor infrastructure services are considered.

Relocating the capital, as presented in Jakarta, is intended to address some of these issues: high cost of land, central area unable to accommodate new functions, longer and longer commuting and ever-expanding urbanisation at the fringes[7]. It must be recognised, however, that 'growing a new capital' from scratch needs to create a full new identity, culture and reason of being – something that is not frequently and successfully done in a short period of time. It also does not necessarily remove or address the issues of the previous capital, which finds itself deprived of symbolic functions and highly valued human capital.

6 From Track 2: Soumya Warrier – The Anti-City, https://isocarp2019.isocarp.org/paper-platform/abstract/public/467/the-anti-city

7 From Relocating the Capital Special Session, https://dryfta-assets.s3-accelerate.amazonaws.com/assets/isocarp2019/eventdocs/1569599073RelocatingtheNationalCapital-MinistryofNationalDevPlanning.pdf

Congress delegates enjoy the local cuisine and traditional performances during the Gala Dinner hosted by the Indonesian Association of Urban and Regional Planners.

Digital planning and digitization

Digital planning is in infancy and has not yet evolved enough to be institutionalised in formal planning. However, new data open up new conceptual possibilities that were never available before.

New data can support the implementation of the UN Habitat Sustainable Development Goals in a way that can provide a new understanding across borders and geographies. Digital, publicly accessible data and plans (as the Indonesian Gistaru system[8]) also provides transparency and accountability to the population.

But of course, city digitisation has the potential to go further: it can describe the city in dynamic terms and help make urban complexity easier to understand and manage. It can capture liveability parameters and human behaviour and can alert planners, city managers and citizens of emerging negative trends well before they become entrenched. It can explore new ways to embed local preferences and identify priorities [9].

This is all very exciting; however, for now, our relationship with the 'infosphere' of the city is yet to be defined, and it is important to remember that data is not a panacea: data is not always right and is not in itself 'planning'.

8 Gistaru.atrbpn.go.id

9 From Cities and Digitisation Special Session, https://isocarp2019.isocarp.org/programme/program-schedule/discussions/program/88/5-7-cities-and-digitisation-perspectives-and-challenges-of-data-informed-urban-planning-amp-design-special-session

Planning for inclusion

As a closing final reflection of an exciting Congress week, I want to draw the attention to the many contributions that asserted in no equivocal terms that planning has responsibility for humanity: planning for fairness, for children, for well-being and to be able to respond to climate change, and so on.

In my mind, however, this was very visually brought home by the reflections on 'billboard planning' exemplified by a single road bridge in Cairo where 209 billboards sell an empty and unattainable dream of urban living and in a foreign language that few of the passers-by can even read. "*People are aggressively targeted by billboard planning, but they are generally excluded from the city* [10]."

As planners, we have to ensure that the billboards, the renderings and the appealing images do not become the planning. But neither are the technical words and the complicated data dashboards and statistics: without focus on humanity and involvement of the people that **are the megacity**, there can be no good planning.

The Young Planning Professional (YPP) workshop teams pose for a photo during the Gala Dinner

---

10   From Track 7 – Mennatullah Hendawy, https://isocarp2019.isocarp.org/paper-platform/abstract/public/47/visual-communication-and-the-mediatized-city-from-billboards-to-offices-of-urban-planning-in-cairo

Congress Programme

Time axis: 7:30 8:00 8:30 9:00 9:30 10:00 10:30 11:00 11:30 12:00 12:30 13:00 13:30 14

Monday
9 September

Meeting point: Hotel Borobudur (Ballroom Entrance)

Technical Tour - Kota Tua

Meeting point: Hotel Borobudur (Ballroom Entrance)

Technical Tour - Dukuh Atas Interchange

Transport Break

Lunch Break
Bogor (IPB) Centre

Technical Tour - Kampung Aquarium

Registration
Hotel Borobudur (Flores Promenade)

Registration
Bogor (IPB) International Convention Centre

Mayors' Caucus: Localizing SDGs
Bogor City Hall | Closed Session

Tuesday
10 September

Parallel Sessions

1.1 Scales (1/2)
Hotel Borobudur (Boardroom)
2.1 Beyond Megacities
Hotel Borobudur (Timor)
3.1 UNICEF Opening Session | Special S.
Hotel Borobudur (Flores A+B)
4.1 Cool Planner | Speccial Session
Hotel Borobudur (Banda B)
5.1 Mobility in Smart Cities
Hotel Borobudur (Sumba A)
6.1 Climate Change – Globally
Hotel Borobudur (Sumba B)
7.1 Cross-border Governance
Hotel Borobudur (Ambon+Nias+Ceram)
YPP Seminar
Hotel Borobudur (Singosari Room)

Coffee Break

Parallel Sessions

1.2 Linkages and Structures (1/2)
Hotel Borobudur (Boardroom)
2.2 Megacities Backside
Hotel Borobudur (Timor)
3.2 Planning and design
Hotel Borobudur (Flores A+B)
4.2 Culture-sensitive Approaches
Hotel Borobudur (Banda B)
5.2 Knowledge Economy
Hotel Borobudur (Sumba A)
6.2 The Currencies: Water
Hotel Borobudur (Sumba B)
7.2 Territorial Planning
Hotel Borobudur (Ambon+Nias+Ceram)
Planners for Climate Action
Hotel Borobudur (Singosari Room)

Lunch Break

Wednesday
11 September

Coffee Break

Session Plenary
Hotel Borobudur (Flores A+B)
Speakers: Shipra Narang Suri
Sofjan Djalil
YPP Presentations

09:00 | Speech: Metropolitan Spatial Planning
09:15 | Keynote Speech
10:15 | YPP Presentations

Parallel Sessions

1.5 How to Plan Ahead | Special S.
Hotel Borobudur (Banda A)
2.5 Managing Megacities | Special S.
Hotel Borobudur (Timor)
3.5 Sustainable Mobility
Hotel Borobudur (Flores A+B)
4.5 Design for Urban Regeneration
Hotel Borobudur (Banda B)
5.5 Smart City Strategies
Hotel Borobudur (Sumba A)
6.5 Metabolism
Hotel Borobudur (Sumba B)
7.5 Democratic Urbanism | Special S.
Hotel Borobudur (Ambon+Nias+Ceram)
ISOCARP Institute Seminar
Hotel Borobudur (Singosari Room)

Lunch Break

Thursday
12 September

Coffee Break

Session Plenary
Hotel Borobudur (Flores A+B)
Speakers: Agnes Deboulet
Basuki Hadimuljono
Panelists: Teresa Marat-Mendes
Jean-Claude Bolay
Natalie Rosales
Marc Wolfram

09:00 | Speech: Urban Infrastructure
09:15 | Keynote Speech
09:35 | Panel Discussion
10:05 | Speech
10:15 | Awards for Excellence - Projects

Parallel Sessions

1.7 Effciency
Hotel Borobudur (Banda A)
2.7 Mega Infrastructure
Hotel Borobudur (Timor)
3.7 Public Space, Public Life
Hotel Borobudur (Flores A+B)
4.7 Culture-led regeneration | S. S.
Hotel Borobudur (Banda B)
5.7 Cities and Digitisation | Special S.
Hotel Borobudur (Sumba A)
6.8 Planning Tools
Hotel Borobudur (Sumba B)
7.7 Metropolitan Governance
Hotel Borobudur (Ambon+Nias+Ceram)
IAP Meeting (2/2)
Hotel Borobudur (Singosari Room)

Lunch Break

Friday
13 September

UNICEF Training | Side Event
Speakers: Jens Aerts

Free time

UR-SCAPE | Side Event
Speakers: Stephen Cairns, Rosita Samsudin, Joris van Etten

WRI CArbon Neutral Recap
Speakers: Jens Aerts

FIABCI-APREC Seminar

Urban Development Control - MASP

The State of Indonesian Cities - PUPR

Timeline (top axis): 14:00 | 14:30 | 15:00 | 15:30 | 16:00 | 16:30 | 17:00 | 17:30 | 18:00 | 18:30 | 19:00 | 19:30 | 20:00 | 20:30 | 21:00 | 21:30

Opening Plenary
Bogor (IPB) International Convention Centre
Speakers:
Bernardus Djonoputro
Slawomir Ledwon
Martin Dubbeling

14:00 | Traditional Dance Performances
14:10 | Welcoming Remarks
14:25 | Welcoming Statement
14:50 | Gong Beating Ceremony
14:55 | Introduction
15:05 | Panel Discussion

Coffee Break

Second Plenary
Bogor (IPB) International Convention Centre
Speakers: Marc Funda, Rami Hajjar
Martina Juvara
Congress Team Members
Matt Lally

16:00 | Speech: Mobility and Metropolis
16:10 | Speech: Empowering Smart Cities
16:20 | Introduction
16:40 | Facilitated Discussion with the Congress Team
17:00 | Keynote Speech

Break

Welcoming Reception
Bogor City Hall
Speakers: Hendricus
Andy Simarmata
Slawomir Ledwon
Ridwan Kamil
Bima Arya Sugiarto

19:00 | Traditional Dance Performances
19:10 | Welcoming Remarks
19:40 | Dinner and Performances
20:30 | Return to Jakarta

● Meeting point: *Bogor City Hall*

Return Transport

Parallel Sessions
1.3 Scales (2/2)
 Hotel Borobudur (Boardroom)
2.3 Metropolitan City
 Hotel Borobudur (Timor)
3.3 Participatory planning
 Hotel Borobudur (Flores A+B)
4.3 Local Identities and Branding
 Hotel Borobudur (Banda B)
5.3 Cities of Future
 Hotel Borobudur (Sumba A)
6.3 Planning for Climate | Special S.
 Hotel Borobudur (Sumba B)
7.3 Local Leadership
 Hotel Borobudur (Ambon+Nias+Ceram)
Relocating the National Capital
 Hotel Borobudur (Singosari Room)

Coffee Break

Parallel Sessions
1.4 Linkages and Structures (2/2)
 Hotel Borobudur (Boardroom)
2.4 Megacities Resiliency
 Hotel Borobudur (Timor)
3.4 Urban Childhoods | Special S.
 Hotel Borobudur (Flores A+B)
4.4 UPAT Beyond Heritage | Special S.
 Hotel Borobudur (Banda B)
5.4 Co-design in Smart Cities
 Hotel Borobudur (Sumba A)
6.4 The Currencies: Heat
 Hotel Borobudur (Sumba B)
7.4 Metropolis Management
 Hotel Borobudur (Ambon+Nias+Ceram)

Break

Parallel Sessions
1.6 Sustainability
 Hotel Borobudur (Banda A)
2.6 Neither Urban nor Rural?
 Hotel Borobudur (Timor)
3.6 New Paradigms for Public Health
 Hotel Borobudur (Flores A+B)
4.6 Sustainable Redevelopment
 Hotel Borobudur (Banda B)
5.6 Smart Public Spaces
 Hotel Borobudur (Sumba A)
6.6 Building Unique Cities | Special S.
 Hotel Borobudur (Sumba B)
7.6 Using Metro-Hub | Special S.
 Hotel Borobudur (Ambon+Nias+Ceram)
IAP Meeting (1/2) | Closed Session
 Hotel Borobudur (Singosari Room)

Coffee Break

Parallel Sessions
Producing spaces, changing places
 Hotel Borobudur (Banda A)
World Resources Institute
 Hotel Borobudur (Timor)

Urban Island of Java 2045
 Hotel Borobudur (Banda B)
ASEAN Planner Session
 Hotel Borobudur (Sumba A)
6.7 Operating Cities
 Hotel Borobudur (Sumba B)

Break

ISOCARP AGM Evening
Hotel Borobudur (Singosari Room)
Open to all delegates

Parallel Sessions
2.8 Alternative Forms
 Hotel Borobudur (Timor)
3.8 The Right to Housing
 Hotel Borobudur (Flores A+B)
UPAT Wuhan Placemaking Week
 Hotel Borobudur (Banda B)

6.9 Planning – Looking Forward
 Hotel Borobudur (Sumba B)
7.8 Debate Governing the Metropolis
 Hotel Borobudur (Ambon+Nias+Ceram)
ISOCARP Awards Seminar
 Hotel Borobudur (Singosari Room)

Coffee Break

Closing Plenary
Hotel Borobudur (Flores A+B)
Speakers: Martina Juvara
Congress Team Members
Fahad AL Qahtani

16:00 | Congress Summary
16:45 | Local Experts' Reflection
17:00 | Mayors' Caucus Reflection
17:10 | Presentation of the Jakarta Declaration
17:20 | ISOCARP 2020 Introduction

Break

Congress Gala Dinner
Candi Bentar (Ancol)

Jakarta Declaration

We are entering the century of the metropolis. Global metropolitan urbanisation is facing enormous challenges, primarily due to the effects of the current economic development model that makes cities less affordable and unsustainable. Precarious urban informality is increasing at a fast pace due to inadequate legislative, regulatory, institutional and financial frameworks. The management of metropolitan areas is the main challenge for governments, urban professionals and civil societies.

Urban professionals are the key actors to support both decision-makers and civil society to build the essential frameworks and make large cities affordable, inclusive, resilient, sustainable and safe. The 55th ISOCARP conference in Jakarta, September 2019, has mobilized collective intelligence of high level international and Indonesian urban professionals to propose solutions for planning the metropolis.

Our Twelve Recommendations

1. We advocate that good urbanisation and sustainable cities are the engines of prosperity, wealth and better quality of life for all people and their nations. Planning balanced urbanisation should be a prominent concern for all city and political officials and at the forefront of their agenda, especially as metropolitan areas are a significant contributor to the GDP of the country.

2. We call upon all national and local governments to assist other countries in embracing good and sustainable urbanisation, the promotion of carbon-neutral urban development and the care of natural resources.

3. To move into a more sustainable future, we need a new planning paradigm, and a new model of city-making focused on transformative capacity, equity and speed.

Didier Vancutsem presenting Congress Declaration

4. We ask local and national governments to create and strengthen territorial and metropolitan technical bodies engaged in advancing governance, knowledge sharing, public debates, urban innovation, and policymaking.

5. We believe that the planning of new future cities, metropolises and megacities is not just about numbers - of people, functions and jobs: it is about working strategically across government levels and scales from territorial to neighbourhoods, from national drivers to local livelihoods, formal and informal, from macro to micro.

6. We advocate treating large cities as integrated parts of a wider ecosystem, where solutions can be identified at a systemic level and through the use of local intelligence for identifying locally sensitive climate-adapted solutions before resorting to alien engineering approaches.

7. We recognise that without a strong network of interlinkages and interdependencies to the region, a megacity cannot be sustainable. We thus highlight the need for better spatial justice between megacities and their hinterlands to support towns and rural areas.

8. We believe that urban planning should support the growth of individuals accompanied by equitable investments at the smallest scale, where public spaces and collective facilities turn into places, co-designed, co-produced and managed at the neighbourhood level and in particular with children.

9. We believe that anyone involved in changing cities should aspire to enhance local culture and identity and potentially create a new heritage for the future with real foundations in endogenous values.

10. We embrace new technologies which support and augment human intelligence and capabilities, including solutions which improve liveability, equity and transparency.

11. We encourage using the tools, methodologies and platforms advocated and created by international, professional organisations and NGO partners, such as the Sustainable Development Goals, their system of indicators and the New Urban Agenda, to move towards metropolitan areas that matter, and where no one is left behind.

12. We encourage both national governments and financing institutions to streamline administrative hurdles, risk management and provide the organisational framework that allows complex and multi-level collaboration, including integrated urban investment finance.

We, as a global Society of City and Regional Planners, together with the Indonesian Association of Urban and Regional Planners, are eager to support the Indonesian decision-makers and the citizens, together with local urban professionals, to envision and contribute to the future development of the Indonesian metropolis and beyond, including the New Capital City.

We recommend approaching the complex challenge of managing the metropolis with humility and with respect for people and for natural resources.

Speakers

PLENARY KEYNOTE SPEAKER

Matt Lally
Associate Director, Arup

A highly experienced urban designer and town planner, Matt has worked internationally on a wide-ranging portfolio of major planning and development projects in both public and private sectors throughout the UK, Europe, Australasia, Middle East, Asia and Africa. He has lived and worked in London, Sydney, Singapore and Doha. Experience encompasses sub-regional strategies new settlements, major urban regeneration, Transit Oriented Development, housing renewal, urban extensions, mega sport events, resorts, specialist employment precincts and associated infrastructure.

Matt has been responsible for the preparation of several government best practice research and guidance publications in the UK and Australia related to different facets of urban planning, design, housing and masterplanning, including the internationally renowned Urban Design Compendium. He has been a visiting tutor in urban design at University of Technology Sydney, University College London (Bartlett) and Belgrade University.

PLENARY KEYNOTE SPEAKER

Shipra Narang Suri
Coordinator of Urban Planning and Design Branch UN-Habitat, Nairobi

Shipra Narang Suri is an urban planner with a Ph.D. in Post-War Recovery Studies from the University of York, UK. She coordinates UN-Habitat's Urban Planning and Design Branch, which is UN-Habitat's largest thematic branch and portfolio. The work of the Branch covers themes such as regional and metropolitan planning, national urban policies, city planning, extension and design, public space, urban renewal, climate change action planning and building climate resilience for the poor, with extensive normative work and operational activities in over 50 countries. Shipra is also the focal point within UN-Habitat for preparations towards the Secretary-General's Climate Action Summit 2019.

Shipra has extensive experience in advising national and local governments, as well as private sector organisations and networks, on issues of urban planning and management, good urban governance and indicators, liveability and sustainability of cities, urban safety, women and cities, as well as post-conflict/post-disaster recovery. She is the former co-Chair of the World Urban Campaign, a platform that brings together a large array of global organisations to advocate for sustainable urbanisation, and the former Vice-President of the General Assembly of Partners, a platform established to bring stakeholder voices to Habitat III and in the drafting of the New Urban Agenda. She is also a former Vice-President of

ISOCARP, the International Society of City and Regional Planners.

Shipra has worked with the United Nations, specifically, UN-HABITAT, UNDP, and UNESCO, as well as international NGOs and private sector organisations, for over two decades. She has worked across Asia, Africa, South Eastern Europe and the Middle-East. She has been involved in the development and execution of a variety of development, research and training projects and programmes, is a regular public speaker at national and international fora, and has several publications to her credit.

PLENARY KEYNOTE SPEAKER
Pedro Ortiz
George Mason University

Pedro Ortiz is a Senior Fellow at the Marron Institute of Urban Management. He is also a Senior Consultant of Metropolitan Management and Planning for IGO's (International Governmental Organizations) such as the United Nations, European Union, UN-Habitat, World Bank, InterAmerican Development Bank, and others. He also consults for national and local governments directly, and through consultancy firms. Ortiz was also a Senior Urban Specialist at the World Bank.

PLENARY KEYNOTE SPEAKER
Agnès Deboulet
Professor of Sociology at the University of Paris

Agnès Deboulet is Professor of Sociology at the University of Paris and researcher at LAVUE (CNRS). Her research interests focus on globalisation issues, capabilities and urban related conflicts in popular districts in the Middle East and Paris region. She is involved in various research about urban renewal processes, inequalities and citizenship issues as well as on a continuous research activity on precarious neighbourhoods. In 2016 she has been directing a report for United Cities and Local Governments (UCLG) in preparation for the Habitat III conference, which is discussing the contradictions between competitive growth and metropolitan governance on the one hand, and social justice and environmental challenges on the other.

From 1989 to 1992, Ortiz was the elected Mayor of Madrid's Central District (Distrito de Salamanca). Additionally, he was a member of Madrid's City Council (1987-1995), where he was responsible for Urban Prospective (1993-1995) and Culture (1991-1993). He served as Director of the "Strategic Plan for Madrid" (1991-1994), and was the Director General for Town and Regional Planning for the Government of Madrid Region. He also authored the "Regional Development Plan of Madrid of 1996" and the "Land Planning Law of 1997."

Ortiz is currently a Fellow at George Mason University - Shar Institute. He was previously a Visiting Professor at Milano Politecnico, and the Director of the Masters program of Town Planning at the University King Juan Carlos of Madrid.

Planning the Megacities

Matt Lally
Associate Director, Arup

Presentation outline

I Overview

II Who are we planning for?

- Global demographic shifts
- Ageing populations
- Designing for urban childhoods

III Megacity Planning Challenges

- A growing focus on city resilience and urban adaptation
- Pollution and urban degradation
- Rising inequality and social polarisation
- Housing affordability – the financialisaton of property
- Infrastructure demand and access (transport, energy, telecommunications, water, waste, education, healthcare, etc.)
- Attracting and retaining talent
- Digital technology and opportunities for innovation

IV So how do we plan in a way that maximises positive outcomes?

1. Questions of scale

- Taking the wider view
- Integrated land use and transport planning supported by multi-layered mobility systems
- Creating station places
- How do we achieve 'density done well'? What is the model?
- Friction is good

2. Questions of balance

- Defining the level of ambition
- Strategies for a balanced city
- Planning for complexity: close technical integration, scales of intervention

3. Questions of liveability

- What do we mean by "liveability"?
- Thinking big and acting small

4. Knowledge economies and identity

2000	2019	2050		2100
47%	55%	68%		85%
living in cities				

At the end of this 100 year cycle of urbanisation, global population will stabilise and c.85% of people will live in cities.

The city planning choices we make now will fundamentally shape the system of cities for the next century.

ARUP

Critical moment for the future of cities, Matt Lally presentation 1/86
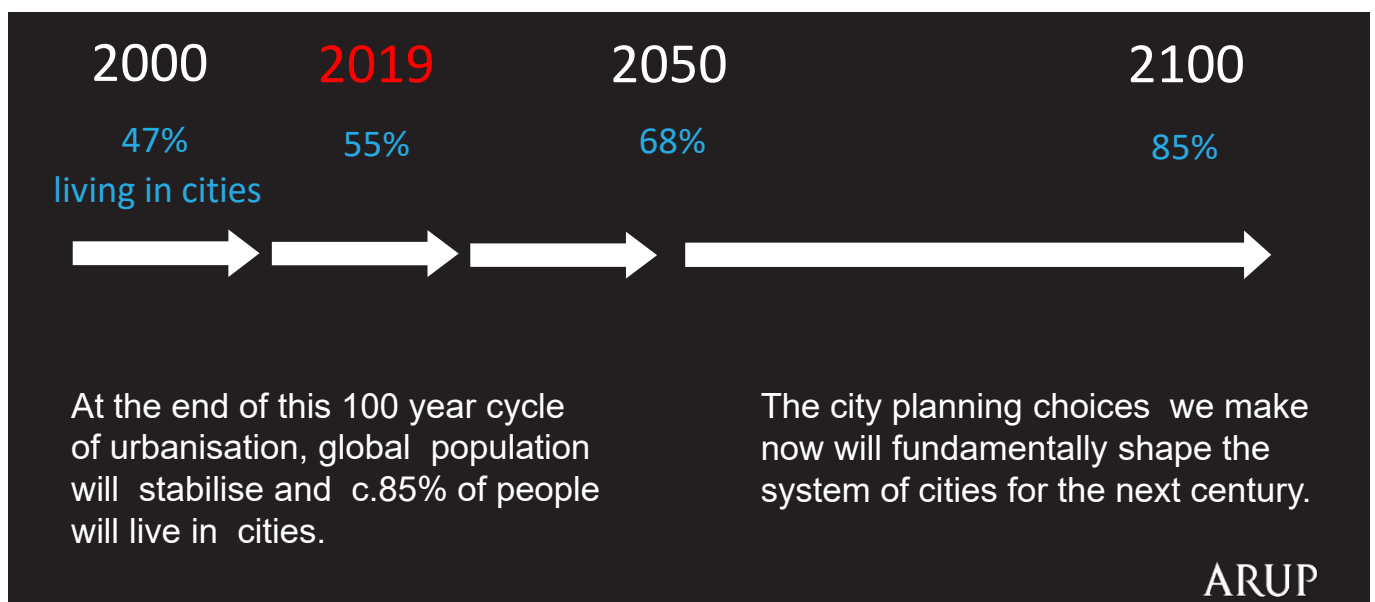
5. Smart futures

- Integrating digital technology (experience-based, human-centred design with technology as an enabler)
- Closed thinking v Open thinking
- Focussing on walkability

6. Planning for resilience

- Defining resilience, cities as systems
- Research
- Influence
- Value
- Strategy
- Application

7. Urban Governance

- City leadership
- Infrastructure-led Growth
- Capturing the value
- Close integration

V Conclusion

- Creating socially mixed, inclusive cities
- A polycentric approach: TOD and walkable urbanism
- Creative place-led hyperdensity requires new urban typologies
- Expectations of Gen Y – liveability is central in planning for innovation
- Going beyond sustainability – restoration, regeneration and resilience
- Human-centred design with technology of an enabler of good urbanism
- Delivery through value capture
- Thinking big and acting small – it's not all about the mega.

Matt Lally presentation 39/86
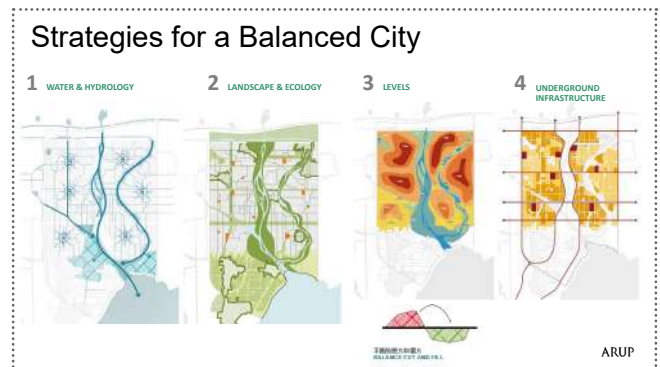
Matt Lally presentation 41/86
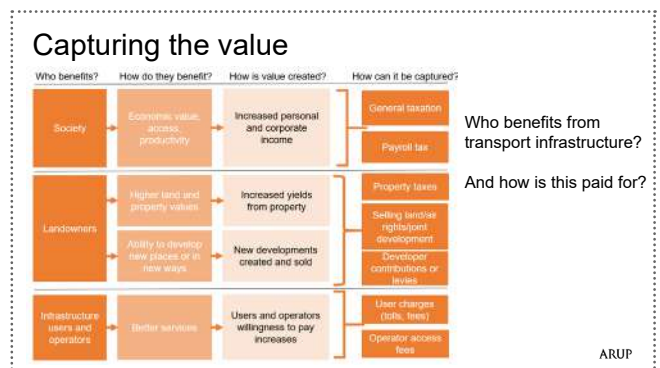
Matt Lally presentation 82/86
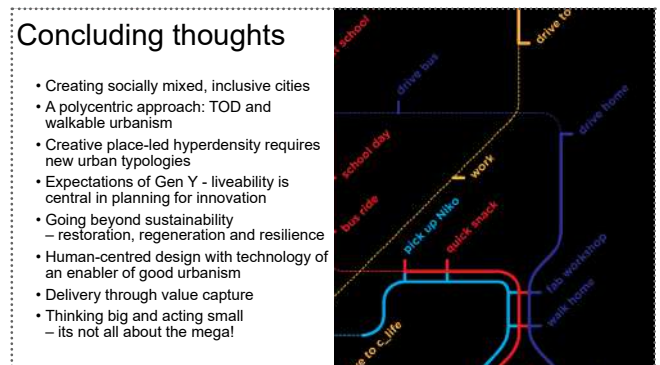
Matt Lally presentation 85/86

Sustainable Urbanisation in the Global Agendas: From Ideas to Implementation to Impact

Shipra Narang Suri
Coordinator of Urban Planning and Design
Branch UN-Habitat, Nairobi

The presentation discusses sustainable urbanisation in the Global Agendas and offers some perspectives on how planners can help accelerate the implementation of their project plans in a more impactful and more effective way.

The discussion is divided into three parts: 1) global trends; 2) the evolution and mainstreaming of sustainability in global urban agendas; and 3) showcasing UN-Habitat's practice from ideas to implementation to impact.

Global trends

- More than half of the world's population live in urban areas, a number that is growing by about 1.3 million people per week.

- About 54% of the world's population occupies only 2% of the total land area.

- Cities generate 70% of the global waste and 70% of the global greenhouse gas emissions. They are responsible for over 60% of global energy consumption. These challenges are further aggravated by inequality, urban poverty, inadequate infrastructure, insufficient public transport, air and water pollution, a surging youth population in several cities, on the one hand, and an ageing population on the other hand - compounded by climate change.

- Cities also generate over 70% of the world's Gross Domestic Product.

Sustainable Urbanisation

The sustainability agenda in urban development has gained traction since the Habitat I United Nations Conference on Human Settlements was held in Vancouver, Canada, in 1976. In the last four decades agendas of sustainable urbanisation, sustainable cities, adequate shelters, and cities for all have emerged and promoted through the Habitat III Conference on Housing and Sustainable Urban Development, which took place in Quito, Ecuador in 2016.

In recent years, however, a major shift in discourse on urbanisation has occurred: urbanisation is no longer seen as a problem to be addressed, as a model of development to be discouraged, or as a trend to be halted or reversed. For the first time, urbanisation is seen as a tool for development.

The 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs) that the world's national governments adopted in 2015 put forward a vision of urbanisation as a source of economic wealth, as a generator of social prosperity and environment sustainability, and cities and towns as hubs of innovation and drivers of shared prosperities. These agendas have critical urban dimensions (e.g., land tenure security, infrastructure), particularly the SDG 11 and its 10 targets and 15 indicators, which serves as an enabler for mainstreaming and incorporating both outcome and process targets.

The New Urban Agenda

The New Urban Agenda is seen as an accelerator to the SDGs and an implementation framework for the Agenda 2030. It is a commitment to end poverty, inclusive urban prosperity, environmentally resilient and sustainable urban development. Most importantly, for urban planning professionals, it has a very strong implementation section focused on planning.

Opportunities and Challenges

- Mainstreaming of sustainable urbanisation: These agendas mainstream sustainable urbanisation and acknowledged it as positive force towards development, which is a big opportunity for urban planners.

- Beyond the hardware – inclusion, resilience, culture and heritage, governance, financing: The second opportunity in the agendas goes beyond just the hardware (i.e., the provision of housing, water and infrastructure and roads) but also talks about issues of inclusion, safety, governance, dimensions of culture and financing. These are important hooks for urban planning professionals to anchor their work on.

- Challenges of the global agendas: These include the capacities, resources, data, and knowledge that are crucial in implementing these agendas in a holistic and integrated way.

Urban Planning is declining all over the world

While there is an emphasis on how urban planning and design can serve as an important catalyst to build inclusion, foster engagement, bring coherence and others mentioned above, what needs to be highlighted is the trend of declining urban planning.

The agendas are ambitious, and the tools are available. But the use of these tools, particularly the use of planning and design to realise the agendas is on a decline. While it has been said time and again that there is a resurgence in the Professional Planning practice in the last 15 years, the impact of that says otherwise. Planned areas and cities are on the decline whereas the informally planned areas by communities are on the rise. The completely unplanned areas are chugging along on the same level. Informality – or the share of residential land in informal areas – is increasing in most parts of the world, except for Europe and North America.

The decline in the deployment of planning as an effective tool has various reasons: time, capacities, and, importantly, it is due to political realm. These are constraints that most planners grapple with all the time. Unplanned urbanisation, in effect, has led to inadvertent consequences such as pollution, congestion, and sprawl, just to name a few.
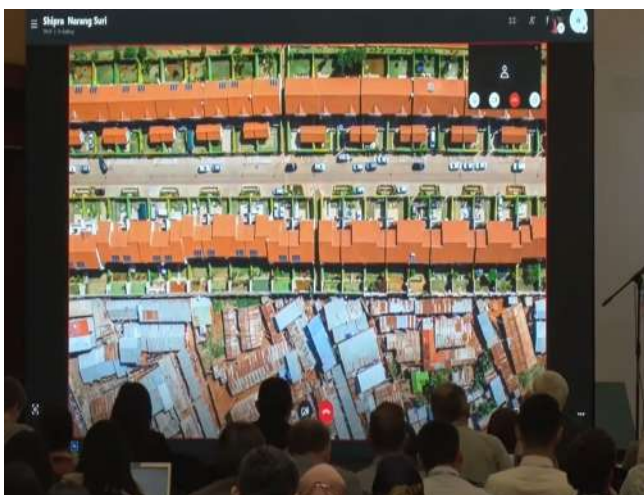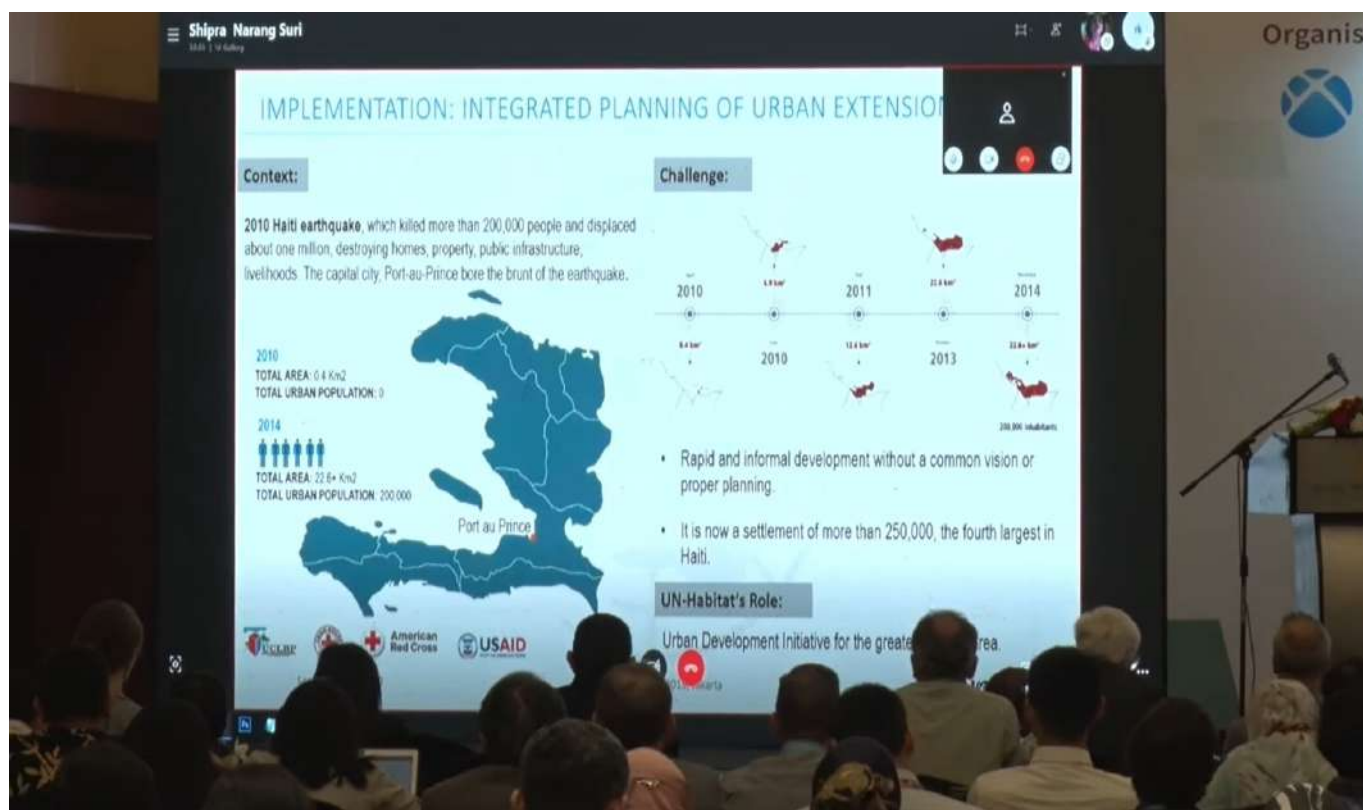
UN-Habitat's Urban Planning and Design Mantra

The translation of global principles and ideas into action, implementation and, ultimately, into impact, is anchored on UN-Habitat's most important guiding principle:

"Compact, socially inclusive, better integrated and connected cities and territories that foster sustainable urban development and are resilient to climate change." (IG-UTP, p.1)

When one sets a vision or agenda for a city or a territory, region or a country, it is important to absorb, consolidate, and refine from all the global agendas what it is and the essence of what one would like to be the guiding principle for the city or country. This is what the UN-Habitat is trying to implement in many parts of the world.

Haiti is an example of UN-Habitat's work and approach. After the earthquake in 2010, a million people were displaced, and Haiti's capital and largest city, Port-au-Prince, bore the brunt of the damage. Many residents who lost their homes started converging around the settlement in

Lessons from experience:

- Effective planning and implementation is a matter of integration of different enablers (Urban rules and regulations, urban planning and design, municipal finance)

- National urban policies and local implementation must complement the integrated planning approach

- Inclusive participation and a human-rights based approach are the best guarantee of success – not just improving the process but also generating better and more sustainable outcomes.

- Planning for climate change needs to become an integral part of statutory planning process and instruments

- Alignment of plans and actions to global principles, goals, targets and indicators is a continuous process that needs new tools and capacities.

How can planners support real change at scale? This can be synthesised into four points:

1. **Planning to policy**: Linking urban and territorial planning to national frameworks and policies through **vertical integration**

   One level of action is seldom enough, particularly in achieving the impact we need. Vertical integration from community-based action, to national frameworks and policies, all the way up to international transformation of planning practice and planning education, is critical for real impact.

2. **Move from supporting to empowering:** Building **endogenous capacities** for comprehensive planning processes at urban and territorial levels.

   Planning solutions are often context specific. Endogenous capacities need to be built for comprehensive planning within cities, territories, countries. The move from supporting to empowering is the end goal.

3. **Funding to financing:** Mobilising **finance for investments** into sustainable urban development aligned with SDGs, the Paris Agreement, Sendai Framework, New Urban Agenda.

   There needs to be a shift from funding to financing. We need to reduce any kind of dependency, be able to generate investments, and mobilise finance for investment aligned to global principles.

4. **Data, data, data**: Monitoring and reporting for the global agendas **need new forms of data**, which can be generated through, or linked to, planning processes

   Designing or monitoring a plan requires careful consideration of which indicators to use and how these will align into the global monitoring of these agendas.

Finally, and most importantly, planners should always try to put people at the centre, ensuring that no one and no place will be left behind.

Metropolitan Governance

Pedro Ortiz
George Mason University
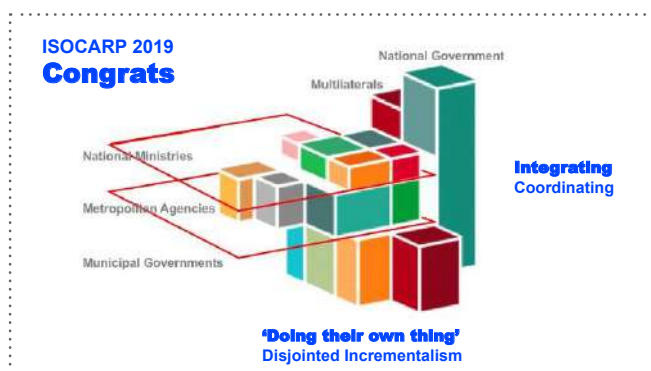
Introduction - Pedro Ortiz presentation 8/45
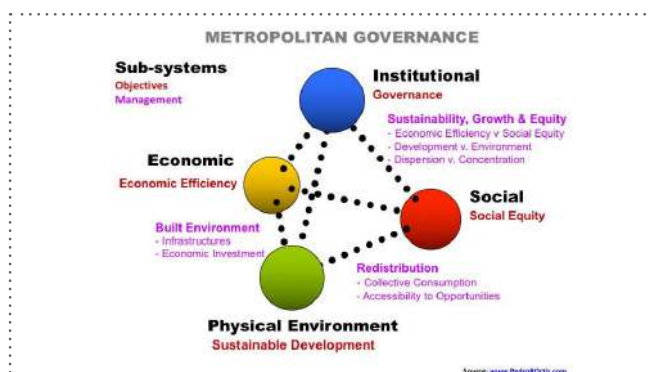
Metropolitan Governance - Pedro Ortiz presentation 12/45
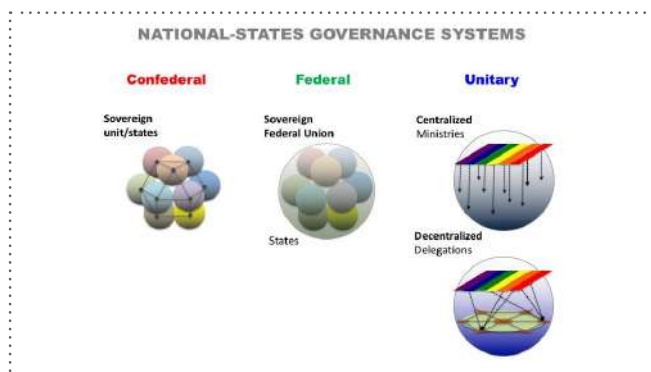
National-States Governance Systems - Pedro Ortiz presentation 31/45

Metro-Urban expansion is challenging world development. Only three cities in world history have been one million-plus inhabitants. Now we have 500. These Metro-Cities produce 75% of the world's Gross Domestic Product. Out of 100 most economically powerful urban units, 46 are metropolises. Many are expanding at a 5% annual rate and they double their size every 14 years. However, lack of a methodology for expansion is producing an uncontrolled pattern, jeopardizing development and equity.

To be able to cope with the challenges of metro-urban expansion, it is critical to understand that metropolises, as a very recent phenomenon, are a complex system, feared both by nations and cities, and lack the required government institutions to play their role. Metropolises are not cities. Their DNA is different. The latter is a hierarchical unitary system, whereas the former involves a matrix dialogue: an interaction among a multitude of actors, municipalities, agencies, and institutions, acting more like national structures with their own competences. The multiplicity of issues, sectors, and stakeholders in metropolises requires a dialogue that is peer-to-peer – one that reflects more complex national political mechanisms than the unitary municipal ones.

How do you run a metropolis? Do you choose a tool before knowing what the task is? Metropolitan governance first requires defining what must be done in the metropolis and designing the institutions that need to manage it. In a nutshell, governing metropolises is the result of balancing among economic efficiency, social equity, and environmental sustainability in the context of unitary, federal, and confederate national administrations.

Competitive Cities and Spatial Justice

Agnès Deboulet
Professor of Sociology at the University of Paris

The presentation builds on the result of the report entitled[1] *"Competitive Metropolises and the Prospects for Spatial Justice: the role of metropolitan areas in the global agenda of local and regional governments for the 21st Century"* authored by Agnès Deboulet together with Cyprien Butin and Jeanne Demoulin. The report is developed as part of the research led by the LAVUE Centre, in collaboration with the UCLG Committee on Social Inclusion, Participatory Democracy and Human Rights and Plaine Commune, and realised as a contribution to the fourth UCLG report on decentralisation and local democracy. The excerpt below is culled out from the Executive Summary[2] of the report.

---

1   The full report is available in the Publications section at https://www.uclg-cisdp.org.
2   A. Deboulet, C. Butin, and J. Demoulin. "Competitive Metropolises and the Prospects for Spatial Justice: the role of metropolitan areas in the global agenda of local and regional governments for the 21st Century." (pp. 4-5), January 2018, https://www.uclg-cisdp.org/sites/default/files/Metropolis_Right_to_City_Summary.pdf.

A Guiding Principle: Spatial Justice

The idea of justice, and in particular spatial justice, lies at the heart of this urban reform, making it possible to envision a future for all in metropolises keen to enhance the well-being of their residents.

This principle comes from the development of Henri Lefebvre's work – to whom we owe the notion of "right to the city" – notably by the founding researchers of the online magazine "Justice spatiale/spatial justice". It suggests that any investment linked to space can be a vector of more or less justice or injustice and that, therefore, policies must be attentive to the discrimination and spatial inequalities that they can convey. They must try to counter the effects of the widespread competitive policies that most metropolises have implemented over the last several decades, in particular, growing spatial and social inequalities. Public policy can also begin to find alternative models.

This theme of contradiction between competitiveness and social justice spans three parts: 1) the first part exposes that contradictions between urban economies increasingly oriented towards the competitiveness of metropolitan territories and the unequal distribution of resources; 2) the second part examines the various models of development, rethinking the current dependence on fossil energies without abandoning concerns of social justice, as suggested by the concept of "buen vivir" (Good Living); and 3) the third part questions models of governance and urban management, particularly how cities conceptualised and implemented urban policies that put justice at the centre and promote urban democracy.

Overall the aim of the report is to present some of the existing debates regarding different metropolitan realities and policies, show their associated risks, and point towards some possible directions.

Limits of current policies

- Predominant technicist approaches (ex. eco-neighborhoods, smart cities) with low sensitivity to users and practices and barely no social dimension
- A vast neglect of urban policies and urban projects social impacts
- Very little measures to **control land and housing prices including taxation measures**
- Need to promote a systemic approach including a democratic revisio of governance : municipalities are the most able to cope / self-critical capacity
- Need to document thoroughly the situation many cities have a static vision of inequalities and cannot monitor

Agnès Deboulet presentation 13/ 14

The buen vivir

- Alternative vision based on a critics of linear visions of technical progress and promotion of nature

- Reactivates the « social and ecological impératives at the origin of sustainable development discourse

- It praises harmony between different social and cultural categories (cultural, sexual and ethnic minorities; foreigners ; générations)

- It is aiming at developing territorial equity (universal access to public services, fight against urban segregation, urban fragmentation, decentralisation of utilities …), see Quito local development plan

Agnès Deboulet presentation 13/ 14

Metropolis and urban regions

L'urbanisation croissante de la planète
Cartographie : Laura Margueritte
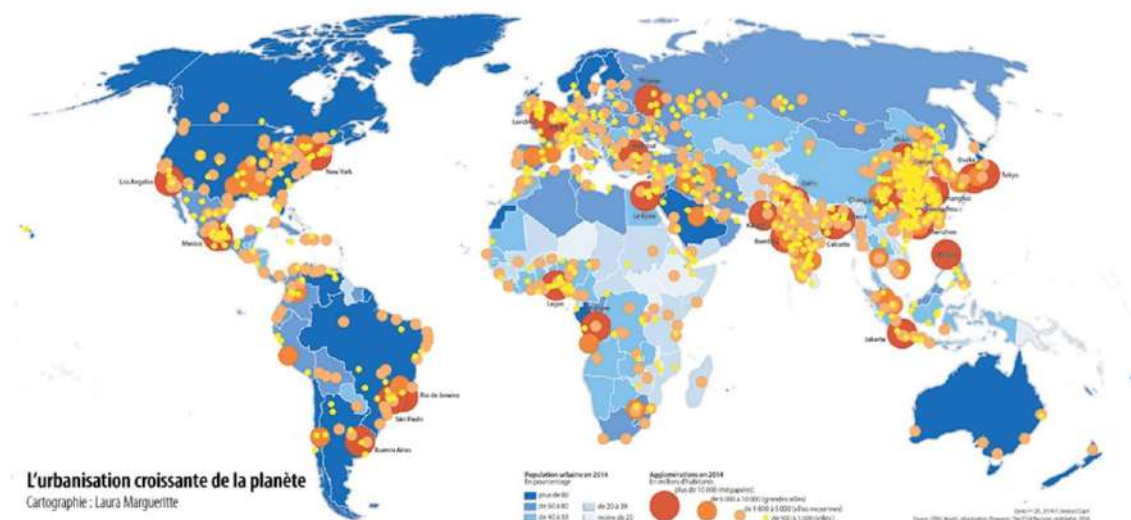
Urbanisation map, Blog Habiter en ville, 2017, G. Fourmont; Agnès Deboulet presentation 5/ 14v

Local Speakers

SPECIAL GUEST SPEAKER
Bambang P.S. Brodjonegoro
*Minister of National
Development Planning*

Bambang P.S. Brodjonegoro is currently the Minister of National Development Planning/ Head of National Development Planning Agency (Bappenas). He was previously the Minister of Finance (from 27 October 2014 to 27 July 2016). During President Susilo Bambang Yudhoyono's administration, Bambang served as the Deputy Minister of Finance (from 3 October 2013 to 20 October 2014). Bambang is one of Indonesia's leading economists, with a Master's Degree (1995) and Ph.D. (1997) in Urban and Regional Planning from the University of Illinois at Urban Champaign, USA. His areas of expertise include regional economics, fiscal decentralisation, public finance, development economics, urban economics, and transportation. Prior to his ministerial positions, Bambang's career included commissioner roles in several state-owned enterprises, such as PT. Pertamina, PT. Aneka Tambang, and PT. PLN. He is also active in a number of international boards including the ASEAN Infrastructure Fund and the ASEAN+3 Finance and Central Bank Deputies Meeting. He is a committed and active academic, currently a Professor of Economics at the University of Indonesia. Prior experience has included positions as guest lecturer in the Department of Urban and Regional Planning with the University of Illinois; Director General of the Islamic Research and Training Institute at the Islamic Development Bank; and Dean of the Faculty of Economics with the University of Indonesia.

SPECIAL GUEST SPEAKER
Anies Rasyid Baswedan
*Governor of
Jakarta City*

Jakarta's Governor, Anies Baswedan is widely recognised as a prominent academic, due to his active involvement in pedagogic affairs, which led him to be appointed as an education minister. Prior to the ministerial post, he was the rector of Jakarta's Paramadina University, and was one of Indonesia's youngest university rectors at that time. Anies' most notable innovation is Gerakan Indonesia Mengajar, or the Teaching Indonesia Movement, a program that gathers the youth to contribute to national education. The Teaching Indonesia Movement recruits, trains and sends young graduates to teach in remote regions across the archipelago.[JakartaPost] Anies' vision for Jakarta is to make the capital city a liveable and happy place for its people.

SPECIAL GUEST SPEAKER
Bima Arya Sugiarto
Mayor of Bogor City

Bima Arya Sugiarto is an Indonesian politician, who was elected to be the Mayor of Bogor in 2014. Now he is elected again for the period 2019–2024. His vision is to improve public transport, urban hygiene, bureaucracy and civil administration, including to manage the street merchants. He received many awards for his

achievements, including the establishment of online systems for the city in 2017. He has also received awards from the Ministry of Health and the National Body of Demographics and Family Planning.

SPECIAL GUEST SPEAKER
Ridwan Kamil
Governor of West Java

Mochamad Ridwan Kamil is the 15th Governor of West Java, the most populous province of Indonesia. He was also the Mayor of Bandung. He was elected as mayor of Bandung on 23 June 2013. Previously, he was an architect and lecturer in the Department of Architecture, Bandung Institute of Technology. Kamil founded the architectural firm Urbane Indonesia in 2004 with three partners. As governor, Kamil is now more focused on mainstreaming the planning and development approach to the happy and creative communities. Kamil also had the opportunity to be the keynote speaker at Kenya UN-Habitat Assembly session with the theme of the advanced society being a happy society.

SPECIAL GUEST SPEAKER
Basuki Hadimuljono
*Minister of Public Works
and Housing*

Mochamad Basuki Hadimuljono is the current Minister of Public Works and Public Housing.

He obtained his master's and doctorate from Colorado State University. The last position he held prior to his ministerial appointment in October 2014 was director-general of spatial planning. During his time at the ministry, he had participated in several national-level working groups including ones related to rehabilitation following the 2004 Tsunami in Aceh, handling of the Sidoarjo mud flow (2006–2007), reparation of the Purbaleunyi Toll Road and management of food scarcity in Yahukimo Regency (both in 2006). He also received a Distinguished Honorary Fellow award from the ASEAN Federation of Engineering Organizations in February 2017, along with an International Lifetime Contribution Award from the Japan Society of Civil Engineers in July 2017.

SPECIAL GUEST SPEAKER
Sofjan Djalil
*Minister of Land and
Spatial Planning*

Sofyan Djalil is the current Minister of Agrarian and Spatial Planning. Previously, he was the Minister of National Development Planning/ National Development Planning Agency from August 2015 to July 2016. From October 2014 to August 2015, he was appointed as Coordinating Minister for Economic Affairs. In the Yudhoyono Presidency, he served as the Minister of State-Owned Enterprises of Indonesia from 2007-2009 and Minister of Communications and Informatics from 2004 to 2007. He successfully obtained a Doctor of Philosophy on International Financial and Capital Market Law and Policy at Tufts University. In the same university, he also obtained two master's degree: Master of Arts on Public Policy and Master of Arts in Law and Diplomacy (MALD).

Congress Team

TRACK 1:
Limitless cities and urban
futures: planning for scale

Peter
Newman
Australia

Peter Newman is Professor of Sustainability at Curtin University in Perth, Australia. He has written 20 books and over 340 papers on sustainable cities including Cities and Automobile Dependence, which has been called one of the most influential books in urban planning. His book on Green Urbanism in Asia in 2013 was based on his teaching in the National University of Singapore with Masters students from across Asia. In 2014 he was awarded an Order of Australia for his contributions to urban design and sustainable transport. Peter has worked in local government as an elected councilor, in state government as an advisor to three Premiers and in the Australian Government on the Board of Infrastructure Australia and the Prime Minister's Cities Reference Group. He is a Co-ordinating Lead Author for the IPCC on Transport and his latest book is Resilient Cities: Overcoming Fossil Fuel Dependence. He is Editor-in-Chief of Sustainable Earth, a new Nature journal and in 2018 was made WA Scientist of the Year.

Stephen
Goldie
United Arab
Emirates

Stephen Goldie has over thirty-five years' experience in urban planning and design, more than twenty years of this at executive level. His urban planning and design experience ranges from regional and metropolitan strategy to complex inner-city design, from high-level policy and legislation to seemingly intractable local disputes, and from detailed urban design to complex management issues. Many of these projects have been distinguished by awards, but more importantly, more than fifty of the projects that he has led, or for which he was the senior planner, are either built or being implemented. As well as being a leading Australian New Urbanist, Stephen is also a published researcher and thinker on the impacts of artificial intelligence and robotics on cities and the application of those technologies to the planning and design of cities.

Currently, Stephen is employed by the Abu Dhabi Department of Urban Planning and Municipalities as City Planning Advisor to Al Ain, the garden city of the Emirates, in order to continue the development of Al Ain as a liveable and sustainable city.

Luo
Wenjing
China

Wenjing Luo (Helen) works as a national registered urban planner at the Wuhan Planning & Design Institute (WPDI), where she has been taking charge of dozens of planning practices on a broad variety ranging from urban strategic planning, master plan, regulatory planning, industrial development planning, planning consultation to sustainable urban design and urban renewal. As the projects she has been working on mainly involve the National Independent Innovation Zone of Eastlake which is also known as the Optical Valley, she has gained a great deal of experience concerning metropolitan areas and knowledge-based districts which can be applied to other cities or countries. With eight years of experience, she has worked, published dozens of papers and won several prizes. Though working locally, she has been endeavored to engage in all kinds of international events to gain global visions.

TRACK 2:
Besides the megacity and other cities: planning for balance

Tathagata Chatterji
India

Dr. Tathagata Chatterji is Professor of Urban Management and Governance at Xavier University, Bhubaneswar and has over 25 years of academic cum industry experience in the urban development sector. His research interests are: urban economic competitiveness, globalisation, peri-urban transformation and Smart Cities. He had published two books – 'Local Mediation of Global Forces in Transformation of the Urban Fringe' and 'Citadels of Glass – India's New Suburban Landscape'; He received the prestigious Gerd Albers Award 2016 for best publication of the year from the International Society of City and Regional Planners (ISOCARP) during its 52nd annual congress in Durban, South Africa, for his research publication on comparative modes of urban governance in India.

Fedor Kudryavtsev
Russia

Fedor Kudryavtsev, 1970, Russia, Moscow, managing partner of ArchNOVA Lab and associate professor of Moscow Institute of Architecture (MARHI).

I was trained of "art to organise space", as my teachers in famous Moscow Institute of Architecture used to say. I graduated from MARHI in 1993 and have completed postgraduate course on inner city development in the Institute of Housing and Urban Development Studies (IHS) in Rotterdam in 1995. I have started independent architectural and planning practice in 1998. The spaces I have been working on in the last two decades ranged from single family house to city agglomerations like the one of Moscow that counts now around 18 million citizens. My design experience has been getting a strong support by teaching in MARHI since 1996 and by applied and theoretical studies I have been simultaneously undertaking as Head of the Laboratory of Urban Studies of MARHI in 2006-2016. Since 2018,

I am running a private Laboratory of Urban Research and Projects ArchNOVA Lab, which aims is to develop urban studies on emerging urban phenomena and convert them into advanced urban and architectural projects. My team is working both locally in Russia and internationally. Current projects include comparative study of BRICS largest agglomerations, new model of mass Soviet housing renovation in Moscow, research on Soviet planning legacy in China, development of rehabilitation model for urban areas with higher levels of criminal activities in Russian cities, study on self-organisation of large scale urban structures in megacities and planning applications of big data analysis.

My favorite projects engage city strategic planning, studies of new urban phenomena, architectural design, master planning and planning theory. Among them there were conceptual schemes for Moscow (2009) and Saint-Petersburg (2016) agglomerations, new vision for Korolev science city: research, strategies, key projects (2014), research on self-organisation of city scale urban structures from mass local changes, scenario of vast industrial area redevelopment in Saint-Petersburg (2014). Many of my international projects were fulfilled with my Chinese colleagues, including study on high-density urban forms in Shantou (2013), comparative study on Moscow and Beijing urban dynamics (2013-14), short term consulting of Guangzhou Eastern Bay Area project (2017).

TRACK 3:
Liveable places and healthy cities:planning for people

Jens Aerts
Belgium/USA

Jens Aerts is a senior urban planner with 20 years of experience, working on the cross-section of practice, policy and research. Most recently he has been working as an international consultant for the Habitat III secretariat, UNICEF HQ and the World Bank. He authored UNICEF's recent publication 'Shaping urbanization for children, a handbook on child-responsive urban planning' and supports the agency in the Urban task Team with the development and implementation of its Global Urban Strategy, including training and technical assistance in regional and country offices.

Jens is a partner at BUUR - Bureau for Urbanism, specialised in city development plans and stakeholder engagement processes towards sustainable urban transformation for the Brussels Capital Region and several secondary cities in Belgium and the Netherlands. Before that he assisted both Governments of the Flemish and the Brussels Region to build urban planning capacity in public agencies and to direct community led neighbourhood plans, sustainable mobility programs and key public space interventions.

Jens has been teaching at the Cosmopolis Centre for Urban Research of the University of Brussels (VUB) from 2011 until 2016 and is currently affiliated with the Urban Community and Health Equity Lab at Columbia University's Graduate School of Architecture, Planning, and Preservation (GSAPP). He holds a MSc in Civil Engineering and Architecture from the University of Leuven (Belgium) and obtained his MA Urban Planning at Universitat Politecnica de Catalunya in Barcelona (Spain). He is member of the Board of the Flemish Spatial Planning Organisation (VRP).

Mahak Agrawal
India

Mahak Agrawal is an urban planner and researcher from India. Currently working on the issue of sanitation deprivation and climate crisis response across coastal districts of India and urban India in the north, she has served as an expert reviewer to the Second Order Draft of the IPCC Special Report on Climate Change and Land.

She is also a Local Pathways Fellow to the United Nations Sustainable Development Solution Network (UN-SDSN). Through her project called: A Dream of Open Defecation free India? Decolonise and Innovate urban sanitation; Mahak is working with Change.org on a petition that holds Government of Delhi accountable for its toilets' provision for the urban poor with key emphasis on females, children and differently abled, with the campaign's demand to audit these facilities, for their usability.

In different capacities, she has worked with non-profit organisations, development banks, universities and research institutes, as well as technical divisions of government-at the Centre and city level in India. Next to her contribution to the United for Smart Sustainable Cities (U4SSC) initiative, Mahak explores innovative, enduring research-guided solutions for pressing urban and regional environmental problems. She is specifically interested in climate change and urban studies investigating multi-track approach and inequalities of adaptations and transformations, development and geography, associated global challenges and human geography. An advocate of open data for effective urban management, monitoring and response, she often provides thought leadership to the Young Academic Network of the Association of European Schools of Planning (AESOP) and the South Asia Centre at London School of Economics. In 2017, she was awarded the Prof. V.N. Prasad Best Thesis Award for best thesis in Master of Planning in India.

TRACK 4:
Knowledge economies and
identity:planning for culture

Nasim Iranmanesh
Iran

Nasim Iranmanesh is an architect with PhD in urban planning. She is professor at the Islamic Azad University of Tehran in the Urban Planning and Architecture Department. She has been an ISOCARP member since 2004 and is a member of the ISOCARP Scientific Committee.

She works at the Municipality of Tehran and has cooperation with other organisations, such as Sazvareh Nou consulting engineers and Building & housing research center (BHRC), as as a designer and urban planner. She has numerous publications in architecture and urban planning and has presented several lectures at national and international congresses. She has been a member of the Society of Iranian urban planners since 2002.

Piotr Lorens
Poland

Piotr Lorens is an architect and urban planner, full professor and Head of the Department of Urban Design and Regional Planning at the Faculty of Architecture, Gdansk University of Technology. His professional interests include urban design and development issues with a special focus on regeneration of distressed sites. He was involved in design and development of numerous urban regeneration schemes, including planning for transformation of Gdansk waterfront. Piotr is also serving as consultant and expert in numerous planning and development projects. Recently He was playing the role of the Head of Gdansk Master Plan Commission, appointed by the Mayor of Gdansk, as well as

an expert of the Polish Ministry of Development. His research and professional issues include also dealing with local identity and heritage within the urban transformation processes, shaping urban public spaces systems as well as dealing with social, economic and legal aspects of urban transformation.

Besides academic and professional appointments, Piotr is also active member of ISOCARP (Vice President YPP Program within years 2011-2017) and Society of Polish Town Planners (currently – Chairman of the Society Board). In addition, Piotr is member of ICOMOS and TICCIH. He also plays the role of the Chairman of the Urban and Metropolitan Areas Group, Committee for Spatial Economy and Regional Planning, Polish Academy of Sciences.

TRACK 5:
Smart futures
and sustainability:
planning for innovation

Dorota Kamrowska-Zaluska
Poland

Dorota Kamrowska-Zaluska is Assistant Professor and Director of the mid-career program on urban development and management of metropolitan areas, at the Department of Urban Design and Regional Planning at the Faculty of Architecture, Gdansk University of Technology. She is a Visiting Scholar and Research Fellow at several research institutions including the Massachusetts Institute of Technology (2013), a Charted Urban Planner with 16 years of experience working both for the public and the public sector.

She is also taking part in various participatory research and user-oriented design projects. Her research interests are: smart and sustainable cities, territorial impact of EU Cohesion Policy, social innovation in urban regeneration. Dorota is the author of more than thirty papers and a book on sustainable urban regeneration. She is involved in various research projects on

smart and sustainable development. She is a board member of the Association of Polish City Planners, President of Gdansk Division, and ISOCARP Deputy Bureau Member for Poland.

Awais Piracha
Australia

Associate Professor Awais Piracha is an urban planning academic with the Western Sydney University in Australia. He is a renowned international expert in the areas of sustainable urban development and use of spatial analysis in land use and transport planning. Professor Piracha was trained as a civil/environmental engineer as well as a town planner. He is a Planning Institute of Australia Registered Practicing Planner and a NSW Independent Hearing and Assessment Panel Expert. He previously worked as a researcher with the United Nations University (UNU) in Tokyo, Asian Institute of Technology (AIT) Bangkok and University of Dortmund Germany. In his professional career spanning over two decades, Professor Piracha has led in numerous research and consultancy projects as an urban planning expert.

TRACK 6:
Changing environment and risks: planning for resilience

Markus Appenzeller
The Netherlands

Markus Appenzeller (*1972) studied architecture and urban planning in Stuttgart and Chicago. He graduated from Stuttgart University in 2003. His diploma focused on expansion, stagnation and consolidation at the example of the City of Duisburg in the Ruhr Area.

Markus worked for Munich-based Fink+Jocher Architects as project leader and at the Office for Metropolitan Architecture in Rotterdam on projects in London, Riga and the UAE. Since 2006 he was working for KCAP Architects&Planners in Rotterdam – first as project leader for a number of masterplans in the London Docklands, then as director for international projects, responsible, among others, for the Olympic Legacy Masterplan for London.

Between 2009 to 2011 Markus was a Studio Professor at Berlage Institute Rotterdam. In 2012 Markus founded MLA+, a practice for architecture, planning and consultancy. MLA+ today employs around 140 people in offices in Rotterdam, London, St. Petersburg, Shanghai, Shenzhen, Berlin and Rio de Janeiro. In 2013 and 2014 Markus was curator and co-creator of the Post-graduate Master Program "Design of Urban Ecosystems" at the National Research University ITMO in St. Petersburg. In 2016, Markus was Diploma Studio Professor at Moscow School of Architecture. Since 2018 he is heading the Urbanism Department of the Amsterdam Academy of Architecture.

Juanee Cilliers
South Africa

Juaneé is Professor and the Chairperson of the subject group for Urban and Regional Planning at the North-West University (NWU), as well as Leader of the Research Program for Sustainable Planning, Development and Implementation within the Unit for Environmental Sciences and Management (UESM).

She completed the 4-year professional degree in Urban and Regional Planning at the NWU in 2004 (cum laude), the Master's Degree (cum laude) in 2005 and enrolled for a Ph.D in Urban and Regional Planning. She completed a second Master's degree in Economics in 2010 as well as a Sustainable Communities course from the Aalto University (Finland). In 2011 she successfully completed the Project Management Course at the Potchefstroom Business School. Her early career's international exposure extended her collaborative research network and she is

currently collaborating with researchers from Germany (Bauhaus University), Belgium (KU Leuven University), the Netherlands (Eindhoven University, Wageningen University), Namibia (Namibia University of Science and Technology), Australia (Curtin University, Griffith University), the International Society of City and Regional Planners (ISOCARP) and the UN-Habitat. Locally she is the Principle Investigator for a NRF THUTHUKA project (2013-2017), two NRF Community Engagement projects (2015-2017 & 2019-2021), a DTI-NRF THRIP project (2015-2019), a Water Research Commission project (2016-2019) and she also collaborates with the South African Cities Network and the South African Day Organisation. She is member of the South African Planning Institute (SAPI), the South African Council for Planners (SACPLAN), the International Association for Development of the Information Society, the South African Translators Institute (SATI), member of ISOCARP and lifelong member of the Association for Development of Teaching, Education and Learning (ADTEL).

TRACK 7:
Urban governance and planning profession: planning for future

Eric Huybrechts
France

Eric Huybrechts is a senior Architect and Urban/ Regional Planner, member of Isocarp (scientific council, France representative), Icomos (working group on Climate and Heritage), Société Française des Urbanistes (Scientific council) and Officer of the Royal order of Sahametrey (Kingdom of Cambodia).

He is the Manager of the International affairs at the Directorate general of Paris Regional planning Agency (www.iau-idf.fr). He has developed a large experience in the field of Urban and Regional Planning as expert and team leader on Algiers, Beirut, Cairo, Damascus, Dubai, Erevan, Ethiopia, Istanbul, Kampala, Mongolia, Mumbai, Paris/Ile-de-France, Phnom Penh, Rio de Janeiro, Samarkand, Saudi Arabia, Tripoli-Libya, Al Ula.a He has prepared projects at local level, sub metropolitan, metropolitan, regional and national scales. Recently, he was the team leader for the National Urban Development Scheme of Ethiopia (2013-2015), and for the National Spatial Strategy of Saudi Arabia (2017-2018).

He represents IAU-IdF to the World Urban Campaign of UN-Habitat, Climate Chance (in charge of Territorial planning alliance) and the global network of Metropolitan and Territorial planning agencies (MTPA). He is managing decentralised cooperation projects with Abidjan, Beijing and Beirut. He has also an academic experience as a scientific researcher in the MiddleEast and as lecturer in several universities in France and abroad

Jennilee Magdalena Kohima
Namibia

Jennileae Magdalena Kohima is lecturer at the Department of Architecture and Spatial Planning within the Faculty of Natural Resources. She teaches undergraduate and postgraduate courses on Town and Regional Planning and Regional and Rural Development programmes in the Section of Spatial Planning. She has close to 10 years working experience in the public, private, development and academic sectors in various development and planning fields (land reform, land management and urban and regional planning), having worked for the Ministry of Land Reform, GIZ Namibia, Du Toit Town Planning Consultants and presently Namibia University of Science and Technology.

She is member of the Namibia Council for Town and Regional Planners as well as the Namibia Institute of Town and Regional Planners as Town and Regional Planner in Training. She is currently reading towards a PhD in Urban and Regional Planning at the University of the Free State, Bloemfontein, South Africa focusing on land use management and urban informality in Windhoek, Namibia.

Congress Tracks

With urbanisation continuing at pace and a globalising economy, metropolitan areas are morphing into megacities. How does scale become power and define new global roles for megacities? What can urban planning and development strategies do to promote liveability, well-being, sustainability, innovation and responsive governance for their dwellers? Come to Jakarta, one of the largest and fastest sinking cities in the world, to explore contemporary challenges that megacities face and solutions that work on the ground.

Join us at the plenaries and discover your global community of urban professionals in the tracks!

photo: Faiz Muhammad, Unsplash

TRACK1: Limitless cities and urban futures: planning for scale

- Reasons why megacities and city regions are growing and leading planetary urbanisation
- Global influence and competitiveness: the role of megacities
- Megacities as leaders in low impact energy, food, and resources consumption
- Linkages, relationships, disparities, synergies and connections: opportunities for the whole and its parts
- Prospects, visions, futures, predictions, forecasts and scenarios for megacities in the future

TRACK 2: Besides the megacity and other cities: planning for balance

- Role and future of cities that aim for balance rather than limitless scale in the global race towards agglomeration advantage
- Alternatives to the megacity through regional networked urban clusters
- The megacity backside: shrinking settlements, disappearing villages and other similar externalities
- Planning for spatial balance: rural-agrarian productivity, wildlife and urbanisation equilibrium of metropolitan areas
- Neither urban nor rural: emerging lifestyles, urban forms and economics beyond megacities

TRACK 3: Liveable places and healthy cities: planning for people

- Health, safety, prosperity for all: children, elderly and other vulnerable people
- Environmental justice, spatial equity, the right to the city
- Access to urban services and a clean and safe environment
- Access to urban services and a clean and safe environment
- Collective space and building the community (formal and informal)
- Frameworks and tools to measure liveability
- Planning with people and communities: universal design, co-production and open data
- Livability as a universal or cultural value

TRACK 4: Knowledge economies and identity: planning for culture

- The value of locality and identity in the globalising world
- Local identities and cultures as assets within the megacity
- Unspoken pasts: the role and legacy of colonial heritage

- Knowledge as the foundation of a high-value urban economy
- Culture, heritage and identity as economic drivers
- Tourism as consumption or tourism as promoter of locality

TRACK 5: Smart futures and sustainability: planning for innovation

- Smart cities, automatisation, financing and technological advances
- Shared and inclusive innovative economies and digital transformation
- Citizen-focused smart services
- Disruptive and sharing technologies and their impact
- Strategic and real-time data-based policy and data management
- New mobility and its influence on urban form

TRACK 6: Changing environment and risks

- Climate change and sinking cities
- Vulnerability to disasters and how that can be mitigated
- Waste, urban footprint
- Re-naturing, biodiversity, and urban metabolism
- Building, evolving, securing quality of life
- Triggering leverage – planning for more than a single purpose

TRACK 7: Urban governance and planning profession

- Planning, policy and politics surrounding the megacity
- City production by the people: participation and informality
- Governance: from models to pragmatic paths, from top-down to bottom-up approaches
- Addressing the mega-scale and the neighbourhood
- Organisation and technical support for managing the megacity
- Taking the lead through diplomacy, branding and international networks
- Non-state actors in urban governance

Presentation schedule

	Track 1 — Limitless cities and urban futures *planning for scale*	Track 2 — Besides the megacity and other cities *planning for balance*	Track 3 — Liveable places and healthy cities *planning for people*	Track 4 — Knowledge economies and identity: *planning for culture*
Parallel Session 10 September 9:00-11:00	1.1 Understanding Megacities: Scales (1/2) Prihadi Nugroho Pedro B. Ortiz Ali Alraouf Qing Lu **1B**	2.1 Beyond Megacities: Key Challenges and Alternatives Teresa Marat-Mendes Joao Borges Jean-Claude Bolay Stephen Goldie Ratoola Kundu **2**	3.1 UNICEF Opening Session: Children and Cities, Planning for the Future (Special Session) Lynn Tang Jens Aerts **3**	4.1 Cool Planner in South East Asia: City Resilience Design (Special Session) Moderator: Milena Ivkovic Beverley Salmon Dushko Bogunovich Bert Smolders **4**
Parallel Session 10 September 11:30-13:00	1.2 Understanding Megacities: Linkages and Structures (1/2) Eunice Yorgri Ivan Rwampungu Anna Katrina Karaan Yixuan Peng **1B**	2.2 Megacities Backside: Peri-urban Interface Dani Muttaqin Satyajit Mal Esther Vlaswinkel Mirza Permana Chunxiao Huang Zhao Chen Soumya S Warrier Soelaeman Soemawinata **2**	3.2 Planning and Design for Collective Space and Transport for Children and Communities Dhea Andriani Ran Guo Shuai Li Gregor Mews **3**	4.2 Culture-sensitive Approaches in City Planning Ehsan Ranjbar Lin Chen Vicky Ariyanti Haixuan Zhu Sai Liu Dian Zhang Benjamin Scheerbarth **4**
Parallel Session 10 September 14:00-15:30	1.3 Understanding of Megacities: Scales (2/2) Mohammed Hamidul Hasan Aadithyaa JS Manuela Negrila Dushko Bogunovich **1B**	2.3 Metropolitan City and Its Shadow Regions Erie Sadewo Hong Geng Dianhong Zhao Tianzhu Liu Ivana Angelova Liang He **2**	3.3 Participatory Planning and Multi-generational Well-being Mengqi Zhong Poeti Akbar Xuhui Liu Xin Sui Constant Cap Slawomir Ledwon **3**	4.3 Historic Cities, Local Identities, and City Branding Luni Shen Nasim Iranmanesh Alexandr Khvan Citra Persada Giuseppe Pace Peter Starr **4**
Parallel Session 10 September 16:00-17:30	1.4 Understanding of Megacities: Linkages and Structures (2/2) Dushko Bogunovich Felicia Atmadja Huihui Nan Shua i Li William Zuo **1B**	2.4 Urban Expansion and Food Supply: Megacities Resiliency Jason Hilgefort Yi Li Xiaoyi Wen Zhengyin Lu Thomas Weith Sandy Jiyoon Kim **2**	3.4 Planning Sustainable Urban Childhoods for the Youngest (Special Session) Rushda Majeed **3**	4.4 UPAT Session Beyond Heritage: Culture as Urban Renewal (Special Session) Moderator: Milena Ivkovic Keith Davis Emilie Röell Zhichao Liu Xiuli Yao **4**
Parallel Session 11 September 11:30-13:00	1.5 How to Plan Ahead: Wuhan Metropolis Experiences (Special Session) Wenjing Luo Frank D'hondt **1A**	2.5 Managing Megacities and Hinterlands Relations - Planning at a Regional Scale Xue Jiang Huimin Qi Dianhong Zhao Tathagata Chatterji Greg Vann **2**	3.5 Sustainable Mobility and Streets for People Marc Funda Fenita Indrasari Natalia Tanan Fernando Caetano Yang Ye Cheng Peng Sebastien Goethals **3**	4.5 Design for Urban Regeneration Malgorzata Hanzl Jie Zhang Xiaoxiao Deng Dihao Zhang Ana Peric Ferdous Farhana Huq **4**
Parallel Session 11 September 14:00-15:30	1.6 Planning for Megacities: Sustainability Latifah Latifah Dayinta Pinasthika Bo Bian Silvia Croce Daniele Vettorato Daniel Petrovics **1A**	2.6 Alternative Models of Spatial Development: Neither Urban nor Rural? Dani Muttaqin — Ye Liu Soelaeman Soemawinata — Xiaoyi Wen Bakti Setiawan Bin Li Zhengyin Lu **2**	3.6 Data, Indicators and New Paradigms for Public Health Gabriela De Souza Tenorio Chengcheng Liu Daniel Mambo Tampi David Green Dayinta Pinasthika Adriadi Dimastanto Raeesa Ghoor **3**	4.6 Culture, Heritage and Sustainable Redevelopment Tubagus Furqon Sofhani Yang Yang Qi Shen Harini Septiana Qinglian Wang Natasa Zivaljevic Luxor **4**
Parallel Session 11 September 16:00-17:30	Producing spaces, changing places- exploring novel public life study Gregor Mews **1A**	World Resources Institute (WRI) - Forest City **2**		Urban Island of Java 2045 **4**
Parallel Session 12 September 11:30-13:00	1.7 Planning for Megacities: Effciency Prihadi Nugroho Vaishali Aggarwal Mariana Reis Santos Frank D'hondt Putrikinasih Santoso **1A**	2.7 Beyond Megacities: Role of Mega Infrastructure in Hinterland Development Dwitantri Rezkiandini Lestari Roni Susman Thomas Weith Latifah Latifah Sai Liu — Haixuan Zhu Fatih Eren — Ahmet Bas **2**	3.7 Public Space, Public Life Adriadi Dimastanto Juan Li Matej Niksic Hang Sui Apostolos Kyriazis Ahmad Rifai **3**	4.7 Culture-led Regeneration: Issues and Challenges for Planning and Development Processes (Special Session) Tubagus Furqon Sofhani — Ana Peric Michael Stott — Peter Star Ehsan Ranjbar Natasa Zivaljevic Luxor **4**
Parallel Session 12 September 14:00-15:30		2.8 Future of Urbanisation Sebastien Goethals David Green Esther Vlaswinkel Derry O'Connell Paramita Rahayu Pietro Elisei **2**	3.8 The Right to Housing and Livelihoods Akino Tahir Mengqi Zhong Fujun Xia Mahak Agrawal Rouve Bingle **3**	UPAT Session: Wuhan Placemaking Week Design (Special Session) Moderator: Milena Ivkovic Jason Hilgefort Ali Alraouf Michael Stott Olga Chepelianskaia Dushko Bogunovich Wenjing Luo **4**

1A Banda A **1B** Boardroom **2** Timor **3** Flores A+B **4** Banda B

Track 5 Smart futures and sustainability *planning for innovation*	Track 6 Changing environment and risks *planning for resilience*	Track 7 Urban governance and planning profession *planning for future*	Special Sessions Side Events, Sessions Proposals
5.1 Mobility in Smart Cities Palak Thakur Sugandha Pal Daniele Vettorato Dian Luftiana Alloysius Joko Purwanto Andrey Borisov Ozge Çelik Putrikinasih Santoso **5**	**6.1 General Introduction: Climate Change – Globally** Juanee Cilliers Etienne Drouet Natalie Rosales Pérez **6**	**7.1 Cross-border Governance** Daniel O'Hare Serin Geambazu Zivile Simkute Sindi Haxhija Khaled Abdellatif **7**	**Young Professional Planners Seminar** Meenakshi Nair Sayali Virulkar Manasa Garikaparthi **8**
5.2 Knowledge Economy and Innovation Milieu Dianhong Zhao Mariana Fiuza Yu Sun **5**	**6.2 The Currencies of Climate Change: Water** Tanaya Sarmah Theresa Audrey Esteban Priyanjali Prabhakaran Suja Kartha Ramya Sakkeri Matej Niksic **6**	**7.2 Territorial Planning** Slawomir Ledwon Serin Geambazu Huihui Nan **7**	**Planners for Climate Action (P4CA) – catalysing and accelerating climate action** Moderator: Didier Vancutsem Nicolas Gharbi Shipra Narang Suri Bert Smolders **8**
5.3 Cities of Future - User-oriented Services Jianxiang Huang Adriano Bisello Dian Hasanuddin Qinglai Zhang Ming-Chun Lee **5**	**6.3 Planning for Climate Change (Special Session)** Travis Bunt **6**	**7.3 Local Leaderships** Tathabrata Bhattacharya Olga Chepelianskaia Teti Argo Thai Son Pham Xiangyi Meng **7**	**Relocating the National Capital (Special Session)** Moderator: Kania Sutisnawinata Bambang Brodjonegoro Vadim Rossman Alfonso Vegara Norliza Hasyim Shipra Narang Suri **8**
5.4 Co-design and Participation in Smart Cities Xin Sui Silja Tillner Xuhui Liu Nankai Xia Huiyi Xia Tian Qin Amandus Jong Tallo **5**	**6.4 The Currencies of Climate Change: Heat** Anusha Roy Ferdous Farhana Huq Olufemi Ojo-Fajuru Shuo Zhang **6**	**7.4 Metropolis Management** Frank D'hondt Marc Wolfram Ana Peric Mennatullah Hendawy Eric Huybrechts **7**	
5.5 Smart City Strategies in Urban Planning and Design Thibault Pilsudski Citra Persada Dorota Kamrowska-Zaluska Hanna Obracht-Prondzyńska Jassim Al-Sorour Noor Alamri **5**	**6.5 Climate Change and Operating Cities – Metabolism** Sani Nuraini Thai Son Pham Aishwarya Talluri Wiwandari Handayani Dani Muttaqin Shivangi Singh Parmar Natalie Rosales Pérez David Mathewson Raka Suryandaru **6**	**7.5 Democratic Urbanism: A Method for City-building (Special Session)** Erin Simmons Joel Mills **7**	**ISOCARP Institute Seminar – Solutions towards better Cities** Moderator: Didier Vancutsem Shipra Narang Suri Daniele Vettorato Tjark Gall Etienne Drouet Charles-Edouard **8**
5.6 Smart Public Spaces Wibawa Jati Kusuma Mennatullah Hendawy Mayank Dubey Le Dong Vaishali Aggarwal **5**	**6.6 Building Unique Cities: An Imperative for Sustainability and Liveability in the Global South (Special Session)** Olga Chepelianskaia **6**	**7.6 Using Metro-Hub (Special Session)** Moderators: Maria Del Pilar Tellez Soler **7**	**Indonesian Association of Urban and Regional Planners (IAP) Meeting (1/2)** closed session **8**
ASEAN Planner Session **5**	**6.7 Climate Change and Operating Cities – People** Anastasia Widyaningsih Niken Prilandita Andie Arif Wicaksono Priyanjali Prabhakaran Rolf Schuett **6**		
5.7 Cities and Digitisation: Perspectives and Challenges of the Smart City Technologies on Urban Planning and Design (Special Session) Moderator: Yi Zheng Sebastien Goethals Fedor Kudryavtsev Junyan Yang **5**	**6.8 Climate change and Urbanism: Planning Tools** Cong Cao Muhammad Shamsuzzaman Shuang Zheng Peijun Lu **6**	**7.7 Metropolitan Governance** Ali Alraouf Arif Gandapurnama Ananya Ramesh Jyoti Vijayan Nair **7**	**Indonesian Association of Urban and Regional Planners (IAP) Meeting (2/2)** closed session **8**
	6.9 Planning – Looking Forward Rahul V Hien Bui Julia Babcock Theresa Audrey Esteban **6**	**7.8 Debate Governing the Metropolis** Moderators: Eric Huybrechts Jennilee Kohima **7**	**ISOCARP Awards Seminar** Dhiru Thadani Martin Dubbeling Ana Peric **8**

5 Sumba A   **6** Sumba B   **7** Ambon+Nias+Ceram   **8** Singosari Room

Track 1

Limitless cities and urban futures
Planning for scale

CONGRESS TEAM

Peter Newman
(Australia)

Luo Wenjing
(China)

Stephen Goldie
(United Arab Emirates)

LOCAL EXPERTS

Budi Situmorang
Khairul Rizal

Megacities (including city-regions) are growing larger and more powerful than many countries. Megacities have become global nodes of migration, trade, knowledge exchange and innovation with seemingly limitless potential for further growth.

