Recap of the 56th ISOCARP World Planning Congress

56th ISOCARP World Planning Congress
‘Post-Oil City: Planning for Urban Green Deals’
Virtual Congress
08 November 2020 - 04 February 2021

Editors: Piotr Lorens and Hangwelani Hope Magidimisha

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The ISOCARP 2020 Congress marked its fourth and final stage on 2-4 February 2021. After four months of over 40 Congress sessions, 165 paper and case study presentations, and over 290 registrations, ISOCARP officially closed its first fully virtual and longest World Planning Congress. Together with UN-Habitat and Urban Economy Forum (UEF), ISOCARP hosted a Place-leaders Roundtable during the Closing Plenary, with city leaders from the Global North and the Global South sharing their perspectives and experiences on planning for an Urban Green Deal.

As in previous ISOCARP congresses, the closing ceremony provided a peek into the sessions through the lens of the Congress Team members, led by General Rapporteur Piotr Lorens and Co-rapporteur Hangwelani Hope Magidimisha. The team summarised and reflected on the key takeaways of their respective tracks compiled through a 20-minute pre-recorded video. Equally important is the presentation of the Declaration of the 56th World Planning Congress. The Congress Declaration is a product of the collective efforts of the Scientific Committee, spearheaded by Dushko Bogunovich, the Congress Team, the co-hosting organisations, and all the delegates of the Congress.

While 2020 was marred by deep and all-encompassing uncertainty brought about by the pandemic, ISOCARP sees the delivery of its fully virtual Congress as an opportunity to expand its reach, explore uncharted frontiers, and continue exchanging knowledge about ‘Planning for better cities’ in times like no other.

As ISOCARP Secretary General Frank D’hondt aptly put it, we could either adapt for the worse: “we could not dance in Doha’s new downtown as ‘planned’”; or change for the better by “reinventing the congregation of the planning community through, for example, engaging in virtual placemaking, and dancing on the Virtual Congress square of Gather.Town.” On a parallel note, and in relation to the theme of the Congress, changing for the better means seeing the opportunities created by the present global crisis for post-carbon cities and urban green deals.

We could go on and on about this experience but, ultimately, there is one clear message: the 4-month fully Virtual Congress would not have been possible without the hard work of the core team as well as the contribution and participation of all the participants involved.

We hope to finally meet everyone again in-person and dance in the streets of Downtown Mshreib at our next Congress in Doha, Qatar, 9-12 November this year.
Working with our co-hosts

A Note from Urban Economy Forum

As the efforts to accomplish the ambitious Sustainable Development Goals and SDG 11 are underway, the 56th ISOCARP Virtual World Planning Congress (WPC) provided the recognition that they are indeed actualized by cities, planners, communities and those working on the ground. In this regard Urban Economy Forum’s (UEF), in collaboration with ISOCARP and UN-Habitat, has set an example of the role of partnerships as a critical tool for the success of global development initiatives by harnessing the comparative strengths and advantages of the partners.

For UEF, co-hosting ISOCARP’s 56th WPC was important to its goal to continue to better understand the principles of urban economy and sustainable resources and how to mobilise urban capacities for shared and inclusive urban prosperity. This collaboration demonstrates the positive impact working alongside global organisations with a shared vision has to generate synergistic outcomes.

The COVID-19 pandemic forced the 56th WPC to reimagine the way the conference was delivered as the Congress quickly adapted to a virtual platform. Creating an interactive platform for participants was an important component that led to the success of the congress. The Congress’ Gather Town platform was an innovative approach to try and connect the Congress’ virtual nature to seem more physical.

The issues for Future Post-Oil Cities opened the opportunity to explore different aspects and emerging issues in the context of COVID 19 pandemic combined with arising urgency of green urban development.

The common thread that connected the different tracks highlighted the need for people-oriented approach and the need for accountability to the community while focusing on fundamental changes in urban design, infrastructure development, social and environmental sustainability, and democratic governance.

It was clear throughout the 56th WPC that building connections not only among urban planners globally but also this partnership and continues to look for additional opportunities to work alongside ISOCARP and UN-Habitat to advance our shared agenda and enrich each other’s dialogues toward promoting sustainable urbanism globally.

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It was clear throughout the 56th WPC that building connections not only among urban planners globally but also
connections between urban planners and other urban stakeholders was crucial for integrated approaches to urban development. A topic during the congress was the concept of 'Barefoot Planners'. This group lacks formal education but have a deep understanding of the local community and their needs. For Urban Economy Forum, this is such an important concept that promotes greater public participation through alternative channels.

The themes chosen were timely and when cities around the world, from the Global South and North, are facing pandemic, climate, and poverty related challenges. It became clear at the congress that the issues that we now face are different and previously not clearly foreseen.

The experts and speakers were knowledgeable, well prepared, and effective in their presentations. It was a delight to hear from so many experts in current and emerging subjects and be able to connect these with practical examples as well.

The presentations under the tracks dealing with existing economic models, evaluation of current policies, data driven planning, spatial open data, use of technology to build resilience, heritage, and smart culture, age and ethnicity sensitive data and technology as well as women led city initiatives were very substantive.

The special session on urban regeneration forum jointly organised by the three partner organisations presented living examples of urban regeneration projects and identified common challenges and opportunities of urban regeneration projects and the ways that other cities can learn from.

Examples of building successful Public-Private-People Partnerships (PPPP) models for regeneration areas, integrating urban regeneration and sustainable urban development goals as a response to the impact of growing urbanisation and sprawling cities were presented at the session.

It was a great opportunity at this session for UEF to introduce the Regent Park World Urban Pavilion as a global hub for knowledge and innovation for sustainable urbanism.

The ISOCARP Declaration is a good document that clearly outlines a shared vision for a world freed from oil with a comprehensive plan for urbanism that leaves no one behind. We must all deliver this message to those that make decisions and raise this alternative force through consensus, such as we accomplished at the congress.

UEF values highly the spirit of inclusiveness, cooperation and effective, solution-oriented approach of the members of the secretariat who seamlessly managed the congress held over four months, that too virtually!

The congress achieved the goal of creating a momentum towards a transformative journey, to shift cities and countries from unsustainable production and consumption patterns and lifestyles.

UEF greatly appreciates ISOCARP for the opportunity to co-host the 56th WPC and looks forward to continuing its collaboration with ISOCARP to explore mutual areas of interest toward sustainable urban prosperity.
Virtual Global Congress

During almost four months, the 56th ISOCARP Congress successfully brought together different experts in a high-quality dialogue on Urban Green Deals. International organisations, city representatives, civil society, and academia from various countries discussed ongoing trends and forefront approaches and tools to address cities' challenges and opportunities towards more sustainable and resilient urban futures.

Despite the unexpected operational challenges to host the event during a global pandemic, ISOCARP proactively adapted the Congress format. The ever first virtual ISOCARP World Planning Congress took the advantage of connecting world-wide expertise and experiences through a diverse and large set of emerging topics. Through a holistic approach, the congress addressed the post-oil city as a complex interlinked system of social, physical, economic, and environmental interactions.

As major co-host, UN-Habitat actively engaged in the global congress and contributed in setting common approaches, exchanging knowledge, and strengthening connections with a multi-faceted group of professionals on its main field of work, from academia to private and public representatives. The Congress included the participation of Ms. Maimunah Mohd Sharif, Executive Director of UN-Habitat, Rafael Tuts, Director of Global Solution Division, Christine Knudsen, Director of External Relations Strategic Planning, Knowledge and Innovation, Shipra Suri, Chief of Urban Practices Branch, Laura Petrella, Chief of the Planning, Finance and Economy Section and different urban planning and development experts of the agency such as Klas Groth, Salvatore Fundaro, Jose Chong, Cecilia Andersson, and Herman Pienaar, among others.

The Congress main theme on Urban Green Deals served as a fertile ground to discuss, elaborate, and exchange multi-scale knowledge to address key challenges that cities are facing nowadays and that are exacerbated by the COVID-19 pandemic. A multifaceted dialogue was held on how climate emergency impacts on health and economy, and exacerbates inequalities, while highlighting a path of recovery coupling with environmental quality and sustainability as essential factors for ensuring people well-being in the longer term.

The Congress added particular value in acknowledging the importance of the role of the planning profession, and the importance of planners to speak up in public debate. Through planning at different scales, working across multiple...
sectors and disciplines, they play a key role in supporting new green deals, leverage local economic assets, optimize urban efficiency, and bring infrastructure where they are most needed, addressing complex demands.

**Key take-aways**

Among the diverse set of topics addressed in the different thematic sessions, key aspects were highlighted as main drivers for urban prosperity in a post-oil city.

From several examples presented, it was demonstrated that the provision of a safe, accessible, and attractive public realm is both central and critical to successfully regenerate and revitalize urban areas. Experiences gained highlighted the potential of urban regeneration to improve and up-lift deprived and underdeveloped areas into vibrant and more resilient neighbourhoods, using public spaces as a catalyst and connector asset.

Likewise, human and environmental health have become core aspects of urban planning, to align and transform our built and natural environments to enable the full potential of cities and territories to deliver healthier and resilient environments. Tools and examples were presented, including the sourcebook jointly developed by WHO and UN-Habitat "Integrating Health in Urban and Territorial Planning", and a training on integrating urban health as an input to urban planning and design.

Key principles for sustainable urbanisation that UN-Habitat has been advocating for in the last years, were endorsed in the vision of a more sustainable post-oil city. Discussions were held on the "International Guidelines on Urban and Territorial Planning", and projects addressing aspects of adequate urban density, mixed land-use and proximity to services, connected and efficient street networks, adequately located housing, sufficient public spaces and connected green infrastructure, among others.

UN-Habitat case studies on the application of these principles were presented, such as the Saudi Cities Programme, comprising a total of 17 major Saudi cities, and the Child-Friendly Public Spaces in Sharjah, focused on multi-level participatory public space upgrading. Furthermore, UN-Habitat presented their studies on spatial patterns and dynamics in the face of the pandemic, focusing on urban functionality, density and design of human settlements covering the future state of cities in a world with pandemics.

Innovative technologies, data, and digital platforms were also acknowledged as drivers for enhanced public participation, improved energy efficiency, and increased coordination and integration of urban management.

Finally, the Sustainable Development Goals were also part of the discussion. UN-Habitat’s "SDG Project Assessment Tool" was presented as a mechanism to localize the SDG’s, but also to improve urban projects’ quality and inclusive approach towards the implementation of the SDGs. The World Urban Pavilion initiative was also presented, in support of sharing innovative ideas and approaches to sustainable urban development and urban regeneration projects.

**Conclusions**

2021 marks the beginning of the last decade of the 2030 Agenda, in a moment where social inequalities and climate change effects become intensified, impacting socioeconomic stability and human well-being. A moment when urgent and collaborative action is needed to embrace new urban deals to foster prosperity and equal opportunities.

The Congress unfolded the importance to integrate efforts in different dimensions and scales. Firstly, short-term and long-term strategies should be aligned to the 2030 Agenda for the SDGs, Paris Climate Agreement, NUA, the Sendai Framework for Disaster Risk Reduction and other agendas. Secondly,
vertical and horizontal collaboration between different sectors and levels of governments is key to achieving a transformative impact. National and regional planning instruments should guide these strategies in a common direction through an integrative development framework. Cities and local governments are in the forefront of transferring over-arching strategies into action, including that community-based actions and local strategies are integrated to the planning to promote demand-driven solutions and effective change.

After enlightened discussions on solutions to recovery from environmental, economic, and pandemic-related crises, and to make the transition to post-oil cities, participants came to a common understanding that to build back better requires not only professional’s expertise and government’s actions, but engagement from citizens, community leaders, private sector, NGO’s, academia, and partnership for the goals. Key considerations for this transition revolve around evidence-based and participatory policies and the use of innovative tools for data gathering and design, rethinking urban morphology for more compact and environmental-friendly development, and strengthening the role of quality public space for achieving prosperous and sustainable cities.

Now it is time to translate these ideas into action, to address the long-term determinants of environment, social inclusion, and health, and to consider these Urban Green Deals into planning of cities for better urban quality and equality. This is a call for cities, governments, and the international community at large to deliberately facilitate this engagement and adopt sustainable urban and territorial planning as key tool for shaping Urban Green Deals and achieving shared prosperity and effective recovery.
# Congress Programme

**NOVEMBER**

**8 November 2020**

11:00 - 12:30
OPENING PLENARY AND KEYNOTE PRESENTATIONS

**9 November 2020**

13:30 - 15:00
REVIEW 16 AND AWARDS KEYNOTE PRESENTATIONS

**10 November 2020**

12:00 - 13:30
PARALLEL SESSIONS:
1. TRACK 6
2. TRACK 3
3. TRACK 4
14:00 - 16:00
AGM

**DECEMBER**

**9 December 2020**

12:45 - 13:15
KEYNOTE PRESENTATION

13:30 - 15:00
PARALLEL SESSIONS:
1. URBAN REGENERATION FORUM
2. ISOCARP INSTITUTE
3. TRACK 6

16:00 - 17:30
PARALLEL SESSIONS:
1. TRACK 1
2. TRACK 2
3. COVID-19

**10 December 2020**

12:45 - 13:15
KEYNOTE PRESENTATION

13:30 - 15:00
PARALLEL SESSIONS:
1. URBAN POLICY FORUM
2. TRACK 3
3. AWARD SESSION

16:00 - 17:30
PARALLEL SESSIONS:
1. TRACK 1
2. TRACK 2
3. TRACK 6

**11 December 2020**

11:00 - 19:00
VIRTUAL MEETING PLACE NETWORKING AND PUBLICATION LAUNCHING

**JANUARY**

**12 January 2021**

12:45 - 13:15
KEYNOTE PRESENTATION

13:30 - 15:00
PARALLEL SESSIONS:
1. TRACK 6
2. TRACK 7
3. TRACK 9

16:00 - 17:30
PARALLEL SESSIONS:
1. EDUCATION FORUM
2. CLIMATE ACTION FORUM

**13 January 2021**

12:45 - 13:15
KEYNOTE PRESENTATION

13:30 - 15:00
PARALLEL SESSIONS:
1. TRACK 5
2. TRACK 7
3. TRACK 9

16:00 - 17:30
PARALLEL SESSIONS:
1. URBAN HEALTH FORUM
2. INCLUSIVE PLACEMAKING FORUM
3. TRACK 4

**FEBRUARY**

**2 February 2021**

13:00 - 15:00
ISOCARP WORLD CAFE

15:30 - 16:30
SGM

**3 February 2021**

12:45 - 13:15
KEYNOTE PRESENTATION

13:30 - 15:00
PARALLEL SESSIONS:
1. TRACK 7
2. SPECIAL TRACK
3. TRACK 8

16:00 - 17:30
PARALLEL SESSIONS:
1. ISOCARP REVIEW 16
2. THE REAL SMART CITY
3. TERRITORIAL APPROACH

**4 February 2021**

13:30 - 15:30
CLOSING PLENARY

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*European Standard Time Schedule (Time zone: CET, which is 1 hour ahead of Coordinated Universal Time/UTC)*
Sue is President of the Royal Town Planning Institute 2020 and a Fellow of the Institute. She has 40 years’ experience in town and country planning and community engagement. Sue has worked in a number of different planning roles in the public, private and voluntary sectors, at national, regional and local levels. She has also worked in academia as a senior lecturer in planning law and practice and is currently a visiting lecturer at Birmingham University. The golden thread that runs throughout Sue’s career is her passion for equality, diversity and inclusivity, in terms of both effective community engagement and the planning profession itself. In 2018 she established her own planning and community engagement consultancy which focuses on the provision of best practice strategic advice and support in respect of community engagement in major development projects. Sue is also a Fellow of the Royal Society of Arts and the Royal Geographical Society.
Camilla Ween is an architect, an urbanist and a Harvard Loeb Fellow. Working globally, she focusses on delivering sustainable cities through environmentally friendly urban design and integrated public transport networks that also include walking and cycling infrastructure. She is a Steering Group member of the UN Urban Economy Forum, a UK Design Council Built Environment Expert, a member of the UK High Street Task Force (supporting local authorities to transform Britain’s highstreets) and Head of Communications for ConnectedCities. She writes and lectures widely and active on many design review panels. She is a Director of Goldstein Ween Architects.

Why is change urgent?

UN 2019 report on *Species Extinction* concluded:

- Land and Sea use-change
- Exploitation
- Climate change

... the negative trends in nature...

Will continue to 2050 and beyond...
‘Casino of Death’?

Change through rebellion or collectively?

WHAT COULD WE DO?

CITY DESIGN

- Convivial
- Places for people
- Room to play
WHAT COULD WE DO?

GROWTH / LAND USE WITH TRANSPORT

- Transport oriented design (TOD) / Along transport corridors
- Polycentric cities
- ConnectedCities

WHAT COULD WE DO?

ECONOMY

- Circular economies
- Live within planetary boundaries
- Wealth-sharing
- Wealth for local benefit
- Sustainable economies

WHAT SHOULD WE DO?

HUMAN RIGHTS

- Freedom
- Freedom from persecution
- End modern slavery
- End child labour
- Protect indigenous peoples

all shapes all sizes all types all ages
No fears No hunger No plagues No cages
Steffen Lehmann

Steffen is full Professor of Architecture and Director of the Urban Futures Lab at the University of Nevada, Las Vegas. He was born in Stuttgart, Germany, and studied at the Architectural Association School in London in the 1980s, and holds a Ph.D. in Urbanism from TU-Berlin. Steffen is an internationally recognised educator, scholar, author, strategic leader, and has been a Head of School in Australia and in the USA. Steffen became a licensed architect in Berlin in 1993. He has dedicated his long and distinguished career as an urban designer and educator to social impact through the improvement of cities’ public spaces. He has published 22 books and in the 1990s, he coined the concept of Green Urbanism. He is Founding Director of the interdisciplinary Urban Futures Lab, and CEO of the Future Cities Leadership Lab.

Limits to Growth

“The Limits to Growth” 1972 book, commissioned by the Club of Rome — triggering a change in thinking

Cluster for Sustainable Cities, UK
and
Urban Futures Lab, USA

Two think tanks.
Interdisciplinary international research groups that brings together 40 key researchers across a range of disciplines, with an interest in urban resilience and Sustainable Cities development,
• delivering evidence-based research for better decision making, influencing practice.

Rethinking Architecture for the Age of Global Warming

www.city-leadership.com
www.urban-futures-lab.com
Poly-centric structure of cities

Food production in the city and community building

Local food vs Global flows of food

Local community gardening: roof with fat package of soil

Urban Regeneration = “rebirth”
Different strategies to transform existing cities

- Upgrading the neglected city centre
  Seville: new public space at former car park

- Revitalising “non-places”
  Seoul: removing a motorway to re-nature the city

- Converting urban infrastructure
  New York: High Line, a linear public park

- Improving the neighbourhood, housing
  Detroit: temporary urban farming & community gardens
Lučka Kajfež Bogataj

Lučka is Professor for Climatology at the University of Ljubljana. She is one of Slovenia's pioneers in researching the impact of climate change. She served as vice-chair of the Working Group 2 Fourth Assessment of the Intergovernmental Panel on Climate Change and she was the joint recipient of the Nobel Peace Prize in 2007. She was also a member of the Steering Committee for the Global Climate Observation System at World Meteorological Organisation. In 2016 she became a member of the UNESCO Expert Group on the Declaration on Ethical Principles in Relation to Climate Change. Her areas of research include biometeorology, climate change scenarios and impacts on ecosystems.
Climate impacts affect urban living, working and moving

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<th>WORKING</th>
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<td>Reduced labour productivity</td>
<td>Discouraged on public transport</td>
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<td>Health risks</td>
<td>Increased energy use for cooling, decreased for heating</td>
<td>Rail bucking</td>
<td>Increased energy use for cooling, decreased for heating</td>
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<td>Blocked roads and rail</td>
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<td>Damage to houses</td>
<td>Economic asset damage</td>
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<td>Discomfort</td>
<td>Reduced productivity</td>
<td>Shopping constraints</td>
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Carbon removal techniques might require huge amounts of land

- **Natural** Storage in plants and soils
  - **Forestry**
  - Includes: Afforestation, Reforestation, Wetlands
  - Less costly, Closer to deployment, More vulnerable to reversal

- **Agriculture**
  - Includes: Agroforestry, Biochar, Farm management aimed at increasing soil carbon stocks

- **Technological** Storage in rocks and materials
  - **Energy & Industry**
  - Includes: Bioenergy with CCS (BECCS), Direct air capture + storage, CO₂ mineralization

  Less costly, Greater R&D needs, Less vulnerable to reversal

**SUMMARY**

- Climate change is here, it is dangerous and it is going to get much worse.
- **Every year matters** and **Every choice matters**
- The situation is now CRITICAL: we are rapidly approaching points of no return – so ambition must increase substantially.
- COVID 19 situation is not helping but post-pandemic stimulus might
- If we are serious about “saving the planet”, then this requires a fundamental rethinking in economy model
  - Reduction of resource consumption
  - Management that emphasize optimization, not maximization
  - Behavioural changes
Peter Plastrik is a cofounder of the Innovation Network for Communities (INC), which helps to develop social innovations and social-impact networks. He helped to create the Urban Sustainability Directors Network and the Carbon Neutral Cities Alliance and has written extensively about cities and climate change. He has consulted with numerous nonprofit organisations and philanthropic funders. With co-author John Cleveland, he published Life After Carbon: The Next Global Transformation of Cities, Connecting to Change the World: Harnessing the Power of Networks for Social Impact, and Welcome to the Edge of Chaos: Where Change is a Way of Life. He is principal author of seven reports in INC’s Climate Resilience Series (www.lifeaftercarbon.net). Plastrik was born in Paris, grew up in New York City, raised a family in Michigan, and now lives in western Washington state.
NEW IDEAS ARE TAKING HOLD OF URBAN DEVELOPMENT

- Businesses
- Professionals
- Consumers, community activists, city residents
- State/provincial & national governments

The need to change the fundamentals of city life is evident
A feasible vision for the next city is forming
Human ingenuity has been sparked into splendid motion
Urban climate innovation, the motor of radical change, is humming
Different and better ideas for city living are rising, intensifying, and expanding

THIS IS NOT THE FIRST TIME CITIES HAVE REINVENTED THEMSELVES. IT IS THE NEXT TIME.
Tom Meeuws

Tom Meeuws is Vice-Mayor of the City of Antwerp and its alderman for social affairs, poverty reduction, social economy, environment and honorary services. Over the past 20 years, Meeuws has worked in a number of roles at the City of Antwerp, including: staff member to the city’s labour market policy, chief of staff for the alderman for Community Development, Director of the City’s department for community building and society, and Director of its public mobility enterprise. Prior to this, he was a policy advisor on labour market and sustainable development for the Federal Planning Bureau, an independent advisory institution supporting Belgian policy making. In his current role as alderman, Meeuws is responsible for Antwerp’s commitments in several European partnerships and member of the European Regional Executive Committee of ICLEI - Local Governments for Sustainability.
Cliff Hague

Cliff is Professor Emeritus in Planning and Spatial Development at Heriot-Watt University, and a freelance consultant and researcher. He is a Past President of the Royal Town Planning Institute, and of the Commonwealth Association of Planners, and a past Chair of Built Environment Forum Scotland. He is a Fellow of the Academy of Social Science. Currently he is Chair of the Cockburn Association, a 145 year-old civic society organisation that campaigns on planning and conservation in Edinburgh, Scotland. He is a patron of PAS, a Scottish charity that uses professional volunteers to provide advice to individuals and communities. Cliff has worked extensively in European Union regional development projects. He gave the keynote address at the event to restructure the planning profession in South Africa after the end of apartheid. In the UK he has been awarded an OBE for services to planning, and in the Czech Republic a Centenary medal by the Technical University of Brno.

**POST-OIL CITIES NEED INCLUSIVE PLACEMAKING, BECAUSE…**

- The legacy: research on 14 cities in 7 countries in Africa and Asia found them to be "socially and spatially fractured" (SHLC project, Glasgow University, 2020).
- "Neighbourhood planning is rare and almost always benefits only the rich and the emerging middle class”.
- With 3 billion more urban dwellers expected by 2050, this is our last and only opportunity to create more inclusive cities.

http://www.centre forsustainabilitycities.ac.uk/research/comment-articles/

**A LONG HISTORY OF EXCLUSIONARY ZONING IN USA**

- “Seattle’s zoning has roots in racial and class exclusion and remains among the largest obstacles to realizing the city’s goals for equity and affordability.” Seattle Housing and Livability Agenda, 2015.
BARRIERS — KNOWLEDGE, SKILLS, ATTITUDES

- CAA survey reported “outdated curricula” not aligned to SDGs. SAPER “how to negotiate & work within structures of power”.
- SAPER (amongst many) found that informal place-making exists but is not appropriately addressed in mainstream planning.
- The institutional and legal framework quickly comes to define (constrain?) what recent graduates perceive as the practical know-how required.

OVERCOMING THE BARRIERS

Global Planning Aid:
- Promoted by ISOCARP and PAS.
- Develop the place-making capacities of people and groups who cannot access formal planning education but have local knowledge and provide leadership.
- Use volunteer professionals to provide mentoring and support, delivered through IT.
- Use the Place Standard Tool.

CONCLUSIONS

- Oil era cities have embedded exclusion — economic, social, spatial, institutional and political.
- Planning systems and planning education have been part of that reinforcing mix of exclusionary practices.
- A range of “insurgent practices” has emerged in response.
- Inclusive place-making needs to drive the transition to a post-oil city.

www.cliffhague.com
Bruce Stiftel

Bruce Stiftel is Professor Emeritus of City and Regional Planning at Georgia Institute of Technology [USA]. His work concerns collaborative governance of environmental policy and international movement of urban planning ideas. He was founding chair of the Global Planning Education Association Network (GPEAN), and served UN-Habitat as a member of expert groups on the International Guidelines on Urban and Territorial Planning, and the World Cities Report 2016. He chairs UN-Habitat’s Planners for Climate Action, Working Group on Research and Knowledge. Former president of the Association of Collegiate Schools of Planning, he is a Fellow of the American Institute of Certified Planners, and member of the editorial boards of International Planning Studies, Journal of the American Planning Association, Planning Theory, and Town Planning Review.

Christine Knudsen

Christine Knudsen is UN-Habitat’s Director for External Relations, Strategy, Knowledge and Innovation. Previously, she was the Executive Director of Sphere (the Sphere Project) where she led the revision of Sphere Handbook. From 2009 to 2014, she was the Chief of the Inter-Agency Humanitarian & Partnership section in the Office of Emergency Programmes at UNICEF. She was previously with UN OCHA in Geneva, the Senior Protection Officer at Save the Children/US leading child protection responses in Sudan, Somalia, Chad, Afghanistan, Pakistan, Mozambique, and Aceh, Indonesia and with Catholic Relief Services in Burundi, the National Democratic Institute in Gambia and UNHCR in the Russian Federation as a programme officer for Chechnya and Ingushetia. Christine holds a Masters Degree in International Relations.

Reza Pourvaziry

Reza Pourvaziry is an architect holding a master’s degree in Architecture as well as an urban researcher working in this field for over 25 years. His research focuses on the concept of architecture and process of design and sustainability which were presented in articles at international conferences and featured in newspaper.

He established International Art & Architecture Research Association (IAARA) in 2002 to work and research about urban architecture about habitat and settlement with focus on sustainability. He has done architecture projects that he received international architecture awards, including world architecture community for Nashr Yadavaran Administrative Building and housing project for Atlas of unbuilt world by British Council. He was part of jury and steering committee and scientific committee of programs in the field of art & architecture and urbanism. He created different development projects and programs and started working as member of Steering Committee of UN-Habitat’s best practices since 2004.

He continues to work closely with UN-Habitat and was designated by under-secretary-general of UN and former Executive Director of UN-Habitat as First Global Advocate of UN-Habitat in 2016 and was introduced at 40th anniversary of UN-Habitat which was celebrated at Habitat III conference in Quito in 2016. He established Middle East Regional Center for Best Practise and Local Leadership in 2012 –2014. In 2014, Ministry of Housing and Urbanism of Iran recognized him as one of the contemporary architects in the book ‘contemporary architecture’ and since then he worked as president and co-founder of International City Leaders and he was designated for City Prosperity Initiative –Metropolitan Cities initiative by UN-Habitat. ICL and UN-Habitat work together on various research, workshops and conferences and one of the main publications is World Cities Report launched in 2016. At present he is chair of Urban Economy Forum working on urban architecture projects globally.
Roheyatou Malick Lowe

Madam Rohey Malick Lowe, Lord Mayor of Banjul was born and raised in Banjul, The Gambia, a proactive and hardworking individual with significant years of experience as an entrepreneur who has successfully been established within the tourism industry. She studied International Relations at the University of Falun in Sweden and her academic experience has provided her with a strong theoretical knowledge of public administration. She was also very active in the political arena and subsequently a member of a party called ‘Social Democrats’ which gave her the opportunity to serve as a key member of the Child Welfare Committee of Nyköping Municipality with the mandate to oversee the schools within her jurisdiction.

She was elected as the Mayor of Banjul on 12th May, 2018 and since her inception, she has demonstrated professionalism through her leadership style by being very diligent and formulated a total inclusion of all the inhabitants of the city of Banjul in policy processes and giving them a voice to engage in all decisions regarding their city. Furthermore, part of her governance also includes engaging all relevant stakeholders more especially Civil Society Organisations in Banjul for the betterment and development of the City. She also implemented capacity strengthening initiatives in her municipality by restructuring the various departments and hiring qualified technocrats to assist. She has also been a key participant in several international forums advocating the localization of SDGs, furthermore, she was invited by the Canadian government to present the SDGs she has particularly advocated for and implemented in her city.

Maimunah Mohd Sharif

Ms. Maimunah Mohd Sharif (Malaysia) is the Executive Director of the United Nations Human Settlements Programme (UN-Habitat), appointed at the level of Under-Secretary-General by the Secretary-General, following an election by the General Assembly on 22 December 2017. She succeeds Dr. Joan Clos of Spain.

Prior to this appointment, Ms. Sharif was the Mayor of the City Council of Penang Island, Malaysia. In 2011, she was the first woman to be appointed President of the Municipal Council of Seberang Perai. As mayor of a local authority, she led the Municipal Council of Seberang Perai to achieve its vision of a “cleaner, greener, safer and healthier place to work, live, invest and play.” Ms. Sharif began her career as a Town Planner at the Municipal Council of Penang Island in 1985. In 2003, she was promoted to Director of Planning and Development, a position she held until November 2009. Born in Kuala Pilah, Negeri Sembilan, Malaysia, on 26 August 1961, Ms. Sharif holds a Bachelor of Science with Honours in Town Planning Studies from the University of Wales Institute of Science and Technology, UK and a Master of Science in Planning Studies from the Malaysia Science University.

Anantha Krishnan

Has over 40 years of experience in international development work, including over 15 years with the UN in Nairobi Kenya (UNEP and UN Habitat) engaged in urban youth empowerment initiatives, policy and research, advocacy, program management as well as development and implementation of projects. Currently holding the position of Secretary General of Urban Economy Forum, looking at the ways and means to strengthen the economies of cities and towns, supporting the implementation of Sustainable Development Goals at the City level and to deliver services including in the housing and health sectors. Contributed (2014-18) to addressing energy poverty issues among the internally displaced and conflict affected populations in the North East of Nigeria with the introduction of clean cooking stoves initiative led by a Nigerian NGO, ICEED. In 2019, completed consultancy assignments for the World Bank in Nigeria, working on the implementation of the Multisectoral Crisis Recovery Project (MCRP) in Nigeria to support peacebuilding and reconstruction in the Boko Haram insurgency affected areas in the North East of the country. In 2016, participated on behalf of UN-Habitat in conducting a Recovery and Peacebuilding Assessment, a joint UN/EU/World Bank/ Nigerian Government initiative in the North East of Nigeria. Other relevant work includes a consultancy assignment for the Norwegian Government on studying the impact of urbanization on women’s empowerment. Also completed a strategy document for UNIDO on youth employment and entrepreneurship. A position paper was developed by him for UN-Habitat on Urban Basic Services. He has also conducted housing market studies in Myanmar, Mozambique and Tanzania.
About the topic

While dealing with the COVID-19 pandemic crisis, we need to plan ahead to be more health resilient as a largely urban species. This needs to be combined and aligned with our imperative planning challenge to halt and reverse global warming and critical loss of biodiversity.

Therefore, we must move away from oil, gas and coal to reduce pollution, reduce various other environmental concerns and mitigate the processes of anthropogenic climate change.

Today, because most of the human population lives in cities and the trend of massive (and frequently unordered and uncontrolled) urbanisation is accelerating, the urban areas are in the foreground of this “battle for the future”; to reduce reliance on fossil fuels.

To win this battle many cities and local authorities are already developing new approaches to urban planning, but efforts need to be stepped up and scaled up in this Decade of Action to implement the SDGs by 2030.

These new plans and strategies will include ideas associated with reshaping the overall city structure, including redistribution of uses, rethinking the transport system, greening of the urban structure and the provision of people-oriented design solutions to make our cities more health-resilient. Within these plans are new considerations about the nature of economic development and concerns to ensure proper employment. And, as usual, the needs and expectations of local communities are a central part of this planning discussion. All of these elements constitute the core of the process to achieve sustainable urban and regional development designed to achieve health- and climate-responsive actions and policies. Since our cities differ a lot, reflecting the various geographies and cultures of the world, it is hard to define one set of solutions that will work globally. Globally acclaimed planning principles need a place-based and people-centred approach.

As cities produce their own place-specific plan – which may be generically referred to as their “Urban Green Deals” – a wealth of experiences is developed containing ideas to understand the problems, recognise possible solutions and identify ways to implementing changes. These Urban Green Deals are about ensuring the well-being of citizens while profoundly changing the way cities operate within the ecosystem. In light of this effort, the main purpose of the congress is to discuss how these Urban Green Deals may be shaped, which of the issues are most important in particular settings, how to plan and implement them, as well as discussing how they can contribute to the Global Agenda.

The Gulf States have been largely developed thanks to oil and other non-renewable resources exports. Their fast growing and thriving smart cities as forerunners in the region and beyond. At the same time, the cities and states in this region are facing environmental, social and economic consequences of this model of development. Therefore, there is a growing understanding of the need for complex action to solve these problems. Hence, the Gulf-cities' leadership has initiated and propagated the need for a new planning paradigm of carbon-neutral, liveable and loveable, knowledge-based cities that has inspired planners and decision-makers from all over the world.
Topics and issues for Future Post-Oil Cities Congress include:

**TRACK 1**
Understanding Urban Metabolism

**TRACK 2**
Ensuring the Economic Diversity and Resilience

**TRACK 3**
Planning for Urban Connectivity

**TRACK 4**
Safeguarding the Urban Resilience

**TRACK 5**
Focusing on Heritage and Smart Culture

**TRACK 6**
Creating Healthy and Inclusive Urban Environment

**TRACK 7**
Shaping Liveable Places

**SPECIAL TRACK**
The Future of Hot Cities
1. Understanding Urban Metabolism

Born in 1983, now living in Ningbo, Zhejiang Province, China, senior engineer, Chinese Registered Urban and Rural Planner, graduated from Huazhong University of Science and Technology (HUST). Now he is working at the Ningbo Urban Planning and Design Institute (NBPI) and is the Vice-director of the NBPI International Cooperation Center and Baidu Huiyuan Ningbo Planning and Innovation Laboratory.

Since joining the work, Mr. Ni Mindong has charged and finished over 100 urban planning projects and published more than 20 academic papers in the fields of regional planning, master planning, multiplanning integration, zoning planning and special research. Taking advantage of the opportunity of urban planning and development in China, he has visited London and Paris to study, to assist Chinese cities in international cooperation and exchanges, and to actively explore the innovative application of new technologies such as big data in urban and rural planning.

In addition to the practices of urban planning, Mr. Ni Mindong has a long and close cooperation with ISOCARP since winning the ISOCARP Award in 2014. He has carried out a series of activities with ISOCARP in recent years. He took charge of the UPAT (ISOCARP’s Urban Planning Advisory and Team) for the historic section of the Xinmalu District in 2018 and the YPP (ISOCARP Young Planning Professional’s Workshop) for the theme of “Child-friendly Urbanization” in 2019. In 2018, he was also involved in urban renewal UPAT in Durban, South Africa with ISOCARP.

Matej Nikšič is an architect working in the fields of urban planning and urban design. He is a researcher at the Urban Planning Institute of the Republic of Slovenia (UIRS). His research interests cover the issues of liveability and sustainability of urban settlements, urban dynamics and form, urban regeneration, participatory planning and provision of urban public spaces. He is a co-author of Public Space and Urban Justice (2017), Human Cities – Challenging the city scale (2018) and Enabling the City (forthcoming). He works in inter- and trans-disciplinary teams at the national and international levels. He is part of a core team developing new urban planning policies and recommendations for the national spatial planning ministry. He is affiliated with the Faculty of Architecture at the University of Ljubljana as a lecturer of research methods and techniques. In his work he finds challenges in translating the rich legacy of research projects into urban planning practice. He used to be an urban activist too encouraging more sustainable urban behaviours by promoting sustainable mobility patterns (Do the right mix - V troje initiative).
Based on more than 40 abstracts Track 1 was organised in two sessions - the November 2020 session was dedicated to the aspects of the spatial and functional (re)organisation of cities that has a major impact on the metabolic performance of cities, while the second session held in December was putting light on management and governance models and practices that are importantly influencing urban metabolic processes.

A number of sub-themes emerged in the Track reflecting the evolution of the concept of urban metabolism as an internal process by which urban environments use material resources and energy to be able to operate and (re) grow. The presenters addressed different urban operations that require big amount of resources, which very often translates into an environmental stress at both local and global levels.

The common thread of the presentations was a rising awareness that cities are complex ecosystems and therefore new conceptual approaches as well as assessment tools are crucial to understand and regulate the urban system(s) and its metabolism better. The authors’ contributions showed that the complexity of the urbanised worlds is rising, and, along with rising complexity, the consumption is rising too as well as the amount of the waste produced. Climate change is just one—a more exposed problem that is determined by and affecting the urban metabolism—while there are many others too: the growth of urban functional areas on account of the depopulation of rural areas, the rising consumption of natural resources, the rising amount of the urban waste and the (in)appropriate ways of its disposal, the demand for transport and related energy, space, and air pollution issues, the growing need for the supporting facilities of urban life (education, health care, upbringing and schooling etc.), which all result in more energy consumed per capita as well as pollution generated. All these challenges call for a fundamental and increasingly crucial rethinking of the existing economic, cultural and social practices and their possible replacement by new ones in order to reduce the environmental footprint of cities, and reinforce a more moderate consumption of energy and reduced production of waste.

Reorganising cities’ structures for a less environmentally harmful urban operation must also consider the socio-economic realities of cities and well-being of urban communities. Well-being must be one of the key priorities of future policies, whereas the appropriate understanding of the term is of key importance. Instead of competition among urban centres for affluence and material and economic prosperity, urban well-being must be based on the balanced relation of cities with natural processes and other living species on one hand, and in ensuring access to social, health, cultural and economic opportunities on the other hand. This cannot be imagined without a stronger participation of everyone in the processes, which entails cooperation among various partners across professional disciplines and decision-making levels and, importantly, through comprehensive urban planning approaches that consider the consequences of decisions at different spatial scales and interdependent urban systems.
This once again calls for a conscious urban planner, a professional who will be able to transcend mitigation between the most often clashing economic and ecological aspects of urban development, and to advocate for the quality of urban metabolism in all its complexity. Improving quality of life must no longer be related to, for example, more and wider roads, faster transport or larger amount of real estate, to name a few, but to the optimisation of urban systems in terms of accessibility of services, goods and facilities for the whole population under the principle of fairness. This might be a model for the well-being of the population of future cities along with the sustainable mode of urban metabolism. However, this will lead to some fundamental rethinking of the existing socio-economic models upon which the functioning and management of cities are based.

The presentations in Track 1 clearly showed that a better understanding of the urban metabolism and all its complex interrelations with demographic, social, cultural, economic, ecological, functional infrastructural and other dimensions of cities is crucial to making informed decisions for future sustainable urban planning and management. Needless to say, more research, studies and exchanges of existing practices are needed at all (local, reginal and global) levels to improve not only the basic insights and knowledge but also the awareness on the importance of balanced urban metabolism for sustainable future within the broader global ecosystem.

Selected Papers

1. VERBRUGGEN Sven, BUNGE Jan, VAN BUTSELE Sylvianne, From City Parks to Park-City: the Antwerp Case

2. BASARAN Tunca Beril, KRAMPOKOUKI Christina, WARNE Simon, HANHAUSEN Rosa Catalina Pintos, Hinterlands of Budget Air Travel - Investigating the Journey of Aviation Fuel

3. KARASSOWITSCH Michael, Architectural Value and Urban Metabolism, The post-oil city as transition to what comes after
From City Parks to Park-City
The Antwerp Case

Sven VERBRUGGEN, VPI at Design Sciences Hub: University of Antwerp, Belgium
Jan BUNGE, director at Squint/opera, United Kingdom
Sylvianne VAN BUTSELE, director at Design Science Hub: University of Antwerp, Belgium

Abstract

Inspired by promising design research—such as Brainport Smart District and Regenvillages—this project explores pilot projects that integrate material flows and energy systems, in the Belgian city of Antwerp. The Design Sciences Hub [DSH] of the Antwerp University together with Jan Bunge conducts this design research. While the capping of the existing ring road is decided policy, organising the priority agenda—which part of this mega project to execute first—is still subject of ongoing design interpellations. These interpellations follow the methodology of ‘rebuild by design’ resulting in broad consensus for executing certain parts. Following this logic, however, the residual spaces are often more likely to remain as such. Nevertheless, studying these residual spaces unveils potential projects in multi-layering the necessary components of the city metabolism, making residue into resources—and unlocking efficiencies by connecting infrastructure systems which too often are planned in isolation. This project serves as an incubator of innovative research and a test case in a quest for the future healthy city.

Keywords

1. Multi-layered Districts: integrating all flows

Today’s material flows are too wasteful. The EU states that “The 20th century’s era of seemingly plentiful and cheap resources is coming to an end.” In order to meet the needs of a growing global population within the sustainable limits of the planet’s natural resources and ecosystems, the EU argues that we need to achieve an economy and society that is resilient to climate change. The EU further pleads for the sustainable management of natural resources and raw materials. Finally, we are starting to acknowledge the real financial and environmental costs.

In order to get closer to achieving these goals we have to start optimizing water, food, energy, and material flows by thinking in circular and interconnected flows. Therefore, we need to design new living typologies and economic models.

Current policies often persist in consuming too much (hinter-) land with large monofunctional resource plants or big infrastructure. Coping with resource, waste and energy flows as separate and unidirectional phenomena, they all require transport to the city and the consumers, and back. To counter this policy we have to start creating cross-functional spaces on a hyperlocal scale. Spaces that mingle various functions and programs, integrating multiple flows in a hyperlocal setting, and finding new symbiotic configurations.
Verbruggen, S.; Bunge, J.; Van Butsele, S.

From City Parks to Park-City: the Antwerp Case

56th ISOCARP World Planning Congress in Doha, Qatar
International Society of City and Regional Planners

at once. Europe already looks to Farm to Fork strategies to promote urban farming, local production / economies, shortening the chain of production and transport. Inspired by promising design research—such as the Brainport Smart District project and the Regenvillages—this project explores the viability of integrated material flows and energy systems for pilot projects in the Belgian city of Antwerp.

Current research in preventive healthcare and wellbeing has shown us the importance of access to green outdoor spaces. The recent pandemic has highlighted this importance. According to John Surico, journalist and urban planning researcher, ‘for city residents, equitable access to local green space is more than a coronavirus-era amenity. It is critical for physical, emotional, and mental health.’ Sociologist and spatial expert Pascal De Decker underlines this importance and argues that if the city is no bigger than a balcony and a courtyard, the obligation to keep people in house makes city dwellers dream of the countryside. The architect Rem Koolhaas goes even further: ‘In the city, you are no longer the winner, but the loser—packed together too much. We have been too snobbish in the city. It is high time we look the other way.’ The Brussels city architect, Kristiaan Borret states that the crisis can help us mitigate the densification hysteria, recognise the open space as an indispensable outlet, and make the city more crisis-resistant. By including more public space in our developments, we are making the city more climate-robust.

Increasing cohabitation in cities, intensifying local production and providing more open space appear mutually exclusive. Because traditionally more city activity brings more flows. Treat these flows independently and a city of congestion will be the outcome. The key must be a smart combination of multiple flows. A green network that integrates material flows and energy systems accounting for multi-layered districts with integrated (and hyperlocal) material flows and energy systems, providing clean air and green beneficial spaces, and new living typologies, as part of the metabolism of the city. Turning a city park towards a park city regarding these challenges, is exactly what this paper is talking about, taking Antwerp as a case.

Beyond the Ring Road

Antwerp is exemplary for many mid sized European cities that find themselves located between a driving economic area such as the Antwerp port and the hinterland with patches of nature intertwining a less diverse urban sprawl. The meandering perimeter that delineates this intertwined urban fabric serves as a membrane crucial for a healthy metabolism of the city nucleus. In a policy to densify cities this perimeter is often considered as a potential area of innovation. During these strategic developments, however, the most defining role these areas play for the city’s vitality cannot be overlooked.

The Antwerp ring project has the ambition to realise a super park covering the sunken motorway and circumventing the inner city—which compared to for example the Madrid Rio project is triple in length. This intergenerational project—called this way because it will take decades to fully realise the project—portrays itself as the new central city park with tangential veins protruding various districts, changing the historic reading of the city: from an historic centre with satellite districts and suburbs, towards one unified urban tapestry with the ring park organising a new centrality.

Ultimately, we are convinced that this approach can lead to a "multiplier" effect, not only affecting the immediate environment of the Ring, but influencing the city far and beyond. The Ring can evolve into a metropolitan hybrid of park and city, grafted on a diverse infrastructure. The final park figure is not a geometrically isolated form, but rather an organic figure with branches and veins protruding the city fabric. The enormous strength of an organic figure with a meandering perimeter is that precisely this perimeter is ten times the circumference of geometric parks. This means that in the future Antwerp will be known for
the longest park edge environment. Where the capping of the ring road is a means, the park edge and the park space that defines it are the strongest assets.

The new perspective ‘from infrastructural ring road to metropolitan park,’ however, puts pressure on this new “terrain vague”. The new park environment becomes the space neighbouring districts turn to for compensating their lack of functions and qualitative open space. At the same time entrepreneurs see a new possible area of expansion. It will be crucial to maintain the frayed edge as an exemplary solution for future infrastructure works, adding an 21st-century meaning as well.

**Figure 1. The ambition for a 21st century park environment. Source: sketched by Sven Verbruggen.**

### Beyond A 19th Century Park

A 19th century city park is often a well planned park with more aesthetic then stringent infrastructural or functional challenges. These parks were designed primarily for romantic strolling and showcasing patches of nature. A park of the 21st century will play a strategic and crucial role in a transition towards sustainable and healthy cities that require the parks to serve beyond strolling or showcasing alone. The park of the 21st century incorporates infrastructure such as water and air filter installations, service roads, and smoke exhausts. The green elements will be more diversified in function: serving as sound barriers, natural filtering systems, local food production, stepping stones for biodiversity, or forming greenhouses, seasonal gardens, wetlands and buffer zones.

This kind of park investigates the necessity to create decentralized systems on the neighbourhood level to create more resilient cities. As previously argued, the park edge plays a crucial role in this. The park edge is the mediating frame where the change from city to park must remain legible and recognizable. Introducing building projects in these parks will be the key to start a process of transformation towards multi-layered districts with integrated (and hyperlocal) material flows and energy systems interacting with
the intended ecological and sustainable setting. It is crucial to research what these projects are, how they look, what they represent, and how they add value to the system and the community (healthcare, research, education, training, community centres, start-up incubators, living laboratory, spaces to explore and test future solutions and grow new businesses,...). This requires design research and typological studies. If we meet these challenges, Antwerp for instance will not only have a huge park, but the city will grow as a ‘park city’.

The incubating Blue Sky Studio

But how to try an experiment like that? We pursue design research to investigate the scale and feasibility of strategic (pilot) projects that considerably improve the city’s metabolism. The primary goal of this report is to draw full attention of investors and policymakers to these crucial sites and their potential. Insights of what makes these projects fit for implementation will be used to progress the ongoing design research captured by the overall impetus: ‘From City Parks to Park City’.

The Blue Sky Studio of the Design Sciences Hub [DSH] is a twelve months high level design inquiry pinpointing crucial challenges in tackling wicked problems. In 2019 the DSH proposed to focus the first Blue Sky Studio on a transforming healthcare system—notice a trend of hospitals being relocated in the vicinity of highway systems and becoming more megastructures. Considering possible countermoves in mobility, logistics and housing development—moving away from the highway system—the DSH questions the current trend in hospital real estate. The COVID19 only enhanced the topicality of the first Blue Sky Studio focus, resulting in 3 leading innovation themes. These innovation themes align with big systemic changes such as evolving from an oil driven and waste producing economy to a green energy driven and circular economy, and from a centralized to a decentralized and demand driven distribution system, all enhanced by smart data, technology and communication.

The Blue Sky Studio chose to explore innovation themes through a virtual test case—in size equal to a real locoregional network serving 500.000 inhabitants—that allows to design, visualise, and test a variety of innovating components. The virtual test case focuses on the future Ring park. Within this future Ring Park the Blue Sky Studio investigates a 1,5 km by 0,6km area, East Antwerp, part of the Ring project, that even in the most promising designs remains a residual space.

Figure 2. The virtual test case within the future Ring park. Source: sketched by Sven Verbruggen.

Because, this area exists out of multiple barriers: the ring road to be sunken and covered, a wastewater treatment plant, an old railway yard, the local ring road, and the existing railway bed. On top of that a new above regional node needs to be integrated serving primarily the district of Merksem but also connecting
other remote areas. It seems that all hope for this site to outgrow its residual character is lost. Yet, to make a successful ring park with interconnected ecosystems redesigning and incorporating these residual spaces will be crucial.

The Blue Sky Studio set itself the design challenge to transform this residual space into a new healthy district, concretizing the innovation themes and integrating incentives from the farm to fork strategies promoting local food production, waste to energy systems, and new modes of transport. In the end this virtual living lab should promote solutions for a more circular, hyperlocal and healthier “park city”—hauled by the Sinatra mantra ‘if we can make it there…’

Considering this design research, it is crucial to stipulate that rather than imagining the design as a realistic masterplan, we should recognize the design proposal as a virtual living lab or test site that incubates a variety of setups, further research and showcases. The Blue Sky Studio operates as an incubator showing possible futures. The collage is crucial to provide an overview and cause serendipity to maximize design research goals.

**Combining water filtering, waste to energy, and urban farming**

Any design for the test site ultimately should guarantee a green belt continuity and crossings of multiple barriers. Rather than discussing the iterative design process it seems more productive in this setting to describe the triggering insights, solutions spaces and research hunches that emerges: (1) a modern Ponte Vecchio as transferium, (2) dispersed healthcare components, (3) the permeable, green and filtering coverage of the ring, (4) the multi-layered service road connected to the local waste and energy plant, (5) the urban farming on top of the wastewater treatment plant, (6) the specific symbiotic green that emerges as seasonal gardens, greenhouses, sound barriers, wetland and recreational area.

For starters: the car park located next to the above regional node proposes one way of crossing some barriers, serving quite literally as a bridge stretching from the green belt to the old train yard for which the new design anticipates a further connection to park Spoor Noord protruding the district of Borgerhout. Not only would this location comply with practical arguments—being that close to the ring road and the event infrastructure called Sportpaleis—planning this car park here anticipates a larger ambition: demanding a transition to clean transport leaving behind the motorised vehicles at the ‘gate’. The mineral surfaces dedicated to cars can therefore be reduced to a minimum for the entire site. The carpark typology should be designed with a second life in mind anticipating a future with changed mobility and transport.
The dispersed healthcare components connect to the covered ring road and the above regional node—complying with the high accessibility requirements. Situated next to the carpark nullifies any further need of roads on the campus keeping the surrounding landscape as natural as possible. The overall ambition of the ring park prioritizes the campus model as the preferable typology to guarantee the continuation of green spaces. At the same time the constraints of this specific setting account for a unique relation to the surroundings that, although highly crucial, is often lacking in contemporary hospital developments. Imagine the quality of spending your time in a geriatric component with a beautiful view on nature, close to your friends and family.

The popular understanding of a covered ring road is a total encapsulation of the polluting traffic, swapping it for a green and healthier environment. The culprit, current traffic, is cast away to the underworld. This binary thinking surfs on the idea that traffic is bad and nature is good. Unfortunately the reality is more complex. We are the drivers that we condemn to the underworld. The traffic industry works towards innovations that will reduce pollution. Next to the knowledge about a spiking in exhaust at all entrances and exits, we would create a non-qualitative underworld that comes with a maintenance burden for future generations. And finally, current morphology makes it infeasible at several locations to cover the ring road anyway. For all these reasons, we pursue design research for a semi-coverage where green decks account for natural primary sound barrier, air filter, and visual screen, still allowing light to penetrate the lower areas.

Transforming the residual space into a healthy district with 3000 inhabitants and maintaining the continuity of the park environment, requires a smart way of integrating buildings and infrastructure. A well planned multi-layered service road will guarantee that no other roads are needed in the park. The service road integrates connections to the energy grid, water and data supply, district heating, and grey water system. It connects the waste to energy plants, local buffers for peak loads, garbage collectors, health checkpoints, and distribution hubs. It allows small electric vehicles of all types, and logistic carriers to reach all facilities for transport and for those who have difficulties to walk or take a bike.
As a symbolic gesture we designed the aquaponics and urban farming on top of the wastewater treatment plant, only to raise the ambition of recuperating our waste water to its full capacity. By upgrading the treatment infrastructure and the vicinity of different end-users the residual space can become a resource for a variety of water use: from sanitary use, cleaning, and gardening to urban farming, animal drinkwater and swimming.

In the end the pursued symbiosis of merging a health district with a continuous park results depends on multiple guises of greenery: seasonal gardens, greenhouses, sound barriers, wetland and recreational area. A district transforming from a residual park space towards a multi-layered district within a sustainable setting, becoming a healthy park-city.

**Upscaling: from residue to resource**

The 15 minutes city of late reminds us of the city of clusters as argued for by Team X or the walkable city as promoted by the traditionalists since the seventies. But what gains actuality is the idea of decentralised neighbourhoods, districts with local economies, to be more resilient. At least if we guarantee the high quality of spatial design and better living environment.

Integrating flows is familiar to us given the multiple small examples such as grey water experiments on the level of a building or research on urban metabolisms. What urges is the upscaling of integrated flows to
the level of a district. Making a building circular or a building ensemble autarkic might never become viable, but on thinking on the level of districts these zero-waste, energy positive or carbon neutral ambitions can be within reach.

![Image of a multi-layered district with integrated material flows and energy systems. Source: DSH.](image)

Improving singular systems or flows (approaching it one-dimensionally) builds towards low increase of efficiency rates. While the efficiency leap we are hoping for is only reachable if we approach systemic change multi-dimensional. With these experiments in the virtual living lab we are convinced to approximate these efficiency rates on the level of the district. We will need to change our mindset and start thinking of integrating for example a waste to energy plants or water filter installations and urban farming into our living environment and daily routines. We argue thinking in microgrids and hyper localities as a design challenge.

Systems rely on subsystems—for example, a contractor’s procedures rely on a habitual relation to its suppliers, who have established their own routines and methodical behaviour. Systemic change therefore has impact on multiple levels and might primarily be about risk management. Therefore, every pilot project needs science communication, visualisation of possible outcomes, open data for research, and experience centres. These settings need a low-regulated, low-legislated character to avoid roadblocks in generating new business opportunities.

Designing, testing and realising these multi-layered flows, integrated systems, and interdependent functions, requires a specific skill set from whomever takes on the role of mediator or translator between the various disciplines.

**Conclusion**

If we want to increase cohabitation in cities, intensify local production and provide more open space we cannot treat these challenges independently. City development should be a smart combination of multiple flows, as part of the metabolism of the city. The aim is designing a green network that integrates material
flows and energy systems accounting for multi-layered districts with integrated (and hyperlocal) material flows and energy systems, providing clean air and green beneficial spaces. Turning a city park towards a park city, by envisioning, testing and setting-up new possible futures.

4. References


Research Paper

Hinterlands of Budget Air Travel
Investigating the Journey of Aviation Fuel

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Abstract

This paper investigates the oil infrastructures, as intersections of trans-territorial networks systems of power and their exchange with local practices: the journey of Jet A1 aviation fuel that facilitates the budget air traveling in Berlin’s airports, from crude oil extraction in Russia, distillation in Schwedt -Eastern Germany, to refueling off the aircraft by tanker truck sits source to its point of use. A case study focuses on the urbanism dynamics of Schwedt as an attempt to trace part of the planetary urbanism corresponding to Berlin’s growing tourist industry’s use of jet fuel. The first part of the research centers on oil landscapes’ networks -the industrial footprint of oil: its transformation, storage, and transportation. Further provides a depiction of ‘what constitutes aviation fuel and its production network’ to view the actors involved in the process, the links between them, and the spatial implications. The second part addresses how aviation fuel has impacted Berlin and Brandenburg’s hinterland: primarily, Schwedt, a shrinking city despite Berlin’s recent boom, where the size of the traditional urban "city" form is diminutive in scale compared to the adjacent PCK oil refinery's "non-city" form of urbanization. The study’s findings present new ways of interpreting and mapping the metabolic vehicles of planetary urbanization in both architectural and urban scales.

Keywords

Oil, Infrastructure, Hinterland, Planetary Urbanism

1. Fuelling Budget Air Travel

1.1. Introduction

Every month more than 3.1 million passengers fly in and out from Berlin- Schoenefeld airport; how many of them are aware of the process enabling this action? Berlin’s magnitude for budget air traveling results from synergic relations between the city, its airports, and the oil industry. Petroleum-based Jet A1 fuel energizes the aircraft after traveling more than 5000 km through various pathways of infrastructures. This oil flow defines current and future spatial configurations on the earth's surface by generating fixed
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Brenner (2016, p. 125) explains these non-city spaces, such as hinterlands, which are usually hidden from the sight of everyday life. He criticizes the traditional urbanism approaches as being "locked into an externalist framework that attempts to distinguish them, analytically and spatially, from the city". Such a critique is particularly relevant in a context where Schmid and Brenner (2012, p. 5) define planetary urbanism as a "disintegration of hinterlands" as our urban networks and urban support systems sprawl beyond traditional city boundaries into former wildernesses and across borders. Furthermore, this multiscalar built environment necessitates utilizing process-oriented urbanization view in which these landscapes of production are considered to be as a part of the integral global urban condition (Arboleda, 2015, p. 2).

By engaging with an emergent strand of critical urban theory, this paper investigates the oil infrastructures, as intersections of trans-territorial networks systems of power and their exchange with local practices: the journey of Jet A1 aviation fuel from crude oil extraction in Russia, distillation in Schwedt, to refueling off the aircraft by tanker truck sits source to its point of use. The core of the paper focuses on the urbanism dynamics of Schwedt as an attempt to trace part of the planetary urbanism corresponding to Berlin’s tourist industry’s use of jet fuel. Centering on petroleum in the built environment The purpose is to understand how petroleum stitched into spatial practice to understand how these forms shape our future. For this reason, the paper underpins the findings of a seminar series taught by the Habitat Unit at the Technical University of Berlin conducted in April 2019.

The following sections provide a detailed view of the networks of oil landscapes formed by physical infrastructures and social, economic, and political processes. The first part of the research centers on oil landscapes’ networks -the industrial footprint of oil: its transformation, storage, and transportation. Further provides a depiction of 'what constitutes aviation fuel and its production network' to view the actors involved in the process, the links between them, and the spatial implications. The second part addresses how aviation fuel has impacted Berlin and Brandenburg's hinterland: primarily, Schwedt, a shrinking city despite Berlin's recent boom, where the size of the traditional urban "city" form is diminutive in scale compared to the adjacent PCK oil refinery's "non-city" form of urbanization. The study's findings present new ways of interpreting and mapping the metabolic vehicles of planetary urbanization in both architectural and urban scales.

1.2. Background

"The fuels used for contemporary mobility systems rely on the mobility systems of fuel." (Marriott and Mino-Paluello, 2014: 3)

The oil industry functions by moving and shifting elements throughout the territory. From the crude oil extraction point to the refueling tank, the process requires the flow of materials, machinery, energy, and labor, among many others. On the other hand, this broad network across diverse matters, the Jet A1 fuel for this case, is in constant motion, change, or reloading. Thus this network generates a landscape by implementing a physical infrastructure that enables quantitative flows of materials and labor,
outsourcing, and services. The nature of the product and both the production process’s economic and physical organization has its implications of spatial configurations. Therefore, this section demonstrates how production Jet A1 is a matter of technical interest and includes social, economic, and political dimensions by reframing it in three investigation levels.

1.2. The Product

Jet A1 is a petroleum-based fuel that is designed to power modern commercial aircrafts with gas-turbine engines. It is produced from crude oil by processes of multiple distillation in high temperatures in a refinery. Its energy dense, storable and mobile nature makes it convenient for contemporary mobility systems including civil aviation activities. The liquid and lightweight character of oil enables a ‘smooth’ cargo system, which is based on zero storage and constant motion (Levinson, 2008, p. 24). It is economically attractive to the long distance transport between zones of production to consumption. Therefore liquidity of Jet A1 is extremely crucial, otherwise it would be hard to organise and transfer, so ensuring that each day more than 8 hundred barrels of Jet A1 is delivered from PCK oil refinery in Schwedt to Schönefeld airport ‘ready to fuel’ the trips of off budget air travellers. It is transferred into tanker trains, tanker trucks, tanker ships, or pipelines and once at the airport, the fuel is stored in tanks with water drains at their lowest point. When it comes to storage, the ‘water phase’ is the primary concern; prevention of slug water into the aircraft and protecting the product from contamination. However, if the proper conditions are satisfied, fuel can be stored indefinitely (Visser, 2011, p. 2). On the last stretch of Jet A1’s journey to its final destination, smaller tanker trucks pick up the fuel directly in the tank farm and then head back to the boarding gates, where planes await refueling.

1.3. Infrastructure Network

In Berlin’s case, its two airports are the places where the output of the global oil flow is transferred from the industrial scene to everyday life. Tegel, located in the west, receives around 30 tanker trucks a day by land connections. On the other side of the city, Schönefeld is located on the east and supplied via tanker...
trains directly from the railroad. PCK serves these two airports which is a refinery from the GDR-era located in Schwedt/Oder next to Poland, and strategically located on the Druzhba (Friendship) pipeline.

![Figure 2. The route and branches of Druzhba Pipeline. Source: Diagram by authors.](image)

Availability of raw crude oil and intentions to strengthen the economy with Western end of the socialist states, Soviet Union initiated Druzhba pipeline. It is constructed as a trunk crude oil pipeline, with three branches constructed in time, that carries oil from Eastern Russia over 4,000 kilometers passing through seven countries. In this regard, Savitzky and Urry highlight the key of logistics infrastructure by stating that “the uneven geographical distribution of fossil fuels necessitates long distance distribution of paths of pipelines, from extraction points to concentrations of people,machinery or industry, without an infrastructure to distribute energy, reserves are useless“ (2019, p. 182).

In parallel, Council for Mutual Economic Assistance (Comecon) prioritised the project and completed the construction of Northern branch of Druzhba within in three years("PCK-Raffinerie Erdölverarbeitungswerk in Schwedt/Oder in Brandenburg" 2019). According to Druzhba Pipeline reports, it was a product of an international collaboration, where pipes manufactured in the Soviet Union and Poland, fittings provided from Czechoslovakia, the GDR controlled pumps, and Hungary provided the automation and communication equipment ("Druzhba Pipeline" 2019). In respect to that, the magnitude of associated corporations attracts further large-scale economic capital investments and reframes the local geography by introducing new structures (Sordi, Valenzuela and Vera, 2017, p. 217). For instance, the construction of PCK Schwedt is followed by more investments around the region, a second new plant in Leuna, and further infrastructural developments, including a new pipeline. These developments created an economic competition between regional administrations and various cities about the location of new factories (Lesh, 2000, p. 401). Today the refinery receives crude oil directly from the Druzhba pipeline; however, in exceptional cases (Harper 2019), the oil can also be delivered via the Rostock-Schwedt Crude Oil Pipeline ("Schwedt Refinery" 2015).
1.4. Production Network

Jet A1 fuel’s production network requires a coordinated set of activities and highly operational economic collaboration on a broad spatial scale. It is a product of institutional actors’ decision-making on an international and local scale with varied shares in operation. For instance, large-scale infrastructure and industrial complexes such as pipelines, refineries, and ports are invariably owned and operated by holding firms representing at least one of the world’s largest oil companies.

Nevertheless, the involvement of transnational cross-border companies is demonstrated most clearly in the PCK refinery in Schwedt. In the 1950s, the GDR was the largest importer of Soviet oil, all going to the petrochemical combine at Schwedt. Petrochemische Kombinat (PCK) was established as a state company in 1958 by the socialist German Democratic Republic (GDR). The refinery was issued as a part of five-year economic development plans, and Schwedt started processing Soviet crude oil in 1970. The explosion in world oil prices in 1973 set in motion forces that shape the economic relationship for the next decade. The production of refineries was affected by the oil crisis. In the early 1980s, Moscow reduced annual oil shipments, including 2 million metric tons of crude oil, almost half of oil deliveries to GDR. However, it was crucial for East Germany to maintain economic partnerships with the Soviet Union. Even after cuts, GDR received about 97% of its oils. Minerals Yearbook reports that the refinery had a refining capacity between 160-180 barrels per year (1980, pg. 73). Following German reunification in 1991, it was privatized and then sold to a coalition of the German, Italian state oil companies and a joint-venture of TOTAL. In 1994 6.8 million tons of crude oil processed almost less than half of the amount compared to a decade ago.

In more recent times, the Dutch oil company Shell and the Russian-state company Rosneft were major joint shareholders of PCK with 37.5% each, until 2014, when a Russian company Rosneft bought TOTAL’s 16.6% ownership, thus positioning themselves as the most dominant PCK shareholder (“Rosneft”, 2015). This Russian company holds shares not only in this refinery but also in four others in Germany. Rosneft is an example of a leading global firm playing a pivotal role in shaping and coordinating global production,
attempting to strengthen its position in one of Europe's most efficient refining centers and to use the opportunity to serve final customers in its most important market.

In the case of logistical issues, Jet A1 aviation fuel articulates a transnational network of production, organized and controlled mainly by leading global lead firms, but also involving smaller ones. The network reveals critical linkages between multi-scalar actors and regions, shifting and changing with different flows to create new geographic and economic patterns. To illustrate this point, the operation of the Druzhba crude oil pipeline is handled by both the Russian-state company Transneft, and TOTAL, a French multinational oil and gas company considered one of the world’s seven ‘supermajor’ oil corporations (Bergin 2008). In contrast, smaller scale sections of the production chain, such as distribution by road or rail, are usually taken care of by smaller domestic or local firms. The final product of jet fuel is transported by rail tanker to Schönefeld airport by the domestic company IGB, based in Berlin, from where it is transferred by refuelling truck to the aircraft by the German company AFS, based in Hamburg. However, in-between these stages, the fuel is stored in a large airport tank farm, which is owned and operated by a local holding company representing key multinational oil industry players, including TOTAL, a key player who own and operate numerous other tank farms, including at the port of Rostock (Sternberg 2016).