The economies of scale for megacities seem to be outweighing the obvious diseconomies of scale, or inequities, that can be anticipated from limitless and unregulated growth. Therefore, discussions under this track broadly explored two key areas: the understanding of megacities, including the roles, structures and relationships with their surroundings; and the planning of megacities. Together, these led to more detailed explorations around seven sub-themes over seven sessions, providing a platform to discuss the many topics related to the scale phenomenon of megacities. Starting from keynote speakers, this track went through presentations and open discussions about what are megacities, how are megacities influencing our world and how to plan ahead for efficient, liveable and equitable megacities.

One of the first questions was whether megacities can be defined by their scale, but a useful definition by area or population is elusive. Rather, as an agglomeration phenomenon, megacities can be characterized by explosive growth and economic power, often contributing more to Gross Domestic Product (GDP) than the rest of the country. However, while benefiting from economies of scale, megacities are struggling to achieve a balance between economic efficiency and social equity. Case studies show that as megacities grow bigger, so too do the dilemmas caused by diseconomies of scale. These include the peculiar phenomenon of mega blocks and mega slums, contrasted here in China and Ghana, respectively, but not unique to those places. Both of these urban pathologies result from the high-speed of modern urban development in countries that are experiencing massive rural-to-urban migration, mega blocks being the response where governments have the capacity to respond in quantity, but not quality, and mega slums where governments do not have any real capacity to respond at all. In China the

response is now moving towards a high-quality mode, that may be termed smart urbanism, and which seems to be a partial adaptation of the New Urbanism. Certainly, it is similarly focused on urban growth intended to maximise social, environmental and economic benefits during the coming shift from the industrialised era towards a truly ecological civilisation.

Defining a metropolis as a set of urban entities that share significant daily commuting, avoids the difficulties of a scale-based definition. It also highlights the fact that metropolises produce massive economic growth precisely because of urban systems that are based on regional collaborations, notwithstanding their internal locational-transport inefficiencies. In other words, the definition of megacities is not just about their scales but the systems they have formed, leading to the conclusion that we should neither pursue the values of more and big, nor those of less and small, but rather work towards balanced urban systems. This requires a system-thinking approach, where an urban entity is examined as a space of flows, including the capital flows, information flows and people flows. From this the Gravity Model can be used to describe the spatial interactions within and outside metropolises, as has been demonstrated in case studies of urban agglomerations in China. A big message that emerged out of this discussion is that the spatial structures of metropolises have progressed over time from the centralization of resources in cities to the distribution of resources in city-regions. This distribution appears in two distinct patterns. In the "vampire" model, megacities tend to suck-in all the resources from their shadow regions, while in the "friend" model there is a more reasonable division of labour between megacities and their surrounding areas, hopefully achieving positive regional collaborations and a more balanced urban system.

The discussions under track 1 all revealed that there are no one-size-fits-all recipes. Instead holistic system-thinking approaches should be applied to address the problems of urban entities appropriate to their scale and situation. Despite the requirement for bespoke

solutions appropriate to scale, the end goals are remarkably consistent: efficient, liveable and sustainable villages, towns, cities, megacities and city-regions.

The case was made that in macro-scaled urban entities, connections between megacities and global economies should be borderless, because this should improve efficiencies and sustainability. However, the case of Wuhan metropolitan area demonstrates an intent to define its boundaries by quantitative and qualitative methods, so as to collaborate outside these boundaries while growing within them. For example, urban corridor growth, an oftenly used strategy for controlling metropolitan growth, can improve the efficiencies of urban flows by distributing resources along major transportation axes, as exemplified in the case study of the Optics Valley of China, also known as Wuhan East Lake High-tech Development Zone. Auckland case studies also demonstrate that city-region perspectives should be considered irrespective of adopting the compact city model or the "sprawl" model. With the help of machine learning, all such urban land use changes can be visualized by combining the cellular automata program known as SLEUTH (an acronym derived from the input data requirements of this urban growth model: Slope, Land-use, Excluded, Urban, Topology, Hillshade) with Particle Swarm Optimization (PSO), possibly enabling planners to predict future urban patterns and thereby direct them towards smart growth.

Moving from macro-scaled to micro-scaled urbanism, it became clear that connections should also be established between people and public places to improve equity and liveability. This discussion revealed the importance of transit-oriented development (TOD) as a proven micro-scaled strategy with macro benefits. As a compact city model emphasizing liveability, affordability and sustainability, successful TOD is achieved by understanding the synergy between land use, walkability and transit, and by empowering community engagement and activating well-considered public-private partnerships. Although there are universal principles for good TOD, every city should commit

itself to finding how best to create TOD locally. This can include comparative studies, such as the assessments of TOD in Jakarta and Auckland presented in this track. A similar acronym, but a completely different strategy is people-oriented development (POD), which could also be considered the preeminent principle for the whole process of planning, designing and governing metropolises. Especially as POD can guide metropolitan governance, top-down interventions and bottom-up engagement so that they combine towards a mutual goal, as exemplified by the case study of micro-regeneration in Lima, Peru.

In conclusion, this track is focused on urban scale, but the collective findings of the participants - audience, speakers and rapporteurs - would suggest that we should all look beyond scales and towards balanced systems. Thus, the system-thinking approach may be applied in defining, understanding and planning all scales of urbanism, from villages to city-regions. At the macro scale this enables us to plan ahead for efficient, liveable and sustainable megacities, supported by strong networks of interlinkages between these megacities and their hinterlands while also enabling great connections between people and public spaces at the micro scale of the human uraban experience.

Track 1 - Selected Papers

1. Chandan M. Ch., Aadithyaa J S, Prakash P S, Bharath H. A., '*Machine Learning for Building Extraction and Integration of Particle Swarm Optimization with Sleuth for Urban Growth, Pattern Visualisation for Liveable Cities*'

2. Petrovics D., '*Integrating Vertical Farming at Scale in Urban Food Planning, Practical Considerations for Planners*'

3. Luo W., Song Z. Xu L., '*Development: Case Study of the Optical Valley Knowledge Corridor, China*'

MACHINE LEARNING FOR BUILDING EXTRACTION AND INTEGRATION OF PARTICLE SWARM OPTIMIZATION WITH SLEUTH FOR URBAN GROWTH PATTERN VISUALISATION FOR LIVABLE CITIES

Chandan Mysore Chandrashekar, Research Scholar, RCG School of Infrastructure Design and Management, IIT Kharagpur; India

Aadithyaa J S, Undergraduate student, Department of Architecture and Regional Planning, IIT Kharagpur; India

Prakash P S, Research Scholar, RCG School of Infrastructure Design and Management, IIT Kharagpur; India

Bharath Haridas Aithal, Assistant Professor, RCG School of Infrastructure Design and Management, IIT Kharagpur; India

Abstract

Rapidly increasing population and migration from rural areas to nearby urban agglomerations develop tremendous pressure on system of the existing cities without compromising socio-economic and cultural linkages. Policy interventions, both at global and local scale, have created newer avenues for the researchers to explore real-time solutions for problems world-wide. For instance, the outcome of 2015 United Nations agenda for the achievement of the Sustainable Development Goals (SDGs) by the year 2030 primarily focuses on urbanization issues and probabilistic modelling of future scenarios to obtain a robust alternative for resource utilization and further for maximizing sustainability through land use pattern analysis. This is the clear indication toward the very important role of "ever dormant" urban planning, especially in the case of a rapidly developing country such as India. Remote sensing and geo informatics along with Machine learning can provide extremely relevant information about the pattern change in cities and as input to visualize the future growth pockets. In this context, potential of cellular automata (CA) in urban modelling has been explored by various researchers across the globe. In the recent past, models have been drawing majority of the attention along with geographic CA processes about urban growth and urban sprawl studies. Most recent approaches include optimization of transition rules based on machine learning techniques and evolutionary algorithms that follow nature-inspired mechanism such as Genetic Algorithm, Ant colony optimization, Particle Swarm Optimization (PSO), simulated annealing, Grey Wolf optimizer etc. Irrespective of any modelling technique, model calibration remains one of the challenging and most crucial steps towards obtaining realistic results. This research communication tries to demonstrate a novel idea of integrating PSO with SLEUTH post calibration of the spatial-temporal footprint of urban growth from the year 1990 to 2017 for Kolkata, a historical megacity of Eastern India. Results were evaluated and validated using statistical fit measures reveals PSO-SLEUTH performed substantially better compared to traditional Brute Force calibration method (BFM). Another significant development was in terms of

computation time of optimized values from days (BFM) to hours (PSO). The study identifies Kolkata region to be sensitive to spread and road gravity coefficients during calibration procedure. Results indicate growth along the transport corridors with multiple agents fuelling the growth. Further, with the aid of high spatial resolution data, buildings were extracted to understand the growth parameters incorporating neural networks. Using the results, renewable energy aspects were explored to harness and provide a suitable local solution for energy issues in energy gobbling cities. Pattern of landscape change, development of better process of modeling and extraction of building from machine learning techniques for planning smart cities with self-sustaining energy is presented in this research work.

1. Introduction

Asia alone is projected to house 54% of total world urban population (6.3 billion) by the year 2050 against 50% in the year 2010 (UNDESA, 2015) indicates the need for liveable cities that are more likely urban areas. Urban areas, over years have been reorganised and are reorganising due to increased population mostly migration. This ever increasing and irreversible urban growth has given impetus to understand urban morphology in depth and its implications on surrounding nature. Rapid urban growth in Indian scenario can be attributed to rural to urban migration, re-classification of cities, availability of improved health facilities, jobs, improved living, availability of essential amenties etc. in urban areas (Bharath et al., 2018). With the commencement and successful implementation of urban development policies and schemes such as Smart Cities, AMRUT, JNNURM, etc. have promoted migration from rural area to urban core (Shaw & Das, 2017). In 2010, India accounted for 30% of urban areas with 367.5 million people residing within. A clear jump in can be observed in urban population post 2000 (figure 1).

An important decision was taken during September 2015, UNSDS with title "Transforming our world: the 2030 Agenda for Sustainable Development" in thinking of global community in adopting the Agenda for Sustainable Development (SD) through vision 2030. Goal number 11 of 17 Sustainable Development Goals (SDG) elaborates 'Sustainable Cities and Communities' and guidelines to meet these criteria. In addition, article 76 of 2030 agenda pronounces use of geospatial data for tracking and monitoring the progress of various projects under the umbrella of SDG's. In this regard, the creation of big data pertaining to cities, specifically the buildings that are the significant portion will be of paramount importance. The recent development of machine-learning algorithms coupled with geospatial data are among the front-runner technological tools, expected to play a crucial role. Geospatial data sets provide the means to study large area of the earth surface and helps to generate necessary data from complex urban surface features. Geospatial data majorly comprises of satellite data and GIS data. Satellite remote sensing (RS) has been credited for its quickest and lesser cost available method of mapping large areas. The availability of high resolution and multi-spectral satellite imagery provides the best accuracy needed for assessing urban growth pattern (Bharath et al., 2014). Satellite technology and data analysis are adopted by both regional and national governments (Chen et al., 2000; Ji et al., 2001). It helps to map urban areas at finer scales,

both temporally and spatially with consistent images of Earth surface. Remote sensing, its analysis and integration with geographical information systems (GIS) forms a robust technology to monitor temporal urban growth. GIS platform has entered majority of the service sectors by providing facilities to capture, manage, store, retrieve, analyze and display geospatial data on a real-time basis. Further strength to GIS comes from its distinguished built-in database, decision support system and application-specific plugins, makes more reliable tool for urban studies (Tran et al., 2015; Boori et al., 2015).
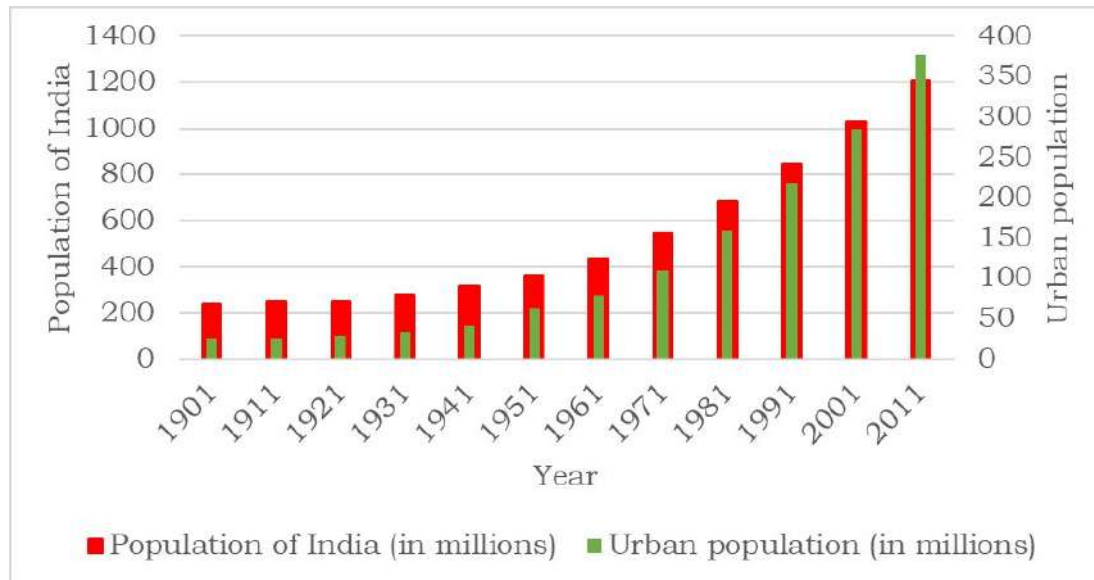
Figure 1 Trends of urbanization in India 1901-2011

Recently, machine learning techniques for building extraction information from remote sensing images has become easier with the advent of integrating various approaches on the same platform. Speed and accuracies of digital image processing have improved significantly with the use of several machine-learning algorithms. Random forest (RF) and Support Vector Machine (SVM) methods of learning algorithms proved efficient in information extraction from satellite imagery (Thanh & Kappas, 2018). Having previous and present years' temporal data, it is necessary to have a vision of development for the near future in terms of urban modeling. It is the process of identifying a theory, could be translated into a mathematical model as well as developing specific computer-aided programs to feed the model with data to calibrate, validate, verify and predict future urban trends (Verburg et al., 2002; Batty, 2009).Theoretical assumptions, method followed, spatial, temporal aspects and geographical extents might vary from each model types, but the final outcome of these models are to understand the complex interrelationships between natural ecosystem and urban environment by observing irreversible heterogeneous patterns of change (Li & Liu, 2006; Crooks, 2010). Wu and Silva, 2010 reviewed urban land dynamics and related models, depicted in figure 2. They highlight the significance of artificial intelligence (AI) and its deep theoretical understanding of urbanization process and relative pressure on land use pattern change. Figure 2 shows broad categories of AI systems used in urban models. In this research paper we discuss briefly about cellular automata (CA), SLEUTH model, optimization techniques such as genetic algorithm (GA) and particle swarm optimization (PSO), its application to urban growth models. The structure of the paper is organized as follows: sub sections 1.1-1.3 provides a brief overview, literature review of Cellular automata and SLEUTH urban growth model, its improvement over last two decades, integration of stochastic optimization

techniques to SLEUTH and building extraction for urban growth application. Section 2 describes the study region selected to implement modeling and extraction of building information along with data sources. In section 3 we describe the novel integrated method adopted to solve time-consuming conventional modeling problem countered with PSO-SLEUTH. Results are discussed with statistics and visualization in section 4. Finally, conclusions are given in section 5.
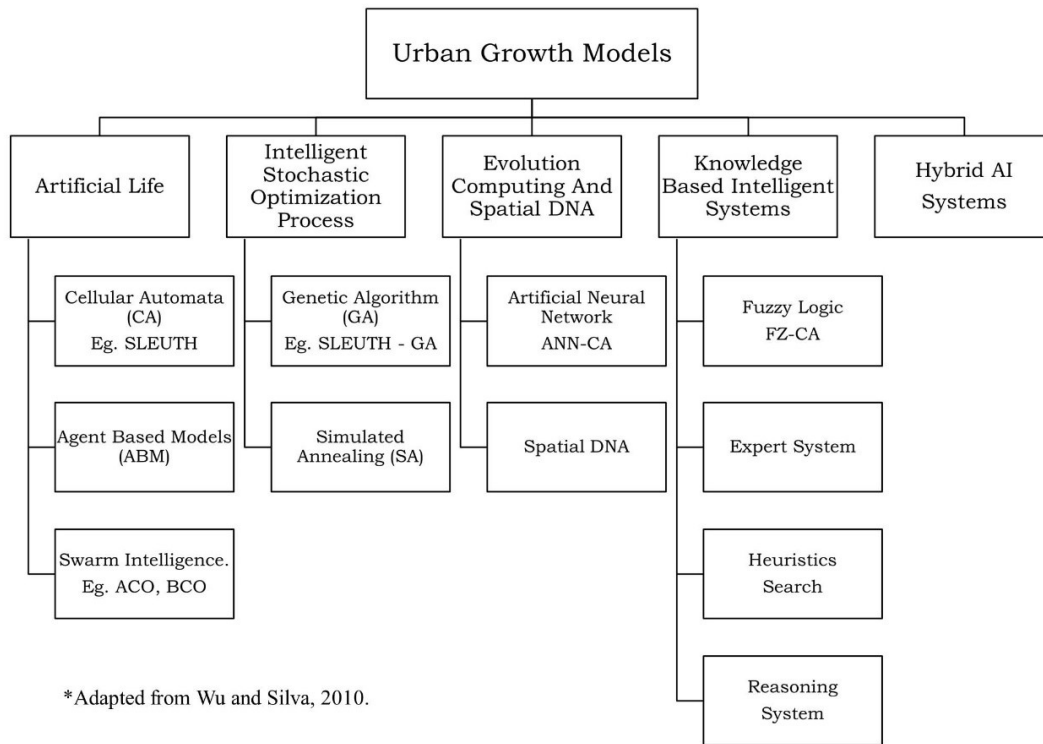
Figure 2 Types of urban growth models

1.1. Cellular automata and urban growth models

Wolfram, 2002, defined CA as discrete two dimensional dynamic systems in which local interactions among components generate global changes in space and time. Torrens, 2000 explains CA is composed of the below four components:

1. Cell space represented by an array of cells

2. Several finite states that qualifies the state of each cell

3. Neighborhood

4. Transition functions, define the next state of the cell in the next period, based on the given state of the cell itself and its neighborhood cells

Standard cellular automata apply a "bottom-up" approach. The approach argues that local rules can create complex patterns by running the models in iterations (Batty & Xie, 1994). Itami, 1994 states that CA are seen not only as a framework for dynamic spatial modeling but as a paradigm for thinking about complex spatial-temporal phenomena and an experimental laboratory for testing ideas. Researchers have successfully used CA in urban modeling over the decades and now have tried to address various related research questions with the help of CA-based models (Alves & Albrecht, 2010; Yang et al., 2012; Torrens & Benenson, 2005).

SLEUTH is a CA-based urban growth model, started as open source, has witnessed numerous applications over different parts of the world. The acronym of SLEUTH stands for slope, land use, excluded, urban, transportation and hillshade, the layers used as input for the model, consists of C-language, using UNIX or UNIX based operating systems (Nimish et al., 2018; Chandan et al., 2019). It has an ability to predict urban/non-urban land use dynamics based on two sub models: urban growth model (UGM) and Deltron land model (DLM) (Dietzel & Clarke, 2004). Model is dependent on five factors controlling the behavior of growth: diffusion, breed, spread, slope resistance, and road gravity. It also considers four growth rules: spontaneous growth, new spreading center growth, edge growth, and road-influenced growth. Best set of coefficients are derived for the five factors using these four rules. Traditional brute force method (BFM) takes days together to arrive at three phases of calibration i.e., coarse, fine, full and shortlisted values for prediction. Most researchers have made successful attempt to reduce SLEUTH computation time and therefore to increase its efficiency. The original version includes SLEUTH UGM and DLM. To reduce computation time, Dietzel and Clarke, 2007 worked on the development of optimization of SLEUTH metric called optimal SLEUTH metric (OSM). OSM narrows down the parameter range and returns a single goodness of fit metric. OSM is the product of various individual metrics like compare, population, edges, clusters, slope, X-mean and Y-mean providing reliable calibration results. The source code for OSM is also available in Project Gigalopolis website and one can readily implement OSM technique. Sakieh & Salmanmahiny, 2016 explored OSM and implemented to Gorgan area of Iran. Authors have mentioned the term "cancer-treating" to understand and predict the urban spread in three different scenarios: afforest protection, rangeland protection and historical growth (without any restrictions). They have also adopted a comparative assessment to measure association between landscape metrics and land suitability values using Spearman correlation to address cancer-treating urban growth pattern. Other improvements of SLEUTH include pSLEUTH, SLEUTH-3r and SLEUTH-Genetic Algorithm (GA) (Guan & Clarke, 2010; Jantz et al., 2010; Clarke-Lauer & Clarke, 2011). GA returns a single best fit statistic for the entire dynamic range consisting of several Monte Carlo iterations. Research in the area of improving run time and various variable optimisation in SLEUTH model is yet unexplored by scientists and this paper presents this novel technique of integrating PSO rules with existing sleuth model to improve its run time by optimising the initial set of variables.

1.2.   Integration of genetic algorithm and particle Swarm optimization techniques with SLEUTH

GA includes heuristic search algorithms based on natural selection and natural genetics using the key concept of simulating, imitating or mimicking evolution process to obtain optimized results (Holland, 1975; Goldberg, 1989). It adopts Darwinian "Survival of the fittest" theory, only the fittest shall survive, reproduce and successive generations shall become superior compared to older generations (Mayer et al., 1999). Developed by Holland in early 1970s, the central theme of GA is robust optimization technique which considers independent variables of the model and converts them into genetic pairs (binary).

SLEUTH-GA is adopted to improve calibration process and to obtain optimized values in less computation time. Figure 3 shows SLEUTH-GA model calibration approach. Coarse, fine and final calibration procedure employed in BFM is replaced by GA calibration, apart from which other procedure remains same. Strength of GA comes from its ability to explore search space with improved results after each iteration. GA applied to SLEUTH follows a four-step process:

Population initialization, Selection strategies, Crossover breeding and finally Mutation. In SLEUTH procedure, the minimum and maximum value for a gene is fixed as 1 and 100 respectively, defining the range of each coefficient. Overall GA analysis involves calibration of metric values, number of iteration needed for calibration and assessing forecasting behaviour (Jafarnezhad et al., 2015).
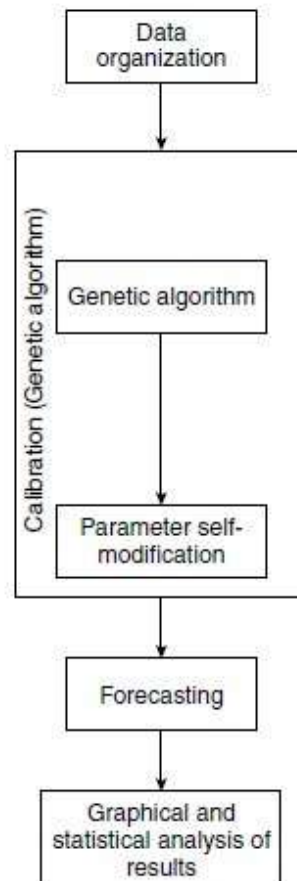
Figure 3 Genetic algorithm and SLEUTH model calibration approach (a Proposed approach based on Goldstein, 2004)

PSO is a population-based stochastic optimization technique inspired by social behaviour of birds flocking and fish schooling (Eberhart & Kennedy, 1995). Each solution to a problem is considered as a bird called particle. All particles have fitness values, and these values are calculated from objective function. Each particle has personal best and global best performance; velocity of the group is adjusted based on best performer in the group. While the advantage of PSO is that complex problem can be solved cost effectively with improved performance whereas unlike several Swarm intelligence-based optimization techniques, PSO also has limitation of particles escaping local optimum and decreased chances of finding global optimum (Shi et al., 2011). Feng et al., 2011 conducted a study to explore advantages of integrated CA and PSO approach. Objective of the study was to stochastically optimize transition rules and therefore reduce computation time, prediction uncertainties as well as improving location accuracy, a case of Fengxian District, Shanghai, China. Authors claim similarity between PSO and CA drives to search global optimum parameters of CA rules. Further, this concept can be applied to SLEUTH-PSO spread optimization to reduce computation time and predict accurate transitions. PSO optimizes allocation of pixels by

considering 3 x 3 kernel and returns a set of eight values that represent Moore neighborhood as illustrated later in figure 10.

1.3.   Urban building structure extraction

Machine learning techniques such as Random Forest (RF) and Support Vector Machine (SVM) are employed by scientists to extract buildings in urban areas. Random forest classifier is made up of an ensemble of multiple decision trees, here majority voting from the decision tree classifiers with 'yes' or 'no' outputs are used to classify the data (Breiman, 2001). The outlier in training is well handled by RF is advantageous in classifying spatial data efficiently (Horning, 2010). SVM works on the principle of identifying right hyperplanes that maximizes the distance to the closest data points on both sides of the classes (Vapnik, 1995; Dixon, 2008; Das et al., 2018). SVM is a supervised learning technique and it can be applied to a multiclass classification. In SVM classification, four kernel functions could be used based on the transformation needed, namely sigmoid, radial basis function, linear and polynomial. Previous studies showed that radial basis function performs best for binary classification from satellite images (Prakash et al., 2018).

There currently exists a gap in planning and visualization of urban structures at metropolitan scale and beyond, that modeling can fulfill with agenda of developing sustainable smart cities. It is also necessary to have insights through dynamic integrated urban growth models. Based on above discussion and detailed literature survey, we have identified the research gaps, aiding in forming major objectives of this research communication as: a) Extracting building from high-resolution satellite imagery, b) Analyzing spatio-temporal changes in urban land use for Kolkata Metropolitan Area, c) Modeling future trends of urban growth using an integrated CA-based SLEUTH-PSO approach.

2. Study area and data

Located at the eastern part of India, Kolkata has been considered for study is also famously known as "The city of Joy" or "Calcutta" during the British rule in India. The city is built on the banks of River Hooghly. The geographical extents of Kolkata metropolitan area (KMA) are (depicted in figure 4) 22°19'59" - 23°0'20" N and 88°4'23" - 88°32'37" E. Kolkata lies about an average of 3-9m above the MSL and situated very close to Ganges delta and Bay of Bengal. The city served as former capital of British India from the year 1772-1911 and presently it is the capital of West Bengal state. The region is also famous for numerous number of wetland ecosystem, natural tanks and lakes. Taking advantage of all four transport modes i.e., road, railway, airway and waterway, Kolkata has emerged as one of the dominant urban centers of Eastern India. Metropolitan urban agglomeration has an area about 1886 km^2 (KMA) with population of 14,035,959 (Census of India, 2011), makes it to the 3rd rank in metro cities of India after Mumbai and Delhi. Currently the physical infrastructure, services, planning and development of the region is administered by Kolkata Metropolitan Development Authority (KMDA).
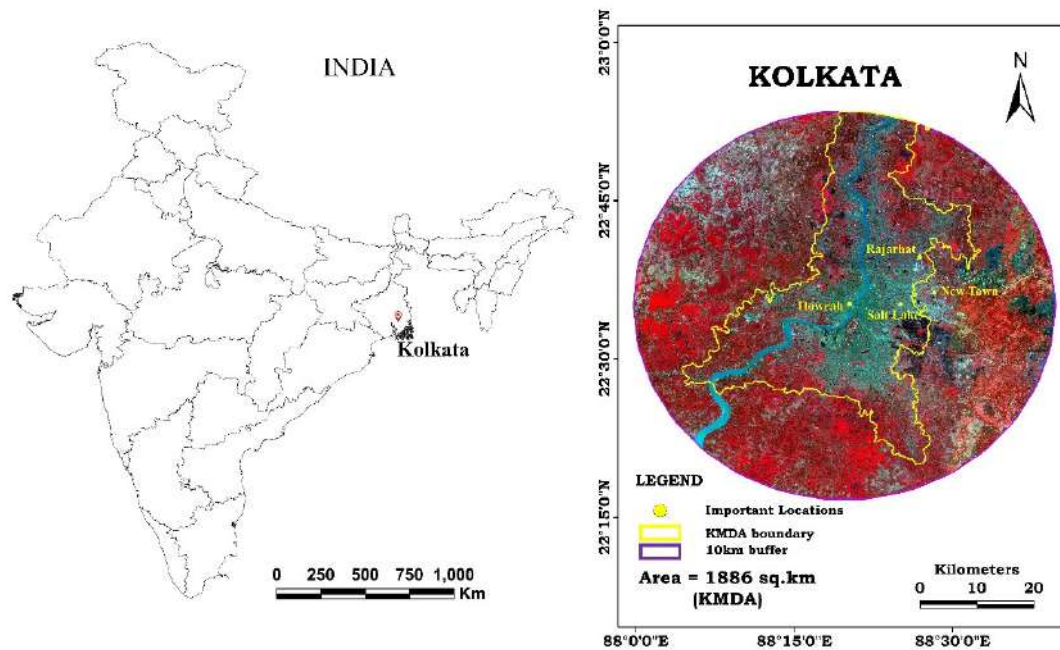
Figure 4 Location map of Kolkata with false color composite as background derived from IRS LISS4 satellite data (Bands: 2,3 and 4)

Stable and floating population can be attributed to a majority of people commuting as tourists, state and central governmental office affairs, academia, healthcare, economy-oriented conferences and so on. Apart from these, region is a commercial hub of East and North-East India with Rs 1.84 trillion GDP in 2014. Figure 4 illustrates the KMDA with 10 km buffer to understand the influence of expanding urban trends, its influence on environment, and future scenario on the periphery. Data required for the study are listed in table 1.

Landsat series (5 and 8), ASTER, Indian Remote Sensing LISS 4 and Cartosat satellite data were obtained from United States Geological Survey (USGS) and National Remote Sensing Center (NRSC). During field visit (figure 5), GPS was used to collect ground truth data of various points and polygons, geo-tagged images were also obtained, aiding in validating land use maps. Toposheets from Survey of India online repository, of scale 1:25000 and 1:50000 were also considered to delineate base layers of administration and other boundaries. City development plan maps obtained from governmental agencies helped in understanding and digitizing restricted areas of future urban expansion for instance: lakes, military area, reserve forest, parks, wetland regions etc. Google earth platform was used as ancillary data in places which were not accessible for GPS data collection. Road network was digitized directly from Google earth and open street maps (OSM).

3. Method

An integrated method adopted for building extraction and urban growth visualization is depicted in figure 6.

Table 1 Data and layers used for the analysis

Data/Layers	Purpose/Source			
Google earth	Geo-correction, classification and validation. Collection of point, line and polygon data.			
Boundary maps and raster layers	To create excluded maps or regions restricted from future development data sets based on City Development Plans.			
Survey of India Topographic maps, online portals (Google and Bhuvan data).	Base layers of the administrative boundary.			
Field data – Using GPS	Geo-correction, training data and validation data, Agents Extraction			
Slope and Hillshade	Processed from ASTER DEM (raster)			
Transportation (Roads)	Street data (OSM, Bhuvan and Google maps) updated with classified images (originally vector, rasterized).			
Satellite data	Land use analysis, slope, hillshade maps, building and urban data extraction			
Satellite/Sensor	Resolution (m)	Date	Path/Row	Remarks
Landsat 5 TM	30	06-Mar-1991 28-Mar-1999 07-Mar-2009	138/44	--
Landsat 8 OLI_TIRS	30	13-Mar-2017	138/44	--
ASTER GDEM	30	17-Oct-2011	N22E088	Reprojected to UTM
IRS LISS 4	5.8	17-Mar-2018	108/56	Reprojected to UTM
IRS Cartosat 2	1	02-Jan-2018	N. A	--

3.1. Pre-processing

To avoid inconsistency between different datasets, pre-processing of data along with geometric correction, resampling wherever necessary (to maintain similar resolution) and

image enhancement were conducted. Satellite images were geo-corrected using ground control points (GCP) collected during field visit and data pertaining to study regions were cropped according to buffer boundary. Contrast stretching was performed wherever necessary to maintain the dynamic range. Satellite data were registered to world geodetic system (WGS) 84, universal transverse Mercator (UTM) Zone number 45.

Figure 5 Data collection during field visit to Kolkata metropolitan area. A) Waypoints collected using GPS B) Wetland area and surroundings, Kamduni C) Hindustan motors industry (abandoned), Konnagar, Uttarapara and surrounding environs as seen from IRS LISS 4 FCC image (D) Panoramic view of Hindustan motors lake. (Date taken: 25 Aug, 2017, Source: Author)

3.2.   Application of machine learning to extract buildings

The resourcesat LISS IV imagery of 5.8 meters multispectral is merged with the Cartosat 1.0-meter panchromatic image using Hyperspherical Color Sphere (HCS) method (Ghosh & Joshi, 2013). The resultant high-resolution color image is clipped for the study area KMDA with 10 km buffer. The training dataset is prepared for two classes; building and non-building category with the help of ground truth and observation from the spatial imagery. Machine learning classifiers (SVM and DT) are trained using the training data obtained from the multispectral image. The training set contains data from three bands that are labeled as '0' and '1' for non-building and building classes, respectively. The predicted output from the classifiers is divided into classes by judiciously identified threshold value to obtain a binary map containing building and non-buildings.

3.3.   Land use analysis

Primary step of land use map generation is image classification. It involves various steps such as creation of FCC (false color composite) image directly helps in identifying heterogeneous patches in the landscape (Bharath et al., 2019). Bands green, red and near infrared are chosen to generate FCC image. Training polygons are digitized based on the spectral reflectance of

various features in FCC, covering the study area ensuring that polygons are well distributed throughout study region. These polygons and its coordinates are entered into GPS and ground truth data is verified during field visit to identify various land use types. A supervised classification technique famously known as Gaussian maximum likelihood classifier (GMLC) is adopted for the study. The classifier proves best amongst others because it takes into account variance, covariance and probability density contours to evaluate the land use class of every pixel under consideration (Duda et al., 2000; Ramachandra et al., 2012). Four land use classes were chosen for the study based on literature, they are: urban, vegetation, water and others (Anderson, 1976; Nimish et al., 2017).
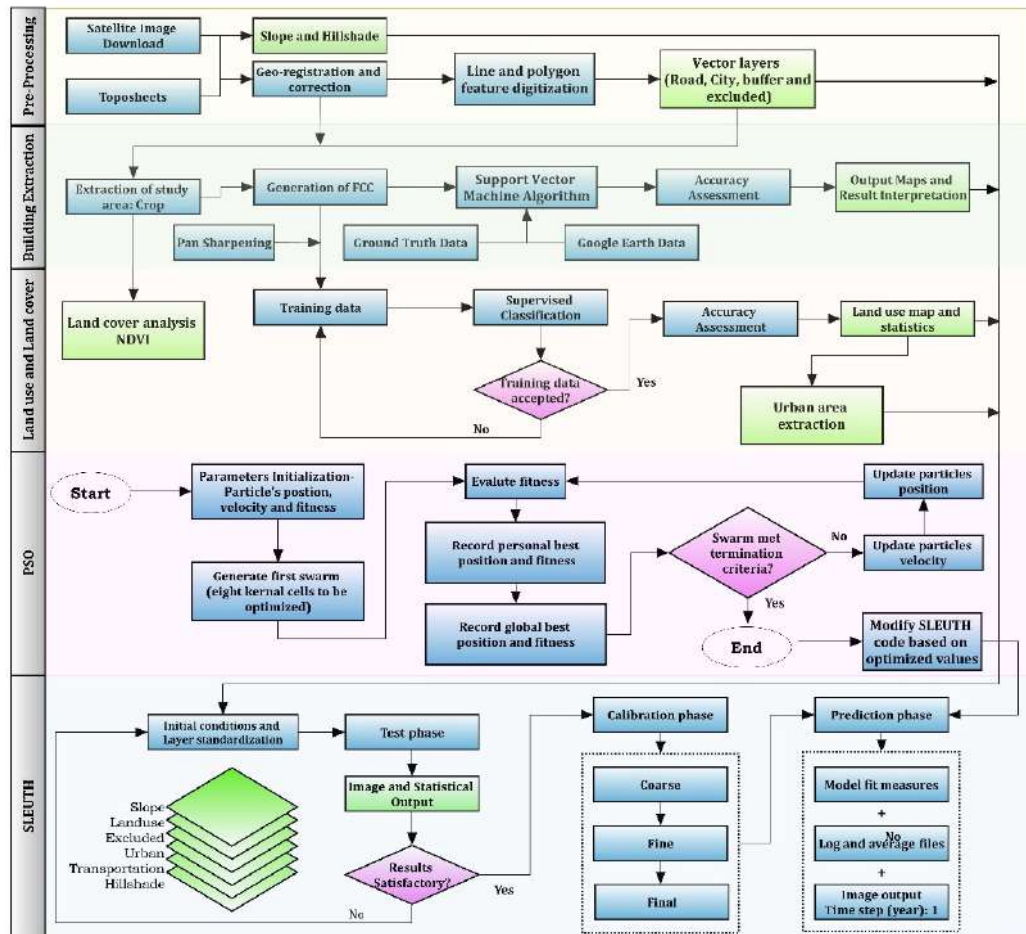
Figure 6 Integrated method adopted for the study

Accuracy assessment was performed in terms of overall accuracy and kappa statistic by comparing the classified map with the validation map. Error/confusion matrix generated helps to estimate producer's accuracy, user's accuracy, overall accuracy and kappa coefficient (Bharath et al., 2016).

3.4. Implementation of PSO and SLEUTH

PSO is popular among various nature-inspired techniques for its simplicity, minimum mathematical computation, achieving improved optimization in less computation time and ease of application to general engineering problems (Rabbani et al., 2011; Yao et al., 2015; Hu et al., 2018). PSO resembles the behaviour of a bird flock or fish school. PSO, in terms of bird flock can be understood as a) Search space of optimization can be treated as birds flying space

b) Every bird is treated as particle and has its own solution or its own space closer to food c) Optimum solution to the problem is considered as food to all birds d) Each bird will search for food, during this process one of the important strategy adopted is search for peripheral region very close to food e) All particles has fitness values f) Estimating position of food by personal flying experience, regarded as Pbest or pid g) All particles preserve their independent best performance h) Group adjusts their velocity based on best performer in the entire group, i.e. best value obtained at any time interval in the entire population is called as global best, gbest or pgd (Stephen et al., 2013). An assumption is made that in a D-dimensional search space with n particles includes possible personal best solutions and global best solutions. These are represented as given in equation 1.

$$V_{id}^{(t+1)} = WV_{id}^{(t)} + c_1 r_1 \left[p_{id} - x_{id}^{(t)} \right] + c_2 r_2 \left[p_{gd} - x_{id}^{(t)} \right] \qquad (1)$$

Where,

i = Particle index; d = dimension/iteration

c_1 and c_2 are cognitive/social constants between 0 and 2

r_1 and r_2 are random numbers between 0 and 1, regenerated after every velocity update

p_{id} = population best or present best solution

p_{gd} = globally best solution

$V_{id}^{(t)}$ = particle's velocity at time t

$x_{id}^{(t)}$ = particle's position at time t;

Each particle keeps track of its coordinates in hyperspace which are associated with the best solution (fitness) it has achieved so far. The value of that fitness is also stored after every iteration. Each particle's position is updated using the equation 2.

$$X_{id}^{(t+1)} = X_{id}^{(t)} + V_{id}^{(t+1)} \qquad (2)$$

Integrating concepts of PSO with SLEUTH includes creation of a new script (Script.sh) file containing eight Moore neighborhood cell values (as illustrated in figure 10) that are to be automatically updated after each swarm iteration and storing best values. PSO provides optimum spread solution ranging between 1 and 99 for these cell values. 1 indicating least chance of urban spread in that direction and 99 indicates highest chance. These best values obtained are then adopted in spread file of SLEUTH3.0 code with p01 patch. Standardized input layers (select) used for model is illustrated in figure 7. Routine full calibration was performed using brute force method (BFM), output controlstat.log file was carefully examined to obtain model fit statistics and optimum SLEUTH metric (OSM), calculated by multiplying metrics such as compare, population, edges, cluster, slope, X-mean and Y-mean. Best OSM was chosen and corresponding coefficient values were replaced in the scenario file during prediction phase.
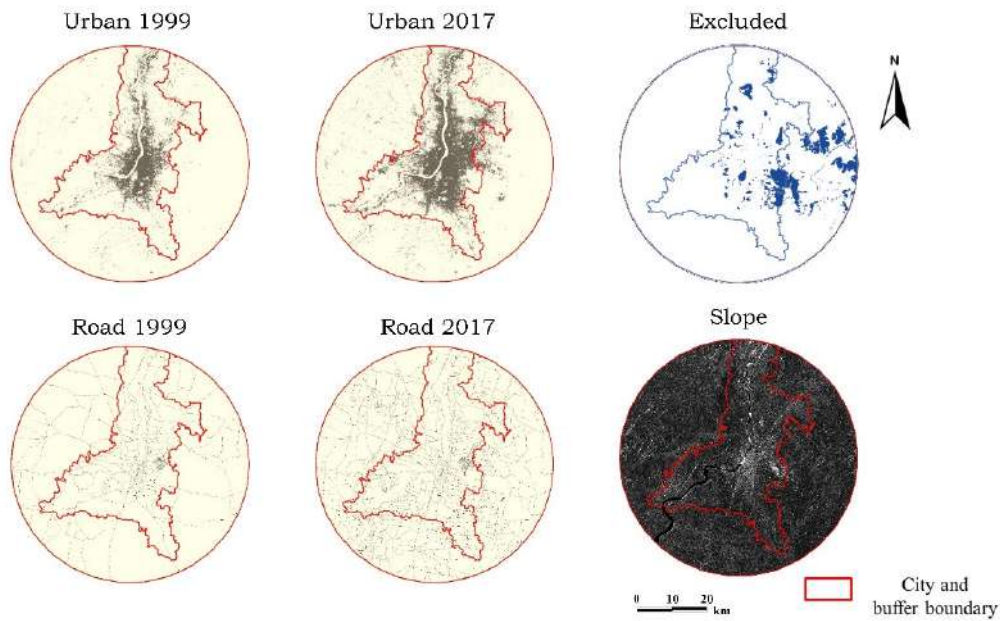
Figure 7 Standardized input layers used in PSO-SLEUTH model

4. Result and discussion

4.1. Building extraction

The data preparation for building extraction involves pan-sharpening of multispectral image using higher resolution panchromatic image. Figure 8, shows the subset of study area, Salt Lake, Bidhannagar, Kolkata, containing the dataset and extracted buildings. It is evident that from a closer look shows improvement in the quality due to image fusion in the picture (8C) and hence to obtain more detailed building information. In the binary output of reclassified image, white pixels represent the buildings and dark area corresponds to non-building class. Artifacts present in the output needs to be removed by performing morphological clean-up operations for further improvement of results. Outcome of this exercise is directly used in land use analysis and modeling as an ancillary urban dataset to describe the pace of urban growth as discussed over the next sections.

4.2. Land Use Analysis

For better understanding of the region, land use analysis was performed and results are as shown in Figure 9, corresponding statistics are tabulated in table 2. There has been significant increase in the urban areas consistently from 1990-2017. Strong economic and administrative base, high profile living, efficient service delivery mechanism, ease of access to public transport system and varied employment opportunities have been the major stimulators of urban growth in the study area. Nearby smaller villages have evolved into larger ones and many new settlements can be recognized along the transport corridors. Urban area saw an increase of 181% in just 27 years. Building extraction from high-resolution data also helps in quantifying urban growth on a microscopic scale. Water body has also seemingly increased in 2017, this can be understood on basis of visualization (temporal scale on Google earth) as well. Increase in water body, especially towards NE and SE directions are attributed to evolving aquaculture and pond ecosystem in the periphery of KMDA. However, significant waterbodies

in the form of ponds, lakes, wetlands, swamps, marshland etc. have been converted into other land use types or encroached over the period. Vegetation category shows consistent statistics, whereas other categories have decreased. Table 2 shows the kappa coefficient and overall accuracy of the classification.
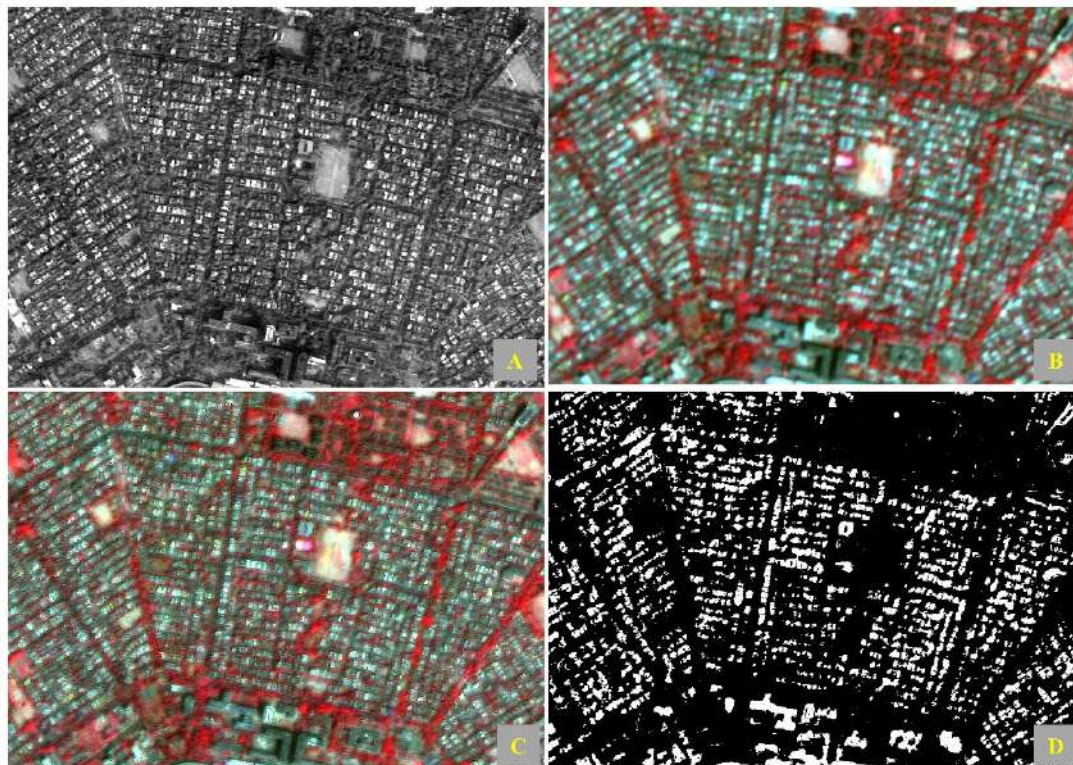
Figure 8 Data used and building extraction results for subset of study area, Part of Salt Lake, Bidhannagar, Kolkata: (A) Cartosat – 2, panchromatic, (B) LISS-IV multispectral, (C) Pan-sharpened image, (D) Extracted buildings

4.3.   PSO-SLEUTH model

SLEUTH codes were modified with respect to spread optimization obtained from PSO. Spread optimization gave eight best fit values indicating eight directions of optimum growth as shown in Moore neighborhood network figure 10C. Best PSO results were achieved at run number 83 with an OSM value of 0.824. After adopting coefficients from BFM, the spread.c, script.c and scenario file were modified accordingly and routine run to obtain control stats and therefore model fit measures.
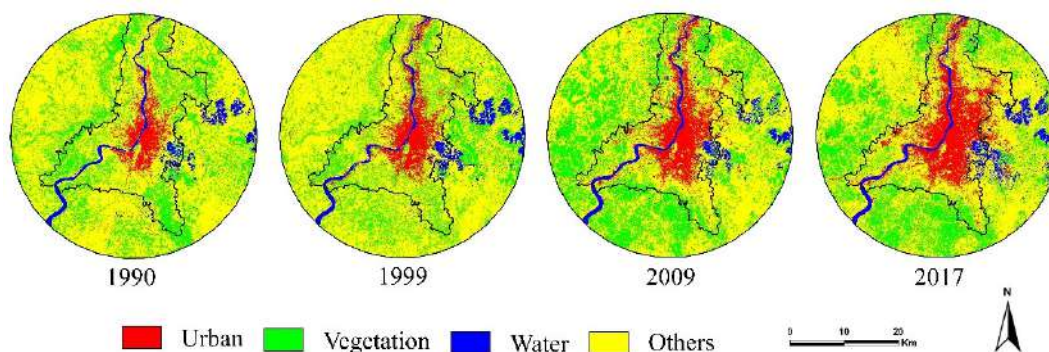
Figure 9 Land use results for KMDA region 1990-2017

Results obtained from PSO were compared with traditional brute-force method (BFM). Corresponding statistics are pictorially shown in figure 11. Substantial enhancement in terms of metrics such as Product, Compare, Edges, Clusters, Size, X-Mean and Y-Mean were observed by adopting PSO technique, while Population, Slope, % Urban and Rad showed minimum difference between these two methods. Leesalee metric was higher in BFM method with a value of 0.519 and lesser in PSO with a value of 0.480. OSM was calculated, achieved OSM was 0.0501 during BFM and 0.600 during PSO-SLEUTH. This clearly shows significant improvement in calibration of coefficients with PSO improvised spread optimized pixel values. Another important development was observed in computation time. Post full calibration process, PSO took 4hours, 12mins and 32 seconds to yield model fit statistics. These results not only indicate the model robustness by integrating PSO, but also it can deliver excellent fit statistics without compromising optimum coefficients.

Table 2 Land use and accuracy statistics

Year	Land use categories				Accuracy assessment	
	Urban	Vegetation	Water	Others	Overall accuracy (%)	Kappa statistic
1990	4.12	23.08	4.2	68.61	88	0.94
1999	6.45	21.17	4.7	67.68	93	0.96
2009	9.04	28.23	4.73	58	91	0.85
2017	11.58	22.18	6.24	60	91	0.89

Further, prediction for KMDA was performed using best-fit coefficients. After three phase calibration, optimum growth coefficients were derived. Of all the coefficients, breed (52) and spread (64) showed medium values whereas road gravity was the highest (80). This indicates Kolkata region has a significant influence of breeding a new urban site in the periphery or spreading type of urban growth from already existing core urban area, can also be referred to as sprawling at the outskirts. High values of road gravity reflect road acting as key urbanization factor. To name a few, Kolkata region has major connecting roads (AH1) towards NW direction, Bardhaman, Durgapur and Asansol; SW direction Kharagpur and further this road (AH45) connects to Orissa; NE direction, AH1 connects to Jessore (Bangladesh) and other important road network such as: Grand trunk road, NH 34, 35, 117, SH 1, 2, 3, 13 and 15. Diffusion and slope resistance showed the lower values of 8 and 16 respectively. Prediction was performed using PSO-SLEUTH to potentially visualize the scenario of urban growth and it was estimated to reach 757.91km^2 in comparison with 494.73km^2 in 2017, can be observed in figure 12.
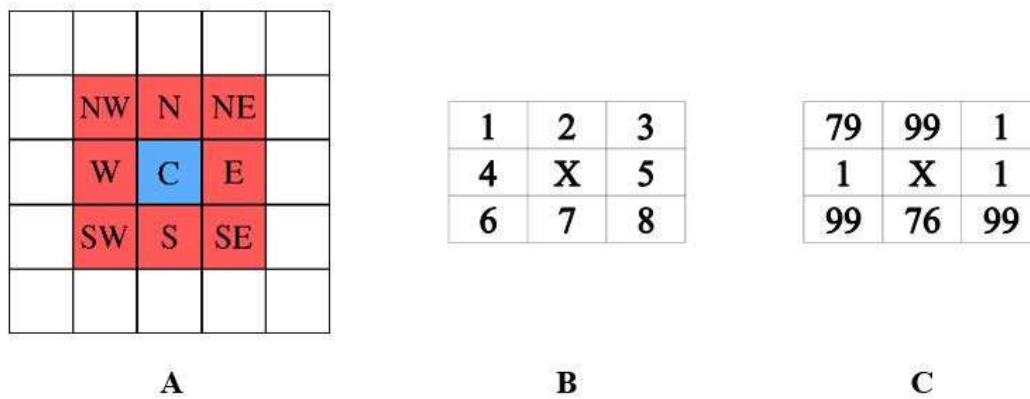
Figure 10 Optimization of pixel values based on Moore neighborhood. A) 3 x 3 kernel and directions B) Allotment pattern of pixel values in code C) Values achieved after running PSO
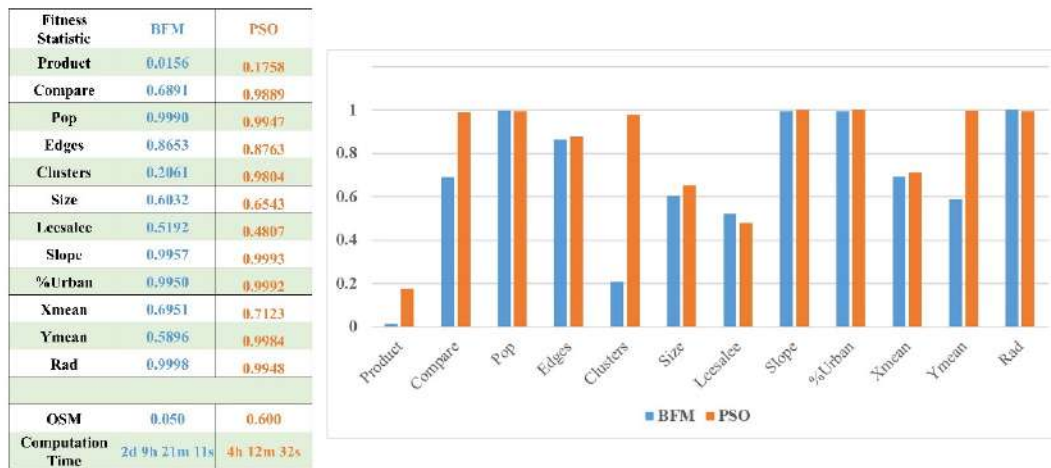
Figure 11 Summary of model fit statistics, comparison of metric values between BFM and PSO

5. Conclusion

Urban land use change is widespread, rapid and has direct effect on ecosystem and environment. It is mainly driven by human-induced activities carried out beyond limits and exploring natural resources to the fullest without any regard to concepts of sustainability. Extraction of building data from satellite imagery has always helped government agencies and planners to assess critical impacts of urban expansion on other land use categories. This research article highlights the significance of building extraction using high-resolution imagery and also discusses the potential of data merging, i.e., panchromatic image and multispectral image using pan-sharpening method to obtain binary classification of buildings, further this data can be used for modelling purpose as an ancillary dataset. This study also demonstrates the successful implementation and monitoring spatio-temporal urban growth using satellite data over a period of 27 years. Accuracies ranging from 88%-93% and kappa between 0.85-0.96 indicated excellent agreement between generated land use image and real-time dynamics.
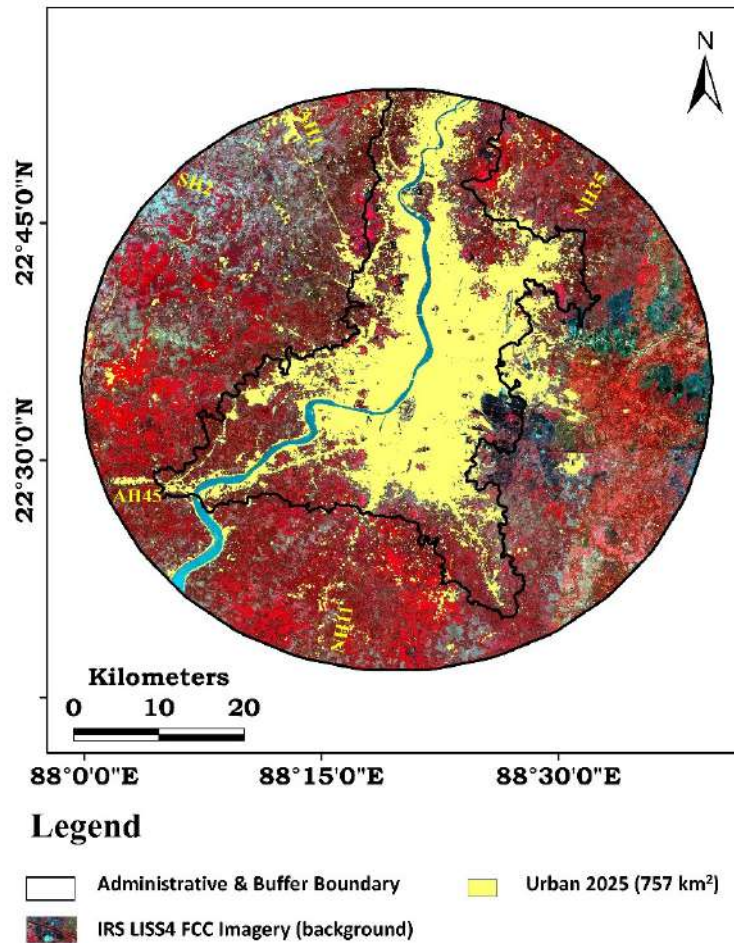
Figure 12 PSO-SLEUTH modeled output for the year 2025, KMDA region

Modeling and visualizing these changes have always been regarded, helps in formulating effective local, regional and national level sustainable environmental policies and management strategies. CA-based models, SLEUTH model in particular, its origins, theory behind, application and its strength when integrated with multiple tools, multi-disciplinary approach and recent advanced techniques such as genetic algorithm, particle swarm optimization, ant colony optimization etc. proves to be worthy urban models. In this study, we perform an integrated novel method of adopting PSO-SLEUTH to optimize spread using Moore neighborhood, calibration and prediction of urban expansion for the year 2025. Unlike other optimization techniques, PSO is faster in terms of computation time, efficient, reliable and has lesser parameters for human intervention. These advantages are explored in this paper, BFM based PSO-SLEUTH calibration saw excellent improvement in results and it can be realized by obtaining OSM of 0.6 using PSO in comparison with 0.05 using traditional BFM. Apart from OSM, other model fit statistics also showed satisfactory values suggesting the robustness of SLEUTH model to integrate with any other improvised algorithm. Visuals from model output suggests KMDA to have at least 757.91km^2 of urban land use by the year 2025, which is 53% increment from 2017. There appears to be a considerable gap in research when it comes to validation and accuracy of models. Adopting optimization techniques along with agent-based models seems to be governing aspects of future efforts. These statistics and findings insists administrators, planners and concerned government officials to focus on emerging land use issues and sustainable urban growth concepts.

6. Acknowledgment

7. References

Alves, R.M. and Albrecht, C.H. 2010. The Use of Simulation in Urban Modelling. Methods and Techniques in Urban Engineering, 109.

Anderson, J.R., 1976. A land use and land cover classification system for use with remote sensor data (Vol. 964). US Government Printing Office.

Batty, M. and Xie, Y., 1994. From cells to cities. Environment and planning B: Planning and design, 21(7), 31-48.

Batty, M., 2009. Urban modeling. International encyclopedia of human geography. Elsevier, Oxford.

Bharath, H. A., Chandan, M.C. and Nimish, G., 2019. Assessing land surface temperature and land use change through spatio-temporal analysis: a case study of select major cities of India. Arabian Journal of Geosciences, 12(11), 367.

Bharath, H. A., Vinay, S., Chandan, M. C., Gouri, B. A. and Ramachandra, T. V., 2018. Green to gray: Silicon Valley of India. Journal of Environment Management, 206, 1287-1295.

Bharath, H. A. and Ramachandra, T.V., 2016. Visualization of urban growth pattern in Chennai using geoinformatics and spatial metrics. Journal of Indian Society of Remote Sensing, 44, 617-633.

Bharath, H. A., Vinay, S., Ramachandra, T.V., 2014. Landscape dynamics modelling through integrated Markov, Fuzzy-AHP and cellular automata. In: 2014 IEEE Geoscience and Remote Sensing Symposium, 3160-3163.

Boori, M.S., Voženílek, V. and Choudhary, K., 2015. Land use/cover disturbance due to tourism in Jeseníky Mountain, Czech Republic: A remote sensing and GIS based approach. The Egyptian Journal of Remote Sensing and Space Science, 18(1), 17-26.

Breiman, L., 2001. Random forests. Machine learning, 45(1), 5-32.

Chandan, M.C., Nimish, G. and Bharath, H.A., 2019. Analysing spatial patterns and trend of future urban expansion using SLEUTH. Spatial Information Research, 1-13.

Chen, S., Zeng, S. and Xie, C., 2000. Remote sensing and GIS for urban growth analysis in China. Photogrammetric Engineering and Remote Sensing, 66(5), 593-598.

Clarke-Lauer, M.D. and Clarke, K.C., 2011, July. Evolving simulation modeling: Calibrating SLEUTH using a genetic algorithm. In Proceedings of the 11th International Conference on GeoComputation, London, UK.

Cortes, C. and Vapnik, V., 1995. Support-vector networks. Machine learning, 20(3), 273-297.

Crooks, A.T., 2010. Constructing and implementing an agent-based model of residential segregation through vector GIS. International Journal of Geographical Information Science, 24(5), 661-675.

Das, S. K., Bharath, H.A. and Prakash, P.S., 2018. Automated building extraction using high-resolution satellite imagery though Ensemble modelling and Machine learning. Remote Sensing of Land, 1–14.

Dietzel, C. and Clarke, K.C., 2007. Toward optimal calibration of the SLEUTH land use change model. Transactions in GIS, 11(1), 29-45.

Dixon, B. and Candade, N., 2008. Multispectral landuse classification using neural networks and support vector machines: one or the other, or both? International Journal of Remote Sensing, 29(4), 1185-1206.

Duda, R.O., Hart, P.E. and Stork, D.G., 2012. Pattern classification. John Wiley & Sons.

Eberhart, R. and Kennedy, J., 1995, October. A new optimizer using particle swarm theory. In MHS'95. Proceedings of the Sixth International Symposium on Micro Machine and Human Science, IEEE, 39-43.

Feng, Y., Liu, Y., Tong, X., Liu, M. and Deng, S., 2011. Modeling dynamic urban growth using cellular automata and particle swarm optimization rules. Landscape and Urban Planning, 102(3), 188-196.

Ghosh, A. and Joshi, P.K., 2013. Assessment of pan-sharpened very high-resolution WorldView-2 images. International journal of remote sensing, 34(23), 8336-8359.

Goldberg, D.E., 1989. Genetic algorithms in search. Optimization, and MachineLearning. Addison Wesley.

Goldstein, N.C., 2004. Brains versus brawn-comparative strategies for the calibration of a cellular automata-based urban growth model. GeoDynamics, 249-272.

Guan, Q. and Clarke, K.C., 2010. A general-purpose parallel raster processing programming library test application using a geographic cellular automata model. International Journal of Geographical Information Science, 24(5), 695-722.

Holland, J.H., 1975. Adaptation in natural and artificial systems Ann Arbor. The University of Michigan Press, 1, p.975.

Horning, N., 2010, December. Random Forests: An algorithm for image classification and generation of continuous fields data sets. In Proceedings of the International Conference on Geoinformatics for Spatial Infrastructure Development in Earth and Allied Sciences, Osaka, Japan (Vol. 911).

Hu, W., Wang, H., Yan, L. and Du, B., 2018. A Hybrid Cellular Swarm Optimization Method for Traffic-Light Scheduling. Chinese Journal of Electronics, 27(3), 611-616.

Jafarnezhad, J., Salmanmahiny, A. and Sakieh, Y., 2015. Subjectivity versus objectivity: comparative study between brute force method and genetic algorithm for calibrating the SLEUTH urban growth model. Journal of Urban Planning and Development, 142(3), 05015015.

Jantz, C.A., Goetz, S.J., Donato, D. and Claggett, P., 2010. Designing and implementing a regional urban modeling system using the SLEUTH cellular urban model. Computers, Environment and Urban Systems, 34(1), 1-16.

Ji, C.Y., Liu, Q., Sun, D., Wang, S., Lin, P. and Li, X., 2001. Monitoring urban expansion with remote sensing in China. International Journal of Remote Sensing, 22(8), 1441-1455.

Li, X. and Liu, X., 2006. An extended cellular automaton using case-based reasoning for simulating urban development in a large complex region. International Journal of Geographical Information Science, 20(10), 1109-1136.

NASA, 2001. Satellite maps provide better urban sprawl insight. Science Daily. Accessed on May 3, 2019. Retrieved from https://www.sciencedaily.com/

Nimish, G., Chandan, M.C. and Bharath, H.A., 2018. Understanding current and future landuse dynamics with land surface temperature alterations: a case study of Chandigarh. ISPRS Annals of Photogrammetry, Remote Sensing & Spatial Information Sciences, 4(5).

Nimish, G., Setturu, B., and Ramachandra, T.V., 2017. Modelling Landscape Dynamics in Protected Areas, Karnataka. Paper presented at Indian Biodiversity Congress - Vol 4, Puducherry, India.

Prakash, P.S., Soumya, K.D. and Bharath, H.A., 2018, November. Urban building extraction using satellite imagery through Machine Learning. In 2018 IEEE Symposium Series on Computational Intelligence (SSCI), IEEE, 1670-1675.

Rabbani, A., Aghababaee, H. and Rajabi, M.A., 2012. Modeling dynamic urban growth using hybrid cellular automata and particle swarm optimization. Journal of Applied Remote Sensing, 6(1), 063582.

Ramachandra, T. V., Aithal, B. H., and Sanna, D. D. (2012). Insights to urban dynamics through landscape spatial pattern analysis. International Journal of Applied Earth Observation and Geoinformation, 18(1), 329–343.

Sakieh, Y. and Salmanmahiny, A., 2016. Treating a cancerous landscape: implications from medical sciences for urban and landscape planning in a developing region. Habitat International, 55, 180-191.

Shaw, R. and Das, A., 2018. Identifying peri-urban growth in small and medium towns using GIS and remote sensing technique: A case study of English Bazar Urban Agglomeration, West Bengal, India. The Egyptian Journal of Remote Sensing and Space Science, 21(2), 159-172.

Shi, Y., Liu, H., Gao, L. and Zhang, G., 2011. Cellular particle swarm optimization. Information Sciences, 181(20), 4460-4493.

Stephen, M.J., Reddy, P. and Vasavi, V., 2013. Fingerprint image enhancement through particle swarm optimization. International Journal of Computer Applications, 66(21), 34-40.

Thanh Noi, P. and Kappas, M., 2018. Comparison of random forest, k-nearest neighbor, and support vector machine classifiers for land cover classification using Sentinel-2 imagery. Sensors, 18(1), 18.

Torrens, P.M. and Benenson, I., 2005. Geographic automata systems. International Journal of Geographical Information Science, 19(4), 385-412.

Torrens, P.M., 2000. How cellular models of urban systems work (1. Theory).

Tran, H., Tran, T. and Kervyn, M., 2015. Dynamics of land cover/land use changes in the Mekong Delta, 1973–2011: A remote sensing analysis of the Tran Van Thoi District, Ca Mau Province, Vietnam. Remote Sensing, 7(3), 2899-2925.

UN DESA, 2015. World urbanization prospects: The 2014 revision. Accessed on February 25, 2019. Retrieved from URL of United Nations Department of Economics and Social Affairs, Population Division: New York, NY, USA.

UNSDS, 2015. New York Summit: Transforming our world: the 2030 Agenda for Sustainable Development. Accessed on April 7, 2019. Retrieved from https://www.un.org/

Verburg, P.H., Soepboer, W., Veldkamp, A., Limpiada, R., Espaldon, V. and Mastura, S.S., 2002. Modeling the spatial dynamics of regional land use: the CLUE-S model. Environmental management, 30(3), 391-405.

Wolfram, S., 2002. A new kind of science (Vol. 5, 130). Champaign, IL: Wolfram media.

Wu, N. and Silva, E.A., 2010. Artificial intelligence solutions for urban land dynamics: a review. Journal of Planning Literature, 24(3), 246-265.

Yang, X., Zheng, X.Q. and Lv, L.N., 2012. A spatiotemporal model of land use change based on ant colony optimization, Markov chain and cellular automata. Ecological Modelling, 233, 11-19.

Yao, F., Hao, C. and Zhang, J., 2016. Simulating urban growth processes by integrating cellular automata model and artificial optimization in Binhai New Area of Tianjin, China. Geocarto International, 31(6), 612-627.

Research Paper

Integrating Vertical Farming at Scale in Urban Food Planning

Practical Considerations for Planners

Daniel Petrovics, MSc; Hungary/Netherlands

Abstract

At all stages of food production and consumption, resources are utilized in an inefficient manner and at an unprecedented rate, clearly affecting urban food systems. This raises future concerns in terms of climate change, and in terms of long-term food security and availability for growing urban populations. A supply-side solution to these issues - with particular potential in megacities - is Vertical Farming (VF), a high-yield form of controlled environment agriculture with promised potential to produce fruits and vegetables within cities, ultimately reducing their resource intensity. This research builds on an Urban & Regional Planning MSc thesis conducted at the University of Amsterdam. The research aims to provide a practical guide for planners, who aim to integrate Vertical Farming into urban food planning. Through this, an indication of whether and how VF can contribute to reducing the impact of food systems in terms of anthropogenic climate change is provided, and ultimately, it helps to understand if and how VF can be up-scaled for further impact. The research utilized an abductive approach with a qualitative design, where 17 experts working in the field were interviewed. These experts represent academia, consultancy, municipal officers, entrepreneurs, and investors. The findings are particularly applicable to planning with VF in cities in and integrative manner. The findings relate to 26 separate factors, along the lines of categories developed by van Doren et al. (2018). These categories include: Measures for Low-Carbon Urban Development, Operational Arrangements, Policy Context, Market Context, Social-Cultural Context, and Natural and Built Context.

1. Introduction

The growing complexity of global food systems has produced a number of undesired social and environmental externalities in the past. This is particularly true for how food is consumed in urban areas, ultimately building a global network of extensive and resource intense supply chains (Steel, 2013; Ilieva, 2016). The amount of resources consumed in the process, raises future concerns in terms of the climate impact of food systems as well as in terms of availability of staple foods for growing (urban) populations.

Ultimately these problems require the assessment of potential interventions in light of multiple considerations and integrated systems perspectives, whilst keeping the goal of sustainable urban development in mind. To illustrate the wicked nature of this problem, an urban food systems lens can be utilized for assessing a potential technological intervention, which promises to contribute to greening the way food is produced and consumed in cities. This specific intervention is that of Vertical Farming (VF) – a form of closed environment agriculture (CEA), capable of producing fruits, vegetables, and medicinal plants (Despommier, 2010) on multiple physical layers. This technology is particularly suitable for urban environments, as it allows for the efficient use of space, as the surface area of the given farm is not a limiting factor anymore when it comes to food production. Next to this, VF promises to reduce the resource use of global supply chains due to its localized nature, can provide year-round supply of produce, and does not require the use of pesticides (Ibid.). Nevertheless, questions have been raised as to how the high energy demand resulting from the use of aquaponics systems and LED lighting among other unaccounted for externalities should be considered for if one plans for truly sustainable urban food systems (Al-Kodmany, 2018).

This paper outlines, based on the framework developed by van Doren et al. (2018), what practical factors need to be taken into consideration when it comes to successfully planning for the up-scaling of VF, and through this embedding this technology in the city as a Low Carbon Urban Initiative (LCUI). Van Doren et al. (2018) outline two pathways to up-scaling – horizontal and vertical. Horizontal up-scaling entails the spatial reproduction of a given technological intervention, both in terms of quantity, as well as in terms of size. Vertical up-scaling describes the institutional embedding of a technology, be that in terms of policy, culture, or economy among others. In total van Doren et al. (2018) outline 19 factors, which should be considered – these factors have been amended with 7 additional factors, which emerged throughout the data analysis period. This is due to the structuring of the research design through an abductive approach. The principle data collection method was that of semi-structured key informant interviews, with a total of 17 having been conducted with the informants' perspectives representing different geographies as well as constituencies.

This article focuses primarily on practical considerations, which urban planners should consider when planning to apply the technology of VF to transitioning to sustainable urban food systems. The research is based on the data collected as part of an MSc thesis, forming a part of the Urban and Regional Planning MSc degree at the University of Amsterdam. The theoretical findings of the research are presented in a separate publication (Petrovics & Giezen, forthcoming), and for this reason this article should be utilized as a practical guide primarily.

In the following, the article discusses the theoretical framework in more detail, summarizes the methodological approach taken, outlines the practical considerations for planners in detail, and briefly concludes.

2. Theoretical Perspective

In an attempt to accelerate urban development trajectories towards low-carbon pathways, it is essential to understand what pioneers, innovators, and ultimately urban planners need to take into consideration whilst planning for socio-technical interventions. Van Doren et al. (2018) outline that such Low Carbon Urban Developments (LCUDs) are informed by scalable Low Carbon Urban Initiatives (LCUIs). As mentioned in the process of scaling these initiatives, two types of pathways exist: horizontal and vertical. Horizontal pathways entail the spatial reproduction of LCUIs (e.g. through introducing physically larger interventions, or through introducing a higher number of initiatives in a given city). Vertical pathways entail the institutional embedding of these initiatives (e.g. through transitioning the policy landscape, establishing favourable market conditions, or affecting the levels of awareness when it comes to a new innovation).

The linkage and relationship of vertical and horizontal pathways to up-scaling LCUIs does not follow in a linear relationship; rather the two pathways interact in a dialectic manner reinforcing each other in a virtuous cycle. This framework can also be linked to Geels' (2002, 2011) Multi-Level Perspective (MLP) on sociotechnical transitions, in that it describes the specific interactions between *niche* and *regime* level dynamics, and in particular helps one understand the process of scaling *niche* initiatives into a *regime*.

In order to analyse these potential pathways the up-scaling framework of van Doren et al. (2018) has been amended with a set of factors, which emerged throughout the data collection process – marked with an asterisk. In total 6 categories, exploring 26 factors allow for understanding how urban planners should assess LCUIs and in particular work with VF for the sake of sustainable urban food systems. The categories and factors are as follows:

Measures for LCUD

- Financial Advantage
- Reliability
- Low Complexity
- Integrative Functions*

Operational Arrangements

- Leadership
- Stakeholder Involvement
- Resource Mobilization
- Communication
- Logistics*

Policy Context

- Regulatory Policy Instruments
- Financial Policy Instruments
- Informative Policy Instruments
- Political Leadership

- Trust in the Policy Framework

Market Context

- Low Capital and Instalment Costs
- Expertise and Skills of Supply Actors
- Information Availability
- Access to Credit
- Energy Price
- Market Dynamics and Conditions of Peripheral Industries*
- Insurance*

Social-cultural context

- Environmental Awareness and Values
- Consumption Culture*
- Product Qualities*
- Social- and Power Relations*

Natural and Built Context

- Technical Compatibility

3. Methodology

As mentioned, the research is based on the data collected for the completion of the thesis as part of the MSc degree in Urban and Regional Planning, completed at the University of Amsterdam. The research design took an abductive approach, and by this not only produced findings related to VF but also amended the set of factors outlined above. The primary method for data collection was semi-structured key informant interviews. These interviews were conducted with 17 experts working with VF in different geographical regions and capacities. The perspectives of these accounts span academia, consultancy, municipal officers, entrepreneurs, and investors. The anonymized accounts of these interviewees are marked with 3-digit codes. The practical considerations outlined below build on their accounts in combination with the slim literature existing on the applicability of VF as an innovation.

4. Practical Considerations for Urban Planners

The following section outlines the findings based on the amended theoretical framework of van Doren et al. (2018). As mentioned, the findings are based on the 17 interviews conducted in the spring of 2018, which follow three-digit codes for reference. The section outlines, factors falling under measures for LCUD, operational arrangements, the policy context, the market context, the social-cultural context, and the natural and built context.

4.1.   Measures for LCUD

Financial Advantage. The financial advantage and profitability of vertical farms is generally dependent on external factors and the business model of the farm. The external factors can be categorized on the lines of real estate and land availability, economic conditions affecting this availability, food scarcity, and the scale at which the operation takes place. As is generally the case with Urban Agriculture (UA), VF is also directly dependent on land availability and is hence receptive in periods of economic downturns, as vacant buildings and lots are more available, and accessible at lower prices in these times (004). This directly affects the viability and profitability of VF as well, especially if the business models consider the availability of vacant space necessary (017). Flipping this logic on its head, economic peeks produce competition in the real estate sector, which makes land less available to UA and VF (e.g. Amsterdam in the recent years) (012, 017). Next to this the scale of the operation also counts, as small-scale installations are not likely to be profitable. This is a typical example of capital expenditure intense industries becoming profitable at scale (011).

The business model related factors can be categorized on the lines of pricing and the ability to charge a premium, the potential for integrating multiple sites within one business, and the potential for integrating functions. Food scarcity and the distance fresh produce has to travel directly impacts the profitability of VF, as this is where premiums can be charged for local and fresh produce (011). If a city is dependent on imports it is sensible to introduce VF and there is potential to charge premiums on the fresh produce. Moreover, dependent on the economic conditions (as is outlined above), business models, which integrate different types of land availability can produce a financial advantage. For example, combining a small-scale, downtown demonstration project, which showcases the technology and produce to consumers, with a large-scale peri-urban

production facility can off-set the incurred financial weight of high land prices in the centres of cities (013). A further type of integration, which can enhance the financial advantage of VF is to integrate functions by for example including some form of hospitality directly linked to the farm (017). This type of integration is explored in detail further below.

Reliability. In terms of horizontal pathways VF is reliable to a certain extent if the installations generally work in self-contained, replicable units or blocks, which allow for easy scalability. This is necessary, as VF is a form of CEA, as is discussed above, which requires tight control over all growth parameters. The production logic of CEA in terms of produce quality directly contributes to the reliability of VF, as the physical aspects of crops are fully controllable, meaning that the visual and aesthetic, the taste, the health and nutritional value, and the shelf life of produce can be directly controlled (010). Due to these factors, the logic of self-contained units has proved successful in the industry on various scales – e.g. InFarm introduced these types of units directly in super markets (InFarm, 2018), CoolFarm utilizes plug-and-play farms (CoolFarm, 2018), while Agrilution has created household level units the size of a small fridge (Agrilution, 2018) (008, 014, 016). The following account from an Innovation Manager from a large tech company working with VF components fittingly describes how this dynamic creates tensions, when one aspires to repurpose vacant space in cities:

> *"I love the whole idea that you take space and transform it into a vertical farm. I love it but I don't believe in it, because with that it's not scalable. I always think you can take an existing old warehouse and build into it another house for vertical farm. But to make it really scalable you need to have always the same set up. […] You need to standardize modules which you can put somewhere, but it always needs to be and in itself an existing ecosystem and not relying on the real infrastructure which the warehouse has given." (016)*

This means that the reuse of vacant spaces is only possible if a self-contained unit is built within the given structure. This way the installation can fulfill the requirements of CEA and can contribute directly to the scalability of the initiative. All these points are however dependent on the knowledge of optimal growth recipes (light, temperature, humidity, nutrition, etc.), which is not yet present in the industry (004). Once these recipes are developed to a sufficient extent, automation and robotization can also enhance the effectiveness of VF (004, 013).

In terms of vertical pathways, the availability of horticultural technolgy and knowledge (e.g. extensive multi-generational knowledge in the Netherlands) can serve as a catalyzer as VF follows many of its principles (008). This being said, a structural restraint persists in terms of staple foods:

crops, such as rice, potatoes, and corn are still difficult to grow in VF (008). Finally an urban planner responsible for green projects in Amsterdam suggested that viable, existing, and functioning examples make municipalities receptive to the technology, as this directly proves it's reliability in the eyes of public authorities. The mentioned example is GROWx in Amsterdam, and the way it is perceived by the municipality as a functioning farm (017).

Low Complexity. As mentioned before the availability of horticultural technology makes the technology utilized in VF available and reliable as well (009). This means that highly developed greenhouse and horticulture industries, such as the Dutch one, can catalyze technological developments as well and can play a great role in ensuring the reduced complexity of VF (015). Nevertheless a key caveat in the industry is that many startups and companies try to develop all of the technology themselves and by this try to reinvent the wheel, ultimately increasing complexity (013). This is unnecessary and risky, as it is better to focus on the core business model of a farm, instead of on developing every single component when such an industry is in the period of innovation (016).

In terms of horizontal up-scaling firstly inefficient practices are common, which reduce the effectiveness of individual plants (e.g. double scissor lifts moving up and down multiple times during harvest) (006), and secondly CEA makes it difficult to make use of vacant spaces due to hygiene considerations (bacteria and plant diseases), if not utilizing the above-outlined self-contained units or blocks (004, 016). Next to this, a further factor that contributes to excessive complexity is that due to the recency of VF, start-ups typically work in silos and wind up developing all the components, which also means that there is no standardization for these components in the industry (e.g. trays, lights, piping etc.) (009, 006, 015). Nevertheless, initiatives are under way to remedy this – the Association for Vertical Farming (AVF) is pushing for industry level standardization (e.g. in components, and dataformats for control systems) (015, 016).