2. The Oil Urbanized

2.1. New Industrial Turn

This part of the research focuses on Jet A1 fuel’s urban footprint, extending across the territory as a productive transformational process. This urbanization pattern is closely linked with industrial operations facilitated by highly specialized infrastructure, labor, and specialized management organizations. Furthermore, the geographical flow of oil requires site-specific transformations between territorial scales and traditional urban limits, over administrative and political boundaries. (camp city) To illustrate the urbanization dynamics of oil, we present empirical research of a city that facilitates Berlin's airports.

Schwedt is a small-sized city in northeastern Brandenburg, with approximately 29,680 inhabitants according to the last census ("Schwedt." 2019). Formerly known as a rural town with tobacco production, the settlement was always a part of regional agricultural trade and production networks through the centuries due to its strategic location between other trading cities. However, by the end of the Second World War, Schwedt suffered from was nearly destroyed; 85% of the city was destroyed and lost its networks with other cities with blown-up bridges and burned locks. The post-war period was a golden age for Schwedt; under the rule of German Democratic Republic, the town was reconstructed and rapidly grew through extensive industrial development. First, a paper factory opened in 1959, which followed the crude oil processing plant, "Das Petrochemische Kombinat Schwedt" in 1963.

The arrival of the large-scale transnational industry to Schwedt distorted the patterns of metabolic flows that had always gravitated around agriculture and thus changed the city’s faith. With continuous investments, Schwedt was to become a symbol in the early 1960’s East Germany into a center of the oil industry. Furthermore, expanding patterns of the oil not only circumscribed to capital and infrastructure but also became an agent for stating political power and realizing state idealism. Accordingly, the tiny war-devastated city of Schwedt was chosen by GDR leaders to become one of four new Socialist Cities as flagships of the Five-Year-Plans. Characteristically, all these cities were built from scratch, linked to massive industrial development, and perceived as experimental areas for the new society. They were conceived as complete, coherent urban places and imagined as "splendid living environments,
economically and culturally, that would promote the collective life of mankind." (Wakeman, 2014, p. 120)

In contrast, for the case of Schwedt, Springer demonstrates that the "establishment of Schwedt there is no notions of a socialist city, rather the decision centered upon where one might best place the oil refinery around which the town was to be built." (Springer, 2007, p. 67).

Figure 4. Oil infrastructure in Schwedt Source: Diagram by authors.

In that regard, Brenner comments that "the spaces of non-city have been continuously operationalized in support of the city-building process through the global history of uneven capitalist development." (2016, p. 125). As the word non-city refers to the rural, countryside and, urbanization is under relentless transformation, which is explained as a result of specific agglomeration patterns and where large-scale industrial operations occur. Furthermore, these non-city spaces are often located at a considerable distance from the main centers of capital, remaining out of sight for city dwellers. In other words, they are hinterlands where the metabolic exchange takes place to enable flows of certain materials, machinery, or products. Furthermore, Schmid and Brenner elaborate on the topic and discuss planetary urbanism to describe "the disintegration of hinterlands" as urban networks and their supplying infrastructures sprawl beyond traditional city boundaries into the former wilderness and across borders (2012). The term 'hinterland' defines various non-city spaces that are both outcome and suppliers of urbanization, whether as diverse types of settlements (towns, villages, hamlets), land-use configurations (industrial, agrarian, extractive, energetic, logistical), or ecologies (terrestrial, oceanic, subterranean, atmospheric) (Brenner and Katsikis, 2020, p. 24). Indeed, hinterlands like Schwedt, which are completely designed to provide materials such as Jet A1 fuel destined for consumption in remote areas to production, are the spatial imprints of these disintegrated and expanded metabolic exchanges.
2.2 Expanding vs Shrinking City

Schwedt's history with planetary urbanization, therefore, dates back to the early 1950s. Simultaneously, several urban planning projects were developed for the town to host workers and their families who would move there in the coming decades to the refinery's commissioning. Construction of socialist planned city quarters such as Am Waldrand, Talsand, Kastanienallee started. During the oil refinery construction, the town's population doubled up to 38,000; in the subsequent decade, it added another ten thousand residents. In those early construction years, there were mainly two groups of inhabitants; workers of PCK and itinerant construction workers who moved from site to site for mega projects to industrialize East Germany. In the corresponding period of the late 1960s through decade, the town expanded with two massive districts, Wohnkomplexe, that each would host fifty-thousand residents. The building boom that corresponded with the city's growth consisted almost entirely of prefabricated concrete GDR Plattenbau buildings.
Commenting on the urban development of cities like Schwedt, Mumford describes the process in two phases. Primarily, there is an intensive act of 'up-building' in which vertical, horizontal industrial and infrastructural clustering occurs, followed by 'un-building,' the degradation of surrounding landscapes through their role in supplying cities with materials (1938, p. 268). Thus, the 'un-building' of Schwedt started with the Soviet Union's collapse and continued after German Unification. Recalling the previous section on production networks, the industry of oil production is possible with the availability of materials or serving infrastructure and intensive cooperation of stakeholders. The reasons for Schwedt's shrinkage are likely to correspond with other former-GDR shrinking cities. The city has been steadily shrinking, requiring spatial reorganization to remove derelict housing blocks. As a result, 11,000 homes have been demolished since 1990 to create space for lower density housing, mixed-use developments, and new parks and forests (Rehmann 2014). The monotonous environment of pragmatic industrial urbanism is also to blame, with its lack of amenities and urban functions, they have already caused Schwedt's youthful population of young workers and their families during its 1980s peak, who allegedly struggled with boredom (Kleiner 2015). Furthermore, Schwedt's decline also corresponds with automation in the oil industry and less labor-intensive technologies. Besides, a gradual decline in Germany's oil consumption, which can be attributed to environmental regulations and improvements in fuel efficiency — despite vast and sustained growth in the number of flights since 1990, Germany's consumption of jet fuel has remained roughly stable since 2006 (Pfeiffer and Wigger 2018).
2.3 Conclusion

This study set out to explore the oil industry’s spatial configurations by tracing Jet A1 fuel journey from drilling in Russia to distillation in Schwedt until it reached the point of use at Berlin’s airports. The flow of oil is explained within the theoretical framework of planetary urbanism as hinterlands, such as the oil drilling equipment, refineries, storage tanks, pipelines, dedicated road and rail infrastructure, airports, and even settlements. Carola Hein explains their role as "nodes in the production, transformation, and distribution of petroleum, which serve as essential drivers of spatial change, over time attracting petrochemical industries, redirecting petroleum flows, reinforcing local petroleum systems, and even translating former—often colonial—dependencies into corporate ones (2018, p.888). As in the refinery in Schwedt, public governments depict oil facilities as a sign of industrial strength and a node for the economic alliance. As a result, spatial planning practices are shaped by collaboration between public and private oil companies, which secures the flows and interests related to petroleum. Furthermore, the existence of extensive petroleum infrastructure has significant staying power. The long life span of petroleum installations and the built environment creates path dependencies, making it incredibly difficult for us to overcome oil dependency and promote new energy practices. In fact the consumption of petroleum products, creating a feedback loop that reinforces the petroleum industry’s presence.

With the acknowledgment that the presence of broad petroleum networks has considerable staying power and they are fixed ensembles, and even as petroleum structures disappear, age, or fail, spatial configurations of oil will shape our future (Cooling and Hein, 2018, p. 88). Besides, the utilization of petroleum products creates a cycle that reinforces the presence of the petroleum industry. On the other hand, imaginaries of new landscapes require a rethinking of energy usage and sustainability. An inclusive approach towards physical, corporate, economic factors that drive the spatial development of oil. Therefore, breaking up the cycle requires starting a stream of applied research and developing innovative tools to acquire specific capacities and knowledge and lead to a deep and operative understanding of hinterland dynamics such as facilitates budget air traveling in our case.
4. References


Architectural Value and Urban Metabolism
The post-oil city as transition to what comes after.
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Synopsis
This paper contributes to evolving the urban environment, which the city commonly represents, by understanding the post-oil period as transitional toward a new paradigm. Transforming the urban toward the coming great changes is developed through orientating toward well being in cities via architecture and spirituality as practices. Turning from circumstantial technological targets, the post-oil city can be planned in specific terms for well being that evolve the urban in terms of its integration with the landscape of the world.

This paper contributes to the evolving urban environment, as represented by the city, through understanding the post-oil period as transitional toward a new paradigm and reshaping urban metabolism through realizing architectural value. This paper interweaves the post-oil city as the familiar technology of Modernism within the existing paradigm of urbanity and the city, architectural value and the practice of architecture’s provision. It describes enabling a transformational period through the ‘post-oil’ moment, whereby ‘post-oil’ is understood as counter to the use of oil and not yet the period that will follow. The end of mineral oil energy and material indicates such a paradigm change, which climate change, biosphere collapse and the vulnerability expressed through 2020 pandemic that so easily causes us to crush the economy, signals to us.

The city is but one kind of urban structure. Perhaps it was once the only kind. The city is our focus due to it typically housing high consumption of material, energy (even if it is less intensive per-capita) and financial centres. It houses the control and power of ‘urban’ development to largely symbolize our civilization. Today the needs of great expansion of humanity, both in numbers - having doubled over a life-time - and personal consumption, have extended the urban condition far beyond city pin-points of intensity. ‘City’ is proposed as an intensity of urbanity, while urbanity has extended to cover the globe. Supplying the city with resources extends over the horizon and deep into the ocean.

The urban system of urbanized striation, valuation and communication is global ubiquitous state of dwelling in the world, while the character, depth and breadth of non-city urban is not clearly taken into consideration. The words ‘city’ and ‘urban’ are commonly used interchangeably, tacitly opposing urbanity-as-city to the rest of the world.

To explore urban technological space fully we may consider the quality of ‘rurality’. A village or town is a kind of rural space, but are we simply creating opposing elements by considering ‘village’ as a parallel entity to ‘city’? Rural places are assertions of a relationship to the Land that supersedes the pervasive urban striations across the world. In the past century many governments went about eradicating nomadic cultures. Why? The nomad occupies rural territories that the urban needs to re-territorialize with striations and limits for the sake of creating reserves and control points for the flows it generates. In North America, the majority of peoples as well as the buffalo and caribou that travelled great migratory routes are not permitted. They contradict the static urban structure of economy of ownership and finance based capital management rather than stewardship.
Villages and towns are integrated with the landscape having at least in their past had an agrarian basis or one of harvesting from nature, such as wood, minerals or sea food, by which they were founded and formed. Rural settlement tends to adhere with the geographic and life forms of the land and are more interactive with nature through agriculture and cultivation that is more directly dependent on the earth’s life. Rural places are generally in a functional relationship with urban structures, e.g. the economy of farming in landscapes that are under the influence of urban structures and systems. They serve urban centres and are coordinated by them financially. The urban refers to attributes of the land for specific tasks such as terrain in terms harvesting resources or simply slopes for drainage or for collection of water, limits for erosion and vehicular movement, lakes to sequester toxic materials, as well as proximity to transport and economically derived centres. Urbanizing structures include industrial farming to harness nature ever more deeply, enframing nature according to human production values. This is much as scientific method forms questions that isolate attributes in terms of problems and solutions. Urban systems overlay natural environment and may allow nature to continue, contradict it or act to eradicate it. Urban structures appear as cuts and deformation in a natural setting, appearing as damage in most cases. This is not appealing, so it is largely ignored. We do not often experience the urban as such in a natural or rural setting. Figure 1. This in urbanized intensities and intensively farmed areas cause profound diminishment of life. Nevertheless, we all feel the quality of rurality. I propose to reverse for many of the readers the concept that we are settling in the natural world, huddled in towns and cities. It is the rare valley such as the Incomappleux that is free from urban overlays. Figure 2. It is now the rural that ekes out its corners lovingly and beloved of its citizens. Such places supersede the urban experientially and yet they are also different from ‘being in nature’.

The relationship of the urban to nature and to rurality, and the latter to each other, will be profoundly important as the present status quo dissolves and evolves. How does the rural supersede urban territorialization at rural places? What are truly rural features? Where does the urban end? This is questioning to understand what the urban is. It is a matter of sensitivity and honesty to recognize the signs of urbanity.

How does this relate to the post-oil city and architecture? Architecture is proposed as the successful outcome of planning and settlement development. Architecture is proposed to be based in consciousness. Material, construction, technology, with building, design and
planning not conflated with architecture are considered architecture's means. Although they are intertwined with our needs and intentions, those are not the outcome of architecture and its value. We will outline a definition and grounds for architecture about life's need for consciousness and its support for well being that expresses the post–oil city as threshold to an evolved urbanity and the city, whereby rurality may gain strength, absorbing globalized urbanity.

1. Technology and Nature as Other.
The Land, nature and its life are understood today through technological valuation as quantification of narrowly appropriated qualities. These are parameters that do not comprehend what cannot be asked as a scientific question. Modern science is method leading to decisive conclusions to posed theses. Architectural and planning education promotes ‘inferences’ as taken from case studies in the same sense. We intend objective proven tenets that require parameters that ‘enframe’ the world, using Heidegger’s term, according to the technologically defined purpose at hand. What cannot be addressed becomes exterior to, or concealed in or as our technology. (Karassowitsch 2015) We have taken up a technicist proxy of building and planning for architecture and well being.

Urbanity is part of this. Nature’s reality eludes our technological urban-encoded landscape. Nature is ‘the other’ in this arrangement, often seen as an enemy. Rural life is often seen as backward according to the advancements commonly accepted as part of the technology driven future. The values of ‘progress’ are based in technology and its corresponding material values are formed to correspond to financial assets. The unspoken, un-integrated and concealed aspects of world include almost everything that makes us human, such as capacity to grasp nature’s not-systems and purpose, the source and nature life, love, consciousness and its purpose, and life’s value for its own sake. The terror of our environmental disaster is that it is the result of this absence. Technology has evolved from its antecedent forms to facilitate a capacity that, with a vast increase of humanity in numbers and in the power we harvest from earthly life, has come to operate at a scale that has an effect challenges the planet’s nature altogether. This is not withstanding the evidence that very small events also have repercussions of change in the flow of life around us. Either way, every particle of energy we use would need to be considered, whether we are sensitive to each particle or the sum. Where the measure of life and consciousness is determined it is partial as ‘enframed’ reserve, circumstantial or as common signifiers. The difficulty of thinking other to the concealing technicist tropes of our culture is daunting because the concealing of (our) nature is itself concealed.

Architectural practice and urban planning often intends the same concealing. The use of styles in the 19th century is exemplary. The proper application of a style was socially safe both in terms of opinion and any lack of skill on the architect’s part (Ruskin 1984, Obedience) and as a symbol that architecture was intended for a project. The eclectic use of styles by 19th century architects has migrated to building technology in Modern and Post-modern architecture where it is incumbent on architects to use ‘proper’ technology to signify architectural merit according to technicist economy and finance by which a project gets its general social approval. It is taken as scientific and reasoned, but the vast failure for betterment belies lack of efficacy. To understand this we need to look beyond technological reasoning and see the integral, emotional and loving assumptions that are concealed.
2. Architecture’s Capacity.
Architecture was part of humanity long before our present Modern machine ages mineral hydrocarbon and electricity based technology and its economy and cultures. We recognize architecture even if it was made in cultures other to our own or in vernacular structures (Rudofsky 1964) or in the distant past. It is a common human capacity based in mind and its conscious awareness. This has long been required when we find the need to change our environment as how best to accommodate ourselves. This ‘questioning’ is not about problems. Architecture comprehends human consciousness that demands recognition of being and purpose. The issue that we face is the reduction of needs to physical and material evidence, when in fact everyone is dependent on aspiration.

The positive aspect that founds architecture is aspiration. When any situation is dealt with consciously, human aspiration is addressed. Architecture is at a locus that provides for aspiration, even if this is concealing in materialist objectivity. We are all dependent on love and we claim the need for quality of life for the wellbeing of those whom we love, including ourselves. As we find ourselves in our world where valuation is as object measurable terms of science and technology, the beautiful soft subtlety of love and life’s meaning is concealed. An environment that we call architecture is, therefore, not directly objectively architecture. Experience in such an intentional environment is how we attain architecture. Architects prepare such a locus, be it an alcove, a room, a building or a sector of a city, for unknown persons to experience as architecture. It is our individual awareness itself that is re-formed when we experience architecture presencing of architecture. Many of these places are so iconic that their symbolization of architecture is more important and overshadows their quality as experience. The Mona Lisa by Leonardo Da Vinci is an example of the object’s meaning replacing its experience. See Figure 3.

The experience of presencing aspiration is awareness as their inner aspiration that is presenced at that prepared locus. Architecture is experience with one’s original aspiration at that locus. It seems miraculous that anyone could ever do this, yet we have many examples over time and across humanity. These are amazing factors that shift the miraculous reality of humanity to attributes of architecture.

We are not taught this as practitioners and we do not get paid for it. Instead we are paid by the brick. There is no structural discrimination between architecture and its (building) technology within the modern profession. Architecture is the venue of the human condition that presently creates the technological problem/solution mode of approach concealing in the technological hegemony. We gladly use the word architecture while few of us do more than heartfully realize what that is. However, what other aspect of human life is so widely accepted with so little agreement as to what it is, or deeper comprehension? It is necessary for practicing architects to be mindful of this and evolve a more definitive common approach. Project-based conceptual thinking of planning and architectural practice to facilitate the provision of architectural value informs any scale in the world-as-urban and comprehends the
therefore, as the value original to consciousness whose only sibling is spirituality. Not religion, but the inner value of heartfelt evolution and practice is meant by spirituality; the glowing heart of any religion is the experience of it founder. Architecture is the worldly outer form while spirituality is the inner form of the freedom—of—choice in individuality and freedom—of—duty to life’s purpose, which we confront when we take action. Architecture’s capacity is that it supersedes current technology in comprehending aspiration and well being. This can be evolved in practice. See Figure 4.

The current transition that we face is not only away from oil or all fossil hydrocarbon power generation, it is not CO2 or other greenhouse gasses. It must be away from the values and expectations embodied as tapping the power of nature in ways that kill its life. In part, mitigation of technology’s harm, which we call sustainability is needed. But technology must evolve, as it has been for millennia, to a form we will no longer call technology. This is after post-oil cities. Developing after-technology architecture is for other papers. This paper is about a post-oil city as threshold experience that embraces that capacity.

If a post-oil threshold city is to support “continuous improvement of urban material, environmental, social and economic conditions” by “leveraging improving the urban quality and efficiency, “what are the key issues? This paper engages the ‘Understanding Urban Metabolism’ track’s terms of approach in terms of resolving specifically: “separation of urban functions (1), low environmental quality (2), unequal development (3) or insufficient support for urban renewal (4)” to express this.

3. Leveraging our Capacity to Evolve in the Post-Oil City
Before entering into these four specific areas, we will address “continuous improvement of urban material, environmental, social and economic conditions” to express conceptual issues in urban metabolism. Essentially, let us admit that continuous improvement of cities with current technological concepts has not resulted in a culture that functions in a sustainable way, even if it is in a socially stable context such as many in Europe (e.g. Switzerland, Finland or Norway, or many parts of Germany, and France). Even those that are locally stable require wealth of the standing reserve that the earth’s natural being cannot sustain.
The material and energy inputs of modern technological processes required for their form of culture are those responsible for extracting and harvesting energy and matter on narrow parameters that leave the nature of Gaia staggered and at the threshold of deep perennial change. Cutting the enabling wealth, which includes finance and banking, in countries like Austria, Germany and Switzerland, and they would nevertheless be a well placed compared to 150 years ago on the basis of today’s gains. Such changes will not force us to forget what is essential knowledge, including material gains understood through the modern machine ages technology. But those remnants would remain piecemeal fragments of nature.

To claim that our urbanism has a metabolism is aspirational. It may be euphemistic. The systems we use are a facsimile of metabolism, which is a natural condition. We are far from having a metabolism. We are far from having even ‘circular’ systems. Cities and the world would suffer from fatal metabolic issues, if we think it to be metabolism.

The need is for more foundational grounds than altering and improving so-called metabolic pathways. Our society will disintegrate along with the changes required of large components of the environmental context that we have so generously and lovingly been brought to this stage by. Urban metabolism as city versus rural and machine age technology versus nature will come to a close.

This is not as frightening as it may sound to some. Every minute of our existence we rely more on our inner experience than we do on what our systems may give us. It is possible to move beyond the need for belief in matter and technological systems and to be able to say, “I don’t need belief. I know.” Our individual inner worlds demand the focus on improvement that we have lavished on the outer world. There is ample evidence that it is our inner spiritual world that many of us yearn to perfect in order to have the life that functions with the greatest possible success. Spiritual practice, which is ancient and ongoing develops this. This paper relies on such practice and the sciences behind them. I take the liberty of calling them sciences — plural — because these are precise and adroit processes that include what technological sciences do not. The science of evolving consciousness is directly involved in the higher attainments of intentional environments that provide for architecture, registering the well-being that technological science cannot measure. When we look at this from the point of well-being, accepting that we are consciously aware and rely on that every day for everything we do, urban metabolism must include conscious awareness that the human made world might one day join the metabolism of the earth.

If we strike enabling “continuous improvement of urban material, environmental, social and economic conditions” based on technological means that do not inherently support wellbeing or the earth’s natural capacity, what is available to us? Then what do we look toward? It must be through refining the role of human consciousness or conscious awareness and its role in the world. It is in support of this, which is commonly called spirituality, that the capacity of architecture may be leveraged and appropriately valued. Architecture inherently leverages this as both need and capacity. Architecture has for millennia been the worldly manifestation of the need and the discovery of our role in the world because of this link. A vision for an after-technology planning and any environment has as its base the conception of human life as an essential role in the life of the earth. This is not merely poetic. It is far beyond sustainability as a concept. Nothing less will do. This must be valued by a functional quorum.
of many others. It is a blessing that architecture is already accepted by the vast majority of people.

4. Four Parameters
Accepting the possibility of an after-technological transformation lead by architecture based on the above, the following 4 elements are developed to challenge what leveraging cities’ “metabolic quality and efficiency” means in terms of well being. This becomes an architectural project based on its superordinate programme to provide environments that support the responsibility that consciousness gives.

4.1. separation of urban functions
becomes cooperative whole of transformed after-urban settlements

There is a symbiosis between rurality, nature and architecture. Rural settlements derive a functioning structure from the landscape based on its whole intensity. The matrix of settlement is integrated with nature on its terms, in the way that rural settlements are created with the Land, rather than urban settlements that impose on and oppose nature. The urban superimposes across the world while the rural supersedes the urban where it occurs. This may begin with farming but as we see in Feng Shui and Vāstu, we may create settlements from within landscape and have done so for millennia. This means farming of all sorts, not only urban/city–farming and other land-based activity zones which has already long been within the urban structure.

Our current technology, including communications, allow for distributed power, services and manufacturing. If planning cities aspires experience of architecture, which is by nature service to human aspiration, and not service to modes of technological enframing, urbanity will evolve, to its after-technology form. The city will dissolve within the current urbanized world. Distributed technology is meant to provide the means to live in a local manner, in many places, with minimal shipping. This may include all production and higher quality with changed motives for mass iterative production. The relationship between the Land and settlements will change

The foundational tier is architecture as service to human consciousness and the life that we are indebted to. Systems can be light and the hardware needs to be light. After-technology architecture can, however, only be living and production will turn to nature as nature produces. The growth of this would de-emphasize density (i.e. as not a priori bad or good) and prioritize integration of distributed services and integrated with of the Land. We all live in the Land, no matter what the structures we make appear as. This begins to absorb the city and its division.

4.2. low environmental quality
high quality environments depend on high quality society

Low environmental quality is a direct result of goals other than well-being. The argument goes that if we increase wealth and if we increase technological efficacy we will also increase well-being. It is unfortunate to have to recognize that these are circumstantial targets have no obligation to result in well-being. The inexorable growth of a wall of difficulties that do not allow themselves to be solved by technical means is becoming undeniable. Climate change, which has not seen any significant remedial results over decades of producing initiatives and
agreements, is one of these. Another is the entrenched slums in countries such as India where the development of wealth depends on the very poor. The evidence that slums are central is relentless claims of removing and reducing slums whereas economies are socially and economically dependent on differential wealth. The occasional eradication of a slum, like pest removal, only demonstrates the powerlessness of those people, not betterment. See Figure 5.

Architecture as a profession languishes because it reflects the same structures of exclusion and misappropriated energy, if our professional association’s aims are also based on circumstantial goals. Our means for intentional environments are building technology, like a form of equipment. Science and technology and all of the learning of architects needs to be applied to well-being not to building and physical places. We discuss ways to ‘design’, (i.e. to use the equipment) within parameters that set a careful limit as to what is asked; we end up playing games. Nevertheless, necessary aspects of architecture are responsibilities that we cannot leave behind fully and still claim to be architects and planners. They are combined with or subverted in terms of the value of technology. I refer to the discussion of Heidegger in his *Questioning Concerning Technology* (Heidegger 1977) that technicist action and society conceal what technology cannot measure and capture.

Urbanization brings material and power toward cities. It changes the Land where the resources are taken. Bringing that harvest to cities’ intensified urban locations of habitation has a great deal of force against the environments through which such action passes. If we are concerned with wellbeing the damage to these corridors and spaces of transport would also need to be vastly reduced. If sound and pollution are removed we would enable awareness that the movement and the vectors of energy created by transporting gigantic amounts of material and energy remain unpleasant and harmful. We may gradually enhance our sensitivity to find that no matter the refinement of process for the speed and tonnage of movement current technology facilitates, it is to our detriment. An example of this can be taken is the orcas in the Salish Sea in western Canada and the northwest USA. They suffer dramatically due to increasing tonnage of the ships moving through the sea. Noise is a factor, also ship strikes and their environment is deteriorating. Are orcas be more sensitive than human beings? Is it possible that if they are harmed, we are not? The attention that they get makes it clear. The contaminated water problem in Flint Michigan that has not been corrected for a generation belongs to this questioning. We are unable to fix the circumstances of the Indigenous people of Canada. Technological thinking in the form of norms, appropriating resources and controlling movement is the harm. Urbanism requires corridors of power that destroy quality to deliver circumstantial goals. We are hoodwinked by our circumstantial needs and by inability of our conscious minds to overcome negatives - this includes delusion. Those negatives amount to legions of mentally ill people, and misuse of millions of lifetimes. Lack of sensitivity is not grounds for acceptance. Technology cannot measure well being, but we must, nevertheless, know our well being within.
High quality environments would reflect high quality cultures and societies. Without consciousness of this fundamental contradiction we cannot provide betterment. Architects and planners who gain awareness of architecture’s essential character are among those who contribute to ‘high quality’ culture, reflecting it in the intentional environment. If architecture and planning have wellbeing as a primary goal, they will begin to be activist in supporting higher quality environments.

4.3. unequal development

Environmental equality decoupled from personal wealth

Unequal development is the manifestation of our social systems that thrive on inequality and create social and individual issues for exploitation. Unequal development stems from the need for environments to support well-being. Inequality is grandfathered in to planning and architecture that have not developed based on inequality. Unequal development manifests a system that is does not prioritize well being. The phenomena of our machine ages enframing action of technology is to gain maximum standing reserve in the service of humanity’s expansion and the improvement of access to material and power based means. This is concealing whatever it is that nature is actually doing with this technicist understanding that is expressly not nature’s. Because we use this technicist form of knowledge that functions to conceal, although we are part of nature, we will not comprehend nature on her terms and those terms that support all life are subverted.

We ‘enframe’ nature, including our brothers and sisters, for material benefits. To express that nature is generous is qualified, since we are an integral part of nature so that we would not exist without it while nature would not be whole without us. We may perceive it as generosity, but the inherent responsibility of human consciousness in the world requires that our lack of generosity reflects in nature’s action. Our ‘utilization’ of nature’s attributes through technical economy and finance does not exclude people’s poverty. We seek to gain a maximum of power and capacity out of nature’s realm as thieves. It means admitting that our current materialist objective science based building technology is a tool that can work for well-being but is not bound to. Removing poverty from its integrated role in the economy will mean that our economy and its finance, if finance needs to still exist, will need to be re-grounded.

Cities functioning with inequality implies a mandate for evolution of consciousness or spirituality. Such a mandate includes aspiration, as per architecture’s superordinate program. If this is absent architects and city planners who are not conscious of this will “build” inequality. The battle that Edmund Bacon, the Executive Director of the Philadelphia City Planning Commission, fought with Louis Kahn around Louis Kahn’s planning for the centre of Philadelphia can be taken as an example. The debate is nuanced and explicit. Bacon was a recognized city planner, what Kahn was proposing was unrecognized. It is made poignant by the animosity and apparent anger he still held on the disagreement decades after Kahn had passed away. (My Architect 2003) Non Arkaraprasertkul in his paper on Kahn’s plan and Bacon’s opposition brings us to the threshold of the essential quality that keeps us building inequality. (Arkarapasertkul 2008) See Figure 5.

Kahn’s proposed re-development of Philadelphia’s centre is based on speed of movement and a civic centre. It is opposed by Bacon’s creation of city destinations that are orientated to
economic growth, adding elements to enhance an unchanged city form while supporting the automobile at all locations equally. Bacon considered Philadelphia fully structured, while Kahn planned a layer of infrastructure, addressing well being directly. Bacon attends the economy. While Bacon claims Kahn was merely scaling up architectural planning to city scale, Bacon’s plan provided for buildings around the central city space. The contention of how to handle the automobile resonates with the theme of the post–oil city. Both featured the automobile. Both create space for it, but Kahn handles its character as ‘fast’ and different from walking and other modes of travel while Bacon claims it must occupy the civic space. Kahn’s planning discriminates movement infrastructure that has the attribute of making possible de-linking Philadelphia from being an oil-based city. Bacon’s city includes the automobile as an “honoured guest”. Kahn’s planning for Philadelphia is not post-oil, but it facilitates de-coupling from fossil oil-based power in how he deals with movement.

While the current technological form of planning and architecture is concealing humanity’s nature and the nature we depend on, architecture remains at its heart. It cannot be excluded, and there lies the trouble: Production that is circumstantial to architecture seems possible from within the space of such practice – Bacon’s space – but not from without. Economy concealing the possibility of architecture in its means creates unequal development. Equal development would not by definition engage the difference between wealthy and less wealthy people. If we can agree that the issue is to attain architecture as defined above, as the aim of all human intentional environments, equal development would give everyone the quality of architectural space, whether made of straw or plated in gold.

4.4. insufficient support for urban renewal

Urban renewal will need to be replaced in post-oil cities with a concept that renews our relationship within nature based on community informed by the above three points. Urban renewal would only bring us back to the condition which requires us to create separation of urban functions low environmental quality and promotion of inequality for economic gain. Urban renewal is, therefore, replaced by urban transformation and dissolution and evolving the rural. Even the glossiest most complete and perhaps highest rent areas of the city would fall under this transformation that evolves the city and wealth.

The architect whose realm is of conscious awareness that includes the millennia of seeking its fruition, the entertainment of its goals and the duty that humanity has within nature as a
part of its functioning is a key player. The architect is a practitioner of the preparation of environments that support well-being, gaining sophistication like the medicine man who knows the action of every plant and creature. The duty to make gardens on earth, whether it is a machine or of vegetables and flowers, is duty in harmony with ‘whatever nature is’, which very few of us will grasp consciously or attain with our super consciousness. Living architecture does not need renewal, it evolves.

5. The Transitional Post-Oil City
This paper concludes that the post-oil city is potential for defining well being in terms of its support by a built environment which is by its nature architecture, developing a cooperative whole of elements (1), architectural value as ‘high quality’ of value giving measure and form to well being and daily life’s satisfaction in terms of any input situation (2), to support environmentally unified comprehension of human life (3) for evolutionary transformation of urban environments (4). Urban renewal is pointless if it only brings us back to an inadequate model that induces planetary disequilibrium and human discord. Being ‘green’ and sustainability are low order targets. Professionals may set more informed goals that include transformation based on aspiration. Environmental and social threshold events of greater transformational technological change become ‘Urban Well-being Agreements’.

1. Living and production will turn to nature as nature produces. The growth of this would de-emphasize density (i.e. as not a priori bad or good) and prioritize distributed services, integrated with the Land. Separation of urban functions can be dissolved. Considering the urban rather than only cities allows us to create in the form of the Land, transforming urbanisation to dissolve the city as isolated intensity. Such after-post-oil places form in harmony with the Land and would eschew the capacity to striate, overlay and ‘replace’ nature with reductivist process that cuts and obliterates. Our intentional environments become a cognitive whole that understands human responsibility in terms of the earth.

2. High quality environments represent our social cultural and individual condition materially and spirituality. Architecture is aspiration from within that. Architecture inherently supports spirituality and fullness of parameters in its superordinate programme. If this is taken up, the environments will evolve the higher quality.

3. Equal development. Architecture as the higher aim of any intentional environment creates equal development in terms of well being. This has less to do with the material used and more to do with the experience of architecture.

4. Urban renewal is replaced by environmental transformation beyond urbanism-as-technology. The post-oil city is a threshold for transformation beyond sustainability and toward the after-technology architectural paradigm for well being.

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1 Karl Popper clarified this aspect by challenging the 'method/inference' model that science generally holds with his concept of 'falsifiability' which says that, "A theory is scientific only if it is refutable by a conceivable event." Even if one does not accept this, it does indicate purpose in clarifying what science and the technology based on it represent. See Thornton, Stephen, "Karl Popper", The Stanford Encyclopaedia of Philosophy (Fall 2018 Edition), Edward N. Zalta (ed.), URL=https://plato.stanford.edu/archives/fall2018/entries/popper/ Visited August 14 2020.

2 'Enframing' is term created by Lovitt, Heidegger's translator for the German Das Gestell. "As "Enframing," that claim ceaselessly brings both men and things to take their places in the stark configuration that is being wrought out through ordering for use. This challenging summons, ruling in modern technology, is a mode of Being's revealing of itself. Yet in it, also, Being withdraws, so that the summons that thus "enframes" is all but devoid of Being as empowering to be. Compelled by its claim, ordered and orderer alike are denuded. All that is and man himself are gripped in a structuring that exhibits a mere skeleton of their Being, of the way in which they intrinsically are. In all this the essence of technology rules." Heidegger 1977 p. xxix-xxx.

3 These practices include satshtantra, Buddhism, sāmkhya, gnostic forms of Christianity (Cloud 2005), the many approaches of hathayoga and rajayoga (Vivekananda 1978), e.g. Heartfulness.
Lorraine Gonzales is a senior land-use planner that has practised in the public sector for the past 26 years. Twenty-two of those years has been at Clackamas County, a public jurisdiction within the Portland Metropolitan area of Oregon, USA. Her past work has a focus on long-range planning to include master planning of rural communities and urban light rail communities. She has also participated in transportation corridor projects, developed County Code, zoning development ordinance and comprehensive plan amendments, and reviewed commercial, industrial and multifamily design review projects. Her current project involves creating development and design standards to ensure future development provides a sustainable urban transformation along a commercial corridor within proximity of a light rail station community. This particular project is termed as a “grass roots” effort in which the community takes on a primary role in partnership with the consultant team and jurisdiction staff.

In the past Ms. Gonzales participated as co-chair at the Durban, South Africa and Gdynia, Poland congresses, and participated as a local organizing committee member for the Portland Oregon congress. For the Portland Oregon Congress she coordinated with three local Portland Metro jurisdictions to ensure a Young Planning Professionals (YPP) project was available at the Congress, and served as a local YPP project mentor with the two ISOCARP Congress YPP mentors. In addition to ISOCARP Congresses, she has participated as a UPAT member for the Stiges IV Project in Spain.

Hanna Obracht-Prondzynska is an architect, urban planner and spatial data scientist with an experience gained while working on urban projects in Poland, USA, China, South Africa, Romania etc. For the last five years she was a spatial planning specialist at the Pomeranian Office for Regional Planning (Poland), where she was working on the development plan for the Pomeranian region and the metropolitan area of Gdansk-Gdynia-Sopot. Additionally, she codesigned policies for urban functional areas and introduced conceptual studies such as the urban development among the Pomeranian metropolitan railway.

Currently she works as a researcher and lecturer at the Gdansk University of Technology, Faculty of Architecture, Department of Urban Design and Regional Planning where she received her Master’s degree in architecture and urban design. She also studied at the Vienna University of Technology and graduated Warsaw University of Technology as a GIS analyst.

Since then, her professional practice focuses on data driven design while her research concentrates on enhancing urban data management and data visualisation aiming to introduce tools for shaping and implementing urban policies and supporting urban processes.

She is a cofounder of GUT Urban Data Lab as well as a board member of the Polish Society of Town Planners. In the ISOCARP she participated in congresses, coordinated YPP workshops and introduced Mentor&Student Research Lab platform for e-research cooperation.
Tract 2 of the congress brought diverse topics as a base for an interactive and engaging discussion focused on the economic diversity and resilience in post-oil cities reliant on establishing framework plans and strategies to guide local economic investments in response to global economic trends. What drives a city’s economy is dependent on understanding how to maintain a balanced and diverse economy, acknowledging the post-oil realities and global competitions, and acting on relevant opportunities across economy cycles. It is essential that cities engage in future debates to contribute, shape their knowledge-based society and to develop a diverse and circular economy. The speakers within Track 2 have been looking for an answer to what extent the generation of knowledge, sustainability, and innovation will influence a city’s economic and development structure that was previously focused on traditional oil-based production.

The submitted papers featured the list of topics below:

- Circular Economy
- New economic models for circularity (influencing current city development – sharing economy, online vs. locality)
- Regenerative approach and spatial factors for economic success and resilience
- City Planning and economy for planetary crisis
- Green economy & regenerative approach (recycle and zero waste)
- Tourism vs. environmental justice
- Financial services for resilience
- Aspects regarding structural flexibility for economy opportunism
- Data collection for monitoring & elevation tools for implementing regenerative based solutions
- Data driven decisions for net-zero

**Problem & focus**

Two sessions covered the content of Track 2 within which the speakers presented the challenges and possibilities of the implantation of circular economy. By reviewing different cases of smart sustainable models, they formulated recommendations of practical nature to guide urban economy and introduced planning solutions applicable in the post-oil urbanism. As the cities today need economic diversity to diminish development disproportions, they emphasized the role of sharing and green economy but also regenerative approach to enhance the implementation of eco-town concepts and shaping compact urban structures.

The first part of our discussion was focused on different dimensions and approaches used to establish a circular economy. The intent was to examine on how urban models used by the cities around the world, approach the implementation of circularity to shape the post-oil urban environment. By assessing smart sustainable urban models the sessions brought questions on how the city’s resilience has been improved and what policies surfaced that could be recommended to policymakers.

The second part had seven presentations that focused on current policies and recommendations used to guide local economic investments based on planning solutions that shaped compact urban structures, and featured case studies that addressed how economic diversity was applied to reduce development disproportions, restore and sustain future urban concepts, and green economy needs to create holistic and knowledge-based models to enhance the implementation of eco-town concepts.

The discussion brought regional, metropolitan, and local perspectives to emphasize the role of the integration of urban processes, communication
techniques, and technology for strengthening urban resilience, engaging societies, and developing smart urban data management techniques to ensure the circular economy-based approach.

**Urban Policies and Models Enhancing Economic Circularity**

With a question on how city scale, challenges, partnerships, and current economic approaches can transform urban strategies and policies, we examined case studies from Russia, Poland, China, Europe, Canada, and India that addressed the following topics:

*Circular economy influences and operational principles:*

- The role of labour forces in developing countries and its influence on the economy.
- How the circular economy and new jobs and the labor force level?
- New policies related to circular economy.
- Transformation of sustainable urban strategies to improve the quality of life.

*Data Tools:*

- The importance of qualitative and quantitative data analysis.
- The role of data reporting tools to define the economic needs.
- Economic models to assess consumption and demands of goods.
- New trends with a focus on environmental and ecological economies.

**Approaching circular economy**

The new urban policies are strongly focused on the economic performance factors of sufficiency, sustainability, urban metabolism, maintenance of waste, renewable energy, diversity, eco-effectiveness, and industrial ecology. The cities today need a transition from the economies focused on a consumption of goods and demands to the new trend of circular economies focused on environmental and ecological aspects to optimise use of resources or even to shift towards regenerative planning. The operational principles of such an approach focus on the prevention and reduction of resources, employ innovative practices to reuse materials, maintain and repair resources, and improve, recycle and recover products. As the cities today face the consequences of climate changes and increasing urban dynamics it is important to maintain resource values and reduce the system size. Urban optimisation and the shaping urban resilience become an urgent need calling adaptive planning approach. There is a need to design and educate communities to apply circularity and adaptability within the urban policies and strategies.

Establishing a circular economy for a developing countries brings the ability to provide solutions allowing urban optimisation and shaping better quality of life. It creates a base for new jobs, increase of job skillset levels, provide a new form of consumerism, to breakdown social disparities, and to create a balance of social equity. The new consumerism opens an opportunity to interlink the developing countries to a global scale economy and introduces technology advancements that provides a needed job level advancement.
As a good practice it is worth mentioning the case of three urban level circular featuring the Canadian cities of Toronto, Victoria and Collingwood. The basis for these three cities was to demonstrate how size determines the approaches used to define sustainable circular economic practices within that urban environment. Furthermore, it shows what practices provide effective development opportunities empowering communities and supporting urban resilience. The case mentions the keys to success: (1) infrastructure costs are both a private and public responsibility, (2) public participation plays an important role on sustainable policies and the inclusion of sustainable environment and community revitalisation, (3) community involvement is a strong force due to housing functioning as the largest tax base revenue source, (4) urban life relies on natural resource preservation. For all three of the urban case studies economic challenges exist to support public service, infrastructure demands, and social justice. The tax base and public participation provide sustainable goods, policies and the ability to increase density, and partnerships between public and private entities are evident for adoption of policies.

**Data-based tools and bottom-up initiatives to empower the implementation of circularity and to shape adaptative cities**

The role and importance of data tools were addressed during the discussion as they allow to assess the economic shortcomings and to define the needs to enhance, redefine the economic status and improve the quality of urban space. Data tools are more often used to identify existing conditions on the local and spatial levels to evaluate exogenous influences, to define economic needs and contribute toward finessing of policies and strategies to improve and expand the economic success of cities. The importance of identifying urban functional areas and thinking outside administrative boundaries was stated to contain economic stability within a city/town/region. Essentially, data tools are used not only to depict the current status of the functional, sustainable, infrastructure conditions, diversity within a city, and a city's character, but will also help to identify where economic shortcomings exists and to what level improvements are relevant to expand the economic conditions.

The presentations further ascertained that a multi-ministry involvement and bottom-up initiatives are necessary and should be prioritised to determine where development should occur. The statement also assessed that the case study projects proved more successful when starting at a small-scale approach, such as public spaces, to establish a more effective economic status within a city/town/community to help focus on local centres of a city and prioritise where development should occur to protect and strengthen the local economies of a city/town/community. By factoring this data into the equation, the result was the creation of a welcoming environment thereby inviting an increase investments and stable economic status for the city.

**Conclusions**

For the successful implementation of circularity, adaptability and urban resilience the first step is to examine and analyse limitations, challenges and opportunities on a macro and micro level. Data-driven approach occurs as a supportive tool for real-time monitoring and shaping responsive urban structures. Data tools are essential in the determination of a city's needs, to define where economic growth falters, and where it has the potential for growth.

As the resources are limited while at the same time, we are facing a need of the implementation of regenerative approach, smart planning is necessary and should be based on prioritising recognised conditions and needs. Such approach should be adopted in the form of new policies followed by new financial modes to fund and invest on circular economy infrastructure. Additionally, establishing metropolitan boundaries
can ensure suburban growth is managed and not in conflict with economic and sustainable impacts and potential growth for the city. Urban dynamics need to be recognised to pursue transformative changes and building capacities that will direct growth of a city or community and support citizens of that city or community.

Territorial Oriented, Evaluation and Definition of Transformation Needs

With a question on how new urban economy models, rapid development, changing lifestyles and urban dynamics influence the urban environment, we addressed case studies of China, Brazil, Italy, Portugal, Indonesia and England and tackle the following topics:

- Economies of informal settlements and the consequences of gentrification
- Evolution and transition of industrial lands and office districts & workspaces
- Regeneration and real estate influences, and reconfiguration of districts and buildings influences
- Challenges that drive transition of the economic environment
- Collaboration efforts for transition of urban workspace
- Urban tourism
- New Big Data for assessing urban transitions

Urban transformation for climate adaptability and resilience

The need of transformation of industrial lands was tackled during the discussion. Based on the Chinese case our speakers evaluated an eventual transformation of factory-based industrial lands to technology-based land uses. New land patterns are shaped on the bases of global industrial influences. Analysing such process both pros and cons of such transformation can be defined. Surely to empower smart development technology-based employment is crucial to urban growth and economic development in the regions and serves as a substitute for land a capital growth. The cons however show an inefficient transformation due to productivity levels and intense land use being compromised and disproportionate based on health and environment risks and impacts.

Urban regeneration empowered by sharing economy

A significant part of the discussion has been focused on how sharing economy contribute to the process of shaping urban dynamics, lifestyles and healthy urban environment. The cases of Sao Paulo Brazil, Italy, Lisbon, Indonesia, and London have been mentioned. Additionally, the presented cases showed how the urban planning can benefit from social media data and how urban dynamics are shaped in terms of increasing role of economic models used by Uber, AirBnB or other similar. Informal settlement of Brazil addressed squatter communities and the transition of how mobile and internet technology provided connection to other settlements that otherwise would be disconnected from the overall region. The technology introduced Uber and AirBnB as economic resources to supplement the economies of the Sao Paulo. The growing market allowed the economy to thrive for private investors rather than a community benefit. The consequences associated with Uber was gentrification and the omission of community welfare. Uber focused on the capitalism concept as oppose to a social enterprise. The Airbnb economy however focused on community profits instead of the capitalism concept to serve single ownership for financial gain.

Additionally, our speakers showed how the office districts are transforming as the coworking and sharing workspaces become part of new urban lifestyle. We explored the concept of regeneration of tertiary office districts and the influence of positive outcomes to regenerate and modify office spaces. It was found that
co-working office spaces bring more job and economic opportunities aligned with energy and innovative locations. This model provides possibilities for multi-modal interface that can integrate cultural and artistic concepts and provide important economic centres.

Local economy benefiting from urban dynamics and global trends

Discussed case studies showed that the conflicts between the spatial plans and tourism plan exist. As the tourism market rapidly develops, the urban demands increase for accommodations and other tourism needs. It can result in natural environment damages, increased consumption of resources, increase in real estate values and gentrification along with the quality of public safety realm. However, as the local economy can strongly benefit from global trends it is important to feature collaboration among urban spatial and tourism planning efforts. It is only possible when providing a balanced approach to the development of urban economy serving both residents and tourists.

Conclusions

Urban form is strongly influenced by economic changes and practices. By targeting a different economic market based on technology and education positive fiscal influences prospered in the region and for the country. Sharing economy changes urban dynamics and shapes urban lifestyles. It can further result in the need of adjusting urban environments to changing urban patterns and living choices to help shape inclusive cities.

Possible solutions and the need of reconfiguring the urban environment has been found. To shape circularity and urban resilience we need to integrate initiatives shaping inclusive and consider domestic labour, environment, social health, and functional elements in the singular design concept. Incorporated new functions and services can help shape healthy workspaces and environment for comfort and productive engagement. Such places call for pedestrian connectivity, should incorporate natural elements, need to rethink on a spatial level to conform to contemporary city needs and demands, require recognising the economic influences on a spatial level and urban space.

Collaborative efforts integrated and responsive planning would help to resolve future impacts as the economic and infrastructure needs of the city and surrounding communities are realised.

The key to success

The discussion has proven the need for knowledge-based models for smart policies implementation. Our cities call for data-driven planning responding urban dynamics. More importantly, in terms of climate changes and evolving urban processes, there is an urgent need for real time-monitoring, which can ensure urban resilience and economic diversity. To shape adaptive and resilient urban structures the cities need to define a way to benefit from new technological and economic solutions. Big data and constant data flow as well as sharing economy established a new base for urban changes allowing not only for analysing urban processes but also changing urban lifestyles. Such an approach can support the process of shaping urban circularity and resilience while enhancing the implementation of smart policies and ensuring eco living choices. It can further result in diminishing the negative consequences of climate changes and reducing the use of resources. Transition from sustainable to more regenerative planning based on data-driven solutions and new economic models can ensure urban resilience and adaptability of our cities and it can help to provide healthy urban environment and economic diversity.
Selected Papers

1. MORGADO Sofia, TOMAZ Elisabete, HENRIQUES Cristina, MELO Patrícia C., Coworking in Lisbon: experiences of collaboration and sharing on changing urban contexts

2. GODINO Federico, Effects of platform economies on informal settlements in Sao Paulo, Brazil settlements
Abstract

As innovative and creative ecosystems, Coworking Spaces (CWS) show high adaptability and recovery capacity in facing global event disruptions. This article is an exploratory study that aims to approach the development of coworking spaces in the city of Lisbon. It investigates the location patterns and adaptation of such ecosystems in Lisbon, by mapping the phenomenon and examining its spatio-temporal dynamics that was influenced by the urbanisation phases of the city, as well as the development and planning policies designed over the years. Starting from a broader view of CWS location in the city, this article moves on to present two particular cases, implemented in a different time and socio-economic circumstances in different parts of the city: LxFactory and The Creative Hub. This study is part of a broader contribution to COST Action (CA)18214 "The geography of the new workspaces and the impact on the periphery".

Keywords

Coworking Spaces, Spatial Patterns, Creative Economy, Urban Development, Lisbon

1. Introduction

The concept of coworking emerged in early 2000 (see, e.g. Moriset, 2014; Gandini, 2015; Waters-Lynch et al., 2016). These collaborative spaces proliferated rapidly all over the world. They tended to locate on renovated and reconverted urban deindustrialised or brownfield areas, providing shared offices and hosting a variety of activities for different types of users, including events, training, and networking sessions, among others. Its members, mostly freelancers, entrepreneurs, startups, small companies, seek values of collaboration, openness, knowledge sharing, promoting partnerships and social interaction (Fuzi, 2015; Merkel, 2015).
Innovative and creative ecosystems, such as Coworking Spaces (CWS), have attracted the attention of the media, politicians and academics, due to their ability to adapt under pressure and provide new alternative solutions for work activities and work regimes, thus stimulating urban regeneration processes (see for example the work of Akhavan and Mariotti, 2018; Durante and Turvani, 2018; Capdevila, 2019).

Despite the popularity of CWS, to our knowledge, there is no systematic and interdisciplinary approach to the study of this phenomenon in urban studies fields, specifically for the Lisbon Metropolitan Area. A holistic vision can promote a more comprehensive and integrated action to solve urban problems and achieve long-lasting improvements (Roberts, 2016). The changes brought by the emergence of CWS have sparked a debate on how to best respond to current and future crises, and their effects on cities, work patterns and life routines.

2. The research background and review

The spread of coworking practices and the enthusiasm for their ability to improve the socio-economic conditions of knowledge-based workers (Gandini, 2015) is based on the shifting nature of work, the essence of knowledge networks, labour markets dynamics, and a growing discourse around proto dynamics of class recomposition (Arvidsson, 2014).

Albeit still scarce, influential research in creative industries studies (Gill and Pratt, 2008; Pratt, 2008; Grugulis and Stoyanova, 2011, no date) have shown how knowledge workers are mostly freelancers and precarious professionals, often in the early stages of their careers, that need to manage social capital and to be proactive in their professional networks, as a decisive source for incoming jobs.

It is also argued that people in creative occupations who were offered permanent jobs in media firms, willingly or not, have moved to different job titles such as freelancers, 'startuppers' and even 'changemakers' (Bandinelli and Arvidsson, 2013). This path usually leads to the creation of their own enterprise, project-based work, subcontracting, with varying levels of job stability and security (Bandinelli and Arvidsson, 2013).

The rapid diffusion of CWS, mainly since 2007-08, can be partly explained as a reaction to the subprime, then eurozone crisis (Moriset, 2014; Gandini, 2015). From then on, one may observe a growing stream of academic work concerning coworking practices. The Covid-19 pandemic is a second shifting moment in 2020 when lockdowns were implemented to overcome the health emergency, mostly social and economic (Coworking Europe, 2020).

According to Botman and Rogers (2010), the Coworking movement agree with the international online editorial Deskmag data collection, that supports coworking is part of 'collaborative and a 'sharing' economy'. According to Deskmag 2019 Coworking Forecast (2019), there are currently around 18,700 CWS around the globe.

Moriset (2014) noticed that even big firms and corporations who are investing on CWS projects are looking for open office spaces in city centres or neighbourhoods that provide the facilities and infrastructures needed for their work as well as proximity to the urban buzz of the city centre.

In the same vein, Mariotti et al. (2017) confirm that the location of CWS in the core of Milan may be explained by a high density of firms and population, good local public transport accessibility, skilled labour force availability, as well as the proximity to universities and research centres.
In turn, Boschma (2005) states that geographic proximity is not a sufficient condition to sustain aspects of innovation, interaction and knowledge exchange, but other essential forms are needed - cognitive, organisational, social and institutional.

For Capedevilla (2015, 2019) one of the main reasons for choosing a CWS is the proximity to coworkers’ housing as well as the proximity to their customers, or being in a central location. However, localised innovation spaces, such as the CWS, involve formal and informal interactions between individuals, communities, and firms.

The search for a better work-family balance is also considered decisive for CWS’ professionals (Tremblay, 2019). CWS founders’ social bonds with the communities, as well as a central location, infrastructure, human, and financial resources, have also been identified as crucial factors of choice (Tremblay and Scaillez, 2020).

3. Methodology

Urban planners, policymakers, economists and the whole variety of professionals and researchers dealing with metropolitan areas have long sought to understand, explain and – of course - plan the location of human and, notably, economic activities and their impact on innovation and development indicators of a region. Such concerns consist of significant planning and policy documents, including the ones related to the Lisbon Metropolitan Area and its Municipalities. Therefore, several actions and interventions interlink or influence the creative industries location (Área Metropolitana de Lisboa, no date; CML, 2019; Carvalho and Almeida, 2020).

Lisbon’s experience may contribute to a deeper understanding of the phenomenon, benefiting from the participation in the international COST Action (CA)18214 "The geography of the new workspaces and the impact on the periphery" (www.new-working-spaces.eu).

The overall architecture of the COST Action (CA)18214 provides a methodological backbone that allows establishing similarities (or dissimilarities) between the various Metropolitan Areas already studied. Milan, Oslo, pave the path (Micek et al., 2020), but Lisbon is tailing these research developments.

In this Action, typologies of New Working Spaces [NWS] include coworking, co-creation, maker-spaces, and similar structures.

In line with the four-tiered structure of this COST Action, the paper delves into a first empirical approach to CWS in Lisbon, by mapping them as a testbed to the eighteen municipalities of the Lisbon Metropolitan Area1.

The desktop research for CWS mapping was done based on multiple listings, databases, and social networks online2. Data comes from platforms that collect data from CWS, as well as data from startups and fab labs

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1 Working Group 1 Glossary and Taxonomy: Collection of state of the art about new working spaces in Europe and outside. The following activities will be carried out: Task 1.1. Definition of the phenomenon; Task 1.2 Definition of the working spaces typologies; Task 1.3 Geographical distribution and location patterns with a specific focus on peripheral areas. COST Action (CA)18214 “The geography of the new workspaces and the impact on the periphery” (www.new-working-spaces.eu)

in Portugal. Collected data about the CWS location (latitude and longitude) include 148 CWS so far, which has enabled the construction of a Georeferenced Database and which together with other information being analysed will feed a set of indicators. The research is in an exploratory phase, so adjustments are expected.

Figure 1. Coworking in Lisbon – Designing the approach. Source: authors’ production, 2020.

4. Lisbon: LxFactory and Beato Creative Hub

The city of Lisbon is one of the oldest cities in the world continuously inhabited. Located in one of the few natural deep-water harbours in Europe, the Estuary of the Tagus river provided, for centuries, safety against a range of menaces including, but not restricted, to the Atlantic Ocean. It is an inner sea, with a Mediterranean micro-climate condition, faced by a stepped topography in its lisbonesque\(^3\) northern side.

Lisbon settled and conveyed quasi-optimum conditions for trade. Its geostrategic position allowed a competitive position within world maritime routes. Between the Tagus’s embankments, boats of all types would stitch, with fine thread, the fabric of relations between the riverside towns and other settlements.

In recent times, the Lisbon City Council has positioned the creative industries at the heart of the city’s development strategy in order to transform it into one of the most competitive, innovative and creative

\(^3\) Specific urban character of Lisbon introduced by A. Nouri.
European cities in Europe by increasing visibility and stimulating entrepreneurship, knowledge and innovation as well as investment (CML, 2019).

In the approach to CWS in Lisbon, the urban layout and the two relevant moments (2008/09 and 2019/20) - its inherent activities, stakeholders and communities – play the leading role in the selection of Lx Factory and Beato Creative Hub.

Starting from a broader view of the location of the CWS in the city (already mapped but undergoing analysis), this article presents two particular cases, implemented in different temporal and socio-economic circumstances in different urban areas: LXFactory and the Beato Creative Hub.

The first case emerges informally as a response to the eurozone crisis in the former industrial site of Alcântara. LXFactory received the city’s first CWS, recognised as such, the Coworkinglisboa (Roussel, 2018; How, 2019).

The second case, in Beato, was created in response to the growing demand for this type of spaces and regeneration of a former military-industrial complex, refrained by the current pandemic of COVID-19.

These new centralities find support under the Strategy for the Municipal Master Plan for Lisbon (ratified in 2012, with later amendments). The Plan anchors new centralities around the ring railway stations, especially those in need of urban rehabilitation (former industrial fringes) and core areas losing population and activities, civic engagement and a range of innovative activities.

4.1. LxFactory and the emergence of the CWS in Lisbon

The Alcântara neighbourhood became, in the second half of the 19th century, a symbol of Lisbon’s industrial development. Located on the outskirts of the capital at the time, it clustered companies in textiles, metallurgy, typography, chemistry, among others, supported by the opening of several road infrastructures and a new railway line on land conquered by the Tagus River (Pistola, 2009).

The industrial activity in Alcântara was being abandoned and relocated throughout the 20th century, originating a vast abandoned and degraded brownfield area. Several projects were developed for the reconversion and requalification of this area, since the beginning of the 21st century. The place became a vital centrality for the city. In 2007, a new Development Plan for Alcântara⁴ foresaw the preservation of almost the entire industrial complex for the tertiary sector. In 2005, the real estate company MainSide Investments SGPS S.A. acquired the buildings of the former Companhia de Fiação de Tecidos Lisbonenses. Due to the successive delays of the requalification plans promoted for that area, in 2008, this private investor decided to proceed with a temporary space project, called Lx Factory. This place quickly attracted cultural and creative businesses given the central location regarding public and private transportation, low rental prices, availability of large spaces and the complementary synergies, like other cultural clusters in many European cities.

The Coworklisboa was founded in February 2010 by the couple Ana Dias and Fernando Mendes (an over 20 years freelance designer). In contact with pioneers of the coworking movement at the European level,

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⁴ The Alcântara Development Plan, approved in 2011, was subject to several corrections and adjustments, and the final version was approved only on 2014 by the Lisbon Municipal Assembly. Resolution No. 318/AML/2014 http://www.cm-lisboa.pt/fileadmin/VIVER/Urbanismo/urbanismo/planeamento/termosprovados/pualcantara/P_112_A--2014.pdf
they decide to start a space where people could work and collaborate rather than be alone at home. In search of adequate space, they settled in the Lx Factory.

As the space motto goes: "This is not about work anymore", this project was based on a strong community and cooperative spirit. Therefore, Coworkinglisboa has become an inescapable place for entrepreneurs and digital nomads – ranging from designers and architects to programmers or marketers, and a national reference for shared workspaces and Lisbon creative ecosystem. Several coworkers who start their business in this collaborative space, become tenants of LxFactory. The complex, composed of several industrial buildings, provide a unique environment attracting many innovative projects in various sectors of activity and hosting diverse events. In 2017, the space of Lx Factory was purchased by French Keys Asset Management. The increase in the value of rents led to the closure of Coworklisboa at the end of 2019, which moved to a new open-space of 4000 square meters in Beato, called NOW_No Office Work. Realising that 30% of the companies that used Coworklisboa’s spaces were foreign, they intend to offer living spaces alongside shared work areas that bring freelancers and companies together. The project also has a community focus and will carry out social projects such as the studio "Manicómio" ("Loony Bin"), opened in April 2019 to receive artists with mental health problems for the creation and exhibition of works of art away from psychiatric hospitals.

4.2. Beato Creative Hub and the Startup Lisboa

In the late 19th century, the development of railways, the enlargement, reorganisation and specialisation of the Lisbon harbour quays and storage areas, the eastern part of the city of Lisbon suffered a change in its urban, economic and social fabrics. Thus, in this rural area, where convents and recreational parks predominated, a new urban reality emerged from a delayed industrialisation process and the development of communication infrastructures.

At the beginning of the 20th century, a significant part of the urban fabric of Marvila and Beato housed several warehouses and manufacturing units, interspersed with residential units integrated into the pre-existing urban network for the growing workforce, called “vilas operárias” (villas – detached housing typologies for workers) promoted and built by the industry owners, a rising bourgeoisie, following hygienist ideas for the working families. Precariously, “pátios”, usually resulting from the subdivision of old manors. These manors, often organised around courts (pátios), were let, per room, by a decaying aristocracy.

A manufacturing complex for the production and supply of food products for the Portuguese Army, known as Military Maintenance was founded by the Portuguese State, which operating between 1897 and 1998., In 1997, given its architectural, scientific and technological value, a museum was created that portrays the history of this institution.

The 1998 World Exposition - EXPO’98, in Lisbon boosted an urban regeneration project in the eastern riverside area of Lisbon, through the design of public space and the construction of infrastructures that promote a new centrality.

With the reconfiguration of the port infrastructures, the riverside area between the train station of Santa Apolonia and the Expo 98 area, belonging to the Beato e Marvila parishes, attached to this area and with a vast obsolete industrial area, has become the target of growing interest. The Regional Spatial Plan of the Lisbon Metropolitan Area - PROT AML defined this area "marked by obsolete or deactivated occupations that tend to be reconverted or renovated. Its position in AML and the size of the areas to be renovated
create conditions for the development of new metropolitan centres with the installation of dynamic and innovative activities" ⁵.

In 2016, the Municipality requested the concession of the southern section of the Portuguese Army Maintenance complex, which had been decommissioned for more than a decade, to fit it into its economic and innovation strategy in the city. After the signing of the agreement, the City Council invited the StartUp Lisboa⁶ to design the concept and model and ensure coordination of the construction project for the Beato Creative Hub. This project is part of a loan of €250 million from the European Investment Bank to regeneration strategy of the Municipality (European Investment Bank, 2017).

The Beato Creative Hub spans 32,195 square meters from the south wing of the former the old Military maintenance to accommodate businesses in technology, innovation and creative industries. The former house of the commander of the military maintenance compound, "Casa do Capitão", opened in August 2020 as a space for cultural programming and the project "Praça" [Piazza], launched in October 2020, a restaurant and market space in the old workspace and the cafeteria. The second phase is already under negotiation. The future intents aim to an all-encompassing requalification of the neighbourhood and surrounding areas.

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Table 1 Lx Factory and Beato Creative Hub location features. Main characteristics of the two cases at three relevant time stages of the development of the urban areas where they are established (table 1). Source: authors’ production, 2020.

⁵ The PROT AML was approved at the Meeting of the Council of Ministers of February 7, 2002 and published in DR, by The Council of Ministers Resolution No. 68/2002. Available at https://dre.pt/application/conteudo/302557.

⁶ Start-Up Lisboa is a private non-profit association, founded in 2011 by the Lisbon City Council, Montepio Bank and the Portuguese Agency for Competitiveness and Innovation (IAPMEI) to support and incubate companies. In addition to contributing to the regeneration of the city center - the first building at the Rua da Prata 80, Baixa (Lisbon downtown)- bringing together innovative economic activities and rejuvenating the social fabric. Available at https://www.startuplisboa.com, accessed 11/02/2019
5. Concluding remarks

Coworking spaces have exploded in recent years in the city, which attract more and more nomads and digital entrepreneurs attracted by the low cost of living, pleasant climate, quality of life, security, as well as by the international dissemination and encouragement of local authorities to public and private initiatives to develop an innovative business ecosystem.

Urban planning actions involving rehabilitation, social-inclusiveness projects and large scale investment. Interventions led consistently since the 1994 Lisbon Master Plan, and more recently by the one in force (2012, and following amendments) were strategically identified as crucial to a city that has lost over 40% of its inhabitants, together with productive activities to other municipalities in the Lisbon metropolitan area. As a result, CWS are popping in the city, especially in former industrial and underprivileged areas, evolve from peripheral structures to a constellation of emergent new urban centralities.

In the approach to CWS in Lisbon, the urban layout and the two relevant moments (2008/09 and 2019/20) - its inherent activities, stakeholders and communities - play a significant role in the selection of the two cases analysed: Lx Factory and Beato Creative Hub.

These two spaces reflect the urban transfigurations that the city has experienced in its progression, from markedly rural areas, going through a period of intensive industrialisation and reaching, today, the challenges of a 4th industrial revolution in a global world. They are anchor points in the conversion of their urban neighbourhoods with vast industrial heritage (former industrial fringes), which require an urgent socio-economic revitalisation and new development paths. If LxFactory took place by private initiative, Beato Creative Hub is part of the municipal strategy of promoting entrepreneurship and the creative economy, which are considered as a way of resilience capacity under disturbing events such the 2008 economic and financial crisis.

Further research aims to focus on the analyse the consequences of the covid-19 pandemic, with unparalleled impacts in cities, work patterns and life routines. Despite Covid-19\(^7\), public combat measures and strategies are being devised to initiate the recovery process. Coworking spaces are trying to adapt and react to present circumstances.

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CIAUD, Lisbon School of Architecture, University of Lisbon, Portugal
DINAMIA’CET, ISCTE – IUL, Portugal
ISEG-Lisbon School of Economics and Management, University of Lisbon and REM/UECE, Portugal

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\(^7\) As the paper is being written, Europe in under a severe 2\(^{nd}\) wave. Experts, scientists and politicians announce a 3\(^{rd}\) vague to the 1\(^{st}\) trimester of 2021.
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EFFECTS OF PLATFORM ECONOMIES ON INFORMAL SETTLEMENTS IN SÃO PAULO, BRAZIL

A data-based analysis on how Uber, Airbnb and Instagram affects urban dynamics in informal settlements

Federico GODINO, Italy

Abstract

This paper investigates how urban platform economies effects relationships between non-informal and informal areas of São Paulo, Brazil. Following a theory on the functioning of global city formulated by M.Castells, this paper analyses urban digital economies as agents of the segregation process inherent to the contemporary global city. Starting from data on Uber, Airbnb and Instagram this research describes urban phenomena that affects processes of real estate investment, gentrification, development of public transport, use of public soil, eviction and expropriation. All these phenomena show a complex relation with informal areas, that are included in digital networks created by these platforms but often suffers all their negative aspects in the fields of public space and real estate. This analysis have been conducted with Qgis with the primary goal of mapping digital economies outputs (Uber rides, Airbnb listings, Instagram posts) and analyse these data to better understand how platform economies works in areas of high social vulnerability.

Keywords

Platform, economy, informal, data, urbanismo, inequality

1. Introduction: São Paulo as ground of study of platform economies in fragile territories

New technologies have changed mainstream living habits in big cities: digital platform economies are tools to get an accommodation, get goods, move, and structure social life in a city. Their functioning is shaped on the environment of global cities: they provide information for people who have to navigate a big urban environment they ignore and they rely on huge amounts of data from other users and presence of perfect internet coverage. São Paulo has been chosen as ground to this research due to the strong presence of informal settlements not only in peripherical areas but also close to the city centre. These areas have been generated by the process of construction of the global city and are an organic part of its environment (Castells 2001). In the age of modern infrastructural development, São Paulo and other major Brazilian cities grew at great speed. To sustain this rhythm constructions were made by low wage workers from rural areas (mainly from north-east of the country). These populations took little advantage
of the grand architectures they built, in fact often they could not even afford to live in the city they worked. They lived in temporary group of shacks that gradually became permanent favelas (Lloyd-Sherlock 1997). That is the case of major informal settlements of Brasilia and São Paulo. Division between non-informal and informal city is still visible in urban morphology today and still represents exclusion from the city’s economic advantages. In São Paulo almost the 30% of the population lives in informal settlements (SMDU 2012). These areas are not circumscribed on the borders of the built environment but often are located near the centre. To map informal areas this work relies on a database by SEHAB (Secretaria Municipal de Habitação de São Paulo) which contains position and area information for all informal settlements in the city, which include nucleos (informal areas regularized with primary urbanization infrastructures) favelas (informal settlements) and corticos (squatted buildings). This paper mainly (where is not otherwise specified) considers all type of informal settlements as they share the same socioeconomic and aesthetic characteristics. That is why the main distinction in the analysis has been made between informal and non-informal areas of the city.

In the meanwhile, connections that gives global cities their position in global markets have accelerated. Digital platforms today allow global citizens to live, move, get all possible kind of goods, and even participate in social life of a city that they do not know. And even more important they constitute a network that exclude areas that are useless for a global citizen. It reinforces the perception of what is in and what is left outside the city. Even if, as we will underline, appropriation of new territories is a strong element of urban growth in global cities. São Paulo is the perfect case study to analyse how platform economies reinforces this division influencing informal settlements urbanization process.
This work considers digital interactions between non-informal and informal city from three points of view: transport, housing, and social networks. There is of course a variety of digital platforms that contributes to the contemporary way of living in Sao Paulo in these fields. The choice of analysing Uber, Airbnb and Instagram was made because of two factors: number of users and data availability. Uber is the most used carhiling app in the city (Rochabrun, 2019) and the only one that publishes its data, even in a very raw form (Uber Technologies, Inc.). Airbnb is the largest network for short term rent in the city of Sao Paulo: around 10000 houses are currently on the platform's listings. So, this is both the most representative platform for short term rent market and one of the few that we can study thanks to the open source work of Murray Cox that published Airbnb listings on its website Inside Airbnb. In the case of Instagram this is both one of the most used social networks in brazil and the only one that is entirely based on the use of images. The approach this analysis chose was to link the production of social media content to images that represented the urban area they are produced in. Instagram offered this possibility thanks to geo-localization metadata and a hashtag system that made easy to elaborate the huge amount of data obtained through the application API.
2. Platform mobility

2.1. Carhiling in São Paulo

São Paulo is the city with the highest number of uber rides in the world (Rochabrun, 2019). Carhiling apps found a perfect ground in a city that have historically predilected private car mobility on public transport. For some routes carhiling is even cheaper that public transport. This led a great amount of people operating as drivers. Many of them lives in favelas, and this let both to an increase of car loans and to a saturation of favela urban space with cars. In Paraisópolis favela, for example, urban voids are turning into parking lots for driver’s cars (often rented). Even if the presence of favela drivers is relevant in São Paulo, the phenomena is hard to quantify given restricted access do uber drivers listings and the absence of reliable census of favelas. In addition to this there are numerous favelas that are formally not included in the uber availability area, due to the risk of robbery to which drivers and passengers are exposed. Uber also introduce a problematic relation with public transport, complementing it in the wealthiest areas and competing with it in the poorest (Jin, Kong e Sui 2019). In cities with poor public transport infrastructure as São Paulo that leads to even less incentive to development of public transport sector. That phenomenon is even stronger considering that the divide between public and private transport users in Brazil partly reflects the divide between wealthy areas and ones of strong social vulnerability and therefore poorly represented interests in the construction of the city.

Figure 2. Map of aggregated Uber rides in São Paulo. Source: F. Godino
2.2. Uber in São Paulo

The amount of uber transit from these areas has been calculated thanks to uber movement database on São Paulo (Uber Technologies, Inc.). The source data set refers to last quarter of 2018 and includes the arithmetic mean, geometric mean, and standard deviations for aggregated travel times over the selected date-range between every zone pair in the city. Starting from this our goal was to represent on a map places that showed the highest number of uber arrival and departures. To fulfil this task has been used Python programming language\(^1\). This base has been imported and graphically elaborated in Qgis, where a distinction has been individuated by boundaries containing or intersecting a favela. The resulting map (Figure 2) shows on an urban level the amount of uber rides starting from or arriving to a favela area. The Qgis analysis was applied to the whole metropolitan area of the city, city-scale map just shows the São Paulo municipality area. In this map the points represent aggregation of uber rides for each geoboundary area. Points’ colour represents the total number of departures and arrivals of the area.

![Figure 3. Uber rides in informal areas. Source: F.Godino](image)

![Figure 4. Uber rides in non-informal areas. Source: F.Godino](image)

As it is clear from figures 3 and 4 many favela areas are peaks in uber usage in the city of São Paulo. Among them there are some that reaches peaks of more than 3000. The second relevant fact is that almost 30% of city’s uber rides start or arrives in-or very near- a favela. This information has to take into account.

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\(^1\) Data were presented in this form: file1.dow showed a day of the week. Each ID (source and dstid) represents a polygon. These are the basic units to model the city map. From this has been calculated the number of arrivals and departures for each point. (immx) After that he defined each block, defined by the ID, with geographical coordinates. This file was provided by Uber in the “Geo Boundary” section on Uber Movement section ( Uber Technologies, Inc.). It consisted of json files that contains an ID that can be matched with the ID of the previous file associating it with the “geometry.coordinates” field. Each record also contains informations on the name of represented areas. Technically we operated an INNER JOIN operation between file1 and GeoBoundaries file on the ID field. The resulting file contains the following fields for each block: geographical coordinates, total rides arrivals, total rides departures.
accounts two factors: high demand of uber transit for favela inhabitants that can actually afford using uber and people from non-informal city going into favelas. Unfortunately, is hard to discriminate among the two starting from current dataset. Anyway, favelas are vibrant markets for small scale economies and a lot of people from outside have to visit it for work purposes. For sure in a lot of favelas there is a strong demand for carhiling services given the lack and the high cost of public transport. The problem of exclusion from uber service is not common to all São Paulo’s favelas. Some of them are included or de facto not excluded for being near to neighbours reached by the service, anyway it is a fast-changing situation due to the interest of many agents. In addition, there is the fact that a lot of drivers lives in favela, so the impossibility of serving their own community is quite paradoxical. In fact, recently a carhiling service has been established to fulfil this demand. The name is UBRA and in the intention of creators from São Paulo’s Brasilandia favela, it should be the uber for informal city. (Amigo, 2018).

3. Platform housing

3.1. Online rent and gentrification

This field is an example of an inverse trend from the one described for Uber: Airbnb integrates in its network every space that can be appealing for global citizens. This trend is equally dangerous to resident population of favelas: it leads to an increase of prices that often do not coincides with gentrification in the sense of improvement of urban environment and vivacity of little scale commercial activities. This phenomenon became evident in proximity of 2006 Rio de Janeiro Olympic Games (Gaffney, 2015). By that time was already working in Brazil a form expulsion of the most vulnerable strata of community from Favelas: renting an house to a foreign tourist for some weeks gave more reward to owners than renting it to a Brazilian favela resident for the whole year (Neuwirth, 2006). Of course, in the example of Rochina and Vidigal favelas a privileged geographic position on panoramic hills of Rio has to be considered among the factors that leads to this kind of speculation. However Airbnb as main house rental platform for tourism in the world have accelerated this phenomenon, and while in Rio de Janeiro these implications are clearer, the same pattern is happening in city of São Paulo and in particular in favela areas like Paraisópolis or Heliópolis that have a strategic position in housing market. Airbnb listing prices inside or in the immediate proximity of this favela are in an average-high level, while the favelas inhabitant’s average salary is still one of the lowest in the city (Montanez, 2020). In Paraisópolis and other favelas we can now see a process of densification and medium-scale real estate investment boosted by a growing demand both of long term and short-term rent. Because of this platform housing is a perfect tool to penetrate the protected market of favela’s real estate. Airbnb generally imply a rise in rent prices and as a result in house prices (Sheppard & Udell, 2016). This factor, united with a large percentage of favela population currently living in rent, is making favelas housing market more and more hostile to local low-income communities (Marques, 2016).
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**5.3. Mapping Airbnb in São Paulo**

The map (Figure 5) shows presence of Airbnb proprieties in the city of São Paulo. It has been made thanks to the open-access database of Inside Airbnb by Murray Cox in the city of São Paulo (Cox, 2017). To this huge amount of data has not been applied any clusterization since the specific position inside or outside a favela can affect considerably the price of the single listing. The database has been joined with administrative boundary file in QGIS. Then from all listings have been isolated the ones that found themselves inside or at a 50 meters distance (the half of medium length of a São Paulo urban block) from an informal settlement and the one that are included in areas of “high social vulnerability” (Geo Sampa 2018). In São Paulo often the nearby of an informal settlement are deeply influenced by this proximity in terms of house prices. The regions to which the Airbnb dataset has been linked belongs to a dataset from São Paulo’s municipality. This choice has been made because these boundaries represents regions of relatively uniform socioeconomic conditions. Looking at the figures 6 and 7 we have to consider the problem in reporting informal settlements’ names, so also in these graphs of “informal settlements and high vulnerability areas” are reported names of non-informal neighbours and data are referred to all data collected in informal settlements in these neighbours. First thing to acknowledge is that data of Airbnb listings coming from informal and high vulnerability areas are proportionally relevant: they represent the 11.12% of the total while the area corresponding the their selection criteria only represents the 4% of the total considered territories. Second characteristic of this data are the high price per night of accommodations in favelas and socially vulnerable territories. This is both caused by the fact that their price is indeed high compared to the economic conditions of their neighbours and to some anomalies in pricing. In some areas are present listings for prices that totally out of market standard for their area (there are al least 15 cases of this disproportion, the most evident in little favelas in the neighbour of
Itaquera reaching prices between of over 5000 R$ per night). On the other hand, presenting high prices in poor areas is a strategy mainly based on the information asymmetry between local and tourists who often ignores that in São Paulo are present a lot of informality and poverty enclaves in otherwise wealthy neighbours.

Figure 6. Airbnb average price per night in non-informal areas. Source: F. Godino

Figure 7. Airbnb average price per night in informal areas. Source: F. Godino

Another important information that we get from these data is the general predominance of entire apartments or houses both in informal (91%) and non-informal (90%) areas Airbnb listings. This evidence strongly contradicts the platform rhetoric of space sharing and integration between people. It shows that Airbnb is mainly used as an investment on a second house, leading to inevitable rise of rent prices in the area. In conclusion we can state that Airbnb in informal areas of São Paulo follows the same dynamics than in non-informal ones, possibly with an even more disruptive effects on urban environments due to the lack of regulation and to the poor economic condition the inhabitants. It is interesting to observe this dynamic in the general framework of the increase of real estate investment in informal settlements of São Paulo. This trend has interested central favelas like Paraisópolis.

4. Platform gentrification

4.1. Examples of platform gentrification in Sao Paulo

Another key factor in the analysis on how digital economies influences physical space of informal settlements in São Paulo is related to social media and in particular Instagram. As L. Manovich stated in its seminal paper on this argument:

"Social media content shared today in cities, such as Instagram images, their tags and descriptions, is the key form of contemporary city life. It tells people where activities and locations that interest them are and it allows them to share their urban experiences and self-representations." (Mnovich & Indaco, 2016).

This field shows the same dualism seen in the Airbnb analysis: Instagram is a powerful tool for inclusion of marginalized areas in touristic and economic network, while Instagram-centred processes of gentrification can cause a big harm to the most fragile populations of interested neighbours.
This process often starts with a high level of digital content production in a specific area that becomes an attraction for tourists and non-informal city residents. You can find these phenomena both in Rio de Janeiro’s panoramic and “artistic” spots and in São Paulo’s main centers of street art. In Rio, it has already been underlined how this process has been encouraged by travel agencies during the 2006 Olympic Games (Siqueira, 2018). In São Paulo, the most interesting example of gentrification induced by social media is without any doubt the one of Beco Do Batman, a small area in Vila Madalena district that rapidly turned from a neglected and semi-informal alley into an attraction and a symbol of cultural vitality of its neighbor (Costa & Lopez, 2013). Taking into account that Vila Madalena was already gaining an “artistic” aura thanks to low prices that drove young artists to choose it as base for their studio and residences (most important the group of “Casa 7” between 1980 and 1985 (Itaú Cultura, 2017) ) in a classic art-driven gentrification process. The phenomena changed with the introduction of Instagram and the boost of production and share of images tagged in Beco do Batman. Differently from art-production driven gentrification, the process of Beco Do Batman growth in popularity has been related to visits to the area’s graffiti and small commercial activities in the nearby as bars and small shops of handmade or alternative merch so that’s better described as art-consume driven gentrification. In fact, the medium of graffiti here evolved towards a dispositive meant for reproduction on social media. Artworks often consist of drawing made to be photographed in the background adding physical elements (such as wings or other elements) or context to the person captured in the image and often integrating urban furniture in this spatial layout such as benches, which are coloured and de facto integrated in the artwork. References to the artist’s Instagram account are always present in the framework to be included in the picture. Beco do Batman, as well as other local attractions, surely played a role in the recent boom of real estate investment in Vila Madalena, contributing to create its hip aura. But its particularity is the totally Instagram centered popularity that this alley gained. What’s more interesting is that this point of view is that the boom of...
mainstream popularity of Vila Madalena coincided with an increase of high rise real estate investment in all blocks but the one of Beco do Batman, which has been left untouched not to compromise his local atmosphere.

4.2. Mapping Instagram in São Paulo

This kind of process seems to be recurrent in informal areas that are highly attractive to real estate market. In São Paulo trends of Instagram popularity of favelas are mainly related to funky music scene, landscape, and street art. This analysis is based mainly on graffiti hashtags that are recurrent in São Paulo’s underground scene. The purpose of this choice is to link Instagram popularity directly with forms of artistic intervention on the built environment, excluding other forms of image production that could be misleading in an analysis of Instagram-linked gentrification processes. The dataset for this analysis was obtained through Instagram’s API where the research selected four hashtags: ( pixo, pixacao, pixosp e xarpi) all linked to the practice of a particular urban graffiti technique called pixo. Among this selection were deleted all posts that was not georeferenced. This approach is meant to link a high reproducibility on social media to a context of deep social fragility. In this way is possible to observe how a phenomenon that express the anguish of informal settlement’s life can turn into a mediatic case and give unprecedented visibility to a specific place. The focus of the phenomenon of pixo in this analysis is meant to isolate a specific kind of urban painting that is peculiar of informal settlements (in all the forms of favela, nucleo and cortico). The abundance of graffiti and urban painting in the city of São Paulo would have made a wider data choice a too generic field of analysis to observe such a specific phenomenon.

Figure 9. Instagram pixo related posts in non-informal areas of São Paulo. Source: F. Godino
First thing to acknowledge is that the phenomenon of pixo is not limited to informal areas but it is present in territories of all social vulnerability and in particular to territories of high density (figure 8). That is because pixo is a practice that tend to appropriate all possible urban surface. Particularly adapt to this purpose are neighbours where coexists a huge number of urban surfaces and a poor system of security. These neighbours are often not listed as high social vulnerability because of the socioeconomic mix they contain: they are medium-high density areas in which coexists commercial and tertiary activities, low and high budget residences and a number of squatted buildings. The practice of squatting is a strong incentive to pixo because squatted buildings, often old high-rise structures in the city centre, are the only actively supporting the phenomenon. As figure 9 shows the largest part of pixo-related posts are located in areas of low social vulnerability. This is coherent with the presence of nucleos and cortices in otherwise medium or high-income neighbours. In fact, as specified in figure 10, almost 10% of all posts by are located inside or near a favela.

The visibility of pixo represents a strong share of urban-related posts in the city of São Paulo and so it contributes to the visibility of these areas. Just like the phenomena of urban painting and other forms of street art, pixo contributes to the creation of an aesthetic value to the neighbour. This atmosphere influences a range of agent that goes from commercial activities to private householders and artistic creators. All these agents, that are attracted to the area in proportion to the visibility of its artistic atmosphere, easily becomes gentrification agents since the sum of values they bring to their environment makes it more attractive to real estate speculation. In this sense pixo shows a difference from others urban graffiti techniques: its creators are conscious of this process and often the artwork expresses a will...
of rebellion against these rules. To do that it avoids classic representation techniques and adopts a rigorous and simple aesthetic. Despite that the effect is quite the opposite of the creator’s will and message. The complex alphabet used by pixadores for their messages makes them almost unreadable for unskilled observers reducing them to mere pieces of aesthetic, increasing the visibility of their Instagram representations. This is of course just one aspect of the complex relations between informal areas and social media, but it helps us to understand what kind of processes these technologies introduced in urban development of São Paulo.

5. Conclusions

5.1. Uber

The effects of the use of Uber on the relationships between informal and non-informal areas act on multiple layers. The first is the intense use of informal settlements public space. The informal settlement type that is more affected by this phenomenon is favela: in its public space is visible a huge increase in the number of cars due to the popularity of carhiling driver as a full-time job for favela inhabitants. That led to an intense usage of soil as car parking and made economically convenient to use some empty lots as parking instead of using them for construction. A second effect of Uber on informal settlements is the isolation of informal areas. Carhiling, contrary to public transport, allows its users to avoid the problematic areas of the city and that makes informal settlements -and in particular favelas- more and more isolated from the rest of the city. The last consequence deducted from the massive amount of Uber transit in favelas is the lack of incentive in the development of public transport for these areas. Carhiling is becoming a common substitute for metro and bus lines, taking a huge number of users and profits from public transport lines.

5.2. Airbnb

Airbnb acts primarily as a tool of gentrification and the notable fact is the high level of prices in informal settlements, not the relevant presence of Airbnb listings in these areas -which could be considered a positive fact per se if aligned to local housing prices. The high average price of Airbnb in favelas, corticos and nucleos indicates that the offer of short-term rent is mainly oriented to people that normally lives in non-informal contexts. This phenomenon has been already observed in Rio de Janeiro where the aestheticization of Favelas made economically convenient for second-house owners to rent it for a few weeks to foreign tourists rather than for the whole year to local inhabitants and families. That led to an impoverishment of the social tissue of favelas and to a growing problem with internal displacement of people evicted from their favelas and forced to find a new place in even more peripheric and poor areas.

5.3. Instagram

Instagram data are not linked to a direct economic indicator nor to a precise spatial output, like for Uber and Airbnb ones. The first notable result that can be deduced from the vast distribution of informal settlements-related pictures is that in São Paulo these images represents an aesthetic trend. Informal settlements are very popular on Instagram: we can find a massive distribution of images related to informal aesthetic and tagged with informal-related tags even very far from informal areas. That is in part due to the strong action of aestheticization currently investing Brazilian favelas. Starting From the most panoramic spots of Vidigal in Rio, informal settlements became an attractive ground of investment for tourism. This trend invested also informal areas of Sao Paulo situated in strategic spots, for example
Paraisópolis favela that is surrounded by the residential skyscrapers of Morumbi. The popularity gained by these areas acts as a distortion of the image of informal settlements and as a gentrification tool.

5.4. Combined conclusions

The three of these analysis shows how informal areas of São Paulo are vulnerable to all the negative effects of platform economies. As already stated this do not imply that platform economies can’t produce positive outcomes when introduced in an area with strong informality presence, but rather that for the present situation of the city these economies seems to rely to a situation that allows them to access both a cheap workforce and a flourishing new market in informal areas. None of these aspects are an advantage to informal settlements residents. What is even more visible is that the negative effects of platform economies are contradictory, for example one tending to a maximum exploitation of free space for uber parking and another tending to the anesthetization of public space causing a gentrification led by external agents. In this frame it is hard to synthetize the effects of these new technologies on the city’s physical form. It is better to acknowledge a complex set of processes, in large part hostile to informal communities’ residents, acting simultaneously and independently on the city’s social and physical fabric. To subvert this state of things would require acting on a normative level to regulate the activity of these platforms, in particular Uber and Airbnb that are host for economic transactions. Of course, the rise and existence of these companies is deeply linked with a normative gap in existing legislation regarding online businesses, so they are generally hostile to a deeper stronger by public authorities.

6. References


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3. Planning for Urban Connectivity

**TRACK LEADER**

*Serin Geambazu (Romania)*

An urban planner, an expert in strategic planning and megaproject governance, teaching at Ion Mincu University of Architecture and Urban Planning, Bucharest at the Urban and Landscape Design Department for five years. Serin Geambazu was educated at TU Berlin University, Urban Management, Habitat Unit and received her Ph.D. from Ion Mincu University with a co-supervision from Istanbul Technical University for her research on governance and planning process in megaprojects. With an experience of almost seven years, she practices urban planning and took part in projects of infrastructure, housing and retail, execution of detail plans, zonal development plans, masterplans and also strategic general development plans in the private and public sector, but also consultancy projects in Berlin, Istanbul, and Bucharest. She is recently engaged in EU funded projects in Danube Region as project manager at Urbasofia. Serin Geambazu is an ISOCARP member since 2009. As one of the leaders of RUPA, I joined the Russian organising committee at the ISOCARP congress in Perm in 2012, and was a congress team member at the 50th ISOCARP congress in Gdynia in 2014. I was one of the organizers of the YPP national schools in Russia in 2012-2016. In 2017 I participated in the School of Chief Architect in Yekaterinburg as ISOCARP tutor and, in 2018-2020, took part in Winter planning University in Irkutsk as an expert and a Pilot. The areas of special professional interest are participatory planning, strategic spatial planning, housing policy, urban planning standards, legislation, and modern approaches to the transformation of existing urban areas.

**TRACK LEADER**

*Alex Antonov (Russia)*

Graduated from Moscow Architectural Institute, Faculty of urban planning in 1991. In 1991-1999 worked at the Central Research Institute for Urban Planning and Giprogor as a regional and urban planner. From 1999 to the present, I have been working at the “Research and Development Institute for Urban Planning” on a series of general plans in Moscow region and the planning scheme of the region, planning documents for Udmurt Republic, Kabardino-Balkaria, spatial development strategies of the Yaroslavl Region, Ufa and Yekaterinburg. In 2014-2017, I took part in various projects with Strelka Design Bureau. In 1990’s I was one of the founders of the Russian GIS Association and a publisher of “GIS Review” magazine. In 2010, I was one of the co-founders of the Russian Urban Planners Association (RUPA). I have been an ISOCARP member since 2009. As one of the leaders of RUPA, I joined the Russian organising committee at the ISOCARP congress in Perm in 2012, and was a congress team member at the 50th ISOCARP congress in Gdynia in 2014. I was one of the organizers of the YPP national schools in Russia in 2012-2016. In 2017 I participated in the School of Chief Architect in Yekaterinburg as ISOCARP tutor and, in 2018-2020, took part in Winter planning University in Irkutsk as an expert and a Pilot. The areas of special professional interest are participatory planning, strategic spatial planning, housing policy, urban planning standards, legislation, and modern approaches to the transformation of existing urban areas.
Track 3 Summary

Urban connectivity is vital for urban performance and a core component of post-oil cities. In Track 3, we redefined urban connectivity from network planning to local design and we discussed new tools to tackle urban mobility in a smarter, greener and more efficient way. Changes in mobility behavior patterns caused by the COVID-19 crisis in different countries were also considered, the Special Session “East-West Urban Mobility Dialogue” focused on post-COVID Cities’ Responses to the Current Urban Mobility Revolution. A total of 24 papers were selected and presented, with authors from countries representing 4 continents: Europe, Asia, Africa and North America.

In the first session “Redefine urban connectivity from network planning to local design”, the urban connectivity concept was updated and broadly explored at two levels: the city level (network) and the local level -1) the city level (network) and 2) the local level - its effects on the urban form. Presentations focused on the importance of the quality of street space, the permeability and the liveability of the adjacent areas. Issues related to transport infrastructure, street patterns, traffic design and pedestrian flows, interchanges and intersections were discussed within the geographical context of the participants. Solutions such as TOD approaches, and innovative land use policies around transportation HUBs were embraced as new urban connectivity trends. Finally, the debates during the session raised questions related to usage of the traditional street network by new types of public transport, such as metro buses and autonomous vehicles, revolutionizing travel behavior patterns, and mobility prospects.

Naturally, as we live unprecedented times due to the pandemic, the track tackled urban connectivity also from the perspective of a post-COVID-19 mobility around the world. Issues related to models of migration and infection from a public transport point of view, traffic performance of polycentric space structures, traffic flow models measuring the intensity of spatial connection and commuting patterns of city center workers were presented by the authors and debated among the participants. During the session, examples demonstrating that prioritizing non-motorized traffic will, in turn, improve motorized traffic and therefore, the transport system as a whole and solutions such as greener transportation infrastructures, human-oriented land-use policies instead of car-oriented ones, mixed-use development were put forward. Following these approaches, in the interactive parts of the session, participants underlined the opportunity of the COVID-19 crisis for planners and authorities to adapt our cities in this new reality and become more resilient moving towards a sustainable future.

The main lessons learned from the sessions were:

Everything will change about mobility. Achieving a Sustainable Transport is not a Myth and the following 5-10 years will be crucial in terms of our choices as planners, authority representatives and citizens. We have new tools or new ways of resolving urban connectivity deadlocks: autonomous vehicles, intermodal public transit, human-oriented land-use policies or city models such as 15-minute city, but there is an urgent need for an integrated approach, the best mix of tools relevant for the specificity of every city. We need to discuss more in order to plan better connected cities, to plan new network facilities relevant to rapidly changing transportation technologies.
Papers and presentations within this track focused on the following:

• Density/mobility balance;
• Planning for integrated transportation models;
• Integrated planning and urban design solutions and concepts and their applicability in various contexts;
• Innovative solutions and precise pairing the modes of urban development with provision of comfortable, reliable and sustainable transport;
• Connectivity at the regional level;
• Urban pattern and street form;
• COVID and Post-COVID mobility;
• Mobility behavior modelling.

Selected Papers

1. BEZAI Nacer Eddine, MEDJDOUB Benachir, FADLI Fodil, CHALAL Moulay, AL-HABAIBEH Amin, Autonomous vehicles and smart cities: future directions of ownership vs shared mobility

2. MAJOR Mark David, TANNOUS Heba O., AL-THANI Sarah, HASAN Mahnoor, KHAN Abida, SALAHELDIN Hadeel, Macro- and micro-scale modeling of multi-modal transportation spatial networks in the city-state of Doha, Qatar

3. DONG Raymond, Small Case, Big Principle – Achieving a Sustainable Transport is not a Myth
Autonomous vehicles and smart cities: future directions of ownership vs shared mobility.

Logistic regression to predict future use of AVs based on current transportation mode used.

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Fodil Fadli, Department of Architecture and Urban Planning, Qatar University, Doha, Qatar.

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Abstract

Over the last decade, there has been increasing discussions about self-driving cars and how most auto-makers are racing to launch these products. However, this discourse is not limited to transportation only, but how such vehicles will affect other industries and specific aspects of our daily lives as future users such as the concept of work while being driven and productivity, entertainment, travel speed, and deliveries. Although these technologies are beneficial, access to these potentials depends on the behaviour of their users. There is a lack of a conceptual model that elucidate the acceptance of people to Self-driving cars. Service on-demand and shared mobility are the most critical factors that will ensure the successful adoption of these cars. This paper presents an analysis of public opinions in Nottingham, UK, through a questionnaire about the future of Autonomous vehicles’ ownership and the extent to which they accept the idea of vehicle sharing. Besides, this paper tests two hypotheses. Firstly, (a) people who usually use Public transportation like (taxi, bus, tram, train, carpooling) are likely to share an Autonomous Vehicle in the future. Secondly, (b) people who use Private cars are expected to own an Autonomous Vehicle in the future. To achieve this aim, a combination of statistical methods such as logistic regression has been utilised. Unexpectedly, the study findings suggested that AVs ownership will increase contrary to what is expected, that Autonomous vehicles will reduce ownership. Besides, participants have shown low interest in sharing AVs. Therefore, it is likely that ownership of AVs will increase for several reasons as expressed by the participants such as safety, privacy, personal space, suitability to children and availability. Actions must be taken to promote shared mobility to avoid AVs possession growth. The ownership diminution, in turn, will reduce traffic congestion, energy and transport efficiency, better air quality. That is why analysing the factors that influence the mindset and attitude of people will enable us to understand how to shift from private cars to transport-on-demand, which is a priority rather than promoting the technology.

Keywords

Autonomous Vehicles, Ownership, Shared Mobility, Smart Cities, Urban transformation
1. Introduction

The world is witnessing a rapid technological development which is affecting the way we live, work and interact with each other. Technologies such as quantum computing, fifth-generation wireless technologies (5G), artificial intelligence (AI), robotics and Internet of Things (IoT), have led to the emergence of possibilities and perspectives that help to tackle social, economic, and environmental challenges that are facing our cities. This, in turn, aids in the delivery of smart city objectives (Tryfonas and Askoxylakis, 2014), including creating sustainable environments, smart infrastructure, facilitating planning and decision making. Amongst the initiatives on developing smart infrastructure and which has proliferated in the last decade is Automated driving. Several studies have shown that the adoption of Autonomous Vehicles will bring a wide range of benefits such as independent mobility (Fagnant and Kockelman, 2015), tourism extension (Cohen and Hopkins, 2019), Innovative freight delivery (Alessandrini et al., 2015), Comfort and entertainment services (Atzori et al., 2018; Panagiotopoulos and Dimitrakopoulos, 2018), and Reduced congestions and increased accessibility (The House of Lords Science and Technology Committee, 2017; Joiner, 2018). However, access to these potentials depends on the behaviour and the acceptance degree of the users.

On the other hand, the full adoption of AVs has the potential to change urbanisation patterns as well as urban design; this will have substantial implications on cities planning policies (Stead and Vaddadi, 2019). According to (Faisal et al., 2019) some of these urban transformations are: millions of square kilometres presently utilised for parking may be freed, road space design can be different, and urban sprawl will increase. Adopting AVs will make City planning face a dilemma between the travelled distance and the city size, For example, a study by (Zakharenko, 2016) argues that in both cases whether AVs will increase or decrease cities size, the travel/commute distance will increase.

Although it is conjectured that AVs on-demand services will be the future mobility, it is still ambiguous what are the driving factors of public interest in SAVs (Nazari, Noruzoliacee and Mohammadian, 2018). (Grush and Niles, 2018b) argue that before transitioning to several types of shared mobility, AVs ownership would reach its high peak. For this, (Grush and Niles, 2018a) recommend to significantly concentrate on working how to reduce vehicle ownership by moving users to ride-buyers (which is a form of SAVs). A study by (Kim, Mokhtarian and Circella, 2020) using exploratory factor analysis to gauge the impact AVs could prompt specifically in terms of residential location and Vehicle ownership, found that most respondents expect "no change". Thus, between the expectation of Urban transformation and no change in the users’ decision indeed in terms of vehicle ownership, it is crucial to study the factors that will drive public interest into SAVs.

According to (Kuhnimhof, Zumkeller and Chlond, 2013), since the turn of the millennium, in Great Britain vehicle ownership has shown signs of stagnation and even decrease. This is due to people shifting to other travel modes. Therefore, based on the former assumption and in the case of full AVs, if people travel is shifted to SAVs, vehicle ownership will decrease significantly. Many scholars have investigated the possible impact of AVs on private vehicle ownership and shareability. However, most of the research works have focused on examining how shared AVs (SAVs) models can reduce private vehicle ownership. (Narayanan, Chaniotakis and Antoniou, 2020) argue that the methodologies used for modelling SAVs impacts lack realistic indication for verification and validation because most of the studies are employing existing simulation models which these methods are believed to be debatable in determining the real SAVs impacts. For instance, research by (Zhang, Guhathakurta and Khalil, 2018) has shown that a 9.5% reduction in private vehicles can be achieved. Whereas (Milakis, van Arem and van Wee, 2017) stated that 67% to 90% conventional vehicle ownership could be replaced when implementing shared AVs conveying same mobility quality. Another study by (Fagnant and Kockelman, 2016) revealed that each shared AV could substitute roughly 11 private cars.
(Menon et al., 2019) argue that, it is significant to take into account that people's perception of SAVs change and is affected by personal experience, information gathering and publicity. In our previous work (Bezai et al., 2020) and in response to the lack of a conceptual model that elucidate the acceptance of people to AVs, we have identified the determinants of users' acceptance to AVs namely perception, vehicle usage, and cost. To attain successful adoption of AV in urban environments while diminishing congestions and pollution levels, scholars suggested that it is crucial to reduce AVs ownership by moving towards shared mobility. However, we argue that the implementation of this strategy might be difficult because it is related to factors that affect people acceptance of AVs such as privacy, safety, as well as users' mindset and attitude. Based on that, this paper aims to test whether the adoption of AVs will reduce vehicle ownership by studying the choice patterns between the current mobility modes used by people and their future Mobility choice. In other words, this study will test Two assumptions; Firstly, people who currently use public transportation are likely to share AVs in the future. Secondly, people who use private cars are likely to desire owning AVs. The former assumptions are studied considering Nottingham city as a case study and taking into account both types of mobility either in the city or between cities (long distances).

The remainder of the paper is structured as follows: Section 2 discusses the research methodology employed to address the aim of this research, which is a quantitative methodology using a survey. Section 3 presents the findings and hypotheses testing using logistic regression. Section 4 summarises the study aim, findings and suggests future research.

2. Methodology

This research embraces a quantitative research methodology with a survey questionnaire being the primary research method. The choice of this research method was motivated by the fact that it is possible to reach a wider audience efficiently within a short time. The online questionnaire survey was developed using our framework of users' acceptance of AVs (Bezai et al., 2020). In particular, the current study revolves around the survey questions' part that addresses overall considerations and desires in owning or sharing AVs. Additionally, the survey encompasses socio-demographic questions to get insight into the sample characteristics and examine how answers may vary across different sub-groups (Gender, occupation, education, etc.). The survey contains a total of 10 questions which are close-ended in nature to help quantify the answers. The questionnaire was distributed using the Jisc online surveying platform, which in turn relies on social media and databases to recruit participants residing in Nottingham, UK.

2.1. Sample size

It is worth noting that this is an exploratory study which does not intend to generalise to the broader UK population but instead get an insight into Nottingham city residents' opinions about AVs ownership and shareability. Nevertheless, careful considerations were taken when calculating the sample size to fulfil the purpose of the study. First, we have used equation 1 by (Morse, 2000) to calculate the necessary sample size of this study. As discussed by (Conroy, 2015), a margin error of ±10% might be perfectly acceptable and hence why in this study, we opted for a 7% margin error. Secondly, since our case study (Nottingham city) had an estimated population of 332,900 (Nottinghamshire County Council, 2019), a Z-score of 1.65 was obtained. As shown in equation 1 the recommended sample size was 139. Thus, we opted to recruit 140 participants in the survey questionnaire.

Finally, descriptive statistical techniques such as frequency analysis were used first to explore the responses and analyse the sample characteristics. After that, we used binary logistic regression to test the following hypotheses, see Table 1. The choice of this technique was attributed to the nature of the dependent variable, which is dichotomous (Peng and So, 2002; LaValley, 2008).
Necessary Sample Size
\[\frac{(Z - \text{score})^2 \times \text{StdDev} \times (1 - \text{StdDev})}{(\text{Margin of errors})^2}\]

Sample Size = \[\frac{(1.65)^2 \times 0.5 \times (1 - 0.5)}{(0.7)^2}\] = 138.90

Margin of Error: 7%, Confidence Level: 90%, Standard deviation: 0.5, Z-score: 1.645

Equation 1. The equation used to determine the sample size reproduced from (Morse, 2000).

Table 1. Summary of the hypotheses developed for this study.

<table>
<thead>
<tr>
<th>TYPE OF MOBILITY</th>
<th>HYPOTHESES</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN THE CITY</td>
<td>Hypothesis 1: Public transportation VS SAVs</td>
</tr>
<tr>
<td></td>
<td>H0: People who are using public transportation to move around the city do not significantly predict that people will share AVs.</td>
</tr>
<tr>
<td></td>
<td>H1: People who are using public transportation to move around the city significantly predicts that people will share AVs.</td>
</tr>
<tr>
<td></td>
<td>Hypothesis 2: Private car VS AVs Ownership</td>
</tr>
<tr>
<td></td>
<td>H0: People who are using their private car to move around the city do not significantly predict that people will own AVs.</td>
</tr>
<tr>
<td></td>
<td>H1: People who are using their private car to move around the city significantly predicts that people will own AVs.</td>
</tr>
<tr>
<td>BETWEEN CITIES (LONG DISTANCES)</td>
<td>Hypothesis 1: Public transportation VS SAVs</td>
</tr>
<tr>
<td></td>
<td>H0: People who are using public transportation to move between cities (long-distance) do not significantly predict that people will share AVs.</td>
</tr>
<tr>
<td></td>
<td>H1: People who are using public transportation to move between cities (long-distance) significantly predict that people will share AVs.</td>
</tr>
<tr>
<td></td>
<td>Hypothesis 2: Private car VS AVs Ownership</td>
</tr>
<tr>
<td></td>
<td>H0: People who are using their private car to move between cities (long-distance) do not significantly predict that people will own AVs.</td>
</tr>
<tr>
<td></td>
<td>H1: People who are using their private car to move around the city significantly predicts that people will own AVs.</td>
</tr>
</tbody>
</table>

3. Results and discussions

3.1. Sample Characteristic

140 participants with various socio-demographic characteristics have filled the study survey, as shown in Table 2 and Figures 1-3. Overall, there was a fair distribution between male (54.30%) and female (45.70%) respondents. Similarly, 45% of respondents were married, whereas 44.30% were single. Although there was a fair age distribution in the sample, more than 57% were aged between 25 and 44...
years which is 10% higher than the proportion of the ones in Nottingham city. This might be because the survey was diffused through social media and networks, which are used mostly by the younger population. As for the sample educational profile, 35.70% and 25% were educated at the postgraduate and undergraduate level, respectively. Conversely, 22.1% achieved a further education degree, whereas 15% obtained high school qualification (Figure 2). Approximately 73.1% of the respondents were economically active, and 22.9% were students. This explains why 33.3% of the surveyees commute between 5 and up to 50 miles to work.

Table 2. Summary of the demographic details of the sample studied.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1</td>
<td>7</td>
<td>3.51</td>
<td>1.375</td>
</tr>
<tr>
<td>Gender</td>
<td>0</td>
<td>1</td>
<td>1.54</td>
<td>0.500</td>
</tr>
<tr>
<td>Occupation</td>
<td>1</td>
<td>6</td>
<td>1.99</td>
<td>0.877</td>
</tr>
<tr>
<td>Distance from home to work/study Place</td>
<td>1</td>
<td>6</td>
<td>3.01</td>
<td>1.360</td>
</tr>
<tr>
<td>Marital status</td>
<td>1</td>
<td>4</td>
<td>1.70</td>
<td>0.765</td>
</tr>
<tr>
<td>Level of education</td>
<td>1</td>
<td>5</td>
<td>2.84</td>
<td>1.140</td>
</tr>
</tbody>
</table>

1. Age: 1=Under 21/ 2= 21-24/ 3= 25-34/ 4= 35-44/ 5= 45-54/ 6= 55-64/ 7= 65 Or Older; 2. Gender: 1= Female/ 0= Male; 3. Occupation: 1= Student/ 2= Employee/ 3= Self-employed/ 4= Retired/ 5= Unable to work/ 6= Other; 4. Distance from home to work/study Place: 1=0-1 miles/ 2= 1-3 miles/ 3= 3-5 miles/ 4= 5-10 miles/ 5= 10-25 6= Over 50 Miles; 5. Marital Status: 1= Single / 2= Married / 3= Divorced/ 4= Other; 6. Level of Education: 1= High school / 2= Bachelor / 3= College/ 4= Masters/PhD/ 5= Other.

Figure 1. Gender and Marital status distribution of the survey’s respondents
3.2. Participants willingness to share/own AVs:

Figure 4 demonstrates that 38.8% of the respondents showed interest in owning an AV compared to 20.20% opt to share the upcoming technology. On the other hand, 38.80% of participants decided on neither share nor own an AV which makes it more than the third of the respondents. In this question, the option "Other" also is provided for participants to comment on the interest of owning or sharing an AV. 2.20% represents the respondents that selected "others". Therefore, the former group expressed opinions at owning or sharing technology depend on various reasons. For instance, it depends on the context where the person is living, rural or urban. "...this would be in an urban context only? What if you live in a rural community..." (participant 100). Besides, the same participant adds that it depends on the number of cars that could be owned "would you need to own two or more cars". Other reasons also are mentioned such as safety, personal experience and learning about them in advance.

3.3. Hypotheses testing

3.3.1. in the city

Hypothesis 1: Public transportation VS SAVs
**H0**: People who are using public transportation to move around the city do not significantly predict that people will share AVs.

**H1**: People who are using public transportation to move around the city significantly predicts that people will share AVs.

The analysis of hypothesis 1 focuses on the factor of "using public transportation" and whether it affects the consideration of "the desire of an individual to share an autonomous vehicle". In other words, whether people who currently use public transportation will be expected to share AVs in the future.

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>Sig.</th>
<th>Exp(B)</th>
<th>Nagelkerke R Square</th>
<th>df</th>
<th>Chi-square</th>
<th>Sig.</th>
<th>Percentage Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>0.481</td>
<td>0.023</td>
<td>1.617</td>
<td>0.359</td>
<td>1</td>
<td>5.700</td>
<td>0.017</td>
<td>56.6</td>
</tr>
</tbody>
</table>

Test value: alpha=0.05

As can be seen in Table 3, the logistic regression model is statistically significant, ($\chi^2 = 5.700$ and $p = 0.017 < 0.05$). The model explains 35.9% (Nagelkerke $R^2 = 0.359$) of the variance in sharing an autonomous vehicle and classified 56.6% of cases.

The p-value of the predictor "using public transportation" Sig = 0.023 < 0.05, so we reject the null hypothesis and accept the alternative hypothesis. Therefore, the independent variable predicts the dependent variable significantly, and we can explain the positive relationship between the two variables. This is to say that for every one-level increase in using public transportation around the city, it is expected a 1.617 growth in the log-odds of sharing an autonomous vehicle.

**Hypothesis 2: Private car VS AVs Ownership**

**H0**: People who are using their private car to move around the city do not significantly predict that people will own AVs.

**H1**: People who are using their private car to move around the city significantly predicts that people will own AVs.

The above assumptions will enable us to explain the relationship between the dependent binary variable "Own an Autonomous vehicle" and the nominal variable " Private car use " through performing a logistic regression test. This is to say that the hypothesis testing focuses on whether people who currently own private cars are likely wanting to possess an AV in the future.

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>Sig.</th>
<th>Exp(B)</th>
<th>Nagelkerke R Square</th>
<th>df</th>
<th>Chi-square</th>
<th>Sig.</th>
<th>Percentage Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private car</td>
<td>0.993</td>
<td>0.007</td>
<td>2.700</td>
<td>0.072</td>
<td>1</td>
<td>7.426</td>
<td>0.006</td>
<td>64</td>
</tr>
</tbody>
</table>

Test value: alpha=0.05

Similarly, to hypothesis 1, the logistic regression model for hypothesis 2 is also statistically significant, ($\chi^2= 7.426$ and $p = 0.006 < 0.05$). The model explained only 7.2% (Nagelkerke $R^2 = 0.072$) of the variance in own an autonomous vehicle and precisely classified 64% of cases Table 4.
The p-value of the predictor "using a private car" $\text{Sig} = 0.007 < 0.05$, so we reject the null hypothesis and accept the alternative hypothesis. Therefore, the independent variable predicts the dependent variable significantly, and we can explain the positive relationship between the two variables. In other words, for every one-level increase in using a private car in/around the city, a growth of 2.700 is expected in the log-odds of owning an autonomous vehicle in the future.

To see whether the participants' information influences this positive relationship or not, the logistic regression test is rerun taking into consideration the participant information (Age, Gender, Occupation, Distance between home and work or study place, Marital status and Level of education). Hence, Table 5 shows that the variables mentioned above are not statistically significant in the logistic regression except for the gender. The p-values of the variables: Age, Gender, Occupation, Distance between home and work or study place, Marital status and Level of education are all upper than 0.05. On the other hand, the gender variable is statistically significant ($\text{Sig} = 0.001$). Therefore, the participants' gender has a positive relationship with the desire to share AVs. As per Table 5, the gender Female is codified by 1, which means that females are $(1/0.197)$ 5.07 times more likely to share an AV than males.

### Table 5. Logistic regression of the participants' information and sharing AVs Hypothesis 1; In the city.

<table>
<thead>
<tr>
<th>Participants’ information</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-</td>
<td>-</td>
<td>6.24</td>
<td>6</td>
<td>0.397</td>
<td>-</td>
</tr>
<tr>
<td>Gender (1)</td>
<td>-1.626</td>
<td>0.5</td>
<td>10,601</td>
<td>1</td>
<td>0.001</td>
<td>0.197</td>
</tr>
<tr>
<td>Occupation</td>
<td>-</td>
<td></td>
<td>3,558</td>
<td>5</td>
<td>0.615</td>
<td>-</td>
</tr>
<tr>
<td>Distance between home and work or study place</td>
<td>-</td>
<td></td>
<td>8,294</td>
<td>5</td>
<td>0.141</td>
<td>-</td>
</tr>
<tr>
<td>Marital status</td>
<td>-</td>
<td></td>
<td>0.431</td>
<td>3</td>
<td>0.934</td>
<td>-</td>
</tr>
<tr>
<td>Level of education</td>
<td>-</td>
<td></td>
<td>5,415</td>
<td>4</td>
<td>0.247</td>
<td>-</td>
</tr>
</tbody>
</table>

#### 3.3.2. Between cities

Similarly, to the hypotheses set for the assumptions "in the city" logistic regression will be applied to predict the AVs future use for long distances "between cities". Thus, Hypotheses 1 & 2 will analyse whether people who are using public transportation or private car to move for long distances will share or own AVs in the future.

**Hypothesis 1: Public transportation VS SAVs**

**H0:** People who are using public transportation to move between cities (long-distance) do not significantly predict that people will share AVs.

**H1:** People who are using public transportation to move between cities (long-distance) significantly predict that people will share AVs.

Table 6. Logistic regression's results of Hypothesis 1 (Long distances: between the cities)
As can be seen in Table 6, the logistic regression model is not statistically significant, \( \chi^2 = 0.077 \) and \( p = 0.781 > 0.05 \). Besides, the model explained only 0.1\% (Nagelkerke \( R^2 = 0.001 \)) of the variance in sharing an autonomous vehicle and correctly classified 59\% of cases. We also notice that the p-value of the predictor "using public transportation" \( \text{Sig} = 0.781 > 0.05 \), so we accept the null hypothesis that the independent variable does not significantly predict the dependent variable.

Consequently, based on the logistic regression analysis, there is no significant positive relationship between using public transportation between the cities or long distances and the willingness to share AVs in the future.

**Hypothesis 2: Private car VS AVs Ownership**

**H0**: People who are using their private car to move between cities (long-distance) do not significantly predict that people will own AVs.

**H1**: People who are using their private car to move between cities (long-distance) significantly predicts that people will own AVs.

Table 7. Logistic regression’s results of Hypothesis 2 (Long distances: between the cities)

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>Sig.</th>
<th>Exp(B)</th>
<th>Nagelkerke R Square</th>
<th>df</th>
<th>Chi-square</th>
<th>Sig.</th>
<th>Percentage Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private car</td>
<td>0.018</td>
<td>0.960</td>
<td>1.018</td>
<td>0.000</td>
<td>1</td>
<td>0.003</td>
<td>0.960</td>
<td>61.4</td>
</tr>
</tbody>
</table>

Test value: alpha=0.05

Table 7 depicts the logistic regression results and the model statistically found is not significant, \( \chi^2 = 0.003 \) and \( p = 0.960 > 0.05 \). The model explains 0\% (Nagelkerke \( R^2 = 0.000 \)) in the amount of the variance in own an autonomous vehicle and correctly classified 61.4\% of cases. Besides, we notice that the p-value of the predictor "using private cars" \( \text{Sig} = 0.960 > 0.05 \), so we accept the null hypothesis that the independent variable does not significantly predict the dependent variable.

Therefore, the results from the logistic regression demonstrate that there is no significant positive relationship between using private cars between the cities or long distances and the possibility to own an autonomous vehicle in the future.

4. Conclusion

This study examined two relevant hypotheses to find out whether the current mode of transportation used by Nottingham city residents, either in the city or between cities, is a determinant of future AVs usage and ownership. At first, we argued that cars will change many aspects of our lives and that their benefits are achieved when they are shared. Secondly, we reviewed the recent literature; a good deal of research has been done on the potential on how SAVs can reduce ownership. However, these studies
focused on the ability of SAVs to minimise vehicle ownership, and how one shared AV can replace many current vehicle ownerships. Many studies, nevertheless, did not take into account the factors that will make people shift to using SAVs. Thirdly, since there is a lack of a conceptual framework that identifies the real motives that attract people interest to SAVs, we argued that it is vital to start to know the trend of AVs ownership based on the current usage patterns of the transportation/travel mode. To achieve this aim, we have conducted a survey questionnaire where we utilised a combination of statistical techniques, including binary logistic to test the hypotheses. In the city, the results demonstrate that based on the current mobility choice a growth in the vehicle ownership is expected; a 2.7 increase is predicted in the log-odd of willing to own AV in the future. Interestingly, it has been found that females are 5.07 times more likely to share an AV than males. On the other hand, prediction results regarding moving between cities or long distances did not show any variance either increase or decrease in shareability or ownership expectations; this is maybe due to the size of the sample.

The literature has discussed several factors that determine people's desire to own AVs, such as Knowledge gap; people are not familiar with the technology, AVs are not yet commercialised, machine distrust, Portraying AVs, personal space enjoyment, suitability to children and many more. Nevertheless, there is a lack of knowledge that identifies the factors that will make people shift to share AVs.

To conclude, this paper examined potential prospects for car ownership based on the travel patterns people use today. Therefore, based on the outcomes, more accurate results can be obtained and generalised if we take into account the study of a larger sample that represents the population of the UK. In addition to the former, the next step is to include a section that examines the factors that make people drawn to SAVs. In the end, the potential benefits of AVs will be realised when they are shared, so identifying the factors that help to shift users from ownership to service-on-demand is a priority rather than promoting them.

5. References


Faisal, A. et al. (2019) ‘Understanding autonomous vehicles: A systematic literature review on capability,


Macro- and Micro-scale Modeling of Multi-modal Transportation Spatial Networks in the City-State of Doha, Qatar

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Abstract

Researchers and practitioners have been modeling the street networks of metropolitan and geographical regions using space syntax or configurational analysis since the late 1990s and early 2000s. Some models even extend to a national scale. A few examples include the island of Great Britain, within the national boundaries of England, over half of the Combined Statistical Area of Metropolitan Chicago and the entirety of Chatham County, Georgia and the City of Savannah in the USA, and the Chiang-rai Special Economic Zone in northern Thailand bordering Myanmar and Laos. Researchers at Qatar University constructed a space syntax model of Metropolitan Doha in 2018. It covered a land area of 650 km², encompassing over 24,000 streets, and approximately eighty-five percent (~85%) of the total population (~2.8 million) in Qatar. In a short time, this model led to a deeper understanding of spatial structure at the metropolitan and neighborhood level in Doha compared to other cities of the world, especially in the Gulf Cooperation Council region. The paper presents the initial results of expanding this model to the State of Qatar, which provides ideal conditions for this type of large-scale modeling using space syntax. It occupies the Qatari Peninsula on the Arabian Peninsula adjacent to the Arabian/Persian Gulf, offering natural boundaries on three sides. Qatar also shares only a single border with another country to the southwest, which Saudi Arabia closed due to the current diplomatic blockade. The expanded model includes all settlements and outlying regions such as Al Ruwais and Fuwairit in the far north, Al Khor and the Industrial City of Ras Laffan in the northeast, and Durkan and Zekreet in the west. Space syntax is serving as the analytical basis for research into the effect of the newly opened rail transportation systems on Doha’s urban street network. Researchers are also utilizing space syntax to study micro-scale spatial networks for pedestrians in Souq Waqif, Souq Wakra, and other Doha neighborhoods. The paper gives a brief overview of this research’s current state with an emphasis on urban studies.

Keywords

Geography, Model, National, Space Syntax, Transportation
1. Introduction

Over the last 80 years, the computer science revolution and progressive evolution of digital technology have enabled models and simulations on a before-unimagined scale and complexity about our world’s different aspects. The genesis of this revolution began—now famously—during World War II. It included British mathematician Alan Turing and the electro-mechanical bombe device’s construction to assist decryption at Bletchley Park in the United Kingdom. It also involved American theoretical physicist Robert Oppenheimer and modeling the process of nuclear denotation in the collaborative Manhattan Project between Canada, the United Kingdom, and the United States.

Today, there are computer models and simulations in a cornucopia of fields dealing with natural systems like physics, chemistry, climatology, biology, and human systems such as economics, health care, social science, and engineering. A computer model is the digital representation of a system, which is similar to but simpler than the system it represents, offering a thoughtful balance between realism and simplicity (Whitt & Maria, 1997). Modeling is the act of building a model, i.e., “to produce a representation or simulation” from the Latin *modus* meaning small measure. A computer simulation is a process of using the model to study the behavior and performance of an actual or theoretical system (Whitt & Maria, 1997). Simulating is the act of using a model for simulation, i.e., “to make a simulation of something” from the Latin *simulatus* meaning to copy or represent. The keywords or phrases in these definitions of computer model and simulation as a thing (noun) and its act (verb) are *representation* (to represent), *simpler than*, and a *system* with ‘offering a thoughtful balance between realism and simplicity’ being an important but ancillary consideration, i.e., ‘providing necessary support to the primary activities or operation.’

The emphasis on the *representation of a system* means the built environment was ideally-suited for the computer science revolution. Working with representations is an everyday occurrence in the architect, urban designer, and town planner’s professional career. They work with plan and elevation drawings and two-dimensional representations of three-dimensional realities such as one- and two-point perspective drawings. Built environment professionals also work with two-dimensional representations of three-dimensional 'hyperrealities.' A hyperreality arises due to human consciousness’s inability to distinguish reality from a simulation of reality, seemingly bending the real and the fictional together, so there is little distinction between where one begins and the other ends (Tiffin & Terashima, 2001; Baofu, 2009). Architectural representations of this type include section, architectural detail, three-point perspective, and axonometric drawings. In some ways, they are like reality, but we rarely, if ever, see the built environment in such same precise manner. Finally, some of the most iconic architectural and urban proposals were only ever representations, such as Le Corbusier’s Ville Radieuse and Frank Lloyd Wright’s Broadacre City. We never constructed these proposals, but cannot deny their subsequent influence as mere representations (Major, 2018).

The fields of the built environment, often in concert with civil engineering, enthusiastically embraced the computer science revolution’s challenges. There are software programs to construct traffic models simulating vehicular movement flows based on the gross amount and relative intensity of origins and destinations available in an urban environment. Many software programs enable the design of built environments, creation of architectural drawings, and the final product modeling entirely within a digital realm, such as SketchUp, Revit, AutoCAD, and many more. Software packages like Rhino and Grasshopper

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4 Also known as gravity modeling since their mathematical foundation is Newton’s Law of Universal Gravitation.
fed the widespread adoption of parametric design principles in architecture over the last 30 years. Parametric design explores the technical limits of architectural planes, such as the building envelope. It utilizes an algorithmic process based on the grid subdivision of a plane into a coordinate system, which can be manipulated by the designer. Parametric design principles strongly relate to the traditional assessment of built forms’ stability using structural grids in architecture and civil engineering. Parametric design software transitions a previous static, usually plan-based representation into a dynamic one, whereby the design intent of the architect leads to a design response in the architectural object (Woodbury, 2010; Jabi, 2013). Geographical Information Systems (GIS) software enables the modeling of the urban environment simultaneously with the storing of massive amounts of socio-economic data using shapefiles, which researchers and practitioners analyze in various ways, including conventional Cartesian measurements. These are only a few examples of the software available for modeling of the built environment. There are far too many to summarize here.

Figure 1: Examples of the outputs for the computer science revolution in the field of the built environment over the last half-century including (left) suburban sprawl at the urban-level in Boca Raton, Florida USA in 2019 and (right) Frank Gehry’s 1997 parametric design of the Guggenheim Museum Bilbao in Spain in 2015 (Source: Google Earth/Wikipedia Commons).

Many computer software packages tailor their programming for the modeling of the built environment for particular purposes. Unsurprisingly, financial and technical considerations tended to feed digital evolution in the fields of architecture, urban design, and town planning over the last half-century. Typically, the former associates with cost-saving in some manner, usually reducing labor and increasing output for tasks. However, it also includes fiscal impact analyses of various kinds, especially at the urban-level. The latter is often consistent with exploring the technical limits and new meanings of architecture form, a theoretical preoccupation in the field since the late 19th century. Generally, the impact on the built environment has been positive. However, the results are not universal. For example, the institutional and professional spread of origin-and destination modeling to assess the fiscal impact of vehicle trips on roads in urban development coincides with the proliferation of suburban sprawl across the urbanscape, especially in the United States (Speck, 2010; Schmitt, 2014; Ball, 2015; Major, 2018) (Figure 1).

A small part of this story over the last 40 years is space syntax, which began to gain prominence during the 1990s. Space syntax is an international research program of academics and practitioners scientifically investigating spatial networks from the single building to entire metropolitan regions. Founded in the late 1970s and early 1980s by Bill Hillier, Julienne Hanson, John Peponis, Alan Penn, and many others in The Bartlett at University College London, space syntax researchers developed a set of techniques for the simple representation and mathematical measurement of architectural and urban space (Hillier and Hanson, 1984; Hillier, 1996; Hanson, 1998; Major, 2018). Their goal is to understand the role of built space in society. Computer models and simulation have been a fundamental part of space syntax from
the very beginning (Figure 2). Today, the international space syntax community composes hundreds of researchers and practitioners in more than forty countries worldwide with academic centers of excellence in Europe, South America, and the USA.

Figure 2: Space syntax model of global integration (radius=n) in Greater London within the North and South Circular Roads in 1999 where relativized mean depth of all streets (represented as lines of sight and movement) is in a range from red (most integrated or least depth) through orange, yellow, green, and light blue to dark blue (most segregated or most depth) (Source: originally by Hua Yoo, 1991 based on a color version in Major, 2000 and courtesy of Space Syntax Limited).

Figure 3: Representing (top, left to right) a point, line, and convexity (‘the quality or state of being convex’) in space syntax and (bottom, left to right) a visual field (in dark grey) from a point, line, and convex space (in light grey) in the plan of Souq Waqif in Doha, Qatar. NOTE: Plan elements in the large open plaza towards the lower left represents impediments to movement but not visibility, i.e., a normal human being can see over the top of these elements (Source: Authors).
2. About Space Syntax

A foundational principle of space syntax is that the built environment is both a product of society and an influence on society. Space syntax representations are usually plan-based. They utilize objective, easily understood constraints of the built environment for the most generic human uses such as movement, occupation, and visibility (Hillier, 1996) (Figure 3). A point in space is the simplest notion to build a geometry with no size, only position. The number of points in any space will be infinite without a resolution – defining the bounds of a space and a size for the points – such as the average standing area of a normal human being (0.28m$^2$) (Turner et al., 2001; Major, 2018). Movement tends to be linear because we are bipedal, forward-facing creatures usually bound by gravity. The axis or line of sight and movement (e.g., axial line) represents an idealization because a line is a set of points having a length but no width or depth. The matrix of longest and fewest (i.e., most strategic) lines of sight and access completely covering all spaces of a built environment as defined by its built surfaces (walls or facades) is the axial map (Hillier and Hanson, 1984). The axial map is the most common reference to a space syntax model in forecasting for pedestrian and vehicular movement in the urban environment, typically within a range of 60%-80% accuracy (Hillier et al., 1993; Penn et al., 1998).

The occupation of space tends to be convex where everyone can see and be seen by everyone else, such as a group of people gathered in a circle or a room. All points are visible to all others in a convex space. The collection of all convex spaces composing a built environment is the convex map, which tends to be more useful for building analysis (Hillier et al., 1987a-b; Hillier, 1996; Hanson, 1998). The potential for seeing and moving is a visual field, which is all visible and accessible space from which we might see or move as defined from a point or set of points such as a line of sight and movement or convex space (Benedikt, 1979). The matrix of all visual fields from a gridded set of points to all others in a built environment is a visibility map (Turner et al., 2001). Space syntax uses combinations of these simple descriptions — point, line, space, field — to create layered representations of the built environment.

We can measure the matrices of these representations using topological graph theory. It enables us to mathematically quantify the configurational relationship of all spaces to all others within a set range.
Configuration is a relational system where any local change in a system can have global effects across that system to varying degrees, dependent on the size of the system relative to the significance of the change itself within it (Hillier, 1996) (Figure 4). Configurational measures offer a scientific basis to implicate or dismiss the designed spatial network as a factor in higher-level social, functional, and cultural outputs. Space syntax software also incorporates metric parameters such as the length of streets/segment and the plan area/perimeter surface area of visual fields. Over four decades, researchers have developed a large and diverse set of configurational and metric measures using space syntax. Some are more useful than others, and sometimes it can take years of testing to confirm or refute their usefulness. Space syntax software measures the configurational relationship of all spaces to all others across the entire network and automatically colors each space in a range from most integrated or shallow to most segregated or deep; for color, red through orange, yellow, green, to blue and purple (refer back to Figure 2).

Figure 5. The procedure for modeling settlements based on the (a) plan/plat, (b) convex map, (c) figure-ground, and (d) axial map for the layout of Gassin in the Var region of France circa 1980 (Source: Authors after Hillier and Hanson, 1984).

Urban analysis in space syntax primarily relies on drawing an axial map of the open space structure based on a plan of a settlement (Hillier and Hanson, 1984; Hillier, 1989) (Figure 5). For the best results, this usually requires a plan or plat that accurately depicts all building footprints in the settlement. We can also divide the open spaces into the fewest and fattest set of convex spaces as defined by built forms necessary to encompass the entire settlement. We might do this if we wish to double-check that one-dimensional mapping of the longest and fewest strategic lines of sight and movement connects all the two-dimensional representations of space in the convex map. Most people forgo this stage unless they are researching the design or use of specific spaces in a settlement such as a public plaza or square. Instead, they tend to proceed to immediately draw the longest and fewest lines of sight and movement based on the plan/plat to create the axial map of the settlement. Best practice usually suggests beginning with drawing the longest lines, then the shortest lines, and concluding with the lines of intermediate length connecting between the two extremes. The use of a figure-ground representation with all built forms in black often assists this process. Once the axial map is complete, then we can process the model using computer software to analyze the system of relations between the lines.

Hiller and Hanson (1984) argue some basic properties tend to characterize all axial lines based on their degree of ‘symmetry-asymmetry’ and ‘distributedness-nondistributedness’ within the system. It means the degree to which space is composed of shallowness/rings of circulation or deepness/sequences that
form trees in the underlying topological graph. A space syntax model of the urban environment based on axial mapping can offer a very realistic picture of spatial networks based on a purely mathematical representation. We can layer in additional data about other urban functions such as land use, building heights, population density, and other socio-economic data to develop more sophisticated models.

Since the late 1990s and early 2000s, space syntax researchers and practitioners have been modeling street networks across metropolitan and geographical regions, even on a national scale. These models range in size and scale. A few examples include the island of Great Britain (land area of ~209,000 km²), within the national boundaries of England (~130,000 km²), over half of the Combined Statistical Area of Metropolitan Chicago (~10,900 km²) (Figure 6), the entirety of Chatham County, Georgia and the City of Savannah (~1,640 km²) in the USA and the Chiang-rai Special Economic Zone (~1,521 km²) in northern Thailand bordering Myanmar and Laos (Hanson, 2009; Turner, 2009; Major, 2018; Kasemsook et al., 2019; Major, 2020).5, 6

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The first task for launching the burgeoning space syntax research program at QU in 2017 was constructing the axial map of Metropolitan Doha as part of "The Doha Syntax: A Configurational Model of Vehicular and Pedestrian Networks in Qatar's Capital" research grant. It covered a land area of 650 km², encompassing over 24,000 streets and approximately eighty-five percent (~85%) of the total population (~2.8 million) in the State of Qatar at the time. The researchers later expanded this space syntax model to the entire State of Qatar on the Qatari Peninsula as part of the Master of Urban Design and Planning (MUPD) program and "The Doha Syntax, Phase 2: Urban Movement Network Validation of Space Syntax Model of Metropolitan Doha, State of Qatar" research grant currently in progress until the end of 2021.

The expanded model includes all settlements and outlying regions such as Al Ruwais and Fuwayrit in the far north, Al Khor and the Industrial City of Ras Laffan in the northeast, and Durkan and Zekreet in the west. Space syntax is serving as the analytical basis for research into the effect of the newly opened rail transportation systems on Doha’s urban street network. Researchers are also utilizing space syntax to study micro-scale spatial networks for pedestrians in Souq Waqif, Souq Wakra, and other Doha neighborhoods (Major et al., 2019; Khan et al., 2020; Major & Tannous, 2020; Tannous, 2020; Tannous & Major, 2020). In the next section, we provide a brief background about urban development and land use in the City of Doha and the State of Qatar over the last 50 years before reviewing some initial findings of our ongoing urban studies at the metropolitan and national scale.