Integrative Functions. This emergent factors is essential, as multiple interviewees outlined that the reliability, viability, and most importantly profitability of VF in this phase of innovation is dependent on integrating food production functions of a farm with other functions (003, 009, 002). These integrative solutions include firstly, functions for marketability (e.g. proximity of the produce and a story) (003), secondly, functions for environmental sustainability (ecosystem services, biodiversity, enclosing nutrient cycles, etc.) (003), thirdly, thermodynamic functions (e.g. cooling water to be used for district heating, or utilizing excess energy and heat from logistical hotspots,

server systems, or airports) (001, 003, 009), and finally, functions for educating the public (e.g. nursery visiting center, VF at public institutions [schools or hospitals] and public space) (010, 002, 007, 014). As a professor working with horticulture explained,

> *"there is an advantage when your are very nearby where the consumers are; I think you should also take the opportunity to make the connection with the citizens, so make some part of your firm or the nursery open for public or that you have sometimes that they can visit so that they can see it. This is because they can't consider it as a factory, and in particular if nobody is allowed to have a look inside how it looks, they might have all types of ideas which are not correct."* (010)

Finally, functions for citizen engagement and community meeting points can also be introduced, in order to re-establish the social aspect of food in cities (009, 010). Such places are considered substantial, as this is "where people meet, discuss about food – this is extremely important for the evolution of community" (009).

In terms of vertical up-scaling this function mixing takes a different dimension. As a respondent outlined, dependent on desired goals, municipalities should directly push for and require function mixing (003). This respondent went on to describe the benefits as

> *"all of a sudden your urban farming is a means to many different ends […] maybe you don't want to optimize for efficiency but for social impact."* (003)

4.2.   Operational Arrangements

Leadership. With regards to the role of leadership, the only opportunity outlined by interviewees was by a start-up working in Amsterdam, whose founder mentioned that next to their core three person team it is necessary to partner with visionary and powerful individuals who are vested in the project. He said this is absolutely necessary for the success of such an initiative (008). As he mentioned in explanation for why a tender for a farm was turned down,

> *"You need individuals that are both visionary and powerful. And we had powerful people in that process. I'm not sure if we had some visionary ambassador in that project."* (008)

This account highlights the necessity of fitting leadership qualities not only to the extent of power but also in envisioning what is required for the success of a VF initative. Nevertheless it becomes questionable where such individuals can be found, as an account from a member of the

Amsterdam Economic Board suggests, based on this logic cities would have to rely on "kind of superheroes, super engineers saving the planet" (001).

Stakeholder Involvement. Without conducting an extensive stakeholder mapping exercise, based on the accounts of the interviewees the following can be said. Generally the respondents indicated that the industry is disproportionately focused on engineering and technology, mostly dismissing social elements, which also results in a disproportionate focus on stakeholders in this realm (001). Nonetheless initatives exist, which can be understood as *niche* developments, such as OneFarm in Amsterdam, putting an inclusive approach as a centerpiece to its business model (008). Through engaging local community members in education activities and a volunteering program, they not only aim to open up the black box of the vertical farm to the public, but they also aim at utilizing locally available knowledge and social institutions (OneFarm, 2018). This logic was further extended to a systemic level by a member of the Amsterdam Economic Board. He suggested that outlining a vision for inclusive and participatory approaches to planning by involving all stakeholders from citizens through tech companies to farmers is the way to plan for the success of a food system (001).

In terms of engaging stakeholders necessary for conducting and maintaining operations to a sufficient and successful degree, it has been stated that due to the young nature of the industry, these necessary stakeholders (e.g. light engineers, data scientists, horticulture specialists, entrepreneurs) are not used to collaborating in this manner (015). Next to this there is no framework present yet for establishing this cooperation (015). This being said opportunities do lie in collaboration between *niche* experiments and *regime*-level actors, as was outlined by an Amsterdam based VF entrepreneur, who has set up a business relationship with one of the major lettuce producers in The Netherlands (009). In this sense it is not only resistance that originates from *regime*-level actors, but windows of opportunities also open for collaboration, which ultimately support the up-scaling of VF.

Resource Mobilization. VF carries an advantage in the sense that technical platforms (such as the control systems necessary for handling the production system) can be set up and run by relatively few people (008). This fact is furthered by the tendency of component prices to fall, enabling the per unit output of the VF industry to grow in financial terms. The recurring example for this dynamic is how the prices of LED lighting have decreased due to growing efficiency and broader availability (010, 011). Such developments can reinforce *niche* formation. Next to this due

to the small profit margin there is a general awareness in the industry of the necessity to utilize resources (human, electrical, and spatial) in the most effective and efficient manner (006). Nevertheless, as a sustainability consultant outlined, traditionally in the agricultural sector, there is a race to efficiency rather than quality. This means that there is a serious risk of recreating this dynamic in the VF industry, which could ultimately lead to a race to the bottom, hindering horizontal as well as vertical pathways to up-scaling (003).

Communication. The accounts regarding communication are not clearly categorizable as directly contributing to horizontal and vertical pathways, as they are applicable to individual plants as well as the resulting broader societal dynamics equally, if replicated sufficiently. In general, multiple interviewees suggested that there is a general lack of trust and fear towards new and innovative technologies from the public. The examples mentioned were primarily hydroponic growing systems and soiless cultivation methods (008, 014). Nevertheless with growing interest in local produce, great opportunities lie in communicating the proximity of VF produce (010).

Logistics. Once again, planning for interventions in the supply-side of food systems carries potential, if one thinks in systemic terms, which necessitates a focus on logistic systems as well (003, 006, 017). By looking towards integrated systemic solutions in terms of distribution logistics, and by creating an alternative scaled logistics system for distributing food in cities, the ultimate connection can be made between farmers and consumers. The principle *niche* experiment mentioned as an example for such a system is the FoodLogica experiment, which is a bike-based food delivery system aiming to "clean the last mile's of Amsterdam's local food system" (FoodLogica, 2018). If one aims at introducing VF from a sustainable urban food systems perspective, it is essential to conceive of this type of alternative logistic system. Next to this by connecting individual, local producers and end consumers, using such systems can result in "creating an economy of scale without actually needing to scale up yourself" (003). This is especially true as the larger a city, the larger the required logistics operation for scaling, and hence the more difficult it will be for individual plants to scale themselves (006). Next to this, as Steel (2008) outlines in detail, with the lengthy food supply-chains, countries such as the U.K. tend to create bottlenecks in the forms of food distribution centers. Hence, localizing food production and combining it with alternative logistic systems based on more decentralized solutions carries great potential in terms of establishing resilient urban and regional food systems as well.

4.3.   Policy Context

Regulatory Policy Instruments. In terms of VF this factor can be understood broadly as the role zoning regulation plays and the way municipal institutions interact with VF in terms of up-scaling. Zoning is generally perceived as a barrier, however progressive municipalities have found ways to accommodate existing zoning codes. Moreover, establishing municipal level authorities responsible for food planning has pushed for more innovative approaches to city-level food planning and has created the *milieu* necessary for up-scaling VF. Nevertheless institutional barriers on the *landscape* level also persist mostly on the lines of bureaucracy, exemplified by difficulties arising from administrative boundaries, stringent health and labor regulation, and lacking harmonization of agricultural regulation across countries. In the following these points are outlined in detail.

First of all, most interviewees regardless of constituency suggested that zoning codes generally do not recognize VF, and do not fit directly in any category. It is not clearly industry, nor food processing, nor agriculture (008, 009, 010, 006, 011, 017). Next to this if vacant space is available, the zoning categorization (e.g. for a space originally intended for commercial use) becomes problematic in a similar fashion (009). Furthermore, the integrated use of electricity and water is a red flag for code enforcement officials, as was suggested by a supplier of horticulture technology components:

> *"you watch the eyes of the officials when you say 'hey I want to run electricity-water-electricity-water'- that's what you're saying right? You want to put irrigation systems and electricity together in a sandwich style"* (006)

Seeing that regulations are not yet ready to accommodate the socio-technical reality of VF it is also essential to take a step back from focusing solely on the codes and regulations, and to look at those resposible for applying them in practice. This same supplier cited above, suggested that the problem is not only with ill-suited and outdated regulation, but with administrators' and clerks' lacking awareness of how to apply them in the context of VF (006).

Despite this, flexible regulators who decide on zoning permits also exist as was outlined by a VF entrepreneur in Amsterdam (008). By utilizing categories of exception, VF can find its space within predefined zoning codes. This claim is further supported by what a municipal officer outlined: certain zoning plans allow for making case-by-case exceptions, as was the case in Amsterdam with GROWx (017). The same officer went on to describe the tendency of UA to gain prominence in zoning plans (017). He furthermore suggested that VF does not directly produce noise or smells that could be problematic for neighbourhoods (017).

In terms of vertical pathways, it has been suggested that the establishment of municipal level food councils can serve as an enabler, as these authorities can create fitting food strategies, where VF can become a key element (002). The primary example for this type of *niche* development mentioned was that of Amsterdam, which established its own council in December 2017 (FoodCouncil MRA, 2018). Next to this municipal level policy initiatives can also catalyze the development of VF. Pushes for sustainability and green agendas, as in the case of Amsterdam (Municipality of Amsterdam, 2015) and Singapore (Building and Construction Authority, 2014) were mentioned (015, 017), alongside the establishment of public food strategies, such as the *Good Food Strategy* in Brussels (Brussels Environment, 2016), or the *Voedselvisie* in The Netherlands (Natuur & Milieu, 2017) (015, 017). However, the key takeaway here is that it is necessary to make urban and vertical farming an explicit goal within public and municipal policies and strategies in order to see a systemic transfer of land to VF, as was outlined by an urban planner working with the Municipality of Amsterdam (017). A key consultant working at building networks within the VF industry fittingly suggested that,

> *"It's not so much about just creating a vertical farm, it's really building a totally different environment with institutions, organizations. […] in the end I hope that you can say there is a better contribution to delivering fresh foods from highly productive, highly sustainable, and circular ways with a very low footprint." (004)*

This being said the reality of the regulatory landscape is one of extensive red tape, which slows and blocks innovation (002). This boils down to the following. Firstly, municipal and administrative boundaries do not always overlap with those necessitated by urban and regional food systems, which ultimately results in lacking communication, influence, and coordination (002). Secondly, stringent health (006) and labor safety (014) regulations also hinder the cause of VF in terms of vertical pathways, and finally, difficulties also arise from the heterogeneity of agriculture related legislation and categorization between different countries, ultimately hindering the up-scaling of an industry already riddled by an inadequate legislative environment (015).

Financial Policy Instruments. Multiple sources of public and private funding exist and are available to VF. This section assesses the public instruments primarily, as the private ones are described in detail further down. Among the public instruments are municipal level subsidies and loans directly targetting urban agriculture (and VF), alongside peripheral subsidies targetting CO_2 reduction, EU level funding through the *Horizon 2020* program, the *SME Funding Instrument*, and potentially the *Common Agriculture Policy* (CAP). Nevertheless the scope of these funds is relatively limited, and in general confusion persists on the accessibility of these instruments.

In terms of municipal finance, the case of Amsterdam is illustrative, as small start-up subsidies targetting urban agriculture purposes, as well as larger loans for green innovation purposes targetting entrepreneurs in this field exist simultaneously (017). On the EU level, the *Horizon 2020* program has been mentioned multiple times as an available instrument (014, 015). Nevertheless it has also been criticized for the slow and inefficient processes, which can generally set back innovation (016). A living example for the success of this funding scheme is InFarm, a Berlin based VF company, which raised €2 million through this program (European Commission, 2017a). Moreover, an interviewee working closely with agriculture policy at the EU level suggested that the CAP is turning towards urban instruments and innovation in the field of agriculture more and more (015). This is exemplified by a Communication Paper published by the European Commission, titled *The Future of Food and Farming*, which mentions VF – for the first time – as an industry with potential for urban applications (European Commission, 2017b). Finally it was also mentioned by an entrepreneur that peripheral subsidies (targetting CO_2 reduction for example) also carry potential for this field and are an active consideration in their business model (009). Nevertheless, most of these subsidies generally target needs-based industry actors – for example the staple crop agriculture sector in the U.S. (006), or the large-scale farmers in the EU through the CAP (015), which can be understood as *landscape* level pressures creating resistance for up-scaling. Finally, the general accessibility of these funding schemes was accounted for as problematic by the same EU agriculture policy specialist (015).

In terms of vertical pathways, general willingness for municipalities to establish green agendas (017), the creation of platforms for knowledge sharing (e.g. Amsterdam Economic Board or the AVF) (003), and simple changes in EU legislation describing minimum acreage for qualifying as a farmer (015) can be mentioned as creating supportive environments for the dissemination of financial instruments.

Informative Policy Instruments. Based on the accounts of the interviewees informative policy instruments are clearly lax in the VF industry. This can be exemplified by the perception that vertical farms are generally seen as black boxes (009), which not only hinders societal acceptance, but also reduces the access to information on how to set-up and operate such an installation successfully. Next to this, simple information on for example the CO_2 reduction capability of VF is also not yet available, as was mentioned by a municipal officer working with the City of Amsterdam as well as multiple entrepreneurs (017, 008, 009).

A further problem arises from the general categorization of produce. There is industry-level confusion on how to categorize the produce, as it does not clearly fall into the pre-established

categories of organic, non-organic, processed foods, and the like. (008). Besides, simple elements such as a label for VF are also not yet existent. As the head of a large tech company working with lighting solutions outlined,

> *"it might be worthwhile seeing if there is a label that could on the one hand side guarantee quality and basically standardize quality a little bit. And on the other side trigger a discussion and explain to the consumers what it is you're doing." (013)*

This lacking label hinders both consumer acceptance as well as the necessary discussions that can push for the development and adjustment of food safety categorization and regulation (013, 014).

Finally, for vertical up-scaling it is essential to have supporting frameworks for initiating business processes. In established industries this would mean that farmers can turn to the ministries responsible for agriculture, and SMEs can go to the business bureau. Yet still, as a policy specialist outlined, VF has no such public contact point, which can setback the initial phase of starting-up vertical farms (015). As the policy specialist outlined,

> *"One of the administrations should take this field and say, 'Okay, you are interested in vertical farming. You want to set up an activity, so come to us and we will advise you on the different stages you have to go through and the different partnerships you can enter into.'" (015)*

Political Leadership. Once again in terms of political leadership, progressive and forward looking municipal officers and institutions are of great importance. City Councils carry the opportunity to enhance VF (004), hence in an ideal scenario such authorities should also focus their work on UA and VF. This also means that food strategies should be outlined by understanding the food related practices of the consumer and citizen (001), as is also outlined by Cohen and Ilieva (2015). This being said it was also mentioned that Urban Agriculture is generally not on the agenda of politicians (003). Closely related, a significant problem of the AVF is that governmental authorities and public figures are not present to a sufficient degree in the industry association (011). Next to this, extensive involvement of public authorities can also hamper developments, as was outlined by an interviewee:

> *"the government tends to want to be involved too much, so it really sometimes also slows processes down because they are so active in promoting it and trying to subsidize it that everything needs to be reported and that you can hardly do any work because you're continuously playing tour guide for the government." (013)*

Hence, political leadership is a necessary and a generally missing element in the VF industry, nevertheless if present it should be conducive to the goal of the farms, and not to the agendas of politicians and public authorities. Finally, the shifting nature from country level food diplomacy to city level food diplomacy was also outlined as a supporting factor (004).

Trust in the Policy Framework. In general, trust in the functioning of existing regulatory instruments is regarded as lax, considering that a fitting policy framework specifically targeting VF does not exist, as was outlined above. This is primarily due to the regulatory barriers that persist, the general policy landscape, and the fact that institutions tend to follow academic and entrepreneurial endeavors with a lag (008, 004). As the Chief Innovation Officer of an Amsterdam based start-up accelerator also working with VF mentioned, "the policy space usually follows the experimental phase" (008). In more systemic terms, this also means that considerations for food security, food planning, and the concept of a food chain generally are not integrated into the political and administrative systems of countries as of yet (002). Nevertheless, exceptions for these dynamics do exist as was explained by a researcher from the University of Wageningen: "There has been the example in the Netherlands for even a ministry on food. You know, not on agriculture but on food" (002). Such an institutional switch may seem of small nature, nevertheless concentrating on food rather than solely agriculture suggests systemic shifts, which could also prove conducive to the cause of VF. Next to shifting institutions it was also discussed that on a case-to-case basis soft-power mechanisms can come in handy exemplified by knowing government officials (013).

4.4. Market Context

Low Capital and Instalment Costs. Virtually all interviewees agreed that VF as the most technology intense form of UA carries high up front costs (001, 005, 008, 010, 002, 016). Seeing that components such as LED lights, trays, pumps, and control systems, among others are essential, costs per m^2 can add up to €2,500 (009). This ties in with the reluctance of traditional lending institutions to support the up-start of VF projects, as well as the emergent Venture Capitalist (VC) funding schemes present on the North American context, as is outlined in more detail below.

Expertise and Skills of Supply Actors. With regards to expertise and the skills of supply actors, it can be said that the VF industry is in the beginning of the innovation cycle. This carries certain defining characteristics, which are also applicable to the field of VF; such as lacking industry-

level integrated and shared knowledge, the development of certain types of partnerships with research institutes, tension with *regime* level industries – especially the greenhouse horticulture industry, multiple individual failures, and the emergence of alternative business models, which challenge the incumbent *regime* from within. These are outlined here-on.

Firstly, multiple interviewees mentioned that there is lacking integrated knowledge, which would be essential to VF. As a Sustainability Consultant working with aquaponics systems outlined, "I'm basically looking for a plumber, farmer, chef" (003) or in other words "in terms of skill sets you need a slightly different set of yet unavailable skills. It needs a rare combination of plant scientist, farmer, data scientists, etc." (008). These accounts highlight two points. On the one hand, integrating this type of diverse knowledge within a multi-disciplinary team can be challenging due to the different backgrounds of the individuals, while on the other hand this set of knowledge is more available and affordable at scale (014, 003). This tension however is being slowly resolved seeing that more and more partnerships are established for knowledge generation at the *niche* level for example, by universities such as the HAS University of Applied Sciences collaborating with companies such as Philips through Public-Private Partnerships (PPPs) (010, 013, 016).

Secondly, it can be said that a great source of resistance comes from the traditional greenhouse and horticulture industries, which carry much of the necessary knowledge, as well as technological components required and suitable for VF (010). As is outlined below, this resistance can be understood as the *regime* maintaining its position, something that is particularly visible in the Netherlands. As a lighting specialist working with both industries outlined,

> *"greenhouse growers are sceptical of vertical farming and they fear that as a kind of destructive instrument. These interest groups are not geared toward helping vertical farming." (011)*

A potential way forward from this systemic resistance is through the creation of alternative business models, which are on the rise in the VF industry. These models are based on flat hierarchies (016) and partnerships (009), which essentially produce efficient, transparent and innovative workflows, as well as higher levels of aggregate knowledge, which can catalyze changes and progress in the field of VF.

Finally, the role of public authorities should also be outlined, considering conflicting accounts persist. On the one hand, the inherent inexperience of municipalities towards VF combined with an experimental and progressive setting can result in municipal officers being open to experimentation and innovation, and ultimately allowing for the licensing of innovative forms of UA (002). On the other hand, this total lack of public experience with the industry can create

tension seeing that municipalities generally struggle with various types of regulation, as evident from the afore-discussed issue on zoning. (002)

Information Availability. As previously mentioned, the principal problem with regards to information availability lies with the absence of knowledge sharing across the industry. This stems from 1.) entrepreneurs' lacking knowledge - closely linked to the required combination of specific but diverse types of knowledge, 2.) the structural conditions of the political economy, which push for working in silos, and 3.) the technological focus of the industry - rather than the required plant physiology focus. Nonetheless, certain pushes exist for uniting the necessary expertise and personnel, as well as to create a much-needed industry association. The first point – entrepreneurs lax knowledge – has been exhausted above; hence this section discusses the others.

With regards to the structural conditions of the political economy, it can be said that on the one hand, the trend towards neoliberalism has created a political economy geared towards competition, which inherently reduces opportunities for collaboration (001, 004). As a consultant working with business networks outlined, within this *landscape* pressure,

> *"Competition is a great good but if you do it in a collaborative way, you can learn from each other." (004)*

Hence, competitive elements are crucial in such an early stage of an industry; nevertheless certain forms of collaboration are necessary for optimal results. On the other hand, in certain contexts the VC mode of financing also creates silos for R&D on the *niche* level, seeing that this form of financing is geared towards producing and patenting intellectual property (006). As a supplier of horticulture technology described the North American context:

> *"In my experience 99 percent of the decisions made in the industry are about short term profit." (006)*

This account highlights that a pure profit-oriented focus is likely to produce an outcome of short-term returns, and not long-terms transitions, which could benefit the industry as a whole. Next to this, the AVF is still not perceived as a full-fledged functioning industry association, which would be crucial for overcoming these types of barriers for the advancement of the field (011).

Furthermore, the focus of the industry is disbalanced and too concentrated on technological solutions. More focus should be paid to plant physiology (006), as this should guide the development of growth systems and not *vice versa*. As the afore-mentioned supplier of components outlined, "the industry won't ever grow until we focus on the plants" (006). The head

of a lighting supplier company also outlined a misconception from the side of many entrepreneurs, namely that

> *"people think you can just put racks into a warehouse, start growing microgreens and you're in indoor vertical farming, and you're going to solve the world food hunger." (013)*

By failing to develop plant physiology centered knowledge and growth technology simultaneously (013), the process of businesses focusing on building farms solely has been exacerbated. The key point here is that without the fitting operational knowledge, no farm can function optimally and hence the transfer of this knowledge is also necessary (016). An example for how this knowledge transfer can function in a beneficial manner, is the business model adopted by Signify City Farming – Philips City Farming at the time of data collection – which focuses on lighting technology as their core business model, and offers knowledge services after setting up plants in order to maintain the functionality of their business partners' installations.

This being said, pushes for sharing knowledge and integrating and consolidating the necessary information are under way. On the one hand private companies have pushed for business ecosystem approaches to industry-level collaboration. For example, MeetingMoreMinds based in Amsterdam focuses on building business networks, and has initiated such a process in the VF industry as well. Next to this, companies directly working with VF components, as for example Osram, also put building a business network at the core of their business model (004, 015). On the other hand, as previously mentioned, the AVF is gaining more and more traction (009). Sharing knowledge, shaping policy and legislation, pushing for standardization, and providing networking opportunities all fall under their core activities (Association for Vertical Farming, 2018). Nevertheless, certain entrepreneurs are generally sceptical of the AVF due to its young nature and overlapping personnel with private VF initiatives (009, 011). Two explanations can be provided nonetheless. From a structuralist perspective, the inherent competition of industry actors embedded in the landscape of the neoliberal political economy creates a general perception of distrust, which can mean that such an initiative is treated with scepticism. From the perspective of the innovation cycle however, it can be argued that the critical mass of VF initiatives has not been reached yet, which in effect hinders pushes for standardization, knowledge-sharing, and the maturation of the AVF into a full-fledged industry association (006).

Access to Credit. With regards to access to credit and funding schemes external to the above outlined public financial instruments, it can generally be said that traditional lending institutions, such as banks are reluctant to invest in agriculture (006). This is especially true for

Europe, where banks will generally not fund VF due to the high sales price per product (013). In the U.S. the iconic exception to this dynamic is the $200 million investment by Softbank in Plenty, a *niche* VF initiative (Bloomberg, 2017). Despite the reluctance for traditional lending institutions to fund VF, other funding structures, which can be categorized as developments on the *regime* level also exist. Examples for this are large technology companies funding experiments, as is the case with BrightBox in Venlo supported by Philips (013), or start-ups receiving Foreign Direct Investment (FDI) as was the case of GrowX in Amsterdam (002). Next to this it was suggested that there is a growing trend for impact driven investment, which can qualify as a *niche* development (008). This being said in general it is still funding schemes originating in the public sphere that carry the potential to support the industry primarily, as is discussed above.

Energy Price. Energy is the most expensive factor when it comes to the operational costs of VF (009, 006, 002, 014). This means that any kind of dynamic present in the energy sector will affect the operations of a vertical farm to a great extent, and is worth exploring through the accounts of the interviewees. Without conducting an exhaustive review of energy sector market dynamics, those explicitly mentioned can be categorized in two clusters: price volatility and dependence on the energy price, and structural availability of (renewable) energy sources and their relation to the grid. In terms of price volatility, a general *landscape*-level trend of decreasing energy prices is perceived as conducive to the growth of the industry (008). Moreover, the high degree of dependence on local energy prices makes it questionable to what extent VF can be a solution deployable universally regardless of market conditions (010). This fact is further intensified by the conceived opportunity to make case-by-case energy deals in order to enhance the reliability of affordable energy access, however interviewees expressed that it is difficult to strike these case-by-case deals with energy companies (009).

This being said, the structural changes, which the energy sector is undergoing also have to be outlined as respondents highlighted tensions here as well. Firstly, decentralizing tendencies in the energy sector carry decentralizing tendencies for the supply-side of food systems as well (016). With growing availability of power in remote areas – where elements of food crises are also more present – the potential to set-up VF without dependence on centralized supplies of grid-connected power grows. Secondly, it was theoretically outlined that VF could balance energy peeks and dips in grids due to the flexibility of growth cycles by for example reversing the day-night rhythm in a farm to reduce the peek loads on the grid (016). However, this requires careful planning and understanding of the energy infrastructure, as well as the energy up-take requirements of farms, as VF can also put extreme pressure on the grid (002). Thirdly, with regards to renewable energy

sources, a number of entrepreneurs pointed out that in their experience it is not possible to cover energy demand by only renewable energy sources (009, 015). This is mostly due to the fact that most VF facilities are not yet at the scale where they can make use of on-site solar energy (006). Furthermore, utilizing on-site renewable energy sources increases the complexity of the farm, which seeing that the industry is still in the early phases of innovation increases the risk of failure (016).

Market Dynamics and Conditions of Peripheral Industries. This factor is essential to consider as seemingly peripheral industries carry great potential for developments in VF. Changes in other industries can affect the market for the produce and the prices or availability of growth components. The primarily example mentioned for this dynamic can be found in the North American context, where the legalization of cannabis is creating a new and controlled market for plant growers. As was outlined by a growth component supplier, the opening of a regulated market has attracted traditional horti- and floriculturists to grow cannabis, leaving their initial markets with an undersupply. The resulting changes in pricing have produced a market environment, which allows for new industry players to enter the market with more capital-intensive production methods, for example VF (006). This point highlights that seemingly external market dynamics can have a direct impact on one specific industry.

Insurance. The final point that did not fit the categorization of van Doren et al. (2018) is related to the role insurance companies and their requirements play in blocking VF. In general it was suggested that insurance companies set the requirements for extra technical additions from a health and safety perspective, by for example requiring sprinklers above the plants incase of fire, which directly effect profitability in terms of upfront costs (010, 013). Furthermore, the general perception is that insurance companies are sceptical of business models aimed at retrofitting old buildings by for example reducing the maximum floor load when installing piping (013). This factor can seriously hinder the potential for reusing vacant space.

4.5.   Social-cultural context

Environmental Awareness and Values. In terms of awareness and values two main clusters should be outlined: 1.) general consumer attitudes towards VF and the surrounding dynamics, and 2.) broader societal developments in terms of food related environmental attitudes.

Most interviewees agreed that there is general perception that that VF is not natural (009, 010, 014, 015, 016). In response to this, an Amsterdam based VF entrepreneur suggested that,

> *"for me it's completely not natural that we have cities with more than 10 million inhabitants. […] I would really like humanity to be established in a way that it is spread equally around the globe; we would be okay with growing everything through organic methods and permaculture. That would be perfect, but is it natural to have cities with more than 10 million people? No."*

In the eyes of those working in the VF industry, these perceptions also stem from opinions based on half-information stemming from the early phase in the innovation cycle (008), and generally lacking awareness of how food is produced (009, 010) and how food systems function (001). As a Dutch interviewee outlined, "we are not aware that food is anything else than a given" (008). In a similar conversation a Germany based VF project manager outlined that their company's existence is legitimized by placing VF at the crossroads of fresh food production and reducing environmental impact. She suggested that this is necessary as "we're all very demanding global citizens that want everything all at once" (014).

Nevertheless, there is a general growth in media attention (010) in the topic on the one hand, while on the other hand it was mentioned that VF specifically carries the same educative potential as traditional soil-based UA when it comes to citizen engagement on the local/neighbourhood level, as was explained by a municipal actor (017). It was also suggested that the general gap in the knowledge about food systems can be potentially addressed by appealing to the tech-savy generation(s) through engaging them with agricultural food production in this manner (015). Next to this, on a more *landscape* level, consumer level pushes to buy more local produce (006), the adjoining (global) sustainability agendas, such as the SDGs (004) or growing discourses on circularity, as for example in The Netherlands (006) carries the potential to support VF in terms of shaping mind-sets and behaviour.

This being said, it is essential to point out that efforts to raise awareness about food systems should also conceive of VF in this context. As the same Germany based project manager suggested,

> *"vertical farming particularly in urban city centres shouldn't be seen as a replacement for a local agriculture system that already exists. It's more about really re-shifting our focus onto regional produce and urban food systems [...] the cities themselves can become self-sufficient in their fruit and vegetable needs." (014)*

In this sense, VF is an element of a larger systemic solution targeting regional and urban food systems as is also outlined by Forster and Escudero (2014). Finally, a key point raised by an

entrepreneur is that the scepticism towards VF in terms of it being natural or not can be a catalyzer to open conversations about food systems at the consumer level (016). By being exposed to food production that is perceived as unnatural, the above-mentioned scepticism and general questions about the origin of food that winds up on the consumers plate can also be asked. Hence the science-fiction-like look of plants growing under purple lights carries the potential to open up larger discussions about factory farming, food-miles, and year-round availability of fresh produce.

Consumption Culture. When discussing any topic related to the supply of produce, the surrounding consumption culture should also be examined. Hence also in the case of food, it is necessary to also explore the dynamics throughout the consumption chain, which is why food culture is a key point. One respondent outlined that when one looks at any type of transformation within a food system, the focus should be on targeting the predominant food culture (001). He went on to describe the problematic nature of fast-food dominant food culture (001, 003). This aspect highlights the persistence of structural and systemic problems, seeing that the continuous presence of cheap and unhealthy foods make it questionable if green values and marketing or communication strategies on sustainable and organic produce are sufficient to change end consumer behaviour, and if at all the presupposed agency is present. In this sense VF in and of itself will not bring society-wide changes in the context of food consumption, as structural barriers persist, and thus should be targeted from a more systemic perspective.

Product Qualities. Seeing that VF is ultimately focused on produce, the qualities of these products should also be explored, as this is one of the competitive advantages arising from VF. Different qualities that carry competitive advantages outlined are as follows: high-end produce, for example edible flowers, herbs, and micro greens can be produced through VF (003, 007, 012), non-edible produce, for example for cosmetics, pharmaceuticals, and pet foods (014) can be produced in these plants, and finally produce that is difficult to ship long distances also carries a competitive advantage (003).

Nevertheless, demand for food is more varied than VF can currently meet (005), which is a major barrier. As two interviewees outlined, "we cannot feed the future cities in this way at least not with the current technology" (006), which means that "vertical farming will definitely not feed the world" (016).

Social- and Power Relations. A key factor, which was preconceived of as missing from the theoretical framework is that of social- and power relations. For this reason, explicit attention was paid to assessing this element of VF as well. This is the key factor when considering the politicizing focus of the critiques of transition theories (Wachsmuth, 2012), and the metabolic conception of cities (Swyngedouw, 2016). In terms of societal problems, the following can be said. Firstly, socio-cultural divides between different groups within a city are apparent in food cultures as well (003). This means that health problems related to food are often grounded in economic standing (003). Secondly, food policy is often too focused on middle-class consumption patterns (004). For VF to be successful these points need to be actively considered by those working in the field, be those entrepreneurs, public officials, or the AVF, as societal acceptance of this type of innovation depends on its accessibility by the wider public.

In terms of problems explicitly mentioned in relation to VF the following can be said. Firstly, the industry has an extractive tendency. A respondent mentioned that certain companies even utilize the up-coming food crisis to market their products with only profit in mind (009). Secondly, VF does not directly and inherently carry an inclusive social dimension, which is common in soil based Urban Agriculture (004). Finally, closely linked to the societal points above, VF produces high-value products that tend to serve the wealthiest strata of society – the top 5% of the consuming public (006). These points are essential to consider when planning for the up-scaling of such a technology, as wide applicability and acceptance depend on considerations for wider societal needs.

4.6. Natural and Built Context

Technical Compatibility. The final point within the predefined theoretical framework developed by van Doren et al. (2018) is that of technical compatibility. The most general result under this factor is that VF solutions always have to take the specific urban context into consideration (003). This means that plug-and-play solutions are theoretically viable, and in terms of yield quantity and quality even more reliable; however, it does not directly guarantee market competitiveness or acceptance in societal terms directly. In this sense, contextual factors to consider are 1.) levels of development, 2.) sunlight hours and growing seasons, 3.) density and fresh produce availability from local/regional sources, 4.) the tension between universal applications and adaptability to already existing built environments, and 5.) the logic demanded by different urban settings when it comes to food systems. These points are discussed hereon.

Firstly, from a technical perspective, due to the unitary logic of CEA, VF is possible anywhere in the world (010). However technical compatibility and advancement is always dependent on the levels

of development where VF is to take place. This means that possibilities to automate for example are dependent on the relationship between capital and labor costs (009). Next to this, compatibility with locally available parts produced by local manufacturers should also be considered from a sustainability perspective, as was outlined by an Amsterdam based VF entrepreneur (009). Nevertheless, viability of a farm is also dependent on natural conditions, namely the general growing seasons and sunlight hours. Environments with ample sunlight do not directly necessitate VF as in these areas greenhouses can suffice (006). It is environments with low sunlight hours and short growing seasons, for example in Scandinavia, which necessitate VF (006, 014). Besides general soil quality should be considered (015), which is an essential point in the context of the global imbalance in the nitrogen and phosphorus cycles (Rockström et al. 2009).

Furthermore, factors specific to the given urban environment, which were mentioned and should be considered, are density (014), the extent to which mega-cities are dependent on long supply-chains, extensive food miles, and imports of fresh food (009, 014), and the land price in city centres (010, 015). This being said there is no perfect recipe for choosing fitting cities. These factors illustrate that multiple points need to be considered when choosing the viable sights for VF, and highlight that the theoretical universal applicability of the technology does not compare to universal viability. A LED lighting provider based in Finland illustrated this, who suggested that,

> *"you have different logic in different cities depending on the geography, the political system, and development." (011)*

He went on to categorize cities on the basis of the different kinds of enabling logics that allow for VF. Firstly, he mentioned Hong Kong and Singapore as cities with limited land availability. Secondly, he suggested that mega-cities such as the urban areas around Shanghai and Beijing have concerns for food safety, which can support VF. Finally, he mentioned North American cities, such as New York and Chicago as having a growing environmentally conscious consumer base, which can similarly be conducive to VF, but from a completely different perspective (011). This theoretical exercise once again highlights that different contextual factors can be conducive to up-scaling from different perspectives, and therefore prove the point that there is not a perfect recipe for the best-case urban environment, when it comes to VF.

5. Conclusion

What emerges from the above accounts is a reaffirmation that there is a need to transition urban food systems to a more sustainable state, and that VF under certain conditions can be an active component of such a transition. Nevertheless, understanding what practical steps need to be taken is a crucial first step in this process, and for this reason the accounts of the 17 interviewees scope 26 factors, which should be considered in this process. The case of VF illustrates that even technologically, and in terms of resource use potentially intense interventions also carry opportunities to transition cities on to more sustainable and green pathways. However, it is essential to reconsider these interventions from a more holistic perspective, which allows for assessing environmental impacts from multiple perspectives, and also allows for understanding the socio-economic structures underlying these interventions, and what this means for planning with this type of transition.

As can be seen from the emerging tensions from the above accounts, one-dimensional promises for any type of sustainability intervention should be treated with a grain of salt. This is due to the fact that without appropriate reflection, and the resulting multi-factor mapping of what has to be considered, introducing complex elements into already complex systems – such as VF into urban food systems - can accelerate the given systems level of complexity to unimaginable and unmanageable levels. Ultimately such interventions can result in unwanted side-affects, such as even higher GHG emissions per kilo of produce, hence, a careful assessment of multiple factors should be the bare minimum when conducting planning exercises. As can be seen, the amended framework of van Doren et al. (2018) can suffice in catering to these needs through the 26 factors outlined above, when considering LCUD in cities. As can be seen from the emergent factors, a predominant focus has been put on social and political factors, and their implications for assessing socio-technical interventions. The reason for this is that the initial framework did not sufficiently cater to these elements, and the accounts of the interviewees highlighted the necessity to amend the initial framework.

All-in-all, having applied an urban food systems lens to a potentially scalable socio-technical intervention – Vertical Farming – has proven that multiple and integrated perspectives need to be considered when assessing the true climate mitigation as well as up-scaling potential of such experiments. Next to this conducting such an exercise, encompassing the amended framework of van Doren et al. (2018), has proven that a handful of factors, previously not considered can also emerge in the process, adding analytical depth to the analysis.

6. Bibliography

Agrilution, (2018) "Smart Gardening," accessed from: https://agrilution.com/.

Al-Kodmany, K. (2018), "The Vertical Farm: A Review of Developments and Implications for the Vertical City," *Buildings*, (8.24).

Association for Vertical Farming, (2018), "Why Join," accessed from: https://vertical-farming.net/why-join/.

Bloomberg, (2017), "SoftBank Vision Fund Leads $200 Million Bet on Indoor Farms," accessed from: https://www.bloomberg.com/news/articles/2017-07-19/softbank-s-vision-fund-leads-200-million-bet-on-indoor-farming.

Brussels Environment, (2016), "Good Food Strategy," accessed from: http://document.environnement.brussels/opac_css/elecfile/BRO_GoodFood_Strategy_ENGL.pdf.

Cohen, N. and R. Ilieva. (2015), "Transitioning the food system: A strategic practice management approach for cities," *Environmental Innovation and Societal Transitions*, (17): 199-217.

CoolFarm, (2018), "About," accessed from: https://cool-farm.com/.

Despommier, D., (2011), *The vertical farm: Feeding the World in the 21st Century*. Picador.

European Commission, (2017a), "Infarm: The Vertical Farming Revolution, Urban Farming as a Service," accessed from: https://cordis.europa.eu/project/rcn/206087_en.html.

European Commission, (2017b), "Future of Food and Farming: Communication," accessed from: https://ec.europa.eu/agriculture/sites/agriculture/files/future-of-cap/future_of_food_and_farming_communication_en.pdf.

FoodCouncil MRA, (2018), "About," accessed from: http://www.foodcouncilmra.nl/.

FoodLogica, (2018), "About," accesed from: http://foodlogica.com/.

Forster, T. and G. Escudero, A. (2014), *City Regions as Landscapes for People, Food and Nature*. Landscape for People, Food, and Nature.

van Doren, D., et al. (2018). "Scaling-up low-carbon urban initiatives: Towards a better understanding," *Urban Studies*, (55.1): 175-194.

Geels, F. W., (2002), "Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study," *Research Policy* (31): 1257-1274.

Geels, F. W., (2011), "The multi-level perspective on sustainability transitions: Responses to seven criticisms," *Environmental Innovation and Societal Transitions* (1): 24– 40.

Ilieva, R. T., (2016), *Urban Food Planning: Seeds of Transition in the Global North,* New York: Routledge.

InFarm, (2018), "About," accessed from: https://infarm.de/.

Municipality of Amsterdam, (2015), "Agenda Duurzaamheid," accessed from: https://www.amsterdam.nl/wonen-leefomgeving/duurzaam-amsterdam/publicaties-duurzaam/agenda-duurzaamheid/.

Natuur & Milieu, (2017), "Voedselvisie 2030," accessed from: https://www.natuurenmilieu.nl/wp-content/uploads/2017/09/NM-Voedselvisie-2030-rapport-v3-ia.pdf.

Steel, C., (2008), *Hungry City: How Food Shapes our Lives*. New York: Vintage Books.

Swyngedouw, E., (2016), "Circulations and Metabolisms: (Hybrid) Natures and (Cyborg) Cities," *Science as Culture*, (15.2): 105-121.

Petrovics & Giezen, (forthcoming), "Planning for Sustainable Urban Food Systems – An Analysis of the Up-scaling Potential of Vertical Farming," Manuscript Submitted for Publication.

Rockström, J., et al., (2009), "A safe operating space for humanity", *Nature*, (461): 472- 475.

Wachsmuth, D. (2012), "Three Ecologies: Urban Metabolism and the Society–Nature Opposition." *The Sociological Quarterly*. (53.4): 506-523.

Case Study Paper

The Spatial Strategies of Knowledge Corridors in Megacity Development:

Case Study of the Optical Valley Knowledge Corridor, China

Wenjing LUO, Wuhan Planning & Design Institute; China

Zhongying SONG, Wuhan Planning & Design Institute; China

LI XU, Wuhan Planning & Design Institute; China

Abstract

As a comprehensive spatial concept, corridors especially mega-corridors and knowledge corridors have played irreplaceable roles in developing megacities. This paper uses the case of the Optical Valley Knowledge Corridor in China as an example to illustrate how to make spatial strategies of knowledge corridors in the dimensions of innovation networks, knowledge economies, environments and urban amenities, transportation systems and urban governance towards making a liveable, sustainable and efficient megacity in the backgrounds of knowledge-based urban development.

Keywords

Corridors, Knowledge-based urban development, Knowledge economies, Megacities

1. Introduction

Originated from the linear city model more than a century ago, the term "corridor" is not only an urban model fully tailored to the transport technology but also a comprehensive spatial concept in dimensions of infrastructures, economics, urbanizations and ecology. It is in the 1990s that the modern version of the corridor concept namely mega-corridor has been brought up in the Europe 1992 project, which aimed at the physical integration of European Territory. Especially with the addition of a prefix "mega", mega-corridors have been assumed to play key roles not only in physical but economic integrations together with the cross-border and transnational infrastructures. In a similar way, cities especially megacities are also growing out of their borders towards regional collaboration, which has given a new role for corridors in the aspects of achieving spatial, economic and social integrations to enhance regional competitiveness.

Especially in the times of global knowledge economies, there has been a prevalence of knowledge corridors considering their great contributions to knowledge-based developments for megacities. With the rise of innovation districts, science and technology clusters have been formed in the forms of corridors in the backgrounds of knowledge economies, which can be exemplified by Silicon Valley, Route 128, London M4 Corridor and

etc. With the announcement of *National Innovation-driven Development Strategy Outlines* in China(State Council of China,2016), great efforts especially in Chinese megacities have been dedicated to developing knowledge corridors aimed at enhancing regional competitiveness through linking themselves with their surrounding cities and towns by a bundle of infrastructures and mainly developing technology-led industries, like Shanghai G60 Corridor, Guangzhou-Shenzhen-Hong Kong-Macau Corridor, Hangzhou West Knowledge Corridor, Hefei Knowledge Corridor and etc.

To achieve regional competitiveness by knowledge-based development, the government of Hubei Province, as one of the major provinces locating in Central China near Yangtze River, has announced at the end of 2018 to develop a knowledge corridor based on one of the largest agglomerations of high technology, primary electronic companies in its territory, known as the Optical Valley which has aimed to be the Chinese version of Silicon Valley. As a provincial development strategy, the Optical Valley Knowledge Corridor (OVKC) is not only supposed to implement the Chinese innovation-driven development strategy, but also to develop a more liveable, sustainable and efficient megacity, which is Wuhan as the capital of Hubei Province, by enhancing the spatial, economic and social integration with its neighbouring cities. Greatly inspired by Silicon Valley, Route 128 and other corridors, the Optical Valley Knowledge Corridor is also an answer to the cluster phenomenon in innovation geography to develop a more competitive innovation economy through technology leapfrogging (Cornell University, INSEAD, WIPO, 2018).

However, despite the general claims of the importance of knowledge corridors, we still know very little about strategic goal-setting in this area. Although there have been a large number of practices concerning corridor development cross administrative borders, studies focused on planning practices of using corridor strategies at an urban scale can be considered relatively scarce. Thus, the aim of this paper is to investigate how to use corridor strategies towards more liveable, sustainable and efficient megacity in the context of China. The Chinese planning system can represent the characters of many top-down counterparts in most developing countries and some developed countries. With the goal to achieve spatial, economic and social integration, the spatial strategies of corridors concern a complex set of economic, social and even political factors, which may be not all applicable to different institutional systems but can be transferrable to other cities which intend to use spatial strategies of knowledge corridors.

The methodological approaches here do not only include the case study investigation of the OVKC as well as science and technology clusters, but also the literature review on corridors. In addition, a set of semi-structural interviews with local governments, representatives from 4 local universities and 17 local enterprises and an online survey concerning the needs of knowledge workers have been conducted. Starting with the literature review on the concept of corridors, the paper will attempt to provide an understanding of the knowledge corridor concept by an investigation of the innovation clusters especially a discussion of the Silicon Valley. Following the interpretations of knowledge corridors in five dimensions, the fourth section will attempt to establish the framework of making spatial strategies of knowledge

corridors. Using the OVKC as an example, strategies have been proposed in correspondence to the interpretations by making it as a loop for innovation systems, a boom for knowledge economies, an attraction for knowledge workers, a highway for innovation flows and a mutual-force for urban governance. Last but not least, the concluding part will discuss the challenge of implementation in policymaking, followed-up work to do and its implications for other cities.

2. Literature Review

Not as a new and univocal one, the corridor concept can be traced back to the linear city models brought up by the Spanish urbanist Soria y Mata(1844-1920) as early as 1882, which has been called the first model fully tailed to the development of transport technology (H Priemus & Zonneveld, 2003). On this basis, the Ciudad Lineal model has been developed and exerted influences on the pattern of urban expansions along with infrastructures especially in regional plans, which was not in the form of unbroken lines but more likely "beads on a string". Although opposed by many urbanists due to the destruction of ecological environments, the linear or belt developments have taken place on a large scale with the technological progress of transportations. Especially in the 19th century, urban decentralization has been enabled by the widespread use of private cars, which can be exemplified by the Silicon Valley in California, Route 128 near Boston, the Silicon Glen in Scotland and the M4 Corridor in Britain. The Silicon Valley, originated from the Stanford Industrial Park, has undergone the expansion along the Route 101 and Route 280 towards San Francisco and Santa Carla. Meanwhile, Route 128, also benefited from the knowledge spillovers of MIT, has been known as the technology corridor due to the agglomeration of high technology firms. As the United Kingdom's equivalents to Silicon Valley and Route 128, Silicon Glen running through Edinburgh and Glasgow has been known as the "industrial belt" of Scotland, and the M4 Corridor has also witnessed the high technology growth along the M4 highway. The common features of all the cases mentioned before are not only that they are all originated from the spillover effects of universities but also famous for the agglomerations of technology enterprises along the main roads.

With the constructions of cross-border especially transnational infrastructures and the awareness of economic integration, corridors are leading urban expansion more at regional and interregional scales than at sub-regional and urban scales. As a modern version, the concept of mega corridors has been brought up in the "Project" Europe 1992, which aimed to promote the economic, social and physical integration by enhancing the level of connectives (Priemus & Zonneveld, 2003). Evolving as a multi-faceted concept, the mega corridor has been not only defined as a bundle of infrastructures with heavy flows of traffic linking transnational urban agglomerations, but also an attempt to reconcile regional economic growths and sustainable developments. Thus, the meaning of corridors has been extended to the dimensions of infrastructures, regional economy, urban development and governance(Zonneveld & Trip, 2003).On this basis, the spatial developments of corridors have been focused on establishing the connections between the transportation, economic development, environment and urbanization with the premises that which areas should be designated as corridors and which parts should be defined as development zones and open

spaces (Priemus & Zonneveld, 2003). As an instrument to achieve economic, social and urban integration, the corridor strategies imply overcoming not only physical borders but also social, cultural and institutional barriers which call for co-governance. Thus, strategic spatial planning, which is directed more towards integrated courses beyond traditional planning, concerns that the corridor concept has been elaborated as a physical and network of international infrastructure, and especially the nodal points of corridors have been balancing between the space of flows and the space of places (Albrechts & Coppens, 2003).

Although the concept of corridors has evolved from linear or belts forms to networks, one thing for sure is that the essential characteristic of corridors is the connectivity which enables the free and easy flow of people, goods and information (Chapman, Pratt, Larkham & Ian,2003). Especially in the backgrounds of knowledge economies which calls for efficient flows of financial and intellectual capitals, corridor developments have been considered as important instruments for megacities to achieve economic competitiveness by spreading economic activities from nodal points to the surrounding areas. Greatly inspired by the success of corridor developments especially the Silicon Valley, Route 128, the Silicon Fen and the M40 Corridor, developing countries in Asia Pacific Region have taken on initiatives of knowledge-based urban development especially science and technology clusters in the form of corridors. Amongst the most notable in the past few years are Tokyo-Yokohama-Tsukuba Corridor, Malaysian Multimedia Super Corridor, Shanghai G60 Knowledge Corridors, Guangzhou-Shenzhen-Hong Kong-Macau Corridors in China and etc. Although the concept of knowledge corridors has not been officially defined, the key elements of corridor projects in the backgrounds of knowledge-based urban development focuses on the assembly of knowledge infrastructure(e.g. universities, research and development institutes and etc), technological infrastructure(e.g. ICTs) ,connections to the global economy (e.g. international companies and finance institutions)and concentrations of well-educated and creative people(e.g. knowledge workers) (Winden & Berg, 2004; Carrillo, 2006; Corey & Wilson, 2006, Sarimin & Yigitcanlar,2011). The strategic developments of knowledge corridors in the economic, socio-cultural, enviro-urban and institutional dimensions have been exemplified by the case study of Malaysian Multimedia Super Corridor to be able to achieve economic prosperity, environmental sustainability, socio – spatial order and local institutional competence (Sarimin & Yigitcanlar,2011).

Although there have been examples of corridors towards knowledge-based urban development, the concept of knowledge corridors hasn't been officially proposed yet based on the literature reviews. Thus, before discussing the spatial strategies of knowledge corridors, there are two key questions to be resolved. Firstly, how to understand the concept of knowledge corridors in the new economies driven by science and technological clusters, which do not rely on traditional factors like before. Secondly, how to make spatial strategies of knowledge corridors towards a more liveable, sustainable and efficient megacity based on the local conditions? The next sections will attempt to answer the questions.

3. The Understanding of Knowledge Corridors

On the one hand, what knowledge corridors are different from other corridors is that the former one has an agglomeration of knowledge infrastructures especially and the ability to attract knowledge flow especially intellectual and capital resources constantly. On the other

hand, what corridors can contribute to the knowledge-based developments is that they can use the strength of connectivity to draw more flows into the nodal points and spread them into the surrounding areas so as to increase the regional competence at a larger scale, which will affect the space of places in return. This section will attempt to elaborate on the interpretations of knowledge corridors.

As a complex process, innovation often requires knowledge flow between different kinds of knowledge organizations which establish contact networks and alliance networks by frequent and repeated interactions (Huggins &Thompson, 2015). During the process, local innovation network could be established, which initially catalyzes the intellectual change and knowledge transfer across administrative borders, namely the regional innovation networks which will improve the efficiency and influences of local networks in return. (Pyka & Scharnhorst, 2009). This could be exemplified by the new-emerging trend of science and technology clusters since 2017, which grow beyond urban or regional borders by major transportation systems to achieve collaborations (Cornell University, INSEAD & WIPO, 2018). In the top-ranking list of the science and technology clusters, knowledge corridors have proved to improve their competitiveness of local and regional innovation networks by achieving efficient connections at different scales. Thus, knowledge corridors can be interpreted as a new form of urban and regional spatial structure, which could establish free flows of innovation resources by a bundle of infrastructures linking urban agglomerations, so as to develop local and regional innovation networks. The following five aspects are the major features of knowledge corridors that could be exemplified by case studies.

First of all, there should be a high concentration of different kinds of innovation resources related to the whole process of knowledge production, diffusion and transfer, which act as the foundation of producing innovation flows. In particular, knowledge production sectors include universities as well as their affiliated labs, knowledge transfer sectors like research institutions and related servicing facilities including investment captures and incubators should be all included as the three basic kinds of innovation resources, which keep interacting with each other to form innovation networks of knowledge corridors. Taking the Silicon Valley as an example, Stanford University, Stanford Research Park and Institutional Venture Partner can represent the three typical kinds of innovation resources, which have been interacted with each other frequently and repeatedly and formed the foundations of innovation networks. What's worthy to mention is that key technological infrastructures like national labs, as essential parts of the innovation resources, are playing crucial roles in forming regional innovation networks.

Secondly, the commercial spin-off effects of knowledge production sectors are the roots of innovation networks as well as their dynamics, considering their roles of enhancing expected economic returns of knowledge. For instance, the success of the Silicon Valley does not only repy on the spillover of Stanford University, which has given birth to local leading enterprises but has also benefited from firm neighbourhoods, where leading enterprises play the role of dandelion so as to nurture new start-ups. As essential parts of local innovation networks, firm neighbourhoods and their structures can be depicted as matrix machines, which indicates that distances matters a lot to the way leading enterprises interacting with new start-ups (Pyka & Scharnhorst,2009). This can be exemplified by the case of Hangzhou West Knowledge Corridor, which has witnessed the assembling lots of new start-ups within a 5 kilometre-radius circle centred at the local leading enterprise namely Alibaba.

Thirdly, keeping an attraction for knowledge workers can be considered as catalysts to boom innovation networks, as human capitals have proved to be key flows to improve regional competence. The various demands of knowledge workers should be satisfied by providing not only pleasant environments but also well-established urban amenities. Taking the Silicon Valley again as an example again, its pleasant climate, seashore and mountain landscapes have been known as one of the key factors to keep withdrawing human flows from other places of the world. Besides, there are not only basic urban amenities like schools, gyms, cultural centres and hospitals, but also a high density of the third places besides home and work like coffee shops for knowledge workers to interact with each other face to face, which has also proved to be essential urban amenities especially to creative industries. Thus, it has been proposed in the plan of the Hangzhou West Knowledge Corridor that the density of coffee shops should be improved to 2 per kilometres square, according to the counterparts of the Silicon Valley.

Fourthly, infrastructures which are the backbones of knowledge corridors should be well-equipped, so as to improve the efficiency of innovation flows. On the one hand, transportation hubs like airports, train stations and harbours as nodal points should be well-connected to the regional transit systems, which can not only facilitate the absorption of intellectual and capital flows but also help developing regional innovation networks based on the local networks. On the other hand, the inner transit system including highways, subways as well as bike lanes should be well established to improve the efficiency of inner flows between nodal points. This can also be exemplified by the Silicon Valley which has not only benefited from the Route 101 and 280, but also from the San Francisco International Airport and San Jose International Airport. Thus, it has been proposed in the plan of Shanghai G60 Knowledge Corridor that the network density of highways should be improved 15 percent based on the existing transit system.

Last but not least, smart urban governance to keep urban planning, development and management flexible and adapt to the uncertainty of innovation is the key to keep constant flows in the places of space. The case of the Silicon Valley has not only exemplified the success of market-driven forces but also the smartness of urban governance. Not only the top-bottom approach by governments to regulate the spaces which play necessary roles in the process of innovation but are less-favoured by market, but also the bottom-top approach to improving the initiatives of markets should both be used in the governance of knowledge corridors. Besides, as the boundary of knowledge corridors usually crosses the borders of cities, provinces or even nations, the governing process usually requires the collaborations of vertical governments as well as the participation of universities, enterprises, citizens and etc. As a dynamic participatory process, the co-governance of knowledge corridors will not only need a long-term vision and short-term actions, but also require continuous evaluation and revision according to their own developmental stages and also adapting to new requirements (Sarimin & Yigitcanlar ,2015)

Based on the interpretations of knowledge corridors in five dimensions, the next session will attempt to discuss corridor strategies especially for megacities by the case studies of the OVKC in China, so as to shed some lights on other cities

4. The Knowledge Corridor Spatial Strategies in Megacity Developments: Case of the Optical Valley Knowledge Corridor in China

As the largest knowledge-based urban development initiative in Hubei Province, China, the OVKC covers an area of 1515 kilometres square in Wuhan as well as its neighbouring city namely Ezhou. By benchmarking the progress amongst the prosperous knowledge corridors, it is intended that the OVKC function as a high-tech catalyst to help Wuhan and Ezhou to attract knowledge workers and techno-enterprises and become global international centres, so as to help with the transformation of urban development. The completion of the OVKC is estimated at an approximate 30-year timeframe and the development staged into three phases to allocate the initiatives. The first phase of the OVKC aims at creating a regional innovation hub in the Yangtze River Economic Belt in three years. The main goal of the second phase would be making the OVKC as an essential part of the Chinese innovation communities until 2035. Last but not least, the final goal would be aiming at a world-class innovation cluster, so as to help transform China into a "knowledge nation" till 2050. Towards the goals, adapting to the prevailing social-economic, technological and environmental circumstances in Wuhan, with the principles of producing diversity, prosperity, equity, efficiency and sustainability, a framework of spatial strategies of knowledge corridors based on the five dimensions of interpretations have been established in the aspects of making the OVKC a loop of innovation networks, a boom for knowledge economics, an attraction for knowledge workers, a freeway for innovation flows and a mutual-force for urban governance.

4.1. Making knowledge Corridors a Loop of Innovation Networks

As a type of linear form, knowledge corridors are actually science and technology clusters with a variety of knowledge sectors interacting with each other. The major differences between knowledge corridors and other types of science and technology clusters lie that the former ones with the character of connectivity are easier to develop a loop of innovation networks both locally and globally. Cases like the Silicon Valley show that the development of innovation networks usually go through stages from the agglomeration of knowledge sectors, the formation of local networks, the development of local networks and establishment of regional networks. Although the OVKC has abundant innovation resources including 60 universities, 19 national labs, 121 research institutes and etc, there are still missing ingredients including inter alia, key technology infrastructures, new types of research institutions, venture capitalists to fund the start-ups compared to other knowledge corridors home and aboard. Due to the lack of certain types of innovation resources, the local innovation networks has not been well-established only with local universities, research institutes interacting frequently with enterprises in Wuhan and out of Hubei Province. Let alone the regional innovation network, which has been dominated by three technology clusters centred around megacities like Beijing, Shanghai and Shenzhen. Therefore, the OVKC is at the stage between the formation of local networks and the development of local networks.

Based on the current stage of the OVKC, strategies towards making a loop of innovation networks have been made including bringing more varieties to the types of innovation resources, developing both local and regional innovation networks, so as to improve the

regional roles in the national and international innovation geographies. Firstly, various knowledge sectors have been proposed to be introduced including new types of research institutions and all related servicing sectors like venture capitals and incubators specifically. What's more important is that key technological infrastructures should be encouraged to locate within the OVKC, which would prefer scenery sites. Secondly, networking development is required not only between local universities and industries within Wuhan, but also between all kinds of knowledge sectors in and out of Wuhan as well as Ezhou. Knowledge neighbourhoods have been proposed to be established centring at local universities and research institutes surrounded by venture captures, incubators and new start-ups within 5 kilometres, so as to enhance the transfer of knowledge (Figure 1). On this basis, local innovation networks can be built with four distinctive functional zone designated as key areas to produce, transfer and commercialize knowledge specifically and multiple knowledge neighbourhoods as nodal points to improve the capacity of local networks. Thirdly, the regional networks can be developed with the two airports acting as the innovation hubs to input and output knowledge talents and products. Based on its own strengths, the OVKC will be able to form a regional innovation community with Shanghai and its surrounding cities along the Yangtze River.
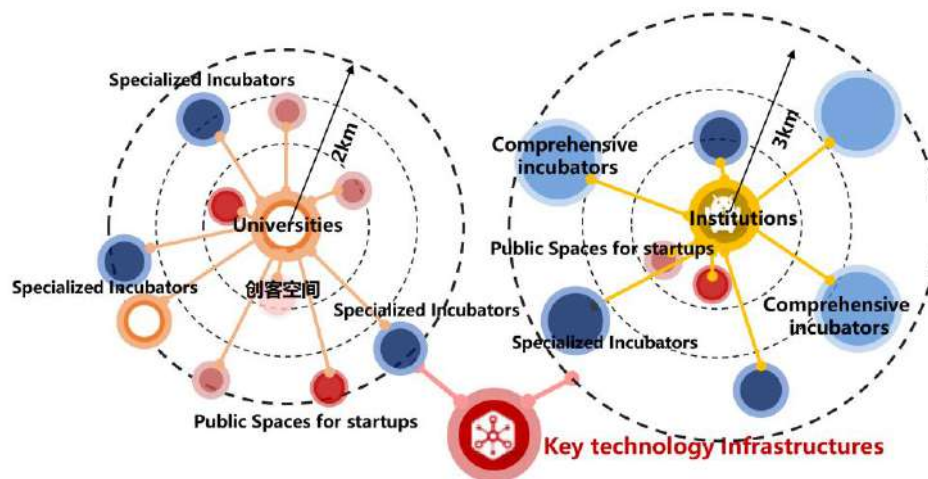
Figure 1 Local Knowledge Neighbourhoods

4.2. Making Knowledge Corridors a Boom for Knowledge Economies

Related to the innovation network is the geographical concentration of technology enterprises, which form industrial clusters and derive the booming of knowledge economies. Thus, the key to making knowledge corridors as a boom for knowledge economies is to incorporate the industrial chain with innovation networks by bridging the gaps between the producing and commercializing knowledge so as to keep nurturing local leading enterprises which could also give birth to new start-ups in the firm neighbourhoods. However, although the OVKC has been well-known for its competitiveness in optoelectronics industries, bio industries and intelligent manufacturing industries, the main reason lies that local leading firms are mostly the branches of national enterprises with their research functions locating in the first-tier cities like Beijing, Shanghai and Shenzhen. This has resulted in the failures of building local firm neighbourhoods, which can be exemplified by the fact that the current

amount of unicorn enterprises ranks behind compared to other knowledge corridors in China. Besides, there is an intriguing fact that high-tech firms have taken account for two-thirds of the total amounts but one-third of all the production value of Hubei Province respectively. Investigations indicate that current high-tech firms are experiencing the threshold of growth due to lack of technical service facilities like pubic semi-works, public data-sharing centres.

Therefore, to boom the knowledge economies of the OVKC, the first thing to do is to build local neighbourhoods of firms and enhance networking possibilities between existing local leading enterprises and start-ups by locating technological service facilities including public semi-works, data-sharing centres and research labs in between, which not only can decrease the cost of growth for start-ups but also can realize the "dandelion" roles of local leading enterprises through face-to-face communications(figure 2). Besides, it is also proposed to introduce new leading enterprises which could locate their research and development sectors locally. To increase the attraction for them, designated zones with specific favourable policies on tax, constructions and etc, have been proposed, which requires deeper discussions furthermore. In this way, the current industrial chains of the OVKC could be incorporated with the innovation networks, which will not only focus on increasing the competence of the existing dominating industries, but also stress the roles of the technological service industries and attempt to expand the boundaries of existing industries towards the future. Especially, stressing the roles of the technological service industries like finances would benefit the building of local innovation networks by enhancing the access of knowledge sectors to venture capitals.

Firm neighborhood for existing leading enterprises   Firm neighborhood for future leading enterprises
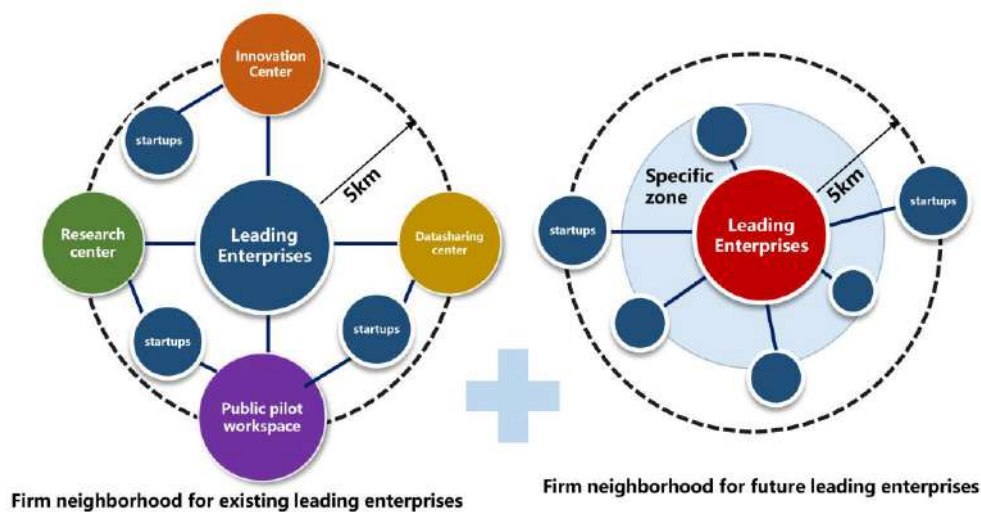
Figure 2 Local Neighbourhoods of Firms

4.3.   Making Knowledge Corridors an Attraction for Knowledge Workers

Knowledge workers, with a higher level of education, have been known as one of the most important driving forces behind knowledge-based developments. Together with knowledge, they are sourcing from universities but are free to move anywhere favourable to their living expectations. Pleasant environments and well-established urban amenities have proved to be the major attractions for them. As for the case of Wuhan, it has been known for its

nickname as "the Forest of Campus" but suffering from the loss of undergraduates for a long time due to the lack of attraction for knowledge workers. Although the OVKC is surrounded with mountains, lakes and rivers, there is neither many high-quality city parks with easy access nor greenways linking the surrounding sceneries. Investigations indicate that public space is the most important aspect that the OVKC should be improved at, and the existing urban amenities fail to meet the requirements of knowledge workers. Not only there is a lack of basic urban amenities especially elementary schools and hospitals, but also the third places like coffee shops for knowledge workers to mingle are short-supplied compared to other knowledge corridors. Considering that the number of knowledge workers in the OVKC is increasing at a higher rate than that of local residents, it is necessary to supply with customized urban amenities to meet the requirements of knowledge workers.

Thus, to make the OVKC an attraction for knowledge workers, it is suggested to establish a complex of "green", "red" and "yellow" infrastructures towards the current problems. Firstly, "green" infrastructures including high-quality urban parks with multi-functions like culture and sports and easy-access pocket parks with communication spaces have been proposed to locate within the corridor, linked by greenways (Figure 3). Secondly, "red" infrastructures which mean basic urban amenities for local residents should not only be supplemented according to the whole evaluation of the current facilities but also be required to be built with high standards. Thirdly, "yellow" infrastructures specifically targeting towards local knowledge workers are suggested to locate around workplaces within 15-minutes walking distances. According to the investigation with knowledge workers, the functions of "yellow" infrastructures are supposed to include not only retails, apartments, sports and so on for basic livings, but also encouraged to provide coffee shops, art galleries, book stores and libraries for knowledge workers to minge between and after work. This complex of "green", "red" and "yellow" infrastructures will furnish the innovation networks by keeping attracting knowledge workers.
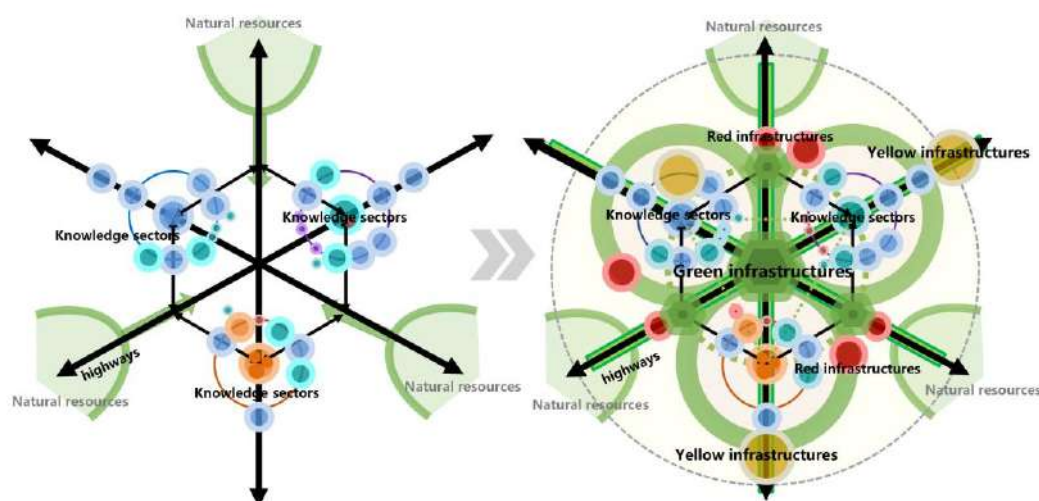
Figure 3 The Complex of "Green"," Red" and "Yellow" Infrastructures

4.4.   Making Knowledge Corridors a Freeway for Innovation Flows

Based on a bundle of infrastructures, knowledge corridors should become a freeway for innovation flows owing to the connectivity. With nodal points equipped with a transportation hubs playing the roles of attracting flows, the infrastructures of corridors could provide a freeway for innovation flows, so as to improve both the local and regional innovation network as a result. Aimed to be the national and international innovation centre, the OVKC still has a long way to go due to its current weak connection locally and regionally. Although with 3 high-speed train stations and 10 intercity train stations, the OVKC has taken the position of transportation hub in Central China, which will be threatened due to the construction of new super highspeed railways in nearby cities. Although there is the Tianhe Airport which is supposed to become the biggest passenger airport in Central China and will be the Shunfeng Airport which aimed at ranking the third among freight airports in Asia, this area is weakly connected to both the airports. Due to the rivers as natural barriers, the transportation system of highways, subways and greenways are all underdeveloped, leading to the traffic jams in rush hours let alone easy access to nodal points.

Therefore, to realize the goals of the national and international innovation centre, the first thing to do would be improving the strategic position in national and international transportation systems by speeding up the construction of the Shunfen Airport and locating super highspeed railway stations within the boundary of the OVKC. Besides, the network density of highway systems is proposed to be improved so as to improve the connection between nodal points especially airports, train stations and other hubs. More efficient public transport systems are also proposed to be built by extending the subway line to link with most nodal points and establishing greenways to connect subway stations with workplaces and housing areas. In particular, a specialized public transport system including subways and bus lines is suggested to establish door to door between universities, research institutions and major knowledge sectors, towards the problems of low efficiency of current public transport. A smart transit system is also suggested to build upon the existing roads, towards the problems of traffic jams in rush hours. In this way, the goal has been set that it will take not more than 60 minutes to reach nodal points especially the airports, train stations and other transportation hubs from anywhere within the boundary of the OVKC.

4.5.   Making Knowledge Corridors a Mutual Force for Urban Governance

The tricky parts of governing knowledge corridors lie not only with the uncertainty of innovation but also the cross-bordering issue of linear developments, which is like a dynamic, participatory and strategic process and it requires a careful and delicate orchestration (Sarimin & Yigitcanlar, 2015). As the boundary of the OVKC crosses the borders of two cities, a mutual-force between central governments vertically as well as the two municipalities and the public horizontally has been missing due to the institutional issues. Although the public policies concerning to the innovation activities in the OVKC have been issued at a number of more than 100, only less than 10 percent of the policies are related to the governance of spaces for innovation activities. This has led to the difficulties in the whole process of knowledge-based urban development, due to the lack of flexibilities to adapt to the uncertainty of innovation. For example, the current land use regulation has set up a rigid upper limit for the mixed-use functions while investigations indicate that the requirements of the existing enterprises to improve the proportions of mixed uses are difficult to meet with. This has also increased the institutional cost for enterprises to be engaged more in innovation activities.

To form a mutual-force for urban governance, it is suggested that a "one-stop-agency" for the operational management of the OVKC should be established at first to enhance the organizational capacity, which involves not only the provincial government of Hubei, the municipal governments of Wuhan and Ezhou, but also local universities, enterprises and the public. Besides, the flexibilities of current land use regulations have been proposed to be enhanced by increasing the upper limit of mixed-use functions and adding a new type of land use to the existing system, which could be undefined of land use and applying for specific policies to locate key technological infrastructures, leading enterprises and etc. Beyond this what needed most is not only the adjustment of current public policies but also a continuous policy monitoring system to recognize the current development stage as well as the problems and ensure that the objectives can be achieved. In correspondence to the understanding of knowledge corridors, the system of 36 indexes which can be measured every year and compared with other cities have been established in 5 dimensions corresponding to the interpretations of knowledge corridors (table 1).

Table 2 The Indexes of the Monitoring System

Category	Sub-category	Index
Innovation Resources	Innovation Input	Number of key technology infrastructures
		Number of Incubators
		Number of Public Spaces for Startups
		The percentage of research and development expenses in GDP（%）
	Innovation Output	Valid patents per 10000 people per year
		Number of PCT patents per year
		Number of invented international standards
Industries	Industrial Structure	Percentage of the added value of strategic industries in GDP(%)
		Percentage of the added value of new economies in GDP(%)
		Percentage of high-tech service industries incomes(%)
	Innovative Enterprises	The Increasing rate of gazelle enterprises(%)
		Number of unicorn enterprises
		The Increasing number of high-tech enterprises per year
		Number of enterprises with venture capitals
Physical Environments	Public Spaces	Areas of parks per person(square meters)
		Coverage of urban parks with an area of more than 5000 square meters to residential districts within 500 meters(%)
		Number of urban parks with an area of more than 10 hectares per 10000 people
		Coverage of greenways to residential districts within 5-minute walking distances
	Urban amenities	Number of international schools per 10000 people
		Number of hospital beds per 10000 people
		Number of larger urban amenities(including exhibitions, libraries, art galleries, theaters and etc.) per 10000 people
		Coverage of urban amenities to residential districts(%)
		Areas of the third places(like coffee houses) per person (square meters)
Transport	Accessibility	Coverage of airports within 60-minute travel(%)
		Coverage of train stations within 45-minute travel(%)
		The Density of high-way network(meters per square meters)
	Connectivity	The Density of branch network(meters per square meters)
		Milestones of subways(kilometers)
		Percentage of travel by public transport(%)
		Milestones of public transport per 100000 people(kilometers)
Governance	Spaces	Percentage of increased spaces for innovation activities in office buildings per year(%)
		Percentage of increased apartments for knowledge workers in housings(%)
	Policies	Percentage of policies for innovators (%)
		Percentage of policies for capitals
		Percentage of policies for related issues (%)
		Percentage of policies for coordination(%)

To implement the strategies at local scales, short-term, mid-term and long-term targets for the index system have been made respectively and an action plan for the next year has also been established especially. As a complex of long-term vision, plans and short-term actions together with effective policies, knowledge corridor strategies would require a long span of time to achieve progress. Within the first phase of development, the projects listed in the action plan for the OVKC are about to launch or still in progress though. However, what's obvious right now is that both local governments of Wuhan and Ezhou are preparing to collaborate with each other with the establishment of the strategic plan, which indicates a good start for the implementation of the strategic plans. With the strategies been proposed elevated to national agenda while keeping sinking locally and regionally, this would also improve the competitiveness, sustainability and liveability of the megacity of Wuhan and its metropolitan area.

5. Conclusions

How to understand the concept of knowledge corridors in the new economies driven by science and technological clusters, which do not rely on traditional factors like before? How to make knowledge corridor strategies towards a more liveable, sustainable and efficient megacity based on the local conditions? The two questions above have been answered by the literature review and case studies in this paper. Although the corridor concept, with a long history, has evolved from linear or belt patterns to networks, one thing which has never changed is its character of connectivity. Greatly inspired by the success of the Silicon Valley, M80 and other technology clusters in corridor patterns, there has been a trend of using the spatial instruments of knowledge corridor with its connectivity to improve the regional roles of megacities in developing countries especially like China. Based on the original concepts and case studies, knowledge corridors, as the combination of knowledge-based urban development and corridor development, could be interpreted as corridors with various knowledge resources to establish local and regional innovation networks, clustered leading enterprises which could nurture start-ups to boom knowledge economies, pleasant environments and urban amenities to attract knowledge workers, well-connected transit systems to improve the efficiency of innovation flows and co-governing mechanism to adapt to the uncertainty of innovation. Based on the five dimensions of the understanding, the case study of the OVKC has been used to elaborate the knowledge corridor strategies, which are proposed to be made as a loop for innovation networks, a boom for knowledge economies, an attraction for knowledge workers, a freeway for innovation flows and a mutual force for co-governance, towards a more liveable, sustainable and efficient megacity. As a complex of visions, plans and actions together with effective policies, knowledge corridor strategies should not be phased according to its own circumstances but also require continuous monitoring.

As there will a span of time to access the achievements or failure of the strategic plans of the OVKC, what the case study would like to contribute is the framework in making knowledge corridor strategies rather than the wholesale packages. Like an orchestra, the implementation of knowledge corridor strategies does not only require a conductor to vision, lead, monitor and make adjustments constantly but also a group of music players to collaborate. Although the music books like the framework of the strategies may not change in different theatres, the performances will be not the same with different audiences like the country-specific social, cultural, economic and technological circumstances, which are the key factors to determine the final effects.

6. References

Albrechts Lousi, Coppens Tom (2003) "Megacorridors: Striking a Balance between the Space of Flows and the Space of Places". Journal of Transport Geography, Vol.11 No. 3(September).

Castells Manuel (1999) The Information Age, Oxford: Wiley-Blackwell.

Castells Manuel, Halls Peter (1994) Technopoles of the World, London: Routledge.
Carrillo Francisco (2006). The Century of Knowledge Cities：Approaches, Experiences, and Perspectives. Carillo (Ed.). New York: Butterworth–Heinemann.

Chapman David, Pratt Dick, Larkham Peter, Ian Dickins (2003)" Concepts and Definitions of Corridors: Evidence from England's Midlands", Journal of Transport Geography. Vol.11 No. 3 (September).
Corey Kenneth, Mark Wilson (2006). Urban and Regional Technology Planning. New York: Routledge.

Cornell University, INSEAD, WIPO (2018) Global Innovation Index 2018, Energizing the World with Innovation, from https://www.baidu.com/link?url=dAMQnK3rfmHAsAEKLJroUcCn5eJrj3pfwf6Qu74Dfo3u7X-jwLC5vMMJDJr6RFHJQnWNQnVzJ7QXXFODG3_dRK&wd=&eqid=e05e388f0000cdac000000055d13623d

Haug Peter (1986) "US High Technology Multinationals and Silicon Glen". Regional Studies. Vol.20 No. 2(February).
Huggins Robert, Thompson Piers (2015) "Entrepreneurship, Innovation and Regional Growth: A Network Theory". Small Business Economics. Vol. 41 No. 5(June).
Lambert Christine, Boddy Martin (1998) "Planning for Major Urban Expansion: A Case Study in the UK's M4 Growth Corridor", Planning Practice and Research. Vol.13 No.4 (August).

Malairaja Chandra (2003) "Learning from the Silicon Valley and Implications for Technological Leapfrogging the Experience of Malaysia". International Journal of Technology Management and Sustainable Development. Vol.2 No. 2 (October).

Priemus Hugo, Zonneveld Wil (2003) "What are Corridors and What are the Issues? Introduction to Special Issue: The Governance of Corridors". Journal of Transport Geography. Vol. 11 No.3(September).
Pyka Andreas, Scharnhorst Andrea (2009) Innovation Networks – New Approaches in Modelling and Analysing. Heidelberg: Springer-Verlag, Springer-Complexity.

Sarimin Muna, Yigitcanlar Tan (2011) "Knowledge-based Urban Development of Multimedia Super Corridor, Malaysia: an overview". International Journal of Knowledge-Based Development. Vol. 2 No. 1 (January).

Sarimin Muna, Yigitcanlar Tan (2015) "Multimedia Super Corridor, Malaysia: Knowledge-Based Urban Development Lessons from an Emerging Economy". VINE. Vol. 45 No. 1 (January).
State Council of China(2016) National Innovation-driven Development Strategy Outlines (No.15) , Retrieved May 19, 2016, from http://www.gov.cn/gongbao/content/2016/content_5076961.htm
Winden Van. Berg Van (2004). Cities in the Knowledge Economy. Rotterdam: European Institute for Comparative Urban Research.

Zonneveld Wil, Trip Jan (2003) Megacorridors in North West Europe: Investing a New Transnational Planning Concept. Housing and Urban Policy Studies 27: The Netherlands: DUP Science.

Track 2
Besides the megacity and other cities
Planning for balance

CONGRESS TEAM
Tathagata Chatterji
(India)
Fedor Kudryavtsev
(Russia)

LOCAL EXPERTS
Adiwan Aritenang

photo: Atik Sulianami, Unsplash

Discussions in Track 2 broadly explored two key areas: the context of contemporary urbanisation in which the megacities, their scale economies and their regional linkages are embedded, and what the possible alternative spatial models are. These two broad themes then led to more detailed explorations around seven sub-themes.

Track sessions provided a holistic framework to discuss various topics related to urbanisation beyond the megacities and to get shared conclusions in the end. Starting from keynote speakers' presentations on key challenges and alternatives, the track progressed into more detailed sub-topic discussions and concluded with debates on new urbanisation alternatives to megacities. Key points of discussions included exploration of the peri-urban dynamics of the metropolitan regions, metropolitan city and its shadow regions, megacities resiliency and food supply, planning at a regional scale to manage megacities and hinterlands relations.

Alternative models of spatial development were reviewed at various scales, starting from those settlement typologies beyond the urban-rural binary and going further to mega infrastructure opportunities for new models of hinterland development. The big message which emerged out of the discussions stressed the importance of planning at a regional scale to achieve the objectives of balanced development.

- The focus must switch from networked cities to networked regions.
- Planning policies need to encourage poly-centricity as opposed to hyper concentration in metropolitan centres.
- Development of small- and medium- sized towns as well as rural revitalisation needs to be prioritised.
- Smaller settlements play vital roles in providing livelihood opportunities and offer better quality of life.