3. About the City-State of Doha

The State of Qatar is a peninsular nation on the east coast of the Arabian Peninsula in Western Asia. It lies adjacent to the Arabian/Persian Gulf in the Middle East. Qatar encompasses a land area of 11,581 km², sharing a common border with only Saudi Arabia to the south. However, the western border of the United Arab Emirates (UAE) is only 80 kilometers (km) to the southeast (Figure 7). Under normal circumstances, the UAE border is only a one-hour drive away from the border of Qatar. However, the border has been closed since the initiation in June 2017 of the Qatar Diplomatic Crisis, which is an economic blockade of the State of Qatar involving Saudi Arabia, UAE, Bahrain, and Egypt.

There is archaeological evidence of Qatar’s human habitation dating back to 50,000 years ago, including Stone Age settlements and tools. However, large-scale settlements are a relatively recent phenomenon on the Qatari Peninsula beginning in the late 19th and early 20th centuries. Initial urbanization gathered pace after the exportation of oil under British rule during the mid-20th century. Development in the country later transformed into rapid urbanization and globalization after independence in 1971 due to the exportation of natural gas, especially since the 1990s. The land in Qatar is generally flat along the coastline of the Arabian/Persian Gulf. It also tends to be extremely dry, with very few inlets (Major & Tannous, 2020). Qatar’s official religion is Islam, although it is not the only religion practiced in the country. There is a significant minority of Christians, Hindu, and Buddhists (~31%) due to a large expatriate population. Only about 12% of the population are Qataris. Arabic is the official language, though people extensively use English as a second language.
Seven municipalities divide the State of Qatar as administrated by the Ministry of Municipality and Environment (MME), which serves as the main regulatory body for urban planning and development in the country. The smallest in terms of metric area (203 km$^2$) and densest for population (956,457 people) and urban development (4,711 people/km$^2$) is Doha itself. However, urban growth and expansion have spread to the adjacent municipalities – Al Daayan to the north, Umm Salal to the northeast, Al Wakrah to the south, and Al Rayyan to the west – during the last 20 years. The effective urban functioning and national impact of the Doha Metropolitan Region is significantly more expansive. Doha occupies up to ~5.6% of the land area in the State of Qatar. Still, it accommodates as much as ~85% of the country’s total population, depending on the delineation of metropolitan boundaries and the accuracy of various population estimates.

Globalization and rapid urbanization have been distinctive characteristics of Qatar over the last 50 years, especially since the 1990s. As a result, the country witnessed a remarkable economic transformation from a small fishing and pearling nation into a prosperous, diverse economy based on natural gas and oil production and exportation. Today, the State of Qatar “is, by far, the richest country in the world, with a GNI per capita of $116,799 - more than $20,000 higher than any other nation” with more natural gas reserves (13% of total global supply) than all but two other countries (Russia and Iran) in the world (Suneson, 2019; CIA, 2020). Revenues from natural gas and oil reserves fed rapid economic growth in the country and the hosting of mega-events such as the Asian Games 2006 and the upcoming Fédération Internationale de Football Association (FIFA) World Cup 2022. Most of this growth focused on Doha. Economic development included not only urban expansion. It also included the creation of Industrial areas in Doha and on the east coast and the inland conversion of desert wasteland tracts into irrigated agricultural land to promote food security, especially after the initialization of the diplomatic blockade in 2017 (Figure 8). Rapid urban growth and expansion impacted several different aspects of Doha, not only its physical size. It led to a massive population increase over the last 20 years, from an estimated metropolitan population of 492,000 in 2000 to over 2.4 million people in 2020. Over 80% of the national population lives in Doha and its suburbs of the metropolitan region. As a result, the Qatari government faced significant issues for managing growth, transportation, infrastructure, housing, and protecting the natural environment.

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11 GNI is Gross National Income.
12 Approximate estimates based on various sources, but principally the Qatar Ministry of Development Planning and Statistics (MDPS).
Meeting these challenges led to investment in – and a radical transformation of Doha’s urban environment (Salama and Wiedmann, 2013; Furlan et al., 2018). This transformation included constructing an extensive road network based on widening and a ring-road/expressway system. There was an almost complete abandonment of traditional low-rise courtyard housing in favor of contemporary (usually three-story) residential villas and high-rise apartment living (Al-Mohannadi et al., 2019). A proliferation of modern, climate-controlled shopping malls and new housing developments appeared in Doha’s suburban peripheries. The planning, design, and construction of new, satellite business districts composed of iconic skyscrapers on reclaimed lands, such as the West Bay area in the 1990s and Lusail City today, changed the popular image of Doha into a city on the rise (Salama and Wiedmann, 2013; Furlan et al., 2018).

4. Modeling Metropolitan Doha for Pedestrians and Vehicles

The key deliverable of a research grant in 2018-19 was a fully constructed space syntax model of the Doha metropolitan region accounting for variations between pedestrian and vehicular networks such as limited access highways, overpasses, underpasses, pedestrianized zones, etc. Once constructed, researchers could regularly update the model to incorporate the most recent development changes to the metropolitan region’s urban fabric. Researchers initially created an ‘all-inclusive’ model based on an MME map showing all building footprints at a scale of 1:100,000 in 2013 (Figure 9). All-inclusive means incorporating both pedestrian and limited-access vehicular routes. We also compiled an MME Zoning and Land Use map in 2008 as an additional reference. Researchers double-checked and revised the initial iteration of the model based on the 2013 Google Earth satellite imagery. Once researchers were satisfied with the 2013 space syntax model’s accuracy, they updated based on the 2018 Google Earth satellite

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[Figure 8: Land use maps of the State of Qatar in (left) 1993 and (right) 2012 (Source: Perry Casteñeda Library Map Collection, University of Texas).]

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imagery. Researchers double-checked this updated model against the most recent information available in Google Maps and several on-site visual surveys to ensure accuracy further.

During the space syntax model construction, researchers processed, revised, and updated more than 30 draft models in 2013 and ten draft models in 2018, constituting hundreds of revisions/corrections for each year. Researchers also constructed six different versions of the space syntax model for Doha at various scales by paring down the initial model using the ring road system as a successive series of smaller boundaries. Finally, once researchers were satisfied with the all-inclusive 2018 model’s accuracy, it only took a single iteration to update and revise for turning movements/lanes, overpasses/underpasses, frontage roads, and the elimination of pedestrianized areas in generating the vehicular model of Doha. We double-checked this vehicular model again using Google Earth satellite imagery in 2018 and on-site visual surveys.

The primary difference between the pedestrian and vehicular model of Metropolitan Doha lies in the representation of vehicular turning movements such as the measurement of Global Choice at the interchange between Salwa Road and Doha Expressway/D-Ring Road (Figure 10). Global choice is a space syntax measure of ‘through-movement’ in the urban spatial network. The choice measurement gives every street (represented as a line of sight) an initial value of 1, which then proportionally shares that value among all immediate connections. The computer then adds up all the proportionate values shared for each street to measure the degree of importance of that street within the urban spatial network. Even this modeling technique for vehicular turning movements is relatively simplified based on cardinal
directions, i.e., left or right turns, and route continuation based on disconnection of crossing routes. However, the pedestrian model is much simpler, relying on a straightforward reading of the urban spatial network as defined by building facades. For example, the pedestrian movement model treats Salwa Road and Doha Expressway/D-Ring Road as singular spaces as read by pedestrians, incorporating simple left-right direction changes. The vehicular movement model treats Salwa Road and Doha Expressway/D-Ring Road as multiple spaces, as defined by frontage roads incorporating 45° turns to account for off-ramps in vehicular turning movements. It requires a disconnection (overpass/underpass) between the continuing route in the north-south (Doha Expressway/D-Ring Road) and east-west (Salwa Road) directions.

![Figure 10: Detail of the interchange between Salwa Road and Doha Expressway/D-Ring Road showing different modeling techniques for (left) vehicular and (right) pedestrian movement in the space syntax model for the pattern of global choice in the urban spatial network of Metropolitan Doha, Qatar in 2018 (Source: QUSD-CENG-2018/2019-4).](image)

The vehicular model of the urban spatial network in Metropolitan Doha incorporates this type of modeling technique for vehicular turning movements, overpasses and underpasses, and roundabouts. In contrast, the pedestrian network model of Metropolitan Doha incorporates a simplified reading of urban space as defined by the building facades and 90° changes of direction (left, right, straight, backward) at such significant interchanges. A key takeaway from the comparison of the pedestrian ('ped model') and vehicular ('vec model') models is that the pattern of the spatial configuration remains mostly consistent (Table 1). The model's axial size increases by 975 axial lines (+4%) due to the modeling of vehicular turning movements. Doha's most integrated street does shift from a long north-south segment of the Doha Expressway/D-Ring Road (global integration=1.86) approximately 4,000 m in length, intersecting with the most extended, straightest segment of Salwa Road (global integration=1.82) in the pedestrian model. The processing of mean depth from the most integrated street (7.43) rounds down to seven.

![Table 1: Comparison of axial size, mean depth from the most integrated street, intelligibility, and synergy in the pedestrian and vehicular models of Metropolitan Doha in 2018 (Source: QUSD-CENG-2018/2019-4).](image)

<table>
<thead>
<tr>
<th>Metropolitan Doha 2018</th>
<th>Axial Size (Total # of Axial Lines)</th>
<th>Mean Depth (Most Integrated Street)</th>
<th>Intelligibility (R² of Global Integration v. Connectivity)</th>
<th>Synergy (R² of Global Integration v. Local Integration)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrian</td>
<td>23,800</td>
<td>7.43*</td>
<td>0.108</td>
<td>0.391</td>
</tr>
<tr>
<td>Vehicular</td>
<td>24,775</td>
<td>8.69**</td>
<td>0.097</td>
<td>0.376</td>
</tr>
</tbody>
</table>

* Doha Expressway/D-Ring Road segment (~4,000 meters in length) interacting with longest, straightest segment of Salwa Road.

** Haloul Street (~5,000 meters in length) running parallel about 590 meters south of Salwa Road.
The most integrated street becomes Haloul Street (global integration=1.56) in the vehicular model. This segment of Haloul Street is approximately 5,000 m in length, running parallel to Salwa Road, about 590 meters to the south. The modeling of separate frontage roads and the limited access highway on this segment of Salwa Road drops its global integration value to 1.43 (-22%) in the vehicular model. Overall, the mean depth from the most integrated street in Doha increases 1.26 (+17%) due to the additional complexity in managing vehicular turning movements. There are other minor differences at the fine grain of the urban spatial network, most obviously in east-west frontage roads along Industrial Area Road and access roads within Hamad International Airport. The changes in Intelligibility (a second-order measure based on the $R^2$ value of global integration vs. connectivity) and Synergy (a second-order measure based on $R^2$ value of global integration vs. local integration, radius=3) are marginal: -10% for Intelligibility and -3.8% for Synergy in the vehicular model. Except for such detailed changes in the fine grain of the urban spatial network, the overall visual pattern for global choice, global integration, local integration, and integration based on mean depth from the most integrated street remains strongly consistent. At the large scale of the urban structure of Metropolitan Doha, these changes are minor. However, they will play a more important role when investigating specific regions and neighborhoods served by these streets.

Based on past results of space syntax research, there is an unsurprising argument that the traditional least-line axial mapping – based on a simple reading of urban space – of Metropolitan Doha offers a more realistic picture of the city as a whole than incorporating the management of vehicular turning movements and road separations, i.e., frontage roads, in the model (Penn et al., 1998; Hillier & Vaughan, 2007). After all, people drive vehicles, and they appear to ‘read’ urban space in the same manner, either way. All that changes is the speed of movement and decision-making for navigation purposes during that movement. It indicates that the ‘all-inclusive’ or pedestrian model (‘all-inclusive’ because it includes simplified modeling of major vehicular routes) should be sufficient in future research about the urban
spatial network in Metropolitan Doha. The vehicular model serves better to research transportation planning management outcomes in specific urban areas of the metropolitan region.

5. Metropolitan Doha 2020 and the Public Rail Transportation Network

Researchers implemented a 2020 update of the all-inclusive space syntax model of Metropolitan Doha as part of the QUCG-CENG-20/21-1 research grant. The grant also includes on-going fieldwork compiling direct counts of pedestrian and vehicular movement flows in three neighborhoods: Old Al Ghanim, northern Al Sadd, and the eastern Al Souq/Qatar National Museum area. The research team is adding pedestrian and vehicular counts for a fourth area (Souq Waqif) to the sample size based on research work arising from the "Space, Time And Natural movement in old Doha (STAND): The morphological case of Souq Waqif" grant (UREP25-002-5-001) provided by the Qatar National Research Foundation (QNRF). The direct counts of vehicular flows will be tested against automated traffic counts on segments of perimeter roads and flow projections on these areas’ internal streets, all of which are being made available to the Qatar Transportation and Traffic Safety Center (QTTSC) at QU.

![Figure 12: Space syntax model of (left) global choice and (right) global integration (radius=n) in the urban spatial network of Metropolitan Doha, Qatar in 2020 (Source: QUCG-CENG-20/21-1).](image)

The primary updates to the space syntax model of Metropolitan Doha involve the inclusion of large sections of the recently-completed street network in Lusail City to the north, finalization of recently-open connections on the Orbital Highway/G-Ring to the west and north, a more detailed modeling of the Qatar University campus in north Doha, and various updates and revisions at the fine grain of the urban grid in several areas throughout Doha. Axial size increases to 24,335 in the 2020 model compared to the 2018 model (23,800 axial lines), representing an increase of 535 streets (+2.2%) modeled as axial lines in only two years. Researchers noted some changes in the value of configurational measures such as global choice and global integration at the fine grain of the urban spatial network, most clearly due to new
additions to the urban pattern in Lusail City (Figure 12). The most notable difference is the northward shifting of the most integrated axial line in the city from the ~4,000m segment of the Doha Expressway/D-Ring Road segment intersecting with Salwa Road to the next northerly part of Doha Expressway. It is a ~3,700m segment intersecting with major cross-streets of Khalifa Street to the north and Al Rayyan Road to the south between Zones 34-36 to the west and Zone 52 to the west. However, overall, the ortho-radial structure of the urban spatial network in Metropolitan Doha remains strongly consistent when comparing 2018 to 2020. It appears mainly due to the northward trajectory of urban development (such as Lusail City) and transportation planning efforts to redistribute and relieve, in relative terms, the degree of traffic congestion in the southern areas of the city, especially along Salwa Road.

During these updates, researchers also took the opportunity to incorporate the modeling of the new public rail transportation networks in Metropolitan Doha, including the Doha Metro (Red, Gold, and Green lines), opened portions of the Lusail City, Msheireb Downtown Doha, and Education City tram networks (Figure 13). There is a long history in space syntax research of simulating the connective effects of public rail transportation on the urban spatial structure, beginning with Shinichi Iida and the combined modeling of the Tokyo street network with the rapid transit system of the Tokyo Metro in the late 1990s at University College London. It includes studies modeling rapid transit public rail networks of the London Underground in London, UK (Gil, 2008; Law et al., 2008). There have also been additional studies based on Tokyo and the Tokyo Metro (Fujitani & Kishimoto, 2013), agent-based simulations of pedestrians using space syntax in Chinese rail stations (Tang & Hu, 2017), and combined modeling of the street network and rapid surface rail transit in Tel Aviv (Lebendiger & Lerman, 2019) to name but a few.

Figure 13: Diagrammatic maps of the public rail network for the (top left) Doha Metro and the tram networks for (top right) Lusail City, (bottom left) Msheireb Downtown Doha, and (bottom right) Education City (Sources: Qatar Rail/Arab Engineering Bureau/UrbanRail.net/Dmitriy Lysenko).
Typically, the methodology for simulating the effect of rapid transit rail transportation networks in a space syntax model of an urban spatial network involves drawing a single line of movement from station-to-station until accounting for the entire rail transportation network. Researchers need to ensure that all lines of movement connect at each station’s location, including any overlap necessary to simulate the role of transportation interchanges between different rail lines. Akin to modeling and connecting with other floors of a single building using space syntax in building analysis, researchers incorporate this simplified model of the rail transportation network as a separate ‘floor’ of the urban spatial network. However, unlike building analysis, where researchers model the transition spaces (stairwells and elevators), this model of the rail transportation network is connected directly into the urban spatial network using a linking function in the space syntax software. The direct connection to the street network simulates the connective role of rail transportation on the urban spatial network at the macro-scale (Figure 14). If we were interested in the transition of passengers from the train platforms to the street level in a specific station, researchers would apply a more detailed modeling methodology to understand pedestrian movement at the micro-scale (Major et al., 1998; Tang & Hu, 2017).

There is very little difference in terms of the visual pattern of the street network’s urban structure for various space syntax measures, including Global Choice (Figure 15). Of course, this is unsurprising. Only 107 axial lines compose the Doha Metro’s combined public rail transportation networks and various tram systems in a metropolitan region consisting of more than 24,000 streets represented as axial lines (Table 2). The bulk of the rail transportation network in terms of axial size (less than 1/10 of 1%) is insufficient to significantly adjust the visual pattern of the urban structure of the street network in the metropolitan region. The global choice pattern for the public rail transportation itself is interesting (see the insert image of Figure 15). It highlights the importance of the Red Line from the main terminal of Msheireb to the Qatar University Metro Station. It appears reflective of the northward trajectory of urban growth in the metropolitan region’s street network as a whole in general. It also reflects the importance of the main terminal at Msheireb, including the immediate rail network connections from Msheireb on the Gold Line eastward to Souq Waqif, on the Green Line westward to The White Palace (eastern edge of Hamad Medical City), and on the Red Line southward to Al Doha al Jededa.
Figure 15: Space syntax model of global choice in the urban spatial network of Metropolitan Doha, Qatar in 2020 with (insert) the public rail and tram systems (Source: QUCG-CENG-20/21-1). NOTE: Model of public rail and tram systems shown at half of actual scale in the insert.

Table 2: Comparison of axial size, mean depth from the most integrated street, intelligibility, and synergy in the space syntax model of the Metropolitan Doha with and without the public transportation rail network (Source: QUCG-CENG-20/21-1).

<table>
<thead>
<tr>
<th>Metropolitan Doha 2020</th>
<th>Axial Size (Total # of Axial Lines)</th>
<th>Mean Depth (Most Integrated Street)</th>
<th>Intelligibility (R² of Global Integration v. Connectivity)</th>
<th>Synergy (R² of Global Integration v. Local Integration)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without public rail</td>
<td>24,335</td>
<td>7.43</td>
<td>0.109</td>
<td>0.388</td>
</tr>
<tr>
<td>With public rail</td>
<td>24,442</td>
<td>7.38</td>
<td>0.121</td>
<td>0.423</td>
</tr>
</tbody>
</table>

* Northern segment of Doha Expressway ~3,700 meters in length with major cross-streets of Khalifa Street to the north and Al Rayyan Road to the south between Zones 34-36 to the west and Zone 52 to the west.

The clearest effect of modeling the rapid transit rail transportation network with the urban street network of Metropolitan Doha lies in the changes to several spatial measures (refer to Table 2). The mean depth from the most integrated street in Metropolitan Doha reduces from 7.43 to 7.38, and the degree of Intelligibility and Synergy both increase in the urban spatial network. Intelligibility increases 11% from 0.101 to 0.121 and Synergy increases 9% from 0.388 to 0.423. By definition, modeling the rail
Macro- and micro-scale modeling of multi-modal transportation spatial network

transportation network means increasing the urban system's axial size, so it introduces more depth into the configurational model. Given these conditions, the logical interpretation is the reduction in mean depth from the most integrated street and increases in Intelligibility and Synergy represents a significant enhancement in the urban spatial network for accessibility and readability. In effect, this the explicit nature of connective rail transportation networks for cities. In this sense, the Doha Metro and more localized tram networks in Lusail City, Education City, and Msheireb Downtown Doha collectively appear to achieve their purpose at the macro-scale of the urban structure for Metropolitan Doha

6. Modeling the State of Qatar

As part of coursework on the MUPD Program in the DAUP-CENG at QU, graduate students prepared the initial modeling of different regions of the State of Qatar in expanding the space syntax model of Metropolitan Doha to the entire State of Qatar. In areas lacking built-up areas, graduate students and researchers merely modeled roads' alignment, erring on the side of simplicity and readability while ignoring minor changes in alignment. Researchers on the QUCG-CENG-20/21-1 then reviewed, revised, and verified this modeling to produce the final space syntax model of the State of Qatar in 2020. The expanded model includes all settlements and outlying regions such as Al Ruwais and Fuwayrit in the far north, Al Khor and the Industrial City of Ras Laffan in the northeast, and Durkan and Zekreet in the west.

The total size of the space syntax model of the State of Qatar without the rail transportation network in Doha is 28,700 streets represented as axial lines (Table 3). The effect of modeling the rail transportation network in Doha at the scale of the State of Qatar is minimal with only marginal differences for mean depth from the most integrated street in the State of Qatar (the same ~3,700m segment of Doha Expressway as the model of Metropolitan Doha), Intelligibility, and Synergy. It is unsurprising, given the connective focus of the rail transportation network in the capital city. The axial size of the space syntax model for the State of Qatar indicates that approximately 85% of all streets represented as axial lines composed the urban spatial network of Metropolitan Doha. It is almost the same as the proportion of the population living in Doha compared to the entire State of Qatar, i.e., ~85% of the total population of 2.8 million.

Table 3: Comparison of axial size, mean depth from the most integrated street, intelligibility, and synergy in the space syntax model of the State of Qatar with and without the public transportation rail network (Source: QUCG-CENG-20/21-1).

<table>
<thead>
<tr>
<th>State of Qatar 2020</th>
<th>Axial Size (Total # of Axial Lines)</th>
<th>Mean Depth (Most Integrated Street)</th>
<th>Intelligibility (R² of Global Integration v. Connectivity)</th>
<th>Synergy (R² of Global Integration v. Local Intergation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without public rail</td>
<td>28,770</td>
<td>8.37*</td>
<td>0.082</td>
<td>0.298</td>
</tr>
<tr>
<td>With public rail</td>
<td>28,877</td>
<td>8.35*</td>
<td>0.086</td>
<td>0.309</td>
</tr>
</tbody>
</table>

* Northern segment of Doha Expressway ~3,700 meters in length with major cross-streets of Khalifa Street to the north and Al Rayyan Road to the south between Zones 34-36 to the west and Zone 52 to the west.

The mean depth from the most integrated street in the State of Qatar is 8.37, representing a 12.7% increase compared to Metropolitan Doha (refer back to Table 2). It means that, on average, almost everywhere is only 8-9 changes of direction away from the Doha Expressway/D-Ring Road and Salwa Road in the State of Qatar. Intelligibility and Synergy at the scale of the country decreased to 0.082 and 0.298, respectively. This change represents a 23-25% decrease for these second-order measures, primarily due to the regional highway/road network connecting the hinterland settlements of Al Ruwais and Ras Laffan to the north, Durkan and the Zekreet peninsula to the west, and the overland road connection to Saudi Arabia. Interestingly, there is a still-noticeable effect of the rail transportation
network enhancing intelligibility (+5%) and Synergy (+4%) in the State of Qatar as a whole. However, the effect is about half of that in Metropolitan Doha itself.

Given the physical, social, and cultural importance of Doha’s capital city in the State of Qatar, space syntax modeling of the entire country accurately reflects the functional dominance of the capital city in Qatari society. The visual pattern of all space syntax measures highlights the radial importance of Salwa Road, Al Waab Road, and Al Rayyan Road in Doha and the State of Qatar. They also highlight the role of the ring road system in the city, especially the importance of the new Orbital Highway/G-Ring Road, in mediating for urban expansion at the macro-scale of Metropolitan Doha. Global choice highlights not only the importance of these streets in Doha and Qatar but also the connective importance of the highways and roads in the hinterlands connecting Doha with the settlements of Al Ruwais and Ras Laffan in the north, and Durkan and the Zekreet peninsula to the west (Figure 16, left). A more localized view of the street network in the State of Qatar is also illuminating as local integration (radius=3, or only 3 change of direction away) highlights the importance of several streets associated with specific settlements. It includes Al Wakrah Road in a north-south direction and Al Wukair Street heading inland to the west on the east coast in Al Wakrah, south of Metropolitan Doha. Local integration also highlights the access road approximately 5.5 kilometers (km) in length connecting into Al Khawr Town Road at the center of Al Khor, the well-defined cross-axis to the west of Al Dhakira, and the two long roads parallel to each other and the coast in the geometric grid of Ras Laffan Industrial City in the in these northeastern areas of Qatar. Local integration also highlights the importance of the Madinat Al Shamal/Al Gharya Road running inland and parallel to the coast, and its intersection with the extension of Al Meena Road running perpendicular, in Al Ruwais in the far north of Qatar. Finally, Al Shamal Road/Highway 1 takes on critical importance for local integration values by connecting all of these northern settlements in the north part of the country.
7. Conclusion

Researchers and practitioners have been modeling the street networks of metropolitan and geographical regions using space syntax or configurational analysis since the late 1990s and early 2000s. Some models even extend to a national scale. Researchers at Qatar University constructed a space syntax model of Metropolitan Doha in 2018. It covered a land area of 650 km², encompassing over 24,000 streets, and approximately 85% of the 2.8 million people living in Qatar. In a short time, this model has led to a deeper understanding of spatial structure at the metropolitan and neighborhood level in Doha compared to other cities, especially in the GCC region. The paper presented the initial results of expanding the model to the entire State of Qatar, which provided ideal conditions on the Qatari Peninsula of the Arabian Peninsula for this type of large-scale modeling using space syntax. The expanded model includes all settlements and outlying regions. The results were a very realistic picture of the functioning of Metropolitan Doha and the State of Qatar for street-level and public rail transportation movement. The paper demonstrates how researchers can utilize space syntax to learn more and understand better about the spatial network of Metropolitan Doha and the entire State of Qatar. With this knowledge, researchers can help guide the future development of the built environment to the benefit of all citizens and residents.

8. Funding

The research in this paper was fully supported by internal grants of Qatar University (Grant IDs: QUSD-CENG-2018/2019-4 and QUCG-CENG-20/21-1).

9. References


Macro- and micro-scale modeling of multi-modal transportation spatial network

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Small Case, Big Principle – Achieving a Sustainable Transport is not a Myth

Raymond DONG, Fuzhou Institute of Planning Design and Research, China

Abstract

Small Case, Big Principle – Achieving Sustainable Transport is not a Myth Abstract With the continuous advancement of urbanisation in the city of Fuzhou in China, intersection roundabouts can no longer meet the need of complex multi-modal traffic. Therefore, how to balance the need of both motorised and non-motorised traffic, and putting forward an optimal intersection traffic arrangement has become the focus of urban road intersection design. The study relates to a complex four-way intersection design at the intersection of Guobin & Qishang Avenues in the city of Fuzhou, China. After exploring three detailed design options for the subject intersection, the recommended option is deleting the give-way which intersects with the pedestrian/cycle lane, that prioritises non-motorised traffic modes and the pedestrian connection to the underground subway station. The deletion of the give-way seems that it could reduce the capacity of the motorised traffic at the first glance, however, the actual effect of the deletion shows an unexpected result: it in fact improves the efficiency of the motorised traffic due to the fact that the improved non-motorised traffic causes less interference to the motorised traffic, which leads to the improvement of the whole system and achieve a win-win situation. This typical small case, reflects a big principle, that is: prioritising non-motorised traffic will in turn improve motorised traffic and therefore, the transport system as a whole.
1. Fuzhou is one of the important cities in south-east coastal areas of China, with an total area of 11,968 sq.km and a population of 15.5 million. The core area of the city is sized 937 sq.km with a population of 9.8 million.

2. The subject site falls within the town of Shangjie, western part of Fuzhou, which is one of the fast-growing areas of the city.

**Issues analysis**

- 1. non-motorised modes congested
- 2. Intersection taking large land causing low efficiency
- 3. many commercial crossovers
- 4. inadequate modes connection
- 5. inadequate scooter waiting area
- 6. inadequate scooter parking area

**Summary:** 6 issues causing the intersection disorderly, congested, and inefficient

**Option comparison**

<table>
<thead>
<tr>
<th>Options</th>
<th>Existing option</th>
<th>Design Option 1</th>
<th>Design Option 2 (Recommended)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advantage</td>
<td>Right turn from National Hey to Dizhan Ave, more efficient for motorised traffic.</td>
<td>Modifying the right turn angle and providing more efficient route for scooter/non-motorised traffic in order to improve the efficiency.</td>
<td>Based on Option 1, deleting the small triangular traffic triangular island which makes more space for scooters/non-motorised traffic to line up at the traffic lights for crossing, providing more waiting space for scooters/cycle/pedestrian to wait for traffic lights.</td>
</tr>
<tr>
<td>Disadvantage</td>
<td>Non-motorised traffic is discontinued and inefficient, conversely, causing more interference to motorised traffic.</td>
<td>Scooters/cycle/pedestrian are still not controlled by the traffic lights, which still causing some degree of traffic interference to motorised traffic.</td>
<td>This option will enable the traffic lights to control all the traffic modes in a more organised manner, which will optimise both motorised and non-motorised traffic.</td>
</tr>
</tbody>
</table>
4. Safeguarding the Urban Resilience

**Pedro Garcia**
(Portugal/Canada)

Pedro Ressano Garcia currently shares his time between research, teaching and architecture practice. Garcia started teaching at University of California at Berkeley in 1996. He teaches at University Laval, Quebec, Canada and lectures in international seminars, workshops and conferences, and publishes regularly with prestigious editors. He is the author of the book Tagus Platform – Back to the River, Lisbon’s waterfront and the 21st Century, and the editor of six books produced by the European Workshops on Waterfront Urban Design. Since 2019 he coordinates a H2020 research project on European waterfront cities’ adaptation to climate change. In his office in Lisbon, Ressano Garcia Arquitectos, theory and practice are combined in projects of architecture, urban design and in the development of studies and ideas that give value to each cultural reality. This work has been published extensively in books, magazines and international events. In 2018, the office received the Merit Award in the Hsinta Ecological Power Plant International Competition, Taiwan.

**Elizabeth Reynolds**
(United Kingdom)

Elizabeth Reynolds is a Chartered Urban Planner and Director of Urben, an east London studio focused on planning, design and problem solving for urban environments. Over the past 20 years Elizabeth has worked in multidisciplinary teams, predominantly on major infrastructure and regeneration projects including the Queen Elizabeth Olympic Park, Thames Tideway and Crossrail. Urben works from macro scale strategic city plans to detailed street design, with a common theme of making cities creative, productive and resilient places. Originally from Melbourne, Elizabeth has lived in Abu Dhabi as well as London and loves exploring art and architecture in new cities. Through ISOCARP she has been fortunate to participate in Urban Planning Advisory Teams in the Gaza Strip, occupied Palestinian territory and Bodø, Norway. As part of ongoing research and writing on contemporary urban issues, Elizabeth is also the author of the recently published book Underground Urbanism, about the overlooked but important places beneath our cities.
With the ongoing threat of climate change coupled with the fall-out from COVID-19, discussions around urban resilience felt especially critical this year. COVID-19 has compounded underlying vulnerabilities and therefore lifting communities out of risk needs holistic, long term approaches to improving quality of life. We heard of ‘wonderful resilience’, with solutions that move beyond the technical to bridge governance and social gaps (The Netherlands).

Key learnings from Track 4 involved:

- The need for better communicative tools to create new alliances amongst different actors (Italy).
- Recovery measures from COVID-19 are well aligned with green new deals & sustainable development goals – including measures to encourage walkable neighbourhoods and cycle infrastructure (Italy & Austria).
- Shifting from disaster prevention, to disaster to reduction, and then to resilient city models to reduce flood risk (China).
- Stakeholder participation in water management needs to be funded and embedded into local solutions to fight flooding and seasonal fires. (Indonesia, global).
- Collaborative international research enabled the creation of an online toolbox for activating green and blue infrastructure in coastal zones (Europe).
- An Urban Sustainability Assessment Framework (USAf) developed by UN Habitat is helping city managers target funding for maximum impact and benefit (India).
- In designing sponge cities, robust analytical research can help make more informed decisions on land use and surface materials (China).
- The Horizon2020 project demonstrates a nexus between water, energy, food & nutrients –adapted to protect important urban waterfronts to safeguard resources and make them more resilient to face climate change (Europe).
- Contemporary, evidence-based policies, well aligned between different levels of government, are vital to delivering sustainable urban development (Lima).
- Large capital investment projects delivered in a top-down manner can alienate local residents and failure to deliver relevant, good value projects – conversely, using social animation & education to Wengage people in civic life (Poland).
- Assessing the vulnerability of communities not only reduces risk but can also create opportunities (Egypt).
- Wood & the Rockefeller Foundation have developed a screening framework with which private and institutional investors can rank projects on a scale of 1-100 to fund and build more resilient communities (USA / global).
- Climatically extreme cities need innovative design and materials - Ashgal and ANAS are using recycled materials to create long-lasting, sustainable, cost-efficient and climate responsive roads (Qatar / Italy).
- The values of indigenous communities can inform design principles for coastal resilience (New Zealand).
- The World Resources institute (WRI) is taking a high conservation value approach to recommending climate responsive strategies for a new
capital city development (Indonesia).

- Eco-geological footprint models can be used to calculate the ecological carrying capacity of land and its influence on seismic disasters (China).

- COVID-19 is exacerbating the dystopic effects of traditional western city models such as gentrification led displacement, racial challenges, crime, housing affordability & food security – more human centred design with “birth to earth” planning is needed (USA / Singapore).

- Analysing how the public and press discussed the outbreak of COVID-19 provided insights into which communication strategies could be useful to improve resilience to future disasters, including undertaking multi-scenario planning exercises with local communities (China).

- Climate change is a reality and historic infrastructure is overwhelmed - cities need not only to be engines of economy but also supportive of human and environmental health, which can be improved through people centric placemaking (India).

- Historic landscape interventions such as polders might be influencing current and future climate disasters – now new technologies and spatial forms are needed to guarantee their safety (Poland).

- Historic military defences might be repurposed to deal with contemporary climate threats (Portugal).

Overall, it seems that the skills needed for planning are a little like driving or riding a bike - as well as keeping your eyes on the horizon to see what might be coming next, you also need to be aware of what is behind and around you – by learning from historical events, landscapes and data; and sharing experiences with your (global) neighbours, it becomes easier to anticipate and mitigate risks. With hard work and international cooperation, we look forward to a safer and more sustainable 2021 (and beyond!).

Selected Papers

1. KNAUF Kristina, ZARATE Halina, CULLEN Jessica, Wonderful resilience

2. JAKKAPPANAVAR Anita C., Place making as a multi-faceted tool in urban design & planning – an strategic approach in case of Hubballi City, Karnataka, India
Wonderful Resilience
Creating hope for an uncertain future

Kristina KNAUF, MVRDV, the Netherlands
Halina ZARATE, MVRDV, the Netherlands
Jessica CULLEN, MVRDV, the Netherlands

Abstract
Resilience needs consent to reach scale. Bold, audacious, and daring design can be a powerful tool to motivate stakeholders to engage in building resilience and ensure their commitment and participation in long-term adaptation. When we think of resilience, we think of pragmatism, and restraint. However, we believe that “beauty and wonder” are crucial ingredients of every successful urban adaptation strategy, as they catalyse the will to change. Using six principles, MVRDV endeavours to transform vulnerabilities into drivers for optimistic, robust and daring designs, challenging communities, investors, developers, and stakeholders to co-create an adaptive urban future that works in concert with nature. The Case Study illustrates several lessons from the comparison of two projects. These inform our practice, and commitment to creating scalable solutions for resilient environments that foster consensus through surprising and intriguing solutions using “wonder” to motivate adaptation towards a sustainable future.

Keywords
Resilience, Architecture, Urban Design, Adaptation, Sustainability, Participatory design.
1. The starting problem: the quest for climate action through rational adaptation

We face unprecedented global crises. A widespread imbalance in global climate systems results in more extreme events, severely affecting the world’s most vulnerable populations. Oscillating between deluge and drought, we witness urban communities increasingly struggling to stay safe, healthy, and prosperous.

Current resilience discourse is regarded as a challenge of strategic problem-solving focused on systemic technical and nature-based solutions. However, if “an urban environment should appeal to all senses” (Sim, 2020), a purely rational approach fails to incorporate a highly influential variable: human psychology. While resilient planning processes support basic human needs, they ignore human desires as an unaffordable luxury in the eyes of an austere future.

However, resilience needs commitment fuelled by hope and love rather than logic. The challenge, therefore, is to address, interpret, and leverage the desires, cultural habits, hopes, and future dreams of people whose cooperation and commitment are essential to making long-term adaptation successful. “Beauty and wonder” might seem frivolous and out of place in the pragmatic field of resilience, but their power and potency lay precisely in their provocative qualities, and their innate ability to spark and prolong the will to change. They challenge and excite the imagination of the public, stoking the fires of the collective force needed to enable long-term adaptation. In as much as resilience is an environmental, technical, political, and economic issue, it is a social and subjective one. Quoting novelist Amitav Ghosh, in Architecture as Measure, Neyran Turan argues that the climate crisis “needs to be seen as a crisis of culture and thus of the imagination” (Turan, 2019), if we are to genuinely build a better, more robust and sustainable existence.

The ambition to enable communities to transition towards a positive future is fundamental to MVRDV’s design approach. In the case study that follows, we place two MVRDV projects side by side: Bastide Niel, a 35 ha master plan for a brownfield transformation currently in development in Bordeaux, France, and Resilient by Design, a regional resilience strategy for the San Francisco Bay Area. Their comparison demonstrates how our six-principles for “wonderful resilience” can incite and accelerate the cultural shift required to build resilience.
2. Explanation of the context: a tale of two scales

2.1 Introduction

What is the value in comparing two different projects? Building resilience is not only dependent on socio-political and economic contexts but also on temporal and spatial scales (Chelleri, Waters, Olazabal, Minucci, 2020). The following comparison is based on: scale, time, status, client, funding, stakeholder involvement, governance and local planning cultures. It seeks to highlight how the context influences possible approaches to resilience.

![Figure 1. Location maps highlighting focus of project scales. Source: MVRDV.](image-url)
2.2 Bastide Niel, Bordeaux

Based on the successful concept “intimate city” presented in the tender, MVRDV was commissioned in 2010 by the Municipality of Bordeaux to develop a masterplan for the transformation of a former military barracks and rail yards site (35 ha) into a vibrant neighbourhood as an extension of Bordeaux’s city centre opposite the river Garonne. Due to its location in the river floodplain, the development was required to be resilient, providing flood protection and abundant green. The proximity to the UNESCO-protected city centre demanded an architecturally sensitive approach, integrating the requirements for density and daylight exposure, while maintaining the historic morphology of the site. The legal planning framework governing the development, ZAC (Zone d’Aménagement Concerté), allows public authorities to develop the site consistently, aided by supervision based on building guidelines whose development was part of the masterplan commission.

Figure 2. Proposal for the transformation of the ZAC, Bastide Niel, Bordeaux. Source: MVRDV.
2.3 Resilient by Design, San Francisco Bay Area

Resilient by Design (RBD) was a one-year long, privately-commissioned competition organised by an NGO between 2018 and 2019 and funded by, amongst others, the Rockefeller Foundation. It involved ten multidisciplinary, international teams who developed pre-disaster strategies for the climate adaptation of the Bay Area, while addressing equity, affordability as well as ongoing “stresses” on the urban systems. In order to find integral links between these broad topics, MVRDV formed a consortium with HASSELL, Deltares, Goudappel Coffeng, Lotus Water, Frog Design, Civic Edge, Idyllist, Hatch, and Page & Turnbull, combining knowledge of urban design, water management, civil engineering, heritage, governance, mobility and digital communication. Initially studying the entire region, the design teams developed design proposals for, and with concrete communities in the second stage of the competition.

![Resilient By Design, San Francisco](image)

Figure 3. Resilient By Design, San Francisco. Source: MVRDV, Hassell+.

2.4 Conclusions on different contexts

The comparison of the two project contexts reveals some universal conclusions:

- While different project scales offer different opportunities to build resilience, the benefits of linking them are often not (yet) considered in planning processes.
- While top-down processes can generate a steep learning curve regarding technical and spatial feasibility of resilience measures, stakeholder engagement processes provide crucial insights in their “desirability” and socio-economic feasibility. However, planning processes need to allocate sufficient time and management for the collaboration to identify mutual benefits.
- An individualistic planning culture and/or lack of integral governance is found in various project contexts, possibly impeding the realization of integral, scale-transcending resilience projects.
- As investments in resilience often do not generate direct returns of investments (Henriquez, van Timmeren, 2017, p. 244), their qualitative/quantitative impact needs to be visualized to motivate implementation.

Even though environmental conditions and technical issues urban communities are facing are often comparable, differing scales, times, and socio-economic factors highly influence the approach to and success of any resilience effort. Therefore, MVRDV stresses the importance of “wonder” not only as a spatial feature, but also as a means of stimulating collective desires that bridge governance and social gaps in the long-term, highlight invisible links in scale and time, and imagine unexpectedly feasible solutions for resilience.

![Figure 4. Comparison of project contexts. Source: MVRDV.](image-url)

<table>
<thead>
<tr>
<th>Scale</th>
<th>Project site</th>
<th>How did scale influence the resilience approach?</th>
<th>Time</th>
<th>Type of client</th>
<th>Funding of design process</th>
<th>Funding of project development</th>
<th>How did client &amp; funding influence the resilience approach?</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHL</td>
<td>Bastide Niel</td>
<td>The scale of the site offers the opportunity to implement and test innovative spatial and technical resilience measures in single buildings but also in small networks of urban environments. Durability and thus gradual realization, feedback loops, design adaptation and optimization are possible.</td>
<td>2018</td>
<td>NVO Foundation</td>
<td>–</td>
<td>Funding for the competition process was mostly provided by foundations. This enabled a new type of planning process, aiming to bridge current administrative boundaries and distanced legislative gaps by ensuring integral collaboration for resilience. Implementation was not secured and relied on mostly public sector funding, facing high risks of investments without guaranteed financial return and lacking cross-sector collaboration. The integral resilience principles therefore needed to be broken down into more singular, comprehensible projects.</td>
<td></td>
</tr>
<tr>
<td>20A</td>
<td>Resilient By Design</td>
<td>The study area comprises a regional scale, supporting the translation of systemic resilience strategies into testable yet adaptable prototypes for local actions.</td>
<td>2010</td>
<td>Public, PPP in implementation stage</td>
<td>Public, PPP in implementation stage</td>
<td>Funding for both planning process and project development was secured and realized by the public sector and the municipality. The client fostered the implementation of innovative resilience solutions.</td>
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</tr>
<tr>
<td>20A</td>
<td>Bastide Niel</td>
<td>The project began when climate change had already led to a critical mass of awareness raising and design practices, therefore, water buffers might be underdimensioned on longer terms and the approach to sun exposure and amount of green is currently being reviewed. The urban heat is driven by a recent change of political agenda.</td>
<td>1 year</td>
<td>Public</td>
<td>–</td>
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<table>
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<tr>
<th>Stakeholders</th>
<th>Drivers of urban development</th>
<th>Governance/ Planning culture</th>
<th>Main stakeholders involved</th>
<th>How did stakeholder influence the resilience approach?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipality, Mayor, private “executors” in PPP, others play marginally.</td>
<td>Public sector</td>
<td>ZAC</td>
<td>Organizers, Advisory board, local organizations, authorities, communities</td>
<td>Project implemented by a broad scope of stakeholders with diverse communities directly affected and involved. The multitude of stakeholders requested a shared participatory approach to resilience, focussing on social issues and their links with environmental issues. The engagement process occupied most of the lifespan of the project and beyond, making the need for inclusion and empowerment evident.</td>
</tr>
<tr>
<td>Public constant, private executor implementation, others events</td>
<td>ZAC</td>
<td>Essential drivers driven by the public sector; an individualistic approach to resilience is present. Requirements for flood protection are made on ZAC-level, with responsibility to not affect neighbouring plots. Collaborations to improve larger systemic issues is not customary. Therefore, the approach for this site is not considering site-external systems. The top-down nature of the ZAC development allows for relatively straightforward implementation.</td>
<td>Organizers, Advisory board, local organizations, authorities, communities</td>
<td>Similar to Bordeaux, the local culture and governance is built on individual actions/ separate expertise with little cross-sector collaboration. This makes the implementation of integral projects that contribute to systemic resilience difficult. This lack of regional governance.</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Time</th>
<th>Type of client</th>
<th>Funding of design process</th>
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</tbody>
</table>
3. A two-tier approach: local action meets systemic prototypes to generate wonderful resilience

3.1 Introduction

How can MVRDV’s resilience strategy identify unusual correlations and transform vulnerabilities into drivers for optimistic, robust, and daring designs? Creating a desirable and adaptive urban future that works in concert with natural systems, our approach is based on six principles, combining a strategic, technological approach to resilience with “wonder-factor(s)” ensuring long-term engagement and commitment of stakeholders.

MVRDV’s six resilience principles include the following:

Figure 5. Principles for wonderful resilience. Source: MVRDV.

3.2 Bastide Niel, Bordeaux

MVRDV’s 35 ha comprehensive development plan for Bordeaux’s Bastide Niel’s former barracks and rail yard in the city centre demonstrates resilience through a symbiosis with natural systems, as the plan embraces 100 year flood events, refurbishes existing buildings, and lifts new constructions above ground level. An extensive system of water buffers under the new buildings ensures a safe and liveable neighbourhood on the floodplain, without blocking the natural flows of the river system.
In addition, urban microclimate and insolation is a main driver for the identity of the design. Sun-cuts define the volumes of the building envelopes drawing daylight to the street level and ground floor, re-creating the intimate qualities and structures of the old city. The diversity of building envelopes are safeguarded in the master plan guidelines and supervision, resulting in unique architecture that visually highlights the interrelation of light and shadow, as well as identity and climate comfort. The public space concept seeks to include a large diversity of species and improve biodiversity while maximising leaf surface for neighbourhood cooling. Citizens have been involved in this climate-driven design through public space installations and events addressing urban climate.

Figure 6. Step-story of design concept: volumetric deductions of site-specific conditions, leading to sun-cut building envelopes (intimate city concept) Source: MVRDV.
Figure 8. Map of predicted flood events (left), map of built flood protection types (right). Source: MVRDV.

Figure 9. Concept section: protected existing buildings, “flood-transparent” new buildings. Source: MVRDV.

Figure 10. Public space concept fostering permeability and biodiversity. Source: MVRDV.
KNAUF Kristina, ZARATE Halina, CULLEN Jessica

Figure 11. Intimate city concept impressions. Source: MVRDV.

Figure 12. Public installation/event to raise awareness on resilience. Source: MVRDV.
### 3.3 Resilient by Design, San Francisco Bay Area

One of the conclusions revealed during the research stage of the Resilient by Design process was that the Bay Area’s loop system is too fragile to offer robust and efficient emergency response and mobility. This, in combination with other stresses on the urban system, causes vulnerabilities in emergency response, and impedes the sustainable and coherent adaptation of communities.

The proposal “Connect and Collect” therefore designs robust alternative links for this system, with a prototypical design for a section of the city along a street or creek, connecting urban communities to the waterfront. On each end of these connections, multifunctional and adaptive public spaces - “Collectors” - integrate water management solutions, community facilities, transport hubs and safe emergency response structures. Adapted by several communities, the “Connect and Collect” principle enhances resilience on a regional scale, broadly coordinating preparedness through integrated design solutions, improving physical and social resilience, while providing both daily and emergency functions for affected communities.

The highly participatory process of this competition aimed at facilitating customisation of this prototype with concrete communities, supported by events, online platforms and AR tools for visualisation and co-design of ideas.

![Figure 13. Collect+Connect concept for a robust regional system. Source: MVRDV.](image)

![Figure 14. Concept for “Connectors”- spatial interventions along streets or creeks. Source: MVRDV.](image)
Figure 15. Collage of possible transformation of a creek. Source: Hassell+.

Collector: Community

Figure 16. Concept for double use of Collectors. Source: MVRDV.
Wonderful Resilience

Creating hope for an uncertain future

Figure 17. Research stage community dialogue. Source: MVRDV.

Figure 18. Community engagement events. Source: Hassell+.
Collect+Connect
Community Booster

Which facilities does your community need?

- Community: Education
- Community: Services
- Community: Events & recreation
- (Health) Care
- Mobility
- Local Businesses
- Sustainability
- Disaster response

Figure 19. A mobile-app tool helps local residents, city officials, and community-based organisations communicate their interests in an interactive way to support community-driven design. Source: MVRDV.

Figure 20. Initial catalogue of potential community amenities to inspire co-design and AR tool. Source: MVRDV.
3.4 Conclusions on different approaches

Whereas Bordeaux presents a straightforward design and implementation of resilient solutions due to its delivery framework, the large scale and lack of comprehensive governance for RBD results in a prototypical and participatory approach rather than a fixed design.

In terms of design, Bordeaux has a clear identity addressing climate adaptation through built structures and public space design. Its site-focused approach to flooding is limiting but can be exemplary for other developments in individualistic contexts.

On the large scale, RBD focuses mainly on blue-green infrastructure and mobility to create a robust framework. Its concrete design and programming, as a carrier of local identities, as Bastide Niel is able to articulate, however remains open. The “wonder” in this approach might therefore lie in the scale-transcending simplicity of the prototype and its co-design-driven customisation.

Alongside local stakeholders, both scales need to create a ‘wonderful’ identity at a micro-scale, which can be “plugged in” to the larger network strategy.
4. The results of the projects: international dialogues versus continuous adaptation in implementation

4.1. Introduction

What outcomes have been achieved? How have our “wonderfully resilient” projects enabled longer-term resilience? How have we influenced planning culture and governance? How have we inspired municipalities and other stakeholders to consciously adapt and prepare?

4.2. Bastide Niel, Bordeaux

The City of Bordeaux has approved the Bastide Niel master plan. The first buildings and public spaces have been realised, and the storage system for stormwater constructed. Meanwhile, the plan is being further adapted to suit emerging needs, including those made urgent due to more awareness regarding climate change and urban heat island effect on public health, as well as those implemented through shifting political agendas. In this case, the “green agenda” of the latest mayor supported this revision. This demonstrates that constant optimisation of a master plan is possible even while in progress. As MVRDV is both supervisor of the plan and the architect in charge of some assignments, constant optimisation is possible while a coherent guidance ensures that the “wonderful” features of the plan are safeguarded in its implementation.

Key lessons learned

1. Master plans can quickly become obsolete if the design fails to incorporate additional spatial buffers and flexibility in built elements
2. Basing the identity of the design on climate conditions can raise awareness and be a strong carrier of “wonder”, but can also be a liability if the conditions change
3. Ensuring the survival of initial “wonder” qualities throughout the design, planning, and implementation process demands long-term commitment; a supervision role of the designer is favourable
4. Implemented projects offer an opportunity for learning, generating feedback loops that can accelerate the cultural shift in building practice and industry, so a constant monitoring and evaluation during and after implementation is essential

Figure 21. Water storage implementation. Source: MVRDV.
4.3. Resilient by Design, San Francisco Bay Area

The remaining HASSELL team has elaborated the Collect & Connect concept in their proposal “Resilient South City”, which creates public green spaces along South San Francisco’s Colma Creek and continuous access to the waterfront. The proposal intends to reduce the impacts of flooding, mitigate vulnerability to rising sea levels, restore native flora and fauna, and offer public amenities along a continuous blue-green corridor to support a healthy lifestyle. The team continues to work with the community, especially local schools on higher ground, as sites of water collection, treatment, and reuse, while making schoolyards available for community recreation and potential disaster sheltering. These beacons of resilience will be connected to Colma Creek via corridors for water and cycling, creating a resilient local network also beneficial for surrounding neighbourhoods.

Though largely a theoretical body of work, the Resilient by Design Challenge has drawn international media attention. As a spin-off, MVRDV and other Dutch firms collaborated to develop recommendations for regional resilience of the Bay Area. The publication *Too Little + Too Much*, summarises these recommendations and illustrates the potential of integral planning tools for Bay Area resilience.

Furthermore, the Connect & Collect concept has proven universally applicable in other coastal projects of MVRDV.
**Key lessons learned**

1. Social equity is a key driver in building resilience, and a close relationship with local communities should be integral from day one
2. The project timeline should be sufficient to allow for meaningful engagement
3. Communities must be able to see themselves reflected in the designs, engaging them and inspiring an optimistic view of the future is crucial
4. Investments in urban resilience naturally come with the risk of gentrification, so counter socio-economic strategies must be ensured
5. Just as physical elements of the project, social aspects need dedicated funding streams
6. Local leaders and regional agencies must collaborate to create visions and guidelines, cultivate buy-in, and leverage resources to support integral climate actions
7. Integral processes and articulated win-wins at a systems level can be difficult in the U.S., compared to The Netherlands where projects benefit from cross-funding potentials
8. It is difficult to make a case for resilience measures that do not demonstrate reliable returns of investments, so there is an urgent need for strategies to demonstrate added value
4.4. Conclusions on project results

Speed of deployment varies with scale. Measurable results are reached faster with a smaller scale and top-down approach, as shown in the Bordeaux project. However, due to their “speed” and risk of change of governance, they are more volatile and prone to obsolescence as it is hard to argue for “unknown” space and investment in projects within a relatively short horizon for stakeholders. Larger scale strategies like Resilient by Design enable definition of clearer, more holistic and long-term goals and requirements for long-term buffers and robustness.

As two fundamentally different projects, one a competition concept, the other a master plan, both projects contribute to a cultural shift towards a resilient future with MVRDV’s six principles. The most important commonality is the relevance of long-term commitment of all stakeholders and close collaborators, including designers. The design materialises the dream in which they have all invested, because in doing so, “we recognize the needs of people in urban spaces, taking care of the environment with protection, comfort and pleasure in mind” (Sim, 2019). We build wonder into our designs, and love them so the project grows into a shared dream to achieve its “wonderfulness.” This is essential to the resilience effort.
5. The broader project impact: practical lessons and a shift in (design) culture accelerating wonderful resilience

5.1. Introduction

The comparison of the two different projects leads to conclusions on their potential impact, both externally (on urban systems, stakeholders, and the professional discourse) and internally (on MVRDV’s design methodology).

5.2. Bastide Niel, Bordeaux

Bastide Niel achieves numerous objectives. Regarding its external impact, it provides much needed new housing close to the city centre, strengthening Bordeaux’s inner city community, and supporting future growth without displacement. Furthermore, it stimulates the general public’s curiosity due to its unique design, drawing attention to the need for climate adaptation. For the public sector, it serves as a showcase for the political agenda and “wonderful” lifestyle in concert with nature. With top-down governance, the project offers an opportunity to test and learn from concrete, feasible solutions, and leverage these in other relevant projects. It can therefore serve as an exemplary project regarding climate adaptation in the professional discourse, accelerating the cultural shift needed in the way we design and build cities.

As for Bastide Niel’s internal impact on MVRDV’s approach to resilience, it demonstrates a positive step in working with a symbiotic approach. Analysing its performance according to our 6 principles, it could however lack long-term robustness and attractive adaptability of the buildings after realisation. This conclusion leads us to strengthen our attention to these two principles in other projects, e.g. in Caen, where generous, additional buffers are an essential, “wonderful” feature of the master plan.
5.3. Resilient by Design, San Francisco Bay Area

Though as yet unrealised, Resilient by Design serves as a strong example for hazard responsive, research-led design on multiple scales and with multiple stakeholders, both externally and internally. It provides direction for addressing resilience in contexts and countries without a PPP-culture, and further stimulates the public and professional debate on the topic of resilience. Local communities gained greater awareness about vulnerabilities and the possibilities of inclusive planning through experiencing public participation and co-design for climate action. Internationally, MVRDV has been invited to elaborate and discuss the RBD proposal in several publications and conferences.

Additionally, the competition raises significant awareness concerning the lack of integral, regional planning and governance in the wider Bay Area. With public presentations of our integral approach to resilience, e.g. of publications such as Too Little + Too Much, and a dialogue with the local administration, we hope to continue to influence political agendas to focus on climate action beyond fixed administrative cycles, and secure the necessary public-private partnerships that make this a reality.

The RBD process has influenced MVRDV’s approach to resilience considerably. It has highlighted the need for an integral approach, more effective methods for engagement, scale-transcending empowerment of all stakeholders, and, thus, “wonder” in any design for future urban environments (MVRDV, The Why Factory 2020).
KNAUF Kristina, ZARATE Halina, CULLEN Jessica

Figure 26. Images of media covering Resilient by Design: AZURE, RUMOER, SCALI URBANI. Source: MVRDV.

Figure 27. Photos of presentation of *Too little + Too much* to California State Senator Weiner and Assembly Member Bonta during Global Climate Action Summit 2018 in San Francisco. Source: MVRDV.
5.4. Conclusions on project impact

Both, discourse and action are necessary for resilience. Therefore, we see the two projects as valuable stepping-stones for local communities and planning professionals in their quest for resilience. They show that the “wonder factors”, as highlighted pink in Fig. 28, are relevant ingredients to stimulate dialogue and experimentation.

As MVRDV has the ambition to help generate collective action that can propel a complete cultural shift in the way we live within, design, and govern cities, our quest to build resilience is in constant development and needs to accelerate. To this end, we are developing a rubric to evaluate our own projects’ resilience. We believe this will accelerate a “cultural shift” in our work as we strive towards 100% resilient projects in the near future.

Figure 28. MVRDV’s evaluation of the performance of projects according to the “6 wonderful resilience principles”. Source: MVRDV.
6. References


Place making as a multi-faceted tool in urban design & planning
— an strategic approach in case of Hubballi City, Karnataka, India
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Abstract

Cities are the main engines of economy attracting influx of population from rural to urban areas. They are the major contributors of global GDP and hold high potential for development opportunities but yet they face many inequalities. These negative effects suppress positive ones if not managed properly. In context to Hubballi (a developing city of North Karnataka), in the past the cultural matrix shared a symbiotic relationship with the green & blue networks that traversed the city in a manner that could be characterized as the urban commons. However, over a few decades, industrialization & changing economic drivers have led to over exploitation of natural resources. Specifically, in the case of Unkal Nullah, a canal which originates from Unkal Lake in the northern end of Hubballi city. The mismanagement of urban development led to self-build practices, poor drainage system and encroachment of low-income houses along the water edges. Lack of maintenance led to waste dumping practices into the canal which was a source of sustenance in the past, to become the backyard or sewer of the city in the present day. This in turn led ecological imbalances which were compromised and neglected to the background. To ameliorate the situation there have been multiple efforts in terms of policies and missions, the most recent one being the ‘smart cities mission’ which also stresses the sustainable development of Indian cities. This paper is an attempt to fulfill the motive of “smart cities makes better cities with healthier people” by assessing Place making as a major tool to configure waterfront dynamics to create public realm, to make people centric approach which contribute to people’s health, happiness and wellbeing. It is necessary to rethink on the matrix of land & water through urban design & planning efforts in making cities more connected with its water-land-people.

Keywords: Place making, people centric design, green & blue networks, smart city mission, urban design & planning

1. Introduction

When city grow in dense, city dwellers contend with increased congestion, waste & water management issues and mobility challenges. All these posed negative impacts directly on surrounding environment affecting people’s health if not manged properly. The recent heavy rainfalls in India in the year 2019 and 2020 have highlighted the mismanagment of water in the metro cities which led major issues like over flooding of drains, poor urban drainage system led to choking of lanes, building collapses, fluvial & pluvial flooding, electrocution and biodiversity loss due to poor planning statergies at regional level and local level in master planning. This calls for immediate attention towards long term urban design & planning statergies for infrastructure development and water management which are the influencial factors for the sustainable growth of the cities.

According to UN Intergovernmental Panel on Climatic Change (IPCC) report in 2013 concludes that the climatic changes are real and human activities are the main cause. Over accumulation of ecological problems like air pollution, water degradation, chemical contamination, deforestation, vanishing lakes, waste generations and accumulation (urban infill), land degrdation and mismanagement of water calls for urgent environment assessment. Also the recent cataclysmic events of COVID-19 also reflected on ecological disequilibrium due to ever-increasing human incursions. This calls for urgent actions to address the importance of ecological imbalances which are part of the daily life communities & its symbiotic relationship to the surrounding environment. This paper illustrates statergies of place -making as multi-faceted tool in urban design & planning and reflect on the aims of smart city mission by structuring it into three main level; Firstly, at city level to develop an approach where water is turned into valuable asset which anchors through vibrant expericiencial spaces; secondly, regeneration of urban voids along the unkal nullah with possible people centric design solutions which benefits community relationships in building sustainable societies and thirdly to shape the waterfronts dynamics according to the disciplines of Urban planning & design to achieve resilient ecological corridor reflected at local level and regional level.

2. Background:
Hubballi–Dharwad are the twin cities of Karnataka state, located at the edge of Western Ghats popularly known as industrial hub with the establishment of small & large scale industries, trading centers for commodities, and Dharwad is an administrative center. The twin cities are also known for large number of educational institutions, start-up companies & NGOs working towards the upliftment of livelihood of the people. Agriculture system largely prevailed in the region in presence of natural resources like rivers, riverlets, lakes, tanks and traditional methods of ponding system influenced by rainfall & soil type. The Unkal Lake act as catchment area and is the oldest lake in the city and the overflowing water canal is Unkal Nullah (Unkal canal). The water and land dynamics acted as transition zone celebrated with cultural production of spaces which can be seen with the presence of many temples, mosques & asvath kattas (sacred trees used to pray and meditate) along the Unkal lake and Unkal Nullah. The Chandramouleshwar temple is 900 year old present at a distance of 3 km from Unkal Lake, the old city was established around it. The Banashankari temple is built during 13th century, present at a distance of 4 km from Unkal Lake. Over the period of time, economic growth accelerated rapid industrialization in the region which influenced the growth of the city. The mismanagement of urban development & negligence of urban planning led to the degradation of natural resources disrupting the ecological processes creating conflitng edge condition. These contradicting edge conditions are also subjected to fluvial floods during extreme rainfall affecting the quality of life of people residing along the Unkal nullah.

3. Research Methodology:

Most of the urban & rural areas of India are agrarian in nature and hence are made up of ponding system like lakes, canals, catchment areas, swamps, ponds, wells which acted as sponge to absorb the rainwater and allow into the ground and later used for irrigation and drinking purposes. Lack of maintenance and degradation of these green and blue networks are isolating the people along the water corridor resulting in disconnection between human & nature relationships. The urban transformation of Hubballi city led the city to expand in all direction making the Unkal Nullah, acting as a backbone of the city as shown in the figure 3. The urban growth patterns of the city have created unpaved edge conditions, traffic congestion, non-porous urban fabric resulting in poor connectivity, and walking is frequently a disjointed & disorienting experience as shown in figure 4. Thus it is important to harness the greener future, plan healthier cities and have long term strategies for climatic changes. The study identifies the present issues of Hubballi’s green & blue networks and attempt an methodology on urban water management, urban mobility and to build resilient future by adopting a more integrated & holistic approach in urban design & planning solutions.
3. The significance of Urban Design & planning in building smart & sustainable cities:

Cities are reflection of physical context, water, land dynamics, culture and people which are connected each other by roads, nodes, & open green spaces. These are important factors that influence the image of the city and shared values of the spaces. Many of our water canals, lakes, riverfronts, seafronts, ponds, swamps and water tanks are cultural production of spaces which are largely subjected to exploitation and degradation effecting the ecological metabolism. These natural resources are the valuable assesses which needs immediate attention. The recent pandemic crisis and climatic changes highlighted the urban issues like movement systems, water management, & ecological imbalances have emerged as important issues and it calls for an integrated solutions in urban design & planning efforts to reinvent the cities & towns into healthy & liveable cities. Cities are transforming in many ways, people have changing their lifestyle by engaging themselves in walking and cycling, understanding the importance of lakes & ponds which act as sponge absorbing extreme rainfall. In response to this, our government have initiated many urban design challenges like Streets for People Challenge, Cycle4Change Challenge to promote healthy lifestyle and to reimagine streets as public spaces through the lens of safety, quality of life, and economic regeneration and child/toddler friendly interventions. Various efforts are been made in making our waterfronts more lively and reimagined the edge conditions like Regeneration of Sabarmati Riverfront project (Ahmedabad), Ganga riverfront Rejuvenation project – Namami Gange through
Smart City Mission approach for urban development and ecological protection of our rich natural resources. The waterfronts of many cities, plays an variety of roles in creating public realm, celebrate functions as open space for recreation and tourism offering an integration-model for economic regeneration and providing healthy lifestyle within the cities. These efforts of Smart city mission translate the vision of the government to recognize the multi-sectoral, multi-dimensional and multi stakeholder nature of urban design & planning disciplines in building sustainable cities.

### 3.1 Hubballi under Smart city project actions:

In 2016, Hubballi-Dharwad was selected for solar city/ Green city master plan by the government of India. In 2017 under Smart City Mission, it was selected for Area Based Development (ABD) which includes redevelopment of 992 acres within the city, a flagship scheme which impacts the overall population of the twin cities. Hubballi is the 4th largest city in Karnataka & 2nd highest revenue genator as industrial hub. It is one of the 49th Metropolitan clusters selected by McKinsey & Company as growth hotspots in India. The main challenges of Indian cities face are multi sector governing bodies, assessing the conditions of urban agglomeration within certain region and to connect with productive network is difficult. The assessment of these agglomeration needs a methodology which are driven by the concepts of smart city mission as key element. The Smart city mission represents technology based solutions in city management, making comprehensive approach in the infrastructure development and global statergies to tackle city challenges which are reflected in a holistic approach. The statergy of Smart city projects establishes a well-balanced urban model in addressing ecology, economy, governance, mobility, people and quality living provided in comprehensive response to the needs of the city. As a whole, the framework of Smart City project is integrated system aimed to have innovative technology based solutions in urban planning & design and to establish smart-partnership between local government and private in order to achieve sustainable development. Focusing on the Hubballi’s waterfront, the study is an attempt to arrive at many integrated solutions by adopting Smart city mission model and implement placemaking design tool to create a character, identity & connect people back to nature. It helps in establishing collaborative process with municipality based partnership, multi stakeholder engagement and people participation to make our cities smarter and vibrant to live, learn and work.