However, smaller settlements and peripheral areas are often overlooked when it comes to planning policy and infrastructure investment. Megacities and global metropolitan regions often cloud the imagination through the sheer magnitude of their scale, and it is essential to strengthen interfaces and interdependencies between the megacities and their shadow regions through an integrated planning policy.

While discussions on this theme demonstrate the importance of spatial planning tools and processes in bringing about greater synergy between rural and urban settlements under a common spatial planning framework, they also underscore the importance of achieving greater synchronization of goals and objectives of the various institutions involved in the regional planning process, to achieve sustainable outcomes. For the achievement of sustainable development at the regional scale, spatial planning tools and processes need to address livelihood opportunities for the rising youth population in fast urbanising regions; encourage local cultural practices and distinctiveness and promote exchange flows of new ideas.

A new spatial model is necessary to sustain hybrid, in-between spaces, 'desa-kota-like' regions and networks of integrated and interconnected smaller settlements. This model should focus not only on servicing and supporting urban activities but also take account of food systems and the creation of a 'productive multifunctional landscape' with a sustainable socio-ecological metabolism of the settlements as the priorities.

Another interesting topic is that of the new "rural revolution": emerging new ways of rural living that are going far beyond traditional agriculture and include various services (hotels, tourism, leisure, art and crafts activities, etc.), new production industries linked to global logistic chains and online customer services (as "taobao villages" in China). Agriculture itself becomes field of innovative technologies engaging robots, drones and big data (new High-Tech villages model). These new trends open opportunities for "rurban life" beyond megacities combining nature environment and modern lifestyles and technologies. Urban and rural is no more clearly distinguished either in functional, social and even spatial terms. Some of the other ideas (below) may sound radical but they are worth to consideration and further assessment.

Many international contributions suggest that urban planning in low-resource countries there be entirely rethought with more focus on poverty alleviation by means of providing space for social, economic and cultural integration of people. These countries face a difficult dilemma: they have no ready models and theories to suit their situation and identify alternative forms of urbanisation and often end up going through the same stages, mistakes and problems as their more developed predecessors, with the added difficulty of having limited human and financial resources. It seems that the world needs "good utopian ideas" to break out of this current situation.

It was obvious that hope is faltering in the potential to provide sustainable and comfortable urban future for the billions of new urbanites expected to move into new urban areas in existing or new cities. This is mainly because of lack of time, resources and human capacity. The priority of global urban agenda should be on improving life in areas where people are already settled and offer better opportunities and living conditions there, rather than responding and trying to address the migration flows towards bigger cities after they have been set in motion. Efforts and resources should be moved away from coping with urban migration towards trying to stop it happening in the first place, at least as far as bigger cities growth are concerned.

The findings of the Track strongly resonate with the New Urban Agenda, adopted by the United Nations at the Habitat III conference, which reposed faith back on spatial planning, to strengthen the fundamentals of planning after years of neglect under a neoliberal, market-led development paradigm.

Track 2 - Selected Papers

1. Mardiansjah F., Rahayu P., Rukmana D., '*Urban Population Growth and the Growth of Towns and Cities in Indonesia: the Challenge of Non-statutory Town Development*'

2. Bas A., Eren F., Pakoz M. Z., *'An Analysys of the Changing Role of Istanbul as a Megacity in the World* '

3. Liu T., Li J., *'Out-migrate Elites as Rural-Urban Link: an Innovative Pathway Toward Rural Development Around Metropolis*'

Case Study Paper

URBAN POPULATION GROWTH AND THE GROWTH OF TOWNS AND CITIES IN INDONESIA

The Challenge of Non-Statutory Town Development

Fadjar Hari MARDIANSJAH, Department of Urban and Regional Planning, Universitas Diponegoro; Semarang, Indonesia

Paramita RAHAYU, Department of Urban and Regional Planning, Universitas Sebelas Maret; Surakarta, Indonesia

Deden RUKMANA, Department of Urban Studies, Savannah State University; Georgia, the USA

Abstract

This study examines the emergence of new tendencies in the current Indonesian urbanization process. The process is characterized by not only the development of large cities and mega-urban but also rapid development of many smaller cities and urban concentration. The latter includes the non-statutory towns in the territory of kabupaten. The rapid growth of towns and population, in addition to the huge number of accumulated urban population in kabupaten suggest that this type of urban concentration will play a more significant role in the future of urbanization and urban development in Indonesia. The development of these small towns and cities will also bring significant implications and challenges for central as well as local governments, including the government of the urbanized kabupaten, especially in improving the capacity to manage such emerging characteristics of development.

Keywords

Urban Growth, Urbanization, Non Statutory Town, Indonesia

1. Introduction

Urban population growth in developing countries has been one of the most important phenomena that bring very big challenges since the second half of the twentieth century (Cohen, 2004; McGranahan & Satterthwaite, 2014; UN, 2014; Jedwaba, et al., 2017). Very earlier study urbanization, suggest that the analysis of the urban population growth lead to the analysis on the process of urban concentration and development (Tisdale , 1942). Later, the study of urbanization became larger as the analysis of concentration then moved into regional or national development context (Friedmann, 1973).

Urbanization is favored because urban status tends to poses higher economic development potential and investment opportunity (Sircar, 2017; see also Ye and Xie, 2012). Urbanization has offered opportunities for economic development, welfare and quality of life for cities and regions, since the process play roles as transformative processes that brings about higher productivity to cities and strengthen the spatial structure of cities and regions in both internal and external context (UN-Habitat, 2016).

Some scholars argue that due to this positive affect of urbanization, this process is often established by government policies (Fan, 2013; Ye and Xie, 2012; Anderson and Ge, 2004). For example, rapid urbanization in India is claimed influenced by how the government intensively defined area as urban. In addition to statutory town like municipal cities that possess governing body, there are outgrowth or a dense settlements growing outside the boundary of statutory town; and census town (CT) or urban area on the basis of three criteria: total population, density, and percentage of male workforce in non-agricultural sector (Sircar, 2017). Census Town (CT) boosts the number of urban areas in India (Sircar, 2017).

Through different perspective, rapid urban growth, such as extended urbanization brings in social, economic, ecological, and governance conflict due to disparity of those aspects appear between the core city and the extended urban areas (Shatkin, 2019). Urban population growth particularly in the South has been also associated with concerns such as unemployment, poverty, disparities, inadequate infrastructure and housing. Obtaining a transformative role of the process requires a good capacity to manage the process, not only at the local level, but also regional and national level (Center for Strategic and International Studies/CSIS, 2015). With this regard, regional urbanization is argued as one way to understand regional disparity (Zhang and Han, 2009).

One of the problem of disparity between the core and the peripheral or extended urban areas is due to directive urbanization or urbanization because of re-classification. It is explained by the phenomenon of Census Town in Indian context (Pradhan, 2013). The conflict is due to the CT is governed by the rural government that possess different characters with the CT. Linking the CT with their urban core is proposed solution to deal with the disparity problems (Pradhan, 2013).

To benefit from such process, in-depth analysis is required. Furthermore, Soja (2011) also emphasized the importance of regional analysis of urbanization especially in recognizing the challenge of reconfiguration of metropolitan and regional modes of urbanization process, including their intercity connectivity and integrations to the global activities. Such analysis is also important to understand the spatial influence of regional urbanization to increase equal opportunities for the cities and the inhabitants. In this context, the study of urbanization has also linked to efforts in improving the roles of cities and other urban concentrations in creating welfares, better quality of life and performing sustainable development (UN-Habitat, 2016).

Similar to the global trend of urban population exceed 50% of the global population for the first time in history (UN, 2015), Indonesia experienced the same milestone in 2012 (Jones and Mulyana, 2015). Indonesian society has started predominantly urban. Today, the Intercensal-census 2015 shows that Indonesia is predicted to have 136.44 million urban populations that represent 53.1% of urbanization level (BPS, 2016). The number is about 50 times higher than 100 years ago. In the future, urban population in Indonesia is expected to increase rapidly with more than 203 million urban populations in 2035 with the level of urbanization about 66.6% (BPS, 2013).

Indonesia has also become a member of group of countries that have more than a hundred millions of urban population since the early year of the 21st century, with China, India and Japan in Asia(see UN, 2015). These figures show the great challenges in the future of urbanization processes in Indonesia. This article aims at examining urban population growth in Indonesia and its implication to Indonesian urbanization challenges. The analysis emphasizes on the urban population growth and its distribution among regions as well as among types of cities in Indonesia. The study applies statistical descriptive analysis, with statistical data withdrawn from national censuses. In doing so, the Indonesian territory will be divided into macro regions: Java, Sumatra and other regions.

The paper consists of five parts. Following the introduction, the concept of urbanization and global urban process as well as their challenges and implications will be discussed. The third part will discuss urban population growth in Indonesia as the case study. Subsequently, the important challenges of Indonesian urbanization process will elaborated. This section will be divided into four subsections: the rapid and significant increase, the spatial distribution, the increasing number of small towns and cities, and the increasing roles of non-statutory towns and cities in *kabupaten.* Finally, the paper will provide some conclusions.

2. Urban Population Growth in Indonesia and its Challenging Issues

Indonesia has experienced significant population growth since the last century. Between 1920, the first census in the Dutch colonial era in 1920, and 1961, the first national population census in the independence era, the population in Indonesia has been double from 40.34 million to 97.07. Later, according to the result of the 2000 national census, the population has been double again to 203.46 million. The last national population census in 2010 shows that the population was about 237.64 million and today according to the result of the 2015 intercensus population survey it is predicted to be 255.18 million with about 135.61 million urban populations in 2015 (see Figure 1). The latest number represents 53.1% of Indonesian population. definition, Indonesia is now an urbanized country (Poston and Bouvier's , 2010). With 3.5% annul urban population growth, Indonesia has experienced a much more rapid urban population growth than the world, Asia and Southeast Asia which have 2.05%, 2.50% and 2.53% of annual urban population growth rate respectively in 2010-2015 (UN, 2014). Bappenas (the National Development Planning Board of Indonesia), BPS (Biro Pusat Statistik or the National Bureau of Statistics of Indonesia) and the UNFPA have also projected that Indonesian will have more than 200 million urban population in 2035 (BPS, 2013).
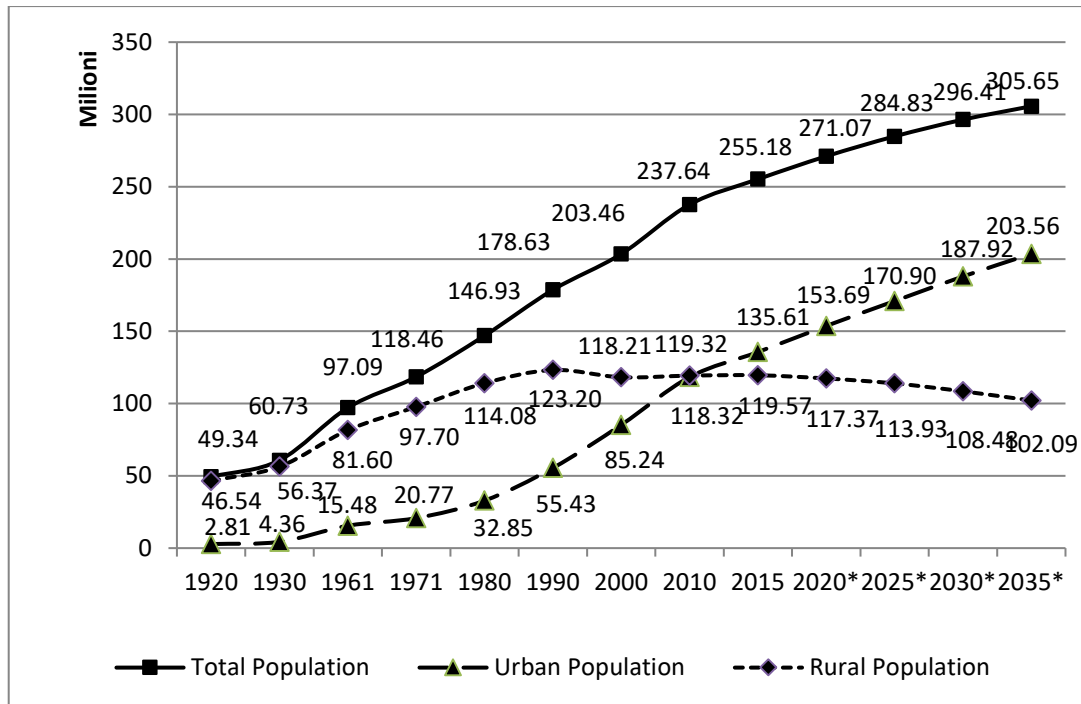
Sources: Calculated from census data.

*Note: * = Calculated based on the results of Bappenas, BPS and UNFPA Population
      Projection in BPS, 2013*

Figure 1 Total urban and rural populations in Indonesia, 1920-2010 and 2015

Zhang and Deng (2016) argue that the Indonesian urbanization process has exceeded its peak after 1980s by defining the period of 1980s as the stage of extraordinary urbanization and the period of 1990s as the stage of urbanization adjustment. This paper argues that the period after 1980s and the later periods, after 1990s is more complicated considering the absolute number of urban dwellers will reach to nearly 3.5 million in 2000s and between 2010 and 2015. It is predicted that the period of 2010s is the decade when Indonesia will have the biggest number of additional urban population annually with more than 3.5 million per year from 2011 to 2020.

Indonesia will be expected to experience to have an average of 2.69 million of additional urban populations annually from 2010 to 2050 (UN, 2014). In this context, it can be considered that urban population growth and urbanization process in Indonesia is distinct and very important, since there are not many countries that have more than a million new urban populations annually, especially for decades. Indonesia places the fourth of thirteen countries, after India, China, and Nigeria, which have the kind of pressure at least until 2050.

The enormous number of additional urban inhabitants that need to be taken care of, has made Indonesia seems to have to build a large metropolitan every year in the coming decades. Certainly, Indonesia needs to develop urban infrastructure and services for its cities that most of them are still lacking. The development is not only important to respond the growing needs of the additional urban population, but also for the present and the future urban population and activities. The failure in responding these consequences will not only creates constraints in providing effective service deliveries as well as in performing economic growth (Lewis,

2014), but also will increase the slum formation in the rapid urbanization process that is not associated with economic growth and development (Quintana, 2016).

2.1. Uneven Spatial Distribution of Population Growth in Indonesia: The dominant concentration in Java

The population in Indonesia is not distributed evenly throughout the country. The results of the SUPAS or *Survey Penduduk Antar Sensus* (Inter-census Population Survey) in 2015 shows that Java remains the main concentration of the population. According to the latest census, there were 136.6 million or nearly 60% of the total populations live in Java. Sumatra and the other regions represents only about 20% of the total population. In terms of density, with an average of 136.8 people per square kilometer in 2015, Indonesia also has a high degree of heterogeneity too. Java has become the densest populated island with and an average population density of 1,120.3 people/km^2, while Papua has the lowest density with a density of 9.6 people/km^2. The second densest populated region is the Islands of Bali and Nusa Tenggara, with 717.7 people/km^2 as the density of Bali and 192.8 people/km^2 as the average density of the region. Meanwhile Sumatra, the second largest concentration in Indonesia, is only counted as the third densest populated region with an average density of 114.8 people/km^2. This considerable imbalance of spatial pattern of Indonesian population density shows that the magnitude of Indonesian population strongly remains in Java Island.

Province	Area (km2)	Urban Population	Urb. Pop Share	Total Population	% Urban	Pop. Density (inhab./km^2)
Java	129,438	90,825,696	67.0%	145,013,573	62.6%	1,120.3
Sumatra	480,793	22,848,775	16.8%	55,198,752	41.4%	114.8
Sulawesi	188,522	6,892,367	5.1%	18,702,298	36.9%	99.2
Kalimantan	468,682	6,864,938	5.1%	15,320,017	44.8%	31.3
Bali & Nusa Tenggara	73,070	5,998,627	4.4%	14,091,466	42.6%	192.9
Papua	418,708	1,191,056	0.9%	4,011,907	29.7%	9.6
Maluku	78,897	991,627	0.7%	2,844,131	34.9%	36.1
Indonesia	*1,965,709*	*135,613,086*	*100%*	*255,182,144*	*53.1%*	*129.8*

Sources: Calculated from SUPAS data, 2015

Table 2. Distribution of urban and total populations in Indonesia, 2015

Java keeps its share of 66 % of Indonesian urban population as it has been since four decades ago (see Table 5). What had been changed for Java is that the very rapid urbanization process in 1970s and 1980s increased the urbanization level of Java from merely 18 % to 25 % and it keeps on increasing afterwards. . The result of the 2000 population census indicated that Java has 49% for its urbanization level in 2000, while the other regions were still less than 35% at the time. Java is much more urbanized than other regions with a 62.6% of urbanization level in 2015 as the highest among regions in the country A more detailed comparison of Java and other island is shown in Table 2

Year	Java	Sumatra	Other Region	Indonesia
Number of Urban Population (people)				
1971	13,727,869	3,700,235	3,337,168	20,765,272
1980	22,926,377	5,481,488	4,437,964	32,845,829
1990	38,335,297	9,291,747	7,762,127	55,389,171

Year	Java	Sumatra	Other Region	Indonesia
2000	59,229,340	14,581,448	12,791,062	86,601,850
2010	79,949,854	19,787,628	18,582,774	118,320,256
Share of Urban Population (%)				
1971	66.1	17.8	16.1	100
1980	69.8	16.7	13.5	100
1990	69.2	16.8	14	100
2000	68.4	16.8	14.8	100
2010	67.6	16.7	15.7	100
Level of Urbanization (%)				
1971	18	17.7	15.4	17.5
1980	25.1	19.6	15.8	22.3
1990	35.7	25.5	22	30.9
2000	48.8	33.7	30.7	42
2010	58.5	39.1	36.9	49.8

Sources : Calculated from census data of 1971, 1980, 1990, 2000 and 2010.

Table 3. Distribution of urban population in three macro regions in Indonesia, 1971-2010

Regions	1971 - 1980		1980 - 1990		1990 - 2000		2000 - 2010	
	people	share	people	share	people	share	people	share
Java	1,022,056	**76.10%**	1,540,892	**68.40%**	2,089,404	**66.90%**	2,072,051	**65.30%**
Sumatra	197,917	**14.70%**	381,026	**16.90%**	528,970	**16.90%**	520,618	**16.40%**
Others	122,311	**9.10%**	332,416	**14.70%**	502,894	**16.10%**	579,171	**18.30%**
Indonesia	*1,342,284*	*100%*	*2,254,334*	*100%*	*3,121,268*	*100%*	*3,171,841*	*100%*

Sources: Calculated from census data of 1971, 1980, 1990, 2000 and 2010.

Table 4. Distribution of new urban dwellers in three macro regions in Indonesia, 1971-2010

These situations have lead Java can still keep its major share of urban population in Indonesia. It also could be predicted that Java will still got million new urban populations annually for the near future.

2.2.   The Increasing Number of Cities, especially small size cities

The urbanization process in Indonesia has also increases the number of cities and towns. Table X indicates that the number of cities has increased from 50 cities in 1980 to 94 cities in 2010, while Table Y shows the order of cities more than 500,000 populations in Indonesia according to their inhabitants. The cities with less than 500,000 populations are not included in the Table Y since they are very dynamic and have many members. It is interesting to recognize that the increasing number of cities has been occurred especially after 2000. It influenced by to the opportunities introduced by the implementation of new decentralization scheme brought by the local government law no. 22/1999.

Type of cities	Number of cities and their population				Additional Population	Annual Growth
	1980	1990	2000	2010		
Large cities of 5 million or more	1 cities	1 cities	1 cities	1 cities	3,084,749	*1.30%*
	6,503,449	8,259,266	8,384,853	9,588,198		
Cities of 1 to 5 million	4 cities	5 cities	9 cities	10 cities	12,893,034	*3.94%*

Type of cities	Number of cities and their population				Additional Population	Annual Growth
	1980	**1990**	**2000**	**2010**		
Cities of 500 000 to 1 million	5,896,176	8,668,522	14,605,297	18,789,210	9,323,706	*5.94%*
	3 cities	5 cities	8 cities	16 cities		
	2,008,005	3,412,728	14,605,297	11,331,711		
Cities of 300 000 to 500 000	5 cities	8 cities	8 cities	8 cities	847,594	*1.17%*
	2,035,601	3,102,478	3,301,576	2,883,195		
Cities of 100 000 to 300 000	17 cities	23 cities	30 cities	48 cities	5,622,926	*3.39%*
	3,264,373	3,922,840	5,685,731	8,887,299		
Cities smaller than 100 000	20 cities	9 cities	7 cities	11 cities	-578,713	*-1.90%*
	1,324,294	565,092	433,914	745,581		
Total	50	51	63	94	31,193,296	*3.08*
	21,031,898	27,930,926	47,016,668	52,225,194		

Sources: Calculated from census data of 1980, 1990, 2000 and 2010.

Table 5. Number of cities and their population in Indonesia, 1980 to 2010

All of the cities in the list, except the DKI Jakarta, the largest city in Indonesia that has a status of a province of special region, are the cities with a status of *daerah kota*, the Indonesian term for cities with decentralized authorities. *Daerah kota*, which often call just as *kota* in daily practices in Indonesia, is one of the two Indonesian administrative divisions as the local autonomous regions at the lowest level, i.e. *daerah kota* and *daerah kabupaten* (or *kabupaten*). *Kota* is an Indonesian word which normally has the meaning of "city". Nonetheless, in the sense of the administrative division of Indonesian territory, it also has the meaning of "municipality", that is to say as the local Indonesian regions designated for the urban area. As an autonomous region, *daerah kota* that is ruled by *walikota*, or mayor, who is elected by the inhabitants of the city for five years, also has local parliament called the DPRD Kota (*Dewan Perwakilan Rakyat Kota*) whose members are also elected by the inhabitants for five years as well. Meanwhile, *kabupaten* is another local Indonesian region designated for non-urban constituencies, as most of their territory is non-urban land. The *kabupaten* is ruled by the *bupati* or the head of *kabupaten*, who is also elected by the inhabitants of the *kabupaten* for five years. As the local representatives, the *kabupaten* has an elected parliament, called the DPRD *Kabupaten* (*Dewan Perwakilan Rakyat Kabupaten*), whose members are also elected by the inhabitants for five years too. Yet, even if the *kabupaten* is designated for a non-urban area, there are many *kabupaten* who also have towns in some particular areas in their territory, as the result of development and urbanization process in their area.

Thus, in terms of urbanization discourse, both *kota* and *kabupaten* have their urban populations and activities reside in their territory. However, in contrast to the *kota* that has their own government institutions in order to take care of their authorities, including in dealing with the needs of urban development management, the towns in the *kabupaten* can be considered as non-statutory towns since they do not have any authorities as well as any institutions as their own, including the urban development institutions. So their need for urban development management is provided by any institutions belong to the government of the *kabupaten*. It is a pity that we do not have any supported data that can show the development of the number of the towns in the *kabupaten*, especially in a time serial manner, so the development of such number could not be figured out precisely as the development of cities that is presented in the Table 5.

One important feature of the Indonesian *kota* is that most of them could be categorized as small or medium size cities. Among 94 *kota* in 2010, there were only 11 cities categorized as cities with more than one million, and 16 cities of 500,000 to one million populations. Eight out of the eleven millionaire cities are located in Java, including five of them: Jakarta, Bekasi, Tangerang, Depok and Tangerang Selatan (plus Bogor that nearly have one million populations) are located in the Jabodetabek or Megaurban Jakarta, while six out 16 cities in the next size are located in Java.

The increasing number of cities, in terms of the creation of new *kota* (newborn cities) as new local governments is considered as an administrative and political process that is also part of the country's democratization process (Fitrani et. al., 2005). This reason is also happen for the new *kabupaten*. Therefore most of the new *kabupaten* and *kota* are created after 2000, the starting year of new decentralization era and democratization process in Indonesia. Meanwhile for towns it is mostly influenced by the Indonesian urbanization process that has been taking place at the regional level.

The process of the creation is known as *pemekaran* that is literally means 'blossoming' (Fitrani et. al., 2005), but Anne Booth (2011) prefers to call it as 'splitting' since the creation of new *kota* or *kabupaten* can be considered as a 'splitting' the new *kabupaten* or *kota* from their *kabupaten induk* ('mother kabupaten'). The number of local government in Indonesia increase from 259 consisted 49 *kota* and 210 *kabupaten* (exclude Irian Jaya or Papua) in 1961 to to 292 in 1998, and 434 in the end of 2004. In 2009, the number has become 495 consisted 98 *kota* and 397 *kabupaten* (Booth, 2011), and today the number has increased to 514 consisting 98 *kota* and 416 *kabupaten*. Most of the new local governments are located outside Java. Java has the least significant increase of the number of *kota*, from 20 in 1971 to 30 in 2010, while Sumatra from 20 became 34 in the same period. The outer region (the region outside Java and Sumatra) was the region that experienced the most rapid increase, from 10 to 30.

In Java, most of new *kota* created were big cities with more than 500 thousands and even more than 1 million population at the time they are initially created. Then, it is also interesting to know that all of the big and cities are located in western part of Java, surrounding the Jakarta area, the densest populated region, which consists of the Provinces of DKI Jakarta, Jawa Barat and Banten. In contrast, most of the new *kota* outside Java consist of less than 200 thousands populations cities, when they were created. These phenomena have also shown the high influence of Java, especially Jakarta, into the characteristic of urbanization process in Indonesia that creates uneven urban growth among Java and the rest of the islands in Indonesia.

1980	1990	2000	2010
Large cities of 5 million or more			
DKI Jakarta	DKI Jakarta	DKI Jakarta	DKI Jakarta
Cities of 1 to 5 million			
Surabaya	Surabaya	Surabaya	Surabaya
Bandung	Bandung	Bandung	Bandung
Medan	Medan	Medan	Bekasi
Semarang	Semarang	Bekasi*	Medan
	Palembang	Palembang	Tangerang
		Semarang	Depok
		Tangerang*	Semarang

1980	1990	2000	2010
		Depok*	Palembang
			Makasar
			Tangerang Selatan*
Cities of 500 000 to 1 million			
Palembang	Makasar	Malang	Batam*
Makasar	Malang	Bogor	Bogor
Malang	Bandar Lampung	Bandar Lampung	Pekanbaru
	Padang	Padang	Bandar Lampung
	Surakarta	Pekanbaru	Padang
		Banjarmasin	Malang
		Denpasar*	Denpasar
		Samarinda	Samarinda
			Tasikmalaya*
			Banjarmasin
			Balikpapan
			Pontianak
			Serang*
			Cimahi*
			Jambi
			Surakarta

Sources: Calculated from census data of 1980, 1990, 2000 and 2010.
Note   : The asterisk indicates the city was a newborn city

Table 6. List of Cities of more than 500 populations in Indonesia from 1980 to 2010

Among the six types of Indonesia cities according to their population, the cities of 500,000 to one million, cities of 1 to 5 million and cities of 100,000 to 500,000 populations seem to be the types of cities that have rapid growth of their population (see Table X). The first type of cities has grown from four cities in 1980 into ten cities in 2010 with nearly 13 million additional populations and an average rate growth of 3.94% annually. In fact, among the six new member of this type of cities, there were only Palembang and Makasar (see Table Y) that have grown and promoted from the cities of less than 1 million in the previous period, while the other four cities were newborn cities that are created from the *pemekaran* from its *kabupaten*, i.e. Kota Bekasi from the part of *Kabupaten* Bekasi in 1997, Kota Tangerang and Tangerang Selatan from *Kabupaten* Tangerang in 1993 and 2008 respectively, and Kota Depok from *Kabupaten* Bogor in 1999. All of these cities created from the main urban areas of their *kabupaten*. One important feature of these *pemekaran* is all of the newborn cities were cities of more than 1 million populations just when the cities created. So, their influence to the population growth as well as the additional population to the type of cities were very important, as if the influence of the newborn cities is excluded from the calculation then the annual population growth of this type of cities will only become 1.35% per year and the additional dwellers only about 2.9 million urban population, a similar level to those of the large city of Jakarta in the same period. Similarly, the type of cities of 500,000 to 1 million has also influence from the creation of newborn cities (see Table Y), as Kota Batam was created in 1999, Denpasar in 1992, Tasikmalaya in 2001, Serang in 2007 and Cimahi in 2001, and only nine cities that have grown from the cities of less than 500,000 populations. In this regards, their urban population growth was only 1.98% annually without the influence of these newborn cities.

The same influence of the presence of newborn cities has also happen in other types of cities. Even the cities of 100,000 to 300,000 populations has the biggest number with 25 newborn cities, while the cities of 300,000 to 500,000 have only four newborn cities, and the cities with less than 100,000 populations have only six newborn cities. Therefore if we do not count the influence of the presence of the newborn cities, we will have different figures of which type of cities that have more rapid urban population growth than others. The analysis shows that the cities of 100,000 to 300,000 population is the type of cities with the most rapid growth with an average rate of 2.77% per year, and the cities with less than 100,000 populations is the next with an average of 2.65% per year, while the cities of 300,000 to 500,000 is the slowest grown with an average of 1.18% per year. These figures show that the small cities with less than 300,000 populations could be said as the type of cities that grown fastest.

3. The Formation of Urban Region

In addition to increase the number of cities, particularly the smaller size of cities, urban population growth in Indonesia has also triggered complex spatial processes that lead into the formation of urban regions. In Java, the most densely populated region that also the place where Indonesian urbanization process is concentrated, the formations are not only occurred in the very big cities like Jakarta, Bandung and Surabaya as the main urban concentration in the island. The formations are also happened in some much smaller cities, as is shown by the Table 7 and Table 8. In addition to the very big urban region of Megaurban Jabodetabek that has nearly 30 million urban populations today, Java has also some large metropolitan, i.e., Metropolitan of Bandung Raya and Metropolitan Surabaya that has more than five million urban populations each, four metropolitans with 2 to 5 million urban populations each (Semarang, Malang, Surakarta and Yogyakarta), four metropolitans with 1 to 2 million urban populations, five urban regions with 500,000 to 1 million urban populations, and two urban regions with less than 500,000 urban populations

Region	Urban Population (people)				Urban Growth (%)	Share (%)	
	1980	1990	2000	2010	1980-2010	1980	2010
1. Megaurban Jabodetabek	**7,782,469**	**13,096,673**	**18,167,494**	**25,923,037**	**4.09%**	**100,0**	**100,0**
In the core areas (DKI Jakarta)	6,480,654	8,227,746	8,361,079	9,607,787	1.3%	83.3%	37.1%
In the peripheries	1,301,815	4,868,927	9,806,415	16,315,250	8.8%	16.7%	62.9%
- the west peripheries (Bekasi Areas)	228,162	1,520,837	3,266,664	5,413,132	11.1%	2.9%	20.9%
- the east peripheries (Tangerang Areas)	188,668	1,152,883	2,631,542	4,443,001	11.1%	2.4%	17.1%
- the south peripheries (Bogor Areas)	884,985	2,195,207	3,908,209	6,459,117	6.9%	11.4%	24.9%
2. Metropolitan Badung Raya	**2,099,892**	**3,349,995**	**4,792,806**	**6,548,327**	**3.9%**	**100,0**	**100,0**
In the core areas	1,461,407	2,058,122	2,136,260	2,394,873	1.7%	69.6%	36.6%
In the peripheries	638,485	1,291,873	2,656,546	4,153,454	6.4%	30.4%	63.4%
3. Metropolitan Surabaya	**2,581,984**	**3,660,295**	**5,297,677**	**6,316,557**	**3.0%**	**100,0**	**100,0**
In the core areas	2,017,527	2,473,272	2,599,796	2,765,487	1.1%	78.1%	43.8%
In the peripheries	564,457	1,187,023	2,697,881	3,551,070	6.3%	21.9%	56.2%
4. Metropolitan Semarang	**1,289,008**	**1,746,977**	**2,256,867**	**2,891,293**	**2.7%**	**100,0**	**100,0**
In the core areas	1,024,957	1,250,971	1,348,803	1,520,481	1.3%	79.5%	52.6%
In the peripheries	264,051	496,006	908,064	1,370,812	5.6%	20.5%	47.4%
5. Metropolitan Malang	**704,975**	**1,130,034**	**1,693,709**	**2,157,237**	**3.8%**	**100,0**	**100,0**
In the core areas	510,906	695,089	742,263	820,243	1.6%	72.5%	38.0%
In the peripheries	194,069	434,945	951,446	1,336,994	6.6%	27.5%	62.0%
6. Metropolitan Surakarta	**772,129**	**1,176,365**	**1,834,189**	**2,130,073**	**3.4%**	**100,0**	**100,0**
In the core areas	469,532	504,176	490,214	499,337	0.2%	60.8%	23.4%
In the peripheries	302,597	672,189	1,343,975	1,630,736	5.8%	39.2%	76.6%
7. Metropolitan Yogyakarta	**570,853**	**1,235,182**	**1,697,581**	**2,148,223**	**4.5%**	**100,0**	**100,0**
In the core areas	398,192	412,392	396,744	388,627	-0.1%	69.8%	18.1%
In the peripheries	172,661	822,790	1,300,837	1,759,596	8.1%	30.2%	81.9%

Sources : Calculated from census data of 1980, 1990, 2000 and 2010

Table 7. Urban population growth in large urban regions in Java from 1980 to 2010

Region	Urban Population (people)				Urban Growth (%)	Share (%)	
	1980	1990	2000	2010	1980-2010	1980	2010
1. Metropolitan Cirebon	**459,918**	**868,330**	**1,354,999**	**1,883,821**	**4.8%**	**100,0**	**100,0**
In the core areas	223,504	254,477	272,263	296,389	0.9%	48.6%	15.7%
In the peripheries	236,414	613,853	1,082,736	1,587,432	6.6%	51.4%	84.3%
2. Metropolitan Tegal	**502,061**	**1,012,893**	**1,543,807**	**1,800,862**	**4.3%**	**100,0**	**100,0**
In the core areas	131,440	229,713	236,900	239,599	2.0%	26.2%	13.3%
In the peripheries	370,621	783,180	1,306,907	1,561,263	4.9%	73.8%	86.7%
3. Sukabumi Urban Region	**324,370**	**453,714**	**760,679**	**1,279,379**	**4.7%**	**100.0%**	**100.0%**
In the core areas	109,898	119,938	252,420	298,681	3.4%	33.9%	23.3%
In the peripheries	214,472	333,776	508,259	980,698	5.2%	66.1%	76.7%
4. Cilegon Urban Region	**139,984**	**269,096**	**753,523**	**1,224,477**	**7.5%**	**100,0**	**100,0**
In the core areas	nd	nd	294,936	360,125	2.0%	58.0%	29.4%
In the peripheries	139,984	269,096	458,587	864,352	6.3%	60.9%	70.6%
5. Kediri Urban Region	**301,201**	**469,179**	**761,834**	**949,221**	**3.9%**	**100,0**	**100,0**
In the core areas	221,636	249,538	244,519	268,507	0.6%	73.6%	28.3%
In the peripheries	79,565	219,641	517,315	680,714	7.4%	26.4%	71.7%
6. Pasuruan Urban Region	**258,404**	**408,697**	**677,415**	**847,996**	**4.0%**	**100,0**	**100,0**
In the core areas	93,366	152,075	162,521	186,262	2.3%	36.1%	22.0%
In the peripheries	165,038	256,622	514,894	661,734	4.7%	63.9%	78.0%
7. Pekalongan Urban Region	**270,883**	**432,983**	**618,151**	**708,369**	**3.3%**	**100,0**	**100,0**
In the core areas	132,413	242,874	262,272	274,839	2.5%	48.9%	38.8%
In the peripheries	138,470	190,109	355,879	433,530	3.9%	51.1%	61.2%
8. Probolinggo Urban Region	**159,696**	**283,151**	**432,133**	**567,142**	**4.3%**	**100,0**	**100,0**
In the core areas	100,152	176,906	156,657	196,957	2.3%	62.7%	34.7%
In the peripheries	59,544	106,245	275,476	370,185	6.3%	37.3%	65.3%
9. Blitar Urban Region	**152,626**	**271,087**	**379,242**	**554,531**	**4.4%**	**100,0**	**100,0**
In the core areas	78,381	118,933	119,372	131,968	1.8%	51.4%	23.8%
In the peripheries	74,245	152,154	259,870	422,563	6.0%	48.6%	76.2%
10. Magelang Urban Region	**221,462**	**291,110**	**398,438**	**449,731**	**2.4%**	**100,0**	**100,0**
In the core areas	123,358	123,213	117,531	118,227	-0.1%	55.7%	26.3%
In the peripheries	98,104	167,897	280,907	331,504	4.1%	44.3%	73.7%
11. Madiun Urban Region	**206,522**	**246,802**	**314,830**	**364,431**	**1.9%**	**100,0**	**100,0**
In the core areas	150,260	170,050	163,956	170,964	0.4%	72.8%	46.9%
In the peripheries	56,262	76,752	150,874	193,467	4.2%	27.2%	53.1%

Sources: Calculated from census data of 1980, 1990, 2000 and 2010.

Table 8. Urban population growth in smaller urban regions in Java from 1980 to 2010

Firman (2016) argues that the period of 1980s to 2000s are the period of mega-urbanization of Java with the phenomena of development of the Megaurban Jakarta, Bandung and Surabaya. The high population density that make the concentrated urbanization possible to be happened in Java and the enormous annual absolute increase bring fundamental basis for

the occurrence of the development of urban region formation that have based on not only in big cities in the form of megaurban or large metropolitan formation, but also in some much smaller cities in the form of small and medium size metropolitan. The development of urban region formation has shift many of urban activities, especially residential, manufacturing and services, from the cores into the fringe areas that brought a great expansion of the urban areas, that later also brought some urban environmental and also issues like traffic jams, flood problems, high intention of ground water utilizations, the appearance of urban heat problems, as well as crimes, poverties, social exclusions and other inequalities in the urban life of every urban region.

Most of the processes are influenced by the limited ability of the core areas in providing space for activities to the growing population and urban activities in these urban areas. The limited provision of spaces in the core areas resulted in high prices of land in the areas, which encouraged many growing activities, especially housing and industrial activities, tend to move out of the city to find cheaper land prices. In the small city-based urban region formation, the development of these formations are also influenced by the narrowness of the administrative area of the city that play as the urban core, which is supported by the availability of regional roads that provide good access for the growing activities outside the city boundaries. As the result, the urban areas expanded beyond the city's boundaries into the peripheries, which are usually the jurisdiction of neighborhood *kabupaten*, which is followed by the formation of small towns and cities in the territory of the *kabupaten*. Even, in the case of Jakarta and Bandung, the process has also created newborn big or millionaire municipalities. In this regard, thus, the formation process of urban region could also be seen as one of the influential factor for the urbanization process in many *kabupaten*.

It is also interesting to know that the development of urban region formation outside Java is not strong as its appearance in Java yet, as today they are only appear in Medan Metropolitan Region in North Sumatera, Metropolitan Makassar in South Sulawesi, and Metropolitan Denpasar in Bali. Meanwhile in Java, their emergence is relatively evenly distributed, as the two largest urban regions, i.e. Jabodetabek and Bandung, are located in western part of Java, and the third and fifth largest, i.e., Surabaya and Malang, are located in eastern part, and the other three large metropolitan, i.e., Semarang, Surakarta and Yogyakarta, are located in central part of Java. In addition, in term of coastal and inland area, even though two out of the three largest, i.e. Jabodetabek and Surabaya, are located in the coastal area, there is Bandung that is located in an inland area. Moreover, three out of four other large urban regions (Malang, Surakarta and Yogyakarta) are located in inland areas, and six out of eleven smaller urban regions are also not in coastal areas.

4. The Increasing Roles of Non Statutory Towns and Cities in *Kabupaten*

Another important feature in recent Indonesian urbanization process is the increasing roles of the *kabupaten* in welcoming urban population growth. As shown in Table 9, the high increase of the number of *kota* or municipalities was not followed by the increase of their share in accommodating urban population in their areas. Instead of increasing, the role of municipalities has declined. The role has decreased from 71.5% of the national urban population in 1971 to only 44.2% in 2010, even though the number of *kota* or municipalities has been double in the periods and the number of urban population of municipalities has also

increased from 15.9 million to 52.3 million. The decreasing role of the municipalities was, in fact, due to the more rapid increase of the urban population in *kabupaten, which* increased from 5.9 million (28.5%) in 1971 to 66.1 million (55.8%) in 2010 (see Table 4). In this context, it indicates that the process of urbanization in Indonesia brings urban areas in *kabupaten* have become the main place for urban population growth in Indonesia.

Year	*Kabupaten*	Share (%)	Kota	Share (%)	Total	Number of Kota	% Urban
1971	5,912,294	28.5	14,852,978	71.5	20,765,272	50	17.5
1980	14,048,324	42.8	18,797,505	57.2	32,845,829	50	22.3
1990	29,267,080	52.8	26,122,091	47.2	55,389,171	51	30.9
2000	49,083,721	56.7	37,518,129	43.3	86,601,850	63	42
2010	66,059,240	55.8	52,261,016	44.2	118,320,256	94	49.8

Source : Calculated from census data of 1971, 1980, 1990, 2000 and 2010

Table 9. Distribution of urban population and among kabupaten and kota, 1971 – 2010

The increasing urban population in *kabupaten* has led to the increasing the number of urbanized *kabupaten*. According to the result of the national census 2010, there were 33 *kabupaten* in Indonesia that more than half of their populations reside in their urban places that consist of 21 *kabupaten* in Java and 12 *kabupaten* outside Java. Moreover, there were also three *kabupaten* (Garut of West Java, and Malang and Jember of East Java) that have more than one million urban population although their urbanization level were still less than 50%. Kabupaten Bogor could be considered as the biggest urbanized kabupaten since it has more 3.8 million urban population in 2010, followed by *Kabupaten* Bandung (2.7 million), Tangerang (2.3 million), Bekasi (2.1 million), Sidoarjo (1.7 million), Cirebon (1.6 million), Deli Serdang of North Sumatra (1.4 million), Karawang (1.3 million), and so on. The existence of the very big number urban population in their territories could be seen as important reason that makes them, as well as other urbanized *kabupaten*, need to have good effort in managing their urbanization process.

It is also interesting to know that there were 11 *kabupaten* that have very high urbanization level with more than 75% of urbanization level that consist of nine *kabupaten* in Java and two *kabupaten* outside Java. The western part of Java, which consists of the DKI Jakarta, West Java, and Banten Provinces, is the micro region where the urbanization process has much more been concentrated. This region has biggest number of very high urbanization level *kabupaten* with more than one million urban populations, i.e., Bogor, Bekasi and Tangerang that play as the peripheries of DKI Jakarta, and Bandung and Bandung Barat that play as the peripheries of Metropolitan Bandung. In fact, these *kabupaten* have spawned newborn big or even millionaire municipalities. Moreover, this region has also other *kabupaten* Cirebon, Karawang and Garut that have also more than one million urban populations each. Kabupaten Karawang could be regarded as part of the large corona in the Megaurban Jabodetabek, since it is located adjacent to *Kabupaten* Bekasi that is being a part of the peripheries in the megaurban. Meanwhile, Kabupaten Garut is part of the large corona in the Metropolitan Bandung as its location adjacent to *Kabupaten* Bandung, the peripheries in the metropolitan, and *Kabupaten* Cirebon is the periphery of *Kota* Cirebon, in which both of them form Cirebon Metropolitan.

Kabupaten	Urban Population	Percentage Urban	Number of *Kecamatan*	Number of Urban *Kecamatan*	Range of Population	
					Smallest	Largest
West Java Province						
- Bogor	3,770,213	79.0%	40	31	40,013	309,918
- Bandung	2,673,499	84.1%	31	27	36,529	220,762
- Bekasi	2,108,130	80.1%	23	16	37,253	417,008
- Cirebon	1,587,432	76.8%	40	36	12,888	72,036
- Karawang*	1,268,086	59.6%	30	12	38,817	145,215
- Garut*	1,043,517	43.4%	42	15	25,142	117,726
- Bandung Barat	938,778	62.2%	16	8	53,619	147,797
- Purwakarta*	458,599	53.8%	17	6	29,314	165,447
Banten Province						
- Tangerang	2,324,209	82.0%	29	23	38,437	227,634
Central Java Province						
- Tegal	811,372	58.2%	18	10	40,094	109,035
- Banyumas*	807,607	52.0%	27	12	27,894	233,951
- Klaten	759,450	67.2%	26	18	15,233	57,958
- Jepara*	656,570	59.8%	16	8	28,842	98,054
- Pemalang*	636,977	50.5%	14	7	24,201	147,087
- Sukoharjo	632,367	76.7%	12	8	15,348	127,886
- Kudus*	600,965	77.3%	9	7	54,208	99,466
- Pekalongan	433,530	51.7%	19	8	20,435	79,797
Yogyakarta Province						
- Bantul	761,396	83.5%	17	12	26,228	120,015
- Sleman	998,200	91.3%	17	16	18,534	181,490
East Java Province						
- Malang	1,166,046	47.7%	33	14	19,861	140,403
- Jember	1,018,122	43.6%	31	10	23,695	116,032
- Sidoarjo	1,772,043	91.3%	18	18	31,373	228,818
- Jombang*	746,272	62.1%	21	12	25,980	137,233
- Gresik	703,912	59.8%	19	8	22,340	112,755

Source : Calculated from result of 2010 census.

Note   : The asterisk indicates that the kabupaten is not adjacent of any city.

Table 10. Urban population and it concentrations in urbanized kabupaten in Java, 2010

The regional urbanization process taken place into the *kabupaten* has also triggered many town formations in the territory of *kabupaten*, as results of the population densification as well as the nonagricultural activities development that lead to rural-to-urban reclassification process of villages in the *kabupaten*. Although Firman (2003) argued that the growth of the urban population in Indonesia has strongly influenced by the growth of large cities in the predominantly agricultural regions in the corridors of the regional roads that connect the large cities of Java, the rural to urban reclassification processes are not only happened in villages of the *kabupaten* located in adjacent to large cities but also in villages in the *kabupaten* around

much smaller size of cities, including in those that are not adjacent to any cities like in Karawang, Garut and Purwakarta of West Java Province, in Banyumas, Jepara, Pemalang and Kudus of Central Java Province, and Jombang of East Java Province. The densification process as well as the development of urban activities changed the previously rural areas into more urbanized areas and form urban areas in the *kabupaten*'s territory, in both small and large size. Firman (2016) said that in Java alone, the number of villages classified as urban village has increased from 7510 villages in 2000 to 9239 villages in 2010.

Kabupaten	Urban Population	Percentage Urban	Number of Kecamatan	Number of Urban Kecamatan	Range of Population	
					Smallest	Largest
Region of Sumatra						
Deli Serdang of North Sumatera	1,355,844	75.7%	22	11	38,201	340,844
Bengkalis of Riau	249,446	50.1%	8	2	37,577	183,567
Belitung of Bangka Belitung	90,557	58.1%	5	1	86,031	86,031
Belitung Timur of Bangka Belitung	62,448	58.7%	7	4	7,042	28,922
Karimun of Riau Archipelago	130,443	61.4%	9	4	20,855	39,190
Bintan of Riau Archipelago	86,331	60.7%	10	4	10,633	37,197
Region of Other Islands						
Badung of Bali	443,699	81.7%	6	5	52,017	104,934
Gianyar of Bali	322,025	68.5%	7	5	27,021	87,680
Klungkung of Bali	87,651	51.4%	4	2	23,016	46,605
East Lombok of NTB	555,562	50.3%	20	10	24,707	76,741
Berau of East Kalimantan	89,688	50.1%	13	2	14,141	62,725
Mimika of Papua	123,425	67.8%	12	2	10,662	106,529

Source : Calculated from result of 2010 census.

Table 11. Urban population and it concentrations in urbanized kabupaten outside Java, 2010

In terms of town formation, a detail study using three rapidly urbanized *kabupaten*, i.e., Kabupaten Tegal, Malang and Purwakarta show that all of the urban villages in a *kabupaten* will not agglomerate into single urban area (Mardiansjah, 2013). The wide area of the *kabupaten*'s territory, where the agricultural land is often still dominating the land have made the reclassification process only occurred in some particular villages that mostly are influenced by two factors, i.e., the history of the villages as service centers and the potential of the villages as the place of development. Most of the villages that reclassified as the initial urban villages are the villages that play role as the place of service center like the market place or other services like educational or health services. Meanwhile, the availability of regional road that connecting the villages to the surrounding urban centers as well as its distance, and the availability of potential economic activities are parts of the potential of the villages as the place of development. Therefore, instead of to be agglomerated into single urban area, in most cases, urban villages of the *kabupaten* agglomerated into some town (urban areas) with varying sizes of tows.

Table 10 and Table 11 show the number of urbanized *kecamatan*, a territorial subdivision of kabupaten, with the range of population size in every urbanized *kecamatan* for every urbanized *kabupaten*. In fact, the number of urbanized *kecamatan* is not the same with the number of town formed in the *kabupaten*. For example *Kabupaten* Tegal that has 10 urbanized

kecamatan (see Table 10) has five towns in the territory, since six *kecamatan* agglomerated into two relatively big towns with a population of about 200,000 and 300,000 respectively, and other two other *kecamatan* agglomerated into one town with 80,000 populations and the rest two *kecamatan* form their own town; *Kabupaten* Malang that has 14 urbanized *kecamatan* has nine small and medium sized towns (30,000 to 200,000 dwellers); and *Kabupaten* Purwakarta that has six urbanized *kecamatan* has two small and medium sized tows ((60,000 and 210,000 respectively). Nevertheless, the number of urbanized *kecamatan* could be seen as an indicator that most of urbanized *kabupaten* have several towns formed in their territory with varying size but significantly comparable to the population of many cities in Indonesia.

4.1.   Some Important Challenges of Urbanization of *Kabupaten* in Indonesia

Previous discussion argues that urban population and urbanization process in Indonesia has not only intensified the urban challenges in large cities but also emerge the in much smaller size town and cities. The challenge in the small and medium cities is coming from the rapid growth of its population as well as increasing number of the type of cites, in both types: cities of 100,000 to 300,000 populations and cities with less than 100,000 populations. Especially for those located in Java, these type of cities has also experienced a process of urban region formation, in which the urban population growth take place beyond the city's border and go to the surrounding *kabupaten* that lead into a rural-to-urban reclassification process in some particular villages where the urban population growth of *kabupaten* took place. In these regards, Firman (2016) argues the process is a kind of urban conurbation process of the large cities that has led the urban population growth occurred not only in the city core area but also extended to the peripheries, the territory of *kabupaten*. Firman (2016) also argued that the rapid growth of urban population in the *kabupaten* was the part of the mega-urbanization process in Indonesia (or in Java) that similar to other large cities in Asian countries. However, the presence of the rural to urban reclassification process has not only occurred in some *kabupaten* adjacent to large cities, but also in many *kabupaten* adjacent to much smaller cities and even in some *kabupaten* that are not adjacent to any cities, in Java and outside Java.

The different characteristic of Java to other regions, i.e., a very high population density, has led into different characteristics of urbanization processes from those outside Java. In Java, the urban conurbation processes have been occurred in both small and large cities, and even happened in some particular not-adjacent-to-any-cities *kabupaten*. These phenomena have also shown the different characteristics of urbanization in Java as an urbanization process that has been appeared in a regional level, which then brought significant differences in the number of urbanized *kabupaten* as well as in the urban population size among urbanized *kabupaten* among in Java and in other regions. In Java, the number of urbanized *kabupaten* is much bigger than those outside Java; and also the urban population size (see Table 10 and Table 11).

In these phenomena, later the role of cities in accommodating urban population growth has been decreasing. Their role that was receiving more than 70% of urban population until 1971 has decreased into less than 50% in the late of 1980s. In the opposite, the role of *kabupaten* in accepting urban population has increased from less than 30% in 1971 to more than 50% starting 1990, even though it was slightly deceased from 2000 to 2010 as there were some *pemekaran* some *kabupaten* into *kota* that also reclassified some urban dwellers of *kabupaten* into those of *kota*. Today, there are more than 66 million people live in towns in *kabupaten*, while about 52 million people reside in cities in Indonesia.

The increasing role of *kabupaten* is considered to bring some important challenges in the urbanization process. The first challenge is coming from the large number of urban population involved in urbanization process in the *kabupaten*, which is not only in terms of the total number of urban population living in *kabupaten*, but also in terms of the number of urban population in some particular *kabupaten*. According to the result of the 2010 census, there are ten *kabupaten* (nine *kabupaten* in Java and one *kabupaten* in Sumatra), which have more than one million urban inhabitants. Some of them have more than two million urban inhabitants, like *Kabupaten* Bogor with 3.8 million urban dwellers, *Kabupaten* Bandung (2.7 million), Kabupaten Tangerang (2.3 million), and Kabupaten Bekasi (2.1 million). There are also 21 *kabupaten* that have around 500.000 to one million urban inhabitants in their territory. These figures indicate that many *kabupaten*, especially those located in Java, could also have big challenges in dealing with their urbanization process in their territory in order to respond their urban population growth.

The second challenge comes from the spatial characteristic of urban population concentration in *kabupaten* that is different from urban concentration in municipalities. Urban population in most *kabupaten* rarely concentrated in a single urban concentration, but commonly in more than one urban concentration with varying size that each of them is significantly comparable to that of the municipality. Most of them consist of the capital of the *kabupaten* and other urban concentrations, which are developed from existed rural centers (Mardiansjah, 2013). The large number of urban concentrations in *kabupaten* will also bring challenges for the *kabupaten's* institutions since they should take care of many towns in their territory in addition to their obligation in managing their regional as well as rural development processes.

The last important challenge comes from the nature of *kabupaten* that is designated as the local government for non-urban region as the complementarity of *kota* (municipality) that is designated for the urban region. As the implication, most of the government of *kabupaten* is not well prepared to implement well management of urban development processes as well as their implications. It is indicated by the absent of some institutions or services that specifically dedicated for managing urban development process such as city planning department/services, building control and supervision institution, and fire department in many *kabupaten* including in the urbanized *kabupaten*. Usually the functions of the absent institutions are performed by a division or even a section of certain institution. Thus, most of the functions are not run well since they are implemented by a lower echelon that means with smaller staffs, smaller financial resources, smaller technical capacities and also smaller decision powers.

These challenges come from the nature of towns in *kabupaten* that can be classified as non-statutory ones. Since towns in *kabupaten* are the part of the *kabupaten*, they do not have their own authorities as well as their own resources, including human, financial, tools as well as decision powers, as all of the resources and authorities belong to the *kabupaten*. Therefore, all of the towns highly depend on the *kabupaten*'s institutions that should also take care of the *kabupaten*'s regional development as well as the rural development as most of *kabupaten* have non-urban areas as the majority of their administrative territory.

5. Conclusion

Located in the place where global urbanization grows rapidly, the Indonesian urban population growth and urbanization process become one of the significant processes that should be better understood and managed in order to take benefit from the inevitable process. The approach developed in this study provides insights into the importance of Indonesian urbanization process that has potential to be experienced by other developing countries in the south: the significant number of urban population involved, the spatial concentration of urban growth that remains to be concentrated in the main region, and the small towns and cities, including those the non-statutory, that should be given more serious attention in order to bring better management in their urban development process.

Although the pace has eased in the last few decades, the challenges brought by the urbanization process in Indonesia could not be considered to have diminished as well. Instead, the challenges will be greater in the future, since the number of annual number of new urban population involved continues to increase until the next decade and will only slightly decrease in the next few decades. This will bring some important changes in the country, as it has changed the population of the country into a predominantly urban society and has led Indonesia to become a member of group of countries that have more than one hundred million urban populations.

In addition to increase the size of some main urban agglomerations, like Jakarta that has grown as the Jabodetabek or the Jakarta Metropolitan Region (JMR), the megacity with a population of more than 25 million of urban inhabitants, including in both in the core and in the peripheries, there is a great tendency that urbanization process in Indonesia takes also place in much smaller town and cities that also developing, reforming, and reproducing small towns in the territory of *kabupaten*. These phenomena will lead into new challenges in urban future in Indonesia, as the phenomena do not only involve enormous number of population, but also large number of *kabupaten* as well as the number of the towns. The solution is considered will not only involve a capacity building for the *kabupaten* in managing their urban development process, but also need a fundamental political will for political and administrative rearrangement that provide better authorities, tools and mechanisms, especially for the urbanized *kabupaten*, in dealing with their urbanization process and urban growth. Furthermore, the solution is considered to need spatial affirmative policies that can accelerate a more balance development and urbanization processes throughout regions in Indonesia.

6. References

Anderson, G, and Ge, Y. (2005) "The size distribution of Chinese cities", Regional Science and Urban Economics, Vo. 35 Issue 6 (November).

Cohen, B. (2004) "Urban Growth in Developing Countries: A Review of Current Trends and a Caution Regarding Existing Forecasts", World Development, Vol. 32 Issue 1 (January).

Fan, C.C. (1999) "The Vertical and Horizontal Expansions of China's City System", Urban Geography, Vol. 20 No. 6. (August).

Jedwaba, R., Christiaensen, L., Gindelskya, M. (2017) "Demography, urbanization and

development: Rural push, Urban Pull and… Urban Push?", Journal of Urban Economics. , Vol. 98 (March)

McGranahan, G., Satterthwaite, D.(2004) Working Paper : Urbanisation Concepts and Trends, London :IIED.
http://pubs.iied.org/10709IIED

Pradhan, K.C.(2013) Unacknowledged Urbanisation: The New Census Towns of India. Munich Personal RePEc Archive. New Delhi: Centre For Policy Research.

Shatkin, Gavin (2019) "The Planning of Asia's mega-conurbations: contradiction and Contestation In Extended Urbanization",International Planning Studies, Vol. 24 No. 1 (January).

Sircar, S. (2017) "'Census Towns' in India and what it means to be 'urban': Competing epistemologies and potential new approaches", Singapore Journal of Tropical Geography Vol. 38 No. 2 (March).

United Nations (2015) World Urbanization Prospects: The 2014 Revision *(ST/ESA/SER.A/366)*, New York: Department of Economic and Social Affairs, Population Division.
https://esa.un.org/unpd/wup/publications/files/wup2014-report.pdf

Ye, X and Xie, Y. (2012) "Re-examination of Zipf's law and urban dynamic in China: a regional approach",The Annals of Regional Science, Vol. 49 No. 1 (August)

Zhang, Li and Han, Sun Sheng (2009) "Regional disparities in China's urbanisation An examination of trends 1982–2007", International Development Planning Review. Vol. 31 (December)

Research Paper

AN ANALYSIS OF THE CHANGING ROLE OF ISTANBUL AS A MEGACITY IN THE WORLD

Muhammed Ziya PAKÖZ (Gebze Technical University, Faculty of Architecture, Department of City and Regional Planning, mzpakoz@gtu.edu.tr); Turkey

Ahmet BAŞ, (Abdullah Gül University, Faculty of Architecture, Department of Urban and Regional Planning, ahmet.bas@agu.edu.tr); Turkey

Fatih EREN (Konya Technical University, Faculty of Architecture and Design, Department of City and Regional Planning, feren@ktun.edu.tr); Turkey

Abstract

Istanbul is a unique part of the world because of not only its history, but also its function as a bridge from the point of economic, social and cultural interrelations. There are many cities, which are settled near a water source; however, Istanbul is the only city that is settled between two continents and two seas. All these features create some opportunities and threats for the city in terms of hinterland relations and the spatial structure.

This paper aims to find out the economic, social and cultural impact of globalization on the spatial structure and the hinterland relations of Istanbul while discussing the city's contradictory positions as an edge of Europe and as a bridge between the East and the West. Within this scope, we made a multiscale analysis considering inter-regional and inter-urban relations and their socio-spatial imprints within the boundaries of the city. Firstly, we made a comparative analysis to understand the changing position of Istanbul in the world in the 21st century by using global and regional indexes. Secondly we examined the change in the hinterland relations of the city by investigating the flows of people, goods, services and ideas between other regions / cities and the city of Istanbul in time. Thirdly, we traced the spatial imprints of these flows and interactions within the city in terms of relocations and displacements.

Our study shows the growing importance of the city not only as a part of Europe but also as a node and bridge for the globalized world while emphasising socio-cultural and socio-economic tensions within the city as a result of this process.

Keywords

Istanbul, globalization, global city indexes, spatial structure, hinterland relations.

1. Introduction

Istanbul is one of the fastest-growing metropolitan areas not only in its region but also in the world. It functions as a bridge in terms of social, economic and cultural flows and transitions between continents as well as the cradle of human civilization.

Despite the changing of the capital from Istanbul to Ankara in 1923, Istanbul achieved to sustain its role as "the nation's industrial and business centre, greatest port, the focus of transportation network and the centre of cultural and intellectual life" (Göymen, 2008). For

the last decades, Istanbul attracts millions of people from different regions in Turkey as well as from the other near and far countries from Asia to Africa (Table 1).

Table 1: Population change in Istanbul, the Marmara Region and Turkey from 2000 to 2018 (TurkStat, 2019).

	2000	2005	2010	2015	2018
Istanbul	11,076,840	12,128,577	13,255,685	14,657,434	15,067,724
Marmara Region	17,829,639	19,467,417	21,285,696	23,403,950	25,034,570
Turkey	64,729,501	68,860,539	73,722,988	78,741,053	82,003,882

Istanbul is located in the middle of the Asia, Africa and Europa. Just in a three hours flight, it could be reached 1.5 billion people. Besides Turkish Airlines (THY) widens its hinterland and starts to flight more than 350 destinations in the world. This makes Istanbul more accessible from any point of the world.

On one hand, Istanbul is an *"avantgarde"* city for Turkey and its region. Economic impact of Istanbul is very high. According to the Turkish Statistical Institute (TurkStat), 43% of the total taxes are collected and 55% of economic activities are produced in Istanbul. Together with adjacent cities (Kocaeli and Tekirdağ) in the metropolitan region, this ratio reaches more than 50% of taxes and 65% of economic activities in Turkey. Additionally, more than 13 million tourists visited the city in 2018.

On the other hand, not only the city of Istanbul and the rural towns within the boundaries of the city, but also other cities in Turkey and near countries such as Balkan and Middle East as well as Africans, which play an essential role supporting and providing resources of foods, labour, industrial activities, raw materials and so on to the city of Istanbul.

As well as economic situation, social and cultural transition between the different groups makes the city unpredictable core of the region. Different ethnic/religious groups and immigrants live in the city together. Beyond all that, Istanbul is a big exporter of the Turkish TV series to the neighbours of the country especially in the Middle East and the Balkans.

In this paper, we examined how globalization process affected the city's socio-economic and socio-political position within the world, and how this change influenced socio-spatial processes within the city. In the second chapter following the introduction, the most popular global city indices including Istanbul were picked and the changing position of Istanbul in the world has been scrutinized. In the third chapter, changing hinterland relations of the city in terms of flows of people, capital, goods, services and ideas/cultures; and their socio-spatial imprint within the city were discussed.

2. The Changing Position of Istanbul in the World

Istanbul is included in almost all international studies comparing world cities. The main cities where Istanbul is compared in various categories in the Global City Indices are New York, London, Tokyo, Paris, Frankfurt, Zurich, Dubai, Beijing, Seoul, Hong Kong, Bangkok, Singapore, Sydney, Vancouver and Los Angeles. These cities both share and compete with each other in the world city network.

Istanbul attracts people from almost every point of the world. The recognition of a global city encourages international organizations to think and produce new projects in that city. According to the Global Power City Index (2018), cities like Doha, Dubai, Beijing and Bangkok make great efforts to attract people's attention, while Istanbul can naturally attract people without special effort. Istanbul is the 34th most powerful city in the world, with high global accessibility and a preferred stopping point for international travel (MMF, 2018). Istanbul is an advantageous transfer and maintenance point in terms of location for both air passengers and airline companies in long-distance transfer flights in the east-west and north-south axis in the world. Istanbul has a strong transportation and communication infrastructure. Ongoing and planned large-scale regional transport projects strengthen the infrastructure and renewal of Istanbul and neighbouring cities. The city has something to appeal to everyone in the world. According to Kearney's Global Cities 2019 Report, Istanbul ranks 26th among 135 most influential global cities (Kearney, 2019).

The business world in Istanbul is very active and lively. The indices reveal that Istanbul can attract qualified people from Turkey and abroad. This is a very important feature for Istanbul, because the performance of global cities is rapidly increasing when it can attract a qualified young population from the world to live and work. According to the JLL Global 300 Cities Index, Istanbul ranks 17th in terms of population, 13th in terms of economic size and 19th in terms of commercial attractiveness among 300 global cities (JLL, 2019).

Istanbul's foreign trade volume is around 195 billion dollars (TurkStat, 2016). According to the data of the Ministry of Commerce, Istanbul exported USD 34 billion and imported USD 57 billion in 2018 (Ministry of Commerce, 2018). With these characteristics, Istanbul is one of the 20 most important business and trade cities in the world according to the 2016 Commercial Attraction Index. In addition, for many years, Istanbul has been shown as one of the leading investment cities by all credit rating agencies. According to World Bank 2015 data, with an economic size of 349 billion dollars, Istanbul has a larger economy than 130 countries in the world (for example, Pakistan, Chile, Ireland, Finland, Portugal and Greece). Having a stock exchange in global city indices is shown as an element that reveals the economic impact power of a global city. In this context, the presence of BORSA İSTANBUL adds a great strength to the economic attractiveness and image of the city. The cost of living in Istanbul is relatively low compared to many global cities (eg Dubai, New York, etc.). In the 2018 survey of the Mercer company, which ranked 209 global cities according to the high cost of living, Istanbul was ranked 154th. According to UN Habitat Urban Data 2016 data, food and clothing prices, urban transportation costs, urban utility bill costs and leisure time costs are among the factors that reduce the cost of living.

The quality, speed and environment of hospital services in Istanbul are better than all other global cities (Numbeo, 2019). The number of visitors to the city to receive qualified health services and treatment has increased in recent years. Compared to many global cities, there are many historical and natural areas to visit in Istanbul (and nearby neighbouring cities). These features make Istanbul stand out in the global competition and make it strong.

According to the global city index data, there are two important issues that have left Istanbul weaker in global competition. First, Istanbul is not yet able to produce sufficiently effective projects and projects on environment, energy and waste. There is a need to make strong moves in the city in terms of clean energy, environment and recycling, not only in order to

be ahead of the economic race, but also to make Istanbul a liveable place for both people and other living things. Evaporation increases, scarce ground and surface water resources decrease, water quality decreases, vegetation cover changes, and seasonal imbalances in temperature and rainfall amounts occur due to global climate change and global warming. Like many other world cities, Istanbul is also affected from changing environmental conditions. Protecting natural resources and nature should be kept on the agenda as much as economic development in Istanbul in order to prevent Istanbul from being affected by climatic changes and global warming in a longer term. Turkey has its signature under the international agreement on global climate change. Therefore, the country must adopt a strong attitude on this issue. The lack of open and green spaces in the city and the intense structuring in Istanbul are the major factors that downgrade Istanbul in global city indices.

Second, Istanbul (including patent, utility model, trademark, industrial design and registration) is unable to produce enough original information and manage the global flow of information. According to the Networked Society City Index 2016, which researches the sustainable development of global cities in the information and communication sector, Istanbul is the 22nd most integrated city in the global network and its performance in this area is rapidly increasing (Ericsson, 2016). The inability to keep the circulation of useful information around the world is the biggest obstacle for Istanbul to become a leading and efficient city in the world in terms of R & D studies and patents.

Istanbul, whose transportation and communication infrastructure has been renewed, strengthened and expanded year after year, has the potential to be a central city that manages all global flows between the three continents. Anatolia and Turkey's European territory of the new road, sea, rail and air are connected with the new projects. This facilitates and accelerates the flows of people, goods, services, information and finance between Europe, Asia and Africa.

Not only in terms of land transportation, but also in terms of air transportation, Istanbul has a great importance both at national and international level (Eren, 2018). Turkey's air cargo operations are mainly carried out via Istanbul and Marmara region. Istanbul Atatürk Airport ranks 30th in the airport rankings according to cargo traffic in the world. Due to its location, Istanbul can reach most of the continents of Asia, Europe and Africa within a short flight distance of three hours. Istanbul New Airport will make Istanbul the centre of both the country and the region in terms of air cargo logistics. With an annual cargo capacity of 6 million tons, the new airport crosses Hong Kong, Memphis, Shanghai, Seoul, Dubai, Tokyo and Frankfurt airports in terms of volume. The fast connection of the new airport by road and sea, and the strong integration of transportation in the city are of great importance in terms of the international competitiveness of the new airport.

There are many large-scale transportation and infrastructure investments in Istanbul. These investments increase the interaction and trade relations of Turkey with Asia, Middle East, Mediterranean and the European countries and relieve Istanbul's urban transport and traffic. Istanbul is a consumption and distribution focus where 53% of the production of logistics activities occurs in Turkey. These activities contribute 32 billion TL annually to the national economy (IBB, 2017). Therefore, Istanbul is the most important locomotive city in the development of trade, industry, finance and tourism sectors.

With the Istanbul Stock Exchange, Istanbul is Turkey's main financial centre. However, the city aims to become an international financial centre. This objective is clearly emphasized in the 2009 Strategy and Action Plan, the Vision 2023 document and the 10th Development Plan. In line with this objective, the international financial centre, which has a physical infrastructure in Ataşehir, is expected to provide new jobs for 30,000 people. In 2016, 104,000 people are employed in finance and insurance activities in Istanbul. Therefore, there are 7 jobs per 1000 people in the financial sector in Istanbul. This ratio is below the average standard in international financial centres. Therefore, the financial sector in the city needs to be expanded by following a special strategy. If the financial and insurance sector in Istanbul grows by 4.7% each year, in 2036 a total of 261,000 people will become employable in the sector. When Istanbul's capacity in the financial sector increases, this will also help the growth of other sectors in the country.

Istanbul has the potential to become a headquarters for financial investors in the Arabian Peninsula, the European Union and Russia. This can be achieved by creating the most advanced technological infrastructure in Istanbul, facilitating access to innovative technology and reducing costs.

For foreign investors, Turkey is considered as a country that is difficult to do business. The World Bank Ease of Doing Business Index based on 2017 data, Turkey is ranked 69 among 190 countries. Unfortunately, the new investment incentive system does not include incentives for the rapid growth and internationalization of high value added sectors such as finance and IT in Istanbul.

Istanbul is a national and international trade centre. 69 out of every 1000 people in the city are employed in wholesale and retail trade sector. This ratio shows that Istanbul is behind Dubai (94) but ahead of Hong Kong (68) and Singapore (63) to become a global commercial centre. Istanbul is also very close to its competitors in the food and beverage sector. In 2016, 284,000 people are employed in this sector in Istanbul. Therefore, 19 out of every 1000 people work in this sector. 25 out of every 1000 people in Singapore and 29 out of 1000 people in Dubai are employed in this sector. Istanbul has the potential to attract many more international students in the higher education sector. Today, 25,000 teaching staff is employed in this sector.

To sum up, Istanbul has a number of strong points/advantages to compete with other global cities such as its location, transport infrastructure, young population, and lower costs of living while it has some weaknesses to eliminate such as its environmental conditions, quality of life and lack of innovations to lead the world.

3. The changing hinterland relations and socio-spatial organization

3.1. Flows of people: Demographic transition

Turkey was mostly "a country of emigration" during the second half of the 20th century. From the beginning of the 21st century, the country has become a cross-road point not only for irregular migrants from Asian countries such as Afghanistan, Pakistan, Bangladesh, Iraq, Iran but also for EU specialist and retirees and regular/irregular migrants from the former Soviet Bloc countries.

Turkey signed Convention Relating to the Status of Refugees in 1951. Today, Turkey, known as migration and asylum country for many years due to policies, are faced with difficulties. However, Turkey's traditional immigration policy nowadays, nation-building concerns, and maintaining a homogeneous national identity was largely shaped by efforts. Turkey's immigration policy in recent years, necessitate the replacement of traditional policies (Kirişçi, 2007).

In 1923 (the proclamation date of the Turkish Republic) the city of Istanbul had a nearly 700.000 population. Its growth continued relatively until the 1970s, when it reached about two million (TurkStat, 2018). After that, accelerated economic development, which fuelled strong internal migration especially from the middle and eastern Black Sea and Eastern Anatolia regions of Turkey, led to a rapid expansion of both population and built-up area. By the end of 2018, the city had a population of more than 15 million on a territory that covers 5.461 km². Currently, about two-thirds of the population (9 million) live on the European side, and one-third (6 million) across the Bosporus on the Anatolian side (TurkStat, 2018).

While there were 20 universities and 198.612 students (associate-bachelor-master-doctorate) in Istanbul in the 2000-2001 education period, the number of universities increased to 57 and the number of university students to 774.350 in 2018-2019 (YOK, 2019). The number of university students in Istanbul corresponds to 41% of the total number of university students in Turkey (1.888.557 in total). In the 2017-2018 period, the number of foreign students studying at the universities in Istanbul is 35,735 which refers the 28.5% of all foreign students in Turkey (YOK, 2019).

According to the TurkStat, 46.509.314 tourists and sojourners have visited Turkey in 2018. Of these, 18.643.175 visited Istanbul as a tourist/visitor (TurkStat, 2019a). There are 1.013.618 foreigners with a residence permit in Turkey, and 517.997 foreigners (51.1% of total foreigners) are located in Istanbul (DGMM, 2019a). Similarly, there are 3.62 million Syrians under temporary protection in Turkey; and 547.535 Syrians (15% of total Syrians in Turkey) are settled in Istanbul (DGMM, 2019b).

While the number of international immigrants migrating to Istanbul in 2000 was 54.644, as of the end of 2017, this number reached 166.044. Of the 166.044 people who came to Istanbul in 2017 by international migration, 148.722 were foreign nationals. In 2017, international net migration to Istanbul was 90.195 (TurkStat, 2019b). As it is seen, Istanbul has attracted 35% of all international immigrants (466.333 all over Turkey) in 2017. In addition, 42.4% of international net migration was realized in Istanbul.

In terms of internal migration, the opposite is the case. In 2015-2018, the emigration from Istanbul is higher than immigration to the city. In this period, net migration was realized as -287.600 (TurkStat, 2019b).

Table 2: The population / visits and the share of Istanbul in Turkey

	(Year, Source)	Istanbul	Turkey	%
Population	(2018, TurkStat)	15067724	82003882	**18,37**
University Students	(2018-2019, YOK)	774350	1888557	**41,00**
International Tourists / Sojourners	(2018, TurkStat)	18643175	46509314	**40,08**
Temporary residents	(2019, DGMM)	517997	1013618	**51,10**

International Immigrants	(2017, TurkStat)	166044	466333	**35,61**
International Net Migration	(2017, TurkStat)	90195	212693	**42,41**
Temporary Protection (Syrians)	(2019, DGMM)	547535	3626820	**15,10**
Domestic Passengers (Airports)	(2018, DHMI)	41795577	112911108	**37,02**
International Passengers (Airports)	(2018, DHMI)	60780029	97587056	**62,28**

As can be seen from the Table 2, the gravity of Istanbul, which hosts 18% of Turkey's population, is much higher than its population. The city has become a centre of attraction for university students, tourists, sojourners, international immigrants and refugees. This attraction has dramatically changed the demographic structure of the city. In the central areas of the city, some of the dwellings inhabited by local residents have been converted into motels / pensions / dormitories, and some have been converted into dwellings where students and refugees reside. The fact that housing stock in the central areas of the city is older than the peripheral areas while the rental and sales values are higher in addition to the parking and security problems in these areas influenced the preferences of the local people, who can find new apartment buildings or reside in gated communities in the peripheral areas. As a result, the demographic structure that emerges in the central areas of the city causes the alienation of the citizen to the city.

The number of universities in the city has increased rapidly in the last 15 years and most of the new universities are concentrated in Fatih, Beyoğlu, Beşiktaş, Şişli, Üsküdar, Kadıköy districts, where can be described as the historical core of the city (Figure 1). Fatih district is also the most preferred area for international immigrants and Syrians under temporary protection. Fatih and Beyoğlu are also the centres of touristic activities.
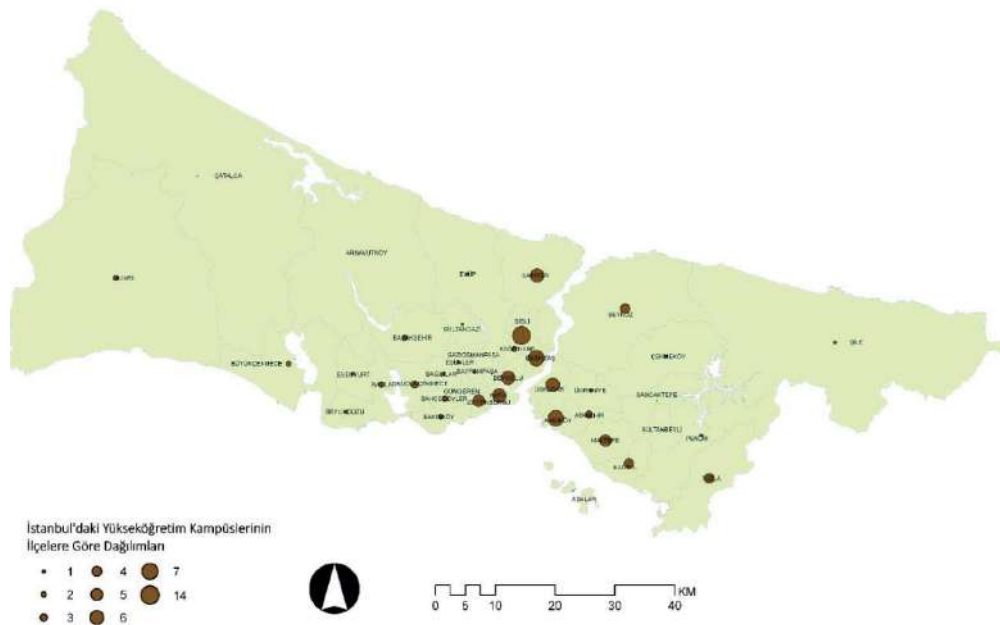
Figure 1: Distribution of Higher Education Campuses in Istanbul by District-2015 (Arlı, 2016a).

In addition, gentrification zones have started to be formed in the central areas of the city, especially in some districts of Beyoğlu, Şişli and Beşiktaş. The transformation in these regions also resulted in the displacement of the old inhabitants of the city.

In summary, Istanbul's adventure of being a centre of attraction and a global city on an international level has led to a change in the demographic structure of the city. The movement of the city dwellers from the centre to the periphery and out of the city, increasing visibility of tourists, students, expats, intellectuals, single white-collar employees in the central areas of the city. In addition, low-quality houses in the central areas of the city, where have not yet been transformed, has become a shelter for the Syrians under temporary protection.

3.2. Flows of capital, goods and services: spatial re-organization

Despite numerous headwinds, unsuccessful military coup and adverse shocks, "Turkey's real GDP has grown by more than 34% over the past 5 years, faster than any other OECD country except for Ireland and only slightly less than China and India"(OECD, 2019). Turkey's business sector showed one of the highest investment rates in the OECD countries. However, even there is a big economic fluctuation in the second part of 2018, which triggered a recession in the second half of the year (Figure 2), strong fiscal and quasi-fiscal stimulus have moderated the contraction in early 2019.

Istanbul is the capital of economy in Turkey informally. All financial centres, banks, insurance companies etc. are located in the city. It has provided more than 40% of Turkish taxes and nearly 55% of economic activities in Turkey (IBB, 2017).
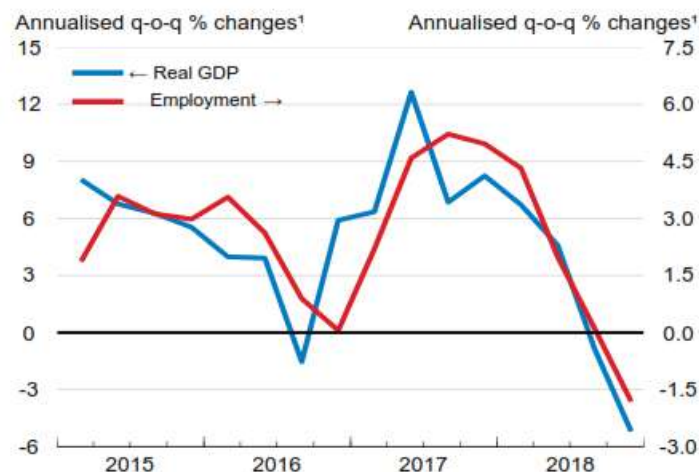
1. Three-quarter moving average.
Source: OECD Economic Outlook 105 database; and Refinitiv.

Figure 2: Turkeys' real GDP and employment distribution between 2015 and 2018.

Thanks to rapid economic growth, numbers of immigrants from all parts of Turkey and from neighbour countries migrated to Istanbul in one of the world's fastest migration rate. This flow of migrants put the physical infrastructure of the city under great pressure and caused great congestion costs. As Göymen points out in his study, the generally unqualified waves of migrants continued to come to Istanbul, putting pressure on housing stocks and physical and social infrastructure; Increased congestion forces the environmental bearing capacity to its limits. (Göymen, 2008).

Istanbul is also one of the main cities of media and cinema industries in Turkey. The ongoing boom period, which remains largely unknown to the majority of casual viewers in the West,

began in 1999. Since then, Turkish drama serials have been seen across the rest of the world by billions of people. To put this surge into context, in 2004 Turkish TV exports were worth $10,000. That figure grew to $350 million by 2017. The aim is to hit the eye-watering sum of $2 billion by 2023 with TV dramas expected to make up over half that total (Looch, 2019).

Human movements and demographic changes in the city have progressed in parallel with goods, services and capital flows. These trends have led to significant changes in the spatial organization of the city.

The traditional business centre of the city (Historic Peninsula-Beyoğlu) first expanded northward (Şişli-Levent-Maslak); later, a financial centre was established on the Anatolian side of Kadıköy-Ataşehir-Kozyatağı axis. As a result of the expansion of the traditional centre and the formation of new centres, the number of skyscrapers has started to increase rapidly in the central areas of the city and sub-centre areas. On one hand, newly constructed skyscrapers have an impact that strengthens Istanbul's global urban image. On the other hand, they have been criticized for their negative impact on the city's historical skyline, as well as the traffic load it brings to the city and deepening the socio-spatial differentiation in the city. The rapid increase in the number of skyscrapers brought about the Dubaization / Manhattanization discussions.