### 3.2 Place making & People Centric Design approach:

Placemaking is people centric approach in urban design, planning & managment of public spaces. It emphasis particular community to discover their needs and aspirations to connect easily to were they live, work and play. It creates an opportunity for the community to feel their ownership, custodianship & catalyzes public realm which contribute to people’s health, happiness and wellbeing. It creates an opportunity for shared use spaces which attracts diverse people to improve their economic, social, and ecological issues. It challenges urban designers & planners to incorporate green thinking and adapt natural technology into their designs to promote sustainability and healthier environs. Common problems like traffic-dominated streets, unmaintained parks, isolated waterfronts sit empty devoid of public realm and vibrancy. This needs to be addressed by embracing a model of placemaking where a place is viewed entirely rather than zeroing in on isolated components. Place making approaches focus on achieving sustainable cities, by empowering communities, creating a safe & healthy society and help in building a bridge between culture & values of a place. In India, the land is often managed by local municipal corporations, the mismanagement of urban land in past years led the process of development to become more institutionalized and community stakeholders rarely have a chance to voice their aspirations about the place they inhabit. People Centric approach in place-making is an interaction design methodology focused on understanding and engaging individuals in ways that are useful, useable, and desirable. It helps the local government in examining the issues & understand perceptions of the citizens using analytical skills, identify site potential and capacity to change which is achieved through stakeholder engagement & Citizen Participation. It establishes collaborative realtionship with diverse people in creating strategic scale to project area and convey design strategies through vision statement. People centric design approaches helps bringing out the design alternatives which are functional, user centric, ease to use, accessible, brings new investment to the city.
4. Water & the City nexus:

The twin cities Hubballi-Dharwad are served with many lakes & tanks serving the drinking & irrigation purposes as shown in Figure 5. The natural beauty and serene atmosphere played a key role in the becoming an integral part of its culture & source for many ecological inhabitants. In 1962, Hubballi – Dharwad had 101 water bodies connected with 152 canals, presently only 19 major water tanks are in Hubballi which are not fit for consumption. Some of the important lakes are Neersagar, Nuggikere, Kelgeri, Navalur, Unkal Lake, Tolankere, and Rayanal Lake. The Unkal Lake in Hubballi is believed to be more than 100 years old, present at north part of the city and under the supervision of Sir M. Vishweshwaraya, Unkal Lake dam was constructed in 1893 for the supply of drinking water to the city. Water supply from Unkal Lake was stopped owing to deteriorated water quality. Later, water was drawn from Neersagar Lake built in 1969 but failed to meet the requirement of the city population. At present, additional water is supplied from Navilatirtha Dam constructed across the Malaprabha at Savadatti in Belagavi District, Karnataka.

The Unkal Lake is spread over 262 acres and with average depth of 2.5m and maximum depth of 6.0 m, & the total water holder capacity of the lake stands at around 26,50,785 cubic meters. The total coverage area of the lake is less than 3% of the catchment area and thus, Unkal Lake behaves as a detention tank. The main source of water is from seasonal rivulet Shalmala (flowing from north part of Dharwad district) & surface drainage flowing from the South part of Dharwad & moving towards the catchment area of Unkal Lake. The overflow of water from the waste weir of Unkal Lake is called as Unkal nullah (also known as Rajullalah/ Hirenullah), it joins Bedthi River near Kalaghatgi (about 30km away from Hubballi) and later joins the Gangavali river* finally meets the Arabian Sea as shown in Figure 6. The Unkal Lake defines as origin for Bedthi River and on its course towards the Arabian Sea, the river falls from a height of 183 km at Magod known as Magod falls. The river is covered with dense evergreen & semi evergreen forests along its path.

*Gangavali river is spread across Uttara Kannada [Sirsi, Mundgod, Anakola], Dharwad [Hiriyadka, Kundig, Kalaghatgi], Raotak atmosphere [Bangalore] of Karnataka. Originating at Dharwad district by two streams from Hubli-Baddi streams (from catchment area Unkal lake at Hubballi city) and Dharwad-Shalmala stream (from catchment area Someshwar Temple lake at Dharwad city). Gangavali River has a catchment area of 1935 sq.km. Source: Profiles of Rivers in Karnataka, Centre for Ecological Sciences, Indian Institute of Science, Bengaluru.
5. Ecological indicators to design and assess green & blue networks:

The below table helps to arrive at desirables goals of urban design & planning interventions to create smart integrated solutions:

<table>
<thead>
<tr>
<th>Category</th>
<th>Indicators</th>
<th>Outcomes</th>
</tr>
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<tbody>
<tr>
<td>Health of the Lake</td>
<td><strong>Built Environment</strong> – Unkal Lake is catchment area acting as sponge to absorb rainwater. Due to lack of maintenance &amp; water mismanagement, drain water is let directly into the lake, making it unfit to drink. Entire lake is covered with water hyacinth and silty clay sediments as shown below. The phosphate content varies from 187-327 ppm.</td>
<td><strong>Multifunctional &amp; Green Edge</strong> – The lake acts as eco-sensitive area were the edge condition is unpaved &amp; unprotected. To have controlled flooding in the nullah the possible solutions is to have detention tanks or a buffer zone which will hold the surplus water &amp; cascading system in the water management which helps in aeration of the water.</td>
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Unkal lake covered by carpet of water hyacinth (source: Deccan Herald Newspaper, July 2019)

Rainwater lashing out the of Unkal Lake waste weir during extreme rainfall of August 2019
The contamination of the water in Unkal nullah is mainly from the domestic wastes coming from adjoining neighbourhoods, Dhobi ghats (laundry services), small scale industries and slaughter houses impacting the water quality, soil, health & hygiene that calls for urgent environmental measures. The unhygienic surrounding have affecting the health of the inhabitants and are subjected to vector borne diseases like typhoid, cholera, jaundice, Malaria, dengue and chikungunya. These issues are due to absence of proper environmental norms and water management in master planning process as shown in figure 7 & table below.

<table>
<thead>
<tr>
<th>Category</th>
<th>Indicators</th>
<th>Outcomes</th>
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<tbody>
<tr>
<td>Water Quality assessment</td>
<td>Public Health - The contamination of the water in Unkal nullah is mainly from the domestic wastes coming from adjoining neighbourhoods, Dhobi ghats (laundry services), small scale industries and slaughter houses impacting the water quality, soil, health &amp; hygiene that calls for urgent environmental measures. The unhygienic surrounding have affecting the health of the inhabitants and are subjected to vector borne diseases like typhoid, cholera, jaundice, Malaria, dengue and chikungunya. These issues are due to absence of proper environmental norms and water management in master planning process as shown in figure 7 &amp; table below.</td>
<td>Environment &amp; water assessment - Water quality tests were carried at four locations namely Unkal Lake, Islampur, near cotton mill, and Gousiya town and inference as per IS 10500:2012 standards within the desirable limits for tested parameters except TDS, TH and Chloride, the water is unfit &amp; unhealthy with reference to the Bacteriology. City is provided with sewerage collection system covering an area of 202 km and treatment facility which are less comparatively. The heavy rainfall in 2019, most of the drain pipelines laid along the nullah were broken (only 24% pipelines are remaining) resulting direct discharge of sewage water. Hence it is important to establish drain pipeline &amp; sewer treatment plant at possible location, than the treated water can be introduced into main nullah to have continuous flow for all seasons.</td>
</tr>
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### THE CITY
- Municipal area (HDMC): 202 sq km
- Population (2009): 0.9 million
- Population (2011), as projected in 2005-06: 1.2 million

### THE WATER
#### Demand
- Total water demand as per city agency (KWSSB): 130 MLD
- Per capita water demand as per KMG: 158 LPCD
- Total water demand as per CPIIEO @ 150 LPCD: 128 MLD

#### Sources and supply
- Water sources: Neeravargi, Maagadalab, borewells
- Water sourced from surface sources: 98%
- Water sourced from groundwater: 2%
- Total water supplied: 111 MLD
- Per capita supply: 131 LPCD
- Leakage loss: 31%
- Actual supply (after deducting leakage losses): 72 MLD
- Per capita supply (after leakage losses): 95 LPCD
- Population served by water supply system: NA
- Per capita supply in the served area: NA
- Demand-supply gap (after leakage losses): 68 MLD

#### Treatment
- Number of WTPs: 2
- Total treatment capacity: 114 MLD
- Actual treatment: 111 MLD

#### Future demand and supply
- Demand (2011), as projected in 2005-06: 183 MLD
- Augmentation needed to meet the demand: 72 MLD
- Required increase in supply: 65%

### THE SEWAGE
#### Generation
- Sewage generated as per CPIIEO: 107 MLD
- Sewage generated as per city agency: 60 MLD

#### Collection
- Length of sewerage network: 412 km
- Population covered by sewerage network: NA
- Area covered by sewerage network: 30%

#### Disposal
- HEl: Hire and Bhakti nullahs

Source: Acres 2011, 77-City WaterExrta Survey 2005-06, Centre for Science and Environment, New Delhi
Notes: HEMC: Hubli-Dharwad Municipal Corporation; KWSSB: Karnataka Urban Water Supply and Sewerage Board

Urban water Management
- Accessibility & service provided - Hubballi gets rainfall about 722 mm which is 28.4 inch in monsoon season (July to September). The Unkal nullah width varies from min 7m to max 35 m with 11 sub nullah joining natural sloping towards the main nullah. As the channel is unpaved as shown in figure 8 and uneven, sewage water logging problem occurs at various occasions of rainfall which creates foul odour issues and over flow of water into the houses residing alongside of the nullah as shown in figure 9.

Movement Corridor - During 2019 flood rains, excessive rise in water level in main Unkal nullah damaged most of the roads, pathways, old bridges, drain lines, & accessing across the nullah was difficult. The possible solution is to create paved embankment as a protected barrier at the edge of the nullah to hold water current flow and to build proper pedestrian & cycling corridor along the edge of the canal for easy commute during heavy rainfall.

Figure 7: Collective mapping of Unkal Nullah near old Hubballi area (The old Hubballi area developed with establishment of Cotton factory & further with growing neighbourhoods of traders, labourers, manufacturer of small-scale industrial commodities - Karwar Road).
JAKKAPPANAVAR Anita C.

6. Urban Morphology:

The timeline explains the effects of rapid urbanisation and mismanagement of development process with respect to the growth of the city, the edge condition along Unkal Nullah & the changes in ecosystem:
**Conclusion from the analysis:** Every city/town/village are flourished along the water for the basic needs of drinking & cultivation proposes and the inhabitant have configured the resources available accordingly to the use & functionality. The interference of human as part of polluting the ecosystem is resulting in difficult situation to live and work. The study calls for urgent attention towards guarding and protecting the blue & green networks which are basic commodities of our daily lifestyle through proper framework in master plan.

8. **Unkal Nallah – a Blue & Green strip in the city & its Challenges:**

8.1 Spatial Organisations:
Water has played a pivotal role in shaping urban life with community, economy and ecology sharing symbiotic relationship around them. A stream, which was once a place for social cohesion today has become paradoxically a place for low income houses who are deprived from basic amenities and also prone to floods during heavy monsoon as shown in figure 10. Thus it is important to change the land & water dynamics of the city to improve quality of life for human well-being. Lack of overlaps of all important nodes make blue & green networks look bluer in the city form, forcing it to behave as backyard losing its visual connectivity. The present urban form identifies current connections, services, population density, centrality & ecosystem which have high potential for development activities and also to generate new investments along Unkal Nullah as shown in the figure 11.

8.2 Urban Connectivity:

With many industry & trade networks, prosperity in commerce prevailed in the region resulting in parceling of road networks based on its use and connectivity. The paths & circulations across the Unkal nullah is connected by 18 bridges as shown in the figure 12. The unpaved edge condition creates negative effects which also suppress the positives ones as shown in the figure 13. As city grow dense, it puts pressure on the natural system,
resulting increased traffic on the roads and discomfort to the users to connect with live, learn & work places. The study suggests an approach towards the edge condition of Unkal nullah by making it a paved corridor by introducing proper walkway & cycle lanes with landscaped spaces to connect to all important nodes of the city. The integrated commute system with BRTS corridor running along the nullah by 1km apart and Public Bicycle sharing stations (project by Hubballi-Dharwad Smart City Limited) also gives an opportunity to reach education, business hub and other desired destinations for the commuters.

8.3 People Demography:
The urban patterns is observed in terms of where people learn & work comparing children, students, the working age, and retired people use the urban networks as shown in figure 14. The social production of spaces can be seen along Unkal nullah with the presence of temples, mosques & institutions as shown in figure 15. The unhealthy & unhygienic condition of the nullah resulted in the lack of diversity within the social environment. To succeed in socially sustainable & vibrant places, it is essential to overcome this lack of complexity by creating places that mix people of all ages and background.

8.4 SWOT ANALYSIS:

Figure 14: Map showing diverse mix of people along the Unkal nullah & BRTS corridor (with 250m walking circle)
Figure 15: Map showing cultural nodes like temples, mosque and other institutions present along the Unkal nullah. Source: HOUA Master plan, Author

Figure 16: City Level Analysis through cognitive mapping explaining the site condition. Source: Derivatives by author
Based on cognitive mapping described by Kevin Lynch in his book “image of the city” & “Managing the sense of the region” similar exercise was undertaken during the time of site visit as shown in figure 16. The main strength is centrality of Unkal nullah connecting very easily to work, learn & live spaces. Its close proximity to BRTS & Railway corridor makes it a potential node to have infrastructure development. The weakness are the poor quality and accessibility of the pedestrian environment making it blur edge condition. The lack of connectivity between nodes results in undefined, disconnection, disoriented, boring, blurry, and loss of visual connectivity. The development along the water edge gives opportunities to the adjacent neighborhoods & institutions to access, connect & use making it a unique city. The core threats are the unpaved area & closed off areas contributing to negative urban spaces which correlate to high threat spaces. The close proximity of the low income houses along the nullah is also threat because of flood effects.

8.5 Collective Memory Mapping of Hubballi, Karnataka:

Figure 18: Memory mapping of Hubballi & Unkal Nullah of past & present situations through stories & interviews shared by residents, neighbours & family member. Source: Illustration by Author

The Illustration 1 gives a mental picture of the city Hubballi in the past & its activities, identity & character of the place. Unkal Lake was source of water for the whole city. Agriculture prevailed along the water stream, was used for irrigation & drinking purposes. Temples, mosques & muttas (religious learning centres) marked the educational & cultural significance of the place. As the city grow dense many neighbourhoods were formed depending the occupation like weaver’s colony (Nekamgar), the famous Illakal saree of North Karnataka is weaved by Nekar Community), Maldar Oni (Basket knitting), Byali Oni (pulses market), Gousiya town (making of copper & steel utensils) and many more as shown in illustration 2. This led to the development of many industrial infrastructure along the water edge which ultimately left their wastage into the Unkal nullah, resulting degradation surrounding ecosystem.

9. Theoretical Basis:

Looking at the examples of Urban renewal projects like Cheonggyecheon, Seoul, South Korea and Sabarmati Riverfront Project, Ahmedabad, India. Both the projects were restoration of massive urban renewal projects worked with multi-partners and multi-stakeholders which aimed to reorganise and plan systematically for long-
term development of infrastructure for the city. Cheonggyecheon was implemented with the total cost of $900 million by Government and multi-partner funded scheme. The aim of the project was revitalise the downtown area and reimagine the green corridor in the middle of hustle bustle of the city. As part of the planning process, citizens were involved in decision-making through an electoral process, which enabled active communication and consensus formation between the government and its citizens. The key elements of the project of the project were removal of elevated highway concrete structure and create an extensive new open space along the day lighted stream, adapting placemaking approaches like pedestrian amenities, recreational spaces and construction of new bridges by reconnecting the urban fabric to many more. This urban renewal and revitalization through placemaking as a tool benefitted the city and the citizen in economic growth and added value for tourism, created flexible public access to the river for fishing & bathing, educational resources and cultural values reflected in the design proposal, highlighted ecological, air & water quality improvement.

Lesson learnt from the implementation of the project:
The massive urban project proved as global best practice example of implementing successful urban greening in a densely populated area. Provided a template for planning across South Korea and around the globe. It is an
eexample of a metropolitan scale, multi-partner project benefitting millions of population.

Sabarmati Riverfront development project, Ahmedabad:
The Sabarmati Riverfront Development project is an environmental improvement, social uplift & urban rejuvenation project that renewed Ahmedabad. The project was developed by the Sabarmati riverfront Development Cooperation Ltd. (SRFDCCL), a company wholly owned by the Ahmedabad Municipal Corporation. Sabarmati River was important source of water, it provided a backdrop to cultural and recreational activities. Untreated sewage flowed into the river through storm water outfalls and dumping of industrial waste posed a major health and environmental hazard. Slowly, the city turned its back towards the river. The project was reclaimed approximately 200 hectares of land from the riverbed. The first phase of construction started with 11 km followed by 22 km with waterside pedestrian realm, open parks, Laundry Campus, river promenade, elevators, blocks, public washrooms, play areas, exhibitions spaces and flower garden was made available for public use in January 2014. The key elements of the project was to reconnect the city with the river place making approaches and positively transform the neglected aspects of the riverfront. Also to safeguard the city and prevent untreated sewage from flowing into the river with proper water retention and recharge tanks. The project also highlighted the rehabilitation and resettlement of riverbed dwellers and activities by providing socio-cultural amenities.

Lesson learnt from the implementation of the project: The Riverfront project presented a great opportunity to people to reconnect and establish a relationship with nature. Traditional users of the river like vendors, washer men were provided organised facilities to utilise. The collective memory of the riverfront was brought into life and transform the city more liveable in terms of environmental improvements, infrastructure development and inclusive opportunities. The paved embankments provided with wide walkways, green space with tree canopy and other amenities making it more diverse place to use and celebrate the vibrancy of spaces.
10. Evolution from Ideas: Possible design solutions & Master Plan Strategies

The focus of the research is to develop a conceptual framework & assessment methodology for Smart city project in Hubballi along Unkal canal & urban voids in an strategic planning approach. Implementation phase entails translating the vision statement for long-term change, understandig the complexities of the city and its symbiotic realtionship & interdependency between Community, Economy & Ecology. This phase includes possible solutions, design recommendations and planning strategies that are viable, sustainable and can exist through multiple stakeholder engagement, explained as shown in the figure 19. The study highlight the importance of water management, having controlled water flooding & storm water into the main nullah, protecting the natural habitat by laying & separating drainage pipelines entering into main nullah & sub-nullahs. Introducing the treatment technology plants to treat sewerage water produced by the city and the treated water will be left in the main nullah for continuous flow (specially during summer seasons). Creating vibrant edge conditions through place making components like paved embankments provided with wide walkways, green cycle lanes with tree canopy and other amenities, making it more diverse place to use, celebrate the vibrancy of spaces and play their roles in building sustainable communities. And thirdly, with the clean & treated water in the Unkal Nullah, it will be contributing the good health of surrounding environment which makes it possible to have urban agroecology - model for sustainable urbanization.

Vision statement: Building inclusive, healthy, functional & productive city to promote place making as multi faceted tool aim to improve the public open spaces & ecological corridor, to build sense of place, identity and associated culture & values, facilitate social capital and community revitalization.

10.1 Possible solution and Design Interventions along Unkal Nullah:
The above master plan is worked on the guiding framework of urban design and planning strategies for Unkal canal on three design principles as explained below.

Figure 19: Typical cross section across with design Unkal stream canal with protected barrier & place making components to establish public realm (at 20-30 width of the Nullah)
Figure 20: Typical cross section across with design Unkal stream canal with protected barrier & place making components

**Design Principle 1: ENHANCING + CONNECTED + CONTEXT - REDEVELOPMENT OF UNKAL LAKE**

The Unkal Lake is landmark marked by park & temple precinct & also upcoming hotels/restaurants around as shown in figure 21. Lake is protected by buffer of 35m, the edge of the lake is designed with series of levels of gabion walls with planter box to protect the over flow of the water during heavy rainfall & enhance the overall experience. The cascading system helps the surplus water flowing from the lake into the Unkal canal in aeration. The Biodiversity Park with horticulture & botanical garden helps to revitalize the defunct agricultural department at Unkal Lake.

![Diagram of Unkal Lake redesign](image)

**Figure 21: Details of Unkal Lake with amenities like pedestrian, seating, culture spaces, protection barrier with various levels of gabion walls with planter box. Biodiversity park to revitalize with horticultural gardening spaces, the sampling are sold in the market spaces created in temple precinct.**
Design possibility 2: DIVERSE+CONNECT+EXCELLENCE - CORRIDORS & WALKABILITY ROUTE NETWORKS

The Urban planning strategy is to provide flexible land use for possible components like Exhibition space, Weekly market & Business centre which is also closer to BRTS Bus Terminus making easy to commute for Work, Play & Shop. These provided incentives create job opportunities & generate new investments which will help to uplift the livelihood of the people around.
Design Principal 3: ENGAGEMENT+CUSTODIANSHIP+POSITIVE CHANGE - REINVENT CITY & ITS FUNCTIONS

Reviving the defunct factory land into Skill Development centre/Research Centre to generate job opportunities & skilled people. At downtown area (Islampur & Gousiya town) were closely packed houses reside along nullah are more prone to floods, the design aims to provide affordable vertical housing for the low income class with workshops for community as shown below. Unkal nullah is separated by proper embankment of gabion wall to prevent from flooding, separate drain pipelines & community gardening for healthy & better smart city.

**Conclusion:**

The waterfront are the vessels of interface between city, people, and nature which needs careful assessment of design interventions, policy frameworks and futuristic planning strategies to build sustainable & resilient future. Hubballi have a good ability to develop in a unique open space environment based on its rich cultures, ethnics, tradition and history of North Karnataka. The study concludes by understanding the indicators & outcomes of the city and making an attempt to rethink on city’s image, livability, and productivity of blue & green corridor through place making as multifaceted tool in urban design & planning. The possible design...
interventions along the Unkal Nullah are multidimensional and integrated system to benefit the users and ecological corridor of the region. The design intent of the project is to solve urban problems in an efficient way to improve water management, sustainability of the city & quality of life of its inhabitants. The design interventions aim to develop an approach were water is turned into valuable asset which anchors by revitalizing of unpaved & urban voids into useable space, identifying the gaps in spatial continuity and transforming the green & blue corridor to a networked movement corridor connecting various work centers in the city and interconnecting the open-space opportunities that will generate new investment.

Indian cities are complex, equipped with urban issues & various governing algorithm bodies which needs to evoke on the present issues of climatic changes, population, global warming & pandemic crisis. The urban infrastructure development, urban transportation and smart city projects are integration of government with multi-stakeholders, & municipality based partnership to provide effective solutions & generate new investments both at local level & region level. These works need a combination of multisectoral frameworks which can be achieved through integrated decision making and people centric approach (citizen participation). An overwhelming people participation includes public surveys, planning workshops for local policy initiative, & design workshop to benefit the voice of the local stakeholders & communities to develop or test design options with user groups. These initiatives not only benefit the nature of the project but also enhances the democracy, social, political & economical context in which it is being designed. The study concludes the potential of place-making as a multi-faced tool to enhance the sense of community, human & nature well-being to build sustainable cities with innovative & technology based solutions. The climatic changes are real and every city needs to plan a long term-strategy within the disciplines of master planning at local & regional level to protect the health of its people & surrounding environs. The results of these multi-sectoral frameworks & multistakeholder engagement when managed properly will definitely have positive change to build a smart city, a better city for the well-being of its citizens.

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5. Focusing on Heritage and Smart Culture

Stefan Netsch (Austria)

Stefan is a senior urban planner with 20 years of experience, working and teaching in different countries. Recently he is the head of the urban planning division of the study “Smart Buildings in Smart Cities” at the University of Applied Sciences in Salzburg (Austria). He completed his doctoral thesis about conversion strategies of church buildings in the Netherlands at the Karlsruhe Institute of Technology (KIT) in 2017. His work and research focus lies in the areas of urban renewal, rehabilitation and renovation of urban districts. He is an active member of ISOCARP since 2007, starting as a YPP in the Antwerp congress and taking part at UPATs in Szczecin (2009) and Palestine (2015).

Laura Verdelli (France)

Since 2009, Laura Verdelli is Associate professor at the Spatial Planning and Environment Department of the Engineering Polytechnic School of the University of Tours (France) and researcher at the laboratory CITERES (a mixed unit of both the CNRS French National Centre for Scientific Research and the University of Tours). She is an architect (Politecnico di Milano, Italy), has a post diploma in Landscape Architecture (Fondazione Minoprio, Italy) and obtained a PhD in Urban and Regional Planning at the François-Rabelais University of Tours (France) and in Cultural Heritage and Museology at the University of Coimbra (Portugal). Laura Verdelli’s research focuses on the construction of new heritage objects (architectural legacies of colonial origin, productive cultural landscapes, lands on water, traditional water management systems) and their spatial impacts, taking into account different aspects: public policies, tourism, evolution of stakeholder systems. Her main keywords are: process of identification, protection and enhancement of heritages and landscapes; contemporary heritage dynamics; labeling (in particular linked to UNESCO); interactions between heritage planning and spatial (strategic) planning; contemporary dynamics of development along water.

Eric Huybrechts (Austria)

Eric Huybrechts is a senior Architect and Urban/Regional Planner, member of ISOCARP, Icomos, Société Française des Urbanistes, and a Officer of the Royal order of Sahametrey (Kingdom of Cambodia).

He is the Manager of the International affairs at the Directorate general of The Institute Paris Region (www.iau-idf.fr). He has developed a large experience in the field of Urban and Regional Planning as expert and team leader. He has prepared projects at local level, sub metropolitan, metropolitan, regional and national scales.
Culture and heritage preservation are still too often undervalued in urban redevelopment processes. Heritage is an important part of the recognition in our society. In an evolutive and changing society, theories, trends, fashion, political wills, perceptions and representations, can have an influence on the acceptance of a legacy as a part of common societal history.

Besides that, the new types of cultural activities become more and more important part in our daily life. Some of these may include implementation of smart technologies, knowledge, and social inclusion, for total participation in the promotion of cultural heritage. This concept – named as The Smart Cultural City – can become of crucial importance for the future city. Heritage and culture can also provide a valuable contribution to sustainable development, in particular through the participation of local populations to identification, protection and conservation processes.

Practitioners and researchers from China, India, Italy, Latvia, Nigeria, Poland, Qatar, Russia and United Kingdom delivered a critical analysis of their field experiences on research and projects and discussed on the effects of new technologies on urban heritage analysis and projects, and on the evolution of urban heritage approaches regarding creative industries and participatory approaches.

Session 1: Smart research on urban heritage

The session focused on the development of new approaches and use of new technologies and methods to analyse urban heritage via GIS, space syntax approach, satellite images, mathematical models to analyse urban morphology. Different territorial analysis were mobilised to reconsider the relation of urban heritage with its surroundings, a larger approach than focusing on monuments, architecture, and public spaces: historical urban landscape, schema-symbols and regional approaches were mobilised. Qualitative and quantitative methods were applied to define heritage values based on collective memory and participation. The different approaches also showed how urban identity is related to heritage and how it is benefiting from different concepts to encompass the diverse dimensions of urban heritage.

The session invited researchers to present and discuss their papers based on field surveys and specific methodologies. The keynote focused on Soho, the famous creative industry district of London and then on the comprehensive methodology applied and its relationship with other methodologies. Speakers presented their monographies and methodologies applied on case studies in different contexts (mostly in China and Nigeria). The discussion provided the opportunity to confront different approaches and explain how new technologies and methodologies enrich the approaches to urban heritage.

Session 2: Smart Urban heritage projects

Heritage conservation is a planning approach covering physical, environmental, and socio-economic approaches. Different regeneration projects of historical urban centres are focusing on creative industry as a driver to define conservation projects. They introduce innovation in land use, architecture, and public space, but also change the scale of projects to consider the relation of historical urban centres with their hinterland. Then urban conservation projects take a different meaning, not isolated, but carry out...
by the population that define values. If landscape, urban morphology, and architectural typology remain the basis of the physical aspects of heritage, the essence of the conservation project is based on the urban soul that is a time-space concept.

The session invited practitioners and researchers to present case studies on planning projects for conservation of urban heritage. The keynote presented the analytical method applied on a regeneration project in Qatar. Speakers presented their case studies with their approaches based on territorial approach and participatory process (with examples from China, India, Italy, Poland and Russia). Then the discussion focused on the effect of creative industry and of new technologies in the production of urban regeneration projects on historical urban heritage precincts.

We deliberately chose to confront very contrasted examples from very different cultural and geographical contexts and, thinking on a post-oil society, we wondered WHAT IF heritage was already sustainable? Therefore, the interplay between globalisation and locality was explored. Numerous concepts regarding heritage inclusion in the development processes were drafted, and it appeared very clearly that the way we value heritage(s) is depending on different perspectives, and if you change perspective you (can) change values.

Post-oil planning must reinterpret planning and design solutions and best practices from the past to adapt them to the contemporary behaviour and needs.

From the different presentations we learnt that heritage do not only need conservation and restauration but also to be considered as a resource and as an asset for the future it needs to be conveniently enhanced through imageability, visibility and readability, and that its place in our imaginary (as well collective as individual) is to be built through actions and participation.

The presentations and discussions under track 5 all revealed that there are no one-size-fits-all recipes. Instead, holistic system-thinking approaches should be applied to address the stakes and opportunities offered by heritage(s).

**Conclusions**

In conclusion, this track is focused on convergences and divergences in case studies of heritage areas development and conservation projects from different countries and showed the gap between planning approach and project mode to implement development project in high valuable urban or historical precincts. The tension between conservation and economic development requires sensitive tools to preserve the assets and make the transformation of these precincts as real tool for sustainable developments. The approaches to define values can take different process, from academic or expert methods to participatory approaches to ensure ownership and mobilisation of actors. Case studies focused mainly on industrial areas and peri urban areas, mainly at the scale of historical precinct, but the diversity of approaches makes location without monuments or “high value” heritages possible location for cultural and heritage assets based on traditions, intangible heritages. Moreover, the heritage precincts are considered in their metropolitan context, making these areas a tool to foster metropolitan identity. Then the relation between heritage assets and the city, through connectivity and representation become a crucial element in planning cities. In regard to contemporary challenges, with a sanitary crisis and climate changes that affect heritage conservation and economic development models based on smart cultures (creative class), heritage conservation projects will face important changes in their objectives and methods where tourism will be less important and local economy better considered. What future for Culture and Heritage planning facing Global crisis should be raised in future Congresses.
Selected Papers

1. CONTIN Antonella, GIORDANO Patrizia, GALIULO Valentina, Ragusa Ibla_S. Paolo neighbourhood: Regenerative Cultural Common

2. TOMCZAK Anna Aneta, KRZYSZTOFIK Sylwia, Integrated change planning in the historic postindustrial area in the centre of the city. A case study of riverside industrial complexes in Lodz

3. VINOD-BUCHINGER Aditya, GRIFFITHS Sam, Spatial Cultures of Soho, London Exploring the Evolution of Space, Culture, and Society of London's Infamous Cultural Quarter
Ragusa Ibla_S. Paolo neighbourhood: Regenerative Cultural Common

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Abstract

In XX century Italy abandonment is a widespread phenomenon. In the case of S. Paolo – a neighbourhood in the periphery of Ragusa Ibla, a UNESCO site in Sicily -, abandonment is linked to 1) the fragility of its geographical position; 2) the contraction of economic growth; 3) the lack of "modern" urban services. These three factors are interlinked and active as circular causes of the present condition of abandonment of S. Paolo. The paper presents our proposal of intervention working on the three factors together through a two-steps method: first we clarify at different scales the issue (abandonment) and the processes that are producing it; then, we intervene on the three circular and non-linear causes, according to our vision of complexity. Our method also acts on the currently widespread development practices, which could entail the risk of manipulating the identity of a historical place in defining not a collective but only a private space (planning gentrification) and without producing a sustainable project in the long-term spam. We follow a Design Thinkers approach within a Practice of Metropolitan Discipline: every analysis is project oriented and evidence based.

Keywords

UNESCO, Abandonment, Vulnerability, Community Foundation, Metropolitan Cartography

1. A generative methodology

1.1. Background: the three causes of abandonment

The main urban challenge tackled by the proposal is the abandonment of the S. Paolo neighbourhood – a peripheral district of Ragusa Ibla, a UNESCO site since 2002 (as one of eight late-Baroque towns of the Val di Noto). The abandoned or unused buildings in S. Paolo represent about 65% compared to the average 42% of the entire municipal territory (where the population, in 2018, recorded a slight decrease compared to 2017 of -0.36%, offset by an increase in migration flows +402, with a general population balance of -247 units). Out of a population resident in Ragusa of 73483 units, in Ibla 1690 reside\(^1\).

\(^1\) For the statistics, see [www.cresme.it](http://www.cresme.it) and [www.bancaditalia.it/pubblicazioni/economie-regionali/2020/2020-0019/index.html]
Abandonments are a widespread phenomenon in the XX century and contemporary Italy (Bonfantini, 2016), already experimented in the same centre of Ragusa Ibla, before the regeneration that began after the town was recognised as a part of the UNESCO site.

From the analysis of statistical data (CRESME; Banca di Italia; Regione Sicilia and ISTAT) we can state that while Ragusa and the historical centre of Ibla are growing in number of employees and tourist attractions, the S. Paolo district is abandoned. It is not a rare phenomenon for the areas of UNESCO sites. All seven UNESCO sites in Sicily have been regenerated, but none of their peripheral neighbourhoods and areas. The phenomenon finds its explanation in the dialectic between cultural good and economic-social good. On the one hand, it highlights the complex patrimonial dimension, which has placed at the centre of attention the cultural value of the historical territories as a quality factor and, therefore, a possible driving force for the development of the different settlement contexts.

Figure 1. Ragusa - Source: Contin A.
On the other hand, there is a vision that recognizes, in those same resources and material presences, a fixed capital waiting to be put to profit. If it still seems right today that the driving force behind the reactivation of historical heritage is tourism, the mechanisms linked to real estate capital prefer to concentrate investments on valuable buildings and consolidated areas. The S. Paolo neighbourhood, however, as a working-class and rural district on the outskirts of Ibla, has been abandoned. The data tell us that there are only 11 activities present (of which ten are for tourists and only one is a kiosk), complicated connections with Ibla and Ragusa, an ageing population. A vital investment decided by the three-year plan of public works in Ragusa\(^2\) dedicated to mechanical mobility will make the neighbourhood of S. Paolo a new centrality of connection between the historic centre of Ragusa, Ibla and the Valleys (fig.5). However, no plan has been provided for possible future private investment. There is a concern that the urban real-estate market will once again feed a mechanism that distances cities and building products from the real needs of individuals and communities. The "urban real estate market" – supported by the drive of ruthless capitalism and the constant search for a global strategy of infinite economic growth – usually prevails over the needs not only of the less affluent segment of the population but also over the needs of the middle class, making ever-larger parts of cities precluded and creating a precise social topography where polarization based on income is increasingly evident.

Therefore, the S. Paolo district abandonment is linked to three factors: the fragility of its geographical position, the contraction of the economic growth (and, specifically, the stagnation of private investments)

and the lack of "modern" urban services required by the evolution of the models of social life and use of the city, that define the quality of citizenship in contemporary European society. CRESME data show that funding for public works tendered by the Municipality of Ragusa is growing and that there are significant social or cultural investments both private and linked to the community. The employment rate is increasing: in 2013, out of every 100 inhabitants aged 25-64, 50% were employed on a national average of 59.8%; in 2018, unemployment was 27.9% among the 25-34 year old people, while in the age group of 35, unemployment was 13.4 %, while the gender gap with female non-participation in employment was very high in 2013 (about 40% against 27% for men). Ragusa is growing from an economic point of view; but it is not growing on the themes of the conservation of its natural (in the separate waste recollection, for example) and physical heritage. There are only 11 private building permits in Ibla between 2010 and 2019, while many renovation sites were started by the authorities. Nevertheless, also the lack of "modern" urban public, private and collective services, which are required by the evolution of the models of social life and use of the city and define the quality of citizenship in the contemporary European society, motivated the local population to move to other areas of Ragusa.

Since these three factors are interlinked and active as circular causes on the present abandonment condition of S. Paolo, the proposal tackles the challenge with an intervention working on them. We address this challenge since the experience in the same Ragusa Ibla and worldwide shows that in a situation of abandonment the next scenario is very likely to be the loss and dispersion of the cultural heritage and the generation/production of an “artificial” and globalised city, taking place with the intervention of the real estate. Worldwide, if we look at most of the "heart of the city" transformation projects, we see built contexts that are mainly the result of real estate operations, which are characterised by the search for the production-reproduction of capital even at the expense of communities, people and their lives. Built areas, neighbourhoods, cities are becoming financial products, where public good values such as cultural heritage and built and natural capitals, are taken into consideration only in their capacity of maximising profit. Tourism is no an exception. According to the data, in the Sicilian Region the growth of the tourist presence was 2.9% in 2018 (7.3 % in 2017) and is now decreasing.

Through a project involving citizens and all agents in the city and territory, our proposal aims to avoid the transformation of S. Paolo into a space that is inaccessible to the low-middle classes and/or the more marginalised groups due to the dizzying increase in rents and the cost of housing. Everywhere in the world, the private speculative real estate activity has transformed the city’s historical centres, and also some of its peripheral areas (through temporary "events" that are not integrated into structural and participatory processes and happen to be held). In S.Paolo neighbourhood we aim to counter the negative repercussions and contradictions of the capitalist city’s ways of transformation.

2. The proposed vision

2.1. The innovative action

In recent time Ibla, was transformed in a renowned touristic centre (with high percentage of Michelin Stars restaurants) while its periphery, the S. Paolo neighbourhood, was neither transformed, nor maintained.

In order to face this issue of abandonment and neglect, we intervene on its three main causes defining a whole project based on an integrated approach, from the plan to the assessment of the result of its impact monitoring. The proposal is built on a cross-cutting, non-linear scientific method for integration between a structured system of projects and a participatory process approach. It provides an alternative
model to the city's mode of production, bringing new life to an urban planning based on the principles of equality, inclusion and civility.

To counteract fragility, our two-steps method propose a first phase of mapping through open-source data (Metropolitan Cartography), remote sensing and OSM of the de facto territorial state of the S. Paolo neighbourhood.

Figure 4. Ragusa Metropolitan Connection Source: Metropolitan Cartography. MSLab.
We consider necessary to establish a project of local communities dedicated to the growth of learning and capacity in the face of risks. To counteract the economic stagnation, we propose an integral project that can attract investment (in the social, economic and energy spheres) on the heritage of local material and immaterial culture. It is a project of urban regeneration that starts from the integrated accessibility between the two historical centres (Ragusa and Ibla) and the connection of the valleys (S.ta Domenica mainly), and aims to transform the neighbourhood, currently considered peripheral, into a new centrality and to incentivise the return of citizens living there. The project encourages participation and innovation; it acts through alternative proposals of collaborative urban regeneration of the areas, leveraging heritage and culture to regenerate also the socio-economic realm. So, it establishes a Community Foundation\(^3\) able to keep together places, actors and skills. By reducing the speculative logics based on urban income (one of the factors characterizing today’s urban and territorial transformations), we intend to modify the administrative and governance models of the city and the territory based on unbalanced relations between public and private. The aim is to prevent the private sector from guiding the choices of the public sector towards private interests and building waste, as it happened, especially in recent decades. The legacy of that attitude is a phenomenon of exclusion and marginalization of significant social strata not only in some large cities but also, in less economically developed territorial areas, as demonstrated by certain internal European areas. In this way, we intend to innovate the rules of public action in the transformation, restructuring and regeneration of even the most fragile city fabrics, through the implementation of a governance following the metropolitan approach to complexity (Giordano, Contin, 2019) and the projects competitions tool. In fact, we believe that the Governance must deal with the in-between spaces: looking beyond the traditional definition of borders, aiming at investigating spaces of interaction between local and global forces and powers, challenging fixed administrative borders at different scales (state, region, city). The goal must be not only the balance between the various interests of actors who, although different, must aim to reach an agreement on what is the public good at the local and global scale, but also, a common intention to achieve the agreed objectives. One could think of a public policy model that operates through public competitions that require not only the design and construction of the work but also a more flexible governance strategy between the different levels of

\(^3\) A Community Foundation is a non-profit organization, which brings together representatives of a local community (private citizens, institutions, associations, economic and social operators) with the aim of improving the quality of life of the community itself, activating energy and resources and promoting a culture of solidarity and social responsibility. The main peculiarity of this type of foundation is the possibility for a community to invest in its development qualities, activating its own resources in order to carry out projects and interventions for the territory. In addition and as an important subsidiarity tool, a Community Foundation has a strong potential in attracting resources, in the form of donations, since it ensures their investment in local social projects and a careful asset management. The main features of the Community Foundation are: being a private entity with assets; representative of the entire community; autonomous and independent; working for the common good.

To be noted is that the Italian CON IL SUD Foundation promotes the development of Community Foundations in the Southern regions of Italy by supporting their creation and the establishment of their patrimony through mechanisms of grant matching ("doubling of the collection") that stimulate the autonomous fundraising by part of the Community Foundations themselves.
decision-making and management. The instrument of the Community Foundation that we adopt for the regeneration project of the S. Paolo neighbourhood goes in this direction. The city agents gathered together in the Foundation become the shareholders of the project and act in an integrated way to finance and manage it over the time.

Figure 5. Ragusa. Existing Project Map. Source: Metropolitan Cartography. MSLab

Territorial intelligence is a discipline that aims to advance the sustainable development of various places by strengthening the local communities. This emerging science exploits multidisciplinary knowledge about territories and their dynamics and strengthens the ability of local communities to participate in an equitable and sustainable way in the development of their region. It also endorses spatial information and the sharing of tools, and promotes authority and decisions focused on participation and association\(^4\). Following that approach to counter the lack of "modern" urban services and products (which ensure the right to the city, one of the principles of our methodological approach) necessary for the evolution of new social models and community logic, we define actions for the development of local products able to activate new productive processes related to food, wine and related supplies. The reactivation of the ancient trades is connected to the study of the historical references linked to the territorial intelligences and competences; they bring us back, more than anything else, to the recovery of ancient fruits, to linens and hemp, to sugar cane of Egyptian origin and cultivated in Southern Sicily, to the horticultural production rich in historical varieties. And also to stone and ceramics. The identified solutions to the above-mentioned challenge is therefore in the form of a meta-project that sets the framework and starts implementing a collaborative and integrated regenerative process of the S. Paolo neighbourhood while developing the organizational environment for its linkage to the wider territory.

\(^4\) See the European Commission Sixth Framework Programme (FP6), running in the years 2002-2006.
3. The method: innovate to invent something that changes the rules

3.1. A widespread gestaltic vision

In our proposal, S. Paolo neighbourhood within Ragusa Ibla is understood as an Evolutionary city. Our vision and method first clarify the issue and the processes – occurring at different scales – that concurred to determine the issue. Then, the intervention is planned not on the issue directly, but on the main factors that determine it (conceived as circular and non-linear causes, according to our vision of complexity). Our method also acts on the currently widespread development practices, which could entail the risk of manipulate the identity of a historical place in defining not a collective but only a private space (planning gentrification) and without producing a sustainable project in the long-term spam. First, in our interscalar vision the S. Paolo district is located, together with Ibla, within the vast area of the eight late-Baroque towns of the Val di Noto. The valley is the reference system, belonging to Catania metropolitan area (fig. 4, fig. 5). Considered within this dimension, the Project is paradigmatic because it does not consider the territory only as a single and separate case, but as a "spark" that can trigger transformations in the entire metropolitan area. The leap of scale is made necessary by the current moment in the history of the world that we call Anthropocene. Moreover, the Project that intervenes on the three causes of the abandonment of the S. Paolo neighbourhood is an effect of the contemporary historical city centre real estate development approach. We can read the abandonment as an effect of the attraction of the metropolitan areas exerted on the citizens, or of the lack of policies of wealth redistribution. But we can also read the abandonment in terms of geographic urgency: Climate Change; the invasion of vegetation at the expense of agriculture in the valleys; the destructive effect of acidic water on the stones of the houses.

Our project is an innovative practice because it doesn’t offer a solution only for a neighbourhood, S. Paolo, or for the city to which it belongs, Ragusa. Our method is about a change in the Gestalt: any local project is planned in connection with the wider areas to which the local scale belongs. Any solution at the local scale recalls endless political choices that give answers at the upper scales to the need for a change of geography, society and politics for the policies of space.

3.2. Prompts for urban authorities

According to our method, urban authorities are invited to test innovative solutions to manage demographic trends, to attract relevant economic activities for sustainable urban development from one side, and to counterbalance the effects of demographic decline. This is consistent with the Italian DPS 2013 (Strategia Nazionale per le Aree Interne) which defines specific ways of building the internal areas. Therefore our Project – revolving around three innovative pivotal points that do not act directly on the issue but on its causes – indicates the guide-ideas modifying the negative trends in the territory; the results to be achieved in terms of citizens’ quality of life; the actions through which to pursue these objectives.

Without being prescriptive in terms of the types of projects expected, the Ragusa city is invited to consider in particular the following points and issues related to the Dps 2013):

- access to community-based social and health services, incentivizing labour force participation through cultural heritage management and improvement; child/elderly care solutions, improve quality of life through, inter alia, participatory methods with focus on gender and inter-generational dialogue;
- accessibility and sustainability of basic public services;
- reorganisation of existing public infrastructure and services;
- reorganisation of land use and public buildings;
• development of society 2.0 and 4.0;
• development of the "silver economy";
• strengthening the active labour force by retaining and requalifying the local one and attracting active workers;
• stimulating local entrepreneurship, especially for the new young population.

Reinforcing the capacity of labour market institutions, vocational education, training facilities and lifelong learning. In parallel with larger cities, we strongly think that attention could also be devoted to smaller and medium-sized shrinking cities. If innovative solutions require an urban-rural interface or functional area approach, such as in S. Paolo neighbourhood, it will be possible under this topic to include local administrative units defined as rural (Vallata di S.ta Domenica), according to their degree of urbanization or biodiversity values within a collective project partnership.

Every city needs a tool that helps policymakers to define objectives based on the SDGs and their impact indicators, in order to make decisions that can link the urban metabolism to the regional metabolism.

Our Design Thinkers approach (the designer produces innovation through field experimentation) wants to change the typical rules of the management approach. Our method starts from the problem finding phase, leading to the identification of an issue, and proposes a vision and a solution: what we can do. Then it acts by innovating, and since our action is experimental, we assume the possibility of taking even wrong decisions. We learn through the creation of a balance between existing proposals that are recalibrated as far as the original context to be adapted/translated to the new one is concerned. A budget of mistakes will be the basis for data history as fundamental material for the transferability of the project and its implementation.

3.3. Case studies on abandonment and innovation

Since our method aims at designing inter-scalar actions and it is in constant dialogue with practices already adopted and implemented, in the case of S. Paolo neighbourhood we drew inspiration from the rich analysis of case studies relating to places of abandonment presented by the journal Planum in 2016 (Bonfantini, 2016) that can contribute to shape our proposal. In this paragraph we outline therefore some basic and highly shared principles of regeneration and reactivation of cultural heritage (built, natural and intangible) in contexts of abandonment and we also try to highlight how our proposal differs from those experiences. Three are the needs that our project wants to discuss:

• the need to introduce in these almost completely depopulated contexts an external figure who knows how to recognise a value "other" than the only value of the past and that can be the "spark" for its transformation, because "endogenous cultural factors require the input of exogenous resources";
• the need to consider heritage as an "economic fact" in the broadest sense of the term and not as pure "fixed capital" to be put on income;
• the need to focus not only on the tourism sector as a driver for the valorisation of cultural heritage.

From the analysis of the case studies and, in particular, on some of their actions that have proved to be particularly successful, we can infer possible criteria of orientation among the different experiences. Our project will be based on a model of horizontal accommodation (making reference and taking inspiration from previous projects, such as the Albergo diffuso in Comeglians and S.to Stefano di Sessanio). However, in our case, the challenge will be to attract new temporary inhabitants and not only tourists. For this reason, our users include also students who will be the residents of the neighbourhood for periods
ranging from one week to several months. The application of the design competition tool - which proposes an implementation of governance and constructive rules, as outlined above in paragraph 2.1 – is an innovation proposed by the project. Our project foresees the integration between the S. Paolo district and the natural and agricultural territory of the S.ta Domenica valley. This deeper connection with the valley through the regeneration of ancient paths redesigned for recreation and new experimental agricultural production will offer the tourist – but also the temporary inhabitant - an immersive experience in the material and immaterial heritage of the city and the region (reference project: Case oltre-la-soglia. Metropolitana Milanese Area, Pezzoni, 2018).

For the introduction of the most advanced technological infrastructures (Project: Colletta di Castelbianco), the Municipality of Ragusa has already allocated funds for the development of the Wifi network. In our project, the architecture of public spaces will be powered by this connection that through a mobile application will make the spaces of the city more porous and permeable. The Wifi network will allow the connection between the citizens and the administration, the service providers and the users of the city.

From the experience of the Torri Superiore proposal, our project draws the awareness that the only agro-food activity is not enough to economically support a project of reactivation of abandoned places. The sources of income will have to be differentiated and distributed between food and wine activities, hospitality and training activities.

The case of Castelfalfi shows us the necessity of establishing a relationship between public and private, that our project innovates in aiming to the agreement not between public and private, but between public and common or collective. In our approach, we conceive the commons in the Latin sense of Communis: the possibility of using the good is subordinated to the community work The common good (Community Foundation) is, therefore, a sacred non-public good that cannot be alienated by the public administration. The Community Foundation, capable of holding together actors and knowledge, is also fundamental for addressing the topic of the management of the reactivated spaces, which cannot be entrusted to a single private actor (Project: Montegridolfo). The Community Foundation will also act as an agent for proposals aimed at transforming the administrative regulations that can prevent the sustainable transformation of places; it will happen thanks to the instrument of the project tender, requiring also the presentation of solutions for implementing governance tools. In the end, in our project, the Community Foundation through the work of the social cooperatives included in the partnership, will be instrumental for the inclusion of some marginalised groups living in the city (Project: Riace).

Our project is part of an innovation process related to the implementation of policies for the reactivation and management of cultural heritage, including intangible heritage (Project: Arcevia), introducing actions for skills certification. The training activity is fundamental to respond to the theme of orographic fragility also present in our project area (Project: Craco). That is addressed by proposing a process of mapping through open-source data (Metropolitan Cartography), remote sensing and OSM of the territorial state of the S. Paolo district, necessary to found a project of local communities dedicated to the growth of learning and capacity in the face of risks. A crucial training point is the development of a set of competences related to: knowing the organizational aspect in the space; planning and organising the single actions within the complete restructuring process while putting it into practice, determining the relationship of everybody with the matter to be operated. The certification of these competences must be recognised and constitutes the guarantee of continuity of the training action over time.

Compared to a selection of European Awarded UIA Projects, our project is a case of evolutionary innovation concerning three projects selected by us as reference. The basic idea of USER - Changes and conflicts in using public spaces & RE-Block - Reviving high-rise Blocks for cohesive and green
neighborhoods (urbact.eu/user)" is that the design of urban public spaces and the main objectives of urban planning are challenged by rapid changes in the way cities are used. Also our project, in regenerating the S. Paolo district, will address the theme of public space, conceived as an element (the pocket garden) that is part of the continuity of the green armature of the S.ta Domenica Valley. The urban and architectural project today must be an element of integration between the built and natural capital to achieve the sustainability of the complex system. The themes of the cultural diversity of the ageing population, energy consumption, social exclusion, segregation and social polarisation, the arrival of new inhabitants, is studied at the different scales covering the UNESCO site. Our project acts: through a study of mobility linked to an innovative integrated and multi-dimensional territorial survey that focuses on accessibility and soft mobility; and through the creation of new job opportunities that are generated by a study on territorial intelligence, the subsequent development of their products and the skills they can generate.

Compared to the project “RE BLOCK - Reviving high-rise Blocks for cohesive and green neighbourhoods (urbact.eu/re-block)”, the project aligns with the "cultural model" which means the city in continuous evolution and a heritage managed by the whole community of citizens. Our project shares RE-BLOCK’s operational objective: "the co-design of actions to produce the city collaboratively, through the combination of specialised actions (decision-makers, technicians) and widespread actions (city actors) in mutual recognition of visions, knowledge, skills". However, this objective is evolved by our project with the introduction of open-source mapping, the Community Foundation and the competences certification.

“URBAN GREEN UP (https://cordis.europa.eu/article/rcn/135393/en)” develops, applies and validates a methodology meant to increase the sustainability of our cities through innovative solutions based on nature. We intervene on the S.ta Domenica Valley by reconnecting it to the city in order to enable the mitigating of the rural-urban contrast that has led to the abandonment of the two components. In the Anthropocene, nature and culture must necessarily collaborate through more porous connections, new land-use patterns (urban-rural linkage) and a renewed relationship with organic and quality agriculture.

4. Conclusion

A syntactical transformation is taking place in today's city. Cosmopolitan globalization puts places out of action. Carlo Cattaneo (Cattaneo, 1844) defined the Italian landscape an anonymous regional garden, indicating that the Italian territory, which Kevin Lynch (Lynch, 1960) called "totally built landscape" and "totally visible landscape", is a social work. The identity of a place is a process in which space, time, work and memory are the essential elements for the definition of the identity matrices of geographical, rural, and morpho-typical nature (CONTIN, 2016). Today, in the discontinuous archipelagos, the new infrastructures articulate and disarticulate that garden. They interrupt the relationships that exist in the territories, and, in addition, they destroy the identity matrix of the agrarian nature. However, it is not cancelled, and the traces of the ancient subdivision of the agriculture fields remain as a trace on the ground, especially as a water line and as an identity image of a characteristic local landscape. It determines a territory whose identity is not static but understood as a dynamic process (Raffestin, 2003).

Alberto Magnaghi (Magnaghi, 2003) profoundly criticizes contemporary design, which reduces the territory to abstract space, to isotropic and inanimate support of economic activities, which generates new poverty due to the degradation of the environment. That, in fact, is what happens when the territory is not understood as individuality and as a set of patrimonial deposits, through which styles of sustainable development are built. Our project proposes a hypothesis of re-appropriation of the territory that starts from local values and strengthens them by creating new relationships between the territory and the mobility networks of settlements and landscapes. This approach aims at establishing a vibrant agro-
tertiary economy of quality, which starts from the culture of care and the awareness of a shared design around which new relationships are built for the production of lasting and self-sufficient wealth.

We propose a model of a city belonging to the metropolitan region that incorporates agriculture by including new functions and a new idea of public and common space. From a metabolic point of view, growth needs a discontinuity in its structuring, which regulates the logic of dismantling structures that are no longer sustainable. However, against the dissipation of the heritage of the past, the concept of sustainability must be improved. How is the transformation of the territory sustainable? Our answer lies in identifying the knowledge that allows us to know the problem inherent in the transit of scale and the process of metropolisation, which is one of the leading causes of the abandonment of our territories.

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Integrated change planning in the historic post-industrial area in the centre of the city.
A case study of riverside industrial complexes in Lodz.

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Abstract

This case study presents the planning and implementation of the regeneration of a post-industrial area in Lodz, a city in central Poland. In the 19th c. Lodz became a European textile empire with numerous factories the architecture of which largely determines the city’s present-day urban structure. The past development of Lodz was driven by the so-called Riverside Industrial Complexes (RIC), so massive that they became to be known as “a city within the city”. As factory walls were rising, residential buildings were built and public and technical facilities were constructed. In the early 20th c., however, the RIC area, occupying 280 ha in the centre of Lodz, was affected by depopulation processes and its spaces started falling into dilapidation.

This article presents the land-use plans for the RIC area and investment projects resulting from them. The main goal of spatial changes was to regenerate the area and bring a new quality of life into it. New land-use rules defined the degree and forms of protection of the rich historic, post-industrial urban fabric from the 19th c., consisting of factories, villas, tenement buildings, and service establishments, and green spaces. They also emphasised the need to maintain a balance between new development projects and the conservation of the city’s post-industrial heritage for future generations.

Keywords

Poland – Lodz, regeneration of post-industrial areas, integrated change planning, compact city

1. Introduction

Lodz is a post-industrial city in central Poland that over several decades in the 19th c. expanded from a small town to a textile industry empire (Ginsbert A. 1962). In population terms, it is today the third-largest city in the country. The spatial expansion of Lodz caused that many post-industrial areas sit now

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1 When, in 1821, the government made a decision to establish a textile industry centre in the town of Lodz, its population was estimated at 799 residents. Following industrialisation processes, the number increased by 1913 to 506,000, i.e., by over 2006% (Ginsbert A. 1962, p. 27).
in its centre. One of them is the area of the Riverside Industrial Complexes (RIC) called “a city within the city”, which looks today much as it did in the 19th c. The factory buildings erected during the Lodz golden days are accompanied by housing estates, brick buildings used as social, educational and healthcare facilities, technical infrastructure and green spaces surrounding the factory owners’ villas and palaces (Liszewski S. 2009). All these features make the RIC area one of the most valuable urban systems that can still be seen (Koter M. 1969). With an area of 280 ha, the RIC is also the largest post-industrial complex from the 19th c. in central Poland.

Fig. 1. A – Poland in Europe; B – Lodz in Poland; C – the RIC area in Lodz, Source: Lodz Planning Office.

2. The past and the present

2.1 The industrial history of Lodz

The main reason for establishing the so-called Riverside Industrial Complexes in Lodz was the valley of the Jasień river with its watermills. In 1827, the land along the river was parcelled out and a new spatial system was designed around St. Emilia St. (now Tymienieckiego St.). The historic layout of the streets and the river’s valley are can still be seen in the fabric of the city. In the space of the 19th c. the RIC area was developed with 11 factory complexes of different sizes comprising weaving mills, spinning mills, warehouses and plants, as well as the factory owners’ residences, workers’ housing, schools, kindergartens, hospitals, cultural facilities, and even a fire-house. The RIC area was, therefore, a self-sufficient urban organism providing its residents with access to a wide range of services, including jobs, housing and entertainment.

Under the communist rule spanning the second half of the 20th c., the RIC area struggled with major economic, social, and spatial problems. A dramatic decline in the quality of the urban structure was especially clear to see. In addition to a large number of vacant parcels, many buildings, including those of historic value, fell into disrepair. The unused industrial sites were increasingly overgrown by vegetation and the water resources of the area, including the Jasień and Lamus rivers flowing in channels, were left unexploited. Having realised how big a problem the RIC area was, in the early 21st c. the city’s authorities decided that intervention and integrated revitalization of its spaces were necessary. The decision was followed by concrete planning activities and actions. Land-use plans were enacted, which enabled the implementation of spatial solutions addressing the area characteristics and exploiting its cultural and natural potential.

2 In Poland, land-use plans are part of the local law.
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Fig. 2. The photographs illustrate the rapid expansion of the RIC area in the 19th c., its current state, and proposed redevelopment; A. – K. Scheibler’s spinning mill (now converted into lofts) and workers’ housing in Księży Młyn; B. – L. Geyer’s factory (now the Textile Industry Museum of the City of Łódź).


2.2 The potential of modern Lodz

A major asset of the city of Lodz is historic, post-industrial structures that occupy an area of 280 ha inside the densely developed metropolitan zone. The RIC area features 11 massive factory complexes made of brick that were shut down in the last decade of the 20th c. The witnesses of its industrial past are also the elements of paving (e.g., cast-iron slabs), of the railway infrastructure (e.g., track, semaphores), and historic fencing. The RIC area is rich in parks and greenery surrounding the villas and palaces of bygone industrialists. It also includes two water tanks, the Jasień river flowing in an underground channel, and a section of Scheibler’s siding railway. The built environment displays a variety of architectural styles and the blocks of streets vary in development density.

Fig. 3. A. The RIC area inside the metropolitan zone. B – post-industrial complexes in the RIC area. Source: Lodz Planning Office.
3. New design

3.1 Redevelopment models

Spatial solutions were varied depending on the nature of historical development and elements of the industrial heritage. Changes were designed with the maximum protection of the historical value of the existing structures in mind. Physical interventions into heritage structures were made dependent on the degree to which they respected their urban and architectural value. Accordingly, three models of redevelopment were established:

1. conservative: emphasising the need to preserve the existing assets (the urban layout, the boundaries of the parcels, the parameters of the buildings, architectural details) to the maximum extent possible;
2. balanced: imposing symmetry between redevelopment and the preservation of the existing development;
3. creative: permitting spatial changes redefining the forms and quality of spaces.

The RIC area was divided into sites in which the three models were to be applied (Tomczak A. 2008). Most of them were covered by conservation activities because of their historical value. However, because the paramount goal of the intervention was to infuse economic life into the RIC area, in some sites compromises had to be made between conservation and redevelopment. The creative approach was mainly utilised to design a system of public spaces and areas of greenery.

Based on the draft planning concepts, a physical model of the RIC area was created to visualise them and to indicate the boundaries of future development projects. The model proved very useful during participatory consultations with local residents, as it clearly showed them how the area might develop in the future.

Fig. 4. Spatial development models for the RIC area. The white, grey and red colours denote the current buildings, new buildings, and new public spaces, respectively. A – the western section of the RIC area along the main axis of Piotrkowska St.; B – a section of K. Scheibler’s and L. Geyer’s post-industrial complex in Tymienieckiego St. Source: Lodz Planning Office.
3.2. Local land-use plans

The whole of the RIC area was covered by local-land-use plans which provided for an integrated change process, thus allowing a linear system of public spaces to be created and preventing the fragmentation of the city’s historic built environment. The plans, prepared based on the findings of an urban inventory, the review of cultural heritage values, and the analysis of natural assets, significantly enriched the existing urban fabric. They introduced new public spaces, including 14.4 ha of greenery, 7.0 ha of roads and pedestrian-mainly routes, and 5.1 ha of spaces dedicated to pedestrians and cyclists. All these changes increased the area of public spaces by 9.7% compared with baseline.

The level of protection and the scope of changes to historic buildings is an example of good practice, having been agreed collaboratively by the Voivodeship Heritage Protection Office, developers, and the Lodz Planning Office as the author of the land-use plans and the ways of implementing them. In the planning work, reports were used from earlier studies of the city’s morphology, cultural heritage protection and natural assets conducted by entities such as the Technical University of Lodz, the University of Lodz, the European Regional Centre for Ecohydrology of the Polish Academy of Sciences, and the Voivodeship Heritage Protection Office. The authors of the land-use plans made sure that they were aligned with the “inward development” concept that Lodz had adopted as a principle to guide its spatial development. The focus of the concept is on improving the quality of residents’ lives and on providing areas in the city centre with new spatial values (Strategia 2013). The land-use plans were also coordinated with the revitalisation process carried out under the Revitalisation Programme for Lodz (GPR 2016).

3.2. Spatial solutions

The land-use plans were designed around the concept of a compact city as defined in the strategic documents of the city of Lodz. They identified gaps in the existing built environment that needed to be filled and indicated better land uses, including uses increasing the economic value of sites. A mixture of functions was emphasised, especially the combination of residential and service functions, and changes improving the residents’ access to services, jobs, and social infrastructure.

The plans also specified permitted changes to RIC spaces and set parameters for new developments. Before, the blocks of streets corresponded in size to the industrial parcels that ranged from 10 to 24 ha. This resulted in an extensive use of spaces inside the blocks of streets and made access to properties problematic. The plans reduced the blocks to make room for new public spaces. As well as enabling easier access to the sites undergoing improvement and increasing the mobility of pedestrians and cyclists, the newly designed streets created more development opportunities, attracting the interest of potential investors. A special role was predicted for the tract of land once used by Scheibler’s railway, which was to be converted into a 2.2 km long straight boulevard for pedestrians and cyclists connecting the revitalised industrial complexes. The plans provided for extending it in the future, so that it linked two railway stations in the centre of Lodz.

A new system of public spaces was designed taking account of historic urban structures. The historically most valuable of them were integrated with the system, and protection areas were established to ensure an unobstructed view of them.
The RIC area has many green spaces, many of which were not used. In the land-use plans, they were designated as parks or spaces connecting the existing areas of greenery. The largest green public space will be situated along the Jasień river, next to Scheibler’s spinning mill converted into lofts.

Fig. 5 A – the system of new public spaces. B – the structural composition of the RIC area with permitted heights of buildings and landmarks. C – the green areas. Source: Lodz Planning Office.
3.3. Architectural requirements

The land-use plans allow new architecture to be constructed in the RIC area provided that it respects the forms and dimensions of the historic industrial complexes. The height limit for new buildings has been set at 25 meters. Taller buildings can only be located at the ends of the composition axes or in sites adjoining public squares. Limited physical intervention into historic buildings is permitted, but its form and the building materials to be used must contrast with the historic fabric. Because the architectural requirements for new development stress balance between conservation and creation, “the identity of place” has been preserved and new projects and functions are integrated with the historic fabric of the city.

4. Implementation

4.1 Programme outcomes

The RIC redevelopment programme has positively changed its area in many ways, turning around its perception among residents and investors alike. In the last dozen or so years many projects have been completed and several new ones are ready to go. A synergy and complementarity can be observed between the building projects of private investors and the municipal projects: the former industrial realm ruled by K. Scheibler and L. Geyer has become a new residential district, L. Grohman’s factory is now the administrative centre of the Lodz Industrial Zone, the school buildings from the 19th c. have been converted to educational and cultural functions, and the old warehouses and cotton and flax mills serve today as offices and administrative spaces. The noticeable increase in investment activity in the RIC area convincingly shows that a well-thought-out spatial policy has the potential of revitalizing the post-industrial areas of cities. The results of the land-use plans implemented in Lodz support the thesis that the historic, post-industrial assets of a city can become one of the key factors driving its development.
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Fig. 7. A. – lofts in Scheibler’ spinning mill; B – the former fire station converted into an office building; C – Grohman’s school, now an office building.

5. Conclusion

The primary result of the revitalisation programme for the RIC area is its steady development based on respect for the cultural heritage of the city and sustaining the historical authenticity of its post-industrial complexes. Spatial changes in the area are easy to see, as well as continued efforts to restore the complexes. The land-use plans provide for the establishment of a linear system of green spaces utilising the RCI area’s natural assets, which will increase the amount and will improve access to urban greenery: parks and garden squares. The potential of the local rivers has also been appreciated and built into regeneration processes. The main axis of an industrial Lodz, Tymienieckiego St., is regaining the prestige it once enjoyed. New east-west roads are being constructed and new spaces are being designed for pedestrians to connect the existing streets and facilitate traffic inside the industrial complexes. New investment opportunities offered by the land-use plans have been coordinated with the parameters of the existing historic buildings. The new system of public spaces has been designed as “a vital organ” of the RIC area, where housing estates and services will coexist with new and current structures of importance for the city and region.

The revitalisation of the RIC area is going on, slowly but steadily improving the quality of spaces and of residents’ lives. After long years, Lodz is regaining the area that witnessed the birth of its industrial history in the 19th c.

The authors wish to acknowledge their gratitude to the Lodz Planning Office for sharing materials for this study and presenting the land-use and action plans for the RIC area. The plans and the execution thereof were awarded in 2020 by the Minister of Development of the Republic of Poland for outstanding creativity in land-use planning.
4. References


Spatial Cultures of Soho, London
Exploring the Evolution of Space, Culture, and Society of London’s Infamous Cultural Quarter

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Sam GRIFFITHS, University College London, United Kingdom

Abstract
Space as affording social interaction is highly debated subject among various epistemic disciplines. This research contributes to the discussion by shedding light on urban culture and community organisation in spatialised ways. Providing a case of London’s famous cultural quarter, Soho, the research investigates the physical and cultural representation of the neighbourhood and relates it to the evolving socio-spatial logic of the area. Utilising analytical methods of space syntax and its network graph theories that are based on the human perception of space, the research narrates the evolution in spatial configuration and its implication on Soho’s social morphology. The method used examines the spatial changes over time to evaluate the shifting identity of the area that was in the past an immigrant quarter and presently a celebrated gay village. The approach, therefore, combines analytical methods, such as network analysis, historical morphology analysis and distribution of land uses over time, with empirical methods, such as observations, auto-ethnography, literature, and photographs. Dataset comprises of street network graphs, historical maps, and street telephone and trade directories, as well as a list of literature, and data collected by the author through surveys.

Soho’s cosmopolitanism and its ability to reinvent over time, when viewed through the prism of spatial cultures, help understand the potential of urban fabric in maintaining a time-space relationship and organisation of community life. Social research often tends to overlook the relationship between people and culture with their physical environment, where they manifest through the various practices and occupational distribution. In the case of Soho, the research found that there was a clear distribution of specific communities along specific streets over a certain period in the history. The gay bars were situated along Rupert and Old Compton Street, whereas the Jewish and Irish traders were established on Berwick Street, and so on. Upon spatial analysis of Soho and its surrounding areas, it was found that the streets of Soho were unlike that of its surrounding neighbourhoods. In Soho, the streets were organised with a certain level of hierarchy, and this hierarchy also shifted over time. This impacted the distribution of landuses within the area over time. Street hierarchy was measured through mathematical modelling of streets as derived by space syntax. In doing so, the research enabled viewing spaces and communities as evolving in parallel over time.

In conclusion, by mapping the activities and the spatiality of Soho’s various cultural inhabitants over three historical periods and connecting these changes to the changing spatial morphology of the region, the research highlighted the importance of space in establishing the evolving nature of Soho. Such changes are visible in both symbolic and functional ways, from the location of a Govinda temple on a Soho square street, to the rise and fall of culture specific landuses such as gay bars on Old Compton Street. The research concludes by highlighting gentrification as an example of this time-space relation and addresses the research gap of studying spaces for its ability to afford changeability over time.

Keywords
Space syntax, Spatial cultures, Landuse, Data analysis, Mathematical Model, GIS
1. Introduction

1.1. Historical background

Soho is London’s historic cultural quarter and benefits from being positioned centrally in London. On its periphery, it is bound by high streets Oxford Street, Regent Street, Shaftesbury Avenue and Charring Cross Road. A total area of 2.6 sq. km, it is part of Borough of City of Westminster and located towards the west side popularly known as the ‘west-end’. Tourists and Londoners alike visit Soho and dwell in its many charms such as music, heritage, people, culture, bars, restaurants, cafes, clubs, gigs, venues, theatre, retail, alternate movement, and so on. Soho has become in some senses a pilgrimage site for the LGBTQ+ community, and has evolved since the 2000’s to become the ‘Gay Village of London’ (Collins, 2004). There is a large concentration of amenities for the queer community concentrated along Old Compton Street (Vinod-Buchinger, 2018).

In Soho’s spatial history, the beginning of some form of boundary making occurred around c. 1676. Most of Soho’s streets take form from this original distribution of land, divided into long narrow plots along the North-South direction where its boundary on east and west sides became the present-day streets. Since the early years of 17th century, Soho has been welcoming immigrants from Europe and other parts of the world. The China Town, Greek street, the Govinda Temple, Synagogue can all be regarded as the impressions of its cosmopolitan past. ‘The foreign immigrants, most of them the French, came amidst this wide spread building development and began to settle here’ (Sheppard, 1966, p. 5). By the late 19th century, Soho ceased to be primarily French and became cosmopolitan. These new immigrants included the Germans and Italian, Swiss, Polish and Russian Jews, Turkish, Indians, Bangladeshis and Irish immigrants, and also a large exodus of British population. (Sheppard, 1966, p. 11).

These communities lived, worked, and traded in the surroundings. The Italians set up businesses along Old Compton Street, many Afghan and Turkish traders sold goods, nuts and garments/fabric at Berwick Street market, the French pastry shops (Patisserie Valerie), English and Irish butchers, the Hindu Temple on Soho Street, the St. Patrick Church for the Irish on Soho square, the French Protestant church on Soho Square are all reminiscent of these early immigrants. These venues were frequented by French revolutionaries, members of the literary society, and others. With the partial decriminalisation of homosexuality in 1967, another revolution took over Soho: ‘the queers’. Old Compton street earlier known for their Italian restaurants now become the centre point of the queers. Since the 2000’s as queer culture became more outward, open, and visual, the identity of this street evolved, and Soho became the famous gay village of London. The spirit of Soho mural on Carnaby street accurately captures this essence. This is the culture of the space transforming and reincarnating to something new. These multiple groups and their differences transformed a small neighbourhood into many identities, and Soho somehow binds the differences as they coexist here having established their authority of the area.

1.2. Temporality in Soho’s identity

These groups organised themselves in their habituation, work and worship around certain specific streets in the early years of the settlement. As though each street would have been a quarter in its own sense, where various cultures and sub-cultures were organised through certain pattern of spatial clustering. Soho underwent various transformations over time evolving from an early Victorian immigrant settlement to the flamboyant cultural quarter, and now the gay village of modern-day London. The research is interested in exploring the patterning of the physical space investigating the influence it may have had on social interactions to assist in these identify transformations.

Why has Soho not evolved to become the China Town of London, although China Town is also at proximity and within its boundaries. Chinese and Asian supermarkets, restaurants, cafes and shops can
be found mostly along Gerrard Street located next to each other in China Town. And Gay venues along Old Compton Street. The research investigates the spatiality of the streets to syntactically explain this process. What makes Soho a transforming and unique Urban village of all sorts. And has this been afforded by its spatial configuration? Clustering, according to spatial theorists Bill Hillier et.al, is a spatial phenomenon (Hillier and Vaughan, 2007). But social, economic or design research have not been focusing of the network as affording any social value. This research, however, analyses the spatial network and build-environment to identify if the spatial connectivity of the area has changed over time, to find correlation to these social changes.

1.3. Space in its Physical Sense – A space syntax approach

To investigate the spatiality in its physical sense, it is pertinent to understand the propositions by Hillier and cohort on the three notions of space in cities – cities as generic with a dual grid, cities as movement economies, and cities as socio-spatial artefacts. Hillier (2016) addresses cities as a dual system of micro-economic and socio-cultural activities. Cities are generic, in the sense, where the street network that links the buildings which make up the city, is a dual system of inter-related networks, foreground and background. Foreground of smaller but longer lines with route continuity and background of larger number of shorter lines with more localised connections (Hillier, 2016, p. 200). Foreground network where social relations are produced which generate micro-economic activities, and background where it is reproduced that is primarily residential functions (socio-cultural functions).

Table 1: Properties of a dual grid - Social and spatial networks model with measures (Hillier, 2016, p. 210)

<table>
<thead>
<tr>
<th>stability</th>
<th>morphogenesis</th>
<th>form function</th>
<th>social network</th>
<th>information</th>
<th>groups</th>
<th>space</th>
<th>process</th>
<th>spatial network</th>
</tr>
</thead>
<tbody>
<tr>
<td>dense (community)</td>
<td>sparse (individual)</td>
<td>clustering coefficient</td>
<td>Shannonian information redundancy</td>
<td>dichotomy</td>
<td>angular integration</td>
<td>mean metric distance</td>
<td>angular normalized choice</td>
<td></td>
</tr>
</tbody>
</table>

In cities as movement economies, Hillier (2007, p. 113) provides fundamental proposition that the structure of the urban grid, that is its spatial configuration, is the single determinant of urban movement, both vehicular and pedestrian. The spatial organisation generates a pattern of busier and quieter movement patterns. Hillier explains this in two theories: the theory of natural movement, which is the proportion of movement the urban grid by itself generates, and the theory of movement economy, where the spatial order of landuses are determined by this distribution of movement along quieter and busier streets. Some streets which have high potential of movement which induces co-presence and encounters and some other wise. It views urban grid of cities as movement economies that generate economic processes as well as spaces for social reproduction (Hillier, 2007, pp. 111–137).

The third proposition is that cities as socio-spatial artefacts, important to this project on community and identity, where Hillier suggests that individuals that form a community are part of at least one spatially defined group defined by their spatial continuity of some kind and spatial proximity of its members such as village or university and another transpatial group which is regardless of spatial proximity such as clans, a trade or an academic discipline. Transpatial groups work by analogy or identity rather than spatial contiguity. They overcome spatial separation, and integrate conceptually individuals that are spatially apart (Hillier, 1989, p. 16). Transpatial groups require to be realised in space through meetings
and gatherings to intensify their solidarity. Spatial and transpatial realizations of community occur in space making space an intrinsic aspect of human activity. Hillier argues that cities are thus socio-spatial artefacts where such relations are realised. It is not a background of human activity. The way human societies order their space are reflections of these relations. ‘Human societies order their spatial milieu in order to construct a spatial culture, [...] a distinctive way of ordering space so as to produce and reproduce not actual social relations but the principles for ordering social relations. Space is used sometimes to generate and sometimes to restrict the field of encounter of human beings and their symbols. Space is not simply a function of the principles of social reproduction: it is an intrinsic aspect of it, a necessary part of social morphology’ (Hillier, 1989, p. 6).

When discussing spatial cultures, it is important to understand how they are dispersed in space. Their patterning of physical space reflects patterning of social space.

2. Methodology

Using space syntax method and Hillier’s theories, the research methodology proceeds with a spatial research at two scales—the relationship of Soho with its surrounding areas at Global scale, and the other as analysing Soho within itself as a settlement at Local scale. At both scales, investigation maps the direction of changes in its physical space through a diachronic assessment of three historic periods, 1890, 1960 and 2018.

![Figure 1: Structure of Methodology](image-url)
3.1. **Global to Intermediate Scale**

Soho and the surrounding regions are comparatively analysed to identify the difference or similarities in spatial parameters. The study regions are Fitzrovia, Bloomsbury, Covent Garden, St James, Mayfair, Marylebone. These are not statistical boundaries but are as identified by the author. In the selection, two considerations were made - The high streets form the boundary between any two regions, segment values of high streets were included in both selections such that when analysing the values of segment and axial models, the values of common streets were added to both sections.
Analysis of spatial parameters:

1. Plot density
   It is the density of plots across the study area. High density implies a greater number of smaller plots. The building layer obtained from Open Street Maps was utilised for this analysis. It provides necessary information on condense or sparse distribution of buildings in the surrounding region and enables a comparison with Soho. Given that Soho is located in Zone 1, Central London, it is assumed that plot and building footprints are approximately equal.

2. Space syntax network analysis
   Tested various network properties and a comparative result was produced for Soho, Fitzrovia, Bloomsbury, Covent Garden, St James, Mayfair, Marylebone, and the radii used are 400 and 2000. The network measures considered were as follows:

   a) Angular Segment Measures - Choice and Integration.
      Angular Choice is calculated by counting the number of times each street segment falls on the shortest path between all pairs of segments within a selected distance defined by the radius. It is the measure of to-movement and shortest path is the path which has the least angular deviation in the network. Routes that are longer and straighter higher choice value (Hillier et al., 1987). Angular integration measures ‘how close each segment is to all others in terms of the sum of angular changes that are made on each route’ (Hillier and Iida, 2005)

   b) Normalised Choice and Integration
      Normalising the values of Choice and Integration enables comparison between scales and grids. It eliminates the effect of high numbers of total depth or the sum of angular measures has on the overall values. The formulae applied are as follows (Al_Sayed et al., 2014, p. 117)

      \[ NAIN_\theta(x) = \frac{(n+2)^{1.2}}{\sum_{i=1}^{n} d_\theta(x,i)} \]

      where \( d_\theta \) is the length of a geodesic (shortest path) between vertex \( x \) and \( i \). Normalised Angular Choice \( NACH_\theta \) is defined as follows;

      \[ NACH_\theta(x) = \frac{\log(\sum_{i=1}^{n} \sum_{j=1}^{n} \sigma (i,x,j) + 1)}{\log(\sum_{i=1}^{n} d_\theta(x,i) + 3)} \quad (i \neq x \neq j) \]

      where \( \sigma(i,x,j) = 1 \) if the shortest path from \( i \) to \( j \) passes through \( x \) and 0 otherwise.

   Figure 3: Formulae for normalising angular integration and choice

   The datasets used for this analysis are courtesy of Digimaps Edina- for the Historical maps for periods 1890, 1960 and 2018 tracing which the model for analysis was generated, Space Syntax Lab – for the network models of London city, axial map of London- by permission of UCL EPRSRC Adaptable Suburbs Project (EP/I001212/1), and Open Street Map- provided data for TQ region of London has also been utilised with QGIS. This axial model was used to measure intelligibility and synergy.

3. Landuse Analysis
   Existing landuses were mapped across Soho. Landuse data for the surrounding region was obtained from services of Ordnance Survey- Address Based Premium wherein a detailed classification of landuses were provided. This data was utilised to analyse the distribution of communal services around Soho.
3.2. Local Scale

The analysis of Soho as a settlement involved micro morphological evolution of the area. Here the changes to the built environment over the three study periods c.1890, 1960, and 2018 were mapped. By comparing the changes, it was possible to view the pattern of change to the physical environment. This approach enables to answer question on how space has evolved over time and what it means in syntactic measures.

1. Morphology of plots, streets and open spaces
Plots, streets and open spaces (including alleys) were traced from historical maps for two periods- 1890 and 1960, provided by Digimaps Edina. Superimposing them on the current map of 2018 to identify changes in plot density for the region. Wherever the plots sizes and geometry differ from the 2018 (current modified map) it was marked in black. Refer Table 2.

2. Constitutedness Analysis
This is a method proposed by Hillier (1984, p.105-106). A constituted space is directly adjacent and permeable to a building. Entrances and exits to streets were mapped for the three study periods to identify street evolution as more or less constituted over time.

3. Network Properties of Soho
An Angular Segment Analysis (ASA) on the micro-network (street) of Soho for study periods were produced and tested for radii 400 and 800, a proxy for less than 5 min walk distances. Smaller radii were selected as the diagonal of Soho is less than 1250 m. Although, this method is not ideal for network analysis as it breaks the street segments from the larger network. The peripheral high streets act as barriers constricting the spread of landuses and other functions. The core argument of this research is this distinctness in function, character, and identity of Soho from its encompassing regions. Other scholars have studied high streets as causing this disjunction between regions dividing them into smaller regions (Vaughan et al., 2010; Griffiths, 2015). As this test focuses on centrality within Soho, these tests on local network should provide conclusive results.

4. Findings

Figure 4: (Left) At Global Scale, Soho has higher plot density areas than surrounding cases; (Right) Highlighted in Red are the concentration of smaller plots along Old Compton, Wardour, Meard, Carnaby and parts of Greek and Frith Streets
4.1. Spatial Research: Comparison of spatial properties

1. Morphology (Plots, Streets and Open Spaces) & Constitutedness Analysis

Plot analysis indicate a larger concentration of smaller plots internally in Soho along Old Compton, Wardour, Meard, Carnaby and parts of Greek and Frith Streets. Along the peripheral high streets, plot density has reduced over time. These findings helped identify specific streets for further landuse investigations. Refer Table 6 for the criteria of selection.

Table 2: Summarises findings from spatial investigation

| Local Scale - Morphology of Plots, Streets and Open Spaces within Soho |
|-------------------------|-------------------------|-------------------------|
|                         | 1890                    | 1960                    | 2018                    |
| When compared to plot size and geometry of 2018 plots (white), all blackened areas have experienced a difference in its plot geometry. |

The street network of each study period when overlapped on to the existing street network of 2018, many streets, and alleys were missing. Red lines indicate the streets that are missing

Open spaces and alleys have significantly reduced over time

Constitutedness have significantly reduced over time
Table 3: Represents the number of missing plots and alleys from each period

<table>
<thead>
<tr>
<th>Year</th>
<th>No. Of plots lost (absorbed to form larger plots)</th>
<th>No. Of streets and alleys lost (absorbed to form larger plots)</th>
<th>Total no. Of open spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>1890</td>
<td>2212</td>
<td>135</td>
<td>242</td>
</tr>
<tr>
<td>1960</td>
<td>473</td>
<td>102</td>
<td>123</td>
</tr>
<tr>
<td>2018</td>
<td>-</td>
<td>-</td>
<td>56</td>
</tr>
</tbody>
</table>

2. Street Network Analysis
   a. Angular Segment Analysis - Integration and Choice value tests

The tests followed to compare the values of spatial parameters of Soho against its surrounding:

![Figure 5: Left: External Boundary, Right: Internal Boundary](image)

**Test 1: Testing the average of all segment values of Soho region (whole) against similar of other regions**

Refer Table 4. Results indicate for CHR400, 800, & 2000, Soho’s average street segment value is significantly higher than that of any of the surrounding regions. Street segments of Soho seem to benefit significantly from the surrounding high streets.

**Test 2: Isolating internal segments (background network) of Soho and testing it against internal segments of other regions in question.**

Refer Table 4. Results indicate Soho’s value is second highest across all spatial parameters. The highest recorded was of Covent garden. Some streets within Covent Garden could not be identified as high street or internal streets and have been included in the data set. These streets have higher values and may have affected the average value. This is a limitation as the method chosen to identify high streets and internal streets is to some extent intuitive. The streets that run at the periphery of each of the regions were removed from the selection. Secondly, streets such as Shaftesbury avenue have also been removed from data set to avoid it affecting the average values, to give a proper indication of only background network values.

Refer Table 6. The network analysis was also performed at a smaller scale (within Soho) for study periods 1890, 1960 and 2018, in order to identify the streets that are central for movement and encounters. Choice and Integration are tested for smaller radii, R 800 and R 400. Top 10% Streets are indicated in red and bottom 10% streets are indicated in blue. Refer Figure 5 and Figure 6. Although it is not advised to extract a part of network without a buffer for segment analysis, this method is useful as it compares street network values over the three study periods within the same region and under the same...
boundary. It enables to view the shift in position of central streets of Soho’s micro internal network over the years. The radii used for comparison across the different maps are also smaller which helps in analysing pedestrian movement pattern within Soho. For this project, it is important to understand the interaction potential afforded by the network over time and this comparative analysis enables to measure this change. Secondly, the selection of only local network of Soho for analysis was made because the perimeter is bound by high streets for all three study periods. An assumption is made that high streets may have limited the local activity concentrating these functions within the area. This may have also enabled in prosperity of local economy affording opportunities supported by the movement economy.

Table 4: Test 1 and 2 Results

<table>
<thead>
<tr>
<th>AREAS</th>
<th>Test1: All Street Segments</th>
<th>Test2: Internal Streets Segment Only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CHR400</td>
<td>CHR800</td>
</tr>
<tr>
<td>SOHO</td>
<td>9331391.43</td>
<td>11613.32</td>
</tr>
<tr>
<td>FITZROVIA</td>
<td>3265651.95</td>
<td>7327.19</td>
</tr>
<tr>
<td>BLOOMSBURY</td>
<td>3341071.86</td>
<td>7409.80</td>
</tr>
<tr>
<td>COVENT GARDEN</td>
<td>3171263.60</td>
<td>7240.69</td>
</tr>
<tr>
<td>ST JAMES</td>
<td>3182366.58</td>
<td>7409.80</td>
</tr>
<tr>
<td>MAYFAIR</td>
<td>3264479.23</td>
<td>7324.70</td>
</tr>
<tr>
<td>MARYLEBONE</td>
<td>3265260.15</td>
<td>7326.33</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AREAS</th>
<th>Test1: All Street Segments</th>
<th>Test2: Internal Streets Segment Only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IN400</td>
<td>IN800</td>
</tr>
<tr>
<td>SOHO</td>
<td>7355.30</td>
<td>324.98</td>
</tr>
<tr>
<td>FITZROVIA</td>
<td>6883.68</td>
<td>278.05</td>
</tr>
<tr>
<td>BLOOMSBURY</td>
<td>6891.87</td>
<td>278.08</td>
</tr>
<tr>
<td>COVENT GARDEN</td>
<td>6869.76</td>
<td>278.49</td>
</tr>
<tr>
<td>ST JAMES</td>
<td>6868.44</td>
<td>277.92</td>
</tr>
<tr>
<td>MAYFAIR</td>
<td>6863.39</td>
<td>278.01</td>
</tr>
<tr>
<td>MARYLEBONE</td>
<td>6863.47</td>
<td>278.03</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AREAS</th>
<th>Test1: All Street Segments</th>
<th>Test2: Internal Streets Segment Only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NACHr400</td>
<td>NACHr800</td>
</tr>
<tr>
<td>SOHO</td>
<td>0.990</td>
<td>1.050</td>
</tr>
<tr>
<td>FITZROVIA</td>
<td>0.950</td>
<td>1.030</td>
</tr>
<tr>
<td>BLOOMSBURY</td>
<td>0.950</td>
<td>1.030</td>
</tr>
<tr>
<td>COVENT GARDEN</td>
<td>0.9400</td>
<td>1.0200</td>
</tr>
<tr>
<td>ST JAMES</td>
<td>0.9400</td>
<td>1.0200</td>
</tr>
<tr>
<td>MAYFAIR</td>
<td>0.9500</td>
<td>1.0300</td>
</tr>
<tr>
<td>MARYLEBONE</td>
<td>0.9500</td>
<td>1.0300</td>
</tr>
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<table>
<thead>
<tr>
<th>AREAS</th>
<th>Test1: All Street Segments</th>
<th>Test2: Internal Streets Segment Only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NAINr400</td>
<td>NAINr800</td>
</tr>
<tr>
<td>SOHO</td>
<td>1.7300</td>
<td>1.3600</td>
</tr>
<tr>
<td>FITZROVIA</td>
<td>1.6200</td>
<td>1.4300</td>
</tr>
<tr>
<td>BLOOMSBURY</td>
<td>1.6200</td>
<td>1.4300</td>
</tr>
<tr>
<td>COVENT GARDEN</td>
<td>1.6200</td>
<td>1.4200</td>
</tr>
<tr>
<td>ST JAMES</td>
<td>1.6200</td>
<td>1.4200</td>
</tr>
<tr>
<td>MAYFAIR</td>
<td>1.6200</td>
<td>1.4300</td>
</tr>
<tr>
<td>MARYLEBONE</td>
<td>1.6200</td>
<td>1.4300</td>
</tr>
</tbody>
</table>
Table 5: Represents the graph analysis output of normalised choice (NACH) and Normalised integration (NAIN) for radii 400 (R400) and 800 (R800)

<table>
<thead>
<tr>
<th></th>
<th>NACH R400</th>
<th>NAIN R400</th>
<th>NACH R800</th>
<th>NAIN R800</th>
</tr>
</thead>
<tbody>
<tr>
<td>1890</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.2. Social research: Landuse Analysis

Evolution of Landuse along selected streets were studied using Kelly’s Directory Year – 1960, 1970, 1980, and 2018 Ground Floor Landuse. Refer Table 6 for selection criteria.

Some important observations from this analysis was the large concentration of singular type function along certain streets such as theatres along Shaftesbury Avenue, film and theatre production house along Wardour street, tailors and garment makers along Brewer Street, printers and supporting facilities along Old Compton street, etc.

Secondly, it was noticed that every space in Soho had a social function. The selection of smaller streets was a conscious decision. It indicated that streets that had poor access were still having multiple functions in the historical context. Meard Street for example in the earlier periods of 1950, 1960, 1970 each had multiple type of landuses. It now has only residential and access for loading and unloading, and one restaurant. Its function has reduced to just three. There is also ongoing debate about its identity as a residential spot and opposition by the residence society to protect Meard Street against gentrification as they oppose the imminent development of a retail store. This analysis shows that at any time in the past
these spaces were part of multiple functions. The debate on its gentrification and multi-use type are meaningless.

Table 6: Indicates the no. of buildings that have direct access to a specified street, the constitutedness of the street in ascending order

<table>
<thead>
<tr>
<th>STREET NAME</th>
<th>c.1890</th>
<th>c.1960</th>
<th>c. 2018</th>
<th>CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walkers Court</td>
<td>17</td>
<td>8</td>
<td>8</td>
<td>Sexual identity</td>
</tr>
<tr>
<td>Tisbury Court</td>
<td>9</td>
<td>8</td>
<td>8</td>
<td>An alley near popular gay streets, present day many massage parlours occupy this street</td>
</tr>
<tr>
<td>Manette Street</td>
<td>15</td>
<td>13</td>
<td>9</td>
<td>An important alley that connect Shaftesbury avenue to Greek Street</td>
</tr>
<tr>
<td>St Anns Court</td>
<td>4</td>
<td>17</td>
<td>9</td>
<td>Music identity</td>
</tr>
<tr>
<td>Soho Street</td>
<td>18</td>
<td>14</td>
<td>11</td>
<td>Presence of a religious centre since 1960's</td>
</tr>
<tr>
<td>St Anns Yard</td>
<td>4</td>
<td>16</td>
<td>15</td>
<td>A multi-purpose space used by many groups of people, such as children of Soho Parish School, the ground for Soho Village Fete, and also by public during the day as a park and at night as pub-goers resting spot.</td>
</tr>
<tr>
<td>Rupert Street</td>
<td>23</td>
<td>16</td>
<td>16</td>
<td>Gay identity</td>
</tr>
<tr>
<td>Ramillies Place</td>
<td>32</td>
<td>18</td>
<td>17</td>
<td>A pass-through street that has deteriorated in recent years and failed as a public space although an attempt was made to revive it adding benches and seating.</td>
</tr>
<tr>
<td>Golden Square</td>
<td>23</td>
<td>18</td>
<td>18</td>
<td>Not actively used by public</td>
</tr>
<tr>
<td>Meard Street</td>
<td>27</td>
<td>19</td>
<td>19</td>
<td>Residential identity</td>
</tr>
<tr>
<td>Soho Square</td>
<td>36</td>
<td>31</td>
<td>30</td>
<td>Active spot and always occupied by different groups of people</td>
</tr>
<tr>
<td>Broadwick Street</td>
<td>78</td>
<td>49</td>
<td>43</td>
<td>An old broad street used as a gathering point</td>
</tr>
<tr>
<td>Poland</td>
<td>76</td>
<td>50</td>
<td>48</td>
<td>Polish identity, polish community</td>
</tr>
<tr>
<td>Great Marlborough</td>
<td>95</td>
<td>60</td>
<td>53</td>
<td>Tailors, retail shops</td>
</tr>
</tbody>
</table>

Figure 6: Graphs indicates the value of selected streets over historic periods
5. Discussion

5.1. Evolution of Soho’s as a true urban village

The research findings indicate that Soho is unique from its surrounding areas such as Fitzrovia, Marylebone, Covent Garden, St James, Mayfair, and Bloomsbury in some of its morphological and syntactical aspects, which could explain why it developed as a unique space in the city.

The aggregate of smaller plots in Soho are significantly higher in comparison with its neighbouring regions and spread across the whole region. Jacobs (1961) has pointed out the importance of smaller plots in fostering diversity. Her notion of the ‘intricate ballet of sidewalks’ that sustain everyday noise strikes significant even to this day as a necessary factor for social cohesion. Smaller plots as contributing to foster social ecology and sustaining diversity has been discussed in many studies. Morphological diversity, Vaughan et al., (2015) suggests, has potential for propagating patterns of co-presence and encounter over time. Through a similar historical assessment, Vaughan et al. (2015, p. 99:17) points out that these smaller plots, buildings or building frontage cannot be assumed as the places of resilience but...
places where uses ‘come and go [...] according to the changing scales of movement in and around it’. They afford this changeability. As plots consolidate to become larger plots, they lose this ability to adapt to changes due to constrains brought upon by the actual physical space which cannot afford multiple smaller uses. In Soho, the morphology of plots has significantly changed along the edges were high streets afford high through and to -movements. But the internal streets have a fair share of juxtaposition of small and bigger plots. It is also interesting to note that over the years the landuses that relate to music, immigrant businesses (such as Italian restaurants, Jewish tailors, Queer venues, fashion), these ‘niche markets’ appropriate streets with higher number of smaller plots.

Interpretation of Soho’s network along space syntax analysis suggests Soho affords both microeconomic and socio-cultural activities. That is, the streets opportune many kinds of social functions. Soho’s immigrant communities were agglomerated along certain streets (Speiser, 2017). They neither had to visit other streets, nor did they suffer for lingering onto their settlements. They neither had to visit other streets, nor did they suffer for lingering onto their settlements. Its communities prospered from its location in the global urban grid and continued to function as a true urban village. Oxford Street is the most integrated street in all of London. As a trickle-down effect, other linear and longer street segments that come off Oxford Street also have higher values and are among top 10% among various syntactic measures. When compared to the surrounding areas such as Fitzrovia, Marylebone, Covent Garden, St James, Mayfair, and Bloomsbury were only a couple of streets are linear, long, and among top 10% of syntactic values, in Soho there seem to be a sort of network of streets with higher values. Together they form a mesh, with potential for high movement and encounter.

Soho’s background spaces have evolved significantly over time from a space of social interaction and community building of a neighbourhood as in the 1800’s to present day back alleys of a shopping district, theatre backstage entrances, garages, and so on. The most changes in social structure occurred along the peripheral streets such as Oxford Street and Regent Street. Plots sizes here have changed vastly over time than other parts of Soho. In the global network of London as a whole, Oxford Street has the highest value of space syntax measures global integration and choice, which means it is the most connected street in the connect and has the potential to bring in high through and to movement to the area. It could be said that change to these areas were brought about by the potential of network to afford that change.

For example, Soho did not evolve to become the china town of London, rather the culturally celebrated gay village of London. Vinod-Buchinger (2018)indicates that it could be connected back to the construction of Shaftesbury Avenue. China Town is the region in the south of Soho along Gerard Street. It has been split from Soho’s main area by Shaftesbury Avenue constructed in 1886. China Town came to existence only since the 1960’s when the Chinese settlers set up restaurants, stalls and businesses in the region. Gay identity of Soho is largely from the queer venues in the region. There are approximately 40 queer venues in Soho (significantly large concentration compared to rest of London) of which 22 of them are concentrated along Old Compton Street. The position and role of Old Compton Street in establishing this identity has been discussed in the previous report (Vinod-Buchinger, 2018). Viewing this through the layer of syntactic understanding of space as demonstrated in the research can answer some questions regarding identity and evolution of spaces. The identity of China Town since the appropriation by Chinese settlers remain undeterred. If all other external influences such as policy, or decision makers interferences are considered neutral, it could be suggested that the network has strongly influenced this areas generation as a Chinese communal space. It was large area functioning as an active background space.
5. Conclusion

Space has the capacity to be structured or affect social structure. Hillier is successful in providing the connection of physical space as a perpetuation of social logic. His speculation on spatial cultures, therefore, enables a method to interact with these abstract ideas of space. The physical space is a generator of movement, a reflection of social relations and a constructor of social order (Hillier, 1989, 2016; Hillier and Vaughan, 2007). This research uses these notions to study the evolving nature of Soho in syntactic measures, there by exploring new ways to engage in social research. Hillier’s spatial cultures is absolute and modest measure of interpretation that enables designers to not intervene but interact with social morphology based on evidences. Space syntax methods used in this research, have demonstrated through syntactic measures the relationship of spatial forms to social processes.

In conclusion, spaces and human relations are undoubtedly complex. This research hopes to have shared an interesting perspective on the spatiality of cultures and their interrelatedness to the evolving identity of Soho.

6. References


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He graduated from Chandigarh College of Architecture, India and Post graduation from Politecnico Di Milano, Italy. He has worked in Spain, Italy, China, UAE. He is recipient of “Indian Young Achievers Award”, Received Fellowship by Congress for New Urbanism, USA.

He is member of ISOCARP, Netherlands, CNU, USA, CTBUH, Chicago.

His project experiences include Housing, Hotel, Township, Private Residences. Some of project experiences are Kolkata Twin Tower, Bangalore Township, Shanghai Medical City, for Shanghai, Spanish Pavilion, World expo 2010.

His interests are environmentally sensitive architecture and ecological projects. He delivered lecture on many national and international forums on various issues related to cities, social issues, sustainable environment etc. His articles are published in newspapers, magazines in India, Italy, Spain, Russia. He is actively involved in academics. He has been a jury member of many competitions.

He traveled extensively in many part of globe and keen photographer. His works have been exhibited in many exhibitions and event in India and abroad.

Elisabeth Belpaire is an engineer architect, an urban and spatial planner and brings over 25 years of experience: architecture, urban planning, design and governance in Belgium, France, Switzerland; sustainable development and disaster risk reduction with UN-Habitat in Vietnam, management of post-conflict programmes and creation of a new strategic integrated planning system in Kosovo; development of a regional capacity building instrument addressing housing & informal settlements with South-East Europe governments and partners; regeneration of West Bank historical centres; design of a Foundation’s strategy for cities to support healthy childhood development; inputs to the public space department of Bogota and to 15-min neighbourhood concept; contributing to Global State of National Urban Policy Programme and the Mentor Student Research Lab on the public spaces of tomorrow; co-initiator of ISOCARP ‘Community of Practice on Urban Health’. Her talks in Chicago, London, New-Zealand and at TEDx Geneva, bring attention to the health and well-being of our young, and how cities can enable them to thrive, especially since too often they fall through the cracks of city planning and management.

Elisabeth holds a M.Sc. in Engineering Architecture from Gent University and an Advanced M.Sc. in Urban and Regional Planning from Leuven University in Belgium.
The way we plan and build our cities affects our health and wellbeing. It also affects how inclusive our environments are. The 2020s is a crucial decade for planning to enable intertwined health of people and planet. In addition to global challenges as climate change, the COVID-19 pandemic acted and is still acting as a stress test on our local urban places, systems and communities. It also highlighted and often exacerbated existing spatial and health inequities. The spatial environment is a major determinant of health and resilience. We need bold change and use this pandemic as an opportunity for a healthier and more equitable future.

The track theme 'Healthy and Inclusive Urban Environment' resonates increasingly with planners. This track received the highest amount of abstracts, papers and case-studies (even before the pandemic spread), addressing various scales from street level to regional level, from impacting body immunity to community well-being, and representing cities and regions from all continents. This is hopeful. This is also necessary to advance and contextualise the planning debate. It also requires more connection and collaboration with health, social and other disciplines.

The parallel session series started with "Experiences from Global Cities", discussing core themes of the track and offering presentations on global issues, experiences, granular transformational data for health of most vulnerable, and planning frameworks from global cities from Europe, Asia, Africa, North America and emerging spatial evidence from Covid-frontline cities in China.

In today’s era rapid urbanization and climate change is resulting in extreme pressures on natural resources and land. The second session "Planning for Cities/Zens and Ecology" focused on various aspects of natural resources and ecological systems in the urbanism of cities and region and discussed the resiliency of and health impact on cities and citizens. Ecology as asset, providing diverse types including health capital, and the potential of green and nature for more productive, connecting and resilient places and systems rather than consumption ones.

The session "Informal settlement and inclusive approaches" was kick-started with a keynote lecture by Dr. Geeta Mehta from Columbia University, pointing out the world cities' deep differences in patterns of urban growth and change across the globe, which is often masked by the crude statistic that the world is now more urban than rural. This asks for contextual approaches. Case study and presentations revealed empirical evidence on the urban gap in the context of growing inequality in metropolis. Public spaces and provision of livelihoods and health/sanitation services crucial for people living in informal settlements, the margins, and migrant villages; and incremental, negotiated and co-created approaches with planners in community-supporting roles instead of conventional planning approaches and bulldozer development.

The session on “Inclusive and Innovative Planning towards urban health and Well-being” put health and well-being of our urban diverse communities at the heart of daily planning and management of our neighbourhoods, cities and regions. This requires inclusion and engagement of vulnerable and marginalized groups, getting better understanding of meaning and form of healthy urban environments, deeper insights in behavioural impact of the built environment. Often forgotten or underrepresented groups include very young children and their caregivers, elderly, transgender, women, African
Americans. Innovative planning tools as Board games and Storytelling of/for can help to become more vigilant towards the needs of diverse underrepresented groups, engage them, construct inclusive communities and cities. Public (used) space as a key built environment to enable healthy behaviours, increase people’s immunity, serve its citizens and increase spatial justice.

Health can be an input and an outcome of Urban Planning. How so and how can it be integrated? And what does this mean at neighbourhood, city, regional or national level? Our Urban Health Forum addressed these questions and offered a training workshop by building upon UN-Habitat’s and the WHO’s publication ‘Integrating Health in Urban & Territorial Planning, a Sourcebook’ and moving forward to its application. The training was provided in cooperation with UN-Habitat, WHO and ISOCARP CoP Urban Health. Some of the Sourcebook key messages: ‘Healthy by design – good urban planning can reduce health risks for communicable and noncommunicable diseases, and relieve pressure from health systems’; ‘Integrating public health in urban planning creates more equitable, socially inclusive and resilient cities’.

WHO’s publication ‘Integrating Health in Urban & Territorial Planning, a Sourcebook’

MIRO board collective exercise from the Urban Health Forum

<table>
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<th>Groups</th>
<th>Health as an input:</th>
<th>Health as an outcome:</th>
</tr>
</thead>
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<tr>
<td>National level</td>
<td>What does it mean to have health as an input?</td>
<td>What could be the health outcomes?</td>
</tr>
<tr>
<td>City level</td>
<td>How can health unlock new opportunities for the project?</td>
<td>“How is urban planning contributing to improving health and well-being?”</td>
</tr>
<tr>
<td>Neighbourhood</td>
<td>How could health professionals contribute?</td>
<td>How could urban planners contribute to health and well-being?”</td>
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Track 6, Special COVID-19 Session featured the UN-Habitat keynote presentation "Spatial Patterns and Dynamics in the Face of the Pandemic: Towards Better Functionality, Density and Design of Human Settlements", a key theme of their global report on Cities and Pandemics. The session offered distinguished keynotes and discussions on key policy and planning issues and government priorities. A diverse panel to reflect diverse contexts and perspectives from elected and expert thought leaders and city makers including Ambassador, renowned architect, women Mayors from European and African cities, WRI, UN Habitat. This livestreamed session is available on YouTube.

Some of the key messages:

- Density was not a deciding factor in increased infection, (and there's confusion between overcrowding and density), but we need to plan for well designed urban density with support infrastructure. - Herman Pienaar, Antara Tandon, UN-Habitat

- Melba Pria, Mexican Ambassador to Japan, stresses that places for the future are healthy inclusive spaces. We need to dignify and recycle urban public space e.g., spaces under bridges; urban orchards give access to healthy nutrients and build...
We need to take different profiles and needs into account, which will make cities more democratic and resilient to crisis. Walking, biking, playgrounds, fresh markets are key elements, as when you design for people, the same principles work in extreme times. - Anuela Ristani, Dept Mayor Tirana

It is key to provide access to basic services for all, in both rural and urban settlements, within 15min, and a holistic approach. - Gertrude Chirambo, President of Malawi network of women leaders

Harnessing the power of technology and data is critical for inclusive and resilient recovery. - Jaya Dhindaw, WRI India

For Italian architect Stefan Boeri ‘Covid is not an isolated event, but closely linked to climate change’ and ‘we can ensure that cities become the leading character to reverse it’. He gives 9 ideas for the future: from creating planetary green corridors to reclaiming public space through the 5th facade and making interior spaces more fluid.

Selected Papers

1. ABDELFATTAH Lamia, BAZZONI Filippo, CHOUBASSI Rawad, GORRINI Andrea, PRESICCE Dant, ZURETTI Marianna, Sizing up post-pandemic sidewalk potential: a case study from Milan

2. HATI Beatrice, Adopting collective frugality in rethinking, re-planning, re-imagining urban informal settlements

3. LEE Ming-Chun, Achieving Equitable Outcomes through Games: Using Board Games for Civic Engagement in Scenario Planning
Case Study Report

Sizing up post-pandemic sidewalk potential
A case study from Milan

Lamia ABDELFATTAH, Systematica s.r.l., Italy
Filippo BAZZONI, Systematica s.r.l., Italy
Rawad CHOUBASSI, Systematica s.r.l., Italy
Andrea GORRINI, Systematica s.r.l., Italy
Dante PRESICCE, Systematica s.r.l., Italy
Marianna ZURETTI, Systematica s.r.l., Italy

Abstract

Sidewalks are increasingly becoming the new protagonists of the street. If not already for fitness, social and environmental causes, walkability is as important as ever today in the COVID-19 moment where open-air and contact-free movement are anchors to safe mobility. Cities around the world are reclaiming streets for pedestrian and cycling activity to ensure that the pandemic response is integrated within pre-existing sustainability goals. Milan is one of the forefront cities embracing this approach, adding 35 kilometres of cycle lanes in the city. In this context, Systematica took up the initiative to measure the capacity of Milan’s pedestrian infrastructure to absorb foot traffic while meeting new social distancing regulations. A citywide GIS-mapping exercise calculated and ranked sidewalk widths according to their degree of suitability for contactless pedestrian flow. The study revealed that 45% of sidewalks across Milan are unfit for social distancing norms while only 17% are considered ideal. Deeper analysis into relevant socio-demographic factors revealed that 65% of inadequate sidewalks are concentrated where 80% of elderly and active daytime populations are present. This analysis was used to create a map of proposed interventions using a needs-based approach prioritizing the coincidence of inadequate sidewalks with perceived vulnerable populations.

Keywords

Walkability, Pedestrian Infrastructure, GIS Mapping, GIS Analysis, Social Distancing; COVID-19

1. Social distancing needs in the time of COVID-19

1.1. A public space problem

Since the beginning of the world health crisis caused by the novel coronavirus, COVID-19, the need to allow for safe interpersonal distance between people both in public and private spheres has become of paramount importance, as advised by the World Health Organization and echoed by health experts around the world (World Health Organization, 2020). Amid unabating trends of rapid global urbanization (United Nations, 2019) and rising environmental concerns (UN Environment, 2016), urban planners and government officials alike are propelled to rethink the organization of mobility infrastructures and their capacities to satisfy these conflicting needs in today’s crowded cities.
1.2. In line with current sustainability goals

The current pandemic situation has emboldened existing plans to shift towards sustainable mobility strategies. One of the main goals of European cities under the Sustainable Urban Mobility Plans (SUMPs) is to promote active modes of travel (Rupprecht et al., 2019). Within a short timeframe following the wake of the pandemic, cities around the world have adopted and implemented short and long-term plans to redirect vehicular road space towards cyclists and pedestrians. In New York, for example, 100 miles (160km) of streets have been reorganized to temporarily accommodate more pedestrians and cyclists (Wamsley, 2020; Weaver, 2020). Likewise, in Milan, the municipality added 35km of bicycle lanes in the city center under its Strade Aperte or Open Streets plan (Comune di Milano and AMAT Agenzia Mobilità Ambiente Territori, 2020; Laker, 2020), in addition to showing clear aims to favour pedestrian movement and active travel in its overarching Milano 2020 Adaptation Strategy plan (Comune di Milano, 2020). Around the world, providing safe and contactless travel options quickly rose to the top of local mobility agendas. At the same time that the city of Milan released its Strade Aperte plan, Systematica was preparing to release the first results of its own initiative to measure the preparedness of Milan’s sidewalks to support pedestrian movement under these new terms.

Figure 1. Pedestrian density on Corso Buenos Aires in Milan. Source: Transform Transport.

2. Approach and methodology

2.1. Guiding approach and methodology

The project is a GIS-based mapping exercise covering all 9 zones of the City of Milan. The study is comprised of a two-tiered process. The first level of analysis focuses on the evaluation of all existing sidewalks in Milan – 3,053 km in total – based on a pre-defined safety ranking of sidewalk widths that follows the one-meter physical distance recommendation of the WHO (World Health Organization, 2020) and regional guidelines (Regione Lombardia, 2020), as illustrated in the chart below (Figure 2).
The model reflects segregated bidirectional pedestrian flow as a way to ensure adequate personal space. This is based on environmental psychology research that points to physiological and psychological stress responses by pedestrians to conditions of crowding and density (Fruin, 1971; Baum and Paulus, 1987); which are likely augmented under the pandemic circumstances. Furthermore, accounting for preferences to increase personal space, our recent studies on pedestrian modelling suggest that the possibility to segregate pedestrian flows based on direction of movement leads to smoother pedestrian circulation dynamics (Transform Transport, 2020).

Figure 2. Adequacy ranking of sidewalk widths. Source: Authors.

The second level of analysis sets out to identify priority zones of intervention based on a needs’ assessment approach. This is achieved by overlaying these preliminary mapping results with two main parameters associated with higher contagion risk: concentrations of elderly populations (hereby defined as persons over the age of 70) and densities of daily populations, i.e. active populations traveling for work, study purposes, etc. Areas with highest matching between these two distinct parameters dictated the scheme for the priority of interventions.

2.2. The making of the map

The process of building the map was based on open source data retrieved from the Geoportal of the Municipality of Milan. Starting from the polygons of the pavements, the centreline of each single sidewalk was computed, taking the edges of the roadway on one end, and the buildings on the other, as sidewalk boundaries. The distances achieved between both edges were then recorded as sidewalk widths and each street segment was color-coded as per the above sidewalk width categories. The database was then developed into an interactive map that was published online for easy public access (Available at: research.systematica.net/prj/milan/sidewalks.html). It is important to note with respect to the methodology that the sidewalk width represents gross widths that do not consider street furniture, trees or sidewalk obstructions. Further detailing of the available data would be needed to construct a more representative model for net usable pedestrian space. A rough estimate by Systematica predicts that about 0.3-0.5m and 1.5-2m of the gross width of sidewalks (for non-tree-lined streets and tree-lined streets, respectively) are occupied by street furniture. Nonetheless, the map represents a necessary starting point for the base-case scenario – assuming totally free movement.
3. Main findings and analysis

3.1. Preliminary Results

Of the 3,053 kilometres of sidewalks spread across Milan, starting from the assumption of free movement, 45% (1,374 km) were found to be unsafe for pedestrians and unfit for practicing social distancing measures. Only 17% of sidewalks fell into the ideal width category, with the highest concentrations being in the centre and in the northeast and northwest of Milan (Zones 1, 3 and 8, respectively). Zone 3 was also found to be the one hosting the highest percentages of adequate and acceptable sidewalks, while Zone 2 has the highest share of inadequate sidewalks by distance: more than 50% of sidewalks by length in this area were found to be inadequate.
3.2. Data synthesis and priority areas

According to the latest reports by the Italian National Institute of Health, 85% of deceased COVID-19 patients up to September 7th, 2020 fell in the age category of 70 and over, with a mean age of 80 (Palmieri et al., 2020). In a similar report looking at COVID-19 impacts on death rates in the first four months of 2020, excess mortality rates for victims of both sexes were all found to be highest in the age groups of 70-80, 80-90 and 90 and above (Istituto Nazionale di Statistica & Istituto Superiore di Sanità, 2020). Map A in Figure 5 traces where the population shares of this vulnerable group are higher than the city average. The second category of interest in this study is the measure of the daytime population present during the day in different areas across Milan. The importance of this factor stems from perceived risks of rapid spread due to more face-to-face interactions on sidewalks. Though imperfect, daytime population is a more accurate measure than population density as it includes non-resident workers and students frequenting the area during the day and increasing chances of contact (see Hamidi, Sabouri and Ewing, 2020 for more on the ambiguous relationship between urban density and the spread of COVID-19). The areas of concentration of daytime population at rates higher than the city average are mapped in Map B in Figure 5. In Map C, Maps A and B are overlapped to show the areas that present the most problematic conditions based on the hypothesis that the presence of a relatively high amount of daytime population (high chances of spread) in areas with relatively high elderly population (vulnerable group) exacerbates potential risks. Narrow sidewalks falling within cluster zones highlighted in purple in Map C are therefore prioritized for intervention based on this preliminary needs’ assessment.
3.3. Priority of interventions

In total, the analysis revealed that 65% of inadequate sidewalks (sidewalks narrower than 2.4 meters) are concentrated where 80% of people over 70, and 75% of daytime population, are present. A district by district analysis demonstrates how these various factors overlap. The graph in Figure 6 gives a visual comparison between all three factors in all neighbourhoods, whereas the charts in Figure 7 situate all neighbourhoods with respect to their absolute Over 70 and daytime populations independently, comparing these factors against the length of narrow sidewalks in each district. Districts in the upper right quadrants of these graphs are those with the most challenging conditions.

Combined, these charts show that Duomo has an active daily population roughly double that of any other Milanese district – unsurprising given its centrality and visitor appeal – while housing a near-average length of inadequate sidewalks. Alternatively, the districts of Buenos Aires-Porta Venezia and Bande Nere, which also average on inadequate sidewalk lengths, host the largest elderly populations by size. The runner-up district of Lampugnano-Gallaratese, in contrast, is also home to the highest combined length of inadequate sidewalks; more than double the length of narrow sidewalks of its forerunners. These reflections give a qualitative idea of the socio-spatial characteristics of neighbourhoods across Milan with respect to the presenting problem, and the magnitude of urgency that each situation brings. Deeper analysis considering shares relative to the scale of each neighbourhood would further support this initial comparative analysis.
Figure 6. District by district comparison of risk factors. Source: Authors

Figure 7. Positionality of Milanese districts with respect to discrete factors. Source: Authors

Overlaying all data, a scheme for priority action areas was conceived following a subjective evaluation of perceived risks. In the first order, areas with high concentrations of elderly populations, daytime population and inadequate sidewalks are given the highest priority level of intervention. This category includes 6% of all sidewalks across Milan, and is mostly located between the first and second ring roads of the city. Districts of interest in this zone include Loreto, Porta Venezia, XXII Marzo, Porta Romana, Porta Genova and Sarpi. Following in Priority Level 2 are areas with the joint conditions of high elderly populations and narrow sidewalk lengths, which account to 12% of the city’s sidewalks (376km). These include some historic and mainly residential neighbourhoods such as Gallaratese, Villapizzone, Musocco, Niguarda/Affori, Maciachini, Lodi, Gratosoglio, Chiesa Rossa, Giambellino and Bande Nere. The third priority level covers 3% of sidewalks; 100km of Milan’s sidewalks are quite narrow and support high daily population shares. Particularly active neighbourhoods in this category stand out, such as Duomo, Città Studi and Porta Nuova. In total, we conclude that 21% of Milan’s sidewalks (47% of all narrow sidewalks)
are deemed unfit for social distancing practices and require either direct expansion or integration within strategic street reclamation efforts.

Figure 8. Priority zones of intervention. Source: Authors

In particular cases where physical conditions are restrictive, the potential to transform streets into shared space between users is recommended. Almost counter-intuitively, the shared street model provides higher safety for all users, including pedestrians, since pedestrians are given the right-of-way over vehicles forced to travel at reduced speeds (Global Designing Cities Initiative, n.d.). This idea could be spread over wider scales as well. In London, the concept of ‘low-traffic neighbourhoods’ (LTNs) wherein streets are completely closed off to non-local drivers is being piloted in 114 neighbourhoods across the city (Surico, 2020). As highlighted in Milan’s Strade Aperte plan, shared street configurations also offer the added potential to support local restaurants by allowing outdoor seating extensions to compensate regulation-imposed drops in indoor capacities (Comune di Milano, 2020). The image below provides one example of this implemented strategy.

Figure 9. Photo of pedestrian priority street in Milan. Source: Twitter - Credits to Demetrio Scopelliti
4. Areas for development and broader impact

4.1. Study limitations and areas for development

As pointed out in Section 2.2. The making of the map, the lack of consideration of fixed street furniture presents a shortcoming for direct implementation. Nonetheless, a detailed survey of all streets in a given pilot area would be useful. Another way to overcome said shortcomings is to carry out a survey for a randomized sample of sidewalks belonging to each sidewalk widths category (see Figure 2). This exercise would give a general overview of the types of fixed elements potentially found on sidewalks of different widths and their frequency of recurrence for achieving more robust statistics.

Another area of concern for application relates to areas where parked cars encroach on sidewalk space, thereby restricting pedestrian movements and narrowing sidewalk space. Via Bazzini in the Città Studi area is one such case, where despite a generous 5.2m sidewalks width placing it in the Ideal category, the net usable width is effectively cut down to an inadequate 1.7m as a result of parked cars (Figure 10). Although a widespread phenomenon in some parts of Milan, this issue calls for directed policy action to respond to parking supply shortfall at the urban scale.

![Figure 10. Parking encroachment on Via Bazzini, Milan. Source: Google StreetView](image)

4.2. Broader impact of the project

Since its official release in May 2020, the Milan Sidewalks Map has gained attention and support from various international bodies. First and foremost, it has been included in the European Commission’s COVID-19 Sustainable Urban Mobility Plans (SUMP) practitioners’ briefing. Developed within the framework of the CIVITAS Initiative & CIVITAS SUMPs-Up, the briefing compiles lessons for immediate, mid-term, and long-term actions for European cities (Peters, 2020). The International Federation of Pedestrians has also expressed support to the Milan Sidewalks project with the mutual objective of promoting walkability as a way to enhance mobility during, and after, the pandemic.

We firmly believe that the online mapping tool offers a comprehensive and easy-to-use tool for planners and citizens alike, contributing to greater collective spatial awareness in a time of new emerging needs. It has the potential to support fundamental decision-making processes for quick action and consistent strategies to retrofit existing streets. In essence, the Milan Sidewalks Map and the consequent studies are intended to offer timely insights to local authorities and support the *Strade Aperte* plan and other city-led initiatives already in place. Besides its material contribution, the project also offers a methodology that can easily be replicated in any city worldwide with the aim of expanding local knowledge about sidewalk potentials and guiding transformative mobility strategies for the post-pandemic city.
5. References


Sizing up post-pandemic sidewalk potential: a case study from Milan


Case Study Report

Adopting Collective Frugality in Rethinking, Re-planning, Reimagining urban informal settlements

Mukuru Special Planning Area (SPA) Planning Approach; Nairobi-Kenya

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Abstract

This paper is centred on approaches adopted in the planning and designing of informal settlements and their implications. The discussions presented reckon that the conventional planning strategies adopted to control and guide urban development are often authoritative and deterrent to the sustainable, inclusive growth and well-being of the urban poor. Through a case study analysis, the paper introduces and discusses an alternative, highly auspicious informal settlement planning approach adopted in one of the largest informal settlements in Nairobi, Kenya. Here, a four-fold contribution is made to the contemporary slum-upgrading and participatory planning debates. Firstly, the analysis provides a global and local overview of the status of informal settlements and reviews the strategies that have been applied in slum upgrading. It is observed that most approaches have turned counter-productive, with devastating impacts of coercive evictions, authoritarian demolitions, destruction of property, loss and disruption of livelihoods. The paper then sets the stage for the alternative approach applied in Mukuru settlement by outlining the pertinent development and situational challenges that invoked the declaration of the Mukuru Special Planning Area. Building on this, the paper expounds on the major elements that demonstrate frugality in this unconventional approach; coalition building, multidisciplinarity, methodical community mobilization and engagement, strategic planning, conservative surgery, and iterative planning. The paper concludes by reflecting on the outcomes of this approach and lessons that can be drawn from it. The SPA Approach demonstrates there is an alternative to current levels of deprivation in informal settlements and conceptually reconfigures the planning process.

Keywords

Informal settlements, Special Planning Area, Frugality, Participation, Collaborative Planning, Multidisciplinary, Conservative Surgery
1. Background and problem statement

1.1. Background

As urbanization continues to heighten at unprecedented rates, efforts of cities particularly in the developing countries to curb its grave ramifications whilst instigating sustainable urbanization have been inefficacious. Subsequently, over 1 million of the global population have been left battling for survival in informal settlements plagued by meagre basic infrastructure, substandard housing, and sanitary conditions, deprived services, myriad human and environmental health risks. These settlements have been acknowledged as a parlous global phenomenon; formally defined in the Habitat III Quito conference as residential areas which; lack secure tenure, are cut off from basic services and infrastructure, are characterized by housing which is non-compliant to planning and building regulations, and are located in hazardous urban environments (United Nations, 2016; Zerbo et al., 2020). These multiple deprivations are pronounced in Eastern and South-Eastern Asia and Sub-Saharan Africa as shown below:

Figure 1: Urban population living in slums and informal settlements

![Urban population living in slums/informal settlements, 2018](image)

Adapted from (United Nations, 2019)

Growth trajectories highlight a 72% increase in urban populations by 2050 which implies an incessant growth of informal settlements in decades to come. The impacts will be largely felt in Sub-Saharan Africa which apart from hosting the 2nd largest proportion of informal settlements, further manifests the world’s fastest urbanization trends (United Nations, 2012; Zerbo et al., 2020). While the settlements in this region vary tremendously in different facets i.e. size, location, morphological structure, tenure structure, population densities, building typologies, social structures; they all exhibit prevalent physical and social development problems which have exacerbated inequalities and limited the residents’ capacities to earn decent livelihoods. Owing to these and other related complexities, the international community has viewed informal settlements as a critical concern for sustainable development and further scaled up discussions on how to curb their widespread growth.

1.2 Problem statement

Over time, cities have adopted highly polarized strategies in informal settlements. Promising efforts have been seen through various slum upgrading programs, pro-poor financing mechanisms, affordable housing schemes, and slum upgrading and prevention policies (United Nations, 2016). However, Collier et al. (2017) observe that governments increasingly inherit broken, ex-colonial policies that do not work for inhabitants of these settlements. (Chitengi, 2018) further highlights that planning standards and approaches employed by planning authorities in informal settlements are often inclined to eradication rather than integration.
In Kenya, efforts over the past decades to address manifold challenges in slums and informal settlements have failed to realize the national obligation to uphold the human right to adequate housing; and the global commitments to eradicate poverty and enhance liveability (GoK, 2010; United Nations, 2017). Reactive post-independence strategies (1963-90s) to manage city development ignored, devalued and stigmatized informal settlements, labelling them “the city’s eyesore”. The negative discourses led to spatial and social marginalization accompanied by phases of mass evictions and slum clearance. Large informal settlements such as Muorotu and Kibarage were pulled down leaving more than 30,000 families homeless and disrupting local economies and social ties (Klopp, 2008; Weru, 2004). However, in the 1970-74 and -78 development plans, propitious slum development was initiated through site-and-service-schemes in settlements such as Dandora and Makongeni (Ivanovic and Tamura, 2015; Mwaniki et al., 2015; Straaten van, 1977). This was succeeded by in situ upgrading programs such as KENSUP\(^1\) of 2004 and KISIP\(^2\) of 2011 which aimed at housing improvement, secure tenure, improved physical and social infrastructure (Muraguri, 2011). Under the latter projects, more than 600 housing units in Nairobi were developed, popularly known as the “Promised Land” whose benefits were disproportionately reaped by the city’s middle-income earners, leaving out the low-income residents (Anderson and Mwelu, 2013; Stenton, 2015).

Conventional planning strategies have manifestly turned counter-productive for the urban poor, with devastating impacts of coercive evictions, loss of livelihoods, authoritarian demolitions, destruction of property, and disruption of livelihoods. On account of this, a more progressive and participatory approach in addressing challenges and leveraging opportunities in these settlements was requisite. The Mukuru Special Planning Area (SPA) was hereby initiated to sever the long-shared physical, social and political stereotypes about informal settlements that have continually obscured their rich capacities and assets. The approach induced holistic social, economic, environmental, organizational and governance improvements in one of the largest of over 150 informal settlements in Nairobi, Kenya.

2. Understanding the Mukuru SPA context

The Mukuru SPA pioneers one of the largest collaborative informal settlement upgrading projects in the nation’s history. Triggered by a staggering number of challenges unveiled through the 2016 situation analysis (Corburn et al., 2016) and a preceding report in 2014 (Akiba Mashinani Trust, 2014), the Nairobi City County Government declared the settlement as a special planning area (SPA) in August 2017. The declaration was based on the Fourth Schedule of the Constitution of Kenya and the Physical and Land Use Planning Act (PLUPA)\(^3\). This two-year vitalizing, participatory and iterative process was inspired by the insufficiency of the conventional planning approaches to address the slum and informal settlement realities and underpinned by the SDGs\(^4\) goal 11 which underscores the gravity of planning cities and human settlements in a safe, resilient, sustainable way that offers equal opportunities for all.

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\(^1\) KENSUP – This is the Kenya Slum Upgrading Programme funded by the UN-Habitat

\(^2\) KISIP – The Kenya Informal Settlement Improvement Project funded by the World Bank

\(^*\) Both projects were funded collaboratively with the Kenyan government and other stakeholders to improve livelihoods of people in slums and informal settlements

\(^3\) The declaration then was based on Section 23 Physical Planning Act (1996) which was repealed by the Physical and Land Use Planning Act (PLUPA) No.13 of 2019. Section 52 of PLUPA provides that a county government may declare in a Gazette Notice, an area with unique development, natural resource or environmental potential or problems, as a SPA for the purpose of specialized development.

\(^4\) SDGs – Sustainable Development Goals which are a blueprint to attaining better and sustainable future for all. Reference is made to goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable.
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2.1. Context and prevailing complexities in Mukuru

The area delineated as the SPA extends across 3 zones; Mukuru Kwa Njenga, Mukuru Kwa Reuben and Viwandani and is defined by the following major elements:

Mukuru is an epitome of complexity in urban informality embedded in tenure, governance, demand and supply of services, social and political ties, crime and violence, spatial constriction and multiple vulnerabilities. One of the cardinal conditions that warranted the adoption of a highly frugal planning approach is the Byzantine land tenure situation whose intricacy is attributed to the historical origins of the settlement in 1958 and governmental processes that took over in the 1980s. The settlement sits on land which was issued out on 99-year leasehold grants to private developers with a condition to develop light industries within 2 years. While a few of the grantees complied with the set conditions, a majority kept hold of undeveloped land past the conditioned period. Industrial workers and migrant families occupied the idle land and rapidly densified to 466 persons per acre. In response, the grantees started charging their plots as collateral to obtain loans while others sold their land to 3rd, 4th parties (Corburn et al., 2016; Horn et al., 2020). These informal tenure arrangements, power struggles among plot owners, de facto landlords and tenants, and multi-layered claims of ownership have intensified threats of eviction, “hot demolitions” and made it increasingly difficult for local governments to provide basic services and infrastructure.

For decades now since the establishment of the settlement in the 20th century, population has increased rapidly, with little or no efforts made to improve the shelter conditions and deliver basic infrastructure. Residents live in 10*10 feet semi-permanent structures which lack connection to water supply, drainage systems, accessibility routes, decent sanitation facilities, safe electric connection and social amenities. Water is supplied to the settlement by NCWSC but distributed via standing taps and water kiosks which are operated by informal unregulated private water vendors. Sewer connection is considerably low;

5 Hot demolitions are acts of arson committed by structure owners or other persons with an ulterior motive of forcibly and unlawfully evicting tenants from the property occupied.

6 NCWSC - Nairobi City Water and Sewerage Company Ltd.
residents rely on pit latrines, ablution blocks emptying into septic tanks or cesspits and “4am service” which involves the collection of fecal waste accumulated overnight in plastic bags. Electricity is distributed informally by power vendors who tap electricity from formal lines and transformers installed by KPLC\(^7\) (Akiba Mashinani Trust, 2014). This “sambaza” method is however lethal and has resulted in electrical fires, electrocution, and widespread power outages over the years. Lastly, inadequate storm drainage facilities have exposed the settlement to severe flooding events which have caused major building and infrastructure damage, displacements, health risks, deaths, halted social and economic activities.

Informal providers assert dominance in service delivery and often supply low-quality services at exorbitant prices. This is substantiated by an evidential “poverty penalty” in Mukuru, which implies a 10.7% - 25.8% rent premium, twice the electricity cost and 4 times more water costs than the abutting middle and upper-class neighborhoods (Corburn et al., 2016). These and other thematic issues were documented in a settlement profile (2016) which was presented to the local government who, in an affirmative and vitalizing response, declared the settlement as an SPA and thus catalysed an evidence-based planning process.

3. Components of the Mukuru SPA planning approach

Cognizant of the complexities surrounding the pertinent development challenges, a highly innovative approach committed to Rethinking, Re-planning, Reimagining informal settlements was adopted. The approach was heavily invested in not just the final plan and its implementation but also the plan formulation process. The defining aspects of this new paradigm were:

3.1. Coalition building and Multidisciplinarity

The SPA’s stance was that cities are capable of being healthy and liveable; only if and when they are created by everyone. The distinctive footing of this project called for novel partnerships from different actors within and beyond the city to unpack the informality challenge through informed co-creation and co-production. Under the superintendence of the local government, the SPA approach brought together hundreds of Mukuru residents and tenfold of organizations. The local government formed a coalition with more than 46 organizations including academia, community-based organizations, civil society, private sector, and other stakeholders who were mobilized in to 7 consortia built based on the thematic sectors of planning and 1 ‘community mobilization and consortia co-ordination’ consortium as shown on figure 3 below:

Figure 3: SPA partners and the consortia composition

Source: (SDI Kenya, 2018)

\(^7\) KPLC - Kenya Power and Lighting Company
Each consortium comprised of a county department responsible for the pertinent sector of planning and professional organizations who were engaged voluntarily based on expertise and capacities. Thematic collaboration with multiple partners was a highly frugal partnership approach that introduced innovation in multi-sectoral action-research and planning.

Within the scope of the SPA, each of the 7 consortia was tasked with the preparation of 1 Sector Plan (total 7 sector plans) which subsequently would be integrated into the Mukuru Integrated Strategic Urban Development plan (ISUDP). The consensus among the stakeholders was that the SPA is strengthened by pooling different types of resources towards a common goal. Their participation was hereby largely self-financed (Makau and Weru, 2018). Through this large-scale collaboration, the SPA profited from specialized expertise drawn from different disciplines which ensured that all development issues were given due consideration and ascertained high-grade planning outputs.

3.2. Participatory approach

Individual participation and representativeness of communities in decisions that affect their lives was a vital ingredient of the Mukuru SPA planning approach. The project underscored the potency of community engagement to; generate trust, credibility and commitment; ensure ownership of the plan; resolve conflicts during the planning process rather than delaying the implementation phase, and to achieve a more sustainable outcome (Empel, 2008). Communities were hereby engaged in evidence-gathering, building project awareness, iterative plan preparation, and plan validation through intensive sequential consultative forums. Cognizant of technicalities and complexities surrounding community participation, a distinctive approach of community mobilization and organization was defined as shown below:

Figure 4: The Mukuru SPA community mobilization and organization structure

The approach adopted was grounded on Muungano wa Wanavijiji’s long-term expertise in participatory processes which acknowledges the existing local leadership structures as bottom-up tools to instigate organizational capacities among residents (Horn et al., 2020).

In contrast to conventional approaches where community consultation is done at settlement level, the SPA approach aimed at involving people from the lowest level possible; in this case the household level. Therefore each household in the planning area elected 1 representative who joined other 9 representatives to form a cell (representatives from 10 households). The cells were cumulated in tens (100 households) to form a sub-cluster/Baraza Ndogo. The Baraza Ndogo hosted neighborhood forums to reflect on the SPA process and progress, discuss community planning priorities and potential solutions. The planning consultative meetings rolled out by 5 thematic consortia (excluding finance and land consortia)

8 Muungano wa Wanavijiji, Kenya is a nationwide federation of the urban poor that seeks to improve the quality of life of its members through an extensive process of policy advocacy and dialogue with governments, civil societies and private sector organizations.
were held at the segment level which was comprised of about 80 Baraza Ndogo. Each Baraza Ndogo selected 1-2 members to represent them at the segment level community planning sessions.

This strategic and intentional community organization structure scaled-up local representation from household to sub-cluster to segment level. Consequently, the “leave no one behind” principle was upheld as all residents had a chance to contribute to the planning process either at the sub-cluster or segment level. (Horn et al., 2020) observe that the process also controlled the influence of absentee-slumlords who are politicians and private investors who illegally own land and manage large-scale substandard housing in the settlement.