Global brand chains spread from the centre to the peripheral areas thanks to the rapidly increasing number of shopping malls in the city. The number of shopping centres in the city, which was 25 in 2004, reached 80 in 2014. Şişli, Beylikdüzü and Esenyurt on the European side, Ataşehir and Ümraniye on the Anatolian side were the most preferred districts of the new shopping malls (Çakır Zeytinoğlu et al., 2016).

The fact that this trend and increasing land values in the city started to put pressure on the industrial areas within the city resulted in the decentralization of the industry in the east-west direction (Kocaeli-Bursa-Tekirdağ). As an important industrial axis of the city, Basin Ekspress Road today is mostly used with services such as shopping centres, hotels, offices and residences.

The symbols of change and transformation in the integration process of Istanbul to the global world appear as "mega projects". Yavuz Sultan Selim Bridge (the 3rd Bosporus Bridge), which was completed in 2016, the Istanbul Airport, which was put into service in 2018, and Kanal Istanbul (the waterway project) planned to be constructed as an alternative to the Bosporus are the three most important and most debated mega projects in this period. All three projects were supported by advocates of economic integration with the global world and criticized for increasing the pressure on the city's natural resources and shifting the direction of development towards forest areas in the north. These projects have become important platforms in which socio-political tensions in the city have come to light (Baş et al., 2018).
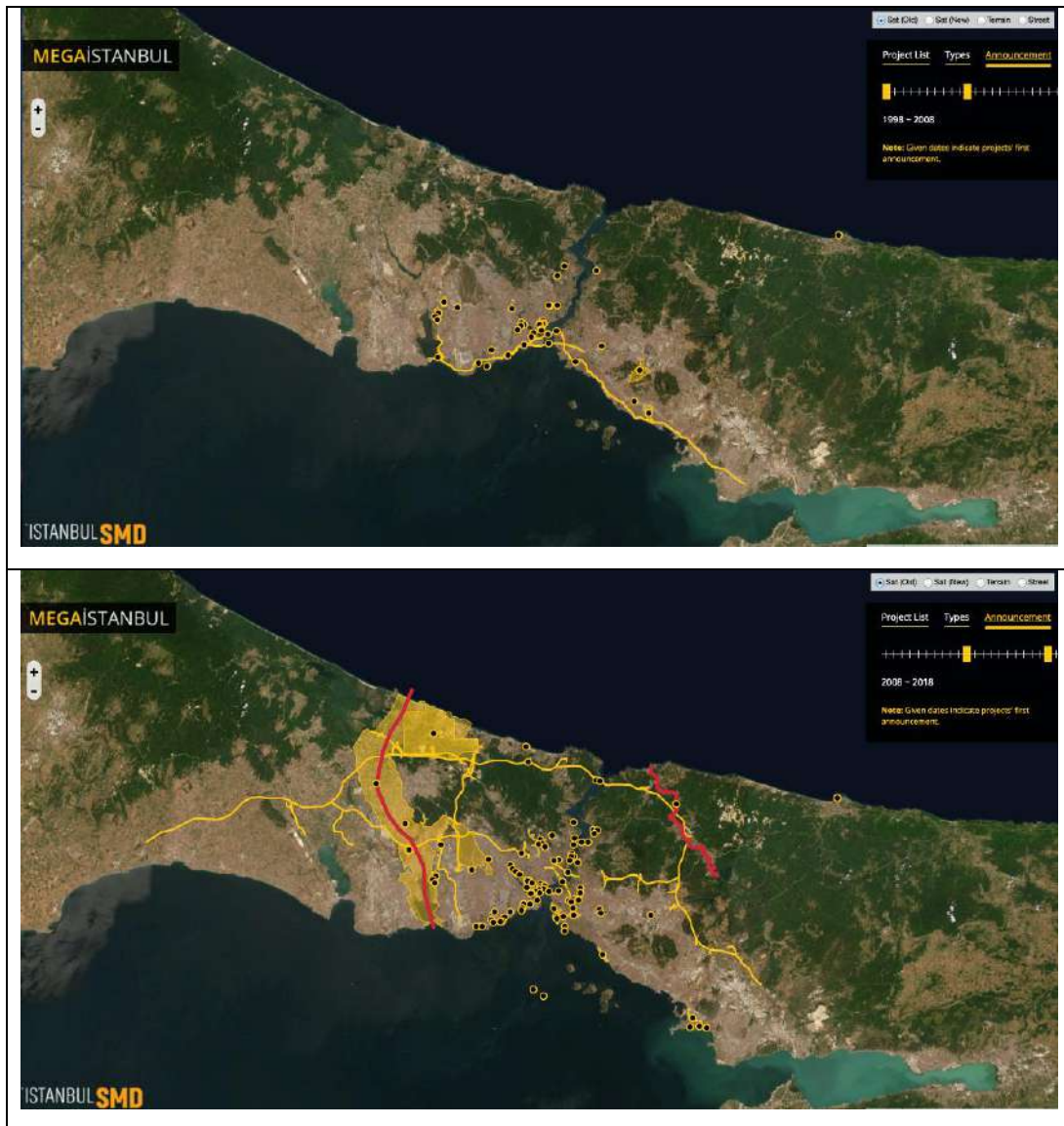
**Figure 3: Planned / Announced mega projects in Istanbul between 1998-2008 (above) and
2008-2018 (below) (IstanbulSMD, 2019).**

The mega projects announced to the public between 1998 and 2018 are shown on the map of Istanbul (Figure 3). In the first decade, mega projects envisaged both in the centre of the city and on the east-west axis. However, the number of these projects has boomed as the integration process into the global world has accelerated; and the location of these projects, both growing in number and area, shows that the direction of development of the city has also changed.

It is also possible to follow the rapid development and change of the city through the land use data of CORINE (Coordination of Information on the Environment) shared by the Ministry of Agriculture and Forestry. It can be read from the 2018 data that mobility started with the new airport and highways / bridges in the north of the city (Figure 4).

The year of 1990	**The year of 2000**
The year of 2012	**The year of 2018**
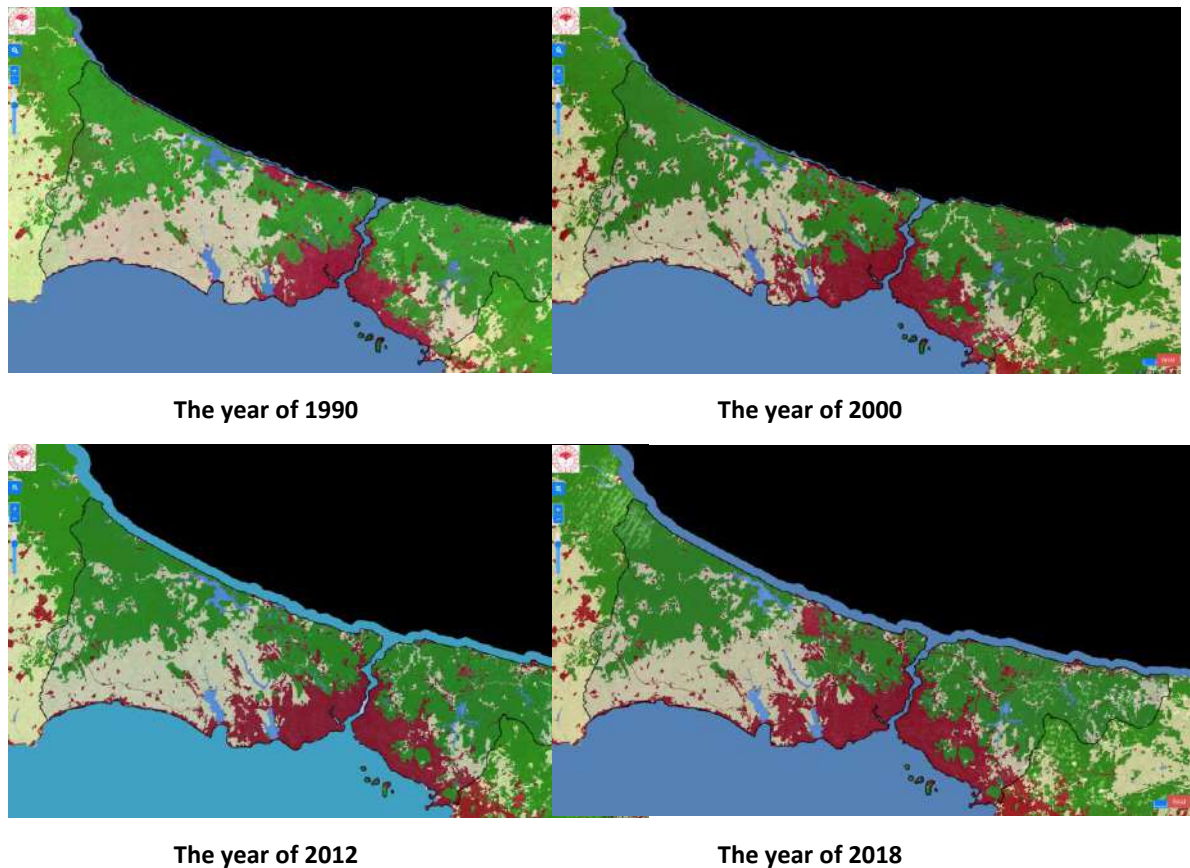
Figure 4: The changing land use of Istanbul between 1990 and 2008 (CORINE Land Use Data) (TOB, 2019).

To sum up, Istanbul's integration with the global world has led to socio-spatial transformations in the central areas of the city, and to the expansion of the city in the east-west and north directions and forcing natural thresholds.

3.3.   Flow of cultures and images: socio-cultural transition

In addition to the flows of people, goods, capital and services, it is seen that Istanbul is on its way to becoming the centre of the cultural industry and expanding its area of influence. Cultural interaction has occurred in two ways. First, a mutual cultural exchange has become possible through numerous cultural events, exhibitions, festivals and congresses; and second, thanks to the Turkish TV series, a cultural hinterland has been formed in a wide geography especially in the Balkans, the Middle East and Latin America.

Turkish TV series have created a cultural hinterland in the geographies where they are exported, and the interest and curiosity of the audience watching the series has increased. According to Ozcan and Anaz, Turkish TV series and films have positively impacted Turkey's visibility abroad (Ozcan and Anaz, 2016). Moreover, there are some touristic organizations organized only to visit the sets (Melamed, 2019; Gürmen, 2016; Sobecki, 2010).

Turkish TV series are also very effective in the Middle East and the Asian countries. For instance, A study conducted in Pakistan revealed that exposure to foreign culture by watching its series and programs, had a profound impact on Pakistani youth, thus affecting cultural identity, norms and values. (Raza, 2015).

Magnificent Century (Muhteşem Yüzyıl), an epic historical drama launched in 2011, that found audiences beyond Latin America and the Middle East. At its peak the series, which tells the story of 16th century Ottoman sultans, was broadcast in over 40 countries with more than 200 million viewers worldwide (Looch, 2019). Ertugrul Resurrection (Diriliş Ertuğrul) is one of the most popular Turkish TV series all over the world. It has shown in more than 50 countries as well as in Netflix.

The city was selected as the European Capital of Culture in 2010. According to the International Congress and Convention Association (ICCA), Istanbul is one of the most important destinations that host international congresses. Although Istanbul, one of the top 10 cities hosting the most international community in the world in 2008-2012, declined by ten places as a result of the terrorist incidents and coup attempt in 2013-2017 period, the city has still an important attraction power (Table 3).

Table 3: Number of international meetings per city between 1963 and 2017 (ICCA, 2018).

Rank	Country	63-67	68-72	73-77	78-82	83-87	88-92	93-97	98-02	03-07	08-12	13-17
1	Paris	90	95	125	152	178	261	299	393	605	885	1,079
2	Vienna	60	41	72	92	119	182	231	280	536	760	950
3	Berlin	19	21	38	66	96	148	169	278	485	683	945
4	London	88	108	110	143	162	167	176	273	383	657	945
5	Barcelona	12	24	19	31	68	121	189	280	458	750	918
6	Singapore	2	10	21	46	88	114	159	234	432	638	795
7	Madrid	26	35	53	62	97	131	127	200	314	493	782
8	Lisbon	8	11	12	26	52	91	139	209	358	521	692
9	Seoul	4	8	17	28	55	103	154	231	383	586	691
10	Prague	33	29	24	25	30	81	153	227	399	536	688
11	Amsterdam	29	49	73	84	100	172	190	257	344	550	652
12	Copenhagen	46	32	65	75	105	131	222	266	335	543	631
13	Brussels	29	47	56	79	113	121	129	161	225	483	585
14	Beijing	0	0	0	5	38	91	137	197	428	644	582
15	Hong Kong	2	12	8	27	41	82	153	209	312	461	580
16	Dublin	14	29	28	46	62	74	104	126	271	369	563
17	Rome	39	43	34	49	76	99	117	211	314	490	560
18	Budapest	18	35	26	54	97	149	220	216	381	481	558
19	Istanbul	8	15	11	9	18	41	95	114	281	598	557
20	Buenos Aires	5	19	31	33	65	90	100	165	276	466	531
	Other	1,197	1,906	3,004	4,434	6,265	8,768	12,055	18,195	28,213	42,655	51,282
	Total	**1,729**	**2,569**	**3,827**	**5,566**	**7,925**	**11,217**	**15,318**	**22,722**	**35,733**	**54,249**	**65,566**

4. Conclusion

Istanbul is a city with high recognition in the world. Today, Istanbul has a certain positive brand value that has naturally emerged in the fields of geography, finance, services, trade and tourism. The city has some important advantages and disadvantages compared with other global cities. The main advantages of the city are its location/accessibility, historical background, cultural heritage, transport infrastructure, young population, cost of living, and healthcare services. The main disadvantages of the city are environmental conditions, lack of open spaces and green areas, and insufficient R&D studies and patents. In addition, the most obvious realities of the city, overcrowded construction, crowded population and traffic congestion create a very strong negative image and perception among the people who look at the city from outside and make the city's many positive features and beauty unnoticeable.

Istanbul after the year of 2000 is a city whose global integration tendencies are getting stronger but consequently its internal tensions increase (Arlı, 2016b).

These internal tensions are leading to the dichotomy of global integration/local segregation. Human mobility in Istanbul is a good example of these tensions, and it shows social relocation and displacements within the city. While domestic immigrations to the city have always been higher than emigration from the city until 2015, there has been a reverse trend since 2015. In the last three years, the city's residents tend to migrate to other metropolises and cities in the country. However the city remains a point of attraction for students, international immigrants, tourists, sojourners and refugees.

The presence of international immigrants means for Istanbul to hold global labour power. The fact that international immigrants prefer Istanbul is a positive contribution to the global attractiveness of the city. It is useful to consider in detail how global labour power can be exploited in the upper and lower levels of Istanbul. While establishing a population policy for Istanbul, it should be taken into consideration that the city would always be a point of attraction for international immigrants. In this context, regular scientific researches/measurements on the qualifications and capabilities of permanent/temporary refugees should be carried out and the social integration policies pursued in the city should be sustained. Following such an approach on international migrants will bring about improvement in the socio-economic structure of the city.

As pointed in the previous chapters, Istanbul's efforts to be integrated with the global world have also triggered socio-spatial transformations in the central areas of the city, and to the expansion of the city in the east-west and north directions towards natural thresholds. The city needs to empower its position among other global cities without destroying its social fabric and transcending its natural thresholds.

5. References

Arlı, Alim (2016a) "Yükseköğretimde Büyüme, Farklılaşma ve Reorganizasyon: İstanbul Örneği (1980-2015)", Sosyoloji Konferansları, Vol.54, pp. 199.

Arlı, Alim (2016b) Dünya Ölçeğinde İstanbul, in Antik çağdan XXI. yüzyıla Büyük İstanbul Ansiklopedisi, Kültür A.Ş., İstanbul.

Baş, Ahmet, Paköz, Muhammed Ziya and Eren, Fatih (2018) The Economic and Environmental Impact of Istanbul's Grand Airport Project on the Urban Structure and Behaviour of Istanbul. Young Planners Workshop 2018. Paris, FRANCE: "European Council of Spatial Planners (ECTP-CEU)". p.38-52. ISBN:978-2-9601363-5-7

Çakır Zeytinoğlu, Filiz, Uydacı, Mert, Çağlayan Akay, Ebru, Değerli, Başak and Karabıyık Yerden, Nevin (2016) "İstanbul'daki Alışveriş Merkezleri Üzerine Bir Araştırma: Kümeleme Analizi", Social Sciences Research Journal, Vol.5 No.1.

DGMM (2019a), "Residence Permits", available at: https://www.goc.gov.tr/icerik6/ikamet-izinleri_363_378_4709_icerik (accessed July 5, 2019).

DGMM (2019b), "Temporary Protection", available at: https://www.goc.gov.tr/icerik6/gecici-koruma_363_378_4713_icerik (accessed July 5, 2019).

DHMI (2018), "Airports Passenger Statistics 2018", available at: https://www.dhmi.gov.tr/Lists/IstatistikList/Attachments/339/YOLCU.pdf (accessed July 1, 2019).

Eren, Fatih (2018) "Top government hands-on megaproject management: the case of Istanbul's grand airport", International Journal of Managing Projects in Business, Vol. ahead-of-print, No. ahead-of-print DOI: https://doi.org/10.1108/IJMPB-02-2018-0020

Ericsson (2016), "Networked Society City Index", Networked Society Insights, available at: https://www.ericsson.com/en/trends-and-insights/networked-society-insights/city-index (accessed July 6, 2019)

Göymen, K. (2008) "Istanbul: Mega City Straddling Two Continents", Urban Research & Practice, Vol.1 No.3, pp. 266-275.

Gürmen, E. (2016), "How Turkish Soap Operas Took Over The World", The FADER, available at: http://www.thefader.com/2016/03/01/turkish-soap-operas (accessed May 8, 2019).

IBB (2017), "National and Regional Synthesis Report", Istanbul Metropolitan Municipality, 1/100.000 Istanbul Master Plan and 1/25.000 Development Plan Research and Application Project, Istanbul.

ICCA (2018), "A Modern History of International Association Meetings – Update 1963 2017", available at: https://www.iccaworld.org/knowledge/benefit.cfm?benefitid=5230 (accessed June 15, 2019).

İstanbulSMD (2019), "Istanbul's Mega Projects", available at: http://en.megaprojeleristanbul.com/ (accessed July 2, 2019).

JLL (2019), "Global 300 Map", Cities Research, Jones Lang LaSalle, available at: http://cities-research.jll.com/cities-research/cities/global300map (accessed July 7, 2019)

Kearney (2019), "Global Cities Report 2018", available at: https://www.atkearney.com/documents/20152/1136372/2018+Global+Cities+Report.pdf/21839da3-223b-8cec-a8d2-408285d4bb7c?t=1527106649606 (accessed July 3, 2019)

Kirişçi, Kemal (2007), "Turkey: A Country of Transition from Emigration to Immigration", Mediterranean Politics, Vol.12 No.1, pp. 91-97.

Looch, Cassam (2019), "The Rise and Rise of Turkish TV", available at: https://theculturetrip.com/europe/turkey/articles/the-rise-and-rise-of-turkish-tv/ (accessed July 9, 2019).

Melamed, Ariana (2019), "The Turks Are Back, and They've Got All of Israel Addicted", Haaretz, available at: https://www.haaretz.com/israel-news/.premium.MAGAZINE-the-bride-of-istanbul-turkey-back-in-israel-and-they-ve-got-everyone-addicted-1.6896105 (accessed May 11, 2019).

Ministry of Commerce (2018), "Foreign Trade Data by Provinces", Istanbul, available at: https://www.ticaret.gov.tr/istatistikler/dis-ticaret-istatistikleri/dis-ticaret-istatistikleri-ocak-mayis-2019/illere-gore-dis-ticaret (accessed June 28, 2019)

MMF (2018), "Global Power City Index", Institute for Urban Strategies. The Mori Memorial Foundation, available at: http://mori-m-foundation.or.jp/english/ius2/gpci2/index.shtml (accessed July 9, 2019)

Numbeo (2019), "Cost of Living in Istanbul", available at: https://www.numbeo.com/cost-of-living/in/Istanbul (accessed June 15, 2019)

OECD (2019), " OECD Reports", available at: https://www.oecd.org/turkey/publicationsdocuments/reports/ (accessed July 9, 2019).

Ozcan, Ceyhun & Anaz, Necati (2016) Geography of Turkish Soap Operas: Tourism, Soft Power, and Alternative Narratives, in Egresi, Istvan (ed), Alternative Tourism in Turkey: Role, Potential Development and Sustainability, Springer (eBook).

Raza, Syed Hassan (2015), "Cultural impacts of Turkish Dramas on Life style of Pakistani House wives", Journal of Culture, Society and Development*, Vol. 33.

Sobecki, Nichole (2010), "Turkish soap opera Noor brings tourist boom to Istanbul*", the Guardian, available at: https://www.theguardian.com/world/2010/aug/13/soap-opera-noor-tourist-boom-turkey (accessed May 8, 2019).

TurkStat (2018) Turkish Annual Statistical Book*, Ankara: TÜİK.

TurkStat (2016), "Foreign Trade Statistics", TÜİK Website, available at: http://www.tuik.gov.tr/PreTablo.do?alt_id=1046 (accessed July 5, 2019)

TurkStat (2019a), "Tourism Statistics*, available at: https://biruni.tuik.gov.tr/medas/?kn=74&locale=tr (accessed June 20, 2019).

TurkStat (2019b), "Migration Statistics*, available at: http://www.tuik.gov.tr (accessed June 11, 2019).

TOB (2019) "CORINE Land Use Data*, available at: https://corinecbs.tarimorman.gov.tr/ (accessed July 3, 2019).

YOK (2019) "Higher Education Information Management System*, available at: https://istatistik.yok.gov.tr/ (accessed July 4, 2019).

Research Paper

Out-migrate Elites as Rural-Urban Link
An Innovative Pathway Toward Rural Development Around Metropolis

Tianzhu LIU, China

Jingsheng LI, Tongji University, China

Abstract

Urbanization has caused the outflow of rural population, leading to the depression in rural areas. However, out-migrate elites (OMEs) are found involving in rural affairs in China's coastal areas and contributing to the rural development. This paper questions what is the role OMEs play in rural development. We undertake the research with the participatory research method: taking the practice of village planning as the opportunity to conduct in-depth interviews, questionnaires, and observations in the planning processes. The analysis concludes the binary nature that OMEs have: both "rural" and "urban". OMEs' kin, geographical and economic relations with the village derived from their rural experience, are the motivation of their participation in rural affairs, while their urban life experience contributes to the significant human, physical and social resources that the village is lack of. On this basis, OMEs deliver resources to the village in the process of participating in rural development. Through the delivery of knowledge and physical resource, they provide diversified ideas and funds for the village. Meanwhile, they bring long-term influence to the villagers by affecting their values and building endogenous capacity for the village. Furthermore, OMEs help expanding the social network of the village by introducing their personal social resources from cities into the village, bringing developing opportunities for the village.

Keywords

Out-migrate elites, Rural-urban link, Rural development, Village planning

1. Introduction

The rapid growth of urbanization and industrialization in China in recent decades has brought about the prosperity of the whole nation, but also accompanied by the large population flowing into the city from rural areas. The proportion of rural population to total population decreased from 82.1% in 1978 to 41.5% in 2017 (National Bureau of Statistics, 2018). Most of the rural population who have moved to the city are young and middle-aged people aged from 15 to 50 years old with greater ability. In such way, urbanization has caused the outflow of rural population, as well as the productivity, capital, and knowledge resource, leading to the depression in rural areas. Thus, unbalanced urban and rural development come to be a significant problem around metropolis in this era. On the other hand, however, diverse subjects in cities are involved in rural areas in different ways as the rural villages are increasingly open, which could be seen as the rural urban interaction, supplying the rural endogenous power (Douglass,1988; Sabet and Shahryar, 2017). Especially

in coastal metropolitan areas where cities are in high degree of aggregation with strong economy, with the increasing integration of urban and rural areas, individuals and organizations from cities participated in the development of the rural villages and affected them. In this rural-urban interaction, we recognized a type of people and we call them "out-migrate elites" (OMEs). They were born in the village and now live in the cities, but till keep contact to the village and bring opportunities to the village.

There have been some discussions about this group of people. It's found that new generation of rural elites who go out to work have improvement their abilities and insights in the process of earning a living and employment, thus making up for the lack of resources, projects and leaders in the village (Chen, 2015). It is also concluded in the study that more than half of the "County sage" had experience in migrant work, contributing to their "elites" property (Xu, 2015). Having a strong sense of self is an important attribute of the village elite, which is related to the experience of having more education and working and living outside (He, 2000). These researches further proof the value of OMEs, but they simply discuss the elite attributes of the persons who are out of the village. The value of OMEs in village development has not been systematically studied. What is the role OMEs play in rural development? Specifically, what characteristics do OMEs have? Why do they keep contact with the villages? And on those basis, in what way do they affect the rural villages? These are the questions we are going to explore in this research.

2. Definition and methodology

2.1. Definition of Out-Migrate Elites

In order to carry out the research, we need to have a preliminary definition of the OMEs. Though there is no generic concept and title accepted by academia, scholars have recognized the existence and value of this group of people. Luo described them "the third force", representing people who went out from villages and work in administrations and enterprises but still care about village development and try to deliver resources for the village (Luo, 2002). Ren (Ren, 2003) named these former villagers who were seeking development outside the village but participate in the village life crossing space barriers as "outflow elites", with the meaning of the potential of elites' return and the long last contact with the village.

Learning from the above literature, we use the term "out-migrate elites" here, aiming to directly express the identity of our research objects, especially the attributes comparing to the normal villagers who live inside the village. "Out-migrate" describes the status of grown up in the village but going out to study or work, and often living outside the village. "Elite" means that he or she can help the village public affairs because of the resource advantages. Actually "out-migrate" determines the attribute of "elite": the small-scale peasant economy situation in China determines that it is difficult for the rural areas to achieve the affluence of most people simply through traditional agriculture. Those who come to the town and city through employment, business, military participation, and further studies have the ability to make a living in the city through their efforts, gradually escaping from the way of relying on land to survive. In conclusion, OMEs in this paper are defined as "the original villagers who migrate to cities to make a living but still care about the development of the village and have

the ability to provide certain resources to the village". This includes, but is not limited to, civil servants, entrepreneurs, engineers, and the alike who works outside the village.

2.2. Participatory research method

In order to answer the questions mentioned before, we undertook the research with the participatory research method, with the opportunities provided by the village planning projects in coastal areas of China. Village planning aims to promote rural socio-economic development through industry planning and spatial strategies, based on the investigation and communication with villagers (Li, 2019). As a part of public policy of rural areas, the planning compilation is normally authorized by government and is always supported positively by villagers. With the support of village planning projects, we have little difficulty to get access to the village and to contact villagers and OMEs, being able to gain trust with them so as to collect information and to conduct in-depth interviews and questionnaires. Moreover, as a typical tool to promote village development, the planning process reflects the OMEs' participation in rural development. Thus, we got the chance to organize meetings and discussions so that it was possible to make observations in the planning processes of initiation, design, decision-making, and implementation (see figure 1).

Figure 1 Group meeting of village planning process in case study villages

2.3. Case study villages

Figure 2 The location of case study villages (left: in China, middle: in Fujian, right: in Zhejiang)

Explicitly, three rural villages (figure 2) in the coastal areas of China, Leishan Village (L village), Pucheng Village (P village), and Tangxi Village (T village), were studied as example, from 2014 to 2017. They belong to Ningbo (L village and T village) and Fuzhou (P village), two well developed large municipalities, at the administrative level. Though through different ways, OMEs in those villages participated in the planning process in diverse forms. Besides to the basic information like geographical and cultural resources of the villages, we collected data through the observation in group meetings and semi-structure interviews and questionnaires with OMEs. Different village planning projects were initiated for different

reasons and therefore were accompanied by different participants, so the research method applied in those cases were not exactly the same.

T village belongs to Yuyao, Ningbo, with the distance of 86 km to Ningbo city centre, 71 km to Yuyao city centre and 11 km to the town, with around 1280 people in 2014. Its village planning was initiated in the 2014 by the villagers, looking for an avenue to better village industry to improve the villagers' income. So that the funding of planning was shared by the village and government. The village has very proactive leaders, who recognized the value of those people "*who has quite good status in cities but always contact the village as well*" and thus organized a series of activities attached to the village planning to enrol them in the process. In addition, a Wechat (a social media app) group was built for the instant communication between villagers, OMEs and planners. In T village, we mainly collect information about OMEs via the village head and through the observation in the planning discussion meetings and the group discussion via social media.

P village is located on the southwest of Fuzhou, with the distance of 80km to Fuzhou city centre and 22km to Yongtai county centre. It is composed of three administrative villages with continuous built-up area and with the villagers sharing same ancestors so that they treat the villages a whole from a cultural identical perspective. P village is very large because of the mentioned reason with around 7000 villagers, 49% of whom migrated to the large cities, mainly being in business. The village planning project started in 2016 because of the OMEs' willing to improve the living environment of the aged and the project fund was shared by OMEs and government. While the main initiator of the planning project was the OMEs group and the amount the the OMEs is considerable, we did semi-structured interview with some OMEs and did a questionnaire through the internet with the help of an OME who was the main contact of the project.

L village is located in Fenghua, Ningbo, with the distance of only 32 km to Ningbo city centre. Different from the former two villages, the planning of L village started in 2017 was not actually an official statutory planning but was a voluntary project attached to the activity "nostalgia economy +" organized by city government which aimed to improve the rural village development though community building. Because the village is very close to the city, many people still lived within the village. The village head didn't realize the value of OMEs, but she accepted our suggestions and contacted the OMEs to participate in the planning discussion, which was the main channel for the data collection.

3. Profile of Out-Migrate Elites

3.1. Basic characteristics of OMEs

In terms of age, OMEs are mainly young and middle-aged people. In P village, the average age of OMEs is 44 years old, and the average age when they migrate is 19 years old. The OMEs who are older than 60 years old often have weaker physical capacity and the less desire for struggling due to their age, and they miss the village life and choose to return to the village. As Lin S, OME in P village stated: "*The first generation of villagers who came to Shanghai to make a living have been in Shanghai for 30 years. Take my parents as an*

example, they came to Shanghai in 1988 and now they chose to go back to live in the village. My father and mother have returned to the village, and they are not willing to work so hard here. (In the city) Although they don't have to do much thing, they feel bored. In the village, the circle of communication is bigger, while in the city they can only share a small family. My mom lived very close to her sister in Shanghai, but they meet at most two times a month. However, in the village, friends meet everyday".

Different from the occupational status in village where people mainly work in agriculture, the professions of OMEs are diversified because of the opportunities provided by the city. In P village, the professions of OMEs include at least civil servant, entrepreneur, engineer, university teacher, middle school teacher, and bank staff. In T village, more than 54 OMEs own the leading positions in their working area.

As for the geographical distribution, most of the OMEs live in cities not far from the village, normally in the same metropolitan area. As shown in figure 3, OMEs in P Village and T Village are mostly located in the county-level cities (Yongtai County/Yuyao City) and municipal-level cities (Fuzhou/Ningbo City) where the village belongs to in the administrative level and mega cities like Shanghai.
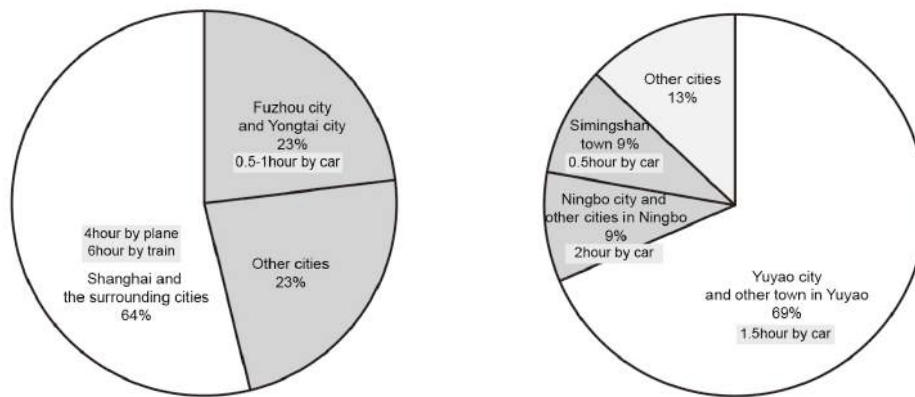
Figure 3 OMEs geographical distribution and time distance (left: P village; right: T village)

3.2. Resource characteristics of OMEs: based on the comparison of villagers

The above information about OMEs provides us with a view to understand their resource characteristics, especially with the comparison of villagers who stays inside the village. This characteristic will be described from the human resource, physical resource and social resource (Lin, 2005). In terms of human and physical resource, generally the most labour intensive age and the ability to set up a career in a more developed city are the support of OMEs' richness in resources, as well as the broad vision and ideas gained from the experience in the city. While many OMEs have also achieved business success, most of the people in the village are still peasants with an annual income of 7,500 yuan in average, relying on the economic support of the OMEs. Moreover, occupation, especially occupational status, is more indicative of the OMEs' rich resources. They have obtained professional skills and organizational skills related to their professions, and accumulated corresponding physical resources due to those skills. A considerable number of OMEs are leaders of government departments or management personnel of the company, which means relatively higher wealth, power and prestige resources (Lin, 2005).

As for the social resource, figure 3 presents the comparison of the social network of a typical villager and an OME: the ability to access a wider range of resources. The village is a "society of acquaintance" which means that people are familiar with each other and have similar job occupation. Therefore, social relations are limited to small-scale primary relations and people's interactions are often repeated with homogeneous resources, as shown in figure 2a. On the contrary, OMEs live in towns and cities and have developed various secondary relationships in social interactions. Thus, the social network is open and wide with rich heterogeneous resources, as shown in figure 2b. The latter may acquire a wider range of resources due to the opening of social networks (Lin, 2005).

a： villagers' close social network   b： OMEs' open social network
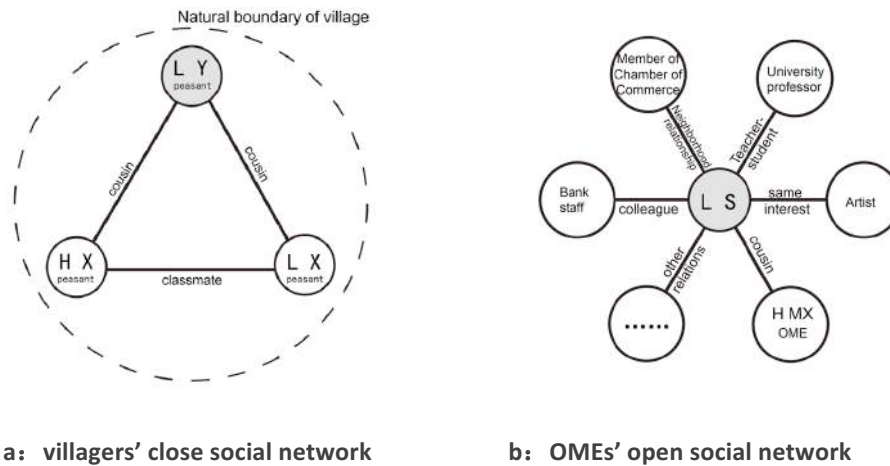
Figure 4. Comparison of social network of villagers and OME in P village

3.3. OMEs' Participation in rural affairs

In the era when transportation and internet infrastructure are not well developed, the OMEs keep in touch with the village by sending money to the family (Li and Xue, 2014). With the improvement of those infrastructure, the contact between those who migrated out and the village comes to be easier. 44% of the OMEs in P village keep contact with the village every week, while the remaining 36% keep monthly contact with the village. The frequency of visiting the village is determined by the geographical location. OMEs living in the county area always visit the village 20-30 times a year, while those who live in municipal-level cities go to the village about 10 times a year, and those who live in other cities return to the village 1-8 times a year. In the village planning projects, though in different ways, there are OMEs involved in the all those villages. OMEs in P village gathered together spontaneously with the consensus goal of making the village better for living. 44 OMEs in Shanghai and more than 20 OMEs in Fujian province were involved in the settlement of "Beautiful Village Committee" and were distributed with tasks by each person's advantages. In T and L village, more than half of OMEs came to attend the village planning discussion after the call from the village head.

Other than the actual participation, the willingness of OMEs also reflects their possibility of participation in village affairs. In P village, 68% of OMEs are willing to give suggestions for the village development; 36% of them would donate for the village construction if needed; 32% of them would like to get policy and funding for village with their social resources; and 16% of them are willing to bring friends to consume in the village. OME in L village who was doing business in Ningbo believes that the development of the village still depends on young OMEs.

He was not likely to return to the village to make a living and work, but he could invest money to the village.

4. Social Relationship: the motivation of OMEs' participation in rural areas

The participation of OMEs to the village has been presented, further, it's necessary to understand why they are involved in the village issues. When we treat OMEs as a kind of exterior resource of the village, the social capital theory is helpful to explain their participation. In the theory, social relation, resource and action are the components of social capital (Lin, 2005). We have discussed the action and resources of the OMEs, so we try to explain the motivation of their behavior through their social relationship with the village.

4.1. Kinship: rooted relationship of OMEs and the village

There is a strong "family" concept in Chinese culture especially in rural areas. Fei described it as "the differential mode of association", which means that the most intimate relationship is with relatives such as parents, and as the kinship goes weaker, the social tie becomes weaker (Fei, 2006). Many young and middle-aged OMEs have parents who still live in village because of the difficulties in adapting the lifestyle in cities, which is the reason why OMEs have intimate contact with the village. In P village, 76% of the OMEs visit the village for their parents and relatives, composing the main reason for why visiting the village. For those OMEs, they care about the living environment of village because the infrastructure and environment is strongly related to the living quality of their parents and relatives.

In addition, OMEs have clan relations with the village, which is derived from the sense of belongings based on kinship, and 60% of the OMEs expressed that they will visit the village for ancestors' worship festival. Ancestral halls and activities are active till now, for which hundreds of OMEs came back to the village in the worship festival day in 2016 even though it was not in vacation.

4.2. Geographical relationship: OMEs' willingness to return to the village in the future

While the kin relationship leads to the connection between OMEs and the individual villagers, the geographical relationship brings the connection between OMEs and the village itself. 80% of the OMEs in P village indicated that they would like to return to the village for vacation or after retirement.

The natural environment, cultural environment and friendly social interaction atmosphere in the village are important parts of the OMEs growth, composing the beautiful memory and the nostalgia of their life. In P Village, the OME Zhang MH introduced the traditional house with deep emotion as "*I always dream of this place.*" Zhang ML expressed his love for hometown as "*The landscape and scenes of the village have always been a beautiful thing for us. We should keep those good memories.*" Lin JY, the OME who was doing business in the county, expressed her emotion for the village through the willingness to repair the ancestral home: "*I come back here three to four times a year. My best memories are about here. I want to come back and repair the old house…Then I can bring my child here to live and for vacation.*" Tang YJ in T village and Lin S in P village expressed most OMEs' willing to return to the village after retirement that "*I will go back to the village within five years in the*

future. My wish is to have a room to stay in the village." Though qualified to migrate Hukou to cities, some people chose not to do so just for keeping his land property in the village.

4.3. Economic relationship: property relations and industry opportunities

Most of OMEs have property related to house and land in village. In terms of land and house property, due to the collective ownership of village land in China, the property distribution of the village is closely related to the household registration (Hukou). The OMEs with their Hukou in the village still have the property of farmland, homestead, and cooperative shares. Moreover, there are some situations that OMEs still owns property in village though their Hukou migrated out. In general, almost every OME have property rights inherited from their parents and other relatives. For example, Lin JY, the OME of P village has been working in the city for decades with her Hukou in the city, will inherit a traditional house owned by his uncle. Further, if the land property has been confirmed before the migration of OMEs' Hukou, OMEs will have farmland property for a certain number of years. For example, P village has already done land rights confirmation about 30 years ago and the OMEs who moved out of his Hukou to the city after the confirmation still has a homestead and farmland. For another scene which can be seen in T village, with the permission of villagers, some OMEs have the shareholding of the cooperative whatever his/her Hukou is in the village or not. These are strong and long lasting ties between OMEs and the village, promoting OMEs paying attention to the village issues, which are related to their private property.

Another aspect of economic relation is about the industrial development. For those OMEs who want to operate a company, there is an advantage in the low cost of both land price and human labour for developing industry (a farm or a resort for example) in the hometown village. In addition, due to the demand for social network in business, people who go out to do business often operate industries that are related to the village and gather in neighbouring cities. For example, P Village has a traditional industry that produces dried fruit, and later OMEs who went out for business are mainly engaged in the food industry and gathered in Shanghai and surrounding cities for mutual support. This kind of link promotes OMEs to link each other closely so that they always have a sense of belongings of the hometown village.

4.4. The binary "rural" and "urban" nature of OMEs

Based on the description of the resources and social relationships of OMEs, a diagram depicting the social relations of OMEs and the village is drawn as shown in Figure 5, from which we conclude the binary nature of OMEs: the "urban" characteristic and "rural" characteristic. The "urban" characteristic presents the resource heterogeneity due to OMEs' occupational and workplace differentiation from their city living experience. This can be seen from the comparison outside and inside the natural boundary in figure 5. The latter "rural" property is reflected from the strong social link between OMEs and the village as well as within the OMEs group, which can be seen as "strong tie" because those are within the cultural boundary of the village shown in figure 5.

The social capital theory refers to the relationship between the strength of the relationship and the acquisition of resources. The weak tie theory believes that infrequent contact "weak tie" brings heterogeneous resources that are not easy to get in normal life (Granovetter, 1973), emphasizing the importance of heterogeneity of resources, though meaning the difficulty of the access of the resources. On the other hand, Chinese scholar Bian proposes that China is a strong relation-based society and the success of action depends not on the

breadth of information that weak ties can bring but on the certain help that strong ties can provide (Bian, 1998), underlining the importance of strong ties, though accompanied with less resources. However, when we talk about OMEs, this group could be treated as the combination of "strong tie" and "heterogeneous resources", thanks to the binary nature it contains. This characteristic indicates the convenience of getting diversified resources from OMEs. Especially when OMEs gather together, they cooperate and deliver integrated resources gained from the city to the rural village.
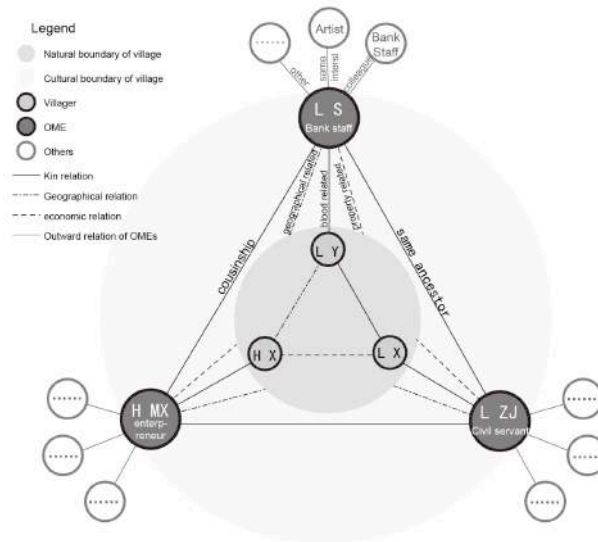
Figure 5 Diagram of the social relation network between OMEs and village (P Village)

5. OMEs' contribution to rural development: the delivery of urban resources to rural community

5.1. Delivery of information, knowledge and physical resource

Based on their own professional knowledge and long-term experience in cities, OMEs have developed diversified ideas for the village development. For example, in the discussion of industrial development in T Village, the OME Tang W working in the county government department proposed the idea to produce of agricultural and handicraft products in the coming years and to develop sports and health related projects in the long run, based on his knowledge of policy environment and economic situation in the county; while entrepreneur Tang ZG, based on his business management experience, recommended that the village could diversify its financing forms such as attracting private capital, crowdfunding, and shareholding. In terms of living facilities improvement, because OMEs have experience in the city and also have their own actual needs for the village facilities, they have put forward very specific ideas and suggestions for the improvement of the living environment, such as "*constructing the waterfront road with the roadway 6 meters wide and the sidewalk 2 meters wide, along with the houses with shops on the ground floor...*" and the OME who has gained training about urban planning even drew the section of the waterfront road to guide the construction. Those are ideas not be recognized by villagers and could be good opportunities for the village.

Moreover, those ideas are able to be achieved because of OMEs' involvement and operation in the project. For individual behaviour, this is reflected in the investment of funds and human labour by OME individuals. Based on the improvement of village environment and the development of individual industry, they provided funds by themselves for village construction and development. For instance, Lin Z, OME in P village devoted money for the construction of village pavilion and main road. In T village, Tang ZY wanted to invest in the hotel located in the village and was in the process of negotiation. Chen SH came up with the idea of developing local specialty for the village and has put it in practice with the result of well designed tea product, using the village's name as its brand name. For the village construction fundraising, the OME representative Lin ZJ expressed the general idea of OMEs as: "*We are obliged to pay for the village construction...The people living outside of the village are wealthier and ought to do something for the village.*" As for the public projects which requires large amount of funding, programs are more implementable with the OMEs' participation. Taking the waterfront road project of P village as example, the project's proposal, initiation, design, and implementation fundraising were all driven by the operation of the OMEs. They planned the project based on their own expertise, estimated the budget, and contacted the design company. In the fundraising phase, they apply government funds through their channel and invest their own money and goods for the project. Lin Z，entrepreneur who was in charge of the fundraising told us how the money raising was planned: "*how to gather more than 9 million yuan for this project? First of all, we should apply for the money from government in the name of the 'beautiful village construction', which could get about 2 million yuan, and then it is not difficult for us to raise 1 or 2 million from individuals*". In those ways, OMEs introduces information, knowledge and physical resources into the village to provide ideas and development conditions for village development.

5.2. Delivery of values and capacity building

In their experience in large cities, OMEs have cultivated the values to understand the precious value of traditional culture and natural environment of rural areas. In the process of participating in the development of the village, the values were imported into the village and affected villagers. Taking the traditional landscape conservation as an example, in all those three villages, when the villagers proposed to demolish the traditional buildings and build the European-style houses, OMEs emphasized the preciousness of the tradition and proposed the necessity to protect traditional features. They suggest that the buildings should keep old style and should not use cement and steel in construction. As the authorized elites, they have influenced villagers and led their value orientation in the process.

In addition, as OMEs have broaden their horizons, accumulated knowledge, and fostered the consciousness of modern citizenship (Yang, 2008), combined with the authority of their elite roles and the ability to integrate village interests (Luo, 2002), they bring about the consciousness of modern governance to the rural village and promote the capacity building by encouraging the villagers through directly participating in village management and the organization of public activities. Research on rural social information dissemination points out that when information sources are homogenous to recipients, that is, when they have the same intention, subculture, language, and personal and social characteristics, the effect of communication to gain knowledge or change attitude is obvious (Rogers and Berger, 1988). The OMEs act as the "source of information" – comparing to the external subjects such as planners and government, the same cultural and linguistic background of OMEs and

the villagers determines the efficiency of communication with the villagers. At the same time, because of knowledge and occupation, they have prestige and authority among the villagers, thus being more effective in delivering information to the villagers. Taking L village for example, the new head of Chen SH, also as the senior executive of a big company in Ningbo, introduced the "5S Management Rule" into the village. He invited the old authorized villagers to give suggestions and make decisions and regulated the reimbursement system of the collective expenditure, modifying the governance model. Based on the introduction of those values and the consciousness of modern governance, the villagers have been fundamentally promoted, thus affecting the development of the village in the long run.

5.3. Expanding social network of the village: bringing developing opportunities for the village

The OMEs' participation has also expanded the social network for villages, through their own social resources, to attract more attention and development possibilities. These social resources include top-down government resources, potential investment subject resources, related technical organizational resources, and so on. In L Village, OME believed that the village had potential to attract investment, so he organized social media group with the entrepreneurs he made friends in business to introduce potential investors to the village. In P village, civil servants (those who were retired and who were serving in the occupation), entrepreneurs, teachers and other OMEs working in the local or other cities were organized as a committee. The civil servants and the member of the chamber of commerce usually have the social relations with government officials so that they were in charge of the contact with the government officials to gain policies, funds, and information support from the special bureaus such as traditional village conservation office. OMEs in the enterprise have social relations with the local propaganda company so that they are required to contact local TV station to film the tourism video for the village. OMEs brings more attention to the village and more development possibilities by introducing their social resources to the countryside.

6. Conclusion and discussion

We conclude the "binary" nature that OMEs have. To the standpoint of OMEs' relation with cities, the experience of working and living in the city contributes to the significant human, physical and social resources of OMEs. From the perspective of OMEs' tie with villages, the kin, geographical and economic relationship is found as the fundamental connections. The "binary" characteristics and the development of metropolitan area, especially the construction of highway and internet infrastructure, make it possible for OMEs to maintain close contact with the village. Meanwhile, OMEs' appeal to the countryside, which is based on their relationship with the village, and the environmental thrust from the cities, prompts them to participate in village affairs. It is in this process that OMEs deliver resources from urban to rural areas, promoting village development. Taking the rural planning process as the example, OMEs serve as the rural-urban link and provide a novel way for rural development by building endogenous capacity for the village. Through participating in public issues, OMEs bring the values and information from city into the village, diversifying ideas to the village development, and exchanging information with villagers to enhance their abilities. Furthermore, OMEs help expanding the social network of the village by introducing their personal social resources from cities into the village.

There are still some issues that need further discussion. First of all, as an important resource of the village, what kind of ways can promote the participation of OMEs in rural development? In addition, what kind of organization can strengthen the role of OMEs? As a link between urban and rural areas, in addition to playing a positive role in the countryside, can OMEs' actions in the countryside also have a positive impact on the city, so that this link is reciprocal? These are issues that need to be explored in the future.

7. References

Bian, Yanjie (1998) "Retrieving Strong Relationships: China's Indirect Relationship, Network Bridge and Job Search", Social Sciences Abroad, No. 2

Chen, Kaibing (2015) "Research on Rural Population Flow and Village Governance in the New Period: Based on the Investigation and Thinking of Shantou Village in East Zhejiang". South China Rural Areas, No. 5

Douglass, Mike (1998) "A Regional Network Strategy for Reciprocal Rural-urban Linkages: an Agenda for Policy Research With Reference to Indonesia." Third World Planning Review Vol. 20, No. 1

Fei, Xiaotong (2007) From the Soil, Shanghai: Shanghai People's Publishing House

Granovetter, Mark S (1973) "The Strength of Weak Ties", The American Journal of Sociology, Vol. 78, No. 6 (May)

He, Xuefeng (2000) "Village Elite and Community Memory: A Two-dimensional Framework for Understanding the Nature of the Village", Social Science Journal, No. 4

Luo, Xingzuo (2001) "The third Force", Zhejiang academic journal, No. 1

Li, Jingsheng (2019) Principles of Rural Planning, Beijing: China Architecture & Building Press

Li, Nan; Xue, Jiliang (2014) "Outbound Labour Remittance Decision-making Mechanism: Active or Passive", South China Rural Areas, No. 6

Lin, Nan (2005) Social Capital: the Theory of Social Structure and Action (translated by Zhang Lei), Shanghai: Shanghai People's Publishing House

National Bureau of Statistics (2018) China Statistical Yearbook 2018, China Statistics Press

Ren, Min (2003) "Outflow Elites and Rural Development", Youth Studies, No. 4

Rogers, Everett M; Berger, Rabel J (1988) Rural Social Change, Hangzhou: Zhejiang People's Publishing House

Sabet, Naser Shafiei; Shahryar Azharianfar (2017) "Urban-rural Reciprocal Interaction Potential to Develop Weekly Markets and Regional Development in Iran" Habitat International, Vol. 61 (March)

Xu, Ming (2015) The Effect of the Rural Elite Social Network on Rural Governance: Take Rural Elite Council in D Country as an Example, Hangzhou: Zhejiang Gongshang University

Yang, Linfeng (2008). "Dialectical Thinking on the Power of the Returning Economic Elite", Journal of Shanxi Agricultural University (Social Science Edition), No. 4

Track 3

Liveable places and healthy cities
Planning for people

CONGRESS TEAM
Jens Aerts
(Belgium/ USA)
Mahak Agrawal
(India)

LOCAL EXPERTS
Aji Pamungkas
Irwan Prasetyo

photo: Rahmatharman, Wikimedia

Planning for liveable places and healthy cities for people is critical. In the face of the climate crisis and increasing inequalities, planning liveable and healthy cities and communities is not a luxury. On the contrary, evidence shows the relation between vulnerabilities amongst the most deprived and the built environment. Therefore, a global call for city planning supporting health outcomes is appropriate. In a way, the urban planning practice needs to reinvigorate the historic roots of urban planning, that has been promoted for more than 200 years in modern times as the public policy that ensures cities' public health, safety and liveability standards.

Realigning planning priorities and the course of action is needed, in order to be sure that planning solutions and strategies will truly build, manage, or promote healthy and liveable cities for people. Three key areas in which collective action and synergies with other sectors is promising, emerged from presentations, sessions and discussions:

1. City planning must support citizen planning

Planning for metropolitan growth entails equitable investments at the smallest scale of neighbourhood, where public spaces and collective facilities turn into places, if they are co-designed, co-produced and managed with citizens, especially with children.

2. Urban planning must focus on equity and urban health.

Considering the demographic dividend in Asian cities, with a significant proportion of young population and a remaining gender gap, urban planning needs to focus on spatial equity, and use rigorous, data-driven analytical and monitoring tools, embed them in urban design, policy and financing cycles.

3. Urban planning must focus on multigenerational mobility

In order to provide healthy, safe and prosperous urban environments for children and women, with places inclusive for all generations, it is imperative to enhance walkability and connectivity, social safety, and clean transportation that allows access for all to the city and its opportunities.

The opening session: Children and cities, planning for the future and the session 2: Planning and design for collective space and transport for children and communities highlighted the three areas of collective action and synergies in planning healthy, liveable cities for the future. From the two sessions, a key message emerged: planning for and with children more than often implies planning for and with all generations. Yet, children are a meaningful lens in terms of analysis of needs and solutions. The message was reiterated in the third and fourth sessions as well.

Creative engagement in Session 3 Participatory planning and multi-generational well-being and Session 4 Planning sustainable urban childhoods for the youngest reinforced the key message of opening day's sessions. These engagements echoed the need for transition from participatory planning that invites citizens to respond during specific isolated moments in processes, into citizen planning in which citizens themselves lead parts or entire planning process.

It was interesting to note throughout the eight sessions of Track 3 that, when it comes to planning healthy cities and liveable communities beyond metropolis, citizens lie at the core of city planning and management. Some planning projects follow this approach, some aim to and several others do not. Some of these projects and practices showcased in Session 5 Sustainable mobility and streets for people and Session 7 Public space, public life, reiterated the need to re-connect people to basic services, city infrastructure and public spaces on short

distances. Despite the potentials of sustainable mobility or public life, public spaces are too often dominated by private vehicles. Therefore, planners need to claim back public spaces for people together with those who need them most.

It is indisputable that when it comes to planning for healthy, liveable cities and communities no single one answer or solution fits across all levels of space, time and governance. We explored these varied solutions from a technological and technical perspective in session 6 Data, indicators and new paradigms of public health. Real time data and data led innovative planning practices showcased potentials for better planning and management of healthy and just cities.

The track ended with back to basics in session 8 The right to adequate housing and livelihoods that highlighted that many people lack access to urban services, from the basic access to water and sanitation, to healthy food.

In the end, we left Jakarta with an altered perspective, enriched knowledge and a way forward to plan cities and communities beyond the metropolis, starting from the perspective of the community and the neighbourhood, where no one and no place is left behind.

Track 3 - Selected Papers

1. Mews G., '*Realising the Potentials of a Design-dividend Towards a Loveable Urban Future*'

2. Green D., '*Healthy Districts: Creating Healthy Cities*'

3. Chaveneau C., Dilip H., Dubucs H., Montagne C., Kyriazis A., Qamar S., Zahid A., '*Urban Morphology and Behavioural Mapping in Abu Dhabi's Public Spaces. Informality as an Interaction of Cultural Context and Urban Form*'

Case Study / Project

Realising the potentials of a design-dividend

towards a lovable urban future

Gregor MEWS

Abstract

Australia is one of the most urbanised countries in the world. At the same time, it is one of the highest per capita emitters of global greenhouse gas emissions. Despite of its material wealth, evidence in relation to the state of children health indicate that growing up in cities is of deep concern to ensure long term prosperity on societal level. The present generation are the least fit and the fattest they have ever been. Spatial fragmentation, social marginalisation, mental health issues and serious cardio-metabolic disorders have been on the rise in adolescence and early adulthood. As it stands, future generations will be off for worse. The problem that Australia finds itself in is created in part by our own actions. Currently we are still operating either in institutional regulatory silos, within technological harsh market competition, ecological unsustainable development patterns, and under enormous fiscal constraints within academia and organisations operating in the civil/societal fields. In absence of a national urban policy and political resistance on cohesive climate change policy, the argument for change within an individualistic society require a reframing. For example, a design-dividend provides benefits to positive financial uplift for development interests resulting from human-centred urban design to ensure liveable and healthy urban future for all. Good design generates a range of public benefits. Capitalisation of a design-dividend starts by addressing the needs of children and young people in the design process. The contribution will introduce some of Urban Synergies Group global key initiatives and collaborative thought leadership with the University of Canberra, Health Research Institute in the nexus of improving health outcomes for children and young people in urban systems.

Critical reflection on the applied systems approach in relation to safe independent childhood mobility (walking and cycling), encounters with nature in public spaces and designing connected play spaces for all will open up space for an engaging discourse on the need for a paradigm shift in the way we continue to shape healthy communities. About Urban Synergies Group Urban Synergies Group to date have been working in the global arena, particularly in contributing to the New Urban Agenda and advocacy of the Sustainable Development Goals (SDG) 3- Good Health and Wellbeing, 11- Sustainable cities and Communities, SDG- 13 Climate action and SDG 17- Partnerships for the goals. We believe that now is the time for to engage in international goals and to realise the potential of a paradigm shift from urban liveability to urban lovability that leaves no one behind.

shaping healthy communities

REALISING THE POTENTIALS OF A DESIGN-DIVIDEND TOWARDS A LOVABLE URBAN FUTURE

Presented by: Gregor H Mews **Date and Place: ISOCARP Worldcongress** 2019, Jakarta, 9-13 September 2019

1 / 42

shaping healthy communities

2 / 42

Urban Synergies group

Why urban design and design dividend?
Proven to provide benefits

Business as usual approaches
(development led)
(linear and reductionist approach)

New Urban Agenda (grounded & healthy urban design)
(non-linear and holistic/ integrated approach)

Add-value design approach

1. Paradigm shift (add-value approach) with urban lovability in its heart (health and well-being)

2. Apply system thinking/ co-design processes (human-centred) to identify tangible actions that can make an impacts with the sense of immediacy

Exemplar initiatives
Children and young people (health and well-being)

Urban Synergies group

*"While good urban design by itself cannot guarantee positive financial returns, and lack of attention to good design principles can still result in a financially successful project, it is also clear that **it substantially enhances** a project's likelihood of becoming a **financial winner.”*** p. 3

THE **DESIGN** DIVIDEND
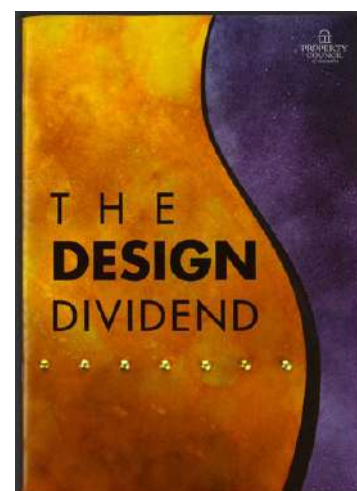
Why urban design?

"Because good urban design enhances a project's performance in itself as well as within its surroundings. Good architecture can mean greater longevity, better internal performance and higher symbolic and aesthetic value, but in itself cannot guarantee that the project connects well with its surroundings in the sense that it utilises the wider setting as an asset - and becomes an asset to its context in turn." Property Council of Australia. (1999). p.3

"Good urban design can provide a competitive edge in a flat economy, and it can advantage a building in a bearish market." Property Council of Australia. (1999). p.3

Does good design cost more?

"Does excellent design cost more? We found that the opposite can be true."
Property Council of Australia. (1999), p.3

- Healthcare - A well designed hospital will help patients get better more quickly.
- Education Environments - A well designed school will improve the educational achievement of its pupils.
- Housing.
- Crime Prevention - A well designed neighbourhood will benefit from lower crime and higher house values.
- Business - Good design will significantly increase a business' bottom line including their productivity and innovation.

(Source: Becker, Frank, Cornell University)

Business as usual

Source: USG image

Development led

- Low quality densification (few housing typologies)
- reduction of public spaces and natural open spaces
- Urban sprawl
- Traffic congestion and poor accessibility
- CBD focused agglomeration
- Car- centric
- Socio- economic segregation
- Disparity in housing affordability
- Heat island effect
- Flood risk and disaster prone

Scholars: Ed Glaeser and Richard Florida

8

shaping healthy communities   #UrbanSynergiesGroup @usgthinkers

Urban Synergies group

Traditional, historic and/or conventional concepts of design performance evaluation:

- Sullivan/Wright–"*form follows function*"; "*form and function are one*"
- Precedence-based design
- *"Standard of Practice"*
- Case Study Investigations
- Bottom Line
- Health, Safety, & Welfare

Urban Synergies group

Current fitness standards based on 22.000 measurements
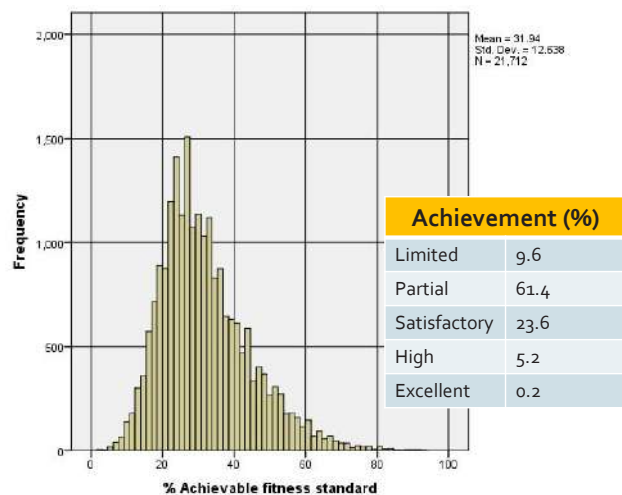
Mean = 31.94
Std. Dev. = 12.638
N = 21,712

Achievement (%)	
Limited	9.6
Partial	61.4
Satisfactory	23.6
High	5.2
Excellent	0.2

% Achievable fitness standard

Source: Prof. Tom Cochrane, University of Canberra, Centre for Research and Action in Public Health

shaping healthy communities   #UrbanSynergiesGroup @usgthinkers

21st century health prospects in decline?
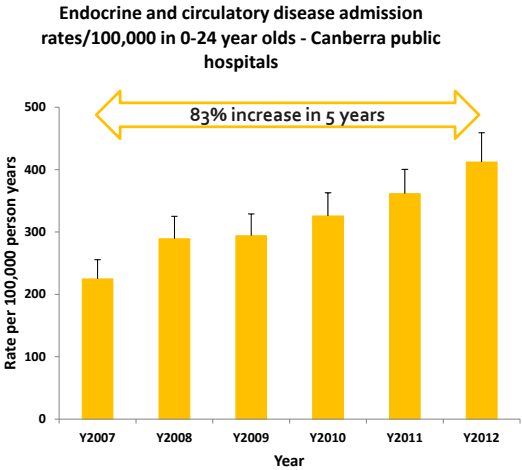
Endocrine and circulatory disease admission rates/100,000 in 0-24 year olds - Canberra public hospitals

83% increase in 5 years

Source: Prof. Tom Cochrane, University of Canberra, Centre for Research and Action in Public Health

shaping healthy communities   #UrbanSynergiesGroup @usgthinkers

11 / 42

We are material wealthy, but are we happy or truly healthy?

Consumption of antidepressants
Defined daily dosage per 1 000 inhabitants per day, 2015 and 2000 (or latest year)

shaping healthy communities

12 / 42
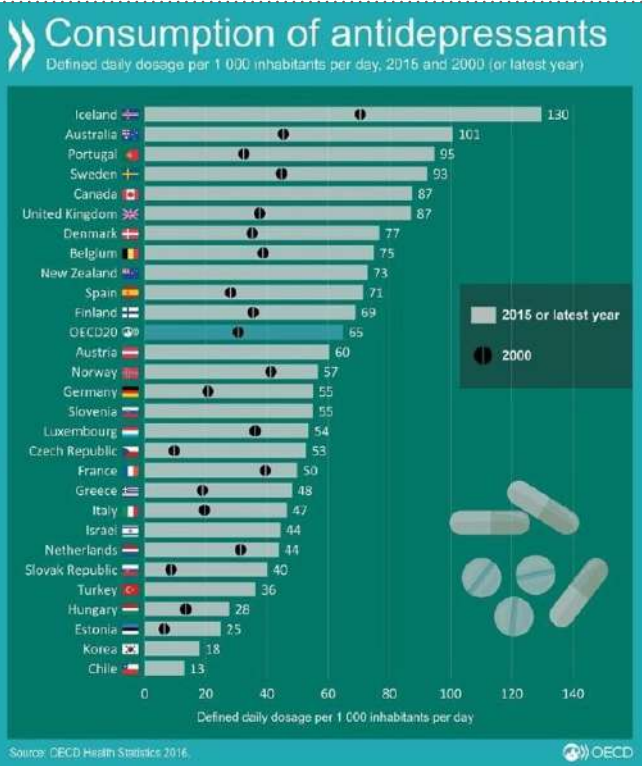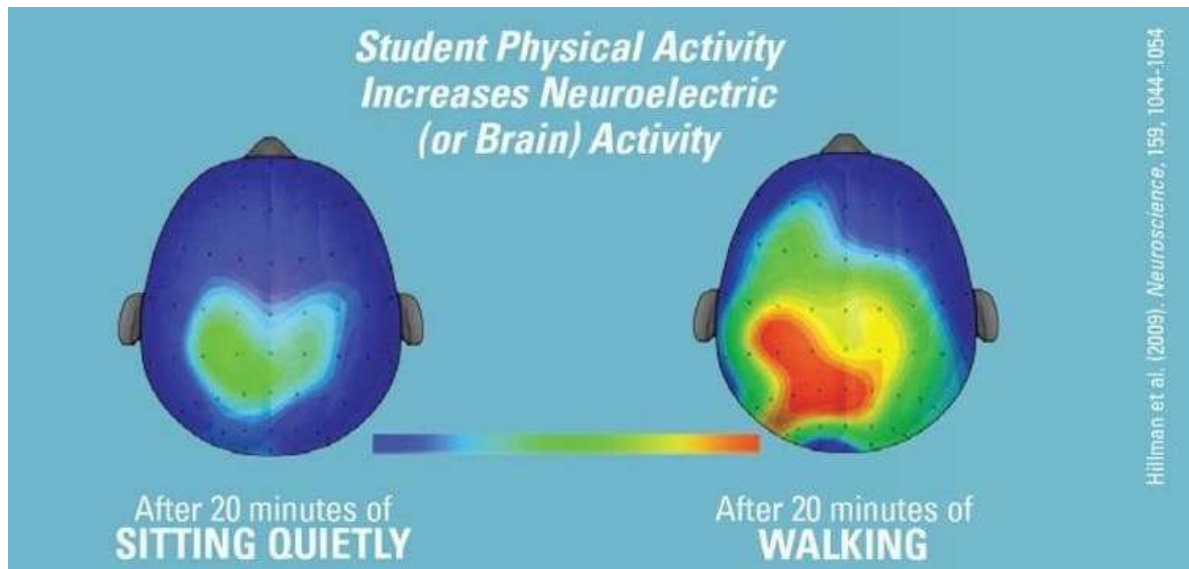
shaping healthy communities

13

13 / 42

"Children today walk less than ever before in the history of humanity"
(Roberts and Edwards, 2010, 39)

Source: Urban Synergies Group

shaping healthy communities

#UrbanSynergiesGroup @usgthinkers

14

14 / 42

**Definition
of health**

„A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."
(WHO, 2003)

15

shaping healthy communities

- Total expenditure on mental illness to be at least **$28.6 billion AUS Dollars** (Source: 2013 Medibank Private Limited and Nous Group)

- Cost burden of physical inactivity on the Australian economy was **$805 million**, including $640 million in direct costs and $165 million in productivity losses. (Ding, et.al. 2016)

16

shaping healthy communities

29.4 BILLION AUS DOLLARS PER YEAR

Price for not prioritising what makes live worthwhile

shaping healthy communities

17

"It takes a whole village to raise a child."

African proverb

shaping healthy communities   #UrbanSynergiesGroup @usgthinkers

18

NEW URBAN AGENDA

with subject index

H III

Source: http://habitat3.org/

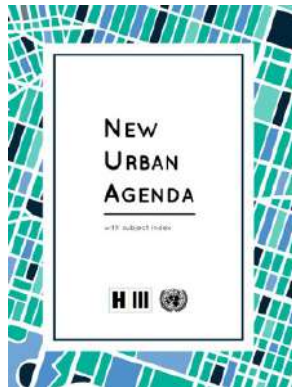**shaping healthy communities**

Focus on Urban Design and Planning

Principle 100: "We will support the provision of well-designed networks of safe, **inclusive for all inhabitants, accessible, green, and quality public spaces and streets**, free from crime and violence, including sexual harassment and gender-based violence, considering the **human scale** and measures that allow for the best possible commercial use of street-level floors, fostering **local** markets and commerce, both **formal and informal**, as well as not-for-profit **community initiatives, bringing people into the public spaces, promoting walkability and cycling towards improving health and well-being**."

The Role of Participatory and "Bottom-Up" Practices

Innovation, Data and Technology

19

Paradigm shift

Source: USG image

shaping healthy communities

Grounded and healthy city

- High quality densification (building design)
- Strategically planned growth (compact and resource sensitive)
- Biophilic design (open space and nature integrated where possible)
- Public transport & Eco-mobility (walking & active travel → good mobility choices)
- Social cohesion and inclusion (public spaces for interaction, local culture)
- Poverty eradication (resource sharing and caring)
- Social justice (child, gender, age and minorities friendly) -> co-designed, co- produced and co-created!
- Climate change mitigation and adaptation (across infrastructure investments)
- A distributed and circular economy (20 minute city, reuse and recycle)

Scholars: Richard Sennett, Tim Beatley, Brendan Gleeson, Stephen Boyden, Paul Tranter, Rachel Davey, Setha Low, David Harvey

20

#UrbanSynergiesGroup @usgthinkers

Holistic Design-dividend approaches

→Contemporary advances to design performance evaluation:

- Life-cycle cost analysis
- Value engineering
- Return on Investment (ROI)
- Post-occupancy evaluation (POE)
- **Value-added design**

Value-added design

- "Benefits of better urban design are increasingly acknowledged across all key stakeholder groups, albeit in different ways and forms" Carmona, M., De Magalhães, C., & Edwards, M. (2002)

- Emphasis on "value"

"Production of space"
Henri Lefebvre

Perceived space

Conceived space

Lived space

Your perceived reality

Source: https://upload.wikimedia.org/wikipedia/commons/1/11/Battle_of_Bosworth_Field_diorama.jpg

shaping healthy communities

23
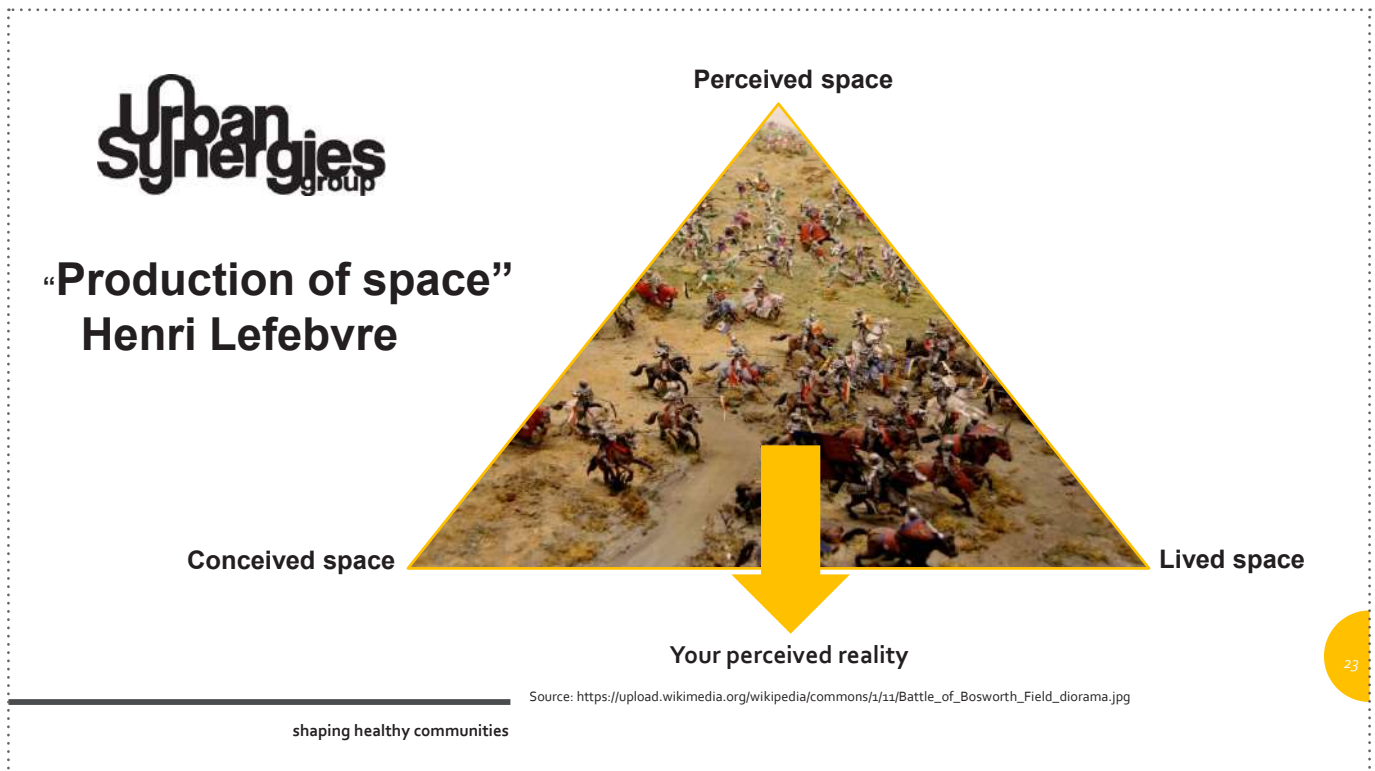
You in your reality!

Birth: Given by others
Name: Given by others
Education: Given by others
Income: Given by others
Respect: Given by others
First & last bath: Will be given by others
After your death your property and belongings: Will be taken by others
Funeral service: Will be done by others

Now think about your impact that you can have on others around you!

24

shaping healthy communities

Urban Synergies group

Two tangible pathways

1. Shift the design paradigm to an add-value approach with urban loveability in its heart

2. Apply system thinking/ co-design processes (human-centred) to identify tangible actions that can make an impacts with the sense of immediacy.

Urban Synergies group

1. Shift the design paradigm to an add-value approach with urban lovability in its heart

shaping healthy communities

26

Urban Livability

shaping healthy communities

Liveable environments **integrate** physical and social well-being parameters to sustain a productive and **meaningful human existence**; productive in the sense that the social clustering of humans yields considerably **more than the sum total of individual productivity**, and meaningful in the sense that humans **need**, by their very nature, **to participate in forming successful and self-sustaining social systems** (Asia-Pacific Economic Cooperation, 2015).

27

Critic of urban livability

shaping healthy communities

"Urban livability **must consider urban morphology as an "incubator"** of social and economic functions. Therefore, economic and physical development decisions must be coordinated to **develop socially and culturally responsive environments**. This process provides a healthy environment that can emancipate the abilities of people and fulfill their need to become a part of sustainable social systems. Therefore, **cities that strive to achieve livability must create a governance model that supports the civic ecology of participatory democracy**."

Kashef, M. (2016). Urban livability across disciplinary and professional boundaries. *Frontiers of Architectural Research, 5*(2), 239-253. doi:https://doi.org/10.1016/j.foar.2016.03.003

28

Definition: Urban lovability (add value approach)

"The concept can be defined as a **positive, voluntary, and intrinsic feeling, or compassionate affection**, turned into an actuality. It uplifts the individual as well as the **collective human spirit as part of everyday life**, offers an inclusive approach to our collective state of human existence, and can improve subjective well-being with a sense of immediacy. By linking everyday life experiences with the concept of 'urban lovability', collective **human existence becomes meaningful.**"

EXPLORING NEW HORIZONS FOR
YOUTH WELLBEING AND PUBLIC
SPACE IN SIERRA LEONE

NINA FREDSLUND OTTOSEN
GREGOR HELMUT MEWS

29 / 42

Reframing: innovation and experimental approaches

→ Shifting the paradigm:

• Quality discourse

• Quadruple Bottom Line

• **Best practice (human-centered urban design →focus children and young people)**

30 / 42

2. Apply system thinking/ co-design processes (human-centred) to identify tangible actions that can make an impacts with the sense of immediacy.

Societal determinants of health

Economic status
Income
Employment
Food security
Housing

Neighbourhood
Secure housing and safety
Food and recreation access
Transport provision
Walkability/ Cyclability

Education
Literacy and numeracy
Child development & progression
Life, Social & Work *skills*

Health care and access
Health literacy
Lifestyle choices
Quality of care and access
Health insurance

Social & community
Social norms & networks
Trust and cohesion
Engagement
Media messages; internet

**Realising the Potentials
of a Design-dividend**

---

shaping healthy communities

33 / 42

Clarence Perry & the idea of the neighbourhood unit
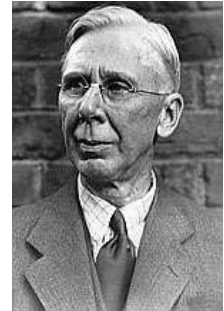
- Comprehensive physical planning tool for designing self-contained residential neighbourhoods
- Community centric lifestyles, away from noise, smoke and ugliness of industrial plants

---

Source: SIK-Holz

shaping healthy communities

34 / 42

Rediscover the magic in our communities and co-create "sticky" spaces and places!
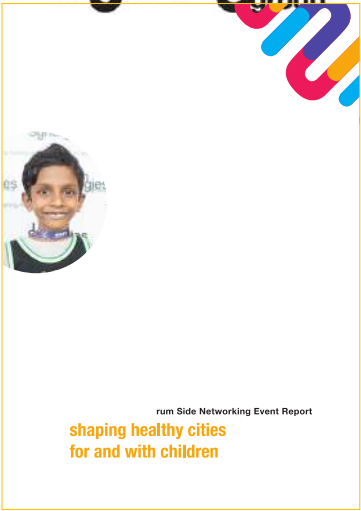
Systems approach

- Safe independent childhood mobility (walking and cycling)
- Encounters with nature in public spaces and
- Design connected play spaces for all.

shaping healthy communities
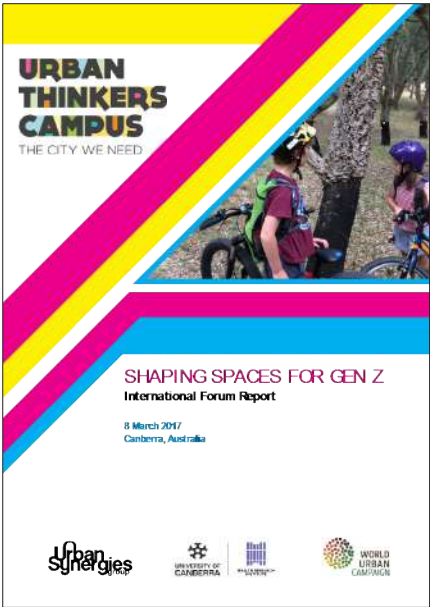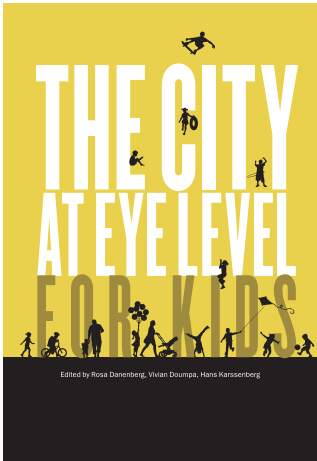
shaping healthy communities
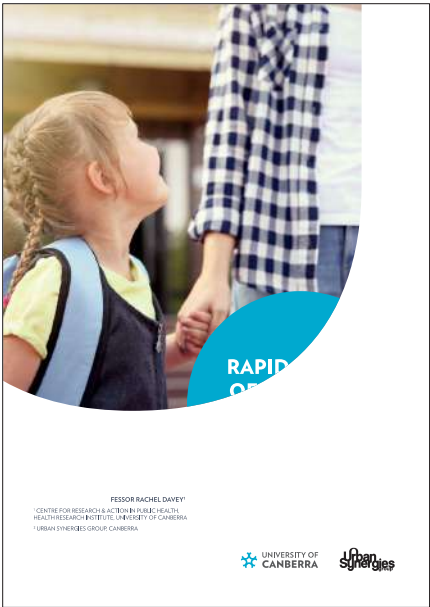
1. Add value approach works! If, you identify the shared and lived values as early as possible in the development process and measure them through indicators (qualitatively and quantitatively) in design performance evaluation!

37

shaping healthy communities   #UrbanSynergiesGroup   @usgthinkers

37 / 42

2. Treat everyone with respect, take time and really learn to listen! The development project needs to demonstrate this through co-design!

38

shaping healthy communities   #UrbanSynergiesGroup   @usgthinkers

38 / 42

3. Celebrate each moment to its full potential and compassion! Its not going to come back → immediacy!

Source: Mews (2016) Right to the city: an exploration in pictures.

shaping healthy communities   #UrbanSynergiesGroup @usgthinkers

39

4. Not one size fits all (context, culture and history matters)!

shaping healthy communities   #UrbanSynergiesGroup @usgthinkers

40

5. Use positive experiences and evidence as an agent for change! (joy through play)

→ Liveable to Lovable

41

shaping healthy communities   #UrbanSynergiesGroup   @usgthinkers

Thank you!

"We are all designers of a future that needs shaping in the now"

Contact
Email:
Gregor@urbansynergiesgroup.org
Mobile: +61 4 22 183 747
Web: www.urbansynergiesgroup.org
Twitter: @usgthinkers
LinkedIn: @GregMews

42

shaping healthy communities

Case Study Paper

HEALTH DISTRICTS
Creating healthy cities

David GREEN, Perkins&Will; USA

Abstract

This paper addresses trends in research related to health in urban environments. It is focused on how regulations control development and the resulting public health outcomes. Regulations significantly impact public health and as such there should be legal and scientific mechanisms to monitor the efficacy of adopted regulations.

Cities are critical to the efficient operation of society. Beyond just issues of quality of life, they are large consumers of natural resources. There is a growing concern that the form of cities may have a profound effect on public health: chronic diseases related to obesity, heart disease, and asthma, among many others. But in general, governments are making decisions about their development in the absence of critical data and analysis that provides direction for these actions. There is a clear need to establish research that provides a scientific basis for rationalizing city planning and urban design. This is an opportunity to use the protocols driving research to inform the methodology of urban and city design.

An internationally supported system of testing and evaluation protocols, both for proposed regulations and adopted regulations, is still absent from planning and urban design processes. Jurisdictions continue to rely on theory and precedents alone when adopting new regulations. Because of the significant impact that the built environment has on the health, safety and well-being of the general population, it seems logical that the profession would adopt scientific research protocols.

In addition, this paper will examine several specific cases across the globe, regulated and designed by a diverse group of professionals, that articulate the issues outlined above and provide methodologies to frame a scientific method for planning and urban design at a consistent, international level.

Keywords

public health, development regulations, health, safety, welfare, zoning,

1. Introduction

1.1. Analytical Rigor

We have, for the past eighty years, used a quasi-scientific set of criteria to direct and regulate the design and construction of our cities and districts towns and suburbs. From the very beginning, pseudo-scientific measures formed the foundation of the professional planning movement. In this process, however, the rigors of basic research and scientific methods have been remarkably absent in reflection on the efficacy of planning's impact on the built environment. Abstract planning principles are translated into operational

regulations without a basic protocol for testing, evaluating, and modifying assumptions based on the results of evidence. The reticence of the profession to test and evaluate is further complicated by the fact that planning is ultimately implemented through a series of legal documents – regulations. Once adopted, regulations are notoriously difficult to change, both due to the precedential nature of the legal system itself and the seemingly inherent credibility bestowed upon regulation by virtue of its own adoption.

At its core, the planning profession is charged with creating rules and guidelines for the development of urban and suburban places through constitutional police powers: to provide for the health, safety and welfare of the general public. Ultimately, effectiveness of planning means, such as zoning, can and should be measured. For example, Justice George Sutherland states that plans and their regulations must "expand or contract to meet the new and different conditions which are constantly coming within the field of their operation" in the seminal Supreme Court case, Village of Euclid, Ohio v. Ambler Realty Co. (Village of Euclid, Ohio v. Ambler Realty CO, 1926). He went on to say that, "in a changing world it is impossible that it should be otherwise."   What Sutherland knew as a fact, and the planning profession seems unwilling to address, is that planning is only as good as its ability to positively affect the health, safety and welfare of the people in places it impacts. And, if our impacts are not positive, we are obligated by the law to improve our regulations.

The creation of an internationally supported system of testing and evaluation protocols, both for proposed regulations and adopted regulations, is still absent from planning and urban design processes. Jurisdictions continue to rely on theory and precedents alone when adopting new regulations. Because of the significant impact that the built environment has on the health, safety and well-being of the general population, it seems logical that the profession would adopt scientific research protocols. To avoid doing this would be analogous to the pharmaceutical industry, in the absence of the Food and Drug Administration, releasing new drugs to the public without trials and then turning a blind eye to potentially negative outcomes.

2. Regulations

2.1.   The Birth of Regulations

The impetus for regulating the built environment came from conditions that we can hardly imagine today. In the second half of the nineteenth century, people were living in conditions that were extremely unhealthy. For example, extreme population density grew in the Tenth Ward of lower Manhattan without infrastructural support – population densities were as high as 1000+ people per acre, or roughly 50 times the density of Manhattan today. (Allen, 2010) Most of this population lived in tenement houses with little natural light, open pit latrines, and no air circulation. With the publication of books such as Jacob Riis's "How the Other Half Lives,' the public began demanding reform through regulation and local jurisdictions responded. (Riis, 1970) One of the most important steps forward was New York State's adoption of the 1901 Tenement House Act. Figure 1 illustrates the impact of regulations as demonstrated by the evolution of houses themselves. The Tenement House Act served to open living quarters to light and air, and set the conditions for healthier living environments.

While the 1901 Tenement House Act is representative of the changes that were affecting individual building form and execution, it was with the adoption of the 1916 Building Zone Resolution of the City of New York that the role of regulations addressed what is commonly understood as zoning. The catalyst for this action was the completion of the Equitable Building in the financial district of the city. The building was reputed to cast a seven-acre shadow across the district at certain times of the day and year, with significant detrimental effect upon those other buildings in the affected area, and upon the general health and welfare of residents and office workers in the district. As a response, the city of New York adopted the Building Zone Resolution. The resolution provided for a number of requirements, including the zoning of the city into areas for residential, commercial and unrestricted uses, the requirements of yards for light and air, and restrictions on the height and form of buildings to ensure natural light and air for the district in general, not solely for the individuals occupying the buildings. The regulation had a significant impact on the quality of the city as demonstrated in Figure 2, the height and setback requirements for buildings permitted under the new resolution. Further, the regulations were easily tested and evaluated to determine the efficacy of their providing more light and air into the city streets and parks. (Building Zone Resolution, 1916)

1. Old Knickerbocker dwelling.
2. The same made over into a tenement.
3. The rear tenement caves.
4. Packing-box tenement built for revenue only.
5. The limit; the air shaft — first concession to tenant.
6. The double-decker, where the civic conscience began to stir in 1879.
7. Evolution of double-decker up to date.

Figure 1 Tenement Transformation

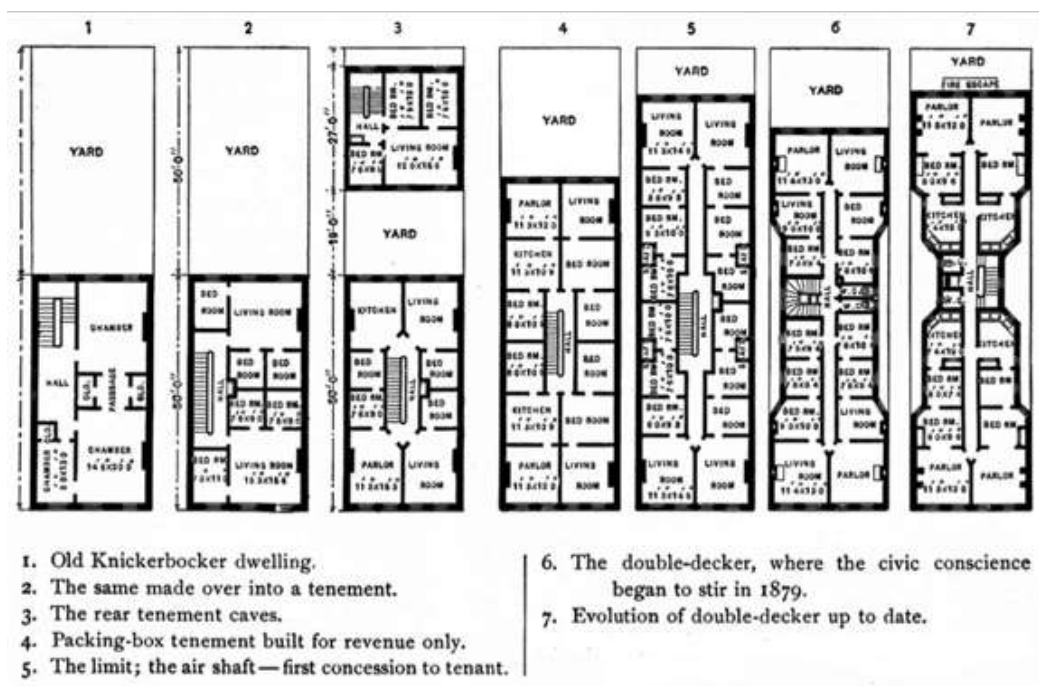Figure 1 above shows the evolution of the Knickerbocker tenement house type leading up to the 1901 Act and subsequent to the Act. The transformation from 5 to 6 demonstrates the direct, positive effect the Act had on the living conditions of the residents; in this case, the diagram illustrates shafts for natural light and air included on sidewalls between the buildings, which were lined up in rows.
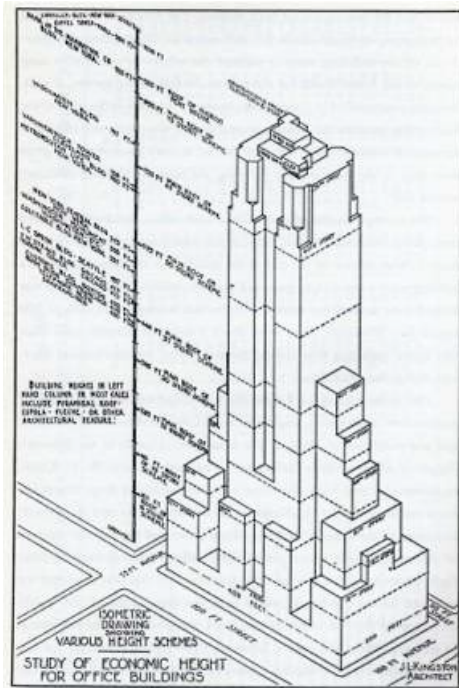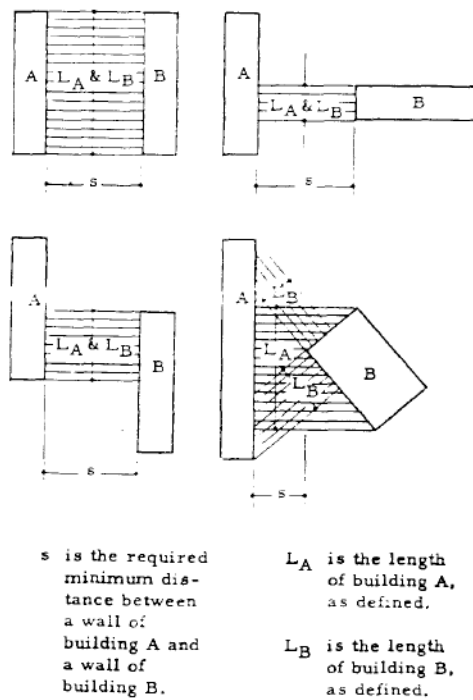
Figure 2 Diagram, 1916 Building Zone Resolution

Figure 2 above demonstrates the logic and application of new building design from the 1916 Building Zone Resolution. It specifically describes the setback requirements for new buildings to ensure light and air reaches the streets below. (Building Zone Resolution, 1916)

This original ordinance was updated and modified thousands of times over the course of 45 years until the 1961 Zoning Resolution superseded it. The adoption of this ordinance signaled the acceptance of a radically transformed understanding of the way regulations operated. Instead of relying on simple, straightforward guidelines that were easily tested, the newly adopted regulations were much more reliant on formula-driven criteria for development. This transformation created a scenario in which it was almost impossible to project the physical outcome resulting from the regulations because each project was easily manipulated based on local and site-specific conditions. This is demonstrated in Figure 3, a seemingly simple calculation to determine building massing and spacing that opened the process to infinite possible results, most of which led to unintended consequences such as degradation of the surrounding public space in terms of light and ventilation at the street level. In addition, there was almost no incremental testing of the proposal to ensure that it would garner the desired results and that those results would meet the constitutional guarantees of health, safety and welfare. While the specifics of the 1961 Resolution were not copied verbatim into other ordinances across the country, the logic of regulating the development of cities and towns and suburbs was predicated on this Resolution almost universally. The following section demonstrates two very specific regulations that were adopted, generally, throughout the country without testing and evaluation, and the impact they have had and continue to have on the built environment. (1961 Zoning Resolution, 1961)

s is the required minimum dis-tance between a wall of building A and a wall of building B.

L_A is the length of building A, as defined.

L_B is the length of building B, as defined.

ILLUSTRATIONS OF SECTION 23-711

Figure 3 Diagram, 1961 Zoning Resolution

Figure above illustrates the fundamental change with the adoption of the 1961 Zoning Resolution. It describes the calculations for meeting building spacing requirements. (1961 Zoning Resolution, 1961)

The 1961 Zoning Resolution had profound impacts on the way we plan and construct cities. At the time, none of the assumptions upon which the new Resolution was based were tested; not prior to the adoption of the new code, nor after its adoption.

The impact this and other regulations had on the built environment and ultimately on public health can be demonstrated through numerous examples, two of which are outlined below.

2.2. Regulating Local Streets

In the seminal United States zoning case, Euclid v. Ambler, the core issue before the court was the question of protection of single-family neighborhoods. The case was brought to the court in a time, the 1920's, when questions of appropriate uses in these neighborhoods were critical. It was not uncommon to find toxic uses, such as rendering plants, slaughterhouses and tanneries, interspersed with people's dwellings. At the time of the case, there was a clear need to separate these extremely unhealthy operations from the districts where families lived. (Village of Euclid, Ohio v. Ambler Realty CO, 1926) Over the course of subsequent decades, however, the protection of single-family neighborhoods expanded greatly. This is demonstrated in a number of regulations adopted, especially through the 1950s, that include minimum lot sizes for single-family homes, and extreme restrictions on corner groceries, neighborhood restaurants and other uses that had historically been a part of the rich mixture of a healthy neighborhood. While there are many examples of regulations that were adopted that have, and continue to have, negative impacts on the

health, safety and welfare of the general public, there are some that stand out especially as clearly demonstrating the need for scientific study to determine the true impact they have. Further, they demonstrate the legal implication of the enactment of such regulations.

A specific example of this can be found in the subdivision ordinance adopted by the City of Atlanta in 1957. It included, as did many other ordinances adopted throughout the country at the time, a seemingly simple, clear and intelligent requirement that cut-through traffic (traffic moving through a particular geographic area with no intention of stopping in that area) should be minimized, or if possible, eliminated from single-family developments. The statement, "Local streets shall be so laid out that their use by through traffic will be discouraged," was a prominent element of the Atlanta Ordinance. (Part 15 Subdivision Regulations, 1957)   The requirement has led to a very particular development pattern as demonstrated in Figure 4. Individual suburbs are designed and developed in such a way that there is absolutely no connectivity between the subject development and other contiguous or proximate developments (residential or commercial). This seemingly benign requirement has had enormous impact on the lives of the inhabitants of the communities developed under this ordinance.
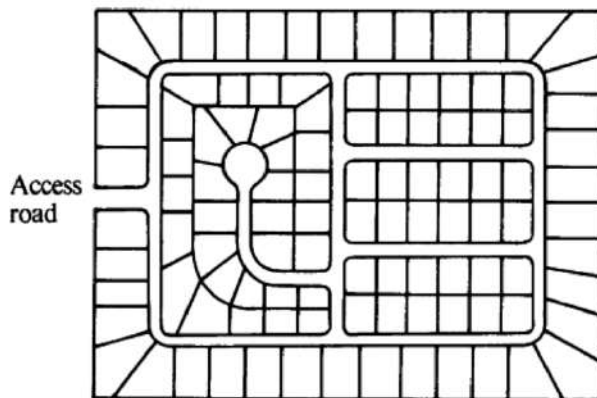
Figure 4 Diagram, Typical Street Pattern

When this ordinance was originally adopted, it was not tested or evaluated, and so no determination could be made about its ability to actually provide a healthy and safe environment for its occupants. Today there is mounting evidence that instead of being a healthy and safe development strategy, it is actually causing unhealthy and unsafe results for the inhabitants of the areas developed under the regulation. (Ewing, R., et al, 2003) Certainly further investigation is warranted to expand and verify the initial research, but this expanded research is extremely slow in coming. As with all regulations and laws, changing these ordinances is extraordinarily difficult.

It is here, in the evaluation of regulations, that the practice of following a scientifically dictated protocol for research would prove beneficial. If basic research provided the data and subsequent interpretation to correlate a regulation with specific health or safety issues, including obesity, asthma, heart disease, pedestrian and vehicular deaths and injuries, elevated crime rates, or even long-term house values (an issue of welfare), the professionals charged with creating and adopting such regulations would have much greater certainty that

they were creating healthier, safer and more economically vibrant developments, and they would be fulfilling their professional obligation to ensure the constitutional guarantees upon which Justice Sutherland based the ruling that made the regulations constitutional in the first place. Further, from a legal standpoint, it would be much easier to modify existing regulations if there was compelling scientific research to back up the proposed modifications.

2.3. Regulating Block Size

Current research indicates that walking provides health benefits; that areas of cities with more pedestrians (people walking) are safer; (Ozbil, A., et al, 2015) and that areas of cities with more pedestrian traffic, particularly commercial, are more economically robust. (Boarnet, M. G., et. al, 2008) (Litman, T. A., 2017) As with most current information regarding cities, towns and suburbs, and the efficiency of their operation, more research is needed to understand correlations between walking and urban planning. But taking the premise that more people walking in cities promotes the health, safety and welfare of the general population, current regulations can be evaluated based on their efficiency in producing developments that are conducive to pedestrian activity.

Throughout the United States, the single most difficult element to incorporate into new development, redevelopment, and other forms of modifications to a jurisdiction's physical layout is the creation of new streets. This difficulty stems from several issues: maintenance costs borne by the jurisdiction, a pre-conceived notion that more streets are less environmentally beneficial, and, as demonstrated in Section 2.0, a general belief that more streets lead to more traffic. Each of these issues demands additional research, but it is extremely difficult to replicate the highly connected street systems of cities and towns constructed in the pre-regulatory era. In this specific case we are focusing on expanding pedestrian activity, and the effect the street system and the regulations that drive street locations have on the efficacy of providing pedestrian activity.

Figure 5 Block Dimensions New York, Crosstown and Uptown

As a basis for researching the correlation between street layout and pedestrian activity, the first step is to identify areas that seem to promote pedestrian activity and those that seem to suppress it. An example of the former is New York, arguably one of the most pedestrian cities in the world. In New York, specifically Manhattan, the streets are highly connected,

with resulting block sizes of 200 feet in the north-south direction, and block sizes generally between 500 and 800 feet in the east-west direction. In this system, there appears to be a correlation between the size of the block face and the level of comfort in walking similar distances. As demonstrated in Figure 5, a walk in the north south direction of 10 blocks is perceptually different from a walk in the east-west direction of the same distance. This begins to identify the possibility that the physical distribution of streets has a direct effect on the comfort of the pedestrian, and further on the efficacy of the system to produce the desired result, more pedestrian activity. It is generally perceived to be easier to walk the half-mile uptown than the same half-mile crosstown. A similar observation was made by Jane Jacobs in her book *The Death and Life of Great American Cities*, in which she advocated for the use of short blocks to increase the number of potential route choices for pedestrians and to avoid monotonous streets. (Jacobs, 1961)

The research on block dimensions and its correlation to a supportive system for pedestrian activity is not the end, however. It is merely an analytical method for providing cities with the tools to create more energy-efficient and healthier overall systems. The increased number of people who walk due to myriad factors will have a direct impact, we assume, on the reduced use of fossil fuels for automobiles. It should also create a more efficient overall system for distribution of utilities and a more resilient infrastructure layout, which minimizes rebuilding when single buildings are reconstructed or newly constructed. In addition, increased walking should correlate, again, we assume, to decreased numbers of health problems such as early onset diabetes, heart disease and asthma. However, the basic research to prove or disprove this is currently almost nonexistent. Cities are, in aggregate, among the largest users of energy, and home to the greatest number of people, yet the national planning community and the funded research within which it is engaged, is minimal. There is a clear need for an increase in research in these areas.

The physical layout and efficiency of the pedestrian system in this case is tied directly to the original regulation that dictated where and how streets would be laid out as Manhattan developed. In this case, it was the Commissioners' Plan of 1811, a survey and plan that identified the location of streets as the city grew. The power of the regulation in this case was in the certainty of the outcome, and, in retrospect, the value of the plan for producing (or allowing) significant pedestrian activity. (Bridges, 1811)

Throughout the twentieth century, however, the methodology for the laying out of streets changed radically. As indicated in Example 1, connected streets were discouraged or prohibited. (Part 15 Subdivision Regulations, 1957) (Ozbil et al, 2011) (Peponis et al, 2008) (Peponis et al, 1997) (Peponis et al, 1998) (Christova et al, 2012) Further, streets were no longer identified in a specific plan, which might guarantee short block faces and highly connected system, but instead were placed project-by-project based on capacities of individual projects and the demands those projects would place on the vehicular efficiency of the system. The resulting pattern of development is indicated in Figure 6. It clearly shows the physical implications of the regulations, including limited intervening public streets, expanded parking requirements, and significant building setbacks, among other requirements that led to the disappearance of the connected system of pre-regulatory cities. The outcome of these regulations is development patterns that deter inhabitants from walking. There appears to be a direct correlation between the sizes of blocks (or the frequency of streets) and the level of pedestrian activity. This is further indication of the need for a rigorous research platform for the investigation of these issues.
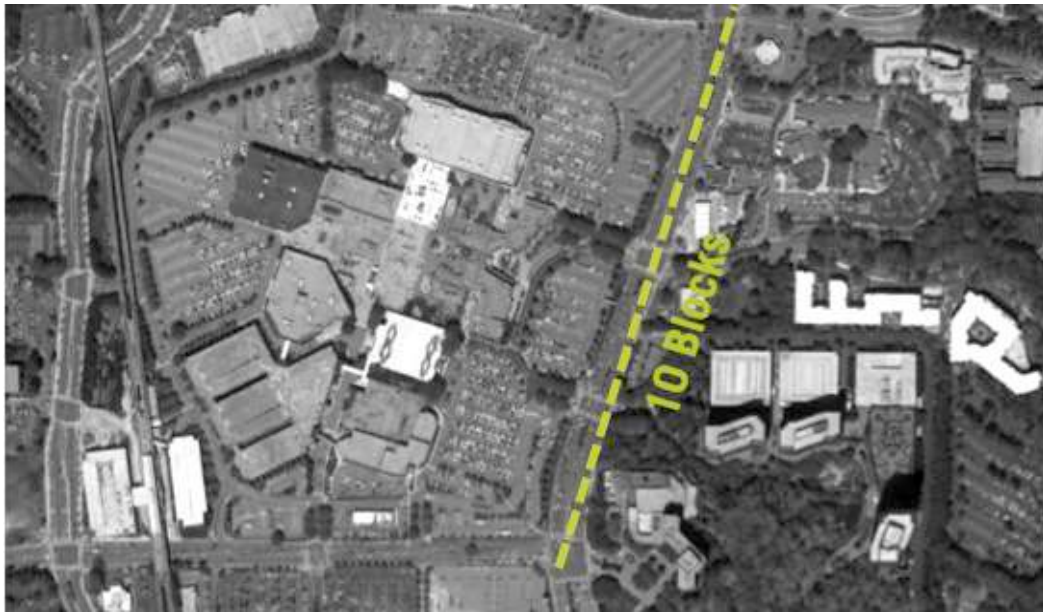
Figure 6 Block Dimensions Suburban Atlanta, Perimeter Center

2.4.   Correlation Between Regulations and Development Patterns

The first trajectory is exemplified through a simple analysis of the relationship between regulations in place and block sizes. Assuming the hypothesis offered in the previous section that "walking provides health benefits" is accurate, then what was the correlation between regulations in place and the resulting block sizes, and by extension frequency of streets? Figure 7 below indicates the results of a cursory investigation into the relationship between the existence of subdivision regulations and the size of blocks. In this statistically limited sampling, the data suggests that there is potentially a significant correlation between the mere presence of a regulation and the efficacy of creating small, consistent block sizes.

The conclusion derived from this limited investigation is that there is an inverse correlation between the degree to which regulations are implemented and the efficiency of creating consistency; the stated goal of the regulation. If this is verified through further research, it implies that the regulations adopted to provide for health, safety and welfare are resulting in development patterns that are inconsistent with the goals of the regulations.

Looking more closely at a sub-set of projects, we can start to see how recent design and planning work compares to these more broad findings. A look at over 50 projects completed around the world within the last 10 years demonstrates that, despite the best intentions of the designers, the average block size for these modern district and campus plans is even larger the post-1928 block size, at 7.71 acres. When only research district projects are taken into account, the average block size is similar, at 7.59 acres (Table 1). This could be the result of the traditional "buildings in a park" typology, only recently falling out of favor for a more urban format, or it could be influenced by something else entirely. Without a rigorous analysis process it is very difficult to understand the causes and effects of design decisions.

This early work supports the proposal that there should be regional, and even national, systems in place to track these issues. The computing power and much of the data already exists, but the planning profession is slow in making moves to identify critical data that

would form the foundation for a more rigorous and directed national research agenda. (Allen, 2010)

Observation 2: the standard deviation of average block size in the following selected cities has increased from .79 to 6.14 from pre-1928 subdivision to post -1928 subdivision.

	Pre 1928 Block Size	avg. acres	max acres		Post 1928 Block Size	avg acres	max acres
1	Atlanta, GA	3.70	8.26	1	Atlanta, GA	22.87	44.49
2	Boston, MA	3.09	4.13	2	Boston, MA	9.45	14.46
3	Baltimore, Md	3.29	5.78	3	Baltimore, Md	14.93	22.72
4	Charleston, S.C.	4.12	6.07	4	Charleston, S.C.	16.89	25.25
5	Chicago, Illinois	3.51	4.96	5	Chicago, Illinois	14.74	19.10
6	Los Angeles, CA	4.41	7.89	6	Los Angeles, CA	8.01	16.08
7	New York, N.Y. (Manhattan)	2.60	3.67	7	New York, N.Y. (Manhattan)	7.72	13.31
8	Omaha, Nebraska	4.34	8.26	8	Omaha, Nebraska	8.27	13.42
9	Portland, Oregon	1.92	3.72	9	Portland, Oregon	2.69	4.24
10	Philadelphia, Pennsylvania	3.07	6.33	10	Philadelphia, Pennsylvania	5.03	5.88
	Average	3.41	5.91			11.06	17.90
	Median	3.40	5.93			8.86	15.27
	Std. Dev	0.79	1.80			6.14	11.42

Figure 7 Statistical analysis provided by Douglas Allen, Georgia Tech. (Allen, 2010)

2.5.   Tracking and Projecting Data

Once we begin to understand the interaction of regulations and development historically, the next step is applying this knowledge to current and future projects and places. To do this involves first developing a method of recording baseline data for such projects. Perkins+Will have recently undertaken such a program for all of their urban design-scale projects. The program, called PlanMetrics, lays out 9 key metrics captured for each project greater than 5 acres. The associated data (figure 8) is then collected, compared, contrasted, and subjected to further inquiry.

The database grows as more projects are completed. In this way, Perkins+Will have begun a system of testing whether or not their own projects meet their stated intent, both defined by the clients, planners, and designers involved, but also by the regulatory context in which they are created. Data collected and referenced in Table 1 includes project area, right of way area, total public blocks, and number of intersections, for example, along with other vital statistics. With more advanced analysis, information such percentage of park area or intersection density, can be recorded and compared. An example of this level of analysis on both a single project, as well as cross multiple projects, can be seen in figures 9 and 10.

	D	E	F	G	H	I	J	K	L
	Project Area	Total Block Area	Total RoW Area	Total Public Block Area	Total Roadway Area	Total Building Area	Total Length of Centerline	Total Number of Intersections	Total Number of Blocks
	7546.22	5575.18	1971.03	2092.53	1795.51	1101.17	241.61	1813	1277
	4061.10	3755.87	305.22	76.95	229.17	712.70	34.61	87	70
	3343.48	2610.57	732.91	0.00	345.92	331.34	40.57	146	120
	3301.89	2905.78	396.11	1286.77	287.70	374.04	89.66	211	105
	1161.64	1011.92	149.72	660.41	107.42	154.42	40.34	806	369
	1007.92	587.74	420.18	308.63	255.06	187.45	26.38	83	73
	879.00	536.00	343.01	45.00	75.00	123.01	16.60	86	78
	876.78	669.70	207.08	206.88	103.69	889.11	6.37	42	34
	840.01	719.99	119.99	418.99	46.01	48.41	12.40	77	82
	782.71	612.80	169.91	10.16	132.62	242.24	21.56	103	89
	659.99	254.30	405.70	52.19	349.51	156.59	12.90	94	77
	636.27	484.38	151.90	187.11	123.21	58.61	14.63	71	167
	617.71	518.60	99.11	232.35	75.91	126.38	17.85	144	96

Figure 8 Sample Project Datasets from PlanMetrics

The database grows as more projects are completed. In this way, Perkins+Will have begun a system of testing whether or not their own projects meet their stated intent, both defined by the clients, planners, and designers involved, but also by the regulatory context in which they are created. Data collected and referenced in Table 1 includes project area, right of way area, total public blocks, and number of intersections, for example, along with other vital statistics. With more advanced analysis, information such percentage of park area or intersection density, can be recorded and compared. An example of this level of analysis on both a single project, as well as cross multiple projects, can be seen in figures 9 and 10.

This method is not limited to Perkins+Will projects – any district, neighborhood, city, or region around the world can be analyzed using the same method of metric collection, thereby establishing a comparable set of baseline information for projects that are anecdotally deemed "successful" or "unsuccessful."
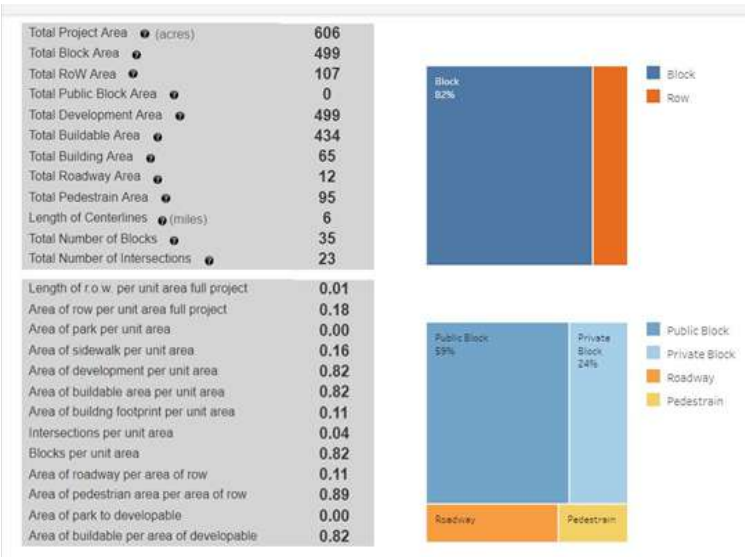
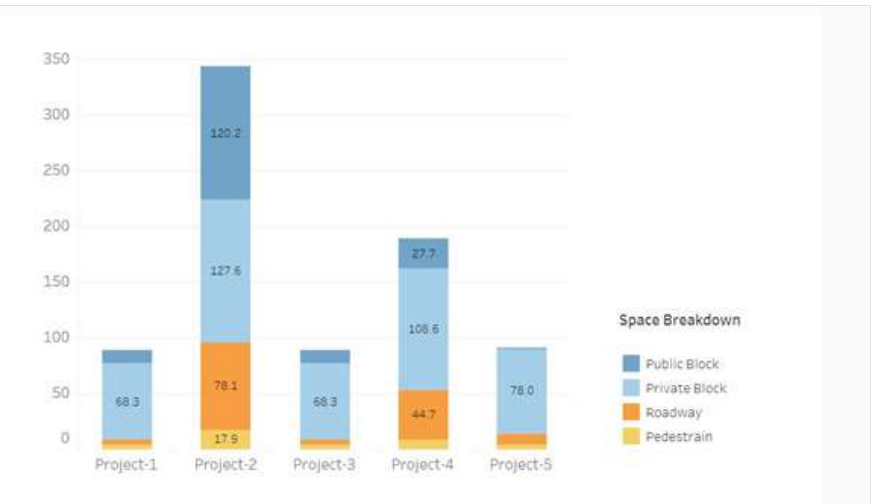Figure 9 Sample Project Analysis from PlanMetrics

Figure 10 Project Analysis from PlanMetrics

One particular project type that lends itself to this analysis method is the research environment. Often owned (or at least operated) by a single entity, these projects are complex districts with multiple building types, public (or publicly accessible) streets and open spaces, and often their own set of governing regulations. Increasingly, research environments are districts integrated seamlessly into the larger city and thus have many of the same opportunities and challenges as the neighborhoods outlined in previous sections. Beyond the practical advantages, these places of research should be laboratories for understanding the impacts of the design standards and regulations that create them.

An example of this approach of collecting baseline data and projecting project performance is the infrastructure plan for Innovation Square in Gainesville, Florida (figure 11). The research and innovation district is located at the heart of downtown Gainesville, and is

owned and operated by the University of Florida. This complex interaction of municipal and institutional interests led to challenges in project coordination, but also interesting opportunities for learning from the project. A key concern for the stakeholder group was understanding the potential for energy efficiency onsite, as well as coordinating a complex system of utilities and public realm features. First, the team developed a coordinated strategy for they physical layout of utility infrastructure based on project goals as well as site constraints. An analysis of baseline and efficient utility use in comparable buildings was then performed to create a framework of understanding for project performance (figures 12-13). While not directly related to testing of regulations per se, this example serves as a powerful precedent of a methodology to test potential impacts of design and policy decisions before final construction has taken place.

3. Case Study One

3.1. Innovation Square

One particular project type that lends itself to this analysis method is the research environment. Often owned (or at least operated) by a single entity, these projects are complex districts with multiple building types, public (or publicly accessible) streets and open spaces, and often their own set of governing regulations. Increasingly, research environments are districts integrated seamlessly into the larger city and thus have many of the same opportunities and challenges as the neighborhoods outlined in previous sections. Beyond the practical advantages, these places of research should be laboratories for understanding the impacts of the design standards and regulations that create them.

An example of this approach of collecting baseline data and projecting project performance is the infrastructure plan for Innovation Square in Gainesville, Florida (figure 11). The research and innovation district is located at the heart of downtown Gainesville, and is owned and operated by the University of Florida. This complex interaction of municipal and institutional interests led to challenges in project coordination, but also interesting opportunities for learning from the project. A key concern for the stakeholder group was understanding the potential for energy efficiency onsite, as well as coordinating a complex system of utilities and public realm features. First, the team developed a coordinated strategy for they physical layout of utility infrastructure based on project goals as well as site constraints. An analysis of baseline and efficient utility use in comparable buildings was then performed to create a framework of understanding for project performance (figures 12-13). While not directly related to testing of regulations per se, this example serves as a powerful precedent of a methodology to test potential impacts of design and policy decisions before final construction has taken place.

From this, the project team created a system for projecting energy use based on various options, in this case both block-by-block, and by different phasing scenarios. The resulting dashboard compares these potential build-out scenarios to conventional and energy-efficient baselines, as well as the various options to each other. (Figures 14-16)

By projecting and analyzing this information in context (Figures 11-13) the project team was able to make better decisions about the balance of building types and the importance of an energy efficient scenario based on actual data, rather than intuition or standard practice.

In this situation, the scenarios tested were independent from regulation, and were limited to shifts in the balance of building typologies. However, the process of defining success, testing scenarios, and ultimately adapting design and policy based on observed outcomes in this smaller controlled environment demonstrates one potential method for developing similar tools to evaluate these and other metrics as a more comprehensive research protocol evolves.

The proactive approach to understanding utility capacity led to a unique investment model specific to this site, based on the evidence provided by rigorous analysis of the various options and the resulting detailed understanding of the preferred design scenario. Scaled up, this type of approach has the potential to influence our understanding and thus design of many aspects of research environments that we currently take for granted, as well as district and neighborhood planning and design more broadly.

4. Conclusion

4.1. Future Research Plan

Moving forward it will be key to incorporate lessons learned from the methods outlined above into a comprehensive research strategy. The approach of such a strategy should be three-fold: first, no progress can be made until there is a consistent and reliable way to gather and record data about existing and planned places. A well-defined but simple data set should be the base for informed decision-making. Second, for both society and the profession, there needs to be further study into what constitutes "success" in the various aspects of the built environment. This can include health, safety, comfort, energy consumption, and any number of other metrics which have value for the lives of people in cities and towns. Data without a contextual metric is essentially meaningless. Finally, to fully capture the power of the data, tools and systems for projecting impacts of planned designs and regulatory changes, as well as tracking progress in real time after they are realized, are crucial to verifying hypotheses about "success." In this way a system of trial and adjustment can be created to ensure that regulations are indeed having the impact they are intended. To this end, regularizing a key set of questions about the performance of place in relation to the regulations that shaped that place is imperative in creating better laws and guidelines. While there may not yet be a mechanism for a national or international research program, individual jurisdictions and the designers and planners who work with them can begin to ask these questions and build the database that will eventually inform a larger conversation, as well as adopt and further develop tools such as those presented in Section 3. The more data that is collected and shared, the easier it will be to make the case for more universal participation in research activities, as well as changes to law and regulations that shape our physical environment.

4.2. Concluding Remarks

This paper examined the current and future trends in research as it pertains to city planning and urban design. It is intended to demonstrate the need to reconsider the methodology used in planning cities, towns, districts, and suburbs. There is a significant lack of scientific

rigor in the research protocols, and further a lack of research in general, in these arenas. The paper poses questions and identifies potential fundamental problems with the current system, and further identifies the need for support for these efforts.

Regulations drive the pattern of development almost to the exclusion of all other influences. They are legally binding and not easily susceptible to change. However, the method through which current and future regulations, and the environment in which they are created, can change is through the implementation of stringent protocols for basic research. The built environment affects our health, safety and welfare, and the rigor with which we investigate the effects on the public should be commensurate with those efforts.

Many of the questions that need to be addressed such as the relationship between urban form, pedestrian movement, and public health cannot be adequately addressed because we do not have a database of sufficient size and depth on the variables of urban configuration to adequately research the issues. Is there a relationship between energy consumption, public health, and the configuration of urban infrastructure? The same questions remain unanswered for energy consumption, and especially re-use of existing infrastructure in light of land use changes over time. What configurations offer the greatest accommodation of change? The aim of this paper is to propose that these efforts are in the national interest of the citizenry, and that as we regulate for the development of cities, we should create a research base to align the regulations that dictate our actions with scientific evidence.

5. References

1961 Zoning Resolution. (1961, December 15). The Zoning Resolution of the City of New York. New York, NY, USA: City of New York.

Allen, D. (2010). The Standard City Planning Enabling Statute and the Regulation of Suburban Block Size. Rocky Mountain Land Use Institute - Sturm College of La. Denver: University of Denver.

Anderson, W. P., Kanaroglou, P.S. and Miller, E.J. (1994). Urban form, energy and the environment: a review of issues, evidence and policy.[online]. Available from: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0028&from=EN.   [Accessed 4.10.17].

Banister, D., Watson, S., Wood, C. (1997). Sustainable cities: transport, energy and urban form.   [online].   Available   from: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0028&from=EN. [Accessed 4.30.17].

Batty, M., Morphet, R., Masucci, P., Stanilov, K. (2014). Entropy, complexity, and spatial information. Journal of Geographical Systems 16, 363–385. doi:10.1007/s10109-014-0202-2

Boarnet, M. G., Greenwald, M., McMillan, T. E. (2008). Walking, urban design, and health: toward a cost-benefit analysis framework. Journal of Planning Education and Research, 27 (3), 341-358.

Bridges, W. (1811). Remarks of the Commissioners for Laying Out Streets and Roads in the City of New York, Under the Act of April 3, 1807. Commissioners of Streets and Roads in the City of New York. New York: The City of New York.

Building Zone Resolution. (1916, July 25). Appendix B City of New York Board of Estimate and Apportionment. New York, NY: City of New York.

Christova, P., Scoppa, M., Peponis, J., & Georgopoulos, A. P. (2012). Exploring Small City Maps. Experimental Brain Research, 223 (2), 207-217.

Doherty, M., Nakanishi, H., Bai, X. and Meyers, J. (2009). Relationships between form, morphology, density and energy in urban environments. [online]. Available from: https://lsecities.net/publications/reports/cities-and-energyurban-morphology-and-heat-energy-demand/. [Accessed 4.16.17].

Ewing, R., Schmid T, Killingsworth R, Zlot A, Raudenbush S. (2003). Relationship between urban sprawl and physical activity, obesity, and morbidity.

Jacobs, Jane. (1992) The death and life of great American cities /New York : Vintage Books.

Litman, T. A. (2017). Economic Value of Walkability. Victoria Transport Policy Institute, 1-31. http://www.vtpi.org/walkability.pdf. [Accessed 10.25.17].

LSE Cities (2014). Cities and energy. Urban morphology and heat energy demand. Final report. [online]. Available from: https://lsecities.net/publications/reports/cities-and-energy-urban-morphology-and-heat-energydemand/. [Accessed 4.10.17].

Ozbil, A., Peponis, J., & Stone, B. (2011). Understanding the Link Between Street Connectivity, Land Use and Pedestrian Flows. Urban Design International, 16 (2), 125-141.

Ozbil, A., Yesiltepe, D., Argin, G. (2015). Modeling Walkability: the effects of street design, street-network configuration and land-use on pedestrian movement. ITU A|Z, 12 (3), 189-207.

Part 15 Subdivision Regulations. (1957). City of Atlanta Code of Ordinances. Atlanta, GA, USA: City of Atlanta.

Peponis, J., Allen, D., French, S., Scoppa, M., & Brown, J. (2007). Street Connectivity and Urban Density: Spatial Measures and Their Correlationlation. 6th International Space Syntax Symposium.

Peponis, J., Bafna, S., & Zhang, Z. (2008). The Connectivity of Streets: Reach and Directional Distance. Environment and Planning B: Planning and Design, 35, 881-901.

Peponis, J., Ross, C., & Rashid, M. (1997). The Structure of Urban Space, Movement and Co-presence: The Case of Atlanta. Geoforum , 28 (3-4), 341-358.

Peponis, J., Wineman, J., Bafna, S., Rashid, M., & Kim, S. H. (1998). On the Generation of Linear Representations of Spatial Configuration. Environment and Planning B: Planning and Design, 25, 559-576.

Riis, J. (1970). How the Other Half Lives: Studies Among the Tenements of New York. Cambridge, MA, USA: Belknap Press of Harvard University Press.

Village of Euclid, Ohio v. Ambler Realty CO, 272. U.S. Supreme Court (November 22, 1926).

Case Study Paper

Urban morphology and behaviour mapping in Abu Dhabi's public spaces.

Informality as an interaction of cultural context and urban form.

Apostolos KYRIAZIS, Abu Dhabi University; UAE

Hadrien DUBUCS, Sorbonne University Abu Dhabi; UAE

Clio CHAVENEAU, Sorbonne University Abu Dhabi; UAE

Clemence MONTAGNE, Nantes Atlantique; France

Hanu DILIP, RW Armstrong; UAE

Ayesha ZAHID, Abu Dhabi University; UAE

Shafaq QAMAR, Abu Dhabi University; UAE

Abstract

Abu Dhabi's galloping growth is shepherded by a stringent set of standards and guidelines for both the public space and the built environment. Its urban form that follows the main characteristics of most new Arab cities (automobile dependency, modernist grid and monotonous suburban sprawl) has already started gaining the attention of scholarly research. However, that research body still misses a critical analysis of the dynamic interaction between the qualitative quotidian practices and the produced urban form. Such an analysis could shed light on the relationship between socio-ethnic groups and urban space programming and appropriation.

This paper presents findings from an ongoing research program for the search of a link between the design and use of public spaces, and the surrounding urban morphologies within the diverse sociocultural context of Abu Dhabi. Fourteen public spaces of the city (both formal and informal ones) were examined in terms of their typology, functions and social profile, as well as for the correlation with their urban context and the public transportation networks. In situ methodological approaches such as behavioural mapping, impromptu discussions and photography were applied in order to shed light on the intricate particularities and qualitative properties of public spaces. The mapping of the public spaces was conducted under the prospect of comparability, either between themselves or with future studies in similar cities in the Middle East and beyond.

The research program – albeit not completed yet – amplifies the importance of informality as an indicator of urban health and as a reminder of insufficient urban planning programming and urban design practices. It also underlines the importance of preserving or even pursuing informality as a catalyst of social cohesion, cultural flexibility and inclusivity. Furthermore, certain urban morphologies, related more to a higher and a more organic degree of pedestrian connectivity seem to optimally contribute to a more diverse and successful public space.

Future phases of the program could also reveal relations on the metropolitan scale with regard to mobility, public transportation needs, strategic approaches and the need to control urban sprawl and densities. This case study of Abu Dhabi could then become of valuable guidance on rewriting public space design manuals and on exporting urban doctrines.

1. Researching Abu Dhabi

1.1. Introduction to context

While often dwarfed next to Dubai in terms of scholarly attention, Abu Dhabi is emerging as a paradigm of a new Arab city in the Gulf region. Its transformation from a seasonal fishing post to a contemporary global hub – as fuelled by the oil boom – has been achieved under a consistent and pragmatic political will (Kyriazis, 2017). Its five decades of history, although shallow compared to most cities, were enough for the city to grow to the extent that construction moratoriums were issued twice in order to allow the city life to catch up (Elsheshtawy, 2008). Automobile dependency still dominates and shapes the urban form (Montagne, 2016) resulting an expensive sprawl against both urban fronts: the desert, with a post-modernist suburban lifestyle and significant horizontal segregation; and the waterfront, through constant reclamation on a sensitive marine ecosystem and the production of exclusive expatriate-based resort-like developments (Kyriazis, 2018). Catalyst to that is the effort of the city to keep up with the latest trends on global urban design and real estate developments while pushing for high targets in tourism that led to emphasis on security and public space privatization (Samarrai, 2018). The urban and architectural scales are controlled by a meticulous set of manuals, partially aligned with the local cultural and climatic conditions. Especially with regard to the public space, it is the analytical manuals, privatization and an almost Orwellian level of security that generate a sense of over-management (Kyriazis, 2019).

1.2. The research project

In a city that was created in a tabula rasa for the sake of modernization (Al Fahim, 2014) and where the built environment is renewed to the degree of risking to eradicate even those shallow layers of modernist history (Menoret, 2013 and Elsheshtawy, 2008), its citizens – expatriate in majority – are a permanent testament of its temporality. A labor/sponsor based residency system underlines this property. However, they provide a pulse to the city as well as a seemingly uninterrupted collective memory that ensures the continuity of its existence (Elsheshtawy, 2019). The public space is their field of action. The street, the square, the alley; a space of interaction without which urban life would not exist (Lefebvre, 2003).

It is this space and its interaction with its users and the urban form that is under research. A city-wide behavioural analysis that would highlight social parameters and could associate them with the urban morphology. In this light, the research team combines forces from two institutions and three disciplines: Architecture, Sociology and Human Geography. Documenting the behavioural profile of public spaces and superimposing it to the urban form and mobility patterns would answer questions related to the genesis and impact of informality, to the consequences of zoning practices and to the interconnectivity of the public realm (Kyriazis, 2019).

Quotidian urbanism has been studied thoroughly in many cities for the last decades, following the influence of Jane Jacobs, William Whyte, Kevin Lynch, Jan Gehl and others. Middle Eastern cities were also examined, as their pre-modern, organic urbanity highlights the importance of randomness and spontaneity (Elsheshtawy, 2011; Robabecciah, 2018; Alawadi, 2019). However, this meticulous study of Abu Dhabi is critical, as the role of informality is tested – and eventually becomes essential – against a condition of over-management and overregulation. Aspects of Abu Dhabi's daily patterns have already been studied (Alawady, 2019; Elsheshtawy, 2019), but this project includes the entire metropolitan area, aspiring to juxtapose the intricate urban morphologies with the public space users and their diverse sociocultural backgrounds.

1.3.   Methodology

Achieving comparability and representativeness within that mega-scale was a key target for the research project. Comparability regarded the formal/informal dualism, different neighbourhoods of the city as well as with other cities in the region. This hypothesis raised the issue of splitting the city to major parts with distinct urban/social characteristics.

The analysis of urban and statistical data would precede the social/behavioural one. However, since access to any statistical and demographic information was limited, the observational part should involve an upgraded empirical analysis, supported by impromptu discussions with public space users (instead of a formal questionnaire). Simultaneously, the role of photographic documentation became even more critical for both parts. Public space photography was a sensitive issue concerning privacy and socio-cultural particularities and special techniques were applied (Kyriazis, 2019).

Observations covered morning-afternoon-evening time slots for both weekdays and weekends, thus adjusting to quotidian religious practices and labour patterns. Furthermore, due to the extreme climatic conditions of Abu Dhabi, most daytime observations were conducted during winter. They include description of actions, brief profiles of public space users (nationality, occupation, commuting means and origin etc.) and mapping of their pathways and actions within that space. This mapping would get superimposed to the urban analysis for a spatial visualization of the observational grid. Furthermore, those profiles will be used to reveal mobility patterns at the metropolitan scale.
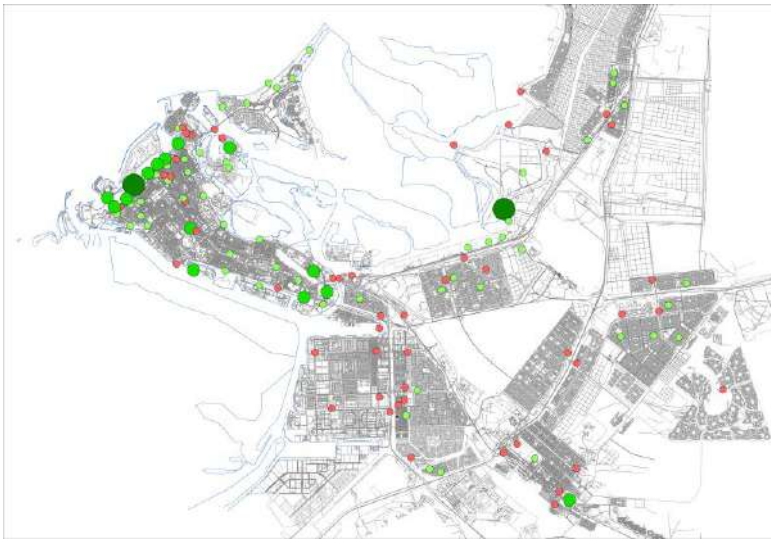
2. Analysis - Observations

2.1.   Selection of studied public spaces

A first effort to pinpoint all existing public spaces in Abu Dhabi highlighted the volatility of the informal ones as well as the necessity of acquiring information of any elusive yet remarkable activities around the city (figure 1).

Figure 1: Map of public spaces in Abu Dhabi. Formal spaces are in green (sized after their importance/impact) and informal spaces are in red.

For addressing issues related to observations' time management and comparability without compromising its scientific principles, the city was divided in seven zones with distinct morphological characteristics and ethnic distribution (in numerical order): the downtown superblocks, the mid-island low-rise villas, the institutional Maqta channel, Khalifa City, the industrial suburbs, the desert sprawl suburbia and the waterfront expatriate free zones (figure 2).

Two public spaces were chosen from each zone; a formal and an informal one. This way, observations from all fourteen spaces in various timings and days would secure a representative enough reading with comparable results. Special attention was given to issues that could affect the objectivity of the observations, such as the intricate climate of the region and major religious events (i.e. the holy month of Ramadan).
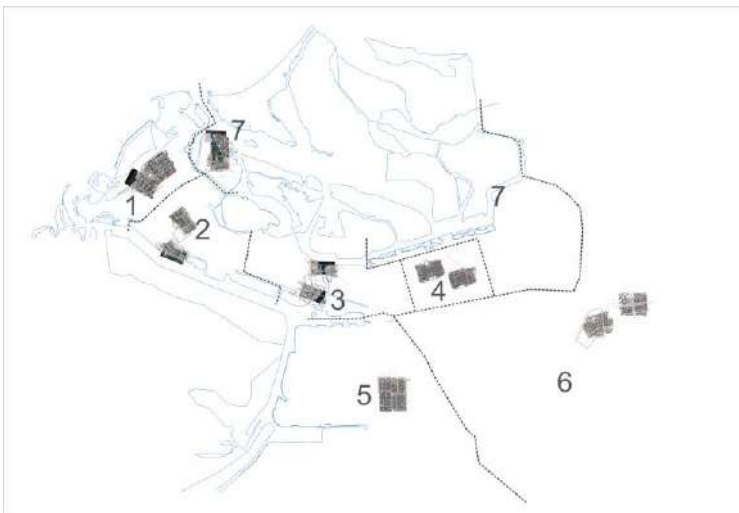
Figure 2: Map of the selected public spaces to be studied.

2.2.   Urban Analysis

A layered urban analysis was necessary both for comprehending the morphological distinctions that the aforementioned grouping induced and for becoming the basis upon which the behavioural mapping will take place. All fourteen chosen spaces are depicted in thematic layers of urban morphology, namely Built-up space, building heights, land uses (ground floor and overall), pedestrian space and road network (figure 3).
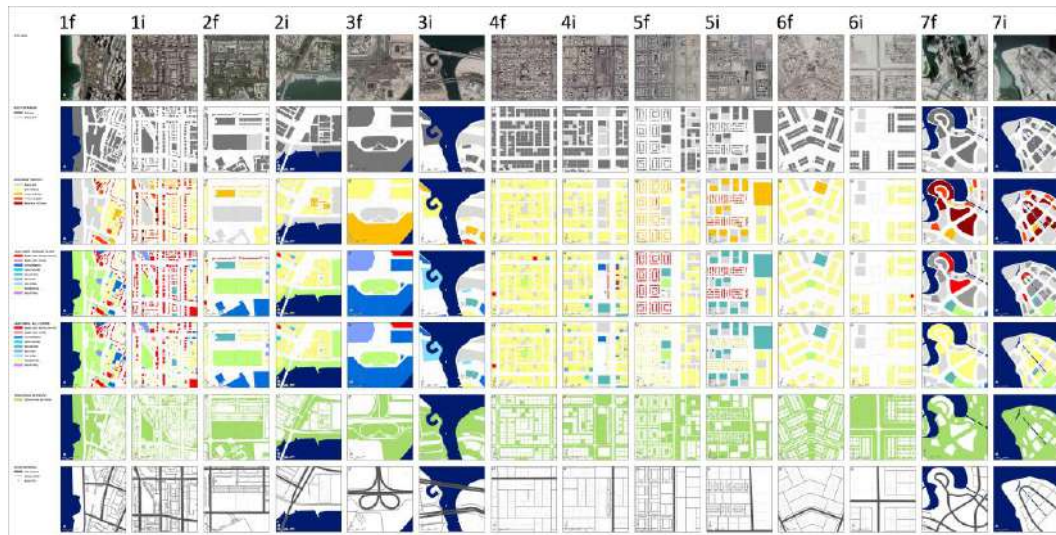

Figure 3: Urban thematic maps of the fourteen assigned spaces (as numbered in Figure 2 with "f" and "I" standing for Formal and Informal). All mapped areas are 1x1km in dimensions.

The theme maps alone reveal patterns of relations between the studied spaces and their urban surroundings. Density, heights and plots' shapes consist a first level of reading related to walkability, accessibility and porosity.

3. Observation findings

3.1.   Behaviour mapping

While only few observation slots remained at the time this paper was authored and most of the digital mapping process is still under way, several significant findings have already emerged. These findings are a fruition of activity observations, qualitative information from the public space users and from the mapping itself.

The research team sought for both formal and informal activities – regardless of the formal/informal status of the site itself. This distinction was elusive (especially in formal spaces) but clear once occurred. However, activities on informal public spaces also display timing and usage patterns, thus highlighting the absence of formal public spaces or the absence of specific uses/activities within them, in major parts of the city.

However, this project focuses not only on the public spaces themselves, but also on their relation with the surrounding urban morphology. The mapping of pathways and activities (figure 4) focuses more on the latter.

Figure 4: Mapping of pathways and activities of public space users (source: authors).

3.2. Formal Public Spaces

The formal public spaces chosen in this project can be divided into three categories, in terms of design sequence: The ones that were created and designed at an ad-hoc basis, like the famous Corniche downtown park (as part of the waterfront regeneration). The parks with plots allocated by Master Plans that got developed later in an isolated fashion (like the parks of areas 4f, 5f and 6f shown on figure 4). Lastly, the parks that were created in residual urban spaces i.e. within highway junctions (like the park on area 3f).

Observations showed that in most of these public spaces, informal actions were less than few and they were usually hinging on alternative use of sport courts (due to overpopulation in other, popular sports), small-scale and time-limited occupation of playground equipment (by sleeping Municipality workers or smoking youth) and arbitrary car parking at unpaved edges of the areas. Security personnel assigned by the Municipality however rapidly quench most of these cases. Other surprises like trash collectors searching on bins and users of quad-bikes inside grass-landscaped areas were rare.

Regardless of the size and importance of the public spaces, it seems that their success depends on the presence of flexible areas within them; areas devoid of a program, areas open to experimentation, adaptation and customization. In the studied cases, this is manifested by open areas of greenery that can easily adapt to cultural particularities and habits (i.e. family pic-nics) but also absorb extra demand in popular segments of the park (i.e. football courts etc.). Furthermore, such spaces are also capable of accommodating local-scale attractions introduced by individuals that rent their needed space from the Municipality. Thus, some revenue comes back to the local authorities (or to park managers) and at the same time, initially unforeseen uses enrich activity options.

3.3. Informal Public Spaces

The informal spaces chosen are either underdeveloped (or not developed at all) public spaces or undeveloped private plots. While many informal spots of Abu Dhabi have established some kind of permanence – albeit a delusive one – many others disappear or appear at surprisingly frequent rates, underlining a condition of temporality. Practically speaking, figure 1 would need constant updating.

Informal spaces usually serve in absence of formal alternatives in a neighbourhood. Therefore, they highlight the deficiencies of the preceding master plans in supplying public spaces in general or specific facilities that could address demand from local residents. This also indicates a gap on the usually top-down urban planning processes and their inability to reflect on the social dynamics of the city. Abu Dhabi – as well as many of the Arab cities of the Gulf – is highly ethnically diverse with the indigenous population occupying only 19% of the total (SCAD, 2018), the majority being from the Indian subcontinent (India, Bangladesh and Pakistan). In this light, it is not surprising to witness so many spontaneous cricket games (especially in sectors 3, 4, 5 and 6). Other sports performed are volleyball (mostly by Indians in the 5i spot), badminton (on pedestrian sidewalks of the 1i area) and football.

In most of these cases, informal gatherings function as community condensers. The Indian volleyball gatherings on area 4f resonated as friends' meetings after working hours, to end up in running neighbourhood championships. Similar settings appear in cases like the Bangladesh square (Elsheshtawy, 2019). Such post-work ethnic gatherings also display a sense of resistance to the daily routine, to labour anxieties and transience.

However, the expatriate communities are not the only ones that express their quotidian anxieties this way. The local youth (including other Arabs) also try to unwind themselves and socialize in manners related to automobiles and engine sports in general, a phenomenon frequently met in the region (Menoret, 2013). The Bateen beach (sector 2i) is a hot spot for impromptu jet ski races during the sunset. To this direction, the informal cases of the areas 4i and 6i are indicative of the consolidation of the private car as a personality extension as well as of the profound impact of the monopoly of this means on shaping the city's urban morphology. The car is used to shortcut big-sized, dirt/sand-covered city blocks and to stop at canteen stations for drive-through dinner orders. Canteen stations are an upcoming trend in Abu Dhabi: apart from following major events in the city (about sports, concerts and the like), they also make self-organized groups, occupying informal public spaces next to highway entrances to the residential suburbs. This trend is so vibrant that the Municipality have been trying to settle the canteen groups in temporarily formalized areas.

3.4. Illegality Vs Informality

The use of unfenced vacant private plots and the performance of several actions in formal public spaces have often been the subject of criticism from local authorities. After raising issues of security and socio-cultural particularities, informal behaviour is sometimes demonized or even penalized (Gulf News, 2018). However, wide scholarly research has shown that security issues truly arise in the absence of street life and informal urbanism (Jacobs, 1961). In addition, such measures tend to strengthen the sense of segregation and temporality and actually function as a catalyst for informality and a reply to oppression (Menoret, 2013).

Interestingly, there is also the issue of a proper definition of informality and illegality by both local authorities and designers. This became apparent on many of the formal spaces through the popular action of barbequing. While barbequing is a favorite task for many park visitors (mostly with an Arabic background), the official parks' signage was clearly prohibiting it. Some of the parks were later equipped with special built-in barbeque stations but the signage remained. Fishing is another popular but occasionally controlled activity. Conversations with Pakistani and Indian fishermen found in the 7i site implied a matter of public space clarity and quality in terms of preserving a high-end image of a public space and matching it with the "values" of its urban surroundings.

3.5.   Informality and Space Privatization

The need to issue special permits for photography in the sectors 2f and 7f reminded the research team of other impactful space-generating forces of the city: the very real estate players, developers and private stakeholders. Public space privatization under the theoretical approaches of neoliberalism and the motivation of surplus value generation (Lefebvre, 2003) by definition oppose the notions of openness and inclusivity (Harvey, 2013). They deny any element of surprise and improvisation as they advocate for a fully monitored "surgery room" urbanism with predefined experience provisions. However, observations showed that public space privatization eradicates (but does not completely annihilate) informal activity, as even in the most diversely designed spaces users' unpredictability and the need for customization are inherent properties with universal value.

Further support to this approach comes from an incident prior to the observations' launch. The initial choice for the 7i sector was a countrywide known kite surf beach in Yas Island. Situated on the opposite side of the Yas global entertainment hub (that includes venues like the Yas Marina F1 race track, the Ferrari World and the Warner Bros World amongst other luxurious destinations), this beach was an informal haven for kite surfers and the like. It offered ideal wind alignments, easy access from a nearby highway and zero development; a setting naturally expressing the sense of freedom associated with these sports. However, in ignorance to the dynamics and potential of that attraction, permits were granted for private water sports facilities that fenced the area. Consequently, kite surfers stopped using that beach, all informal activities ceased to exist and the city lost a unique attraction.

3.6.   Behaviour and the urban morphology

Most of the aforementioned cases and behaviours were the products of in situ observations. However – as aspired from the early stages of this project – their juxtaposition to the urban context (figure 4) should provide valuable insight on the dynamic interface and their intertwining properties that form or provoke each other.

Density does not seem to be associated with any kind of activity (formal or informal) apart from increasing the total amount of flows and the rate of unpredictability. However, its morphological manifestation makes a difference. The use of podiums on high-rise buildings on Reem Island (areas 7f and 7i), fully occupied with car parking spaces for the towers' dwellers, strips the street level of any life and produces elevated areas of exclusivity. Thus, pedestrian flows and activities of any kind in adjacent spaces are limited and channelled, with fewer opportunities for spontaneous socializing. In full contrast, on-street retail maximizes the randomness of pedestrian flow (areas 1i, 4i, 5i). Similar to that dualism, formal parks with single entry point like the Umm Al Emarat park (2f) are isolated from the urban fabric and have more predictable flows.

Moving to lower densities, the key sociocultural notion that shaped the urban morphology is privacy. The public-private dualism becomes more absolute and distinct than ever in the form of the plot walls that surround the "floating" or setback villas. The sikkak (pedestrian alleys) in between are the only reminder of an obsolete morphology and typology of Arabic residential architecture, the courtyard house. The transition was rapid and tailor-fitted the urge for display of an upgraded social status (Kyriazis, 2018). Public spaces 4f, 6f, 4i, 6i and even 2f are surrounded by such housing plots and pedestrian flows to/from them is streamlined through the sikkak in between.

However, low density, extreme zoning and sprawl pay their own price. Large plot sizes and oversized street corridors increase distances and discourage walking. Even in the ideal temperatures of the Abu Dhabi winter, the majority of people drive small to middle distances to reach a park. Furthermore, rigid zoning practices left suburbia devoid of local retail shops. This was a documented (by discussions with users) shortage that if restored, it could attract more people from greater distances.

3.7. Urban mobility

While the research phase of mobility in the metropolitan scale is still in process, several key points have emerged, using the interviews and part of the urban analysis.

Most (but not all) of the selected public spaces are serviced by means of public transportation (bus in particular). However, really few of the users select the bus to visit them. Cars consist the majority of means used, with walking, bicycle and motorcycle following.

With regard to distances travelled on purpose for a park visit, it became clear that formal spaces' users may travel bigger distances – even across the city. Apart from the cases of 1f (Corniche) and 2f (Umm Al Emarat park) that are country-wide known public spaces and may attract large numbers of people from afar, smaller parks also attract people from afar due to the existence of specialized facilities (i.e. football courts etc.). Opposed to them, most trips to/from the informal spaces come from their related neighbourhoods. Exceptions to this observation are activities related to community bonding, like the volleyball matches of area 5i.

4. Conclusion

What started as a humble attempt of this research team to document and map some of the already familiar public spaces of Abu Dhabi, ended up as a revelation. Under the seemingly permanent flashy wrapping of curtain wall urbanism and exclusive (in every sense) architecture, there lies a layer in flux. People, citizens and visitors that live, work, move, socialize and get entertained. They acknowledge transience as a constant and they resist on a daily basis. It is that quotidian struggle that is showcased.

The urban form contributes as an inherent piece of the condition. It highly affects urban mobility, quantities and qualities of public space and behavior within. The public spaces are the recipients of this quotidian anxiety. Therefore, proper planning, programming, designing and maintaining of these open spaces is key to the ability of a city to absorb all those vibrations and clashes.

Informal urbanism and informal behavior are major components of this relation. They are urban and social health indicators, as adaptation, improvisation and surprise are elements that produce and ensure openness, democracy and inclusivity. They imply smart and active citizens, in an era that "smart" only addresses corporate interests (Koolhaas, 2014). Informality is not theofied but becomes essential in disclosing weaknesses, shortages and environments of exclusion and conflict that otherwise would remain elusive.

The behavior mapping of Abu Dhabi's public spaces, apart from the value of documentation itself, is a project that may argue in favor of updating the existing city manuals and guidelines with filling in a gap between urban governance and a textbook yet sterile urban morphology: the social layer, the people, both owners and users. A pathway towards actual social sustainability. This may include an argument for a shift towards program flexibility. Neighborhood and public space design could invest in introducing participatory processes. The city should develop reflexes that would enable it to harness the values of informality. Furthermore, this project could set a paradigm for research on behavioral mapping and social mobility in all Arab cities in the region and beyond, with similar sociocultural and climatic conditions.

5. References

Al Fahim Mohammed (2013) From rags to riches. A story of Abu Dhabi, Abu Dhabi: Makarem

Alawadi Khaled (2019) Life-scapes beyond bigness, Catalog of the UAE National Pavilion at the 16th Venice Biennale of Architecture 2018, Abu Dhabi: Artifice Press limited

Egypt Ministry of Culture (2018) Robabecciah: the Informal City, Catalog of the Egyptian National Pavilion at the 16th Venice Biennale of Architecture 2018, https://www.robabecciah.com/

Elsheshtawy Yasser (2008) The evolving Arab city: Tradition, modernity and urban development. London: Routledge

Elsheshtawy Yasser (2011) (In)formal Encounters: Mapping Abu Dhabi's Urban Public Spaces. Built Environment. 37, 92.

Elsheshtawy Yasser (2019) Temporary cities. Resisting transience in Arabia, London: Routledge

Gulf News (2018) Dh500 fine for playing cricket in undesignated area, Gulf News, 22 January 2018, https://gulfnews.com/going-out/society/dh500-fine-for-playing-cricket-in-undesignated-area-1.2160650 (accessed on June 2019)

Harvey David (2013) Rebel cities. From the right to the city to the urban revolution, London: Verso

Jacobs Jane (1961) The death and life of great American cities, New York: Random House

Koolhaas Rem (2014) Are Smart Cities Condemned to Be Stupid?, Archdaily, 10 December 2014, https://www.archdaily.com/576480/rem-koolhaas-asks-are-smart-cities-condemned-to-be-stupid (accessed on June 2019)

Kyriazis Apostolos (2017) The Morphology of Abu Dhabi's Superblocks: A modernist vision, at: Atiner, 2017: Athens Journal of Architecture, Vol.3, Issue 4. e-ISSN: 2407-9472

Kyriazis Apostolos (2018) A cultural paradox and the double shift of the housing typologies in the Arabic Gulf area: Undergraduate research studies in Abu Dhabi, at: ARCC, 2018: The built environment; Shaping the Quality of life Conference Proceedings, Volume 2, p. 90-98, ISBN: 978-1-935129-24-0

Kyriazis Apostolos et. al. (2019) Behavioral mapping of Abu Dhabi's public spaces: Urban research photography and cultural clashes, On the Surface Conference Proceedings, Lisbon, Portugal. https://www.scopionetwork.com/bookstore/bookofabstracts-2019

Lefebvre Henri (2003) The Urban Revolution, Minneapolis: University of Minnesota Press

Menoret Pascal (2014) Joyriding in Riyadh. Oil, urbanism and road revolt, New York: Cambridge University Press

Montagne Clemence (2016) Urban Development and Urban Planning at Abu Dhabi and Dubai; Politics, Actors and Mobility (translated from French), PhD Thesis, December 2nd 2016, Paris-Sorbonne University, Paris France.

Samarrai Kais (2016) The evolution of Abu Dhabi City's urbanization and the sustainability challenge, at: Al-Asad M. and Mehrotra R. (2016), Shaping Cities; Emerging models of planning practice. Berlin: Hatje Cantz.

SCAD (2018) Statistical Yearbook of Abu Dhabi 2018, https://www.scad.gov.abudhabi/Release%20Documents/SYB_2018_EN_9Sep%20_Chart%20Correction.pdf accessed on 21/6/2019

Track 4

Knowledge economies and identity
Planning for culture

CONGRESS TEAM

Nasim Iranmanesh
(Iran)
Piotr Lorens
(Poland)

LOCAL EXPERTS

M. Faisal
Dias Budiati Prasetiamartati
Ratna Sri Widyastuti

In recent urban planning paradigms, "Globalisation" is a new approach to development which invites urban planners to take serious interest in local features. In short, the expectation is that protecting and drawing inspiration from what makes places unique can lead us to a more compatible and sustainable development in our cities: everybody should feel and appreciate sense of place or sense of belonging in their surroundings.

With this in mind, culture and identity are two critical features which should be more strongly preserved and promoted in urban planning, as by keeping and reinforcing identity in our built environment we can live happier and more satisfied in our cities.

By reinforcing local identity and culture in urban development, there will be a more harmonious and memorable city for its citizens and a more attractive city for tourists and visitors to that city. This is essential in the context of undeniable globalization, which often create places that are indistinct, ugly and boring (and unfortunately many recent developments are unpleasant!).

It is not possible to preserve and reinforce identity adopting a single solution across all places of the world: each place has unique dynamics and needs to find its own way and its own priorities, while recognising that it is not easy at all to revive and protect the identity of a city during modernisation and change. Urban planners have great responsibility in finding solutions tailored and unique to each specific problem. Maybe improving identity in one place could be done through restoration of traditional buildings and extension of traditional built form patterns to new buildings, still adopting innovation and contemporary design (without replicas). In other places identity could be in different features such as traditional clothes or retention and expansion of social activities in the urban space, according the culture of that city. In some settlements, identity can be enhanced even through restoration and reviving of the traditional infrastructure.

However, to promote stronger identity we also need to reinforce the aesthetic awareness of people; citizens should be able to perceive and seek aesthetic quality in their built environments. Without this, the aspiration that each change will result in improved culture and identity will fail. This obviously mean that people participation in improving the identity is essential, as, without it, every plan and design will be unsatisfactory.

So these are the main questions:

- How can urban planners persuade people to participate and join them in improving the identity and aesthetics in their places?

- Which elements will be identified by citizens as cultural and valuable items to be preserved and improved?

- How and who can lead people to understand and prioritise the most important elements of their identity and culture?

These and many others are the difficulties which urban planners have to face, but finding suitable answers is vital for contemporary planning and urban living.

A city without identity is just a dead place which will not inspire its citizens and will create an unhuman setting for its citizens. Unfortunately, too many of us are living in these ugly and unhuman urban settlements and sometimes visit and appreciate those cities that have invested in their own culture continuously and systematically for a long time: historic places like London, Amsterdam, or Florence. But all citizens have the right and need to live in such rich places every day, experiencing belonging, feeling better in the soul and enjoy something pleasant on the senses.

So the key question remains: "How and who can define and improve the identity of the city?" Maybe the best answer will be this: "Just find identity, then don't ignore it."

Track 4 - Selected Papers

1. Septiana H., Al Naema N., J A Al-Jaber A.K., Al Bader F., Lolwa M. Al Khaldi A., '*Forward Thinking on Culturally Urban Imprint in the Contemporary Era Rejuvenating the Traditional Neighbourhood Values and Characters: An Urban Morphology Review on Qatari Cities*'

2. Huq F.F., Ul Khan Shuvo I., Nidalia Islam '*Essence of Urban form and its Relationship with Urban Aesthetics: A case from Rajshahi City, Bangladesh*'

3. Ariyanti V. '*Cultural sensitive approach in water management for a volcanic river basin of Yogyakarta Metropolitan Area*'

Case Study / Project

Forward Thinking on Culturally Urban Imprint in the Contemporary Era

Rejuvenating the Traditional Neighbourhood Values and Characters: An Urban Morphology Review on Qatari Cities

Harini SEPTIANA, Noora AL NAEMA, Amna Khalid J A AL-JABER,
Fatma AL BADER, Lolwa M. Alfaya AL KHALDI

Abstract

Most of the cities in the world are witnessing tremendous changes in their urban landscape, over the last half-century. Under the modern planning regime, the spatial layout organization of a city is very much dictated by the ease of motorized movement priority, in order to cope with increased travel demands as a result of the pressing growth of the economy and population. Today, it becomes planning norm that the primary determinants to define a city's spatial structure are based upon motorized movement patterns, along with other factors such as the population size, urban capacity, and the growth size or scale. The upside of such approach is that the spatial structure becomes more effective and efficient in accommodating a denser population with their infrastructure service, and in anticipating the future expansion. However, the downside will be the tendency to undermining the 'people factor' with their social cultural life and activities.

Without careful thinking and proper planning, one of the impacts of highly prioritized transport infrastructure in shaping the city spatial structure, is the loss of identity. There is a danger of the unique urban culture being diluted and forgotten, leaving 'a legacy' of soul-less cities everywhere, with each lacking any distinct personality or character. With more and more cities seeking to enhance their competitive global position through employing cultural strategies in their developments, it is definitely 'a wake-up call' for cities that have been busy focusing on their rapid modern developments without wisely maintain their local identity and character. Urban identity needs to reflect cultural and historical values, through modern interpretation and not simply by importing foreign templates. Therefore, the urban imprint should be recognized as an illustration of a place's culture and traditions. It demystifies the interaction of built environment and people with all their values, that work together to define an identity. I

n this paper, Qatari cities and towns become the study context as they also experience extreme speed of changes after the discovery of oil and gas in the 1970s, and in current situation, a globalized language of urbanism has overshadowed the then Qatari's unique blend of maritime, rural and urban culture. The world of motorways has become dominant over 'the used to be' tightly-knitted neighbourhoods with intricate alleyways (sikka) and small public open spaces (barahat).

This paper mainly examines the morphology of traditional neigbourhoods that are still intact in the Downtown Doha area and other old towns (such as Umm Slal Mohammad, Al Wakrah and Al Khor) and seeks the opportunity to capture their key principal characters to inspire the modern spatial layout.

The paper comprises of three sections. The first section discusses the evolutionary morphological process of Qatari cities and towns, from rural-village characters to modern spatial layout and its impacts. The second section analyses the traditional neighbourhoods (fereej) as the smaller unit of the city, to elicit attributable principal factors that shape them (i.e. tradition, social cultural values, climate sensitivity, physical pattern) as well as the current adoption of modern spatial layout. And last section elicits the best way forward in defining appropriate urban morphology that fit-well to Qatar context, and in employing cultural strategy to enhance it.

Track 4
Knowledge economies & identity: planning for culture

Forward Thinking on Culturally Urban Imprint in the Contemporary Era

Rejuvenating the Traditional Neighbourhood Values and Characters: An Urban Morphology Review on Qatari Cities

55TH ISOCARP WORLD PLANNING CONGRESS

Harini Septiana I Noora Al-Neama I Lolwa Al Khaldi
Ministry of Municipality and Environment (MME), Qatar

1 / 24

I AIM OF RESEARCH

Develop strategies for creating stronger character and identity on the contemporary urban imprint for neighbourhood design in Qatar
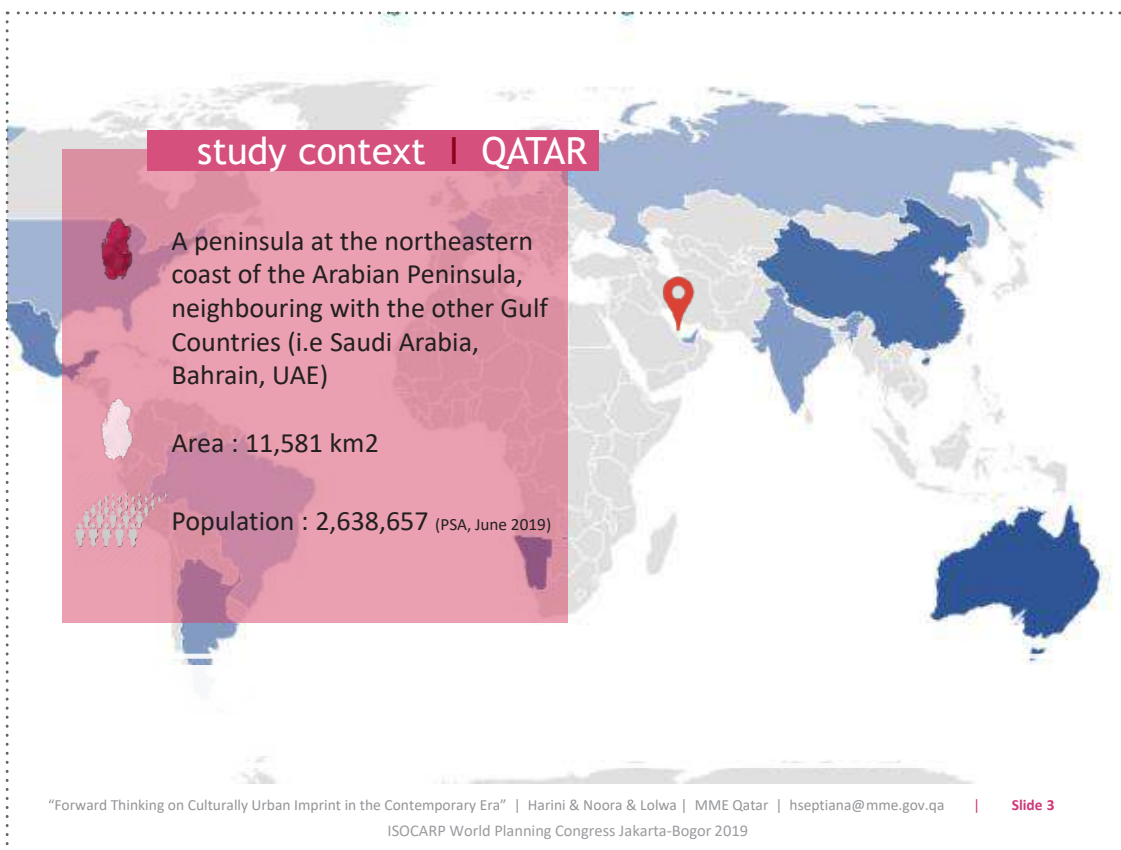
Focus

Neighbourhoods' Morphology

Methodology

Empirical Study; Literature Review & Desk Research

2 / 24

study context | QATAR

A peninsula at the northeastern coast of the Arabian Peninsula, neighbouring with the other Gulf Countries (i.e Saudi Arabia, Bahrain, UAE)

Area : 11,581 km2

Population : 2,638,657 (PSA, June 2019)

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | **Slide 3**
ISOCARP World Planning Congress Jakarta-Bogor 2019

3 / 24

| content

1
**Morphological
Transformation**

2
**Understanding
the Culture**

3
**Rejuvenating Traditional
Neighbourhoods'
(*Fereej*) Values**

4
**Towards Future
Neighbourhoods**

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | **Slide 4**
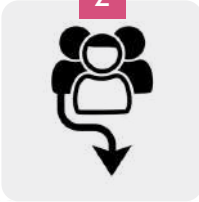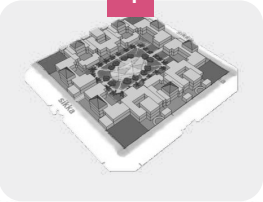ISOCARP World Planning Congress Jakarta-Bogor 2019

4 / 24

1 | MORPHOLOGICAL TRANSFORMATION

The origins of Doha, the capital city, is a small pearling village which transformed into a global city with man-made features as the driver. The early expansion was facilitated through the establishment of the Ring Roads (A, B and C) and Corniche, enabling the emergence of other commercial centres and developments throughout the city
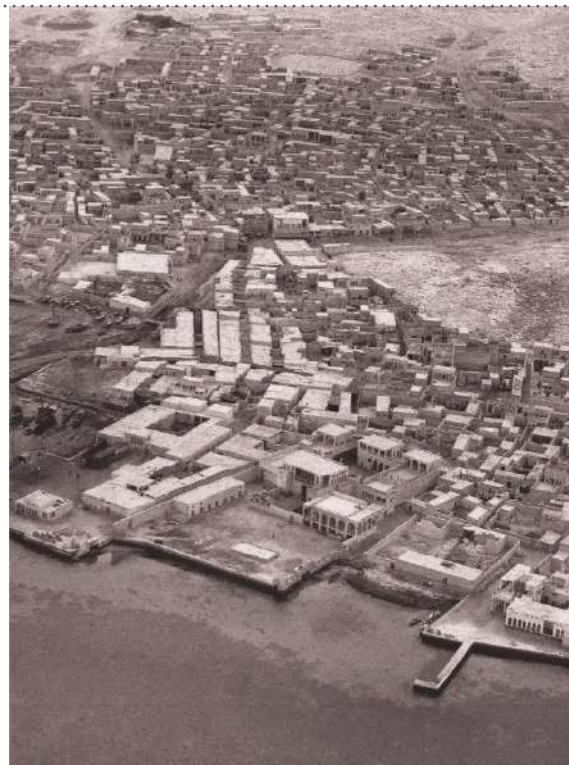

1 9 4 7

1 9 5 9

1 9 7 3

2 0 0 8

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | **Slide 5**
ISOCARP World Planning Congress Jakarta-Bogor 2019

1930s -1940s

Pre-Oil Discovery Settlement:
Tribal Tradition – Desert -Water

- Led by the pearl diving and fishing economy, **the coastline became the key driver on the growth of the early settlement**.