3.3. Strategic visioning and planning

With multiple disciplines and diverse stakeholders, crafting a lucid common vision was of utmost importance to ensure that plan prioritizes the dire needs of the local community whilst contributing to the local government targets as stipulated in the City’s Master plan (NIUPLAN 2014-2030). The visioning process was participatory and remained cognizant of the needs of the most vulnerable. Notably, the process had due regard for the children and youths who were actively engaged through film making and essay writing competitions on “The Mukuru we want” (Dodman, 2017). The adopted vision was: to improve the livelihoods of Mukuru inhabitants by addressing the cross-cutting development challenges of poverty, gender inequalities, infrastructure and basic services, sustainability and economic development; and enhancing the opportunities that exist within the settlement. To achieve this ambitious vision, the project adopted a novel strategic planning framework characterized by a “progressive improvement model”. Here, proposals would be implemented gradually; immediate (0-2 years), Short-term (2-5 years), Mid-term (5-10 years), and Long-term (10-20 years). The entry point was infrastructure upgrading and service delivery, followed later by housing improvements. This aimed at enhancing health, safety, convenience, and quality of life with zero or minimal displacement and in the process buy-in from structure-owners and solicit diverse funding sources for the subsequent housing upgrades.

3.4. Conservative surgery and Iterative planning

Conservative surgery was a key guiding concept of the SPA approach which aimed at inducing favourable future development of Mukuru with minimal destruction and displacement. Contrary to the radical development approaches, conservative surgery perceived the settlement as a continuously evolving organism and sought to trigger effective development without drastically changing the settlement structure. Iterative planning was hereby applied to test the viability of different planning standards on the future development of Mukuru and evaluate the magnitude of pertinent social costs and benefits.

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9 Absentee landlords are individuals who own and manage property (structures) in an informal settlement but do not live within it.

10 NIUPLAN is the Nairobi Integrated Urban Development Master Plan which provides an integrated framework for City growth based on a comprehensive and holistic view of urban development. It aims at ensuring spatial and social equity through inclusive, secure, resilient and sustainable urban development.

11 Iterative planning is a sequential process of prototyping, testing, assessing, and refining a plan with the ultimate intention of improving its quality and functionality.
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The iteration process was not only technical but also participatory and strived for a significant increase in the public realm with minimal social costs. The process was characterized by 4 iterations; the conventional approach (1a) applied the physical and social infrastructure standards as provided in the Physical Planning Handbook 2007. Strikingly, based on these standards, infrastructure would occupy 100% of the area, thus causing total displacement. This undesired effect prompted initiation of the rational approach (1b) which involved adapting the conventional standards to the people’s needs based on the rational professional decision making. Here, social infrastructure provision maintained the conventional spatial requirements but took into consideration the existing number of social amenities and only provided the deficit. By contrast, physical infrastructure modelling applied rational cross-section design and adoptive planning toolkits used in previous slum upgrading projects. This approach downscaled displacement to 45.93%.

The two iterations signified that superimposing the state-provided standards on informal settlements is significantly destructive and may only be practical for formal areas. A participatory approach (2) characterized by a series of community planning forums was thus initiated. Residents deliberated on space required for physical and social infrastructure and together with professionals, developed practical, considerate standards that would be responsive to people’s needs. The consultations yielded proposals from 10 segment level meetings and more than 55 cluster level meetings held due to the emotive issue of space allocation. The participatory approach augmented the public realm with 26.95% displacement. Finally, the negotiated approach (3) was initiated to standardize the consultation outputs into coherent alternative proposals. Displacement here was at 12.53% which was a remarkable decline from iteration 1a. This process led to formulation of alternative guidelines that were technically assessed and affirmed to be practical for informal settlements.

4. The results of the project

4.1 Synced short-term benefits with long-term targets

As per, Gazette notice no.7654, 7 sector plans (to be integrated into Mukuru ISUDP) were produced through intensive processes of inter-consortia coordination and knowledge exchange. To surmount the complex systems and highly contentious challenges of the informal settlement, each sector plan defined immediate action plans whose implementation began even before the end of the plan preparation process. Short-term initiatives such as revitalizing the community’s saving schemes, community clean-up strategies, “youths for safe and inclusive cities” initiative were co-produced as a progressive development of financial,
human, and social capital assets (Makau et al., 2020). Presently, more than 438 savings groups have been activated to enable the realisation of livelihood projects; more than 600 youths aged 15-25 years have undergone training on safety, security, and leadership; and earnest community champions have come forth to heighten the grassroots momentum for medium- and long-term change.

Physical capital assets have also been developed with support from both the local and national governments. Convenient access to sanitation services and emergency access which often receive step-motherly treatment have been arrayed as top priorities in the immediate – short term. Recent developments have seen the national government invest 1.5 billion Kenya shillings for infrastructure development in Mukuru i.e. road network and drainage, water and sanitation, electrification as shown in figure 6 below. Excavations have commenced with structure owners voluntarily opening up corridors to accommodate roads and basic services.

Figure 6: Ongoing initiatives in the SPA

Additionally, the government has repossessed 56-acre land in Mukuru’s neighbourhood from non-compliant private developers. This land has been set aside as a decanting site where the government intends to build 10,000 social housing units to benefit the residents of Mukuru. These actions and initiatives have accrued tangible benefits for Mukuru residents and are critical steps in incremental development which will be scaled-up to attain the overall project goals.

4.2. Redefined “communities-at-the-centre-of-planning”

The Mukuru SPA has developed, refined, and demonstrated what the notion of communities-at-the-centre-of-planning actually looks like. Through the methodical community mobilization and engagement approach, a massive engagement of approximately 5,370 residents in community planning forums was observed while the other residents played an active role in neighbourhood-level discussions. Subsequently, communities have been empowered to understand and keep tabs on the SPA process through neighbourhood discussions, trainings, data collection, local and international community exchange activities, and collaborations with the local government. The engagement structure has also yielded sustainable outputs that are consistent with the desires of the local community. This has multiplied the rate of successful implementation and realization of the project targets.

Notably, knowledge exchange between communities and professionals in the development of alternative standards for informal settlements has built local expertise and provoked a “can-do” attitude among residents. Additionally, developing settlement profiles by mapping out spatial details and living conditions with communities has accentuated the indispensable role of accurate data in instigating partnerships and...
driving evidence-based planning. This has motivated the rise of teams of local-change makers who seek to confront their challenges through the data-based approach. The influence has gone beyond Mukuru into settlements like Kibera evidenced by the Community Mappers initiative12.

Another key innovation in participatory planning has been working with informal service providers (locally termed as "cartels") as opposed to eliminating them. The “delegated-delivery” model was proposed in the provision of services such as water and electricity. This requires informal service distributors to register with the state and local government service utilities as formal regulated groups (Horn et al., 2020). The utilities would then supply services to these groups who would ensure last-mile distribution to the households. The aim of this was to maintain the local social ties and simultaneously reduce sabotage of the formal service reticulation systems.

4.3. Institutional inertia cramped through collective action

Informal settlement planning and implementation is often a slow-footed process due to scarcity of resources, contextual challenges, poor monitoring, and feedback within and between organizations and lack of oversight. Notwithstanding this, the needs of the local communities are dire and demand rapid response. Cognizant of this, the large-scale collaboration effort of the SPA not only applied innovative tactics in the plan preparation process but also in the implementation strategy. As a result, the achievement of seemingly unattainable targets has been fast-tracked through the complementary collective action of local communities, local and national governments, and multiple organizations.

Through explicit visioning, robust local community backing, the involvement of local service providers, zealous stakeholders, well-articulated and co-created plans, the project has been able to: Secure political commitment and solicit sufficient impetus from the local authorities; manage competing interests and priorities; recognize and coordinate various actors and their roles. Additionally, the partnering organizations have individually explored diverse sources of finance to kick start and prop up the planning process which otherwise would have fallen apart since no financial resources had been allocated to the project. The local community also formed “do or die” groups who have ensured perpetual commitment towards the SPA process by exercising bottom-up pressure on the project coordinators, administrators, and local authorities.

4.4. Alternative planning standards

The iterative planning strategy facilitated a review of the conventional planning standards whose adoption would have resulted in 100% displacement as stipulated in section 3.2. Drawing from local and international expertise, the physical and social infrastructure standards were reassessed based on the conservative surgery approach. To mention but a few, the width of the Right of Way of different road categories was determined through a sequential needs-assessment procedure. Communities underscored emergency services access, sanitary services conveyance, walkability, inter- and intra-settlement connectivity as the key elements the road infrastructure needed to consider. The minimum spatial requirements for each service were discussed which led to the development of a 4-tier road hierarchy; arterial road (12m), sub-arterial road (9m), collectors streets (6m), and local access streets (3m). This hierarchy adjusted the conventional transport ation standards which are 30-36m for arterials and sub-arterials, 25-18m for collectors, and 15-12m for local distributors. Social infrastructure on the other hand provided spaces for basic requirements and combined some activities while excluding the secondary ones such as cricket fields, swimming pools, and gymnasium in education amenities to minimize the spatial requirements. The prioritization, combination, or exclusion of activities was based on the community

12 Community Mappers initiative  https://www.communitymappers.com/
proposals. The technical process was spearheaded by SDI Kenya and Indian partners at the Society for the Promotion of Area Resource Centres (SPARC) and CEPT University.

For sanitation infrastructure; simplified sewer systems with narrower widths, shallower depths, lower-costs, and higher flexibility than the conventional conveyance systems were proposed (Makau et al., 2020). This was based on international knowledge exchange from Tanzania where similar systems have been implemented. Practical alternative standards were produced for all forms of infrastructure and social amenities. The unconventional standards provided alternatives for quality infrastructure which was less destructive (conservative surgery), promoted public health, human dignity, safety and convenience, and mitigated environmental risks and vulnerabilities.

5. Conclusion

The Mukuru SPA has pioneered highly frugal approaches to slum upgrading in African Informal settlements. The SPA planning approach upholds that “leave as many structures as possible in their original position, provide formal rights to the occupants of the land, introduce infrastructure and services with minimal disruption, and provide support for the gradual transformation of ‘shacks’ into more durable housing” (Stenton, 2015 p.6). Its holistic, strategic, and participatory approaches coupled with large-scale collaboration (consortia), multi-disciplinarity, and sensitivity to contextual differences, limitations, and opportunities make it an instructive epitome of how slum inventions can be designed and implemented not only nationally but globally. Its approach has drawn interest from both local and national governments and has triggered the declaration of more settlements as Special Planning Areas (Kibera SPA-Gazette notice no.7654), which will adopt the alternative all-inclusive planning approach.

This collaborative approach has also proved to be highly rewarding and effective in building consensus among different professionals and communities. It reveals how power-sharing relationships between local communities and professionals help to invigorate self-help efforts of locals and simultaneously co-produce top-notch outputs that drive agile state action. It is hereby apparent that attaining global targets i.e. sustainable development goals, and building inclusive, safe, resilient, and sustainable cities require urban planning practitioners to rethink and understand the complexity and organic nature of cities. Although conventional standards are instrumental, not all urban contexts can be simply programmed using the conventional tool kit: One size never fits all!

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Achieving Equitable Outcomes through Games: Using Board Games for Civic Engagement in Scenario Planning

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Abstract

Scenario planning is a method that tests development alternatives and their impacts on achieving community goals. This planning method influences growth policy and development regulations and is useful in communications between different departments in the government and the subsequent trade-offs are significant to be able to communicate with the general public. City of Charlotte has been using scenario planning to work with local communities to develop the Charlotte Future 2040 Comprehensive Plan. The City is using a game called Growing Better Places to engage with residents and collect inputs for the Comprehensive Plan and for participants to learn about prioritizing growth and its impacts. The results of each game were combined to make three growth scenarios to show how Charlotte could grow. These scenarios in turn played a central role in assisting the City to adjust their general land use planning strategies. This study investigates those operational issues behind this game and the ability of the City to continually engage with local communities during the planning process.

Keywords

Scenario Planning, Civic Engagement, Comprehensive Plan, Board Games

1. Introduction

Scenario planning is a method that tests development alternatives and their influences on achieving community goals. It is mainly used by the government to support long-term well-being of the community. This planning method influences growth policy and development regulations and is useful in communications between different departments in the government and the subsequent trade-offs are important to be able to communicate with the community at large. Scenario planning that utilizes geographic information mapping to enable data analysis and facilitate communications has been frequently used in regional land use and transportation planning. One example is CONNECT Our Future, a regional plan completed in 2015 for the 14-county region around the City of Charlotte in the United States. Charlotte’s current comprehensive planning project, the Charlotte Future 2040 Comprehensive Plan, is also using scenario planning as a way to develop alternative plans for comparisons and dialogues.

The City of Charlotte has been partnering with local communities to develop the Charlotte Future 2040 Comprehensive Plan, a plan that will guide how the city will invest in itself over the next 20 years. Once adopted, the plan will be the foundation for strategic policy, equitable investment in infrastructure, and new regulatory tools. It will be the blueprint for the City of Charlotte to realize its vision, which is aimed to opening its arms to a diverse and inclusive community of residents, businesses, and visitors alike; a safe family-oriented city where people work together to help everyone thrive.
The City of Charlotte is using a board game called Growing Better Places in their current Charlotte Future 2040 Comprehensive Plan process to engage with residents and collect inputs for the Comprehensive Plan and for participants to learn about prioritizing and leveraging growth and its impacts. The community inputs collected during these games have also been fed into the City’s scenario analysis for developing various future growth alternatives for comparisons and negotiations. One key objective of this game is to ensure that the path to creating complete neighborhoods for all residents in the city is equitable, economically viable and fiscally responsible.

This study seeks to investigate what operational issues behind this game have an effect on the effectiveness and the ability of the city to continually engage with local communities during the Charlotte Future 2040 Comprehensive Plan process. In particular, this study examines the pros and cons of this approach with regard to bridging the gap of under-representation by African Americans, youth, Hispanics, Latino, and senior citizens. This study also compares the various ways in which this board game is played (online vs. in-person) and attempts to identify best practices that can achieve the game’s main goal, which is to listen and engage with all communities in Charlotte.

2. Charlotte Future 2040 Comprehensive Plan

The Charlotte Future 2040 Comprehensive Plan is being developed in four phases (City of Charlotte, 2019a):

- Phase 1: Existing Conditions and Trends Assessment. This phase is about collecting information and listening to the people about what they want their communities to look like over the next 20 years, and the goals they need to set to make that happen.
- Phase 2: Growth Scenarios and Place Types. This phase will take a look at the ways Charlotte could grow and determine the trade-offs of each way to determine the preferred option to make the city’s vision a reality.
- Phase 3: Framework and Plan Elements. This phase will start to draft the actual plan with needed supporting policies that will guide the city’s growth. This phase will also start to look at the steps the city will need to take to make following through on the plan a reality.
- Phase 4: Final Plan and Adoption. In this phase, final reviews will be conducted. City Council will be asked to adopt the plan and use it to guide their decisions.

As of March 2020, the first two phases of the project have been completed. Phases 1 and 2 in the Comprehensive Plan process, which lasted from winter 2018 to fall 2019, were spent engaging with the community to discover their values and priorities for the city’s future. During 2019, the Charlotte Future 2040 Comprehensive Plan team worked to develop a set of vision elements and goals based on the inputs from over 4,500 Charlotte residents. From these inputs, three guiding principles emerged that help shape the Comprehensive Plan as it looks to the future: Authentic, Equitable, and Integrated. Each vision element looks ahead to the Charlotte of 2040 and strives to integrate these three concepts. The Charlotte Future 2040 Comprehensive Plan is currently in Phase 3, which will last until the end of fall 2020 and focus on the introduction of policies and strategies that will fulfill the city’s values, vision, and goals. The Charlotte Future 2040 Comprehensive Plan is on schedule to be adopted by the Charlotte City Council in early 2021 (City of Charlotte, 2019a).
3. Research Questions and Research Methods

This study is concerned with the factors that are attributed to the implementation of the Growing Better Places board game. In other words, this study attempts to unfold what operational issues have an effect on the effectiveness and the ability of this game to continually engage with local communities during the Charlotte Future 2040 Comprehensive Plan process. In particular, this study examines the pros and cons of this approach with regard to bridging the gap of under-representation by African Americans, youth, Hispanics, Latino, and senior citizens. This study also compares the various ways in which this board game is played (online vs. in-person) and attempts to identify those best practices that can achieve the game’s main goal: listening and engaging with all communities in Charlotte. This study is also concerned with the role(s) city staff can play in the implementation of this game.

The proposed study falls into the qualitative inquiry category. The phrase “qualitative inquiry” refers in the broadest sense to research that produces descriptive data, including people’s own written or spoken words or observable behavior. Qualitative researchers tend to look at the context of study and the participants as a whole. It is an inductive process in that researchers gain insight and a deeper understanding through patterns in the data.

This study is carried out by the comparative case study research method, which is one of several ways of doing case study research. Comparative case studies make use of multiple cases for the purpose of comparison.

Four data collection techniques will be employed in this study: 1) documentation review; 2) surveys; 3) interviews; and 4) on-site observations and informal conversations with game players and city staff.

- **Documentation review**: a review of official documents or status reports of the Comprehensive Plan process will be conducted.

- **Surveys**: for the past game workshops in Phase 2, player survey records collected by city staff will be reviewed. For the next round of Growing Better Places board game planned for Phase 3, a survey will be prepared and distributed to game managers to collect information about the game operation and results from the players.

- **Interviews**: a semi-structured interview with game managers and selected game players will be conducted. The primary goal of the interview will be to gather information regarding the effectiveness of the board game in reaching out to under-represented participants and raising players’ awareness of development options that can achieve an equitable growth pattern.

- **On-site observations and informal conversations with game players**: on-site observations will be conducted during the next round of board games in Phase 3. Informal conversations with players will be carried out to collect viewpoints about the play experience from users’ perspectives.

4. Scenario Planning

Over the past three decades, scenario planning with its visioning techniques has helped planners and citizens to articulate priorities and values and help shape the future of their metropolitan regions. It is through scenario planning that the question of what the future might look like can be narrowed down to a more manageable set of possibilities (Lee, 2016).

A scenario is an internally consistent view of what the future might turn out to be. It is not a forecast, but one possible future outcome (Ringland, 1998; Bartholomew & Ewing, 2008). Fundamentally, scenarios
are stories about the future (Ogilvy, 2002). They cannot predict the future precisely. Rather each should only present a vision of the future that is plausible in light of known information (Ringland, 2002).

According to Bartholomew (2007) and Smith (2007), the origin of scenario planning can be traced back to the RAND Corporation (Kahn, 1962) in the 1950s, during which scenario planning was used as a way to consider multiple aspects of a problem at the same time. It was considered as a technique to help strategic planners with limited backgrounds and resources to address the uncertainty embedded in decision-making. It facilitated creative thinking allowing imaginations about how a future might unfold (Andrews, 1992; Bradfield et al, 2005; Chakraborty et al, 2011).

The regional land use-transportation scenario planning practice that emerged in the 1990s basically implanted the military and business models into routine planning practices of the so-called 3C process (continuing, cooperative, and comprehensive) that was required by the Federal Highway Act of 1962, and the environmental impact assessment requirements by the National Environmental Policy Act (Bartholomew, 2007; Bartholomew & Ewing, 2008).

A typical land use-transportation scenario planning process compares one or more alternative future development scenarios to a trend scenario. In the trend scenario, both land development and transportation investment patterns of the recent past are assumed to continue to a planning horizon of 20-50 years in the future and the impacts of this trend on the region and its transportation infrastructure are assessed. This is followed by the formulation of one or more alternative scenarios that differ from the trend with respect to land use choices and transportation investments. These alternative scenarios are then assessed for their impacts using the same set of outcome measures that were used to analyze the trend scenario (Bartholomew & Ewing, 2008). Essentially, land use-transportation scenario planning assumes that if planners and decision makers consider multiple future scenarios and evaluate trade-offs by comparing their costs and effects, they are more likely to make better decisions.

5. Civic Engagement with Board Games

An equitable planning process can produce a comprehensive plan and policies that guide any government in making strategic and equitable decisions on topics including infrastructure investments, affordable housing, and guidance for private sector development, etc. With this belief in mind, the City of Charlotte is committed to listening to the voices of all citizens. African Americans, youth, Hispanics, Latino, and senior citizens are groups who have typically been less engaged in past planning efforts. To ensure an equitable and fair planning process, the Charlotte Future 2040 Comprehensive Plan team has been constantly conducting community engagement activities. Throughout each phase of creating the Charlotte Future 2040 Comprehensive Plan, the approach has been varied, inclusive, and diverse. Among all these community engagement activities, a special board game, called Growing Better Places, has been the key instrument employed by the city to reach out to the local communities, especially for those who have been under-represented in the past (City of Charlotte, 2019b).

In summer and fall 2019 during Phase 2 of the Comprehensive Plan process, Charlotte citizens played Growing Better Places, a board game designed for city staff to gather feedback for the Comprehensive Plan and for participants to learn about prioritizing and leveraging growth and its impacts. The purpose of the game is to gather inputs from a diverse cross section of the community about the future of Charlotte and to have fun doing it. Over 1,800 people have played the game online or in person at community meetings.

The key objectives of playing and winning the game include the following (City of Charlotte, 2019b):
• Fill existing gaps in infrastructure and amenities that make several of Charlotte’s neighborhoods incomplete today.

• Ensure that new development results in community benefits for existing and new residents and neighborhoods align with the community values expressed throughout Phase 1 of the Comprehensive Plan process.

• Allocate the projected number of housing units and jobs for Charlotte in 2040.

• Ensure that the path to creating complete neighborhoods for all citizens is equitable, economically viable and fiscally responsible.

5.1. Game Overview

The goal of playing the Growing Better Places game is to better understand the needs and impacts of growth and community changes citywide. The game is organized into two rounds. Participants can play just the first round if they choose or time is limited.

In Round 1, participants get familiar with each area of the City of Charlotte, including what is there today, what is missing to make certain neighborhoods more complete, what the current projections for growth are across the city, and how the Comprehensive Plan can integrate strategies to help achieve the community’s vision.

In Round 2, participants can do a deeper dive into one or more areas of the city to fill gaps in existing infrastructure and amenities, provide inputs on where investments are made and help shape how and where Charlotte grows in the future. To win the game, participants must use Place Types to complete all of the required actions for a particular area and achieve the community’s vision by ensuring strategies selected in Round 1 are fully implemented.
5.2. Place Types

In 2015, the CONNECT Our Future Regional Growth Framework was completed for 14 counties surrounding the City of Charlotte in North and South Carolina. Based upon the inputs of 8,400 participants, a preferred growth concept for the region was created using a palette of 31 Place Types. Place types better represent how cities work and allow the community to shape more than just land use. Place types do address land use, but also include guidance for other elements, such as general area characters, transportation and parking, parks and open space, building heights, massing and frontages, and aspects of site planning, etc. For the Growing Better Places game, a set of nine Place Types are used to summarize existing conditions and to indicate how and where the community would like the City of Charlotte to grow (City of Charlotte, 2019b).

Figure 2. Examples of Place Types used in the Growing Better Places game (Source: City of Charlotte).

5.3. Vision Elements and Goals

During Phase 1 of the Comprehensive Plan process, citizens who participated in public meetings shared their passion, ideas, and values for the City of Charlotte. Starting with Vision and Values from earlier planning efforts, participants provided feedback and suggested additional ideas. These were used to confirm the Vision Elements and develop the top eight goals that the Comprehensive Plan can influence. This Growing Better Places board game integrates the vision elements and goals in Rounds 1 and 2 of the game. In addition, to ensure that these vision elements can be accomplished in an equitable way, the Growing Better Places game introduce a unique method to use Equitable Growth Cards to guide the players to explore equitable options in order to achieve the direction indicated by the overall Vision Element Objectives (City of Charlotte, 2019b).

Figure 3. Vision Elements used in the Growing Better Places board game (Source: City of Charlotte).

6. Growth Scenarios

A key piece of comprehensive planning for the future growth of Charlotte in an equitable and inclusive way is the creation of Growth Scenarios. Starting with community inputs from the Growing Better Places...
game, a carefully calibrated, Charlotte-specific computer model using CommunityViz, a GIS-based mapping program, is developed to map and to analyze the likely impacts of different growth and development patterns. Four distinct scenarios, explained below, were created to better understand the trade-offs of citizens’ choices. The results will help the City of Charlotte make more informed decisions about Charlotte’s future (City of Charlotte, 2019c).

The four growth scenarios include the following:

- **Business as Usual**: Continues current growth patterns with strong growth in Center City and along key transit and transportation corridors.

- **Strong Centers**: Most development is in Regional Activity Centers, with at least one center in each of the six geographies to provide jobs, goods, services and community gathering spaces.

- **Connected Corridors**: This development creates strong corridors with an emphasis on transit station areas, neighborhood connections and trail systems. Community Activity Centers along the corridors provide jobs, goods, and services.

- **Neighborhood Nodes**: Numerous mixed use small scale centers offer goods and services close to neighborhoods. Additional residential intensity takes place near these smaller centers with less emphasis on transit stations and larger centers.

Figure 4. Four growth scenarios identified to better understand the trade-offs of citizens’ choices (Source: City of Charlotte).

### 7. A Preliminary Discussion of the Game Outcome

#### 7.1. Game Data

Over 1,800 Charlotte residents have played Growing Better Places board game between July and August 2019, including more than 840 people participated in several in-person community workshops and more than 990 people played the online version of the game. In addition to the actual game-playing activities, there have been more than 44,400 views of Board Game online content, including digital flyers, announcements, Facebook promotions, and emails.

#### 7.2. Demographics of Players

Among these 1,800+ players, 64% of participants identified themselves as White, 28% as Black, and 4% as Asian. Overall, 7% of participants also identified themselves as Hispanic/Latino. In terms of age, 62% of
participants were between 25 and 44; while 38% were 45 and above. In terms of income, 15% of participants had annual income less than $49,000; 36% between $50,000 and $100,000; 49% more than $100,000 (Figure 5).

Figure 5. Demographics of participants in Growing Better Places board game (Source: City of Charlotte).

7.3. Game Results: Mapping Agreement

The results of each game were combined to make three growth scenarios to show how the City of Charlotte could grow. Based on all of the game plays, the composite results show growth on every square that players chose (Figure 6). These results show a number of common themes (City of Charlotte, 2019d):

- Reinforce existing pattern of growth
- More development in West and Center of the City
- Less development in South
- Follows transit and activity centers in East and North
- Well distributed neighborhood nodes in all geographies

7.4. Next Steps for Charlotte Future 2040

The Charlotte Future 2040 Comprehensive Plan is currently in Phase 3. In the next few months there will be several community engagement events, as well as community workshops focusing on Place Types and using Growing Better Places board game again to cross-examine the four growth scenarios in a hope that a preferred scenario can be identified by the end of Phase 3.

8. Discussion and Conclusion

As discussed earlier, map-based scenario planning seeks to booster the technical efficiency of spatial analysis in regional planning as well as to build transparent channels for communications and open platforms for participations necessary for the planning process. This socio-technical perspective is important to understand the significance of this particular type of planning, which seeks to integrate social practices of planning with information and communication technologies.
The Growing Better Places board game, discussed in this paper, is essentially a simplified paper-map version of this type of map-based scenario planning practice. It is again through this particular socio-technical viewpoint that three key final observations about the Growing Better Places board game are drawn as the follow:

- **Scenario planning enables rational inquiry and increases understandings of socio-economic systems.**

  The ability of these map-based techniques to conduct analyses and to illustrate the results of such analyses substantially increases planners’ ability to engage and educate the general public about the rational aspect of various key factors involved in the planning process.

- **Scenario planning allows collaborative actions and enables quick explorations and performance evaluations on planning alternatives**

  Scenario planning tools allow community members to generate and compare various land use scenarios that represent different policy alternatives. The Growing Better Places board game, with its map as the canvas, provides the participants a simple sketching interface to quickly paint different combinations of
development alternatives, which can then be tested and refined based on identified parameters to produce a more sustainable solution that reflects the consensus among the community members participating in this collaborative process.

- **Scenario planning helps identify community values and promotes social learning**

  The continuous public engagement and public education about the potential benefits of alternative growth strategies help build durable, inclusive consensus within the community over time. Various techniques used in this Growing Better Places board game, including Place Types, Vision Elements, and Equitable Growth Cards, all afforded the participating residents the opportunities to express their concerns, raise issues facing their respective community, and together identify key values that are essential to the future of their communities.

### 8.1. Final Note

Due to the on-going COVID-19 pandemic, the research activities that were originally planned have been disrupted. Those data collection events that may have required in-person contact were cancelled, including participant interviews and on-site observations of game-plays. The author of this paper plans to resume all research activities in the near future once the public health condition improves and proper authorizations are granted.

### Acknowledgement

The author of this paper would like to thank the planning staff in the City of Charlotte for their assistance in getting access to some of the materials for this study.

### 9. References


Achieving Equitable Outcomes through Games


7. Shaping Liveable Places


Olga Chepelianskaia is an international sustainability expert and Founder of UNICITI. She specializes on sustainable urban development in Asian cities with a focus on climate resilience, natural ecosystems and heritage revival, placemaking and sustainable tourism. She also advises on climate finance and clean energy. Over 15 years of her professional engagement, she managed 5 major international programs, covered over 20 cities and 40 countries, and worked with 7 leading international institutions: ADB, CDIA, Rockefeller Foundation, UNDP, UNECE, UNEP and UNESCAP.

Her technical expertise covers climate adaptation and DRR, climate modelling, integrated urban planning and urban design, heritage revival and valorisation of cultural and natural assets, sustainable tourism and placemaking, urban infrastructure services and climate finance. Her cross-cutting expertise covers program management, policy and governance, public participation and stakeholder engagement, capacity building, PR and communication. Her brand approach is to help Asian cities become vibrant, sustainable, climate resilient, economically dynamic, inclusive and culturally unique by placing their natural and cultural assets at the core of their development.
Creating holistic liveable environments is of key importance today. Cities, in particular, face an increasing pressure on their resources and an increasing climate change threat, which exposes their residents to growing risks. ISOCARP 2020 Congress Track 7 - Shaping Liveable Places – received over 150 abstracts, of which over 30 were featured as presentations during the Congress. The Track was organised in 4 sessions, including a Forum and a workshop. The sessions focused on:

1. Inclusive cities with liveable places for all
2. Improving spatial liveability: tools and practices
3. Inclusive Placemaking Forum
4. Planning for liveability: from cities of the past to cities of the future

The presentations covered a range of global and local approaches, with relevant participation from a wide range of countries across the globe: New Zealand, India, Qatar, Bahrain, Italy and China to name a few. In particular, we welcome this growing presence of China in the international scene as well as its contribution to ISOCARP. We must praise the quality of the presentations that originated a contrast of conceptual ideas and implementable proposals from all the speakers.

The Track 7 mostly followed a very interactive spirit in line with the spirit of placemaking, which was commendably achieved despite the remote online mode. The presentations allowed for further discussion and exchange among the participants where topics were approached from different perspectives opening up the integration with related topics showing the intricate web of interrelation of urban management and planning to solve issues with a holistic context.

The most significant takeaways from the sessions’ discussions were:

**New ways of understanding liveability are required.**

The limited approach to the determinant parameters has proven short of understanding the complexity on physical and symbolic terms a meaningful place requires where physical comfort has to be coupled with psychological and sociological both conscious and subconscious connotative messages.

Apart from traditional urban design spatial approaches, new techniques have to be able to analyse underestimated parameters such as:

- Multiple and flexible creative participation support
- Diversified inclusiveness for a multiclass integrated society
- Cultural symbolic quality for ideological biodiversity
- Connotative and denotative messaging multilayered perceptive support
- Scale integration from the architectural to urban and metropolitan
- Governance dialogue between citizens and the administration
- Government dialogue among government tiers for integrated solutions
- Urban and rural synergetic coexistence in a polycentric metropolitan unity
- Efficiency and equity compatibilization of social and economic objectives
- Climate resilience, adaptation and sustainability for a changing scenario
- Gender and age prioritisation as the unavoidable means to an equitable future
The multiplicity and complexity of the topics pointed by the participants in the discussions will require further effort for research on the future ISOCARP Congresses and the necessary input academia requires to guide their research from professionals and practitioners in first hand contact with pragmatic urban analysis and historical reference for urban solution provision.

Track Chairs, Olga Chepelianska and Pedro Ortiz, congratulate ISOCARP for the groundbreaking experience of successfully managing a virtual congress under the stressing pandemic circumstances, and look forward to continuing the takeaways discussions at the 2021 ‘back to normal’ physical interactive Congress.

Selected Papers

1. CONTIN Antonella, GALIULO Valentina, *What is the quality of a city? Ways of thinking spaces that change*
What is the quality of a city? Ways of thinking spaces that change

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Abstract

Understanding the effects of a metropolis' changes in scale - the rate of growth and its speed - rather than pursuing the search for optimal city size, is mandatory. The New Urban Agenda discussed performance dimensions of the contemporary city's functioning mode, knowing that place quality derives from a mutual effect with the society that uses it. However, our research focuses on how city performance dimensions can be measured to establish the values of the metropolitan form that are capable of endowing metropolitan projects with meaning. The Metropolitan Paradigm of inter-scalar connection and the Metropolitan Architecture Project Hybrid Typology are the references to measure the metropolis' performance. The Metropolitan Paradigm concerns the five city dimensions: physical, economic, energetic, social and governance. In particular, the aim of the paper is to study the physical metropolitan framework and its impact on the lives of metropolitan inhabitants, socio-economic flows and the meaning of the concept of "environment" today. The city is still analysed as a spatial phenomenon represented by data/quantities related to space. Nevertheless, the value of form plays a fundamental role within the Metropolitan Discipline at all scales, as spatial relationships within metropolitan settlements are increasingly not metric but relational. In conclusion, we study the connection between history and geography, environmental issues, the Metropolitan Structural Paradigm, and the new Public Realm heterogeneous elements to represent the metropolitan quality and living-related values that constitute the Metropolitan Democracy’s opportunity.

Keywords
Metropolis, New Urban Agenda, Performance Dimensions, Place quality, Democracy

1. Metropolitan Urbanity

1.1. Traces of the history and the geography of the place within a map - the ground project

Designing a Metropolis is a social project that involves the history and the geography of a place, establishing discontinuity within the collective memory of continuous territorial relations. According to Secchi (Secchi, 1986), a metropolitan project has to originate from a ground project. Ground project means that we have to consider the definition of the characters of the ground (the environment) where the Metropolitan Architecture Project will be rooted. We can describe three metropolitan conditions. The first one draws the ground, its functions and meanings into the building: a great condenser of images, functions and relations; the second reduces the ground into a podium for the technical element devoted to fluxes; and the last one considers the ground in terms of physical extension and economic value. Instead, according to Secchi, a ground project must take care of the history and the geography of a place: traces of these have to be marked on a current map, thus determining the possibility of evaluating the changing quality of space in different eras due to the impact of new projects.
Metropolitan ground project is a complex project (in terms of functions and geographies). It concerns the concept of the Metropolitan Identity that implies "memorable" and interactive architectural images pinned into the place (Lynch, 1960). They can engrave the metropolitan geographical points/places into a Mental Map. The first indicator of the metropolitan urban space's quality is the possibility to figure out its mental map, which testifies a feeling of adequacy (Lynch, 1960).

1.2. The environmental issue - the apparatus for big-scale structuring

The second quality indicator of metropolitan space is the possibility to figure out, in the metropolitan mental map, a synthetic way to define a place made up of both built and natural environment. Due to the Bigness issue (Koolhaas, 1995) - spatial extension and an unprecedented temporal acceleration rate -, a specific methodology, equipment of techniques and tools for structuring the metropolitan shape and its quality indicators' definition are needed. Landscape at this scale is a Metropolitan Architecture and Public Space's composition material too, determining a new and vast meaning. According to Gregotti (Gregotti, 1966), the environmental issue not only concerns the most significant set of problems but somewhat different problems and values. Consequently, the Architecture of the Metropolis must deal with the specialization of various disciplines related to the city-form issue at different scales. The Metropolitan Discipline (Contin et al. 2017) thus establishes a unique spacing methodology (Eisenman, 1997), the metropolitan anthropic-geographical landscape (Gregotti, 1966), allowing its evaluation not only in terms of efficiency performance but rather of quality of living. The Metropolitan Architecture and Landscape Project are a meaningful articulation of a green and grey infrastructural system that shapes a robust metropolitan civic image (Lynch, 1960): a collective memory archive and a metropolitan multiplicity of spatial identity that is local but also global. In that perspective, and according to the sustainability principles, we must root the metropolitan space quality parameters by seeking equilibrium and potential (Lynch, 1960) among the metropolitan DNA elements (Ortiz, 2017).

1.3. The Metropolitan feeling of adequacy as space quality indicator

If the metropolitan space has quality, it must produce a feeling of adequacy in its inhabitants (Lynch, 1960). How can this be determined? The Metropolitan City must involve the environment (geography, infrastructures, and landscapes) as the project’s operative element. It must aim at producing a shared and robust image of public space (by also using ICT) that should meet the needs of the inhabitants related to their cultural and economic activities. It determines the need for continuous dialogue with public politics and policies, through new instruments and knowledge tools, about their vision regarding the metropolitan identity and inhabitants' quality of dwelling. It takes into account the five elements of project sustainability (water, energy, networks, pollution and welfare). Following a nature/water-based approach, the metropolitan project explores the generative potential of the landscape, and the green infrastructures as new contents for Metropolitan Maps and Scenes (new uses, economies, and public spaces needed). The eco armatures are not only the background of the Metropolis anymore, but agents of the metropolitan space and its quality evaluation indicators.

Hence, the Metropolis deals with the long-term period. It means shifting the goal from sustainability to durability. It is the theme of urban quality and value associated with metropolitan dynamics. One of the metropolitan dynamics is the shift from a concept of public space to the proposal of a public realm that identifies the space of the contemporary metropolis. F. Choay (Choay, 2004) described the history of a city as spatial mutations of urban spaces: historically, different scales of urban spaces coexisted within a city. However, the leap in scale resulting from the revolution of the contemporary city’s dimension, defined as
What is the quality of a city? Ways of thinking spaces that change

bigness by Koolhaas (Koolhaas, 1995), with its significant infrastructural junctures, diminished the local scale but also depreciated the traditional city’s aesthetic and cultural values. Nowadays, Metropolitan Architecture is no longer related to single objects but to new urban morphotypes.

In the traditional city, consolidated public spaces and monuments played the role of cultural and social references. However, in the Metropolis, the meaning of public space and monument is no longer primarily bound to distinctive architecture. Alternatively, we talk about a monumental metropolitan approach in the public realm, where Architecture has a strategic value to form relations with the other metropolitan dimensions that together build the structure of the metropolitan territory.

Metropolitan Architecture Project’s monumental approach sets the scene to build a shared robust public mental image of the city. It assures the well-being and psychological security of both inhabitants and urban users (feeling of adequacy) by establishing a new cultural and social reference at the metropolitan scale for several inhabitants’ cultural identity.

We can link Lynch’s concept of feeling of adequacy with Choay’s idea of urbanity. The feeling of adequacy is the product of governance that makes it free (freedom/legitimation) to represent itself legitimately in public places. Facing the need to find a new way of leaving a mark in the contemporary metropolitan fabric, yet avoiding the reproduction of iconic objects, the innovation of the Metropolitan public realm is in the ground involvement into the building of a place. It presents some characteristics of the Mega-form described by Frampton (Frampton, 1999): a form capable of inflecting the existing urban landscape as found because of its stable topographical feature that is eventually insinuated back into the surrounding environment. Finally, the new public realm relates to the Metropolis, achieves particular aesthetics, and defines a new sign for both the local and the metropolitan scale.

The long-term project (permanence of the durability of metropolitan elements’ relations) of the Metropolis means: maintaining, developing and transforming the connections with other elements that define the metropolitan dimension. The dynamic relations that change over time make the project permanent in the metropolitan structure. Unlike the static monumental value of the past, the new public realm has an urban quality that deals with the complexity of modern functions linked to metropolitan dynamics. It is intimately related to the issue of the identity of the local scale and its significance conveyed by the great architectural image at the metropolitan scale.

1.4. The need for a Metropolitan structure paradigm

At the metropolitan scale, reaching the feeling of adequacy indicates a renewed relationship among metropolitan spaces defining the formal spatial quality and its new measures. The system of proportional measures related to both the dimension of territorial sustainability and the metropolis’ speed-time (Venturi, Izenour, Scott Brown, 1977) is allowed by the metropolitan structural paradigm: the Metro-Matrix (Ortiz, 2014). The Metro-Matrix Approach allows resilient articulation of the interface between city, agriculture and nature by promoting the quality of dwelling and by ensuring human well-being within the Metropolis. It holds together the past city context with the new city contexts and measures, which represent the metropolitan dynamics defining new locations and boundaries within the Metropolitan Architecture Projects Acupuncture Chart. The intensity of the metropolitan time is then fixed in the concrete Metropolitan Architecture Project, which is an open project with enduring values.

1.5. Metropolitan Democracy: the goal

The lack of a more symbolic than physical relationship with the place does not allow to determine the phenomenon that Choay (Choay, 1972) called "building competence" or “building monuments competence”, whose power concerns allowing men to act in urban space by qualifying their time through
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intersomaticity. The decadence of that competence determines the loss of effectiveness of residents’ actions in space: knowing how to inhabit a space and the practices it consents, in order to build it without diminishing the possibility of finding space for social gatherings, a job, and leisure time activities, namely quality of life.

Today, Metropolitan urbanity is the relationship between human time and the inhuman time of technology, the tyranny of the Smart-city. Democracy is, instead, a humanistic fact. The time that prevails today is brutal; it is the time of numbers. The criticism levelled at the contemporary urban model passes through the ability to discover unnamed (not-conceptualized) areas inside the metropolitan city model, which can have a metropolitan quality through a critical analysis of the traditional terminology: city, urbanity, urban and urbanization. This first approach reveals that the indissoluble relationship between urbs (space) and civitas (community) no longer exists and that, perhaps, not even the two terms (urbs and civitas) still exist. Choay’s analysis (Choay, 2004) reminded us that, in the city of Paris, the urban space constituted the framework for three types of communication related to material goods, information and feelings (conviviality). The latter space is concretized by the Alphand’s parks, where the unconscious city was nested thinking about Aragon’s surreal descriptions (Aragon, 1926). The Parisian park system was the way to determine the feeling of adequacy through the multiscale approach dealing with the green-grey infrastructure project. It goes from the great Bois de Boulogne to the Buttes-Chaumont, to the district square through the boulevards.

Currently, we can deduce that the term urbanity means behavioural order, and that it is a space to determine the communication that can pass through bodily sensitivity. Nowadays urbanity is related to the whole metropolitan fabric (metropolitan spatial dimension) and to conviviality (domesticity), which arises from environmental knowledge and the several identities that determine the place’s singularity. Subsequently, it stimulates the inhabitants’ feeling of belonging and beauty awareness. Today, the conditions of environmental value are the basis for a sustainable project that can guarantee the quality of life, which corresponds to the values today’s society considers worthy of lasting. It is a quality that must be accessible to all. That is Democracy.

Hence, urbanity/conviviality is quality based on the possibility of living in the city connected to other spaces plus the city dwellers’ relationship quality; namely, the link between spaces (accessibility) and the possibility of exchanging feelings. Today, in a consumerist society, conviviality is the cosmopolitan attitude associated with self-representation (Reeve, Simmonds, 2000): ubiquity and information exchange without affection. Metropolitan Architecture at the local scale must then determine the spatial condition for the development of affection exchange. The spatial structure thus acquires a new symbolic coordinate system, which allows “bright and sensuous” images and information (Lynch, 1960) to penetrate into the bloodstream. Memorable images and information (for a mental map), referring to a scale change.

2. Metropolitan Architecture Typologies as a driver of city quality

2.1 The cultural leap

The relational approach is a product of the contemporary paradigm cultural leap. The contemporary city is understood as a Net-City, meaning a Tele-City, using the definition proposed by G. Shane (Shane, 2005).
The prefix “tele” etymologically refers to the idea of distance, wanting to emphasize the association of the contemporary urban scenario with a dispersed physical reality, compared to an amorphous agglomeration, which forms the so-called urban archipelago. The idea of territory as an extreme urban form derives from the opening of the city. Hence, the territory is multiscale, involving the use of several dimensions in the same project. The task of the Metropolitan Architecture Project is ‘How to give value to new qualities of this hybrid territory’.

The new scale of metropolitan urbanity, given by the size of the infrastructural network, causes a change in the rationale of structuring settlements: the historical city loses power because the Metropolis no longer requires a physical centre where it can settle and represent itself (Gregotti, 1993). The goal is to determine new relationships between new and old epicentres. In the *Postmetropolis* (Soja, 2000), the relationship with history settles in the de-structuring of the changed contemporary city, in which it is no longer possible to clearly distinguish between centre and periphery. The designer horizon lies on the awareness that the project is capable of delineating thresholds of an urbanity that is in the process of being realized. In this sense, the metropolitan urban project is not the rewriting of an interrupted text, but the creation of new geography to understand, find and make the Metropolitan city’s quality.

2.2. The New Built Form types or new land uses as enablers of qualified metropolitan dwelling

The Metropolitan Paradigm allows to place centralities qualified by Characteristic Figures. It is a way to make the new centralities attractive for the different agents of the city. Metropolitan Architecture Project, Heterotopias (Shane, 2005) or Mega Forms (Frampton, 1999) are hybrid architectural entities articulating scales (Fenton, 1985) or urban-morphotypes (d’Alfonso, Samsa, 2001), thus determining original configurations of new built form types (Reeve, Simmonds, 2000). They are the foundation of mental maps at the metropolitan scale, the formation of a "body-space" (Shane, 2005) as the metropolitan fabric emerges. According to Rowe’s reversal code (Rowe, Koetter, 1984), open space is reversed from background to figure involved in the construction of a mental map, starting from the new character and conceptualization of the void or "body-space" or “space in between” at the metropolitan scale. The formal paradigm of “space in between”, structured by eco-armatures (Goveurneur, 2016), allows to recognise a conventional open space form, and provides the potential for a system of gradation of public, semi-public, common and private spaces within a functional rationale. The Metropolitan Architecture Project - a function of creative and managerial moments - shapes that void as a gradient of formality. Finally, the Metropolis is still analyzed as a spatial phenomenon, being represented by data/quantities that are related to space. However, the value of form plays a fundamental role within the Metropolitan Discipline at all scales, as spatial relationships within metropolitan settlements are increasingly not metric but relational.

2.3. The First Hybrid

The importance of hybrid architecture typology emerges in a society where the city becomes a system at the service of the infinite choices and needs of urban actors (Shane, 2005). They deal with different processes and indicators of results based on which to evaluate the quality of metropolitan urbanity, precisely hybrid metropolitan typology capable of influencing the functioning process of the metropolitan urban model into which it fits from the human scale to the territorial and even global scale. We call it an urban morphotype indicating that something typical of the city is part of the current typology.

Metropolitan residents can convey multiple choices in a quick time, so, they need a place capable of
typology of the hybrid building expresses all the potential that the hybrid has in informing the Net-City about an alternative development model, which is more suited to the needs of urban actors.

D. Grahame Shane’s analysis, starting from the reworking of Lynch’s three theoretical models of the city, prefigures an urban system that evolves from the recombination of its three fundamental elements: the enclave, the armour and heterotopia. The third concept, in particular, associated with different architectural typologies, introduces the hybrid building typology, which we shall define as the symbol of the contemporary city model, the Net-City paradigm.

The characteristics of the hybrid building (Fenton, 1985) are linked to the concept of heterotopia, defining a point of mediation between two entities, reinterpreting the hybrid as a recombinant architecture. This analysis will be crucial to create a conceptual bridge that can demonstrate its dominance in terms of quality of living over the rest of the urban fabric in the current model of the generic city (Koolhass, 2006).

The term ‘recombinant’ comes from the panorama of studies of the compositional structure of DNA carried out by Francis Crick and James Watson (Shane, 2005). It is associated with architecture starting with the work of D. Grahame Shane, called ‘Recombinant Urbanism’, to define the possible presence of an urban structure, a DNA of the metropolitan city capable of transforming, altering and reshuffling itself in order to achieve characteristics that differ from its original state. Since recombination is considered a process of ‘crossbreeding and independent assortment of new combinations of genes that do not appear in the parents’, it allows change and response to altered circumstances, thus explaining the ‘mutations’ from generation to generation and the path of Darwinian natural selection.

Similarly, we can find this evolutionary pattern within urban change. The search for greater efficiency, profit or pleasure drives city users to ‘splice’ urban structures that manage flows. They use the elements that make up the city, stratifying one on top of the other, modifying elements’ functioning mode and relationships, thus producing new scenarios for their activities and reusing existing ones for new circumstances. ‘Urban splicing’ (Shane, 2005), similarly to genetic recombination, includes cataloguing, layering, overlapping and recombining disparate elements in order to create new combinations reaching the quality of dwelling.

The word ‘hybridization’ is a term that has been lent to architecture by the scientific realm. The meaning of this term, coined in its meaning by Mendel and Kolreuter (Bateson, 1913), describes the ‘process of systematically combining different species in order to obtain a different species from the original one’. This study led to the creation of the term hybrid vigour or heterosis, and later, also to the opposite term, ‘hybrid sterility’, defined as the inability of the result of hybridization to reproduce.

This scientific approach can be linked to the Metropolitan Architecture Project. Over the years, the combination of different programmes within a single building has led to several examples, some of which have survived, while others have decayed. However, not all buildings that combine different functions inside can be defined as Hybrid Architecture. As claimed by Fenton (Fenton, 1985), the first examples of hybrid architecture were identified in the 19th century in the United States, particularly in New York.

In the latter half of the 20th century and the advent of the 21st, experimentation on traditional typologies pushed once again in the direction of greater fluidity and integration of various programmes, defined by the increasing range of residents’ needs, within large heterotopic hybrid nodes. A new period of strong aspiration for innovation and change initiated the rebirth of hybrid buildings, defined as an architecture of change. This new architectural typology fits perfectly into today’s Net-City thanks to its recombinant capacity and its flexibility to re-code several urban agent’s needs in liveable spaces.
2.4. From the mixed-use tower to the cyber-hybrid mega-form: new strategies for the Metropolitan Architecture Project

With the advent of new communication technologies and the incredible diversification of the architectural scenario, we can see how Fenton’s definition of hybrid buildings urgently needs to be updated. Unifying different uses within a single structure is no longer a point of arrival to achieve architectural and city quality in the sense that it is capable of responding to the needs of the contemporary city but is only a starting point.

What Fenton describes in his analysis is how a series of functions can be united within a building, and the consequent hybrid form is the logical outcome of this transformation process. However, today a hybrid building is hugely more complex in its functioning mode and internal dynamics, far beyond the functions it contains.

The recent development of new frontiers in hybrid architecture has allowed us to explore new formal solutions, dissociating ourselves from the idea that the grid should dominate the building. We can say that, because of its heterotopic nature, hybrid is a project in which the stasis component (enclave) and the movement component (armature) interact with each other, both inside the building and with the rest of the context.

In order to define metropolitan quality space, the hybrid building must be located in a specific context, where a ground project strategy can be defined as the fundamental declaration of grounding the generic city process. To achieve this purpose, the three-dimensional local matrix must be recombinant and should be able to stabilize (or destabilize) the surrounding urban dynamics on different levels. The new metropolitan Hybrid building, located following the Metro-Matrix Metropolitan Acupuncture Chart’s indication, could become the ordering agent of the enclave armour, at the metropolitan region scale.

2.3. The new hybrid season of the metropolitan city as a driver of space quality

Considering the new Hybrid building an innovative typology at the metropolitan scale means having control of the relationship between interior and exterior and, therefore, between public, private and common space. The physical boundaries of the heterotopic enclave are no longer defined by the walls of the architectural object itself but are permeable. They are able to guarantee access to different urban actors with different roles, including the city that the hybrid itself reflects (A+T Research Group, 2020). According to our research, it might be possible to detect categories that could help planners to evaluate the metropolitan morpho-type space quality:

Reflexivity: the hybrid building seeks to have an impact on both the observer and the urban actor. It is proposed as a landmark within the metropolitan scenario.

Sociability: the hybrid building, with its complexity, compresses the public and private spheres within it, exploiting both in order to get the most out of its use for all urban actors, and accommodating the different lifestyles that represent metropolitan life in the Net-City.

Formality: the hybrid building is not the result of functional isolation spaces in the city.

Processualism: the hybrid building should be linked to the sequence of processes of composition and management of space over time, interpolating the need of the public and private body. Therefore, the establishment of a strategic action design programme is a priority action in order to achieve the combination of different functions within a unique building to ensure a strong interconnection of activities, which are changeable in time.
Inter-scalarity: the hybrid building is properly linked to the designer’s ability to be able to represent, in a unique project, the quality of the space at a different scale. To reach this purpose, the strategy section becomes the fundamental tool to understand the value of space, time, functions and common habitus of local agents.

Density: the complex conditions of urban density are factors that determine the development of hybrid buildings, as they enhance the ability to rework weaknesses at different scales of the context and revitalize entire enclaves.

Inter-somaticity: of space, considering hybrid building projects as intermediary devices between architecture and urban planning. In the metropolitan city, it can play a fundamental role in the process of transition from a city composed of parts to an integrated, interconnected system. Hybrid architecture fosters the place identity since it is the physical manifestation of a network of relationships between urban actors.

Measurability: it is a category to identify the measure of scale relationships between the dense urban fabric and common and public space.

Recombinability: it can be based on its functioning process and on the relationships and dynamics it activates. Evaluations closely linked to the architectural composition field become obsolete because it no longer represents the dynamism and variability of these buildings.

It is mandatory to pursue the objective of the metropolitan space’s quality to define a design methodology capable of fostering the transition from an urban system where heterotopia of illusion - or rather, the hybrid building - is still considered an exception to the rule, to a system where interconnectivity and dynamism of this typology are no longer limited to being defined as an experimentation with a high risk of failure. The Hybrid Building is a real, viable and scalable option for the organic and efficient development of the urban metabolism of the Net-City in order to bring out a quality that is now neglected.

3. The final note

The term metropolis implies a geographical area dimension that is greater than that of historical cities (in Italy it is much greater than municipal boundaries). Hence, the link between geography and history must be given due consideration (Febvre, 1922) in the perspective of an urban biography. The semi-independent processes of undifferentiated growth, the hyper-planned processes of the immaterial and transport networks, as well as the centralities at the inter-networks, qualify the urban biography already involving the metropolitan dimension. This is why our idea of metabolism and its three operations - maintain, develop and transform - should be at the centre of metropolitan management. We cannot imagine how it could be missing. Finally, because the City of Muses or the city of art is our research’s brand (its driving core), we encourage training in Anthropology of the inhabited metropolitan city. First of all, the City of Muses concept was created concerning imagines agentes (Yates, 1997). Then, about those images that, as Rossi intended, descend to archetypes while repeating them as analogues in the urban biography of the present day city. Secondly, because we no longer look only at the building type but rather at interpretative maps based on topographical/geographical elements and their relationships. From a hermeneutic perspective, we want to detect possibilities and local resources, both human and natural, towards their “liberation” from the traditional urban accumulation processes, using a Marxist terminology. This is the reason for the word “Muse”, the value of the hermeneutic approach that discovers/invents the urban facts not for narcissistic exhibition, nor for financial interest, but for what we call the “public”, which includes natives and residents among others.
Hence, the case study. *Parma City of Muses* (fig.1) is a masterful example, since it is the production of the map of the remarkable places of Parma invested by a series of events with the relative scenography. We conceived events involving many arts and, especially, music, as well as, through the introduction of modern technical devices as art objects "revisited" mythically or poetically. Through a "story", such devices acted by creating a new spatial-temporal interweave between geography, artefacts, and artistic events. In short, it is a real map invested with ideal meanings, and is highly evocative of the mission of the metropolis’ managers, not as bureaucrats but as curators of a delicate public asset. Nevertheless, we defined an analogous map, more complex than the one of Aldo Rossi’s analogous city - more intimate compared to the epic one that new devices have created here.

What is more, the map is not drawn but interacts with the residents of Parma, who can thus jointly test the quality of a city within its territory.
4. References


Choay, F. (2004). *Espacements. Figure di spazi urbani nel tempo*. Milano: Skira Edizioni


What is the quality of a city? Ways of thinking spaces that change


5. Acknowledgement

SPECIAL TRACK: The Future of Hot Cities

Francois Vienne is an Urban Planner and Smart City expert with 7 years of international experience. François has an international consulting background in a diverse range of public and private developments in France, Middle-East (UAE), North-Africa, and South-East Asia (Singapore, Vietnam, Philippines, Myanmar, Hong Kong, Indonesia, Thailand).

Having worked in several countries, François has developed a keen sense of understanding and respect to the unique local character of each project’s context. His direct involvement in all phases of project development from planning, design, permitting, and planning approval gives him the unique perspectives to effectively lead teams and deliver a project for clients.

François located to Asia in 2014 when he joined ENGIE (Oil & Gas, Energy Services) in Singapore collaborating within an international Smart City consortium: Government of Singapore (Smart Nation), and ERI@N.

From 2016 on, he joined international masterplanning teams in Singapore to deliver Conceptual Master Plans and Strategic Planning Recommendations on a variety of estates and intervention scales: residential and mixed-use communities, greenfield developments, urban renewal projects, large scale developments.

Nasim Iranmanesh graduated from Azad University of Tehran with a degree in Architecture and completed Urban Design from University of Tehran. She finished her PhD in Urban Planning from Islamic Azad University.

Aside from her professional experiences at the Building and Housing Research Center (BHRC) as a researcher as well as in Sazvareh as architect and urban designer, Nasim currently teaches architecture and urban planning in Azad University in Tehran.

She has completed research projects and published several articles in architecture and urban design. Nasim is a Scientific Committee member of the International Society of City and Regional Planners (ISOCARP) and works in the municipality of Tehran as consultant in urban design.
Special Track Summary

While climate change growing issues are affecting many and different parts of the world, from northern hemisphere to tropics and desertic zones, urban areas developed in arid climate seem to face an advanced and severe magnitude of these global issues. As urban population is expected to grow at an unprecedented rate till 2050 when the global population is expected to be 70% urban, observing current challenges tackled by arid zones cities is more than ever essential to leverage opportunistic solutions to grow smarter and more sustainable urban futures in any cities of the world. Water scarcity and treatment policy, energy mix, diversification and renewables sources, urban morphology and planning strategies are not only high-level conceptual themes for discussion about hypothetic urban scenarios, but actual urban strategies and policy framework for sustainability hot cities presented during the Special Track Session embrace to solve immediate and burning problems of the 21st century.

How will hot cities urban strategies showcase sustainable solutions and be demonstrators for other cities in the world? What kind of relationship these cities maintain with ancestral and pre-capitalistic practice, knowledge and wisdom from ancient cities? What kind of urban strategies are emerging to answer crucial problems: water supply, food security, urban liveability in the context of global warming, family care in a stressed climatic environment, energy sustainable and efficient supply in cities increasing energy demand.

Presentation of the Special Track: Future of Hot Cities Sessions

• Water management in stressed context;
• Energy management and potential decentralized solutions towards off-grid models;
• Urban design and building morphology in arid context;
• Urban planning strategies and landscape design;
• Urban Farming.

During the thematic Special Track Future of Hot Cities Session, crucial insights were shared from research works and case studies presented by a panel of key experts from South East Asia (Bali, Indonesia, to Egypt.)

UN-HABITAT 17 Saudi Cities Report Introduction

Bottom-up knowledge to better understand social context within arid cities is essential to guide public decision making. To help doing so, UN-HABITAT, special guest of the session, and co-host to the 56th ISOCARP World Planning Congress, presented a 5-year span research program about 17 cities in Saudi Arabia embedding 70% of the country population. With the help of a tailored Assessment Framework based on a spatial approach, density key parameters and accessibility key performance indicators, the UN HABITAT team has established a diagnosis of the city’s efficiency in Saudi. The session will focus on the results of the analysis of the 17 Saudi cities, identifying the common spatial challenges (unbalanced
growth and development patterns, polarized development/monofunctional, endangered historic patterns, socio-ecological and economic imbalance, lack of cohesion in the urban structure) and the possible solutions toward a more compact, inclusive, integrated and resilient urban future.

Thanks to the UN Assessment Matrix for City Wide Public Space Toolbox and data analytics methodologies, general accessibility mapping were made in Saudi as well as in the Emirate of Sharjah, with the combination of both inhabitants workshops (children, youth, etc.) and geographic information systems. Exploratory approaches demonstrated the need to envisage public at the neighbourhood level while combining 15 indicators at the city scale public space systems. Which revealed, once more, the complexity of urban systems within metropolitan systems.

Key recommendation and toolbox approaches enabled Saudi and the Emirate of Sharjah to further looking into design approach to public space in the future.

**Research Papers Presentation**

A 90-min experts panel discussion where experts shared about their research key findings related to hot cities challenges and opportunities, enabled the audience to better understand the specific challenges faced by cities located in the arid zones both in terms urban planning, city governance, environmental & water management, and their subsequent innovative solutions to overcome. Experts will share their viewpoints and debate on how to reconcile urban development and cities growth whilst facing heavy needs for appropriate urban management and sustainable living environments in these specific urban contexts, from South-East Asia to North Africa.

**Asia Pacific**

Tropics contexts have the opportunity to leverage on multiple energy mix opportunity, in particular in South East Asia, where multiple text bed can be implemented to leverage on abundant watershed, sun exposure. To tackle this chance, Bali has developed energy policy scheme with national grid provider in order to synergize effort into progressive energetical autonomy on Bali hot island. Yet, technology inefficiencies and lack of economies of scale show limits to off-grid systems and efforts shall be continued to both handle water resource while leveraging on it to energy supplies.

**India**

Water is a major concern in arid zone and north urban regions of India face tremendous water stress. The difficulty to find sufficient water resource is burning and it is estimated that 54% of the total Indian population is, to some extent, under water stress.

Water sourcing techniques in arid zones of India have a long background history. It has been found that ancient technique are re-emerging in arid and semi-arid zones due to their relevance at the local scale to satisfy basic needs. The case study explored during the session is the Indian state of Rajkastan (arid zone), totalling 34M ha or 10.5% of the Indian territory. In the paper, classic methods such as: Bawai / Jahalara; Poar; Rapat; Khadin/ Dhara; or Birka Bawri; were explored in order to assess the revival of those practices as well as recontextualize the crucial need to leverage on legacy of precedent civilisations and heritage knowledge in time of crisis.

**Iran**

Urban scale approach of the arid challenges in cities reveals the need for a climate sensitive urban design and urban infrastructure methods. In Iran where urban density and air temperature have increased over the past decades,
examples of compactness and high density in cities fabric show not only original city and street shapes but ancestral techniques to minimise the thermal exchange within the days and during the seasonal changes. Shades and narrow streets, thickness walls, urban colouring codes [from white to beige and natural tones], building orientation to maximise natural ventilation (south-east facing) are urban design and morphological strategies that enable the limitation of discomfort and arid climate shortcomings (heat absorption, etc.) for urban societies living in those areas. Iranian ancestral knowledge, as in Egyptian context, tackle water preservation and heat mitigation, killing two birds with one stone with the inner courtyards, water ponds, and fresh underground bath hydraulic systems, reminding that ancient urban societies are to teach us more than our so-called modernity and "smart" societies.

**Selected Papers**

1. HALIM Deddy Kurniawan, SETIAWAN Ida Bagus, *Bali: Towards a Green Island*
2. IRANMANESH Nasim, *Lessons from Iranian hot cities for future hot cities*
3. MALEK Yosra, REDEKER Cornelia, *Wadi Urbanism - From Threat to Resources*

**General Conclusion**

Amidst the context of Hot Cities of the Special Session, it has been observed that arid climates are not to be fought, but to be solutioned. As our experts shared their research and knowledge based on actual practices around the globe, there is a surge of traditional design and method of irrigation in many places in the world, finding synergies towards adaptation to these specific climates preserving water while designing urban living conditions. As our Congress Team members rightfully stated, there is no point turning back to those particular methods belonging to historical context with their own urban characteristics, and social environment; yet lessons shall be learnt from our ancestors in order to create and re-create sustainable living conditions, being now fully awarded of the fragility and finitude of our natural ecosystems.
Research Paper

BALI: Towards a Green Island

Deddy Kurniawan, HALIM, Green Building Council Indonesia, Bali, Indonesia
Ida Bagus, SETIAWAN, Office of Energy & Mineral Resources, Bali, Indonesia

Abstract

On the 28 October 2019, the Government of Bali issued a Governor Ordinance No. 45/2019 prioritising clean energy as the solution to the energy crisis in Bali. This crisis has been further exasperated by the covid 19 pandemic which has decimated the Islands economy in particular, tourism, its primary industry. This has forced Bali to change its tourism orientation from urban tourism to rural tourism promoting homestay, a shift which will significantly influence renewable energy planning for the Island. There are only two solar power plants on the island; one in Bangli and one in Karangasem each with 1 MWp on-Grid capacity. In addition there is a small hydro power plant in Buleleng with 1,95 MWp capacity, with existing rooftop PV power plant in the community generates around 1.3 MWp and 0.07 MWp off-grid. This leaves the Island with a significant shortfall and must, in accordance with the Ordinance, be met through the promotion of community uptake of solar panel for homes and buildings. This paper presents the of the strategic planning approach used by a special task force supervisory team of Bali Clean Energy to implement the Ordinance for the island

Keywords
Renewable Clean Energy, Governor Ordinance, Energy for Tourism

1. Background

Electricity on Bali was primarily supplied by oil and coal fired power plants from Java. These relied on national oil reserves which ran out in 2019 requiring Indonesia to become a net oil importer, while coal reserves will runout by 2025. This critical condition, anticipated by the Central Government, resulted in the issuing of Ordinance No. 79/2014, a revision of the previous Presidential Ordinance No. 5/2006 on National Energy Policy. Bali has nine local governments with eight regencies (Badung, Tabanan, Bangli, Karangasem, Klungkung, Jembrana, Buleleng, Gianyar) and one municipality (Denpasar), which is also the capital city. Transition to the use of clean energy is complicated by the ongoing construction of coal-fired power plant in Celukan Bawang, which is projected to produce 780 MW. It’s continuing development is still in public debate because it is based on coal and the capacity, planned by state owned electricity company (PLN-Bali), cannot meet the immediate need of 1200 MW and expected increases beyond.

Implementation of the Bali Government’s vision of "Nangun Sat Kerthi Loka Bali", will have a significant impact on renewable energy planning. The vision for the Island which will be implemented through the Development Scheme of Total Planning towards a New Era of Bali, will be carried out across 22 missions. These missions prioritize 5 (five) sectors; 1) Clothing, Food and Housing; 2) Health and Education; 3) Social Security and Employment, 4) Customs, Religion, Tradition, Arts and Culture, and 5) Tourism. These five priority sectors will be supported by integrated infrastructure investment and development on land, sea, and air with an emphasis on the utilization of clean energy. The vision will be delivered through a comprehensive and integrated planning approach within the framework of Unitary State of the Republic of Indonesia. It is committed to maintaining the purity of Bali’s natural environment, by pursuing a prosperous Balinese life, both physically and metaphysically, in accordance to three principles: Political Sovereignty, Economic Independence, and Cultural Personality.
2. Regulation

2.1. National Regulation

Energy is expected to make a positive impact in Indonesia and therefore has a significant role to play in economic growth and national resilience. It is also important therefore that energy management which involves supplying, utilization, and energy mining is executed wisely, in terms of fairness, optimality, rationality, and sustainability.