- The early traditional settlement took place along the shoreline due to **the need for access to the sea, land distribution to tribal clans, and the availability of water resources**.

- The growth of the **early settlements was also dictated by the natural setting and its geographical features**. Neighbourhoods were gravitated along *wadis* (valley), which brought water to the hinterland, with market and harbor areas as the main centres for social interaction. Each neighbourhood was directly linked to the market and harbour area by narrow streets.

- The structure of settlements was the result of collective building efforts of each family, not a conscious planning. With this bottom up approach, it led to the creation of **organic urban fabric.**

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | **Slide 6**
ISOCARP World Planning Congress Jakarta-Bogor 2019

1950s - present

Post Oil Discovery Settlement: Modern Cities

- The discovery of oil has transformed the lifestyle and the traditional occupations (ie. pearl diving and fishing) into oil drilling, refining operations, investment banking, hotel and tourism industry, etc. (Al-Khazraji, 2009)

- This changing the people life style, along with the adoption of the Western planning system, which road system becomes the primary factor in shaping a city, has dramatically **changed the social fabric as well as the city spatial structure, the neighbourhoods structure and the housing design.**

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | Slide 7
ISOCARP World Planning Congress Jakarta-Bogor 2019

7 / 24

1930s – 1940s

Pre-Oil Discovery Settlement

- Traditional settlement
- Homogenous neighbourhoods
- Shaped by local community-led
- Dictated by natural & geographical setting
- Organically clustered
- Typified by courtyard houses
- Integrated traditional neighbourhoods

1950s – present

Post Oil Discovery Settlement

- 'Oil' settlement
- Arbitrary neighbourhoods
- Shaped by central authority-led
- Dictated by modern infrastructure & market driven
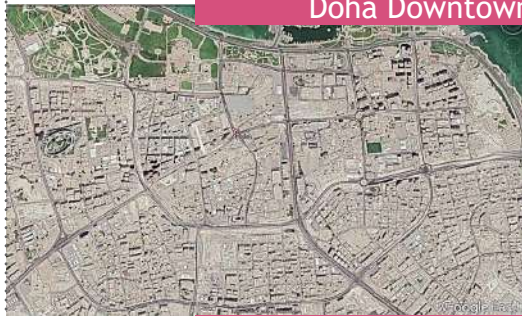- Rigid geometrical grid
- Typified by two-storey single family villa
- Isolated suburban structures

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | Slide 8
ISOCARP World Planning Congress Jakarta-Bogor 2019

8 / 24

Doha Downtown

Al Wakra

Al Khor

Umm Slal

From traces of traditional coastal and óasis' settlements in Qataris cities and towns, some still intact, however the social fabric completely changed

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | **Slide 9**
ISOCARP World Planning Congress Jakarta-Bogor 2019

9 / 24

2 | UNDERSTANDING THE CULTURE

| built environment: a medium of social cultural process

- The interrelationship between people and built environment is a continuous two-way process. People influence and change the environment as it influences and changes them.
- Human behavior is inherently 'situational', embedded in physical but also 'social', 'cultural' and 'perceptual' contexts and settings (Carmona, 2003)

| traditional spatial practices

The Gulf States in general are still bound by deeply religious and traditional values in all aspects of life. The religion plays a significant role in their every day life, therefore mosques become the heart of communities, and they are the primary factors of the spatial structure. All the neighbourhoods were located revolving around them. Mosques function as religious centres as well as public arena for community and communal events, and sometimes become court-house to resolve disputes, and religious school in small settlements (Salama, 2013)

Religion
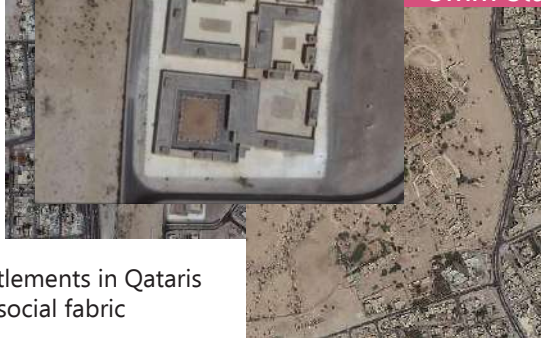
Culture

Familial Bond

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | **Slide 10**
ISOCARP World Planning Congress Jakarta-Bogor 2019
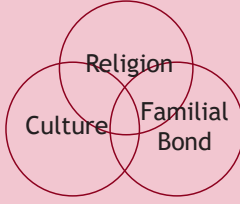
10 / 24

2 | UNDERSTANDING CULTURAL TRANSFORMATION

long standing traditional & cultural heritage

Despite the glamorous ultra-modern buildings and cities with unprecedented rapid developments after oil and gas discovery, **the societal norms of the Arabian Gulf people in general remain very traditional,** due to the strong attachments and bonds to a historical sense of traditional family values under a tribal communal system (Al-Khazraji, 2009)

from traditional to industrialised culture

Post oil boom, the introduction of new form of mobility –cars- and oil settlements by oil companies for their employees that developed separately from traditional settlements, have changed the lifestyle and social norms. **Car ownership and single family dwellings in suburbs became the preferred standard of living and the norm** for majority of the local population (Salama, 2013)

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | **Slide 11**
ISOCARP World Planning Congress Jakarta-Bogor 2019

11 / 24

3 | REJUVENATING TRADITIONAL NEIGHBOURHOODS' VALUES

Sustainable Pattern Development

| walkable environment

Typified by cluster organic composition of predominantly courtyard houses, which connect to each other by series of narrow-alleys (*sikka*) network, the traditional settlement is the best example of a zero carbon foot print area. pattern of development

| culturally sustainable

The traditional settlements were shaped with high consideration on requirements of Islam faith to segregate gender and to ensure privacy.
The '**Cultural sustainability** is a very important aspect of the overall sustainability framework and is regarded as the fourth pillar alongside the other three: environmental, economic, and social sustainability'.

| climatic suited

- Courtyard typology, that has long been adopted, proved to successfully combat harsh desert climate:
  - Ensuring good daily light and air circulation
  - Protecting from harsh sun exposure and provide thermal comfort
  - Ensuring privacy level
  - Low energy consumption
- The narrowness of the streets/*sikka* and tight spaces between buildings provide cooling and comfort thermal for pedestrians

Pocket park
Pedestrian sikka
Courtyard housing
Majlis
Courtyards shared by surrounding families
Private internal family courtyard
(QUDC, 2019)
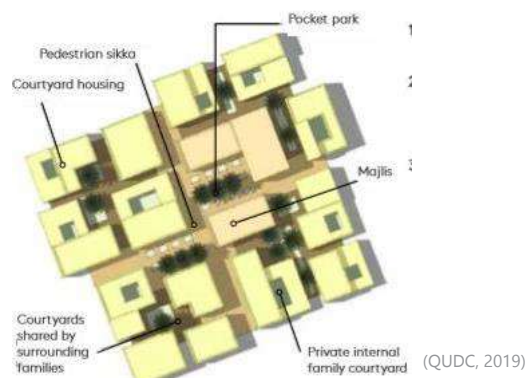
House of Mohammed Said Nasser Allah, Al Asmakh (1935)

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | **Slide 12**
ISOCARP World Planning Congress Jakarta-Bogor 2019

12 / 24

3 ▎REJUVENATING TRADITIONAL NEIGHBOURHOODS' VALUES

Neighbourhood (*fereej*) Characters

Neighbourhoods (*fereej*) are regarded as the important urban cells that determine the quality of the whole.
The *Fereej* is a fundamental urban unit in the structure of Arabic towns and cities, based on the characteristics of walkability, community and privacy.

▎courtyard housing

Traditionally, the *fereej* consisted of series of connected housing.

▎narrow alleys (*sikka*) networks

The courtyard housing were interconnected with narrow alleys (*sikka*) and they form pedestrian networks that link internally and externally.
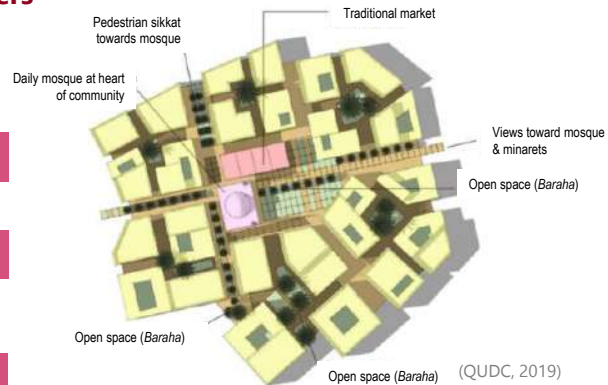
▎series of open spaces (*baraha*)

A series of small public open spaces (*baraha*) as social places for community interaction

▎mosques (*masjid*)

Daily mosques are served smaller neighbourhood sizes, while Friday prayer mosques usually are provided for larger communities

▎market/local retail (*souq*)

Pedestrian sikkat towards mosque
Traditional market
Daily mosque at heart of community
Views toward mosque & minarets
Open space (*Baraha*)
Open space (*Baraha*)
Open space (*Baraha*)
Open space (*Baraha*)
(QUDC, 2019)

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | **Slide 13**
ISOCARP World Planning Congress Jakarta-Bogor 2019

4. TOWARDS FUTURE NEIGHBOURHOODS

Three Key Principles for Shaping Neighbourhoods

4.1 Define the type of neighbourhoods

There are five types of neighbourhoods, as Blowers (1973) identified:

1
ARBITRARY NEIGHBOUR-HOODS

2
ECOLOGICAL NEIGHBOUR-HOODS

3
HOMOGENEOUS NEIGHBOUR-HOODS

4
FUNCTIONAL NEIGHBOUR-HOODS

5
COMMUNITY NEIGHBOUR-HOODS

Based on a common territory, spatial proximity

A common environment & identity

Inhibited by particular socio-economic/ethnic group

Derived from the geographical mapping of service provision

Close-knit, socially homogeneous group engage in primary contact

Only number five (5) has the attributes of a community

4.2 Mixed communities & mixed-use neighbourhood design

☐ Socially balanced neighbourhoods and communities, with some element of social mix
☐ Mixing tenures
☐ Providing balance community service and facilities
☐ Providing opportunity for 'lifetime' communities
☐ Robust neighbourhoods by avoiding housing of the same type
☐ Natural surveillance for safety and security

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | **Slide 14**
ISOCARP World Planning Congress Jakarta-Bogor 2019

4. TOWARDS FUTURE NEIGHBOURHOODS

4.3 Applying Principles and Characters of Traditional Neighbourhoods

- The design of new residential neighbourhoods should be based on the values, characteristics and spatial principles of the *fereej.*
- For suburban and rural context, a compromised approach should be considered: accommodating car-society needs, however vehicle street networks should be carefully designed for not to interfere with the pedestrian networks.

Suburb & Rural Context

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | **Slide 15**
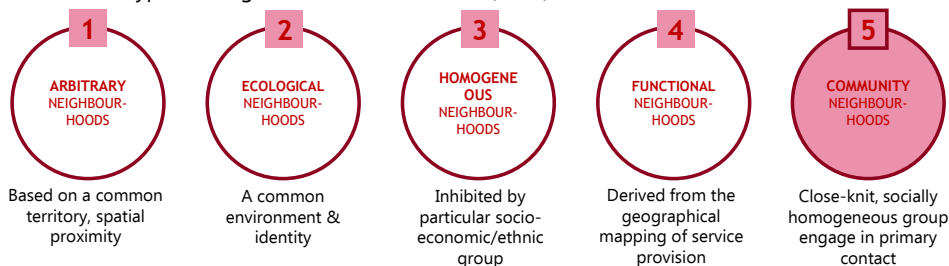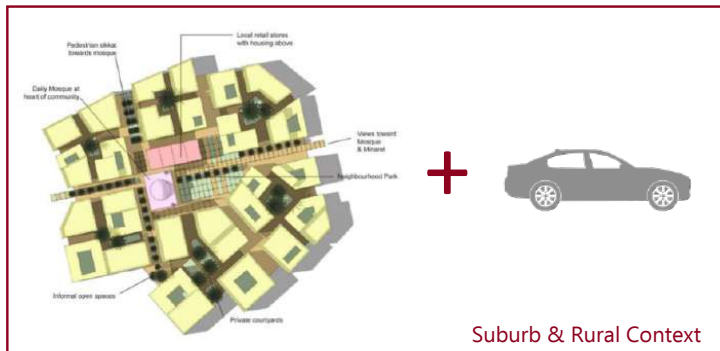ISOCARP World Planning Congress Jakarta-Bogor 2019

| old traditional neighbourhood case - urban context

### Active Conservation Strategy

Physical Elements
- Conserve the morphology (sikka, courtyard old houses, building placement, landscape);
- Conserve and restore the seven (7) old courtyard houses as the original massing;
- Upgrade the sikka, public realm and elements facing to the public realm
- Rebuilt the destroyed houses
- Design-reinterpretation

Proposed Alternatives of Theme and Use
- Art Cultural Quarter;
- Media Quarter (music studio, media related-workshops etc)
- Home Stay /Guest House/Boutique Hotel;
- Specialty Shops with Living Workshop;
- Specialty restaurants and cafes;
- Designer offices
- Low density residential
- Small-medium enterprises

Proposed Alternatives Regulation
- Heritage Overlay;
- Active conservation and regulatory-lead redevelopment for the entire Zone 14
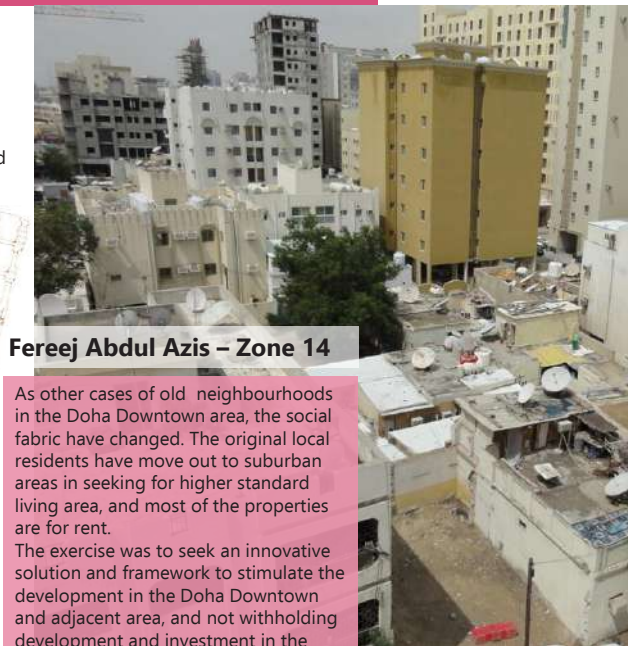
Fereej Abdul Azis – Zone 14

As other cases of old neighbourhoods in the Doha Downtown area, the social fabric have changed. The original local residents have move out to suburban areas in seeking for higher standard living area, and most of the properties are for rent.
The exercise was to seek an innovative solution and framework to stimulate the development in the Doha Downtown and adjacent area, and not withholding development and investment in the area.

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | **Slide 16**
ISOCARP World Planning Congress Jakarta-Bogor 2019

old traditional neighbourhood case - urban context

Summary of the Proposal

Concept 1	Concept 2	Concept 3
Minimum Intervention	Moderate Intervention	Maximum Intervention

Preservation and Conservation approach	Conservation and Redevelopment approach	Full-fledge Redevelopment approach

- Reviving the heritage cluster as a part of the traditional neighbourhood
- Preserving the old townscape
- Preserving the old morphology
- Preserving or conserving the existing traditional courtyard houses typology
- Rebuilding the old buildings

- Preserving/conserving traditional courtyard houses in the small plots
- Sympathetic Redevelopment for larger plots (>600 sqm)

- Sympathetic Full-fledge Redevelopment with courtyard concept, for all plots:
  - Option 1:
    Maintaining ownership of plots
  - Option 2:
    Full-fledge land consolidation

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | **Slide 17**
ISOCARP World Planning Congress Jakarta-Bogor 2019

17 / 24

old traditional neighbourhood case - urban context

Recommendations

1	To encourage ordinary land owners/home owners to improve the condition of their properties, MME -as the institution that is responsible to planning and design practice- should consider several approaches, as follows:
	
	    1) Provide **flexibility/relaxation within current regulations** towards small plots of old traditional courtyard houses, multi-tenement plots, etc
	    2) Provide **Design Guidelines** that addresses physical built form
	    3) Set **planning incentives**:
	        • GFA incentives and or,
	        • FAR incentives
	        • Flexibility in the conservation guidelines

2	Reach out to the land owners/ home owners regarding the approaches/ programmes
3	Enhance the Qatar identity by reconsidering the strategy for heritage and character areas for Doha Downtown and the adjacent zones that bear historical morphology and typology. Rarity and representativeness values should also be one of criteria, not only the buildings that have architectural merit.
4	Establish 'a Touristic Programme of Historical Trail' within Doha Downtown and the immediate vicinities with historical morphology and typology

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | **Slide 18**
ISOCARP World Planning Congress Jakarta-Bogor 2019

18 / 24

mixing different typologies in one district

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | **Slide 21**
ISOCARP World Planning Congress Jakarta-Bogor 2019

21 / 24

exploring contemporary fashion – suburban

Current practice in shaping the neighbourhoods:
- **Lack of character**
- **Placeless neighbourhoods**
- **Unclear spatial structure**

17,000 persons
2,500 units
27 pph

Utility 1%
Streets 27%
Residential 58%
Community Facility 11%
Open Space Recreation 3%

The attempt to create a series of **community-neighbourhoods** which responsive to natural & topographical settings, while addressing the car-society needs to certain level

10,880 persons
1,600 units
17.4 pph

Community Facility 4%
Streets 8%
Utility 0%
Residential 32%
Open Space Recreation 56%

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | **Slide 22**
ISOCARP World Planning Congress Jakarta-Bogor 2019

22 / 24

❙ CONCLUSION

Forward thinking on cultural-urban imprint for neighbourhoods brings us back to **the basic thinking** of the old wisdoms:
- culturally suited
- environmentally and climatically sound
- foster sense of community, religious, and familial bond
- enhance distinctive identity rooted from local intrinsic characters

❙ From 'placeless approach' to place of character-oriented neighbourhood design

In order to encourage the creation of neighbourhoods with characters, it is imperative for the authority to pay more attention to the neighbourhood planning and designing programmes, taking into account the cultural aspects of the communities, and should avoid 'arbitrary planning' approach

❙ From homogeneous neighbourhoods to community neighbourhoods

The land distribution programmes for local population should be based on a proper neighbourhood-planning designing guide, and aims to nurture sustainable community

❙ A Neighbourhood Planning & Design Guide to assist the design of 'old' and new neighbourhoods developments

A full-fledge neighbourhood-design programmes and initiatives requires the authority to prepare all the required necessary tools to assist and to streamline the creation of character and communities neighbourhoods (i.e planning framework, design guide, incentives, cultural strategy, Public Private Partnership –PPP– schemes etc). In addition, an awareness campaign is equally imperative.

"Forward Thinking on Culturally Urban Imprint in the Contemporary Era" | Harini & Noora & Lolwa | MME Qatar | hseptiana@mme.gov.qa | **Slide 23**
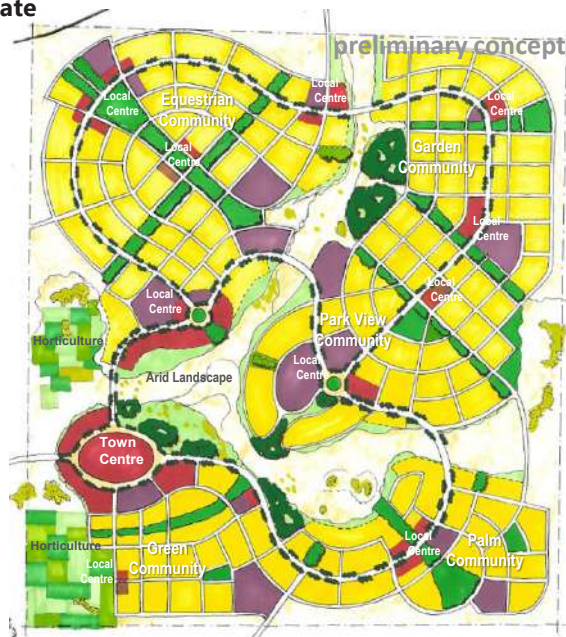ISOCARP World Planning Congress Jakarta-Bogor 2019

23 / 24

Forward Thinking on Culturally Urban Imprint in the Contemporary Era

Rejuvenating the Traditional Neighbourhood Values and Characters: An Urban Morphology Review on Qatari Cities

Harini Septiana I Noora Al-Neama I Lolwa Al Khaldi
Ministry of Municipality and Environment (MME), Qatar

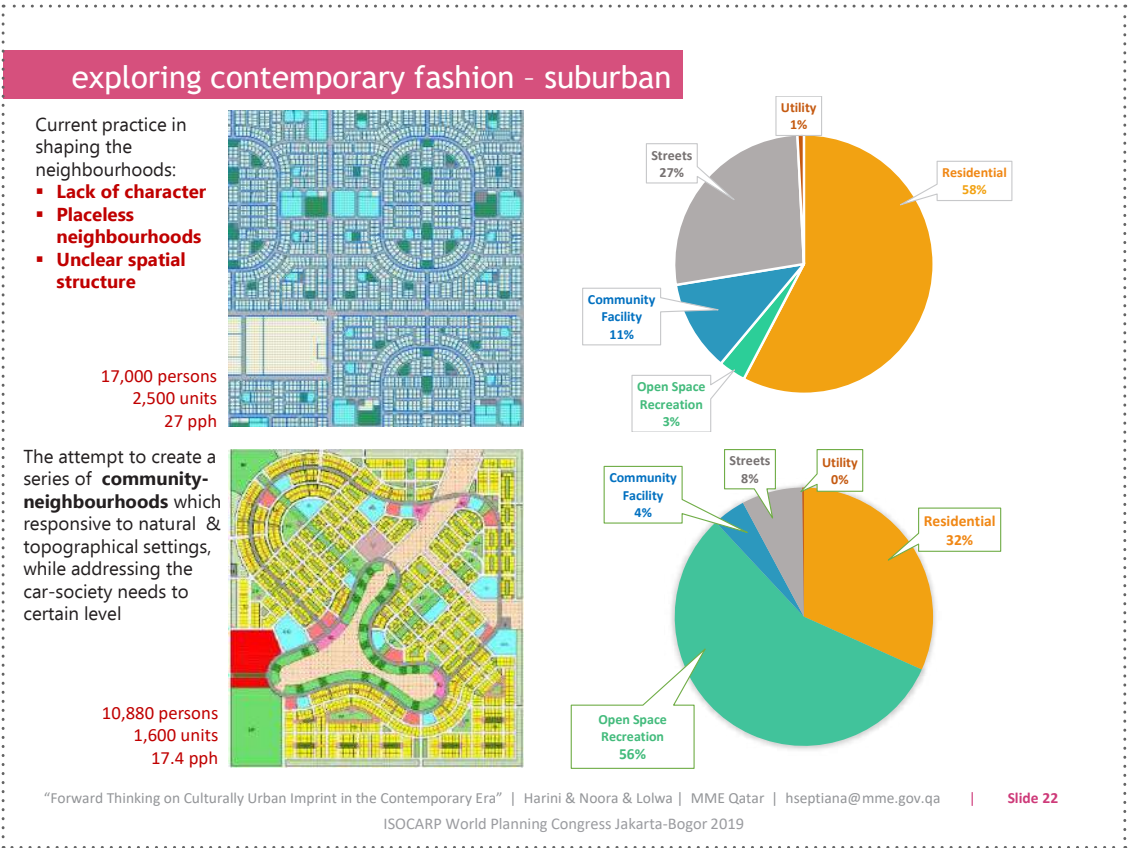**Key findings**

1. Forward thinking on cultural-urban imprint for neighbourhoods brings us back to the basic thinking of the old wisdoms:
   - culturally suited
   - environmentally and climatically sound
   - foster sense of community, religious, and familial bond
   - enhance distinctive identity rooted from local intrinsic characters
2. In order to encourage the creation of neighbourhoods with characters, it is imperative for the authority to pay more attention to the neighbourhood planning and designing programmes, taking into account the cultural aspects of the communities, and should avoid 'arbitrary planning'approach

Questions for discussions

1. For the case of the expatriate population outnumbers the locals, is the community-neighbourhood type still relevant to be applied compared to the other types (arbitrary, homogeneous, functional, etc) ?
2. What will be the authority role in the case of encouraging the creation of a cultural-led neighbourhoods design?

24 / 24

Research Paper

The essence of Urban form and its Relationship with Urban Aesthetics: A case from Rajshahi City, Bangladesh

Ferdous Farhana HUQ, Rajshahi University of Engineering & Technology; Bangladesh

Imzamam Ul Khan Shuvo, Rajshahi University of Engineering & Technology; Bangladesh

Nidalia Islam, Bangladesh University of Engineering and Technology; Bangladesh

Abstract

The identity of a city is visibly recognized by observing its urban form. The development plans of the cities of Bangladesh address land use planning and ignore the aptness of urban form. As a result, the cities of Bangladesh are growing haphazardly and turning into an urban jungle rather than aesthetically pleasing habitable urban space. This study explores the intrinsic nature of the urban form of the major cities of Bangladesh as well as compares the urban form of major cities of Bangladesh with selected cities from around the world. This study conducts Physical Observation on building frontage, elevation, plinth level, footpath, doors and window pattern by employing transect method to acknowledge the character of the urban forms of the selected study area of Rajshahi city of Bangladesh. The findings of the study answer why the urban forms of the cities of Bangladesh look similar irrespective of cultural and geographical context. The findings shed lights on the weaknesses of current building codes regarding the compatibility of the design of the building elements as well as the relationship between building and street which leads to the degrade the urban aesthetics. Based on the findings some strategic and design solutions are provided with a view to improving the look of the city form.

Keywords

Urban form, Urban Aesthetics, Building façade, Building Elevation

1. Introduction

Urban morphology, urban form, and urban fabric are three terms that are highly interlinked with each other. According to Moudon (1997) urban morphology analyses the transformation of a city from its birth to its present state by identifying and dissecting its components. When it comes to the talk of the city's components, the first term comes is the 'physical form' of a city. Several researchers in their study have confirmed that a city can be read and studied by analyzing its physical form (Moudon 1997; Lynch. K 1959; Levy.A, 1999; Lu.S et.al, 2019). Whereas Dempsey.N et al. (N.D) have clearly mentioned that a city's physical characteristic hence physical form is officially termed as 'Urban form'. On the other hand according to Levy. A (1999), 'urban form' signifies the form of 'urban fabric'. Many recent works have disclosed different dimensions of urban fabric (Thompson & Newman 2018, Muller, 2004, Newman and Kenworthy 1999, Newman and Kenworthy 2016). Based on their work the urban fabric can be summarized as a large fabric of urban form that

portrays the essence of physical characteristics of a city. Therefore, the Urban form is the smallest unit of studying urban fabric as well as urban morphology. Dempsey et.al (n.d) in their study have mentioned density, buildings, layout, , and transport infrastructure as the major five elements of urban form, other researchers have generally address four fundamental elements of urban form which are buildings, open space, plots and streets (Moudon.V.A 1997 , Levy.A 1999). Kevin Lynch (1960) in this book discussed the effects of paths, edges, districts, nodes and landmarks on developing the image of the city. Urban aesthetics highly depends on the successful design of physical characteristics or urban form. Qualities of urban form are determined by the qualities of its fundamental elements and quality of urban form influences the human perception and visual complexity (Boeing, 2018). urban aesthetics is highly co-related with 'good visual complexity'. Good visual complexity depends on variety in buildings types, design details, street furniture, signage, human activity, light and shadow, textural details of street trees and urban open spaces. If the design becomes too predictable and controlled, the visual complexity becomes lost. Very few, similar, predictable, or too disordered to be comprehensible urban design produces poor visual complexity. Therefore the elements of urban forms have to be designed by maintaining a balance between order and disorder with unity and variety (Clifton et al. 2008, Elsheshtawy 1997; Gunawardena et al. 2015; Ewing and Clemente 2013; Boeing 2018). ⬛

This study focuses on understanding the tangible built environment of Rajshahi city from the perspectives of Urban aesthetics and finds out the influence of the modification of built forms on urban aesthetics.

2. Study Area

Figure 1 Map of the Research Area

Source 1 Author's preparations from Rajshahi Detailed Area Plan (2004-2024)

The study has been conducted at Malopara area located at the heart of Rajshahi which is one of the fast developing cities of Bangladesh. Three roads from Malopara named (1) MoniChootr, (2) Malopara road and (3) Malopara to Mohila college roads are studied for this research. These three roads have some unique buildings dated since 19th to the 20th century

which makes this area different from other areas in terms of urban form as well as urban aesthetics (Field Survey, 2018). formsFor the study, three roads of Malopara has been chosen. On these three roads, many types of uses are found. The lengths of the three roads are 0.14 km, 0.09 km, and 0.41 km respectively. The total length of the study area is 0.64 kilometer.

3. Method of the Study

The method of the research is inspired from the method suggested by Lamas (1993) to understand the city by studying its elements i.e. ground, parcel, buildings, block, façade, vegetation, streets , squares, courtyards, monument, street furniture and larger structures (Lamas 1993 in Monteiro, n.d; Barbosa et.al, n.d). This research chooses Buildings, façade, ground, and street to study as these elements are the most relevant aspects to examine in the study area. To examine, the selected elements of urban forms direct observation method is used. A checklist was prepared to collect the basic information of the buildings. Transect method was applied where selected streets were divided into transects to classify the typical elements of each section (Watson, Plattus, & Shibley, 2004). Three roads were mapped and characterized on the transect map. The panoramic survey was conducted where the photographic panorama of the study area was created to produce a detailed picture of the site (Anderson, 1978). The color, texture, materials, door and window pattern of the buildings were observed and noted as a part of studying the façade of the buildings. Building elevation survey was conducted to identify the elevation of the streetside buildings of the study area as building elevation is considered to be a significant component that explains urban form. Along with buildings elevation, Building's plinth elevation and footpath elevation were drawn by following a similar method. The data collected from the direct observation and field survey were visualized by using AutoCAD and 3d Sketch up the software to develop the findings of the research.

4. Findings and Discussions

4.1.   Visual Complexity

The significant finding from three transects of three roads presents the dominance of are mixed-use building, blocked footpath, incoherent shop banner, haphazard electric wire, unmatched window pattern, different plinth level, irrelevant building shape, variety in building height and frontage, unmatched color and materials, few unique character door, window, veranda pattern, unique old buildings, broken dustbin and haphazard electrical wire. Visual complexity depends on the unity in the variety of the mentioned elements (Clifton, 2008, Boeing, 2018). The visual complexity of these roads is found to be high due to the lack of order developed by the construction of the modern building by not considering the design and pattern of neighboring buildings. The new-fashioned typical buildings are destroying the unique and traditional character developed by the old buildings in the study area. Mixed-use buildings in the study area have shops at the ground floor which follow various types of the pattern of their shapes, size, front material, nameplate color and nameplate size which degrade the aesthetics of the area. In a residential area, buildings are different in size, plinth level, height, color, texture, nameplates, door, and windows which

denigrate the balance and harmony of the overall streetscape of the research area.

Panaromic view of Road 1 – West side

Panaromic view of Road 2 – North side

Panaromic view of Road 1 – West side
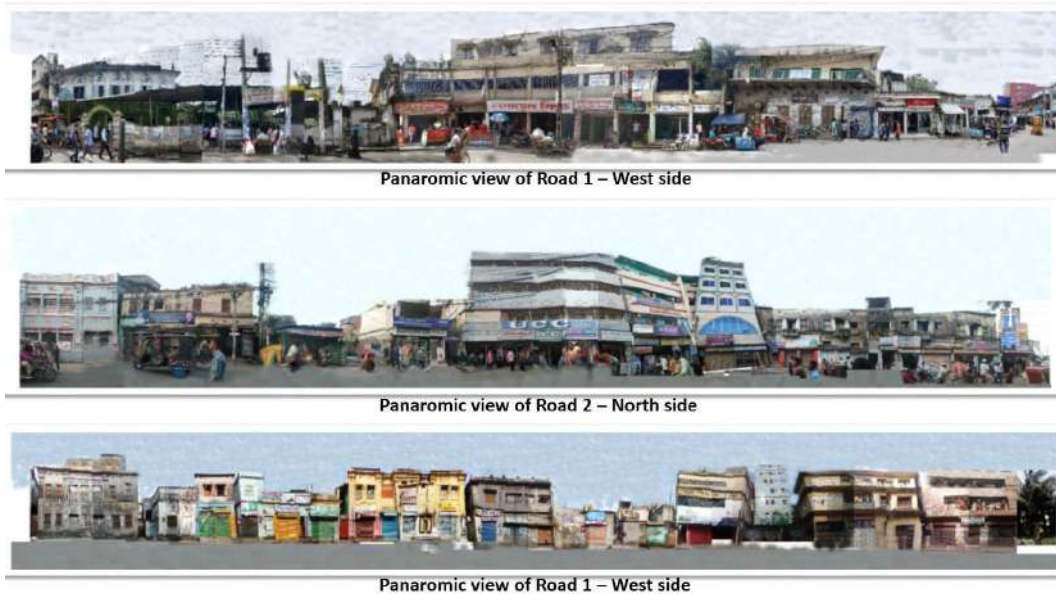
Figure 2 Panoramic Analysis of Research area
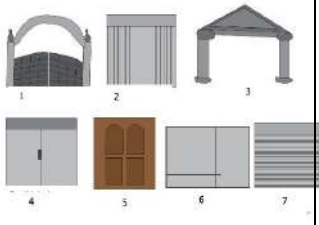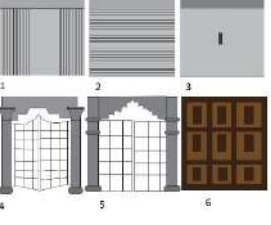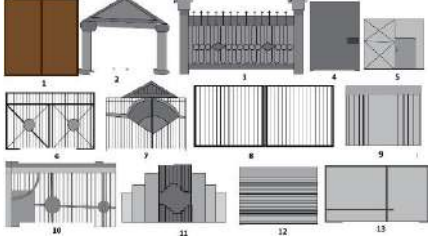
Source 2 Field Survey, 2018

4.2. Façade Scenario

The study area has many old, traditional style historic buildings which form a unique character in the area. But this character is being ruined due to the unconscious development trend. Findings from panoramic analysis approve the findings generated from transect analysis. The panoramic analysis focused on observing the color, texture, materials, plinth level, door, window, and veranda pattern. The panorama of First Street shows the ununiformity on the veranda and shop banner in terms of color and width. Panorama of the second street shows different plinth level of buildings which disturbs the image of the urban form by damaging the edge. The harmony of the building frontage is ruined due to not maintaining the unity in terms of color, texture and window pattern in buildings. According to the third panorama, shops uses different colored gates. Frontage material of the building is different and many buildings are identified using tiles in frontage which violates the unity in urban form hence destroys the urban aesthetics. Some building is found that has no plaster or broken plaster in the facade. Many buildings use different types of veranda and window pattern which has no harmony with the neighboring buildings (Figure 2).
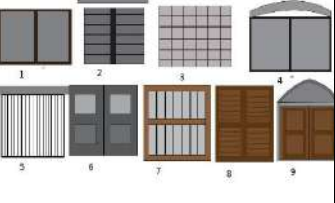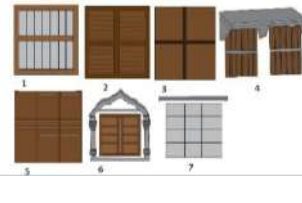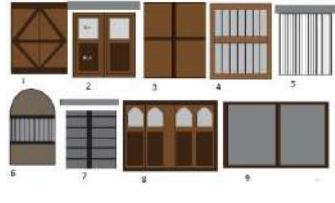
Building Elevation Analysis of the streets suggests that most of the buildings of the study areas are one to three-story buildings. Few 4 to 5 storied buildings have been observed in the study area which is new buildings. Placement of high rise new modern buildings alongside single to double story old traditional buildings without maintaining the color, material and design harmony disturbs the look of the urban form at some points of the street.

Table 1: Gate and door pattern analysis of the study area

Road 1_ Moni Chottor	Road 2 _ Malopara	Road 3_Malopara to Mohila college
No of Pattern: 7	No of Pattern: 6	No of Pattern: 13
Material and phase of style: (1) Steel+concrete, old (2) only Steel (3) Only concrete old, (4) Glass (Modern), (5) Only Wood, old (6) Glass +Steel and (7) Tin, Shutter style	Material and phase of style: (1) Steel, Local name is ketchi gate, Old, (2) Tin, Shutter style, (3) Glass (Modern) (4) Steel+concrete, old, (5) Steel+concrete, old, (6) Only Wood, old	Material and phase of style: (1) Only Wood,old (2) Only concrete old, (3) Steel+concrete, old, (4) Steel, Modern (5) Steel (Modern) (6) Tin +Steel (Modern) (7) Steel, Modern, (8) Steel, grill style, modern, (9) local name is ketchi gate, Old, (10) Only Steel (Modern) (11) Steel+concrete (Modern), (12) Tin, Shutter style, (13) Glass +steel (modern).
Remarks: Old types of gates are made with concrete and steel with more sophisticated design quality than the modern gates which are mostly made with steel.		

Source: Prepared by Author

Table 2: Window pattern analysis of the study area

Road 1_ Moni Chottor	Road 2 _ Malopara	Road 3_Malopara to Mohila college
No of Pattern: 9	No of Pattern: 7	No of Pattern: 9
Material and phase of style: (1) Sliding glass, modern (2) Wood+steel, old (3) Glass +Steel modern (4) Sliding Glass , Modern (5) Wood+ Steel, old (6) Glass +Steel, old (7) wood+ steel , old, (8) Only wood , old; (9) Wood+ concrete, old	Material and phase of style: (1) Wood+steel, old; (2) Only wood, old (3) Only Wood; (4) Wood+ Steel, old (5) Only Wood, old ; (6) Wood + Concrete, old; (7) Glass+steel	Material and phase of style: (1) Only Wood, old (2) Wood +glass, old; (3) Only wood, old, (4) Wood+Steel, old (5) Steel+wood (Modern) (6) wood +Steel+concrete, old; (7) Steel+glass, old, (8) Wood+glass (9) Sliding glass window, modern

Remarks: In most of the buildings windows are made with a combination of wood, steel, and glass following traditional window pattern. New buildings are using sliding window made with steel and glass. Window pattern of this study area is found to be unique and modern buildings should be guided to use windows inspired by the design and materials from the old buildings of the study area.

Source: Prepared by Author

4.3.   Footpath and Plinth Level Analysis
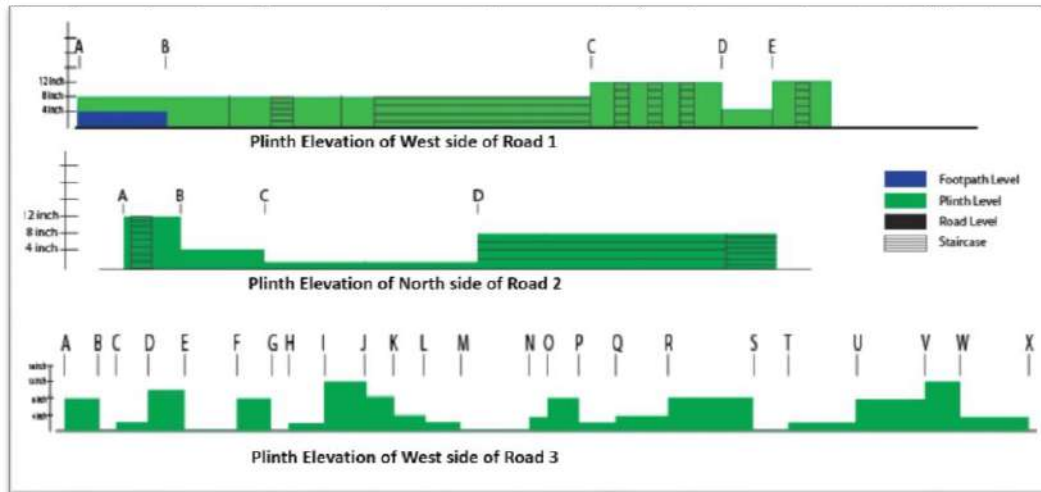
Figure 3 Plinth Level Analysis

Source 3 Field Survey, 2018

Footpath exists only from A to B of road 1 with an elevation of 4 inches from road level. Plinth level elevation is 8 inch from A to C, 12 inches from C to D, 4 inches from D to E and again become 12 inches from E to rest of the road. On the second road, a great variation of plinth level from 2 inches to 12 inches has been noticed. An extreme variation of plinth level elevation is observed at road 3 where elevation varies from 0 inches to 12 inches. There exist no footpath exists in road 2 and road 3. People use stairs to reach plinth level from road level in road 1 and 2. Such variation of plinth level not only destroys unity and harmony in the design of façade but also damages the aesthetics of urban streetscape (Figure 3).

5. Conclusions:

Research findings show the existing trend of streetscape development in Rajshahi city completely ignores the harmony, unity, and complexity of urban form. It is evident that the unique antique streetscape of Rajshahi city is under threat due to the ad-hoc development. To preserve the elegance and grace of this beautiful city we need to introduce some design guidelines for front façade at streetscape level. The guidelines should be able to give user full freedom to use a variety of materials and spatial planning freedom as well as regulate the new development to preserve the unique character of a street. To maintain the basic characteristic of streetscape- plinth height, building elevation, color, materials, scale, and proportion should be introduced to establish the order of urban form. Heritage corridor or streetscape preservation is very common worldwide. In the developed world, design architects, conservation architects, and planners work in a team to prepare a guideline for

areas with unique characteristic and heritage building to prevent random development. This research strongly suggests introducing policy guideline based on the context of the particular area to preserve the beauty and classical aesthetic order of Rajshahi city. Rajshahi City Corporation needs to work on its disordered visual complexity incorporating Architects, Urban planners to establish the harmony of the streetscape.▯

6. References

Anderson, Hugh. (1978) "Panoramic Photography as a Survey Tool", http://www.hugh360.co.uk/measurement/photographic-intersection/panoramic-photography-as-a-survey-tool/

Barbosa, Eliana Rosa de Queiroz; Patrícia Capanema Alvares Fernandes; Tú, Nguyen Thanh (n.d) "URBAN MORPHOLOGY IN THE SOUTH - SPONTANEOUS AND INDUCED FORM", Global Development Network - working paper series Urbanization and Development: Delving Deeper into the Nexus.

Barros, Ana Paula; Martinez, Luis Miguel; Viegas, Jose Manuel (2017) "How urban form promotes walkability?", Transportation Research Procedia, Vol. 27 (September).

Boeing, Geoff (2018) "Measuring the Complexity of Urban Form and Design", Urban Design International, Vol. 23 No. 4 (October).

Bruno, Giuliana (2007) The Aesthetics of Human Environments, Peterborough, Canada, Broadview Press.

Celik, Deniz; Aciksoz, Sebahat (2017) "Urban aesthetic and urban landscape design guides: A Case study of Bartin, Turkey", Journal of Environmental Biology, Vol. 38 No. 5 (September).

Clifton, Kelly., Ewing, Reid., Knaap, Gerrit-Jan., & Song, Yan (2008) "Quantitative analysis of urban form", Journal of Urbanism, 1(1), 17–45 (May).

Dempsey, Nicola; Brown Caroline; Raman, Shibu; Porta Sergio; Jenks, Mike; Jones, Colin; Bramley, Glen (2008) "Elements of Urban Form", Oxford, UK, Springer.

Elsheshtawy, Y. (1997). "Urban Complexity. Journal of Architectural and Planning Research", Vol.14 No.04

Ewing, Reid; Clemente, Otto (2013). Measuring urban design. Washington, DC: Island Press, Washington, DC

Field Survey (2018) "Field survey conducted to identify the door window pattern, building elevation, plinth level elevation, panoramic view of Malopara area, Rajshahi"

Gracia-Domenech, Sergio (2015) "Urban Aesthetics and Social Function of Actual Public Space: A Desirable Balance", Theoretical and Empirical Research in Urban Management, Vol. 10 No. 4 (November).

Gunawardena, G. M. W. L.; Kubota, Yoichi; Fukahori, Kiyotaka (2015) "Visual Complexity Analysis Using Taxonomic Diagrams of Figures and Backgrounds in Japanese Residential Streetscapes", Urban Studies Research, Vol.2015 (September)

Kashem, Md. Shakil Bin; Chowdhury, Tufayel Ahmed; Majumder, Joydip; Rahman, Md. Asif (2009) "Quantifying Urban form: A Case Study of Rajshahi City", Journal of Bangladesh Institute of Planners, Vol. 2 (December).

Levy, Albert (1999) "Urban morphology and the problem of the modern urban fabric: some questions for research", Urban Morphology, Vol. 3 No. 2 (July).

Lu, Shiwei; Huang, Yaping; Shi, Chaoyang; Yang, Xiping (2019) "Exploring the Associations between Urban Form and Neighborhood Vibrancy: A Case Study of Chengdu", China, International Journal of Geo-Information, Vol. 8 No. 4 (April).

Lynch, Kevin (1990) The Image of The City, Cambridge, Massachusetts, and London, England, Massachusetts Institute of Technology.

Monteiro, Evandro.Z (n.d) "Urban forms in diagrams", 21st International Seminar on Urban Form: Our common future in Urban Morphology

Moudon, Anne Vernez (1997) "Urban morphology as an emerging interdisciplinary field", Urban Morphology, Vol. 1 (March).

Muller, Peter.O (1886) "Chapter 3 Transportation and urban form – stages in the spatial evolution of the American metropolis" *GEOGRAPHY OF URBAN TRANSPORTATION,* United States

Newman, P. and Kosonen, L. and Kenworthy, J (2016) "Theory of urban fabrics: Planning the walking, transit/public transport and automobile/motor car cities for reduced car dependency", Town Planning Review, Vol 87 No 4

Newman, P., Kenworthy, J (1999) "Sustainability and Cities: Overcoming Automobile Dependence", Island Press, Washington, DC.

Özarslan, Dr. Nuray (2003) "Understanding The Historic City", Existics, Vol. 65 No. 391/392/393 (May).

Rezafar, Azadeh; Turk, Sevkiye Sence (2018) "Urban design factors involved in the aesthetic assessment of newly built environments and their incorporation into legislation: The Case of Istanbul", Urbani Izziv, Vol. 29 No. 2 (October).

Sharma, Shashikant Nishant (2014) "Urban Forms in Planning and Design", International Journal of Research, Vol. 1 No. 1 (February).

Shibley, Robert G., Plattus, Alan J., Watson, Donald (2003) "Time-Saver Standards for Urban Design", McGraw-Hill Companies

Thompson, Giles; Newman, Peter (2018) "Urban fabrics and urban metabolism – from sustainable to regenerative cities", Resources, Conservation and Recycling, Vol. 132 (May).

Turk, Ali (2014) "Historical Urban Fabric of Isparta City, Its Problems, Solution Offers, and Sustainable Urban Development", Journal of Engineering Sciences and Design, Vol. 2 No. 2.

Verdi, Laura (2014) "Aesthetics in urban space: architecture and art for sustainable cities", Social Space Journal (July).

Case Study / Project

Cultural sensitive approach
in water management

for a volcanic river basin of Yogyakarta Metropolitan Area

Vicky ARIYANTI

Abstract

Although there is substantial literature on the implementation of integrated water resources management and multilevel governance of water, less attention is given on how and why cultural values contribute to the integration level of its implementation. Thus, this paper examines cultural ecological knowledge impacts on current water management practices in Opak sub-basin, Yogyakarta Special Region, Indonesia, which is threatened by the volcanic activities of Mt. Merapi in its upstream. Therefore, it uses the research question of " How and why does the cultural ecological knowledge impacting the water resources management in a volcanic river basin?" We used a qualitative approach to the case study of Opak Sub-basin to investigate a comprehensive understanding, with 57 in-depth interviews, three focus groups, and three months of observation (July-August 2016 and January 2018). The analysis was done using Atlas.ti software for axial coding on several concepts used in this paper, such as cultural ecological knowledge, integrated water resources management, disaster risk reduction, and volcanic river basin management. The codings were arranged using multilevel governance theory, which for this case study proposes three phases of volcanic river basin management: Normal (pre-eruption), Disaster (onset eruption), and Normal+ (Post-eruption) within existing governance levels: national, regional, and municipal. The analysis answer the how part of the question by detecting the main activities of actors within the context of water governance, the relationships between actors, and existing boundary spanning operations within the current interaction attempts in multilevel governance. It reveals that cultural boundary-spanning actors (water whisperers) are the answer to the why part of the question. These actors are more active during disaster volcanic river basin management (VRBM) phase. With them, the cultural ecological knowledge was brought into the interaction attempts. This condition contributed to the highest level of integration. Therefore, we argue that the integration level of water resources management is higher when more cultural ecological knowledge is used in the interaction attempts. The paper proposes that an understanding of the cultural ecological knowledge enables a better implementation of integrated water resources management for this volcanic river basin.

INTRODUCTION

➤ Aim: to seek the impacts of cultural ecological knowledge in current water management practice

➤ RQ: How does the cultural ecological knowledge impacting water resources management in a volcanic river basin?

➤ Method: Qualitative, imbedded case study, 3 sub-cases, 57 in-depth interviews, 2 fieldworks (2016 and 2018)

Cultural Sensitive Water Management, Ariyanti, V., vicky_ariyanti@yahoo.com
ISOCARP World Planning Congress Jakarta-Bogor 2019

3

Methods and Concepts

Cultural Sensitive Water Management, Ariyanti, V., vicky_ariyanti@yahoo.com
ISOCARP World Planning Congress Jakarta-Bogor 2019

4

METHODS

➤ Qualitative

➤ imbedded case study with 3 sub-cases (up, mid, downstream)

➤ 57 in-depth interviews, 2 fieldworks (2016 and 2018)

Cultural Sensitive Water Management, Ariyanti, V., vicky_ariyanti@yahoo.com
ISOCARP World Planning Congress Jakarta-Bogor 2019

5

CONCEPTS

➤ CEK

➤ VRBM Phases where IWRM - MLG - IA take place

➤ Impact Patterns

Cultural Sensitive Water Management, Ariyanti, V., vicky_ariyanti@yahoo.com
ISOCARP World Planning Congress Jakarta-Bogor 2019

6

Discussion

Cultural Sensitive Water Management, Ariyanti, V., vicky_ariyanti@yahoo.com
ISOCARP World Planning Congress Jakarta-Bogor 2019

7

CEK IMPACTS TO VRBM POLICY SETTINGS

Levels of Governance	VRBM Policy Settings		
	Normal VRBM	Disaster VRBM	Normal+ VRBM
National	(+) Conservation on catchment, environmental protection and management law: Existences of CEK in the conservation of values, conservation of heritage areas (sacred locations-artifacts) The revoked law on water acknowledges (embedded in ministerial regulations): the existence of indigenous community structure-dynamics, resources management practices, artifacts: conservation areas and cultural heritage locations, values, and rituals. Utilization: acknowledgement on local knowledge in resources management practices: water, including the attempts in conserving resources using heritage conservation law of practices at irrigation	(+) DRR policy: RenasPB, National, values: gotong-royong, volunteerism, acknowledge of local wisdom in hazards management practices (0) No reference made to CEK on volcano management policy	(+) References to CEK on lahar management through sand mining policy: river regulations, normalizations Small reference on policy for mining of non-metal

Cultural Sensitive Water Management, Ariyanti, V., vicky_ariyanti@yahoo.com
ISOCARP World Planning Congress Jakarta-Bogor 2019

8

CEK IMPACTS TO VRBM MANAGERIAL CONTEXTS

Levels of Governance	Existences of CEK		
	Normal VRBM	Disaster VRBM	Normal+ VRBM
National	(+) Conservation: artifacts of the cultural landscape, cultural heritage, A sub-directorate for CEK conservation under Min. Forestry & Environment (+) Utilization: resources management practice in water allocation is not using CEK, except for Subak in Bali (UNESCO heritage) CEK acknowledgement Min. of Public Works and Housing for community empowerment	(+) Hazard control: values, local wisdom, acknowledged in the BNPB The BNPB relies heavily on updates from volunteers and local wisdom of the communities	(+) Utilization: Artifacts for sand mining: non-metal material, under the Min. of EMR, Dir.Gen. Mineral and Coal do not have any reference to CEK, but the Min. of Forestry & Environment has CEK's acknowledgement on natural resources management

9

9 / 15

CEK IMPACTS TO VRBM MANAGERIAL CONTEXTS

Levels of Governance	Existences of CEK		
	Normal VRBM	Disaster VRBM	Normal+ VRBM
Regional	(+) Conservation for the sacred locations is designated as conservation areas-artifacts, i.e., Mt. Merapi summit as TNGM, the appl terminal as floodplain, and the terminal of Opak at Parang Kusumo Beach as dune conservation zone RPJMD DIY as Hamemayu philosophies, values RTRW: conservation of philosophical axis, utilization of artifacts RPDAST: CEK values in the community role Reference of a cultural condition, community role in Bela and RPSDA CEK values in community initiative on water supply: Pamaskarta coop and the AKSY river community Utilization of water management artifact: Mataram Channel DIY Privilege Status Law: Location of the catchment as cultural landscape/sacred grounds-artifacts Bela, DAS DIY: resources management practices, rituals, philosophies River basin concept as philosophical plain is used (-)	(+) Hazard control through Forum PRB (Disaster Risks Reduction): SKSB, Paguyuban KW, Tagana are usually the same people, they all still use CEK with combined scientific data. RPB DIY: uses the values of gotong royong, volunteerism, kemasyutan philosophies, acknowledge the local wisdom Philosophical plane used to understand flood free zone and philosophical axis as the tool to monitor lahar flow from the Mt. Merapi to downstream areas and the Parangkusumo Beach. Sultan's Premonition as EWS Traditional kenthongan sounds as social EWS Utilization Resources management practice: ex-situ water dropping from another area by Pamaskarta and PU-P ESDM Practice of water utilization from under the river (base flow) - jogja.	(-) Utilization or resources management practices are not being used in the governor regulation on mining in rivers. Examples of these are: permits for the sand mining do not acknowledge the CEK on cultural lands and the limited supply of sand due to Mt. Merapi's inactivity (based on Sultan's wangsit) Rivers have cultural meanings in Yogyakarta as it is the passage of the deities. The existence of illegal sand mining by the governmental organization and privates with the support of high ranks military officers (0) No CEK reference used in BBWS SO's technical recommendation for river sand mining

10

10 / 15

CEK IMPACTS TO VRBM MANAGERIAL CONTEXTS

Levels of Governance	Existences of CEK		
	Normal VRBM	Disaster VRBM	Normal+ VRBM
Municipal	(+)	(+)	(-)
	Utilization:	Hazard control by social networking, even *kentongan* to contact persons in charge of each village.	**Utilization** or resources management practice:
	Values of *gotong royong* in *Sapradar* in *Sleman*, and *Bantul* Resources management practices use local spring or drilled wells, even PDAM taps	Five senses wisdom: the sound difference between flood to lahar, the visual of wild animals migrating downstream as a sign for evacuating, the sound of *kentongan* rhythm as signal-faster, the more volume lahar is coming	Sand mining practices based on CEK: *dapuntaan* philosophy in use, take what you need, let the rest for conservation. Five senses wisdom: over-mining indicators springs died or moved, the riverbed is deeper than 2010 condition (not heed)
	Conservation: FKWA, PKC, TB, GW, river communities (trans-municipal, rather according to the river channels), five senses wisdom: water quality assessment with *biotilk* (FKWA) and communities living along the river; knowledge on types of fishes, values of *gotong royong* or collective action in conservation	*Artifact:* historical safer locations as sacred geography,	(-)
	(+)	**Utilization:**	**Utilization:** the rivers are "auctioned" for their sand
	Conservation and utilization of water policies by the regent use the governor's policies, when necessary derivation of the policy into *perbup,* an example of resources management practice in *pranata mangsa,* seasonal calendar used a crop pattern.	Resources management practices: inter-basin water droppings based on values of *tepa selira* (tolerance, empathy) distributed through CBOs: SKSB, *Tarupa, pasembahan* RW *pasguyban,* etc.)	Sediment dredging from the wells
		The CBOs practice *gotongroyong* and other cultural values:	(+)
		Nrima (accepting) or fatalism towards Mt. *Merapi* eruption	**Utilization** of artifacts for *pasir besasar* or lahar sediment in rivers channels as temporary farmlands
		Not to sit too close to the river during the flood – hazard zone delineation	
		CEK values and philosophies, local wisdom, in RPB *Sleman,* RPB Yogyakarta City, RPB *Bantul gotongroyong, tepa selira, bau wasesda segefani behem.*	

Cultural Sensitive Water Management, Ariyanti, V., vicky_ariyanti@yahoo.com
ISOCARP World Planning Congress Jakarta-Bogor 2019

11

11 / 15

EXAMPLE OF CEK IMPACTS IN MANAGERIAL CONTEXTS

➤ 2018 World Water Day Celebration at Winongo River (BBWS SO, 2018)

Cultural Sensitive Water Management, Ariyanti, V., vicky_ariyanti@yahoo.com
ISOCARP World Planning Congress Jakarta-Bogor 2019

12

12 / 15

CEK IMPACTS TO INTERACTION ATTEMPTS

Legend: Budget (A) broker | Water (B) whisperer | Disaster (C) contact person | ✗ not yet integrated

➤ (+) for Water = Normal, (-) for Water = Normal+

➤ (+) for Disaster = Disaster

➤ (-) for Budget = Normal

Cultural Sensitive Water Management, Ariyanti, V., vicky_ariyanti@yahoo.com
ISOCARP World Planning Congress Jakarta-Bogor 2019

13

Conclusion

Cultural Sensitive Water Management, Ariyanti, V., vicky_ariyanti@yahoo.com
ISOCARP World Planning Congress Jakarta-Bogor 2019

14

LEGITIMIZED HISTORICAL EXPERIENCES

➤ values and philosophies

➤ resources management practices

➤ artifacts

➤ internalization

➤ five senses wisdom
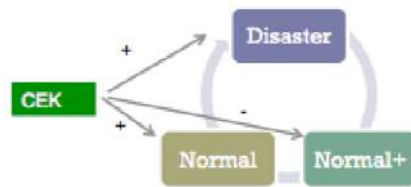
➤ Normal and Disaster VBRM = CEK (+) used to improve integration level

➤ Normal+ VRBM= CEK (-) exists but does not impact, especially for sand mining

15

Track 5

Smart futures and sustainability
Planning for innovation

CONGRESS TEAM

Dorota Kamrowska-Zaluska
(Poland)
Awais Piracha
(Australia)
Adriano Bisello
(Italy)

LOCAL EXPERTS

Abdullah Kamarzuki
Melyana Frederica

photo: Octavian Rosca, Unsplash

Smart cities are appearing everywhere and are sometimes little more than marketing devices for new towns. Yet, there is no doubt that all cities are moving towards automatisation and data-driven provision of services. In addition, it is thought that smart technologies will drive cities' economic capacity and global position in future. Within this frenzy of change, we need a pause to explore critical theories and successful case studies on smart cities, smart regions and smart communities. We need to understand how virtual worlds (and our data alter-egos) will interact and shape the real one; and how disruptive technologies (blockchain, crypto-money, robotisation of production, drones, hyperloop, autonomous mobility) will change the management and planning of cities and urban life.

How will technology change urban form and public spaces? What will be the near-future habits and behaviours of urban citizens? What kind of policy is needed so that smart technologies answer citizens' needs and promote equitable solutions? How to encourage co-creation in the post-digital era? How to protect people from disruptive virtual worlds?

Presentations in Track 5 addressed the following issues:

- Smart cities, automatisation, financing and technological advances

- Shared and inclusive innovative economies and digital transformation

- Citizen-focused smart services

- Disruptive and sharing technologies and their impact

- Strategic and real-time data-based policy and data management

- New mobility and its influence on urban form

- Technology and knowledge transfer

During the thematic sessions in Track 5 some crucial points arose from research works and case studies presented by the delegates: these are summarised below.

Smart knowledge transfer is needed: from ideas to practice thanks to inspired and entrepreneurial local policymakers, which can make innovation thrive in the "Goldilocks Zone" (i.e. in the band which is 'just right' for people). Innovation in decision-making means:

- Allowing integration at different societal levels (from intellectual elite to general citizens, as proposed in the Indonesian perspective).

- Looking at results in the long run as a better approach than pushing for immediate goals.

- Being prepared to support the hassle of the transition and to be criticized for the innovation, before the benefits will be understood.

It is imperative to integrate human behaviours into spatial analysis models, made possible by agent-based techniques, able to describe and facilitate planning of equitable service distribution and the mapping state of mind and moods such as interaction with social networks, feedbacks from visitors, people involved in social activities, in view of the new emerging media and communication tools. This is very important because innovation trajectories may not be predicted by the traditional tools and models planners still use today.

Living labs are a powerful tool to involve the community and to deliver user-centred tools, services and policies. Integration of augmented reality in participation and community development workshops is a new way to engage people (not only young, but also adults). In this setting, the planner is a "human tool" at the service of the community. Participatory mapping may be the best way to deal with unsolved questions that have their roots deep in time, especially with local remote communities.

Data-rich environments are helping planners to consider the issues of growing urban complexity. Profiting from large accessible databases allows planners to conduct once complex analyses. One common example is offered by street view services to identify street quality at a glance

without using significant resources or by use of existing public data repositories to assess the evolution of metropolitan areas.

A holistic approach is needed to break the silos and introduce disruptive innovation into the policymaking framework, as well as in the business and managerial models; this should include strong cooperation involving the four categories of the quadruple helix model (public, private, industrial and social representatives). Innovative business models are possible also in low tech contexts: an example is that of informal settlements thanks to blockchain systems to secure the transparency of transactions and investments mixed with self-build approaches and other unconventional projects out of the box.

The large-scale rollout of EV is expected to contribute positively to the fight against climate change, even if this could be challenging for urban mobility and power supply infrastructure. Maybe unmanned vehicles (self-driving) will be not the final solution for urban mobility, and instead home-based smart working and a wider range of efficient public transport will be better ingredients for success.

It may be better to adopt an approach which restarts from resource-based planning, considering a regenerative approach to restore urban and metropolitan areas, reduce vulnerability, understanding the multiple benefits of complex projects, not only focusing on a specific goal (e.g. energy savings) but to increase the overall quality of life.

General conclusions

Urban planning in modern cities takes place in a data-rich environment, which allows conducting new types of analyses which can be a base to the introduction of real-time responsive urban policy, driven by innovation. Nowadays smart cities, one of the most prominent concept shaping the cities of today and tomorrow, but it will only be effective if the proposed solutions are based on both social and environmental sustainability principles to deliver regenerative measures and to gain multi-level benefits. Smart urban services need to be inclusive for all the social groups (including age, gender, and origin); they shouldn't be just intelligent 'gadgets' but should be co-designed addressing citizens' needs and expectations. Smart solutions need to be integrated within the existing urban networks such as city infrastructure, innovation milieu, and social networks. Moreover, there is a need to ensure interoperability between core urban systems to succeed in the long run.

Track 6
Changing environment and risks
Planning for resilience

CONGRESS TEAM

Markus Appenzeller
(The Netherlands)
Juanee Cilliers
(South Africa)

LOCAL EXPERTS

**Mangapul Rudy
Saut Sagala**

photo: Tom Zimmerman, Unsplash

Climate change is happening, and it will impact the very heart of our habitat: cities. To frame the magnitude of the challenge ahead is to understand that at no point in human history has there been a greater global crisis - no war, no natural disaster, no economic turmoil has had the impact climate change will have. We need to rewrite the entire "user manual for our spaceship earth" within one or two generations, waiting to see if the city planning solution we deem appropriate today will stand the resilience test.

The point of departure should be to understand that climate action as defined in the United Nation's Sustainable Development Goals is not a goal in itself, but realized through, and incorporated in all the other goals. Objectives like creating better and safer communities, securing drinking water, having more inclusive societies and so on should all have a climate change component embedded. In order to achieve that, a number of convincing planning concepts have surfaced in the discussions and presentations and are summarised here.

Embracing complexity

There are no simple solutions to the complex problem of climate change - certainly not when it comes to making our cities more resilient to cope with its consequences. Therefore, we must accept the need to embrace the complexity and work on holistic co-created solutions that take into consideration the direct and indirect, the social, economic, spatial and ecological effects proposed projects and policies have.

Promoting a new localism

Cities and societies over thousands of years have developed local solutions to deal with local climate. Often on par with globally promoted technology - but in most cases cheaper, easier to maintain and rooted in local culture. Despite those advantages, local solutions are often quickly forgotten when shiny technologies

imported from elsewhere are promoted as an advancement. This is not to say that no technology should be exchanged, but whenever action for resilience is taken, these local solutions should be reused, adjusted and eventually enriched with new technology. In that way we keep the local vernacular that makes individual cities unique.

Understanding cities as part of the global ecosystem and not their adversary

Currently cities are seen as the antidote to nature - a place that is detached from it, conquered by humans in the battle against nature. This guides our planning approaches and the technical solutions we use. To deal with the effects of climate change, we need to change this understanding. Cities are the natural habitat of human beings and they are part of nature and part of a global ecosystem. We need to interlock what has been seen as opposites. We need to integrate our habitat better with its surrounding and we need to reclaim nature for our cities.

The session "Sinking, growing, resilient: a multidisciplinary approach to climate adaptation in Semarang, Indonesia[1]" highlighted the three principles and how they could become a new urban reality. A comprehensive water masterplan seeks to provide solutions for the different challenges water poses: supply and demand, drought and flooding, ground water extraction and recharging aquifers. The session also showed the problems that this approach still struggles with fragmented and specialized authority bodies that work in 'silos'. Planning for resilience needs a more comprehensive approach and the close collaboration of governing bodies on all levels. Resilience calls on trans-disciplinary planning.

1 https://isocarp2019.isocarp.org/programme/program-schedule/discussions/program/57/6-3-planning-for-climate-change-special-session

Results can be achieved while the lengthy process of changing administrations is initiated, evident from the study "Green Roof: An Approach to Repair the Climate of Dhaka City[2]" that shows this in an exemplar way. Next to reducing heat island effects by about 1.5 degrees, turning roofs green provides a benefit for all social groups – rich and poor. While the motivations and the level of technical refinement of the green roofs differs, it delivers clear benefits for climate change resilience and local communities. For the more affluent, the green roof is a leisure landscape and status symbol that comes with refined technology and gardening. For the poor it also is a leisure offer but at the same time the roof garden partially serves as agricultural land, reducing the dependence on expensive vegetables from shops. Even though technology can be a lot simpler in a low-income context (a water tap and planting pots) it essentially has the same cooling effect, drawing on a local solution without much technology.

In a similar way, the project "Reimagining Pamba; Sustainable design strategies for Sabarimala Pilgrimage[3]" shows how a flood and the resulting destruction can become a driver to overcome the dichotomy of city and nature. The supporting infrastructure of the *Sabarimala Pilgrimage* was heavily destroyed in a flood, with the river having shifted its edge. Re-establishing the premises came at high costs for earth works, building dykes and waterproofing the buildings. In this approach to reconstruction, not all the buildings affected support the mystic cause of pilgrimage and turned the whole place into a religious theme park entertainment centre, diverting from worshipping to a space where commerce is now king. A new proposal has been put forward to recreate the sacred character of the place, locating the supporting functions away from the temples in a secure and less ecologically sensitive area where no massive infrastructure works are necessary for safety

against natural forces. Ultimately this leads to a win-win-win situation: the pilgrimage can be experienced in its sacred, centuries old character, the supporting infrastructure can be built more efficiently and more in tune with local building traditions and there is less need to interfere with nature.

These examples provide hope. They show that planning for resilience does not have to be an austerity measure. Dealing with the effects of climate change can result in better and more liveable and more inclusive cities. They prove the advantages of embracing complexity, promoting a new localism and understanding cities as part of the global ecosystem.

2 https://isocarp2019.isocarp.org/paper-platform/abstract/public/314/green-roof-an-approach-to-repair-the-climate-of-dhaka-city
3 https://isocarp2019.isocarp.org/paper-platform/abstract/public/509/reimagining-pamba-sustainable-design-strategies-for-sabarimala-pilgrimage

Track 7
Urban governance and planning profession
Planning for future

CONGRESS TEAM
Eric Huybrechts
(France)
Jennilee Kohima
(Namibia)

Teti A. Argo

Large cities and megacities are a main feature of human settlement in the 21st century. The level of complexity of large cities requires new governance systems that are different from traditional regional and municipal administrations. Soft power is necessary to mobilise actors from different levels of government, sectors and territories. Multiform management, across sectors and issues (water, economy, environment, mobility, housing etc.), needs to share visions, strategies and policies with the support of technical bodies, political platforms and a variety of actors. Building the structures of a functioning megacity is an iterative process, which ranges from the very local to the regional and metropolitan scales.

New methodologies are emerging, and this will be an opportunity to share the experiences of building large scale governance and consider the consequences on planning. People participation is different in a megacity, with more complex relations between local communities, local governments and metropolitan governance. Informal dynamics also represent a bottom-up approach to the expansion drive of the city.

Megacities and large metropolis are expanding out of the national or regional limits. Transborder governance case studies were presented in a variety of locations such as between states in Australia, in Gulf countries and in Europe (Finland-Russia and Germany-The Netherlands) showing the complex interrelations between the political and institutional systems to cover the functional metropolitan areas (Canberra-Brisbane for example) or shared concerns (water management). National urban policy frameworks (Lithuania) provides the institutional tools for collaboration both vertical and horizontal tiers.

Territorial planning covers different scales with strategic documents and regulations. Cities are implementing mega projects with exceptional derogation to take international position (Bangalore, Istanbul) that affect the local environment and create social and spatial inequalities. Cities are developing city branding (Doha) to offer specific identity. Billboards (Cairo) focus on luxury real estate products despite of the housing crisis. Adequate housing policy (Ho Chi Minh City) and urban planning rules at city level (Doha) and TOD (India) aim to strengthen quality of life but require new forms of urban governance. Local leadership (Surabaya) and public participation (Kalyani) based on transparent governance ensure co-benefits, resilient cities and better management of the informal areas.

The transformative capacity of cities is based on a transdisciplinary and heuristic approach. It requires collaborative urban governance with flexible and agile institutional arrangements. It can take the form of studios (Castries Vision 2030[1]) to build strategies.

The role of planning agencies is crucial to facilitate the role of complex governance systems of metropolitan areas. The decentralization process in India (Bangalore) and Indonesia (Jakarta) makes the metropolitan management more complex but more democratic. The experience of Bandung universities shows the articulation between a metropolis and its specific development for a high education town. The comparison of metropolitan governance structures (Southern Europe) shows there are no dominant models to apply, but multiple local experiences in close relation with their local institutional and political frameworks.

Democratic Urbanism is a method of city-building that integrates democratic ideals into the urban design process and applies broader shared governance models to the implementation of community aspirations, creating places of deep meaning that are broadly "owned" in the civic mindset (session lead by the American International Association[2]). Examples demonstrate civic capacity to overcome the stark challenges of the 21st century and reinvent communities,

1   https://isocarp2019.isocarp.org/paper-platform/abstract/public/84/beyond-the-plan-building-in-house-capacity-to-plan-design-and-implement-urban-and-territorial-transformations-case-of-castries-vision-2030
2   https://isocarp2019.isocarp.org/paper-platform/abstract/public/98/democratic-urbanism-a-method-for-city-building

illustrate the advantages of a democratic method for city-building that is broader than conventional practice, based on a collaborative approach to governance that offers guidance to local leaders across the world working on the front lines of change today.

To support integrated approaches to metropolitan development, UN-Habitat (who lead this session) and its partners have developed the Metro-HUB[3] approach. It embraces different aspects of metropolitan development and management including planning, governance and finance, that aims to foster the capacity of metropolitan stakeholders to address and better manage urbanisation challenges at a metropolitan scale. It provides a vital pool of resources, tools and expertise for developing institutional and human capacity, directly contributing to the New Urban Agenda objective of leaving no one and no place behind. The example of fragmented governance of Jakarta and Paris shows the importance of soft management tools as Jakarta Grand Design with 6 metropolitan thematic (transport/Air pollution, Green building, Clean Water, Urban farming, Resilience, Solid Waste) to put all actors around the table and coproduce metropolitan solutions. Paris Metropolitan Forum is the tool of local actors to co-elaborate the metropolis beyond the formal Metropole du Grand Paris.

Governing the metropolis requires to overcome the administrative boundaries for managing projects or policies. Several experiences in public participation and empowerment have been realised at the metropolitan level (e.g. Paris, Australia). Local leaderships are in fact the key actors to the metropolitan development. The metropolitan governance building is a long and moving process that needs the support of the state government. Urban forum and planning agencies are the soft power tools needed for managing a metropolis. New planning tools that take into consideration the subsidiarity principle should be reinvented at the metropolitan scale for social and spatial equity.

Track 7 - Selected Papers

1. O'Hare D., '*Towards Effective Planning of Trans-border City Regions: Three Australian Case Studies*'

2. Ramesh A., Vidyarthi N. M., '*Decentralization and Devolution in Growing Megacities: Case of Bangalore, India*'

3. Argo T.A., Rustidja W. S., '*The Role of Local Leadership in Defragmented Urban Development: Case of Higher Education Town – Jatinangor, West Java, Indonesia*'

---

3   https://isocarp2019.isocarp.org/paper-platform/abstract/public/152/training-on-metrohub-approach-to-metropolitan-management

Research Paper

TOWARDS EFFECTIVE PLANNING OF TRANS-BORDER CITY REGIONS
three Australian case studies

Daniel O'HARE

Associate Professor Urban Planning, Bond University, Australia

Abstract

Polycentric city regions are expanding worldwide, often spanning national borders. Using literature review and document research, comparative case studies of regional planning of Australia's emerging internal trans-border city regions are presented. The paper examines fifty years of trans-border planning efforts at three urbanizing borders of the Australian state of New South Wales, demonstrating different levels of commitment and success, partly depending on the proximity (or remoteness) of each trans-border city region to the capital cities in each state or territory. Evidence is provided that effective trans-border planning of city regions depends on overcoming differing levels of commitment to trans-border planning by the state jurisdictions involved.

Keywords

Trans-border, cross-border, city-region, regional planning

1. City regions

1.1. The rise of city regions

With the rise of "global city regions" since the late twentieth century (Simmonds and Hack 2000; Scott et al. 2014), there has been increasing acknowledgment that new models are replacing the twentieth century urban conception of a metropolis. The phenomenon of the polycentric city region has superseded the old idea of suburbs radiating out around a single city centre or 'CBD' (Garreau 1991; Calthorpe and Fulton 2013). Suburbs are becoming urbanized within these new city regions and 'placeless' suburbs are beginning to be transformed through the creation of denser, mixed use suburban centres connected by efficient public transport (Al-Kodmany 2016; Beske and Dixon 2018).

These polycentric city regions are increasingly spreading across state and national borders. Such trans-border city regions have been noted around the world, including in Europe, Asia and the Americas/ North America. Well known examples include:

- the expansion of Shenzen (and other Pearl River Delta cities) and neighbouring separately-administered Hong Kong;
- Aachen-Maastricht-Liege (Germany, Netherlands and France);
- San Diego (US) – Tijuana (Mexico); and

- the 'BonNYWash' crescent embracing Boston, New York and Washington across several north-eastern states in the USA.

In addition to trans-border city regions such as these, there are increasing examples of cross-border collaboration in economic development corridors such as the Dublin-Belfast corridor (linking Ireland and Northern Ireland), the Oresund corridor between Copenhagen (Denmark) and Malmo (Sweden) and the link across the Causeway between Singapore and Johor, Malaysia. Such corridors typically involve a focus on improving transport connections and partnerships to improve the combined international competitiveness and economic well-being of formerly discrete cities and towns.

This paper examines the uneven progress of policy for regional planning of Australia's emerging internal trans-border city regions since the 1970s. Three contrasting case studies are presented, focusing on regional plans in three trans-border city regions.   As an exploratory research paper, the case study methods used are a combination of literature review, document research and policy analysis of city-regional plans. Comparisons are made with selected international trans-border city regions.

The Australian case studies illustrate that development of effective trans-border city regions, even within one country, depends on overcoming differing levels of commitment to trans-border planning by the state or territory jurisdictions involved. This commitment may also be shaped by the different balance between resources (eg infrastructure, jobs) and population within a city region that spans across state or national borders. Proximity to a major city, particularly a state capital city, seems to be another factor influencing state government commitment.

2. Three Australian case studies of trans-border city region planning

2.1. The rise and fall and rise of trans-border city region planning 1967-2019

This paper presents the only three case studies of trans-border city region planning that have occurred in Australia to date. As an island continent, Australia has no international trans-border city regions, so the three case studies occur across internal borders of states and territories. All three are at the borders of the most populous state, New South Wales (NSW), with the neighbouring states of Victoria and Queensland, and with the Australian Capital Territory (ACT) around the national capital, Canberra. The differences in approach are at first surprising, however these differences reflect different priorities during different decades, as well as different forms of urbanisation across borders in the three cases.

Despite internal state and territory borders being the sites of expanding trans-border city regions, there has been limited recognition of the need for – or progress towards – more integrated planning of these city regions in Australia (O'Hare 2011). The most impressive progress has been led jointly by the ACT and NSW governments, where the trans-border planning and significance of the national capital, Canberra, has been recognised and increased since the 1990s through effective translation of new spatial planning concepts – the Sydney-Canberra Corridor and the 'Capital Region' – into cross-border plans and strategies with overt support by the two governments and surrounding local governments.

The support of the ACT Planning Authority for a cross-border approach has been motivated by the relatively tight physical boundaries of the Territory within which Canberra is located. Canberra's population of just over 400,000 is contained within a constrained spatial Territory of 2,358 square kilometres, but the city services a large trans-border region by providing jobs, health, education, cultural institutions, higher order retailing and other services. Suburban development now transcends the Capital Territory border into the surrounding rural shires within NSW, and many Canberra workers commute from surrounding large and small towns and rural areas that offer affordable housing within attractive settings.

NSW has arguably been an Australian leader in trans-border city region planning as three of its four state/territory borders are sites of expanding city regions:

- Canberra and the ACT is surrounded by and socioeconomically and physically intertwined with the surrounding region across the Territory border.
- One of the fastest-growing regions in Australia, South-East Queensland (SEQ) is beginning to merge with the expanding NSW Far North Coast region, just over 100 kilometres from Brisbane, the capital city of the adjoining state of Queensland.
- The twin regional border cities of Albury (NSW) and Wodonga (Victoria) have experienced fluctuating levels of collaborative planning efforts since the early 1970s.

While the ACT and NSW have led Australian efforts towards collaborative trans-border planning of city regions, the other two states, Victoria and Queensland have been less consistent in progress towards that aim.

The order in which the three Australian trans-border planning case studies are presented in this paper requires a brief explanation. Albury-Wodonga is presented first to provide a long term perspective – fifty years – on trans-border planning in Australia. It is a case that initially involved the most creative governance arrangements and promised the most, but has not been consistently followed through due to political and other issues. The case study concludes by exploring an encouraging contemporary resurgence in interest that appears to have been led from the local government level over recent years and supported by initiatives from both states and the federal government more recently.

Following the Albury-Wodonga case, the paper explores the development and transformation of Canberra's trans-border regional planning over the past thirty years. The final case study section of the paper investigates uneven moves towards regional planning linking SEQ and Far North Coast NSW as a trans-border city region. The final case study is the most populous and rapidly growing of the three.

2.2. Albury Wodonga: the first trans-border planning experiment, 1960s to the present

"*What began as an ambitious dream* [in 1967] *became a more modest experiment, which was changed into a regional development exercise as it was dismantled slowly* [between 1989 and 2007]" (Pennay 2005:xi).

Albury-Wodonga is a trans-border city region approximately 300 kilometres from Melbourne and 550 kilometres from Sydney. Two towns established here on each side of a major river crossing on the inland route between the two state capitals in the nineteenth century. This crossing point also intersected with the furthest reach of the riverboat traffic that operated along the Murray River during that century. Both were originally agricultural service towns

for the adjoining rich agricultural regions in the Murray valley. Albury's growth and importance were enhanced as the interchange point for passengers on the interstate rail service between Sydney and Melbourne from 1881 until the standard guage rail service was established in 1962. The two towns grew into cities in the twentieth century as significant marketing centres and manufacturing places for rural products such as wool and after World War 2, other manufacturing. Their roles also expanded as major regional centres for State Government departments, major regional hospitals, education and other services.

Integrated trans-border planning for development of Albury-Wodonga was motivated by 1960s concerns by the two state governments to decentralise development and population from Sydney and Melbourne, where long term population drift to the cities was bringing major challenges of population growth, housing shortages, affordability, traffic congestion and pollution which were coming to be seen as unmanageable. The decentralisation push was also aimed at providing Australians in non-metropolitan areas with a more equitable share of national resources and economic and social opportunities. In 1967, the Victorian Government suggested, to both the NSW Government and the Australian Commonwealth (Federal) Government, that Wodonga (in Victoria) and Albury (NSW) be planned and developed "as one complex" for "accelerated development" (Pennay 2005).

In 1972, a new Federal Labor government announced a National Growth Centres program to drive decentralisation of the state capital cities. Of the several regional centres designated as growth centres, Albury-Wodonga was the only trans-border one. The Albury-Wodonga Development Corporation was formed through a 1973 agreement and supported by legislation passed by the federal government and two state governments, formalising a cross-border region spanning two states and seven local councils (Pennay 2005). The Development Corporation was given responsibility for strategic planning of the trans-border city region and was made the planning authority for major urban expansion projects. Its principal function was "to acquire, hold, manage and provide land in those areas designated for development" (NSW State Records, n.d., no page). The national Growth Centres strategy was abruptly abandoned with the dramatic removal of the Whitlam federal government in 1975. The Albury-Wodonga Development Corporation's powers were curtailed and its planning powers removed, but it was not formally wound up until 2007. It continued to develop and sell the remaining land for urban development, and its legacies include urban and regional infrastructure and a regional framework and mechanism for parklands development. Following the dilution and eventual demise of the Development Corporation, collaboration in cross-border collaboration devolved to the two city councils via issues-based organisations and an informal Alliance of Councils and Shires of the Upper Murray (Brown and Bruerton, 2009).

The Albury-Wodonga Development Corporation planned for a trans-border city of 300,000 people by 2000 (Pennay 2005), a population six times that of the area in 1973 (Harris and Dixon 1978). The current combined population of the two cities has only reached about 100,000, while growth of both Sydney and Melbourne has been dramatic over the same period, in a continued trend of centralisation of population, political and economic power in Australia's primary coastal capital cities.

Current efforts towards trans-border planning seem to be more driven by the local governments of Albury and Wodonga, with less involvement of the surrounding rural shires

that were part of the 1970s Growth Centre initiative, and with less immediate connection with the two state governments.

The *Two Cities One Community: Strategic Plan 2017-2021* was adopted jointly by the Mayors of Albury and Wodonga in 2017 with the message: "Our community does not necessarily see a border. They cross a river to share facilities, venues, infrastructure and services. They expect community leaders to adopt a regional perspective and advocate to state and federal governments on issues that impact their day to day lives" (Albury City and Wodonga City 2017: 3). However this plan is a twin cities plan rather than a city region plan, as it does not include surrounding rural shires that interact with these cities, and which were part of the Albury-Wodonga Growth Centre initiative of the early 1970s.

State Government Regional Plans addressing Albury-Wodonga as a trans-border city region

A desktop review of documents and websites suggests that the commitment of the two state governments to coordinated planning of Albury-Wodonga as a trans-border city region is mixed. This paper seeks evidence in the regional planning of the two states for identified regions along the Murray River state border, as well as evidence in the policies and actions of the Cross-Border Commissioners who have been appointed in each of these two states. The Murray River, which divides the twin cities of Albury and Wodonga and the planning jurisdictions of the two states, also divides the northern Victorian region of Hume from the southern NSW region of Riverina Murray.

The three states addressed by this paper (NSW, Victoria and Queensland) all use regional plans to provide their broad frameworks for land use and development, the role of key regional centres, infrastructure provision, economic well-being and environmental management. The approaches vary in each state, with Queensland's regional plans having been restricted to "State Interests" since 2014. The ACT, in contrast to the states, is effectively a city-state. Its planning addresses not only the urban area of Canberra and land within its borders, but also interactions with the region of NSW that surrounds Canberra.

The Riverina Murray Regional Plan is "centred on creating more jobs, strengthening the region's cities, towns and villages, sustainably managing its agricultural, extractive and natural resources and protecting the nationally significant Murray River" (Department of Planning and Environment website https://www.planning.nsw.gov.au/Plans-for-Your-Area/Regional-Plans/Riverina-Murray). Although the regional plan is jurisdictionally restricted to the NSW side of the river border, cross-border issues are prominent and the plan notes that Albury-Wodonga is one of three "regional cities" in the region and that it is the largest of seven cross-border communities. Aboriginal communities from both sides of the river are acknowledged in the Minister's foreword.

Albury and Wodonga are described in the plan as functioning as "a single economic centre, with employment, investment and services accessed across both locations", with Albury alone servicing "an extensive catchment of approximately 200,000 people [and providing] higher-order services, including for business, office and retail uses, and arts, culture, recreation and entertainment, which support the needs of smaller settlements across the region and in cross-border communities" (NSW Government 2017a: 57).

The Riverina Murray Regional Plan prominently demonstrates NSW government awareness that the region is closer to the interstate capital of Melbourne than to its own state capital

of Sydney: it boldly – in very large print – "acknowledge[s] the important role of this region's centres and their relationship to, and export potential with, Melbourne and Victoria…." (NSW Government 2017a: 9).

The vision and goals of the Riverina Murray Regional Plan are supported by 29 "directions" and accompanying actions. Goal 4, Strong, connected and healthy communities is supported by Direction 23, "Create a connected and competitive environment for cross-border communities", which in turn is supported by Action 24.1 "Work with the Victorian Government and cross-border councils to examine: barriers to and enablers of economic, housing and jobs growth; service delivery models; and infrastructure delivery, including transport infrastructure" (NSW Government 2017a: 51).

In contrast, the Hume Regional Growth Plan, from the Victorian side, is much less overt in its recognition of the trans-border city region, focusing more attention on Wodonga as a regional city in its own right, despite acknowledging "the influence of the combined urban area of Albury-Wodonga (recognised as one of Australia's 18 major cities) in the Upper Hume sub-region" (State Government of Victoria 2014: iv). The area covered by Victoria's Hume Regional Growth Plan includes four of the seven cross-border communities included in the NSW Riverina Murray Regional Plan: "Of these settlements, Albury provides a significant economic gateway to New South Wales and creates opportunities for Wodonga to leverage off this broader economic conurbation" (State of Victoria 2014: 58). Potential benefits from a new inland freight rail line (now under construction) and possible future high-speed rail between Sydney-Canberra-Melbourne are identified as providing opportunities for Albury-Wodonga, although this Regional Growth Plan has a tendency to highlight only Wodonga and other settlements within the state of Victoria.

In considering regional transport links, the Hume Regional Growth Plan notes that people from southern NSW travel to Melbourne for healthcare and that Albury-Wodonga benefits from "a reciprocal agreement that provides a single public health service, available to residents of either state. Hospital facilities in … Albury-Wodonga … provide higher order services to the wider region, including southern New South Wales" (State of Victoria 2014: 64).

Notwithstanding acknowledgment of cross-border settlements including Albury-Wodonga, the Hume Regional Growth Plan seems to step back from the innovative approach of the 1960s that led to Australia's boldest experiment in city region planning through cooperation between the federal government, two state governments and seven local governments in the 1970s growth centre project. The current plan does map Albury and Wodonga as comprising a cross-border settlement, and the plan identifies future urban expansion areas south-east of Wodonga that were first identified for development in the 1970s growth centre plan, but no link is made to that earlier thinking.

The Hume Regional Growth Plan identifies the southern sub-region, within commuting distance of Melbourne, as an area that expects more significant growth than the Albury-Wodonga city region. This supports the argument by Harris and Dixon (1978) that Albury-Wodonga was too far from a major city to achieve the population and economic growth envisaged in the 1970s.

Cross-Border Commissioners and joint state agreements

To deal with the many inconsistencies and inefficiencies faced by residents and businesses located in cities and regions on state borders, both NSW and Victoria have appointed Cross-Border Commissioners in recent years. In 2012, the NSW Government established the Office of the NSW Cross-Border Commissioner in order to identify and resolve cross-border issues. The current NSW Cross-Border Commissioner is based in Wagga Wagga, in proximity to NSW borders with both Victoria and ACT.   The NSW Cross-Border Commissioner is attached to the Department of Premier and Cabinet, and thus has access to key decision makers in government.   In 2018, after pressure from Murray River communities, the Victorian Government also appointed a Cross-Border Commissioner, and the first Commissioner is based in Wodonga and operates under the auspices of the Minister for Regional Development.   The Cross-Border Commissioners both have a wide remit to address incompatibilities between legislation and regulations across borders, and urban and regional planning is just one of those many issues. The NSW Cross-Border Commissioner has assisted in the development of agreements between that state and both the ACT (in 2016) and Queensland (in 2017) as discussed in the other case studies below, but there is not yet a similar agreement with Victoria. Given the success of the NSW Cross-Border Commissioner in dealings with the other states, it is anticipated that the existence of Cross-Border Commissioners in both NSW and Victoria will lead to a strengthening of cross-border initiatives in future planning for Albury-Wodonga as an expanding trans-border city region.

Return of the Federal Government to city region planning: a Regional Deal for Albury-Wodonga

Following its withdrawal from the Growth Centre projects in 1975, the Australian Government has generally been prepared to leave urban issues to the two lower levels of government until 2015, when it reintroduced a Cities portfolio. This reflects wider recognition that cities and city regions are critical to the e conomic and social well-being of Australia. One of the new initiatives of the federal government is to fund City Deals, a partnership scheme based on the UK model, whereby the three levels of government and the community work in partnership to align planning, investment and governance to deliver "a shared vision for productive and liveable cities" (Australian Government, nd, https://www.infrastructure.gov.au/cities/city-deals/index.aspx).

The federal government also offers similar place-based Regional Deals, and Albury-Wodonga was announced as a pilot cross-border regional deal recipient in March 2019 (Australian Government 2019). Under the ten-year AUD$3.2 million deal, the federal government, two state governments and two city councils will engage with business, industry and the community to develop and implement a strategy for population growth and economic development to ensure that Albury-Wodonga "remains a nationally-significant, liveable and prosperous region" (ibid.). If implemented well, this regional deal promises to be a major means of achieving better outcomes for Albury-Wodonga by treating the trans-border city region as one.

2.3. Integrating Australia's Capital City and its trans-border region, 1995 to 2019

Australia's capital city Canberra, founded in 1911, has been comprehensively planned since 1959 by the ACT Planning Authority and its predecessor the National Capital Development Commission. The city's strong history of planning initially occurred solely within the spatial constraints of the 2348 square kilometres of the Australian Capital Territory (ACT). By the 1990s there was increasing recognition that Canberra played a valuable role as the major city for the surrounding region of NSW, and Canberra's planners became increasingly involved in NSW planning of the surrounding trans-border region.

An early example of this trans-border approach to city region planning was the adoption of NSW's first Sydney-Canberra Corridor Strategy in 1995 (McKenzie 1997). The emphasis of that strategy was as much on connections with Sydney as with Canberra, as well as the corridor itself which consisted of a string of towns and smaller cities set in a scenic and productive landscape along the 200 kilometre highway and rail corridor linking the two major cities. The ACT planners followed this in 1998 with the production of the ACT and Sub-Region Plan. NSW updated its corridor study in 2007 to become the Sydney-Canberra Corridor Regional Strategy 2007-31. The strategy recognised and sought to plan for the effects of the growth of both Sydney and Canberra on the region between the two capital cities. Although the Corridor Strategy's focus was mainly on the region between Sydney's outskirts and the ACT border, it gave prominent recognition to the fact that Canberra and the immediately adjacent smaller NSW city of Queanbeyan effectively operate as a single metropolitan area.

The Corridor Strategy refers to the 2006 signing of two Memorandums of Understanding (MOUs) entitled the ACT–NSW Cross-Border Region Settlement Agreement and the ACT–NSW Cross-Border Water Supply Agreement. At the same time, both governments signed the ACT-NSW Regional Management Framework Agreement (RMFA) (ACT and NSW Governments 2006). These MOUs were signed by the ACT Chief Administrator and the NSW Premier and have laid the way not only for updated MOUs since then, but more importantly for an expansion of the cooperation between the two jurisdictions in the planning of Canberra as a city region that extends beyond the ACT borders.

The ongoing commitment of both governments to Canberra-region cooperation since the 1990s can be attributed to decades of voluntary cooperation through diverse formal and informal collaborations including the Regional Leaders' Forum (RLF); the Capital Region Development Board (CRDB); and sub-regional planning strategy working groups. The cooperative approach formalised through the Corridor Strategy and MOUs (renewed in 2011 and 2016) has enabled current regional planning to be increasingly collaborative across the border, including at the levels of the surrounding local governments.

An important regional governance mechanism, established in 2015, is the Canberra Region Joint Organisation (CRJO), which "provides a forum for councils, State agencies and other stakeholders to work together at a regional level to identify shared priorities [and deliver] better outcomes for communities" (CRJO website, 2019). The three core functions of CRJO are: (1) regional strategic planning and priority setting; (2) intergovernmental collaboration; and (3) regional leadership and advocacy (ibid.) The 10 NSW local governments in the region

surrounding the ACT are CRJO members and the ACT Government is an associate member of the organisation.

The region surrounding the ACT border is now addressed by the South East and Tablelands Regional Plan 2036 (NSW Government 2017b). "The combined population of the local government areas within an hour's commute of the ACT, and the Territory's population itself, will increase to more than 660,000 by 2033 – a larger population than the Gold Coast today." (ibid., p4). Of the planning instruments reviewed in this paper, this regional plan is the most overt in its recognition of the significance of the cross-border relationship. The vision of the plan is for "a *borderless region* in Australia's most geographically diverse natural environment with the nation's capital at its heart" (ibid., p8, emphasis added). The regional plan is framed within this strong conception of the region as "a connected and borderless Canberra region." There are no inter-regional rivalries here, just a community-supported conviction that the prosperity of the region is dependent on Canberra and vice-versa. Canberra's airport, its jobs market, high order services, cultural institutions and lifestyle qualities are seen as assets for the region. Conversely, the region is recognised for providing additional housing opportunities (both affordable and prestige), recreational opportunities (ranging from bushwalking and camping to snow skiing and beach surfing), fine produce and scenic landscapes.

The NSW regional plan refers to its evolution from consultation with the ACT Planning Authority and the local governments of the region. In particular, it acknowledges the complementary approach taken by the ACT Planning Strategy 2012, which "acknowledges that Canberra's success depends on its relationship to surrounding areas. It acknowledges the importance of regional collaboration on biodiversity, transport and economic development" (NSW Government 2017b: 13). Those sentiments are reinforced in the 2018 "refresh" of the ACT Planning Strategy (Direction 1.4, p46), which is perhaps otherwise more focused on Canberra itself within the ACT border (ACT Government 2018). The ACT Plan reciprocates by emphasising that the NSW South East and Tablelands Regional Plan 2036 contains several joint initiatives and actions in parallel with the matching ACT plan and policies (p48). Mutual calls for collaboration are acknowledged, most notably by Canberra Region Joint Organisation (CRJO), as is the ACT-NSW Memorandum of Understanding for Regional Collaboration, as well as collaboration arrangements with a key adjoining council (p49).

The South East and Tablelands Regional Plan 2036 has provisions to protect the flight path for Canberra Airport, which is seen as vital to the economy of the surrounding region (Action 1.1, p15). Direction 19, "strengthen cross-border connectivity", addresses the importance of achieving legal and contractual reforms to allow seamless cross-border public transport services for towns and housing developments within commuting distance of Canberra (p44).

As Canberra's ACT Planning Strategy 2012 and 2018 seek to transform low density Canberra into a more compact urban form, the NSW South East and Tablelands Regional Plan acknowledges and attempts to limit the corresponding increase in development of low density development across the border (Direction 25, p53). This is an attempt to guard against the experience of Vancouver, Washington in the US, where significant car-dependent low density development has provided an unofficial alternative to the compact settlement pattern pursued across its border with Portland, Oregon (Bae 2000, in O'Hare 2011). Under Direction 26, proposals are advanced for cross-border infrastructure and monitoring systems

for land, housing and water requirements. In the final section of the Plan, key planning priorities are identified for those NSW local government areas that adjoin the ACT border.

CRJO and the ACT Government are currently lobbying the federal government to back a "Canberra Region Deal" to boost the city and its region by a coordinated investment in infrastructure and enhanced 'borderlessness' in delivery of higher order services such as tertiary education and health care (CRJO and ACT Government 2019).

2.4. SEQ and North Coast NSW: uneven approaches to cross-border planning 2005-2019

The third Australian case study city region that spans state borders is South East Queensland (SEQ) and north coast NSW (NCNSW). SEQ is a large and fast-growing city region which encompasses the Queensland capital, Brisbane and several smaller cities with a total region population of 3.5 million, projected to be home to 5.3 million by 2041 (Queensland Government 2017). SEQ's urban interface with the state border, with a combined population of approximately 700,000, consists of the City of Gold Coast (Queensland) and the contiguous urban area of Tweed Shire in NSW (ABS 2019). Gold Coast-Tweed is Australia's sixth largest city and one of its most rapidly growing city regions. Gold Coast Airport, straddling the border, serves as international gateway to both regions.

Cross-border planning in this large trans-border city region is significantly under-developed, particularly from the Queensland side. Regional plans have been in place in these two adjoining regions since 2005 and 2006 respectively (Queensland Government 2005; NSW Government 2006). From and including that time, there has been a steady building of attention to trans-border issues from the NSW side and a fluctuating level of interest from Queensland. There has not been a true bilateral commitment to the promise offered by the statement that "the NSW and Queensland governments have formed a partnership to share information and promote consistent sustainable planning strategies" (NSW Government, 2006: 44).

The SEQ Council of Mayors, a powerful regional local government advocacy organisation, was established in 2005 to represent the interests of the fast growing SEQ regions. It recognises that SEQ has grown into a city region that is "no longer just a series of disparate geographic areas but a region that, in practical terms, functions as a single metropolitan area" (Council of Mayors website, accessed 21 July 2019). Given that the SEQ region extends to – and, de facto, across – the state border, it is astounding that neither of the two councils abutting the urbanised section of the border – Gold Coast City (in Queensland) and Tweed Shire (in NSW) – are currently members of this influential and highly effective group of ten SEQ councils. Consequently in the otherwise sophisticated current proposal for a SEQ City Deal partnership between the federal, Queensland and local governments for transforming SEQ into a high-performing polycentric city region, there is only one mention of the state border, and that is as the southern boundary of the region (SEQ Council of Mayors and Queensland Government 2019: 8) rather than a transition line in the contiguous settlement pattern. It is therefore not surprising that the document does not advance the case for improved cross-border coordination in planning and development.

Despite their non-participation in the Council of Mayors, the border local governments of Tweed Shire and Gold Coast City have a strong relationship. An agreement exists between the two border councils, providing for bi-monthly consultations between their strategic regional planning teams "to coordinate planning, infrastructure and response to traffic

issues (Brown and Bruerton, 2009, p.57). In practice, this level of cross-border council communication and collaboration happens less frequently, but is invoked to deal with major issues including planning updates (senior planners, pers.comm.).

The current state-level regional plans for the two adjoining regions are *ShapingSEQ: South East Queensland Regional Plan 2017*, and the NSW *North Coast Regional Plan 2036*. Both were released in 2017, soon after the two states renewed their partnership MOU – similar to that noted for the ACT and NSW, above – aimed at information sharing, resolution of cross-border anomalies, and promotion of consistent sustainable planning strategies. The two regional plans show starkly contrasting levels of commitment to the updated *Queensland and New South Wales Statement of Principles and Priorities for Cross-border Collaboration 2016-2019* identifies four key focus areas for cross-border collaboration: i) regional economic development, ii) aligning services and sharing information, iii) local transport, iv) issues of national significance (Queensland and NSW Governments, 2017). As with the ACT-NSW MOU, the document is accompanied by an annual Worklist detailing planning projects. The worklist is reviewed through an Annual Report.

ShapingSEQ's ambitious 50-year Vision and specific 25-year goals for plan delivery do not carry the collaborative cross-border aspirations of the MOU very far forward. The border is largely ignored, other than in acknowledgment of opportunities for North Coast NSW to benefit from SEQ's significant population growth and employment market and the tourism potential of the World Heritage landscapes that span the border. It recognises that upgrading infrastructure will connect the regions and support access to employment and recreation, while also enhancing the flow of goods, services and skills (Queensland Government, 2017). Commitment to the MOU is not prominent in *ShapingSEQ*. While not completely ignored in mapping within *ShapingSEQ*, the border and interactions beyond it receive little attention. The border is termed the Southern Gateway (Queensland Government 2017: 142). This gateway comprises an emerging "Regional Economic Cluster" (REC) hosting priority sectors that offer cross-border services including an international and domestic airport, major regional hospitals health, manufacturing (focused on aviation industries) and tourism infrastructure.

In contrast, *North Coast Regional Plan 2036* brings cross-border planning much more to the fore, including in its Vision statement: "Northern communities have established important links and are integrated with a burgeoning [SEQ.] …. Southern and coastal communities are building relationships and leveraging opportunities from the Pacific Highway upgrade" (NSW Government, 2017). The NSW Department of Planning and Environment stresses the importance of collaboration with the Queensland Government by strengthening communities of interest and cross-regional relationships (NSW Government, 2017). The contrasting regional planning visions reveal the different significance the two states place on cross-border collaboration: NSW acknowledges its importance, Queensland downplays it. *North Coast Regional Plan 2036* dedicates an entire strategy to cross-regional collaboration, The fifth of 25 "Directions" of the Plan is to strengthen cross-regional relationships, with cross-border connections prominent in the rationale and actions under this direction (NSW Government 2017: 25-26). Cross-border relationships are prominent in the text and maps conveying the *North Coast Regional Plan 2036,* and almost absent in *ShapingSEQ*.

The NSW Cross-Border Commissioner has noted key issues affecting many community and business sectors: summer time zones, trade registrations/licences, fees and costs, education,

transport, health, community services, policing and legal differences, emergency management, agriculture, environment, and tourism. (NSW Government, 2012). Those trans-border concerns that could be addressed in city region planning are taken up in the Plan, and the Cross-Border Commissioner is declared a key agent in achieving the Plan's cross-border outcomes: "The NSW Cross-Border Commissioner, the Queensland Government and councils will work together to better integrate cross-border servicing and land use planning to remove any barriers to economic, housing and jobs growth" (NSW Government 2017: 12).

The hard work ahead of the NSW Cross-Border Commissioner is demonstrated most starkly by the lack of cross-border commitment from the Queensland side that is evident in the current City Deal proposal, as discussed earlier in this section.

3. Conclusions

This paper has reviewed three Australian case studies of the planning of city regions that transcend internal state or territory borders. Despite such efforts commencing up to 50 years ago, the three case studies do not combine to tell a story of a uniformly successful model of trans-border city region planning at these three borders of the state of NSW.

The limited success of Albury-Wodonga in attracting sustained growth in population, employment and facilities may be because these twin border cities are so far from the nation's capital cities which attract the greatest population and investment: Melbourne is 300 kilometres away (Harris and Dixon 1978). It is yet to be seen whether cross-border collaboration will be renewed by the "Regional Deal" securing the involvement of three levels of government including both states with their respective Cross-Border Commissioners.

The Canberra region has the advantage of being centred on itself as a capital city of critical population mass and national political and cultural importance. In addition, it is part of a connected corridor of urban centres extending 200 kilometres from the outer suburbs of the NSW capital, Sydney. The ACT and NSW Governments, together with surrounding local governments, provide the most exemplary approaches to collaboration in trans-border planning. The critical success factors demonstrated here over the past 25+ years arguably include:

- willing cooperation between the state and territory governments and their planners;
- clear conceptualisation and political and public uptake of narratives of a Sydney-Canberra Corridor and a Capital Region;
- The signing of a MOU between the ACT Chief Administrator and the NSW Premier in 2006 and its continued support and implementation by the two governments;
- the desire of surrounding rural shires to benefit economically, socially and culturally from their proximity to the national capital;
- a consistent record of actively addressing cross-border issues in plans made by the ACT government, NSW government and local governments over a sustained period;
- the involvement of the NSW Cross-Border Commissioner where necessary to broker expansion of Canberra across the territory border into NSW.

Lessons from ACT-NSW border need to be drawn on to address cross-border regional planning as the third case study city region, Queensland's SEQ, continues to grow across the border into the North Coast of NSW. This trans-border city region is the most populous and fastest growing of the three case studies, manifesting the continued growth of the 200 kilometre coastal city extending from Brisbane, the Queensland state capital which is only 100 kilometres from this border. Plans by the NSW Government, eg the 2006 Far North Coast Regional Strategy and its successor the 2016 North Coast Regional Growth Plan, have addressed the border and key cross-border centres for some years now, while the most recent SEQ Regional Plan, Shaping SEQ 2017, pays scant attention to cross-border planning issues, and these issues are not prominent in the plans of the two local councils that address development of the contiguous urban development that crosses the border.   The unevenness of the response is surprising, given that a MOU and cooperation agreement have existed between the State Premiers of Queensland and NSW since 2006. On the other hand, it is not so surprising that NSW is further advanced in trans-border planning as it has fifty years of experience dealing with these issues on three of its four land borders, while Queensland only faces these issues at one of its borders, and this occurs at the periphery of the state's main city region, SEQ, which is centred around the state capital of Brisbane.

Further research will include key informant interviews with senior planners and community leaders in the three trans-border regions studied here, as well as international comparisons with city regions that transcend international borders.

4. References

ACT and NSW Governments 2006 ACT-NSW Regional Management Framework Agreement (RMFA).

Al-Khodmany, K 2016 New Suburbanism: sustainable tall building development. London and New York: Routledge.

Albury City Council and Wodonga City Council 2017 Two Cities One Community: Strategic Plan 2017-2021. Accessed 21 July 2019 at https://alburywodonga.gov.au/plan

Australian Bureau of Statistics (ABS) 2019 Data by region, accessed 21 July 2019 at https://itt.abs.gov.au/itt/r.jsp?databyregion

Australian Capital Territory Government 2018 ACT Planning Strategy 2018. Canberra: ACT Planning and Land Authority.

Australian Government (no date) City Deals. Accessed 21 July 2019 at https://www.infrastructure.gov.au/cities/city-deals/index.aspx

Australian Government (no date) Regional Deals. Accessed 21 July 2019 at https://www.regional.gov.au/regional/deals/index.aspx

Australian Government 2019 Albury Wodonga Regional Deal. Accessed 21 July 2019 at https://www.regional.gov.au/regional/deals/Albury-Wodonga.aspx

Beske, J and D Dixon (eds) 2018, Suburban Remix: creating the next generation of urban places. Washington DC: Island Press.

Brown, A.J. and M. Bruerton (2009) "Overcoming state borders in Australian cross-border communities: select examples", in B. de Villiers (Ed.) (2009) Crossing the Line: dealing with cross-border communities, pp.47-67, Johannesburg: Konrad-Adenauer-Stiftung.

Calthorpe, P and W Fulton 2013 The Regional City: new urbanism and the end of sprawl. Washington DC: Island Press.

Canberra Region Joint Organisation (CRJO), accessed 22 July 2019 at https://crjo.nsw.gov.au/about/

Council of Mayors, South East Queensland, website accessed 21 July 2019 at https://www.seqmayors.qld.gov.au/

CRJO and ACT Government 2019 Canberra region calls for new deal. Media release, accessed 22 July 2019 at https://crjo.nsw.gov.au/

Garreau, J 1991 Edge City: life on the new frontier. New York: Doubleday.

Harris, CP and K Dixon 1978 Regional Planning In New South Wales and Victoria since 1944 with Special reference to the Albury-Wodonga Growth Centre. Canberra: ANU Press.

McKenzie, Fiona 1997 Growth Management or Encouragement? A critical review of land use policies affecting australia's major exurban regions, Urban Policy and Research 15(2) pp83-99.

NSW Government 2006 Far North Coast Regional Strategy 2006-2031. Sydney: Planning NSW.

NSW Government 2012 Cross-Border Commissioner listening tour report. Sydney: NSW Government Trade and Investment.

NSW Government 2017a Riverina Murray Regional Plan 2036. Sydney: Department of Planning and Environment.

NSW Government 2017b South East and Tablelands Regional Plan 2036. Sydney: Department of Planning and Environment.

NSW State Records (n.d.) "Albury-Wodonga Development Corporation", State Records Investigator: Agency number 2695.

O'Hare, D 2011 Confusion between centrality and remoteness in cross-border regional planning, refereed proceedings, *World Planning Schools Congress*, Perth, July 2011.

Pennay, Bruce 2005 Making a City in the Country: the Albury-Wodonga National Growth Centre project 1973-2003. Sydney: UNSW Press.

Queensland Government 2005 South East Queensland Regional Plan 2005-2026. Brisbane: Queensland Government.

Queensland Government 2017 Shaping SEQ: South East Queensland Regional Plan. Brisbane: Queensland Government.

Queensland and NSW Governments 2017 Queensland and New South Wales Statement of Principles and Priorities for Cross-border Collaboration 2016-2019.

Scott, A, J Agnew, E Soja, and M Storper 2014 Global city-regions: an overview. Accessed 4 April 2019 at https://www.researchgate.net/publication/265192243_GLOBAL_CITY-REGIONS_AN_OVERVIEW

SEQ Council of Mayors and Queensland Government 2019 Transforming SEQ: the SEQ City Deal proposition: Brisbane: State of Queensland (Queensland Treasury).

Simmonds, R and G Hack 2000 *Global City Regions: their emerging forms.* Abingdon and New York: Spon.

State Government of Victoria 2014 Hume Regional Growth Plan. Melbourne: Department of Environment, Land and Water.

Research Paper

Decentralisation and devolution in growing megacities
Case of Bangalore, India

Ananya RAMESH, India

Nirupama M VIDYARTHI, India

Abstract

Through the 73rd and 74th Amendment Act of 1992, India sought to empower urban and rural local bodies. On the contrary, parallel modes of governance have undermined them. In the case of megacity Bangalore, two such modes i.e Electronic City and Smart City are studied to unpack the status of decentralisation. Key person interviews serve as primary data. Following the enquiry of decentralisation and devolution, elements of disconnectedness emerge. Disconnectedness can be seen between parts-affecting the whole, embodied as intents as well as outcomes through tools of planning, administrative, legal, political and economic choices. This leads us to enquire how we can retain decision-making power within the democratic realm and strengthen the role of local bodies in megacities. Unpacking the dynamics of decentralized governance is critical across megacities globally, as cities continue to seek autonomy not just in functioning but identity and influence, in the network of global flows.

Key words

Democratic decentralization, Electronic City, Smart City, Disconnect

Introduction

The United Nations (UN) define megacities as those with a population mark of over 10 million, where Bangalore features in the top five megacities in India with a population of 10.5million (United Nations, 2018). The Census of India, 2011 refers to Bangalore as an Urban Agglomeration under the million plus category, governed by a Municipal Corporation. In India, megacities are categorised based on their contribution to the Gross Domestic Product (GDP) and their role as central to the 'economic future' of the country (McKinsey Global Institute, 2010). Cities in this framework are viewed as concentrations of investment, labour and infrastructural provisions. This makes them vital tools in the 'growth' narrative calling on governments to 'remove barriers in product, land and labour markets' (McKinsey Global Institute, 2001).

Megacities as a process

Harvey deconstructs these 'utopian' (Harvey, 1996) ideas of growth in cities and argues that they are not entities, but processes of 'accumulation of capital across time and space' (Harvey, 1996) especially the big agglomerations which act as the primary centres of 'capitalist creative destruction' (Brenner, 2013, p. 108). In cities like Bangalore this is especially marked in the processes of creating a 'world class city' (Ong, 2011) more pronounced since the mid-1990s (Goldman, 2011a). Michael Goldman discerns the flow of capital and its effect on the transformation of Bangalore from a quiet pensioners town to a

'third world Megacity' (Goldman, 2011a) catalysed by the growth of the IT industry. This makes Bangalore a frontier of "speculative urbanism" (Goldman, 2011b) with the transnational agencies aiming it to connect to a global network of flows while undermining the local bodies. Urban as a 'process of transformation unfolding in diverse sites, territories and landscapes' as proposed by Brenner helps visualise the case of Bangalore with urbanisation bleeding into the "non-urban" and helps ascertain the capture (Brenner, 2013) and its facilitation, at the expense of the local government. When regional competitiveness (Kennedy, 2017) is at odds with local political competence, capital finds non-capitalist spaces and strata ((Luxemburg, 1951) as cited in (Idiculla, 2015, p. 5)) to engage with; to ease the process. Yet for the very same reason, states invite capital in the very same flagship cities, willing to give up some level of control. This can be viewed as a reason for regional imbalances and certain cities growing into megacities and city regions.

In megacities and urban agglomerations, the local governments most often are limited by administrative jurisdictions that do not match the extents of urbanisation (Baud and Wit, 2008, p. 8). Viewing megacities as processes, urges us to look beyond the logics of administrative and jurisdictional boundaries, observing the dynamic nature of part to whole relationships. Spatial, regulatory and financial provisions within these processes define parts, as a dynamic identity and its relationship with the megacity; owing to the multiple processes within megacities.

Decentralisation in India: the institutional framework

The 73rd and 74th Constitutional Amendment Act (CAA) introduced in 1992 can be viewed as a milestone in the attempt to decentralize and strengthen rural and urban local governments as the third tier within the federal structure. The 11th and 12th Schedules added through these CAAs give a detailed list of functions to be carried out at this level of government. The 73rd CAA has better implementation since it actively regulates decentralisation in rural areas through clear demarcation between state and panchayat raj; devolving financial and administrative power proportionately to function autonomously (Baud and Wit, 2008, p. 24). The 65th CAA 1990, a precursor to the 74th CAA failed to be implemented since it sought an unprecedented move within the federal structure, empowering the urban local bodies i.e. municipalities as the third tier of government. Opposed on the grounds of 'bypassing' the state government which are the building blocks of the nation i.e. 'India as a Union of states', the 74th AA toned down this proposition, offering state governments discretionary powers (Baud and Wit, 2008, p. 54). In Karnataka, Karnataka Municipalities Act and Karnataka Panchayat Raj Act provide the framework and institutional structures.

In the case of Bangalore creation of parallel modes of governance through parastatals and taskforces, citing technical expertise as the reason laterally shifts the decision-making power away from the ULBs which has been discussed widely discussed by scholars under the Collaborative for Advancement of Studies on Urbanism through Multi-Media (CASUMM). These studies also establish the undermined power of municipalities due to lack of devolution of power to the Ward Committees, capture of fiscal control and decision-making through creation of financial intermediaries and pre-conditioned loans from international financial institutions. It is in this context, Leo-Saldanha from Environment Support Group rightly points out that "we are ritually decentralised, but effectively centralised".

Studying the complexity of "market-based practices" in Bangalore, Benjamin (Benjamin, 2010)articulates that the impact of neoliberal forces when "policy and programmes favour the big interests over these everyday-practices" poses a threat to the essence of democratic processes and decentralisation. The current approach to democratic decentralisation coupled with regional competition (Kennedy, 2017) and corresponding policy incentives by the state government, are "removing the remaining obstacles to the global presence of capitalism" (Schuurman, 1997) which is discussed through the two cases.

More than two and a half decades after the CAAs, democratically elected urban local bodies remain disempowered. New forms of governance such as Special Economic Zones, Infrastructure Corridors, Industrial Townships, Smart City etc. can be seen as countering this intent, through creation of "enclaves of exception" (Idiculla, 2015, p. 20). We hypothesise that "exception" ((Schmitt, 1985; Agamben, 2005) as cited in (Idiculla, 2015)) as a key intent in these new forms of governance, is leading to various degrees and forms of 'disconnect'. Not only has this shifted decision-making outside the democratic realm and altered the dynamics of local governments, but the disconnects are posing challenges to dynamics within a megacity's parts as well as the regional dynamics. Viewing these disconnects as outcomes, this paper aims to unpack two instances (i.e. Electronics City Industrial Township Authority (ELCITA) and Smart Cities program) of such exception initiated through programmatic and financial exception respectively; implemented through alternate modes of governance .The authors unpack the resultant disconnects as outcomes of processes that contest, claim and retain decision making within the democratic realm and the dynamics of impairment and systematic shift in power away from local bodies aimed at serving other interests.

Case 1: Smart City

Megacity fueled by visions of a World Class city

According to Harvey long-term investments in built environment, infrastructure of communication, production to name a few, facilitate the 'circulation of capital' across time. (Harvey, 2000). Apart from utilizing land to accelerate peri-urban transformations, there is a rising interest in 'Urban Renewal' programs seeking to uplift the core city areas. It is through a combination of 'underestimated costs and overestimated revenues' that projects get approved and bring in funds (Flyvbjerg, 2005, p. 1) They project visions and rendered images of the the city on completion of the project. One of the recent proponent of this 'Urban Fantasy' (Watson, 2014, p. 215) in India has been the Smart City Mission. Often referred to as the 'pet project' of the Prime Minister, it is highly centralised in its conception of development, favouring a certain model of 'futuristic' development, often overlooking the actual needs of the cities or areas where the mission is implemented.

Basic Infrastructure vs 'World-Class Infrastructure'

Carrying forth the JNNURM model, the Smart City Mission seeks to bring in large amount of investment into cities. But just as JNNURM the Smart Cities Mission seeks to restructure the functioning of municipalities. This is usually at the cost of provision of basic services (Baindur and Kamath, 2009). In the mission mode, the State and ULB seek to create and demonstrate 'convergence' with larger national goals and other schemes. The cities conceptualise

projects to fit the requirements of the Central Scheme, the predominant incentive being access to the grants. In this process the convergent goals overlook the city's requirements.

Brigade Road, one of the 7km of roads in the core city of Bangalore selected for the 'Smart SURE' roads which will feature IoT (Internet of Things) based interventions. 'These roads will have 50 smart card-enabled public bicycle sharing points, 30 e-rickshaw stands, 35 e-toilets, water ATMs, 420 sensor-based smart dustbins and 50 designated vending kiosks -all of which will be connected to 1,250 smart telecom towers that will double as street light poles. Not to mention, these roads will also have wi-fi connectivity.' (Ministry of Urban Development, 2016). The disconnect between such proposals and the reality of the various parts of the city faces inadequate water supply, sewerage management and lack of basic services especially for the urban poor is evident.

A large part of the Pan City Proposal for Bangalore focuses on 'Smart' technocratic interventions such as e-governance, B-TRIPS etc. (Ministry of Urban Development, 2016). The call for an overhaul in governance with an intensive use of technology causes a disconnect in the system and induces a demand for 'expertise' which is to be fulfilled by a number of Private players offering allied products and services (Ong, 2011).

Focus on Area Based Development

Though ABD is intended to streamline the goals into smaller spatial entities to be tackled as a project, the Bangalore Smart City proposal is far from execution with very less transparency on the progress of the Mission. Officials claim that the DPRs (Detailed Project Reports) are being prepared at this stage.

The mission talks of concepts like 'Retrofitting' and 'Redevelopment' of existing areas; 'Redevelopment envisages an area of more than 50 acres, identified by Urban Local Bodies (ULBs) in consultation with citizen',this raises questions of equity and inclusiveness as various identities manifest spatially in cities. A look at the Smart City proposals of Bangalore shows trends that ABDs concentrate too much on spatial interventions alone, which view retrofitting and redevelopment as an exercise in aesthetics; modernisation, place-making, material changes etc. It is however a manifestation of 'splintered urbanisms' (Graham and Marvin, 2001) with resources being directed to select areas in the city. 2,090 crores are the current estimates for the projects under Bangalore Smart City with Rs 1,666 crores with over 80% just for the ABD projects (Ministry of Urban Development, 2016). The larger budget for the ABD projects will run the risk of creating 'islands of excellence' (Idiculla, 2015) creating a spatial disconnect between the selected areas in the core and other parts of the city.

Since a large portion of the financing of these projects relies on investments from the private sector and Public Private Partnerships, they depend on the market mechanisms for their completion. These Market forces will play out differently in different cities depending on various factors; highlighting existing patterns of boosterism and inter-region competition. The actual spatial forms that these economic forces would take in a city like Bangalore is to be seen. How they are linked with existing economic nodes would decide their feasibility and working.

Governance in an SPV model

The Smart City Mission aims to tap into the 'spirit of competitive and cooperative federalism' (Ministry of Urban Development, 2015) creating competition in the process of selecting the cities and in the delivery of the pre-defined projects. This would depend on the ambition,

ability to repay and the 'comfort' provided to the lenders. Apart from the influencing reforms and policies, certain financial tools like Special Purpose Vehicles are employed to create a financial island disconnected from the liabilities of the constituent partners. Special Purpose Vehicles have become increasingly popular in delivering and operating projects often compromising on transparency. They allow for securitization of assets, distribution of risks, and the goal-oriented approach seeks to instil confidence and minimise risks for the investors.

The Smart City SPV is to implement, plan, appraise, approve and release funds, manage, operate, monitor and evaluate the various projects. This is overseen by the State level 'High Powered Steering Committee'. An 'Apex Committee' at the central level would monitor the entire mission. This in a sense created parallel structure of entities disconnected from the democratic realm, with State and ULBs asked to delegate their powers to the respective mission counterparts.

A large aspect of creating an SPV allows operational autonomy and acts as a means to bypass the local elected representatives and the democratic accountability. Fiscal decentralisation not the same as decentralisation as per the 74th CAA; 'withdrawal' of the Central and to an extent the State governments in the financing of the projects does not lead to autonomy for the ULBs functioning. The decision making in the case of the SCM is largely concentrated with parastatal intermediaries like KUIDFC, the 'High Powered Steering Committee' at the State Level, the monitoring and evaluation of the projects also rests with the SPV and not with the ULB.

There is no mention of the role of the Ward Committees or the elected corporator in the SCM document especially when it mentions the city level governance with the Smart City Advisory Forum. According to the document the forum will include the District Collector, MP, MLA, Mayor, CEO of SPV, local youths, technical experts, and at least one member from the area (Ministry of Urban Development, 2015). This further distances and takes away from the existing role and powers of the local representatives. The Ward Committees have started functioning now and it's largely the civil society pressure that has strengthened its position in the City. Though there are several shortcomings in its current functioning, State and Central policies are actively undermining its position and powers as laid out in the 12th Schedule.

Cities are not products but multiple processes that require constant dialogue with its citizens. The Mission document calls for the delegation of the powers and responsibilities that rests with the State/ ULB to the SPV. This erodes the current threads of accountability and limits the interaction of the citizens to a grievance interface. Its parallel mode of working creates disconnects in the larger system undermining the already disempowered local units of governance.

Case 2: Electronics City Industrial Township Authority (ELCITA)

With economic liberalisation in the 90s, Bangalore opened its markets to foreign investment and launched the Karnataka Information Technology (IT) Policy in 1997. Electronic city (e-City) which was set up as a hub for electronics industries in the 70s, underwent a paradigm shift from electronics to IT with the setting up of Software Technology Parks of India (STPI), (an autonomous society under the Ministry of Communication and Information Technology,

Government of India) in 1991 (ELCITA, 2017). Today e-City is known as the 'Silicon Valley of India', employs over 1.5million people and is spread across 903 acres. Entry of IT into the Indian market can be seen as the moving of capital, seeking new avenues and territories as discussed by (Harvey, 2003) outside of saturated capitalist economies, to gain from reinvestment. Spatially, this phenomenon is concentrated in the peripheries of cities not only because of land availability but the presence of non-capitalist strata ((Luxemburg, 1951) as cited in (Idiculla, 2015, p. 5)).

Creating the enclave of exception

At inception, in the 70s, the Government of Karnataka (GoK) along with Karnataka State Electronics Development Corporation Limited (KEONICS) developed e-City as a single land use estate reserved for electronics industries, imagining it as the future of the state. This defined the island of exception spatially and based on land use. After the entry of IT industry, the island was also defined institutionally in 1992 with creation of Electronics City Industries Association (ELCIA) and handed over maintenance in 1997; to cater to 'special needs' of industries within e-City (ELCIA, 2014; ELCITA, 2017). In 2012, BBMP passed a resolution (The Hindu, 2012) to include e-City under its jurisdiction viewing it as a revenue source in terms of tax, magnet to attract investment into the city, attract educated migrants and in turn boost the state economy. But ELCIA opposed this in order to avoid paying higher taxes to BBMP which is an Urban Local Body (ULB) versus the lower tax they were paying to the panchayats which are rural local bodies. Given these considerations by the GoK, ELCIA lobbied for the Industrial Township status (ELCIA, 2014) to secure the state of exception and operate autonomously, which was granted in 2013. e-City was managed by parastatals Karnataka Industrial Area Development Board (KIADB) and Karnataka State Small Industries Development Corporation Limited (KSSIDC) and KEONICS (ELCITA, 2017), violating the 73rd and 74th Constitutional Amendment Act (CAA) and with the Industrial township status, the village panchayats are facing a loss of revenue in addition to loss of power (since taxes are now collected by ELCITA and not the village panchayats), failing the intent of the 73rd and 74th CAA.

Governing council of ELCITA has elected and State Government nominated members (ELCITA, 2017). The system of nomination in every council allows the State to retain control and limit autonomy. The chairperson selected from the five elected members doesn't have any executive powers, while these powers are vested in the Chief Executive Officer (CEO) who is appointed by ELCITA, sometimes under political pressures from the state government (Aworti, 2003), challenging the exercise of autonomy. This reflects the nature of ELCITA as a local body which is not headed by a democratically elected representative but by an autonomous Authority which is under state control to an extent.

Enclave of exception; relationship between the megacity and its parts

"…Bangalore city has 45% leakage whereas 5% leakage with ELCITA distribution…everyday meter reading is noted and problems are resolved immediately… unlike BBMP, property tax collection is 95% this year and was 97% last year and we have a paperless office and all the work is online for transparent functioning…". During the interview, the CEO of ELCITA talks about the efficiency in governance and quality of service delivery within the e-City jurisdiction with a sense of accomplishment. It is the ring-fenced spending of revenues within the e-City jurisdiction that offers ELCITA the opportunity to provide, monitor and maintain services better. This has led to a stark contrast in quality of infrastructure and

service delivery which can be observed during surveys. This resultant disconnect is a function of the status of "exception", bureaucratic reach as well as the delimited technical expertise and financial power. Another outcome is compromised service delivery to other parts of the city owing to disproportionate distribution of resources and regional disparities (Tantri, 2014, p. 13). Examples in this case include limited fleet of air-conditioned buses on other routes in Bangalore as there is an oversupply on the e-City route, congestion enroute since elevated expressway to e-City is tolled etc.

Status of decentralisation in the case of ELCITA

The altered modes of governance lay out the spatial, legal and economic models for the development of enclaves. Institutional design, municipal autonomy, control over land and revenues of ELCITA within the e-City jurisdiction, has dictated the terms of development and undermined the local governments as discussed in this section.

Provisions to bypass the local body and reroute decision-making

Policy provisions to enable the state of "Exception": To attract IT companies to Bangalore and e-City, the GoK presented several subsidies and simplified the process. With the first Karnataka IT Policy released in 1997 (Government of Karnataka, 2011) it offered several tax subsidies (on computer hardware and peripherals, 50% subsidy on stamp duty and registration charges), exemptions (work contract tax, entry tax for five years, sales tax for ten years, electricity tax for captive power generation without limit, sales tax on fuel without limit) and land cost subsidy based on employment generated. Even with the electricity tariff slabs, software companies are considered industrial and not commercial thereby offering a subsidy on this front as well.

The Karnataka IT policy recommends the creation of a single window agency to administer the concessions and incentives which will be headed by the Principle Secretary Department of Commerce and Industries, retaining power at the state government level. The Industrial Policy has proposed raising bonds to raise funds for IT infrastructure and education. But the revenues from these bonds will be under the control of CM's task force, with no representation from the respective local bodies. The State Policy for Special Economic Zones (SEZ) (Government of Karnataka, 2009) recommends the declaration of SEZs as Industrial Townships under the 2002 Amendment to the Karnataka Municipalities Act. Even the choice of locating these large estates on the periphery of the city can be explained as "untrammelled accumulation" of capital to engage with non-capitalist space and strata to gain influence and initiate transformation ((Luxemburg, 1951) as cited in (Idiculla, 2015, p. 5)). GoK has plans of setting up several SEZs, industrial centers and the IT corridor in the future (Government of Karnataka, 2011) and these will occupy large footprints within the city limits or within village jurisdictions. In this context, the current policy provisions retract power from the local bodies on accounts of revenue streams, decision making as well as infrastructural capacity. In these systematic ways, by carving out enclaves from within the jurisdiction of the local bodies, granting clearances at the state government level and allowing a bigger stake for private actors, leaves the third tier of government as ceremonial, failing the intent of the 74th constitutional Amendment.

Planning exemptions and spatial implications: Creation of e-City as a single use land parcel and IT and Industrial Policy provisions were the first steps towards building-up the state of exception easing the regulatory requirements and process for industries. In case of IT and

industrial developments, the ULB is disempowered through certain planning exemptions as discussed below. Any IT development with less than 5kVA power consumption has no locational restriction, and the Karnataka Industrial Policy (Government of Karnataka, 2016) has recommended an amendment to the Karnataka Municipalities Act to give powers to KIADB and KSSIDC to approve building construction plan of industrial units notified as industrial areas/estates/townships. Not only does this violate the master plan provisions prepared by Bangalore Development Authority (BDA) (which is already illegal since BDA is a parastatal) but also takes away the ULB's role of building plan sanction and reroutes it through state level agencies such as KIADB and KSSIDC.

Growth of e-city involved physical expansion and acquisition of a larger land parcel. The state, in favour of a "business-friendly rather than market-friendly" approach ((Rodrik *et al.*, 2004; Kohli, 2006a, 2006b) as cited in (Idiculla, 2015)) acted as an agent to acquire land, and handed it over to private developers, aiding the corporate-led economic growth as well as the ensuing gentrification (Smith, 2002; Sampat, 2010) as cited in (Idiculla, 2015)).

All these provisions, have supported and strengthened the state of exception, providing the IT houses in the ELCITA jurisdiction more than the elbow room they were lobbying for through ELCIA.

Ambiguity, contradictions and violations

Ambiguity in provisions of the Amendment Act and implementation: Another instance that raises questions regarding the process, is monolithic industrial land use in e-City that afforded it the industrial township status. While the zonal regulations permit residential use and the Chapter XVI-A 364 (B) of the Karnataka Municipalities Act (Government of Karnataka, 1964, p. 869)on Industrial Township recommends a resident member in the council of the Industrial Township Authority, ELCITA was sanctioned since it did not involve any residential areas. It is for the same reason, Whitefield, another IT hub in Bangalore has not been granted this status as it is a mixed-use development.

Conversing with the CEO of ELCITA, we gathered that in the manner of consolidation of territory and granting the industrial township status to e-City, residential land use was consciously excluded while demarcating jurisdiction, resulting in a monolithic single-use fabric. This has led to a ripple effect on the housing real estate outside of its boundary which can be seen as "traces of planning" (Bhan, 2012) beyond the jurisdiction. Though these are pockets of reterritorialized power, their impacts are much beyond its jurisdictions, across sectors of infrastructure, real estate, economy etc.

Access to the township is thoroughfare but controlled. What this means is for those that are permitted it is free access, while hawkers and street vendors are restricted. This approach to decentralisation creates sterile spaces that are heavily controlled, and every enterprise measured and regulated resulting in a private enclave accessible only to its members. Unlike a public authority that provide services to all legal citizens, such enclaves operate on customer basis, including only those who pay for services (Baud and Wit, 2008, p. 19). Not only is this approach exclusive, but contradictory to public nature of the authority, constituted through the Karnataka Municipalities Act.

Violating the 73rd and 74th Constitutional Amendment Act (CAA): While the 12th schedule added under the 74th CAA mentions provision of public amenities as a function of the local body, the civic amenities sites are under the control of the development authority which is a

parastatal. In the case of ELCITA, after KIADB acquired the land and before handing over to ELCIA, the civic amenities sites were sold out. This not only deprived e-City the opportunity to develop public amenities but is illegal for the state controlled KIADB which acquired the land, to dispose it off without consulting the panchayat or municipality under whose jurisdiction the land parcel was located.

Planning carried out by BDA, a parastatal is against the 74th Amendment as the 12th Schedule mentions urban planning and planning of land use as the responsibility of the ULB. Land and development being controlled by a parastatal is also a key reason for no progress in implementing the Metropolitan Planning Committee (MPC) also recommended by the CAA.

Contradictions within constitutional provisions: Article 243Q of the Indian Constitution which mandates the constitution of a municipality in every state, makes the exception for areas notified to be an Industrial Township. The contradiction between Article 243Q and the 74th Constitutional Amendment Act (CAA), exempts areas declared as Industrial Townships from creating a municipal body. Utilising this contradiction within the constitution, in 2003, GoK introduced an Amendment to Karnataka Municipalities Act 1964 (Chapter XVI-A, 364(A) to 364(Q)) which includes the provisions to carve out Industrial Townships as autonomous municipal jurisdictions, governed by an Industrial Township Authority. Under the same provision, e-City jurisdiction was declared as an Industrial Township in 2013 and Electronics City Industrial Township Authority (ELCITA) was created.

Disconnects as outcomes

Disconnects as contradictions against the local setting: Large portion of ELCITA's revenue is property tax, Central Industrial Security Force (CISF) Security fee and water charges. This can be compared to the largest expenses on estate maintenance, municipal functions and security services (ELCITA, 2017). This one-to-one reconciliation of income and expenditure which is ring-fenced within the e-City jurisdiction affords high quality infrastructure and service delivery. Unlike a municipality or panchayat which collects tax under different slabs and redistributes it across the jurisdiction. This limits the financial ability to improve quality of infrastructure and service delivery. ELCITA on the other hand, with its niche industry members is able to shift to digital systems, improving tax collection etc. In addition to the resulting contrast in service delivery and infrastructure quality due to the ring-fenced spending, ELCITA's approach to administration accentuates this contrast, causing a physical disconnect as well as a systemic one. ELCITA promotes "transparency" in its functioning through its "paperless office" and "digital" platform (ELCITA, 2017). Considering majority of its adjacent areas are under rural jurisdiction, for these authorities to interact, this technocratic approach makes it inaccessible and exclusive. The state of exception and notion of an island is strengthened through exclusivity in process, deepening the disconnect.

Functional disconnect: ELCITA through its constitutional provision and legal mandate, is immune to local governance and has no obligation to the civil society. The functions of the Industrial Township Authority of "social development" and "safeguarding interest of weaker sections and improvement of slums" (ELCITA, 2017) do not come into the picture since the e-City jurisdiction is only industrial land use. In order to fulfil its municipal responsibility, it operates under "Corporate Social Responsibility (CSR)" initiatives through ELCIA but not through its own funds. CSR activities include initiatives in healthcare, education, capacity building, sewage treatment etc. in the neighbouring villages (ELCIA, 2014, 2015). These are project-based initiatives as good-will gestures of corporates and not in the true spirit of a

public body. This redefines the accountability an ULB holds towards its citizens since there are no individuals involved but institutions as corporate bodies to negotiate with. Increasing urban character within the majority rural surroundings, shift from agriculture to informal economy (such as drivers, housekeeping staff etc.), change in land use, are some of the changes that can be seen during surveys, as an outcome of such an approach. This has led to disconnects within the adjacent areas, where physical changes are not in complete sync with the demographics and governance, rural by jurisdiction while competing on urban terms.

During the same process, consolidation of territory and devolution of power to build competence through mechanisms such as industrial townships, infrastructure corridors, SEZs, smart city programs etc. "… underscores the importance of political leadership, of the state and other organized actors, both local and supra-local" (Kennedy, 2007). In the ELCITA case, since the autonomous municipal jurisdiction was carved out of two villages, the village panchayats lost control over these areas as well as revenue. In this manner, the power held by the panchayats prior to reconfiguration of jurisdiction was then re-routed through an additional Industrial Township Authority whose purview and interests are bound by the limits of the township. As a result, the neighbouring areas within the megacity are subject to spatial and functional disconnects. Can megacities afford these disconnects and imbalances as a cost to the current approach of decentralisation, given their primacy and growing needs?

(Keil, 1998) suggests viewing the globalised state as altered socio-spatial scales rather than as being replaced by market forces and the local state with perforations, negotiating alternatives to the hegemonic globalisation. In the case of e-City, ELCITA, the local authority is itself a product of hegemonic globalisation, the capitalist forces of the IT industry. Within enclaves such as ELCITA, how can we then perceive the local state as a space empowered for resistance and negotiation?

Discussion

Post economic reforms, role of the state is seen as transformed from a provider to a facilitator and enabler, with increased participation of private actors in service provision (Batley, 1996). (Swyngedouw, 2005) refers to the new modes of governance where administration and implementation is increasingcoply handed over to private economic actors as well as parts of the civil society, as "Governance-beyond-the-State". Though this arrangement is intended to empower grassroots and democracy, on the contrary, it has created new institutions, empowering new actors while disempowering others. The two cases of ELCITA and Smart City can be viewed through this lens, where these new institutions have been given municipal and financial powers respectively, disempowering the local government and altering the dynamic of the megacity Bangalore and its parts.

(Idiculla, 2015) argues that the state cannot be seen as withdrawn from its role as a provider, rather be viewed as in an "alliance" with influential private players. The terms of this alliance between the state and the private players are crucial to understand the impact on decentralised governance and extent to which the ULB is undermined or empowered. Looking at this flow of private capital as "neoliberalism as exception" (Ong, 2006), shows how the economic liberalisation has been more business friendly than market friendly ((Rodrik *et al.*, 2004; Kohli, 2006a, 2006b) cited in (Idiculla, 2015)), illustrating the nature of

this alliance and changing dynamic of the local governments. The state and its agencies have worked towards creating a business-conducive climate, through spatial, legal and infrastructure provisions; to attract capital in the form of IT companies, industries, infrastructure projects, state and central programs etc. These shifts and instances demonstrate how the state itself, has structurally and systematically, dismantled and limited the power of local governments.

The current approach to decentralisation shows devolution of responsibilities and liabilities while the power and funds are still held by the State. This demonstrates forms of "delegation" (Baud and Wit, 2008, p. 9) to parastatals such as the Bangalore Development Authority, semi-autonomous agencies such as ELCITA and SPVs such as the Smart City Mission, which are instances of "Governance-beyond-the-State" (Swyngedouw, 2005). Tasks and funds are power (Eaton, 2001) and to unpack why the current approach of decentralisation has not really devolved power, the "movers and blockers" (Baud and Wit, 2008, p. 10) of the process are critical to the conversation about decentralisation. In the competitive dynamic (Kennedy, 2017) state governments seem to be willingly or unwillingly handing-over reigns to private players and capital; through different policy, financial and legal provisions. The state government through these provisions and new governance models is enabling "enclaves of exception", thereby taking on the role of "movers" of the process. On the other hand, these enclaves of empowered private actors, utilise this state of exception and adopt exclusive approaches, leading to disconnects and eventually limiting and in some instances blocking the process of democratic decentralisation.

In the current governance model of Bangalore, engaging with the question raised by (Schuurman, 1997) where decentralisation could be viewed either as a progressive political stance for people's benefit or a mechanism to ease the presence of capitalism; perforations for resistance (Keil, 1998, p. 617) in the local state (urban and rural local bodies in this case) are important. This will allow people to negotiate and resist the forms and boundaries of these enclaves so that democratic process precedes/guides private interests and flow of capital. As a result, we can view the "local state as linked to the nature of uneven social development" ((Duncan and Goodwin, 1987) as cited in (Keil, 1998)) working towards the benefit of people.

Conclusion

On the institutional front, Ward Committees must be empowered to act the basic units of city planning and administration; with the power to handle local politics. Instituting Metropolitan Planning Committee (MPC) as the clearance authority will help position these enclaves as part of the megacity system to develop a comprehensive vision and plan for the megacity and its parts. Parastatals who are currently involved even developing and delivering service, must limit their activity to developing infrastructure by putting to use their technical expertise and further engage in regular monitoring, evaluation and betterment and advising the local governments. This would not only result in compliance with the provisions of the 12th Schedule under the 74th Constitutional Amendment Act (CAA) but afford ULBs the opportunity to coordinate the city systems considering the growing and changing needs of a megacity.

The 73rd and 74th CAA proposed institutional frameworks such as Ward Committees (WC), Gram Sabhas (GS), District Planning Committee (DPC) and Metropolitan Planning Committee (MPC) along with setting up of Finance Commissions, to ensure integrated-contextual planning and accounting for financial requirements of the municipalities and panchayats. These provisions primarily seek to empower democratically elected local institutions who represent the people and the current approach has resulted in several disconnects. To fulfil the intent of democratic decentralisation and address the disconnects, instituting democratic process for people's engagement, is equally crucial. This requires "enabling conditions" where participation becomes "a means to hold the state accountable through new forms of governance that involve a more direct state-civil society relation" (Cornwall and Gaventa, 2001). While the disconnects as discussed earlier, are detrimental to this process, participation is pivotal in bringing power back into the democratic realm. This will facilitate shifting people's agency from being "users and choosers of services to makers and shapers of policy" (Cornwall and Gaventa, 2001). People can then enter the realm of "public service decision making" through active involvement but this also brings to the fore tension between "disputed identities of consumer, citizen"((Barnes, 1999) as cited in (Cornwall and Gaventa, 2001)). (Barnes, 1999) highlights the possibility of participation itself reinforcing exclusion and co-option by the powerful. In this scenario, it becomes important to discuss the "infrastructure of participation" as articulated by (Shah, 2013) to be able to leverage participation as integral to democratic process. Referring to participation as an opaque word which can be misunderstood as the same and every context, he urges us to understand the forms and mechanisms people have used to mobilise and negotiate power constellations. This also includes recognising and acknowledging the ownership, passages and regulators of access by ways of which participation is legitimised. Therefore, "infrastructure of participation" in addition to empowering local institutions is important to negotiate the shift from "consumers" to active "user involvement" (Barnes, 1999) and bring decision-making back into the public realm thereby paving the way for democratic decentralised governance.

References

Agamben, G. (2005) *State of Exception*. University of Chicago Press.

Aworti, N. (2003) *Getting fundamentals wrong : governance of multiple modalities of basic services delivery in three Ghanaian cities*.

Baindur, V. and Kamath, L. (2009) *Reengineering Urban Infrastructure: How the World Bank and Asian Development Bank Shape Urban infrastructure Finance and Governance in India Note about the authors*. Available at: www.bicusa.org.

Barnes, M. (1999) 'Users as citizens: Collective action and the local governance of welfare', *Social Policy and Administration*, 33(1), pp. 73–90.

Batley, R. (1996) 'Public-private relationships and performance in service provision', *Urban Studies*, 33(4–5), pp. 723–751. doi: 10.1080/00420989650011807.

Baud, I. S. A. and Wit, J. W. de (Joop W. (2008) *New forms of urban governance in India : shifts, models, networks and contestations*. SAGE Publications.

Benjamin, S. (2010) 'Manufacturing Neoliberalism : Lifestyling Indian Urbanity', in Banerjee-Guha, S. (ed.) *Accumulation by Dispossession-Transformative Cities in the New Global Order*. SAGE

Publications India Pvt Ltd, pp. 92–124. doi: 10.4135/9788132105923.n6.

Bhan, G. (2012) *In the Public's Interest: Evictions, Citizenship and Inequality in Contemporary Delhi*. University of California, Berkeley.

Brenner, N. (2013) 'Theses on Urbanization', *Public Culture*. Duke University Press, 25(1), pp. 85–114. doi: 10.1215/08992363-1890477.

Cornwall, A. and Gaventa, J. (2001) *From users and choosers to makers and shapers: repositioning participation in social policy*. No. 127. Brighton.

Duncan, S. and Goodwin, M. (1987) *The local state and uneven development : Behind the local government crisis*. New York: St. Martin's Press.

Eaton, K. (2001) 'Political obstacles to decentralization: Evidence from Argentina and the Philippines', *Development and Change*, 32(1), pp. 101–127. doi: 10.1111/1467-7660.00198.

ELCIA (2014) *Annual Report 2013-2014*. Bangalore.

ELCIA (2015) *Annual Report 2014-2015*. Bangalore.

ELCITA (2017) *The Making of Electronics City Industrial Township*. Bangalore.

Flyvbjerg, B. (2005) 'Machiavellian Megaprojects', *Antipode*, 37(1), pp. 18–22.

Goldman, M. (2011a) 'Speculating on the Next World City', in Roy, A. and Ong, A. (eds) *Worlding Cities: Asian Experiments and the Art of Being Global*. 1st edn. Blackwell Publishing, pp. 229–258.

Goldman, M. (2011b) 'Speculative Urbanism and the Making of the Next World City', *International Journal of Urban and Regional Research*, 35(3), pp. 555–581.

Government of Karnataka (1964) *The Karnataka Municipalities Act*.

Government of Karnataka (2009) *State Policy for Special Economic Zones*.

Government of Karnataka (2011) *Information and Communications Technology Policy*. Available at: https://www.investkarnataka.co.in/policies.

Government of Karnataka (2016) *Karnataka Industrial Policy (With Amendments) 2014-2019*.

Graham, S. and Marvin, S. (2001) *Splintering Urbanism*. Routledge.

Harvey, D. (1996) 'Cities or urbanization?', *City*, 1(1–2), pp. 38–61. doi: 10.1080/13604819608900022.

Harvey, D. (2000) 'MEGACITIES LECTURE 4: Possible Urban Worlds'. Amersfoort: Twynstra Gudde Management Consultants, p. 124. Available at: https://www.kas.de/c/document_library/get_file?uuid=1463ff93-1eab-8877-edfc-ccef8540c262&groupId=252038.

Harvey, D. (2003) *The New Imperialism*. Oxford: Oxford University Press.

Idiculla, M. (2015) 'Crafting City Spaces : New Spatial-Legal Regimes in India', in *RC21 International Conference on "The Ideal City: between myth and reality"*. Urbino, Italy.

Keil, R. (1998) 'Globalization makes states : perspectives of local governance in the age of the world city', *Review of International Political Economy*, 5(4), pp. 616–646.

Kennedy, L. (2007) 'Regional industrial policies driving peri-urban dynamics in Hyderabad , India', 24(2), pp. 95–109.

Kennedy, L. (2017) 'State restructuring and emerging patterns of subnational policy-making and governance in China and India', *Environment and Planning C: Politics and Space*, 35(1), pp. 6–24.

Kohli, A. (2006a) 'Politics of Economic Growth in India, 1980-2005, Part I: The 1980s', *Economic and Political Weekly Political Weekly*, 41(13), pp. 1251–1259.

Kohli, A. (2006b) 'Politics of Economic Growth in India, 1980-2005, Part II: The 1990s and Beyond', *Economic and Political Weekly*, 41(14), pp. 1361–1370.

Luxemburg, R. (1951) *The Accumulation of Capital*. London: Routledge & Kegan Paul.

McKinsey Global Institute (2001) *India: The Growth Imperative*.

McKinsey Global Institute (2010) *India's urban awakening: Building inclusive cities, sustaining economic growth*.

Ministry of Urban Development (2015) *Smart City Mission Statement & Guidelines*. Available at: http://smartcities.gov.in/upload/uploadfiles/files/SmartCityGuidelines(1).pdf.

Ministry of Urban Development (2016) *The Smart City Proposal*.

Ong, A. (2006) *Neoliberalism as exception : mutations in citizenship and sovereignty*. Duke University Press.

Ong, A. (2011) 'Introduction: Worlding Cities, or the Art of being Global', in Roy, A. and Ong, A. (eds) *Worlding Cities: Asian Experiments and the Art of being Global*. 1st edn. Blackwell Publishing, pp. 1–26.

Rodrik, D. *et al.* (2004) *From Hindu Growth to Productivity Surge: The Mystery of the Indian Growth Transition; Dani Rodrik and Arvind Subramanian; IMF Working Paper 04/77; May 1, 2004*.

Sampat, P. (2010) 'Special Economic Zones in India: Reconfiguring Displacement in a Neoliberal Order?', *City & Society*, 22(2), pp. 166–182. doi: 10.1111/j.1548-744X.2010.01037.x.

Schmitt, C. (1985) *Political theology : Four chapters on the concept of sovereignty*. University of Chicago Press.

Schuurman, F. J. (1997) 'The Decentralisation Discourse : Post-Fordist Paradigm or Neo-liberal Cul-de-Sac ?', in Kay, C. (ed.) *Globalisation, Competitiveness an Human Security*. London: Frank Cass, pp. 150–167.

Shah, N. (2013) 'Do we overestimate the potential of the Internet for participation and democracy?' Available at: https://www.youtube.com/watch?v=YD8BV84y30E.

Smith, N. (2002) 'New Globalism, New Urbanism: Gentrification as Global Urban Strategy', *Antipode*. John Wiley & Sons, Ltd (10.1111), 34(3), pp. 427–450. doi: 10.1111/1467-8330.00249.

Swyngedouw, E. (2005) 'Governance innovation and the citizen: The Janus face of governance-beyond-the-state', *Urban Studies*, 42(11), pp. 1991–2006. doi: 10.1080/00420980500279869.

Tantri, M. L. (2014) *Promises and Paradoxes of SEZs Expansion in India*. 331. Bangalore.

The Hindu (2012) 'ELCIA to resist move to bring Electronics City under BBMP'. Available at: https://www.thehindu.com/news/cities/bangalore/elcia-to-resist-move-to-bring-electronics-city-under-bbmp/article3713830.ece.

United Nations (2018) *The World's Cities in 2018*. doi: 10.18356/c93f4dc6-en.

Watson, V. (2014) 'African urban fantasies: Dreams or nightmares?', *Environment and Urbanization*. SAGE Publications Ltd, 26(1), pp. 215–231.

Case Study Paper

The Role of Local Leadership in Fragmented Urban Development : Case of Higher Education Town Jatinangor, West Java

Teti Armiati Argo,Bandung Institute of Technology (ITB), Indonesia

Ery Supriyadi Rustidja, Indonesia Institute of Cooperative (IKOPIN); Indonesia

Abstract

The Higher Education Town (HET) of Jatinangor is a campus area, a park of cultural technology science, and an urban center for economic activities. As part of Bandung Metropolitan Area, Jatinangor challenge on social-economic change, deterioration environtment, infrastructure supply, and economic activities. Inevitably, HET Jatinangor faces uncontrolled urban space structures, so that it increasingly increases urban problems, including urban sprawl, scatter housing-apartment buildings and flooding. These problems affect the regional levels and urban fringe area. The basic question is how local leadership plays a strategic role in urban and economic change. of HET. Using the participative action research method, the study found that the local leadership role in implementation development plans of HET and role for anticipating urban spatial plans. The study found that local leadership must have strong networks among institutions, such as local government agencies, academics, and local communities. Implication of the study learned that the performance of the HET depends on leadership behaviour and capability of local leaders in urban planning at the HET level and metropolitan area.

Keywords

leadership, local, urban, universiy-town, metropolitan

1. Introduction

Jatinangor is one of part of Bandung Metropolitan Area. Bandung as central urban area influence development of Jatinangor. It has high productivity, high, yield, and prospective investment now and future. Bandung have good economic scale and scoup of city that develop Jatinangor as part of region of satelite of Bandung metropolitan area.

The other side, there are universities, private company, local corporation, public agency, and local community involve in regional dynamic or local development sphere of Jatinangor. Universities are Local Affair State Government Insitute, University of Padjadjaran, Bandung Institute of Technology, Indonesia Institute of Cooperative. At any rate, Jatinangor have industrial area that exist as national strategic area, province strategic area, and also local strategic area.

As an urban fringe area from Bandung, Jatinangor faced social, economy, and environment change It has been challenge of urban dynamics Jatinangor**.** Jatinangor have long journey development of regional development. In Fact, pattern of development Jatinangor have change of driving force urban area development and also urban management agenda. There are shifting pattern development from government driving force to universities driven, corporate driven, government driven, and community development driven. Involvement of government have changed as soon as possible of planning sphere, such as top-down iinterventionists, relocation of higher educational area, deconcentric of planning. The other side existed a few sphere planning in Jatinangor such as collaborative planning, activist planning, communicative action, and bottom-up planning.

In a fact, Jatinangor have highly and fast urban development processes, such as Regional development improved access, public service, and growth, campus academic activities, infrastructure supply, technology park and cultural science, economic growth, the challenges of spatial environmental, uncontrolled apartment buildings , and widespread flooding at the regional level. There are main issues of Jatinangor development, such as congestion, traffic jump, uncontrolled spatial plan, social inequality, rregional environmental degradation (Puddles, Floods, waste management, greenbelt area), border line problems (road, river), urban sprawl, and community economic development. It is too much local issue in Jatinangor must be solved, even as development of Jatinangor capacity of local leader try to build partnership scheme between stakeholders', to develop a scientific culture, to empower local people, and to accelerate technology transfer.

Performance of Higher Education Town (HET) or university town be challenge for leadership overcome a lack of continuity empowerment, economy inequality, lack of Infrastructure, competitive talent, and better doing-living in Jatinangor. The question is how local government plays a strategic role in spatial plan, develop plans, and create program activity for Higher Education Town. The other question, is leadership situation played a strong role in improving the performance of the HET area ?

2. Focus Study and Methodology

This study be worked by concurrent embedded research methods use participation observation, direct interaction, and qualitative-quantitative data combining. The focus study emphasizes how local leaders can face fragmented urban development and how far local leader can do it.

To answer this question, the researchers observed direct participation in community empowerment activities and Jatinangor urban development on the behaviour of local leaders during the activity. In-depth observation of the object of study continued with triangulation, so that confirmation and explanation of the behaviour of local leaders in the face of fragmented urban development that occurred at HET Jatinangor was obtained. The result of triangulation process be derived on local leadership pattern, local leadership spectrum, local leadership on quadruple helix interaction, and local leadership situational in HET of Jatinangor.

A few literature study that relevan include

- Leadership style as a behavior pattern a leader to influence his employees in achieving organizational goals (Dubrin ,2006)

- Leadership style is the way in which a person leaders provide direction and motivate others to optimize performance (Josste , 2009)

- Leadership style can be said as a repetitive pattern of behavior shown by a leader (Khoza, Chetty, & Karodia, 2016).

- Situational leadership style must be able to mediate and recognize certain situations and then identify leadership styles that are suitable for the situation (Aslam et al, 2015).

- Civic leadership is generally enacted by individuals operating in small organizations, in most of the cases built around informal social relationships and common values (e.g., Putnam, 1993).

Determinant factors of effective regional leadership influence trait and behaviour are empowerment leader, accountability, competence, commitment, capacity, futuristic view policy, network, and diversion. Even better, leader as a process and behaviour has characteristics that are individualistic influences a group of individuals to achieve a common goal, and shared activities to carry out by a group or network. Leaderships as a process of motivating people to work together collaboratively to accomplish great things. Leaderships behaviour focuses on what leaders do most of the time and focus on the context of behaviour or how that might cause shift in behaviour

Leadership behaviour explain about reciprocal leadership. It describe reversible of characteristic leadership such as promoting, listening, accounting of multiple, setting of strategy, fostering linkages, individualistic view, creating opportunity, promoting innovation, harness knowledge, and reputation**.**

3. Fact Finding

The study found local government based on leadership periode in HET of Jatinangor be shown in Figure 1.

The study found local government based on leadership periode in HET of Jatinangor be shown in Figure 1

LOCAL GOVERNMENT	LEADERSHIP PERIOD								
	1	2	3	4	5	6	7		9
REGENT	1977-1983	1983-1993	1993-1998	1998-2003	2003-2013	2013	2011-2016		2016 2017 2018
HEAD OF DISTRICT	1978-1980	1980-1984	1984-1992	1992-1995	1995-1997	1997-1999	1999-2002	2002-2005	2005-2007	2007-2009	2009-2012	2012-2013	2013	2014-2015	2015-2016	2016-2018
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Figure 1. Local government and leadership period

Local government leader activity on urban development in Jatinangor include

- Activating on Spatial and Development Plan of HET

- Catalyzing, facilitating, mediating, initiating programs

- Facilitating Interacton for stakeholders

- Assist the legitimacy of local forums

- Bridging the communication process of academic activities and local community services through collective action.

- Provide of the technical and financial assistance

- Legitimize of urban policies

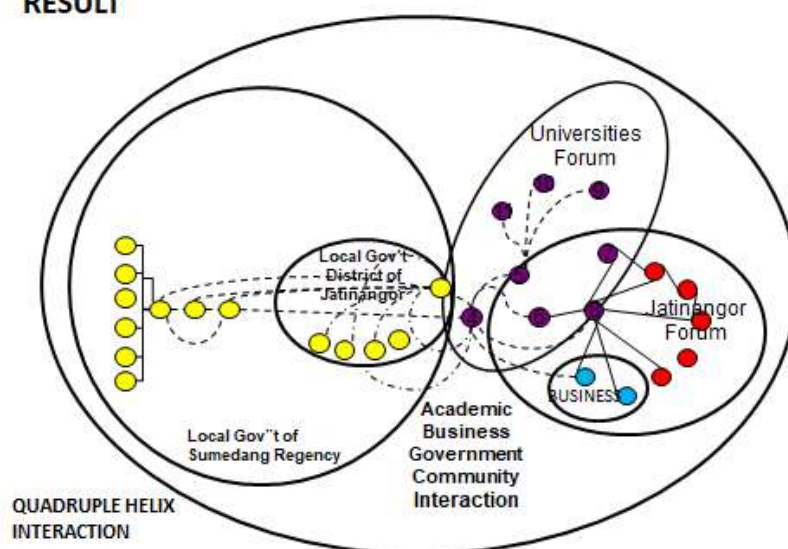Local leader in the quadruple interaction in HET of Jatinangor be shown in Figure 2

Figure 2. Quadruple interaction in HET of Jatinangor

Local leadership pattern in HET of Jatinangor be shown in this Table 1, Table 2 and Table 3

Table 1. Role of Local Leadership

Leadership Pattern

Leadership Pattern	MANAGERIAL	POLITICAL	CIVIC
	Local Goverment	Local Goverment	Local Goverment
Role of Local Leadership	• important intermediaries between managing the functional policy and service delivery responsibilities • Role with respect to central government and local/regional agencies	• Maintaining a critical mass of political support. • Developing strategic policy direction. • Seeking to further leadership priorities outside the authority. • Ensuring task accomplishment. • To combine accountability and legitimacy the capacity to identify and focus on clear priorities for action engaging with other stakeholders in a locality in order to advance strategic decision-making.	• Non-profit organizations and community groups in seeking to transform their local/regional habitus • Appear to be disparate interests into an institutional framework

Adopted from Leslie Budd & Alessandro Sancino (2016)

Table 2. Leader, Structure, Process, and Fellowship of Local Leadership

Leadership Spectrum	MANAGERIAL	POLITICAL	CIVIC
	Local Goverment	Local Leader	Local Community
Leader	Ostensibly the political leader , chief executives	Elected	Individual leadership
Structure	Municipality as a generalist institution	The power concentrated in the hands of the new directly elected	Local and value-based civic organizations
Process	Outsourcing and co-production	Local issue-based shifting to city-regional administrative and territorial entities	Depend heavily on public sector funds
Fellowship	Mainly formal institutional	Electoral participation	Volunteerism, social contact, proximity and govemance reputation

Table 3. Performance of Leadership spectrum in HET Jatinangor

Leadership Spectrum	MANAGERIAL		POLITICAL		CIVIC	
	Local leader	District leader	Local leader	District leader	Local leader	District leader
Leader	++++	+	++++	+	+	++++
Structure	++++	+	++	+	+	+++++
Process	++++	+++	+	+++++	+++	+++++
Fellowship	++++	++++	++	+++++	++	+++++

Conclusion and Implication

The study found that component of leadership situational in HET of Jatinangor include ability to handle urban issues, level of leadership, consistency and commitment, level of representative, foresight, and capacity. A good leadership situation is able to build a strong network between local government agencies, with academics, businesses, and communities to streamline development of HET that benefits multi-stakeholders, such as

- Network between actors in HET will determine effectivity of performance of quadruple helix.

- It is critical to selected capable local leaders in HET for directing leadership situation and at the same time improving performance of HET of Jatinangor according to spatial plan and development plan of HET Jatinangor.

- The common trend towards strengthening the executive side of political leadership rather than the representative one.

- The growing forms of civic leadership as a trigger for creating public and social value and enhancing the resilience of HET

- The concurrent embedded strategy research methods have advantage of being able to analyze factors affecting the performance of HET region and observing leadership behaviors simultaneously.

4. References

DuBrin, A.J., (2016). Leadership: Research findings, practice, and skills, 8th edn., Cengage Learning, Boston, MA.

Karodia, A. M., Chetty, N, & Khoza, N. (2016). Impact of Leadership Style on Employee Performance in the Forensic Science Laboratory of the South African. Journal of Business and Management Review, 6 (1), 50–77.

Kreitner R, & Kinicki, A. (2001). Organizational Behavior,Fith Edition,International Edition, Mc Graw-Hill companies. Inc

Bass M. (1990): From transactional to transformation leadership: learning to share the vision. Journal, Organizational dynamic 18, 3, 19.

Putnam, Robert D. (1993). Making democracy work. Civic traditions in modern Italy. Princeton: Princeton University Press

Ery Supriyadi R. (2012). Local Economic Development And Triple Helix: Lesson Learned From Role of Universities In Higher Education Town of Jatinangor, West Java, Indonesia. December 2012. Procedia - Social and Behavioral Sciences 52:299–306

Our sponsors

Platinum Sponsor

ISOCARP Institute

Doppelmayr

Signify

Silver Sponsor

Ethos Urban

Cistri

Local Co-Hosts

Ministry of National Development Planning/ National Development Planning Agency, Indonesia

Ministry of Agrarian and Spatial Planning, Indonesia

Ministry of Public Works and Public Housing, Indonesia

Government of Jakarta Special Capital Region, Indonesia

Government of West Java Province, Indonesia

Government of Bogor City, Indonesia

Local Sponsors

Ministry of Tourism, Indonesia

PT Waskita Beton Precast

PT Wika Realty

HAS Consulting Group

Nusantara Urban Advisory

PT. Eskapindo Matra Consulting Engineering

PT Blantickindo Aneka

PT Aria Ripta Sarana Consultant

AECOM

Realestat Indonesia

PDW Architects

Endorsing International Partners

Town and County
Planners Association
of Kenya

Fundacion
Metropoli

European Council
of Spatial
Planners

World Urban
Campaign

IHS
Erasmus University
Rotterdam

International
Federation of
Landscape Architects

International Urban
Development
Association

European Umbrella
Organisation
for Geographic
Information

International
Federation for
Housing and
Planning

The South African
Council for Planners

Urban Planning
Society of China

Cities Alliance

UN-Habitat