In Indonesia the regulation of energy management practices is governed by the following four regulations:


b. Republic of Indonesia Law No. 30/2009 concerning Electricity.


Because the Republic of Indonesia is an archipelago nation divided by three time zones (west, central, east) with 34 provinces, it uses a unitary rather than federal system through which to guide the preparation and implementation of these regulations through energy management plans. Bali is a Province located in the central time zone (refer Fig.1).

2.2. Provincial Regulation

As noted previously, the regional development vision of "Nangun Sat Kerthi Loka Bali" which is to create an island which is clean, green, beautiful, thus maintain purity and harmony, requires pro-environment attitude and energy conservation approach. To achieve this goal, energy management should be based on the Balinese values of “Tri hita Kirana”, the balance between environment, cultural-spiritual, and social-economic, or Triple Bottom Line of social, environmental and economic.

To enable this approach, provincial regulations must be adapted to reflect the cultural values and Balinese way of thinking. There are six umbrella regulations that guide energy development and management in the province:


d. Governor Ordinance No. 45/2019 concerning Bali Clean Energy.
e. Governor Ordinance No. 48/2019 concerning Battery-Based Electric Motor Vehicles.
f. Decree of Bali Governor No. 123/03-M/HK/2020 concerning the General Plan for Regional Electricity of Bali Province 2020-2039.

The Draft Bali Provincial Energy General Plan *(Rencana Umum Energi Daerah-Provinsi / RUED-P)* 2020-2050 was developed in consultation with the Indonesian Ministry of Home Affairs and approved and immediately enacted by the Bali Provincial House of Representatives (DPRD Bali) in July 2020.

### 3. Recent Major Research on Renewable Energy in Bali

Several recent studies show that there is significant potential to generate renewable energy in Bali. In 2019 a joint study by CORE (Centre of Community Based Renewable Energy) Udayana University and Greenpeace, produced a Road Map of Solar Roof Power generation across the island. It highlighted the huge potential for roof-based solar energy generation throughout the island suggesting up to 108 MWp could be generated by 2025. (CORE, 2019)

In another study by the Bali branch of the state owned electricity company, a survey of household customers of > 10 kVA who use Solar Roof Power Plant for maximum of 20% from the installed potency, as a mandated by the Governor Ordinance No. 45/2019 is around 159 MWp. (PLN UID Bali, 2020)

In 2019, a joint pre-feasibility study conducted by Directorate General of Renewable Energies and Energy Conservation, Ministry of Energy and Mineral Resources of the Republic of Indonesia and the IESR (Institute for Essential Services Reform), also found that there was potential to generate approximately 340 MWp from all kind of Renewable energy sources across Bali.

Giriantari (2020) also cited the RUEN (National Energy General Plan) 2018-2050 assertion that the potential for renewable energy generation in Bali could reach up to 3,061.6 MWp if a combination of the following sources were employed; Geothermal 262 MWp, Hydro 208 MWp (plus 15 MWp from Mini/Micro Hydro), Bioenergy 191.6 MWp, Solar 1,254 MWp, Wind 1,019 MWp, and OTEC (Ocean Thermal Energy Conversion) 320 MWp with only 4.2 MWp have been already realized of Mini/Micro Hydro 2 MWp, and Solar 2.2 MWp.

### 4. Renewable Energy

#### 4.1. Potentials of Renewable Energy

The are several potential sources of renewable energy in Bali, these are sun, water flow and waterfall, wind, geothermal, bio energy, movement, temperature differences in ocean layers and hydrogen. Based on the results of technical studies, the greatest potential for energy generation comes from the sun with the potential to produce 1,500-1,600 kWP of power.

According to government assessments(?), the greatest potential to accommodate renewable energy infrastructure is in coastal areas and open spaces. Within these, the priority is to utilize government buildings, both provincial and municipal level, commercial buildings, industrial plants, tourism developments, and public facilities as shown in the table 1, for the purposes of installing rooftop solar infrastructure.
With regards to Hydropower, the potential exists to enable microhydro (500-100 kW), mini hydro (100 kW-1 MW), and potential to enable picohydro (max. 500 kw) generators, particularly in mountain areas such as Jatiluwih in Tabanan region which is dominated by rice production, and serves as a regional hub for rice storage. Feasibility studies have also suggested that the tourism developments in the area are suitable for picohydro generation.

<table>
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<tr>
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<td>Hydro</td>
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<td>a. Microhydro &amp; Minihydro</td>
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<td>3</td>
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<td>OTEC (Ocean Thermal Energy Conversion)</td>
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Table 1. Potentials of Renewable Energy in Bali. Source: RUEN 2018-2050

Apart from its potential to generate renewable energy, Jatiluwih’s Subak traditional irrigation system has also been recognised as a UNESCO World Heritage Site. The picohydro using Subak is also potential to be promoted in tourism developments and the output could be used at least for street lighting. (see figure 3)

While the CORE (2019) study notes that Rooftop solar has the potential to produce around 1,490 - 1,776 kWh/kWp per sq/m annually, it is vulnerable to the vagaries climatic conditions characteristic of tropical regions. During rainy and cloudy weather, the potency of renewable energy sources such as the sun are reduced significantly, requiring therefore the utilization of hybrid technologies, using electricity smart systems, reducing high cost investment as well as maintenance, and choosing good quality product.
According to the Global Solar Atlas, Bali is well positioned to generate 1,286 kWh/kWp on average with its peripheral areas in the south, north west and north east providing the best locational value. While the PLN-Bali’s 2020 target for photovoltaic output is 159MW, CORE study suggests this may be compromised due to climactic variability and will increase up to 182 MW in 2022 optimistically for Hotel/Tourism, Government/Publics, Business/Commercials, Housing, and others. But CORE predicts the number achieved is only 108 MW due to the intermittent nature of solar power. (Giriantari, 2020).

4.2. Existing of Renewable Energy

According to a field study conducted by PLN-Bali, Amoghasiddi Community Cooperative, notes that as of August 2020, there are approximately 130 Rooftop solar Power Plants installed across Bali with an output of ± 1.500 kWp or equivalent to 1,5 MWp and with a potential to generate of ± 300 - 400 MWp for the total potency of installation.
Several pilot rooftop solar power plant projects have been installed in Bali by the central government, provincial governments, municipal governments, PLN, Independent Power Producer (IPP), universities, tourism industry, and the public. The Central Governments Renewable Energy and Resilience Research and Development Agency (P3TKEBTKE) of the Ministry of Energy and Mineral Resources, has collaborated with the Bali Government to develop these pilot projects as part of the Bali Governor’s Office microgrid system. As part of this cooperation scheme the Bali Government prepares rooftops for installation and the Ministry of Energy and Mineral Resources installs the solar PV infrastructure, each with a capacity to generate 158 kWp which has been deducted from PLN’s grid supply (Giriantari, 2019). In remote areas where there is no access to grid power, small scale solar power plants have also been installed.

4.3. Planning & Development of Renewable Energy

As noted previously, Bali’s electricity, typically supplied by PLN from power plants in Java Island, were fossil fuelled based. With petroleum supplies running out and coal supplies expected to run out by 2025, PLN-Bali has been preparing feasibility studies and transition plans to anticipate the energy crisis. To inform this PLN-Bali has been modelling Bali’s potential 10 yr Energy Mix/ projections as shown in Figure 7. These projections are important in helping transitioning Bali’s shift to renewable energy sources before fossil fuels run out entirely.
Therefore, to realize these projections, PLN--Bali has already planned and developed the development of several renewable energy power plants across the island. Figure 8 and 9 below show some of the primary locations for the development of renewable energy infrastructure in accordance to with the Renewable Energy master plan.

Meanwhile, the Provincial Government of Bali enacted regional regulation No. 3/2020 recently to enable the development of a clean energy industrial estate located in the west of the Island in the Candi Kesuma area of Jembrana Regency. This new Regulation amended Bali Province’s 2009-2029 Spatial Planning Provincial Regulation No. 16/2009 so that hundreds of hectares could be developed, as shown in the Figure 10, that regulates to support Clean Energy industry and drive the utilization of Clean Energy in Bali.

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5. Challenge for Waste to Energy

There are growing discussions about processing waste to be Refuse Derived Fuel (RDF) in Bali. One of the biggest crises confronting the Island is that of waste generation and disposal. This is a critical condition made worse by the influx of millions of tourists to the Island each year. In 2019 alone, 6.5 million tourists visited Bali, twice as many as the existing Balinese population. To manage the issue of waste, the Central Government initiated a national Waste to Energy (WtE) program. This program aims to look at RDF as part of a hybrid solution to coal-fired electricity. Processes such as gasification have been found to offer promising WtE outcomes and benefits. Advanced Gasification has several advantages over other waste management methods. It is: 1) carbon negative, 2) reduces waste stench/odours, 3) has no smoke pollutant, 4) creates no new waste (i.e., polluting ash produced by the incinerator), 5) RDF is a byproduct 6) has no hazardous emission such as Dioxins and Furan, and 7) creates no toxin or leachate to pollute air or soil. It will contribute to reducing greenhouse gas emissions and in turn global warming. To aid transition to WtE technologies, the Central Government is encouraging each province to promote WtE


with the Bali Government taking it one step further by opening up business related opportunities and giving every municipal government the authority to regulate its own schemes. These include developing Business to Business (B to B) and Public-Private Partnership (PPP) schemes.

However, implementing WtE needs careful planning and secured schemes, so that PPP between government and business entity will be accompanied by PT. Penjamin Infrastruktur Indonesia, a state owned company who is responsible as a project guarantor, under the Directorate General of Public Works Infrastructure and Housing Financing - Ministry of Public Works and Housing.

In Bali, planning is already underway for a provincial WtE plant plan, located in Suwung Denpasar and serving Sarbagita metropolitan area, an area which includes the capital city (Denpasar) and three regencies (Badung, Gianyar and Tabanan). The aim is to utilise current waste dump sites, with potential energy generated exceeding 15 MW. This is now going through Full Business Case (FBC) development with a review a Feasibility Study being undertaken in to the establishment of a PPP. This will be followed by full design development of the proposed facility before undertaking Market Sounding stage, and eventually going to public Tender.


As noted earlier, the island’s primary economic source, tourism, has suffered significantly during the Covid-19 pandemic causing hundreds of hotels to close and most supporting industries to be shutdown. This has forced the Government to change its tourism orientation from urban tourism to rural tourism with an emphasis on homestay eco tourism. This has given rise to developments such as ‘the locomotive’ an Eco Tourism Village (ETV). As the ETV has been designed to enable social distancing with 4 kinds of recreation offered; Ecotourism, Agrotourism, Adventure Tourism, and Cultural Tourism (Halim, 2020). The ETV also promotes community based homestays and villas rather than private hotels (corporate) and in so doing will strongly influence the investment in the uptake of domestic renewable energy infrastructure such as Solar PV.

According to Bali Provincial Energy General Plan (RUED-P) 2020-2050, the energy requirement in tourism sector is very high, around 50-60% from total energy required in Bali.

While the Covid-19 pandemic has affected all parts of life, recovery and regeneration of the Islands economy also presents an opportunity to improve both the quality of Bali tourism experience by supporting it with clean green renewable energy infrastructure and by establishing a brand new industry capable of attracting new investment, creating new jobs and supporting families and communities.

According to Bali’s Central Statistics Agency (BPS-Bali), as of 2019 Bali had developed 110 ETV, an increase of by 124% in four years. This has been complimented by an increase in the number of ordinary villages offering ‘homestay’ opportunities which have risen by 32% to 162 villages, an increase from 122 villages in 2014 (Purwanto, 2019).

Some ETV’s generate renewable energy and top up local electricity supplies for the village. Most of them also implement Waste to Energy (WtE) to meet energy demand. In Klungkung regency, a small scale WtE changes its waste into RDF (Refuse Derived Fuel) in the form of briquettes, a block of compressed charcoal dust or organic waste which can be used as fuel.

The ETV of Sudaji in Buleleng regency takes this one step further by creating an integrated waste treatment plant/WTP (Tempat Pengolahan Sampah Terpadu / TPST) with a sorting and recycling facility funded by the Sudaji community initiative. Other remote villages on other island have built WtE gasification system (closed combustion) power plants using foreign grants because incinerator system (open combustion) are not encouraged by the applicable law in Indonesia due to environemtal hazzards.
and air pollution. Gasification can produce syngas (synthetic gas) that directly can fuel the power plant. On Siberut island, there are three bamboo based biomass power plants with total output of 700 kW (Matotonan Village – 150 kW, Saliguma Village – 250 kW, Madobag – 300 kW) using gasifications technology (Wahono, 2020)

Figure 11. Integrated WTP in Sudaji Eco Tourism Village, Bali and Gasification in Matotonan Village, Siberut Island-Mentawai. Source: Field Survey, 2019 & Wahono, 2020

The tourism industry is very closely related to the provision of buildings for accommodation and places to eat and entertainment centres. These buildings are very large in number because of the tourism is a major industry in Bali. In response to the economic crisis brought on by covid, the tourism sector has begun to promote solar power as part of a sustainable green tourism movement that can help to improve competitiveness and corporate image. An example of this is the Waterbom Park in Kuta. It has installed a 156 kWp solar PV to reduce the supply from PLN-Bali. This is an example of cooperation business model referred to as a B to B scheme. Under this type of modela solar roof contractor builds the solar roof power plant on a building owned by Waterbom and sells its electricity to Waterbom Park. Several other hotels in Bali, such as Mercure at Bypass Ngurah Rai - Kuta, Long House Resort at Goa Gong, and Royal Tulip Hotel (also known as Springhill Condotel) at Jimbaran Hijau, are also progressively installing solar PV on roofs. These are are in the South Kuta district, Badung regency shown in Figure 12.


Some hotels such as Springhill, Condotel have been awarded EDGE certificate, a green building certification given by the International Finance Corporation (IFC-World Bank) for excellence in design. This hotel has also been recognised for using less embodied energy in building material, and for water and energy savings through the use of Solar PV panel and an applied water conservation systems as seen in Figure 13.

Springhill uses several techniques to deliver these savings. It has reduced window to wall ratio, external shading devices, insulation of roof and external walls, natural ventilation in corridors, air conditioning...
with air cooled screw chiller, energy-saving light bulbs for internal and external spaces, and solar photovoltaics. For water conservation, it uses low-flow plumbing fixtures for washbasins and shower-heads, dual-flush water closets, water-efficient urinals, water-efficient kitchen faucets, and water-efficient landscaping. It terms of minimising embodied energy, it utilized micro concrete tiles on steel rafters for roof construction, stone profile cladding and autoclaved aerated concrete blocks for internal and external walls, wood block finishes for flooring, and timber window frames.

According to PLN-Bali data, installation of roof-top solar has increased across Bali. From mid-2019 there are now 49 units scattered in South Bali - 36 units, East Bali - 7 units, and North Bali - 6 units with a total installed capacity of around 470 kWp. (refer to figure below).

7. Strategy and Implementation

7.1. Strategy

The utilization, development, and management of renewable energy must be carried out hand in hand between competent parties. Strong commitment is required to achieve energy independence and security. Local Government, in this context, is not only critical to developing regulations but also as pioneers leading regional innovation in the development of renewable energy.

There are several delivery models which can be used to advance investment and cooperation between government and government (G to G); government with business entity (G to B) or sometimes also called PPP (Public-Private Partnership), and business entity with business entity (B to B).

For B to B scheme, usually investor (private or state/provincial owned enterprise) would joint venture with Perusda (Bali province owned enterprise) as the IPP (Independent Power Producer). Nevertheless, in erecting power plant, whatever scheme is chosen (G to G, PPP or B to B), every IPP has mandatory PPA (Power Purchased Agreement) with PLN as the buyer of the electricity produced, so that there is an assurance in doing energy business in Indonesia in general, and Bali in particular.

7.2. Implementation

The local government accelerates the process in realizing Resilience and Competitiveness, particularly in developing renewable energy. In addition to issuing a number of regional regulations (Regional law and
Executive order/Governor regulation), the role of the local government is also to prepare the market demand by prioritizing development zones in industrial/commercial areas, offices, hotels and restaurants. In addition, the scheme to provide incentives and disincentives in the use of renewable energy is important to stimulate and to encourage more massive use, to prepare zoning for industrial areas for clean energy, and to provide vocational workers for the renewable energy sector.

The local government is also very open to cooperating with investors who will invest in the development of renewable energy in Bali. Currently, consultation and coordination phase are being held with the central government, business entities and non-governmental institutions to jointly review technical schemes and sustainable financing in the development of renewable energy.

8. Conclusion

Tourism sector is the economic backbone of the island, so that strong infrastructure is required to support it. Unfortunately, tourism sector is easily affected by natural and unnatural disaster, like Covid-19, in which we are still fighting to it. Therefore Bali government has been accelerating innovations to stimulate economic recovery, such as promoting small micro medium businesses, encouraging digital technology development, in which all of these require reliable and sustainable energy. Green energy is one of the innovations for sustainabile development in Bali, to support sustainable tourism. It is expected that Bali is able to achieve energy independence by prioritizing the use of clean and renewable energy development, such as Solar Power Plant, Hydro Power Plant, and Bio Energy Plant such as WtE which currently these are available to be utilized. Surely, the development is conducted through mutually beneficial cooperation, technology transfer, and giving widely open job opportunities in energy sector. Some conclusions which can be drawn as follows:

a. There is widely open opportunity of Renewable Energy development and investment.

b. The Bali government vision of “Nangun Sat Kerthi Loka Bali” through Total Development Planning to achieve the new era of Bali, is emphasizing on the use of Clean Energy to keep Bali clean, green and beautiful, so that tourism sector will be supported with environmental friendly infrastructure.

c. The challenges are insufficient funds, incompetent human resources, and green energy technology.

d. Mutually beneficial between Central government, Bali Government, Academics, Business entities as investor is required to funding green energy infrastructure in supporting Bali economic recovery.

To achieve the dream of being a green island, the Governor of Bali has issued Governor Ordinance No. 45/2019 that is strongly dedicated for the use of solar power, although not limited to other kind of renewable energies, and established the Taskforce led by the provincial leaders (Governor, Vice Governor and Secretary of the province) and consisted of inter-departments government head officers (Energy & Mineral Resources, Public Works & Spatial Planning, Environment & Forestry, Industry & Trades, and Law & Regulations, Research & Innovation Agency of Bali, Regional Development Planning Agency of Bali), PLN (UID-Bali), academicians, governor’s experts unit, Center for Community Renewable Energy (CORE), Green Building Council Indonesia representative Bali (GBCI-Bali), and communities represented by Amogasiddhi, a cooperative community business unit. In short, this team model resembles a collaborative-participative planning process.

With all of these efforts, solid vision, and strong will and motivation, may God will bless Bali’s endeavor to be a green island with independent clean energy. Hopefully...

References

Bali Provincial Law No. 16/2009 concerning Spatial Planning of Bali Province 2009-2029 (Bali Provincial Sheet No. 16/2009, supplement to Bali Provincial Sheet No. 15)
Keywords

Iranmanesh, Nasim lessons from Iranian hot cities for future hot cities

1. Introduction:

Iran is a special country which have four climatic regions: mild and humid region, cold region, hot region and desert region. Many cities of Iran suffer from harsh climate and water scarcity both. But we notice a rich urban planning and architecture in these cities which were adapted with this hard situation. We can survey this adaptation in many aspects of traditional urban planning and architecture in Iran. They could build some building with a good energy saving and prepared some spaces with suitable conditions for living. Desert has a harsh climate with hot days and cold nights but Iranians build their houses in such a way to keep warm temperature during nights in their walls and then it had cold walls during winter days. Many cities of Iran suffer from harsh climate and water scarcity. But there are a rich urban planning and architecture in these cities which were adapted with this hard situation. We can survey this adaptation in many aspects of traditional urban planning and architecture in Iran. They could build some building with a good energy saving and prepared some spaces with suitable conditions for living.

2. Overview of Iran:

Iran is an ancient country with an old civilization. Most parts of this country have been located in hot and dry region. Many cities of Iran suffer from harsh climate and water scarcity both. But we notice a rich urban planning and architecture in these cities which were adapted with this hard situation. We can survey this adaptation in many aspects of traditional urban planning and architecture in Iran. They could build some building with a good energy saving and prepared some spaces with suitable conditions for living. Desert has a harsh climate with hot days and cold nights but Iranians build their houses in such a way to keep warm temperature during nights in their walls and then it had cold walls during winter days. For example, there was a dense urban fabric in these cities with narrow lanes. Also, they could control the wind into rooms. These houses had central yards which contained pool and plants to reduce the temperature of hot days as well. Briefly, there is a special climatic design in traditional houses of hot and dry region. For the cold region, there was a lot of snow and they had a lot of reservoir or baths or ice house and so on. Nowadays sustainable design in architecture and urban planning is an important and essential paradigm. This paradigm emphasized on adapting with nature instead destroying it. Traditional architecture and urban planning of these Iranian cities of hot and dry region for winter and the second for summer. In summer part they used wind tower to catch and bring drinkable water of city and citizens used water by some traditional hydraulic structures such as water reservoir or baths or ice house and so on. This Qanat provided achieve the problem of limitation of water by some intellectual technology which called Qanat.

3. Climatic regions of Iran:

This paper has been divided in two sections, urban planning scale and architectural scale. Before discussing these two sections, we need to understand the climatic regions of Iran. For example, there was a dense urban fabric in these cities with narrow lanes. Also, they could control the wind into rooms. These houses had central yards which contained pool and plants to reduce the temperature of hot days as well. Briefly, there is a special climatic design in traditional houses of hot and dry region. For the cold region, there was a lot of snow and they had a lot of reservoir or baths or ice house and so on. Nowadays sustainable design in architecture and urban planning is an important and essential paradigm. This paradigm emphasized on adapting with nature instead destroying it. Traditional architecture and urban planning of these Iranian cities of hot and dry region for winter and the second for summer. In summer part they used wind tower to catch and bring drinkable water of city and citizens used water by some traditional hydraulic structures such as water reservoir or baths or ice house and so on. This Qanat provided achieve the problem of limitation of water by some intellectual technology which called Qanat.

4. Results and discussion:

Many cities of Iran suffer from harsh climate and water scarcity. But there are a rich urban planning and architecture in these cities which were adapted with this hard situation. We can survey this adaptation in many aspects of traditional urban planning and architecture in Iran. They could build some building with a good energy saving and prepared some spaces with suitable conditions for living. Desert has a harsh climate with hot days and cold nights but Iranians build their houses in such a way to keep warm temperature during nights in their walls and then it had cold walls during winter days. For example, there was a dense urban fabric in these cities with narrow lanes. Also, they could control the wind into rooms. These houses had central yards which contained pool and plants to reduce the temperature of hot days as well. Briefly, there is a special climatic design in traditional houses of hot and dry region. For the cold region, there was a lot of snow and they had a lot of reservoir or baths or ice house and so on. Nowadays sustainable design in architecture and urban planning is an important and essential paradigm. This paradigm emphasized on adapting with nature instead destroying it. Traditional architecture and urban planning of these Iranian cities of hot and dry region for winter and the second for summer. In summer part they used wind tower to catch and bring drinkable water of city and citizens used water by some traditional hydraulic structures such as water reservoir or baths or ice house and so on. This Qanat provided achieve the problem of limitation of water by some intellectual technology which called Qanat.
lessons from Iranian hot cities for future hot cities

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Abstract

Iran is an ancient country with an old civilization. Most parts of this country have been located in hot and dry region. Many cities of Iran suffer from harsh climate and water scarcity both. But we notice a rich urban planning and architecture in these cities which were adapted with this hard situation. We can survey this adaptation in many aspects of traditional urban planning and architecture in Iran. They could build some building with a good energy saving and prepared some spaces with suitable condition for living. Desert has a harsh climate with hot days and cold nights but Iranians build their houses in such a way to keep warm temperature during nights in their walls and then it had cold walls in days to reduce the temperature of the rooms. Besides they divided their homes to two parts, one part for winter and the second for summer. In summer part they used wind tower to catch and bring the wind into rooms. These houses had central yards which contained pool and plants to reduce the temperature of hot days as well. Briefly, there is a special climatic design in traditional houses of hot cities of Iran. Urban planning of these cities respected some features to reduce the effect hot climate as well. For example, there was a dense urban fabric in these cities with narrow lanes. Also, they could achieve the problem of limitation of water by some intellectual technology which called Qanat. Locating of most of the urban elements of cities obeyed from these Qanats. This Qanat provided drinkable water of city and citizens used water by some traditional hydraulic structures such as water reservoir or baths or ice house and so on. Nowadays sustainable design in architecture and urban planning is an important and essential paradigm. This paradigm emphasized on adapting with nature instead destroying it. Traditional architecture and urban planning of these Iranian cities of hot and dry climate contains a lot of features which can be useful for urban development of future hot cities which will be developed by sustainable urban planning paradigm. This paper reviews some features in traditional urban planning and architecture as some useful lessons for recent and future hot cities. Indeed, there are some aspects in these cities which can lead us a more sustainability in urban planning specially for hot cities.

Keywords

Traditional architecture and urban planning, sustainable development, historical cities of Iran

Introduction:

Many cities of Iran suffer from harsh climate and water scarcity. But there are a rich urban planning and architecture in Iranian cities which were adapted with this hard situation. This paper reviews some features in traditional urban planning and architecture as lessons for recent and future hot cities. There are some aspects in these cities which can lead us a more sustainability in urban planning. This paper has been divided in two sections, urban planning scale and architectural scale. Before that there is a brief explanation about the climatic regions of Iran.

1. Climatic regions of Iran

Iran is a special country which have four climatic regions: mild and humid region, cold region, hot and humid region and hot and dry region. Most parts of this country (%75) has been located in hot
and dry region. Every climatic region in Iran has a specific vernacular urban planning and architecture and, in this paper, I just discuss about the features of urban planning and architecture of hot and dry region.

![Figure 1: Four climatic regions of Iran](image1)

**2- The features of urban planning in hot and dry region:**

In this region the fabric of settlement is impact and buildings have been attached to each other to mitigate the external walls according its volumes. The density and compacting in houses caused minimizing the rate of thermal exchanging through the external walls of buildings either in summer or in winter. So, in summer the heating of sun couldn’t penetrate inside the building and in winter the heat of rooms couldn’t go out as well. The energy saving was increased efficiently in this way. Usually buildings were constructed in very compact urban fabric, in this way more shadow were created on external surfaces. Due to the compaction of houses in urban fabric, the delay in time of heat transferring was optimized so during the day the heat of sun couldn’t arrive inside the house quickly but after a long delay in the beginning of night the heat entered inside when the sun had gone and the weather in cold.

Figure 2 is a picture from urban fabric of Yazd city one of the hot cities in Iran. This is an ancient city in spite of severe water scarce in that region.

![Figure 2: Urban fabric of Yazd city](image2)
Figure 3 is a picture from lanes of this fabrics. These lanes were narrow and twisted so winter wind couldn’t affect on them so much and in summer there were enough shadow to keep away from the hot sunshine.

3- The characteristic of architecture in hot and dry region:
Totally the buildings of this region have been erected by mud and brick which have high capacity. In some places which have very hot climate there were also some settlements which were located inside the hills or underground to extend the time of heat transferring extremely. In this way the settlement can utilize the favorite thermal situation of the earth.
In most parts of this region wood is very limited and because of wood scarce the roofs of buildings were constructed by arch and doom by mud and brick. Of course, in semi-arid regions of Iran there are some roofs which were erected in flat form because there was more wood in those area.
To mitigate the observation of heat by the walls the external surface of them was colored in white color.

In hot and dry region, they used wind tower to catch the wind toward the room. This way was the common way for natural ventilation and using the cool wind during the summer in hot and dry region. Using planted atriums (central yards) is one the most important features of these buildings in hot and dry regions. Central yards which concluded trees, pool and planted area were very effective in increasing moisture which were very important in dry region. All of the rooms were opened just to this yard and utilized the shadow and moisture of the yard. The rooms were protected from sand storm and cool winter winds as well by using this technique in design.

Sometimes traditional houses of that area had several central yards and each yard allocated to each member of family (son’s family) or servants.
Lessons from Iranian hot cities for future hot cities

Figure 5 - a traditional house in Kashan city with several courtyards

Figure 6 shows a typical central courtyard in an Iranian traditional house which consist pool and trees and other plant to create a cool atmosphere by increasing shadow and moisture in them.

Figure 6 - a central courtyard in a traditional courtyard in Yazd city

The orientation of these buildings is toward the south of southern-east. This orientation is the best orientation to control and minimizing the penetrate of the heat of sun. Using colored window is the other feature of these houses. They use colorful windows for rooms to decrease the heat of sun during the hot days. This technique increased the beauty of the interior room too much (figure 7).
In most cases the courtyards were entered in the ground to use the thermal capacity of the ground and increasing the shadow of walls as well. They called these yards “Garden pit” (figure 8).

3.1 surveying of some traditional hydraulic structures in historical cities of Iran

In historical hot cities of Iran there several types of hydraulic structures to serve citizens these structures mostly included bath, water reservoir, ice house, wash house, Payab, water mill. These elements usually were located along the path of water. In most of cities of Iran, water was earned by Qanats and hydraulic structures were set along the path of water of Qanats. Figures 9 – 12 show some hydraulic structures in hot cities of Iran.
In most cases the courtyards were entered in the ground to use the thermal capacity of the ground and increasing the shadow of walls as well. They called these yards “Garden pit” (figure 8).

Figures 9 – 12 show some hydraulic structures in hot cities of Iran.

Payab is a structure which lead to the water of Qanat in underground. Jame mosque (The great mosque) and some important houses had this structure to reach the water of Qanat.
4. Learning from traditional architecture and urban planning of Iran

As it was mentioned, in the past Iranian architects used some intellectual ways to be adopted with the harsh and hot climate of that region. These ways were completely adoptable with nature and environment. The buildings were heated and cooled mostly by architectural design techniques. In contrast nowadays we should spend a lot of energy for heating or cooling in the buildings and this waste a lot of nonrenewable energy in cities of Iran. Today buildings should spend a lot of energy because builders don’t concern climatic design codes during the construction. Recent buildings in Iran waste a lot of energy in summer and winter both because builders don’t use isolation in them. Of course, reviewing of the features of traditional Iranian houses in hot cities doesn’t mean that we should go back to these houses and live in them or built exactly like them.

We studied these houses to use every suitable features of these houses, for example increasing the thermal capacity in the material of recent building can be a good solution against high thermal fluctuation in desert temperature. Increasing shadow in building can be a good way to mitigate the temperature of the building as well.

Using canopy on the top of windows is another practical solution to decrease the cooling energy during the day by preventing the direct sunshine to the room to come in.

5. Conclusion

Iran has a rich heritage in architecture and urban planning but unfortunately in modern area the quality of architecture and urban planning has been decreasing very much. There are many structural codes for construction but in most cases these codes have been ignored by designers and builders both. For example, there are some codes for energy saving that have some codes about designing in such a way that increasing the energy saving of buildings. These codes including choosing suitable materials and detail to increase the energy saving in buildings and avoiding to waste energy and designing efficient canopies to avoid extremely heating in the rooms.
It is obvious that we couldn’t and shouldn’t build exactly like the past. But we can learn some lessons from them. The most important thing is learning how our ancestors were adopted with nature and didn’t fight with it. They found some sustainable solutions to create suitable situations in their living spaces.

4. References:

Research Paper

Wadi Urbanism
From Threat to Resource

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Abstract

This paper intends to throw light on the multiple landscape qualities of wadis as an untapped resource within the Egyptian arid urban context. Wadis are often perceived as obstacles when it comes to urban planning as they are prone to Wadi Flash Floods (WFFs) hazards. This results in prohibiting any building activities to take place within the wadi, making it a “reduced economical value”. In this light ‘Wadi Urbanism’ (WU) proposes urban design guidelines and a methodological framework to attain a resilient planning and integrated design approach to the conventional sectoral and defensive flood-control solutions. The learnings from theory and practice are contextualized in a case study: Wadi Kharouba in Marsa-Matrouh located in the hinterlands of Egypt’s Northwestern Mediterranean coast serves as an exemplary wadi cultivation project that is currently threatened by informal urban development. The research integrates international ‘Water Sensitive Urban Design’ (WSUD) guidelines along with other spatial planning tools at a regional and architectural scale. These studies inform the proposed ‘Wadi Urbanism Guidelines’ (WUGs) – a regenerative design strategy used to take advantage of naturally dynamic wadi landscapes to be integrated into an urban context.

Keywords

Wadi Urbanism, Water Sensitive Urban Design, water scarcity, productive landscapes, desert urbanization, rainwater harvesting, New Urban Communities, landscape urbanism

1. Introduction

Wadi Urbanism: an explorative urban design approach that integrates (cultivated) wadis as (green) open spaces by building on their diverse eco-systemic capacities such as water harvesting, local food production, floodwater management, habitat creation, and dynamic landscape qualities to create a public open space and aesthetic landscape. Wadi Urbanism as a research topic explores water resilient planning and design strategies to face climate challenges and sustainable urban development growth as an alternative urban design model for desert cities. Flash floods in wadis are considered both a threat and an essential source of water, particularly for groundwater recharge, but also to enable wadi bed cultivation. Both threat and intrinsic potentials need to be considered to transform these dynamic desert landscapes into a unique urban quality responsive to increasing water scarcity. This research proposes a set of guidelines consisting of a four-part methodology: 1) Site Analysis, 2) Water Management Plan, 3) Landscape & Environmental Aspects, and 4) Urban Planning & Design. These formulate the ‘Wadi Urbanism Guidelines’ (WUGs) – a regenerative design strategy used to take advantage of naturally dynamic wadi landscapes and their intrinsic comprehensive ecological services. Beyond a case study based in Egypt, where we find wadis both along the coasts of the Red Sea and the Mediterranean as well as along the Nile River (Figure 1), the research further reflects on international wadi development. In response to highly dynamic population growth, the Egyptian government is currently developing a massive urban development program for 20 new cities planning to accommodate 30 million people by reclaiming about two million acres of the desert (Egypt Independent, 2018). Limited water resources have led to exploring alternatives such as the
harvesting of flash floods in wadis. This research uses the case of Wadi Kharouba in Marsa-Matrouh Governorate, one of the urbanizing Mediterranean coastal regions, to serve as a national case study to explore previously proposed WUGs. This case has also been chosen for the ‘Wadi Kharouba Rehabilitation Project’ which aimed to optimize wadi-bed cultivation by implementing several water harvesting techniques that also provide interesting landscaping features. This research argues for the potential of linking current urban development activities with the given topographical qualities of Egypt’s diverse wadi landscapes through mapping and provides context to exemplarily show the environmental and socio-economical capacity within the given case study in Marsa-Matrouh. It intends to bridge the gap between the lower level wadi as a potentially productive and thus green landscape and its upper plain as an urban silhouette to define an integrative urban design approach supported by a methodological framework taking both constraints and potentials into account. Through research by design, the case study is further explored on an urban planning and design level. The research concludes with a reflection on the WU approach where wadis appear as site-specific, multi-functional open spaces that serve as productive landscapes, public urban parks, and last but not least as a major water resource as well as evolving questions as to how this integrated approach could be implemented in current practice.

![Figure 1. Map of Egypt Wadis & Marsa-Matrouh Location. Source: Yosra Malek generated by GIS (2019)](image)

1.1 Understanding Wadis

**WADI** is an Arabic term for a valley or waterstream bed (a waterway). It is an impermanent waterstream that lasts for a short time, usually during and after a rainstorm, and varies from one season to another (Şen, 2008). A Wadi could also be defined as a deep winding channel engraved in the desert landscape formed by the action of water-flow and often leads to a continuous open water source such as e.g. rivers, seas, lakes, etc. (Figure 2) (Rima Mekdaschi, 2013). Wadis are situated in arid regions characterized by a severe lack of available water due to climatic conditions (Şen, 2008). According to this study, wadis are classified into four types depending on if water remains in wadis during the dry season and their scale: a wadi can...
be as small as a few square meters or as large as several square kilometers. The amount of water in the channel and the duration varies from one region and event to another. A wadi can vary in scale from a broad regional scale such as a river, e.g. the Nile River Valley or Wadi El-Nile, down to the scale of a creek. This research focuses on the local scale/seasonal flow wadis ranging from 1-10 km in length where the stream only carries water in the course of heavy rainfall.

1.1.1 Wadi Physical Features
To have a solid understanding, wadis need to be studied in the context of the respective watershed that they are a part of. A watershed is a topographically defined area where a group of streams that channel water into a main connecting stream, that drains off water-rainfall into a common outlet such as e.g. sea, rivers, etc. Watersheds can vary in size from a small drainage area to thousands of square kilometers (USGS, 2019). A top view and transversal section show the different wadi levels (Figure 3):

- First level: the wadi-bed where continuous or seasonal water-flow takes place
- Second level: wadi terraces/embankments where seasonal run-off takes place
- Third level: wadi upper plain (flood-free zone)

1.1.2 Wadi Potentials
This research aims to emphasize the vital role of wadis as a water harvesting resource and its potentials of advancing the quality of urban space through their capacity to be cultivated. The vital role of wadis and their intrinsic potentials are listed as follow:
**Hydrological corridors:** Wadis are hydrological corridors where seasonal and continuous surface runoff takes place. As natural drainage corridors, these can be integrated into urban drainage systems.

**Water source:** Dry wadis are considered as an essential resource to capture rainwater in arid and semi-arid regions by feeding groundwater tables and aquifers on site.

**Ventilation corridors:** Wadis are ventilation corridors and, if cultivated, green buffers with a potentially positive influence on macro- and microclimates.

**Fertile bed:** As dry, fertile beds, the cultivation of wadis as productive landscapes can simultaneously serve as recreational parks and aesthetically intriguing cultural landscapes.

**Natural habitat:** Wadis provide a natural habitat for numerous plants and animals thus playing a crucial role in biodiversity.

**Wadi cliff walls:** provide a natural landscape with vast views, a site-specific spatial quality that contributes to a collective identity, and may also provide prime real estate locations aligning the wadi borders.

1.1.3 Wadi Urbanism - Constraints

To attain the previously listed potentials, several constraints need to be considered and overcome. Physical changes in wadis are frequent due to climate change and irregular rainfall events which can result in a diversity of responses ranging from short-term events such as flash floods, landslides, and point-source contamination, to long-term events such as soil degradation, water exhaustion, and non-point-source pollution (M. Abdel-Fattah, 2017). Wadi Urbanism focuses on sustainable urban design solutions to overcome these limitations for better land and water management. In this context, the existing damage potential poses three main constraints (Figure 4).

2. Methodological Approach towards Formulating Wadi Urbanism Guidelines

2.1 Adapting Water Sensitive Urban Design to Wadi Urbanism Guidelines (WUGs)

**Water Sensitive Urban Design (WSUD)** provides a framework for planners and urban designers to integrate major and minor water-flow paths in the landscape in an urban context by setting certain guidelines for site analysis, water management plans, and landscape and urban design practices (Jacqueline Hoyer, 2011). WSUD incorporates water management in an urban context by integrating water source, landscape, and guiding urban design principles to preserve the natural water cycle (Dickhaut, 2011). WSUD sets a framework or guidelines for planners and urban designers to maximize the exploitation of the natural stormwater drainage network in an urban context responsive to working with the forces of nature.
Malek, Y.; Redeker, C.

Wadi Urbanism (WU) is considered a form of WSUD. Accordingly, various WSUD guidelines (WSUDGs) were examined and adapted to WUGs.

2.2 Wadi Urbanism Proposed Guidelines

Through studying WSUDGs, four key steps in the following sequence were identified to specify WUGs: 1. Site Analysis → 2. Water Management Plan → 3. Landscape & Environmental Aspects → 4. Urban Design & Planning Practices (Figure 5).

2.2.1 Site Analysis

The site analysis is essential to the WU design approach. The site analysis includes two consequent parts: Environmental conditions and topographical features. It concludes with a database that many design decisions are built on focusing on characteristics such as (Figure 11): wadi scale, climatic conditions, water condition, soil type, slope, catchment, etc. (Guangyu Wang, 2016). Topographical features are generated via a Geographical Information System (GIS) programs to spatially represent captured data (Scott D. Bryant, 2012).

2.2.2 Water Management Plan

The water management plan includes the catchment as a whole with a focus on the first level of the wadi. It aims to maximize the use of rainfall-runoff while providing a safeguard environment for the public to enjoy. These objectives are met by defining a well-prepared plan to withstand all rainstorm ranges and to overcome flash-flood hazards that may cause slide slopes and water infiltration of the catchment (Jacqueline Hoyer, 2011). Water Harvesting Techniques (WHT) applied in dry areas play an essential role in accomplishing these aims (Theib Y. Oweis, 2012). WH takes advantage of a naturally occurring process – rainfall run-off collected through the existing topography e.g. the wadi-bed watercourse down a hill slope, mountains, etc. (L.S. Pereira, 1996). The water management plan is divided into two parts:

The Hydrological Buffer designates hydrological boundaries for a watercourse in a wadi-bed where flash floods occur. It is part of the legally defined floodplain which requires special planning and policies to protect water corridors from developments and provide public safeguard Figure 7 (BMT, WBM, Pty, Ltd, 2009). Further, the areas aligning the main channel to both sides, characterized by seasonally wet and damp lands, are not allowed to be built on due to the relatively high soil moisture content after the occurrence of rainfall that may result in landslides and building collapse (Victorian Stormwater Committee, 1999).
Wadi Urbanism (WU) Capturing rainwater that falls on one part of the land and transferring it to another while managing the water-flow ideally eliminates the risk of flash floods by redirecting the water-flow and slowing down the water velocity (Theib Y. Oweis, 2012). In that way, WH increases the amount of water available and stores surplus water for beneficial use such as the production of crops and livestock (L.S. Pereira, 1996). Consequently, the proposed WU water management plan synergizes WH and flow management to provide an alternative source of water for irrigation also of open spaces (Yosra A. Malek, 2020). Moreover, WH offers several environmental benefits, including reducing soil erosion, decreasing surface water and groundwater demand, and groundwater recharge (Rima Mekdaschi, 2013). To specify suitable WHTs for a particular site, selection criteria based on the wadi-catchment type are based on the environmental conditions and given the topography of a region. The most important selection parameters are the scale of the water-catchment and the amount of rainfall (Table 1) (Cox, 1979). Further criteria include rainfall intensity, application scale, run-off characteristics of the catchment, the water-storage capacity of the soil, water-storage (in cisterns), and water-harvested usage, as well as socio-economic conditions, etc. (Theib Y. Oweis, 2012). Water Harvesting may be classified as follows (Figure 6):

- Floodwater Harvesting (FloodWH),
- Macrocatchment Water Harvesting (MacroWH),
- Microcatchment Water Harvesting (MicroWH)

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<tr>
<th>Water Harvesting Groups</th>
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Table 1. Water Harvesting Technique Selection Criteria. Source: Yosra Malek (2020)
2.2.3 Landscape and Environmental Aspects
Landscape and environmental aspects are one of the main design foci of WUGs to enable the incorporation of wadis within public open spaces (Jacqueline Hoyer, 2011). With a specific focus on the wadi-bed and embankments that together define the flood plain. Building activities in the flood plain are prohibited due to the relatively high soil moisture content, immediately after the occurrence of a rainstorm (Jacqueline Hoyer, 2011). These aspects provide open spaces for productive landscapes (reliant on soil fertility) and enhance urban environmental qualities through the establishment of wetlands improving wildlife habitat, for recreational purposes, public utilities, water distribution, and storage thus maximizing the beneficial use also increasing the land value (BMT, WBM, Pty, Ltd, 2009).

2.2.4 Urban Design and Planning Practices
Moving further from the flood zones to the third level (safe zone) where urban development can take place, urban design guidelines elaborate on how to incorporate wadis in an urban context and vice versa (Yosra A. Malek, 2020). By setting a framework for projects on the neighborhood or city scale to define areas where building activities are allowed to prevent building activities within a specific distance on both sides to avoid landslides and building collapse (Dickhaut, 2011). These distances may differ from one wadi to another based on the geographical and physical condition of a certain region (Lloyd, 2001). The urban plan includes the following information (Figure 7):
- Urban Practices and Land Use Plan
- Street Layout and Transportation Network
- Building Layout
The Street Layout and Transportation Network coheres with the enhancement of views encouraging the public to interact with the landscape (Victorian Stormwater Committee, 1999). Also, it emphasizes the importance of implementing a pedestrian network alongside and through the wadi to facilitate access to the open public spaces through the incorporation of pathways between wadi activity nodes and by integrating recreational amenities. Also for safety reasons, the circulation layout is defined by the site topography (BMT, WBM, Pty, Ltd, 2009). Flood zones are served by rural roads that are different in the structure and design of regular roads. Culvert structures may be integrated subsurface to channel the waterstream under the road network. The WU street layout covers both longitudinal and transversal connections with the wadi to prioritize the pedestrian network and bike lanes whenever possible to ensure the urban quality of the wadi spine (Figure 8).

Building Layout Buildings are located on the higher embankment of the catchment possibly to both sides to create a vis-à-vis. According to the arid climate, residential layouts often comprise a more dense form of development. Along with the wadi embankment buildings should also comply with WSUD parameters to avoid barriers (Dickhaut, 2011).
3. Wadi Urbanism Guidelines Proposed Case Study Model: Wadi Kharouba

To test the proposed guidelines, Wadi Kharouba (Figure 9) as an Egyptian case study has been chosen as a WU model to be developed through research by design approach. In collaboration with the local Bedouin community, the wadis of Marsa-Matrouh as part of Egypt’s North-Western Coastal Zone (NWCZ) (Figure 1) have been part of a development project of the International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM) in cooperation with the National Desert Research Centre (DRC) to enhance water harvesting techniques and improving harvesting and distribution systems to create more sustainable models of the already existing wadi cultivation practice using rain-fed systems. The fig and olive production is one of the most important sources of income in the area (Shaaban, 2010), as Egypt is the second-largest contributor with 18.3% of global figs production right after Turkey (Francesco Nesci, 2000). However, until now these agricultural projects are not linked to any kind of urban development plan which consequently happens informally. Until today, Wadi Kharouba stands as an example of a productive landscape without sufficient urban development (Abd El-Rahman, 1986).

Figure 9. Wadi Kharouba Figs cultivation. Source: Menna Mohsen (2016), Adapted by Yosra Malek (2020)

3.1 Marsa-Matrouh Demographics and Wadi Kharouba Status Quo

The current confinement of tourism to a one-kilometer coastal strip has a negative impact on the population density of Marsa-Matrouh reaching up to 5,000 inhabitants/km² on the coast (Rady, 2011). 11% of Marsa-Matrouh population lives in areas further away from the coast with scarce development around the green fingers of the wadi (Figure 10) (Rady, 2011). These hinterlands include dispersed Bedouin settlements, most of whom plant figs. Moreover, agriculture, including figs, olives, and barley fields, accounted for 70% of the total employment of the coastal zone, earning its position as the dominating economical sector (Bonnet, et al., 2014). The main threat facing this economic sector is the scarcity of water supply (Ayyad, 1992). Due to the economical capacity of cultivation, the governorate has oriented its focus towards supporting agricultural development projects such as the ’Matrouh Rural Sustainable Development Project’ (MARSADEV) from 2014-2017 (DRC, 2015). The rehabilitation of 3km of Wadi Kharouba enabled more than 60 families to have new plots of reclaimed land as an additional source of income thus reducing poverty in Bedouin society (DRC, 2015). Many actions of this project have deeply changed the social and natural environment of the region, mainly through RWH for rain-fed agricultural production. However, many of these wadis are still undeveloped with only 2-5% of rainfall being utilized (Salem, 2016).

3.2 Wadi Kharouba Site Analysis

Egypt’s NWC is characterized by an arid Mediterranean climate with hot summers and mild winters. This area receives appreciable amounts of rainwater during rain periods varying from 102-140 mm/m²/year. Heavy rainfall only occurs in winter with approximately 250 mm/m² (Figure 11). Wadi Kharouba is 5.5 km long with a total area of around 165.5km². The center of the catchment area lies at latitudes 31°20’14.7” N and longitudes 27°10’20.2” E (Mohamed E. A. Khalifa, 2015). The wadi-bed is characterized by thick
alluvial deposits and constitutes a subsidiary aquifer of resourceful potential as fertile land for cultivation. It is distinguished by low relief and a mild topography (DRC, 2015).

Figure 10. Wadi Kharouba Site Analysis and Site Boundary. Source: Yosra Malek (2020)

Figure 11. Wadi Kharouba Environmental Condition Matrix. Source: Yosra Malek (2020)
3.3 MARSADEV Project: Wadi Kharouba Water Management Plan

The MARSADEV project focused on wadi cultivation, rainwater harvesting, and supplementary irrigation (Figure 12), disregarding the integration of any urban development in the context of this emergent agricultural community. Moreover, MARSADEV aimed to overcome constraints such as flash floods, soil erosion, and water loss as a frequently occurring event along the NWC. Steps of 3 km Wadi Kharouba reclamation Project (Figure 13).

Figure 12. Existing RWH in Wadi Kharouba, Source: Naiim Moselhy (2016), adapted by Yosra Malek (2020)

Figure 13. MARSADEV Water Management Plan in Wadi Kharouba, Graphics: Yosra Malek (2020)
3.4 Proposed Study Model for Wadi Kharouba

Until today, Wadi Kharouba stands as an example of a productive landscape without sufficient urban development around it (Abd El-Rahman, 1986), the proposed study model intends to bridge the gap between Wadi lower level as a productive landscape and its upper plain introducing an integrative urban design approach. The scale of the urban development and population numbers were defined based on water availability and varying densities to create an inclusive model taking different lifestyles of the Bedouin community and a new urban population as well as a potential ecotourism development into consideration. While the water harvested in the wadis was considered as a water source for crop irrigation only, the hypothetically available drinking water was reliant and quantified through the previously untapped resource of water harvesting from the roof and street escapes of Marsa-Matrouh City. Empirical research showed that the Bedouin community demanded a high degree of privacy and thus a much lower density. As a rough indicator, one Bedouin family on average cultivates 4-5 Feddans (4,200m²) of wadi-bed (DRC, 2015). These givens were visualized through the extended Dutch layer model while the design proposals were illustrated through deep sections. The study model proposed the following (Figure 14):

- **A transitional area** on both sides of the wadi (upper plain) keeping development at least 20-25 meters from wadi edges depending on the width of the wadi
- **Street layout** according to the wadis naturally winding course
- **Culvert structure** channeling the waterstream subsurface to a transversal street network
- **Longitudinal & latitudinal shaded pedestrian corridors & bike lanes** in the transitional area
- **Transversal connections** through stepping stones as pathways built on the wadis sloped walls
- **Buildings** designed based on the different lifestyle communities with very low residential densities for the Bedouin community and a low-rise high-density urban fabric with an average of max. three floors

![Figure 14. WU Design Proposal Visualised on Wadi Kharouba Deep Section. Source: Yosra Malek (2020)](image-url)
4. Conclusion and Outcomes

Wadi Urbanism as a sustainable desert city model builds on the existing topography to create synergies between the dynamic wadi landscape, its productive capacity, and its open space qualities while creating a collective identity for cities through these cultural landscapes. Currently, we can say turning our open spaces which are until now only primarily static with a limited visual kind of pleasure and far away from local givens in terms of water demand, economical recurrent, cultural traditions, and local food production, etc. The Wadi as a topographical palimpsest already adds to the quality and distinctiveness of a city in terms of views, ventilation, wideness, the central access that can be cultivated, and with the agriculture it becomes even more of a special quality which adds more to the city. ‘Wadi Urbanism’ as an urban design approach provides the following research outcomes which serve the urban canvas for these main key points:

- **Site-specific vs. Generic**: By providing a canvas for urban development that is not generic but site-specific, wadis give a special identity and contextualized urban advancement for new desert cities. Especially, with the combination of agricultural production that can establish a new sustainable urban model.

- **Resilient vs. Restrictive**: There is a defensive approach to flooding which is restricting these zones as a no-go areas while building dams. Although an alternative approach such as developing flood-adaptive WHTs could be implemented which slows down the flow of the vastly running river on very few days a year. This opportunity creates a cultural landscape that is working with nature not against it. Cascading systems do not hinder the water but provide an interactive landscape that encourages inhabitants to enter the wadi landscape through the field’s corridors and experience the agriculture landscape and make it accessible for people to learn from such resourceful landscapes and interact with them.

- **Cultural vs. Destructive**: With the agriculture it becomes even more of a special quality allying with the cascading land-scaped cultivated terraces alleviates the elevation difference between the wadi upper plain and the wadi-bed, safely reconnecting people to the water’s edge. Also, the proposed WUGs does not allow any developments or permanent structures in the lower lands of a wadi to protect the city from any potential damage from seasonal occurring flash floods.

- **Identity vs. Replica**: Wadis can create an identity for cities through their respective landscape features resulting in different variations of urban forms and patterns for every wadi city. As a central vast public open space meandering through the city, wadis may create visual interest and refuge with opportunities for recreation and education.

4.1 Future Research Questions: Wadi Urbanism as a Valid Approach?

As a preliminary summary the following points demand further research and policy development:

- **Building regulations**: Although built in the wadi is categorically prohibited, a legal definition of according flood plains that define the area to be exempted from building remains vague. This leaves until now an unclear flood defense line which is for example along the Nile a setback of 35 meters from average water levels.

- **Also, the execution of building regulations**: is often weak, especially in the hinterland. While developments were previously scarce and vastly scattered Bedouin houses, they are currently evolving to laid-out grids to market plots accordingly leading to informal urban development, also in the alluvial flood plain with a high damage potential in the case of flash floods. Also, retroactively, the WUGs could be applied to areas that have previously been developed informally.

- **Feasibility study**: to show the economic potential in terms of water resource management through integrative approaches between aesthetic and productive landscapes, as well as through the harvest itself as a major pillar of the local community and a source of local food production.
Implementation: To plan a wadi city it demands further research in terms of defining the implementation process in comparison to current practice.

The formulated WUGs and anticipated spatial qualities have been explored further through a research-by-design approach with a (10th Semester design studio VII) ‘Wadi City: From Threat to Resource’, under the joint-supervision of Prof.Dr. Cornelia Redeker, Asst.Lect. MSc. Yosra Malek and Asst.Lect. MSc. Manar Karam, based on a site survey guided by the National Desert Research Centre (DRC).


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Urban Regeneration Forum

On Wednesday, December 9th, the ISOCARP 56th World Planning Congress hosted the special session, 'Urban Regeneration Forum'. The session was co-hosted and co-organised by Urban Economy Forum (UEF) and UN-Habitat. Three case studies were presented on urban regeneration: Doha, Qatar, Brussels, Belgium and Toronto, Canada. In addition, UN-habitat's SDG Project Assessment Tool and the Regent Park World Urban Pavilion UN-Habitat-UEF were also presented.

Doha City Center and the Changing Face of Doha was the first presentation by Ali A. Alraouf, Professor of Architecture and Urban Theories, and Faima Faqzy, Design Manager, Msheireb Properties. The project aimed to bridge the gap between Doha's changing architecture and its modernisation while paying attention to its history. At the core of the neighbourhood's regeneration was unity and diversity to build a community that lives in harmony.
An innovative public space plan for the Brussels canal territory was presented by two representatives from 'perspective. Brussels', Sven Vercammen, Territorial Strategy Project Manager, and Alfredo Corbalan, EU Expert on International and Interregional Affairs. The project prioritised positive usage of the urban space, such as in relation to the economic and public usage of it, while integrating social and environmental perspectives, leading to a better community with physical and mental well-being. The project was also designed to create a model for inclusive and connected urban environments.

The Regent Park neighbourhood regeneration project in downtown Toronto, Canada was presented by Heela Omarkhail, Vice President of Social Impact, Daniels Corporation. Through a public-private-people partnership all parties contributed their own expertise with an ultimate focus on social development. The project aimed to house 12,500 people in 5,115 units across 69 acres of the largest publicly funded community in Canada while renovating older structure with energy efficiency in mind.

Presenters agreed that the focus on establishing collaboration between public and private sectors and creating an inclusive decision-making process that involved local communities at the beginning of urban development was key in generating the desired positive economic, social and environmental outcomes.

To support urban regeneration, UN-Habitat presented their SDG Project Assessment Tool, which provides a framework and mechanism to align the projects to the Sustainable Development Goals and New Urban Agenda, adapted to the respective local contexts.

UEF introduced the Regent Park World Urban Pavilion UN-Habitat-UEF (Pavilion) that will be officially launched later in 2021. The Pavilion is a global knowledge exchange hub for sustainable urbanism and will act as a living laboratory for urban regeneration case studies. The Pavilion will also establish a city global network to build urban capacities and bolster dialogue related to emerging urban challenges and opportunities. All cities and urban stakeholders are encouraged to participate in this global initiative that is being led by UEF and UN-Habitat, with the support of the Government of Canada.
ISOCARP Institute Special Session
“Digital Infrastructure for Smart Urban Services and Public Value”

On Wednesday 9 December, ISOCARP Institute hosted the special session "Digital Infrastructure for Smart Urban Services and Public Value".

The session started with the keynote presentation "Assembling Sustainable Smart City Transitions", by Luca Mora, Associate Professor of Urban Innovation at the Business School of Edinburgh Napier University. Pointing out the disparity between the abundance of technological applications and the lack of research on how to build platforms for integrating those technologies for making cities smarter, he set the tone for the discussion on the importance of a ‘collaborative environment’. An open and engaging environment that strengthens the capacity of individuals and organisations to implement the technologies and to work together and participate, innovate and improve. Mora mentioned the importance of "play" in the process: competitions, hackathons and citizen workshops are a great way to innovate and experiment in a more relaxed setting.

The session continued with the experiences from two EU H2020-funded projects, where ISOCARP Institute is currently involved.

The first project, +CityxChange, was presented by Dirk Ahlers (Norwegian University of Science and Technology). +CityxChange is focusing on enabling community-supported energy transition actions in 7 cities around Europe. Ahlers discussed striking the balance between well-established frameworks but also certain flexibility, which allows taking different cultural and natural conditions into account.

The second project, VARCITIES, was presented by Denia Kolokotsa (Technical University of Crete). One of the main goals of the project is the development of a Healthy Cities Helix, a collaborative tool for developing models for increasing the health and well-being of vulnerable citizens with nature-based solutions. These models are especially focused on the symbiosis of urban green and smart technologies.

The presentations were followed by a joint post-it -session, discussing opportunities and challenges related to implementation, participation and governance. All participants agreed on the importance of flexibility and tailor-made solutions (one size does not fit all).

A Smart City is no longer only a question of a technological premise. The technology already exists, but in order to make solutions truly community-based, the gap between technology and the general public needs to be bridged by building platforms of integrated smart city solutions in a sustainable and collaborative manner. After all, a Smart City is a challenge beyond technology.
ISOCARP Institute
Special Session
Digital Infrastructure for Smart Services and Public Value
56th ISOCARP World Planning Congress
9 December, 1:30 - 3:00 PM CET

Lucia Mora
Business School of Edinburgh Napier University

Dirk Ahlens
NTNU & +CityXChange

Denia Kolokotsa
Technical University of Crete & VARCHITIES

Pietro Elisei
President-elect ISOCARP

Didier Vancutsem
Director of ISOCARP Institute

Federico Ali
ISOCARP Institute

The COVID-19 pandemic on top of other economic, social, environmental and political crisis in 2020 has demonstrated the fragility of our urbanised world. In this situation, urban policy is called to reform urban planning and to better link it with other national and local policies. This is necessary to implement National Urban Policies (NUP) and the International Guidelines on Urban and Territorial Planning (IG-UTP) in support of the Sustainable Development Goals and the New Urban Agenda. Aiming at high quality input and an inspiring discussion ISOCARP invited speakers and discussants from UN-Habitat, OECD, UCLG and TU Delft to discuss how to better use existing normative and other tools to support urban planning and development. Ulrich Graute introduced with his presentation the National urban policies and integrated urban and territorial planning as key facilitators supporting the achievement of SDG and NUA. Laura Petrella and Kibong Lee of UN-Habitat gave an overview on the state of the implementation of National Urban Policies (NUP) and the International Guidelines on Urban and Territorial Planning (IG-UTP).

ISOCARP’s SG Frank D’hondt discussed the need to reform planning systems while Vincent Nadin (TU Delft) presented results of the European comparative analysis ESPON COMPASS. Marco Kamiya (UN-Habitat) reflected on the need for NUP from an urban economist point of view. Discussants from OECD (Tadashi Matsumoto) and UCLG (Sara Hoeflich) provided important additional insights to the discussion. At the end it was agreed that more needs to be done to make the full potential of NUP and IG-UTP visible. The new Memorandum of Understanding for cooperation between ISOCARP and UN-Habitat comes just in time to continue dialogue, analysis and implementation.
On Wednesday 13 January 2021, ISOCARP hosted the Inclusive Placemaking Forum in collaboration with Planning Aid Scotland and Global Planning Aid. This Forum explored possible avenues to transfer basic placemaking and planning capacities to grassroots communities and their organizations.

The session started with the keynote "How (un)inclusive is placemaking & planning today?", presented by Bruce Stiftel, Georgia Institute of Technology (Prof. Em.) /GPEAN/Global Planning Aid. Key message is that the current planning community - consisting of adequately educated planning practitioners and researchers - is not up to task to co-implement SDG 11 (urban goal) and the related New Urban Agenda; not in quantity but also not in quality – as many planning curricula did not adapt to the new challenges or are still rooted in outdated ideologies.

Petra Biberbach, Planning Aid Scotland/Global Planning Aid, spoke about "Barefoot Placemaking as a concept". By training interested citizens the basics of placemaking and planning, we could possibly address the ‘planning deficit' hinted at by the previous speaker – provided this happens on a global yet decentralized scale. The ‘Place Standard' - a new tool developed by Planning Aid Scotland – could become part of a global toolbox for citizen placemaking in both Global North and South.

Frank D’hondt, ISOCARP/Global Planning Aid, elaborated further on this toolbox as part of a three-step-training of trainers’ approach (largely online) developed by Global Planning Aid, a collaborative joint
initiative of ISOCARP and Planning Aid Scotland. In his contribution, Abdoulié Njai, Development Oriented Citizens Banjul, confirmed the need for barefoot placemaking and planning in Banjul, the capital city of The Gambia in West Africa, addressing some of the key planning challenges and the critical lack of in-house planning capacity.

Moderated by Olga Chepelianskaia, UNICITI, following prominent panellists further contributed to the lively discussion:

- Regitze Hess, International Federation of Housing & Planning (IFHP): inclusive placemaking is about capacity building of non-planners on the ground, with involvement of public and private sector.
- Ethan Kent, Placemaking X: inclusive placemaking is about ‘idea + process’; the community is the local expert.
- Shi Nan, Urban Planning Society of China (UPSC)/ISOCARP: we need to invest more in the concept of ‘community planners’; planners able to listen to and engage with local communities.
- Cecilia Andersson/Mark Ojal, UN-Habitat: inclusive placemaking is an urban governance question; we need a global toolkit that can be applied to very diverse local contexts.
- Anantha Krishnan, Urban Economy Forum: inclusive placemaking means integrating a focus on economy and culture, as well female empowerment.

Cliff Hague, Heriot-Watt University (Prof. Em.)/Global Planning Aid, concluded the session by linking key messages to his plenary keynote presentation earlier that day, titled "Why do we need inclusive placemaking, what are the obstacles, and how can they be overcome?", resulting in following take-aways:

- Oil era cities have embedded exclusion – economic, social, spatial, institutional and political;
- Planning systems and planning education have been part of that reinforcing mix of exclusionary practices;
- A range of "insurgent practices" has emerged in response;
- Inclusive place-making needs to drive the transition to a post-oil city.

He calls for coordinated action in 2021 to assess the New urban Agenda + 5, including a review through the pandemic prism.
Awards Session

The recognition of ISOCARP awards was scheduled over four months following the general structure of the ISOCARP 56th World Planning Congress.

The first session on November 9, 2020, was devoted to the Award for Excellence winners. Four awardees – two Grand Award winners and two Merit Award winners, showed their projects to exemplify the new planning paradigm. Presented digitisation tools, software and participatory platforms do not only simplify the work of planning professionals but, more importantly, facilitate the collaboration with and inclusion of different stakeholders relevant for the successful implementation of a planning solution.

The second session on December 10, 2020, highlighted the achievements of ISOCARP members in the academic field. The presentation of three Gerd Albers Award winners elucidated hot topics relevant for a proper understanding of contemporary city needs – transnational architecture and urbanism, climate change policy, and underground urbanism. The session also recognised seven winners in the Student Award category, who offered inspiring solutions to city challenges, such as flooding, migration, preservation of urban heritage, and blue and green infrastructure.

The last award stage of February 2, 2021, was devoted to some of the past Award for Excellence winners from 2019, 2018 and 2015 – Roman Pomazan (Urban Sustain Architects), Daria Paramonova (Strelka), and Dhiru Thadani (TAU), respectively. The panellists did not discuss only the main project features but reflected on implementing such projects, hence pointing out to different institutional norms, planning cultures, and negotiation with key stakeholders outside of the professional domain. The session was concluded by Alfonso Vergara (Fundacion Metropoli), past ISOCARP President and the founder of Award for Excellence, who after 15 award editions assesses it as a great ISOCARP legacy and its brand. Moreover, according to Vergara, the great value of the award lies in its independent nature – it is the award from professionals to professionals, greatly supported by the voluntary work of ISOCARP members as jurors for the benefit of the Society.
A Territorial Approach to Climate Action and Resilience

On Wednesday February 9, the OECD hosted the special session, "A Territorial Approach to Climate Action and Resilience", within the context of ISOCARP’s 56th World Planning Congress. The session was moderated by Frank D’hondt (ISOCARP), and brought together a diverse group of experts.

Tadashi Matsumoto (OECD) provided an overall framing of the concept of a territorial approach, which builds on the OECD Programme A Territorial Approach to Climate Action and Resilience. Cities and regions play crucial roles in mitigating and adapting to climate change but cannot tap into their full potential when acting alone. National governments can accelerate climate action especially by supporting local governments in their placed-based actions.

Harriet Bulkeley (Durham University) focused on the importance of accelerating urban climate action through better governance, including by integrating climate action across all sectors and by fostering experimentation (e.g. "failures" are undervalued but can spur innovation). Professor Bulkeley stressed that the environmental transition must be just, and pointed to the importance of identifying key stepping stones when defining a future vision, rather than setting a rigid unchanging final roadmap.

Nick Godfrey (Coalition for Urban Transitions) stressed that technologically we already know how to, and can, achieve net-zero cities by mid-century and that the challenge concerns how different levels of government must work together to accomplish this. In particular,
the national government plays a key role in accelerating urban climate action and enhancing efforts of subnational governments. The recovery from COVID-19 presents a unique opportunity for national governments to invest not only in green objectives, but also at the scale of cities, which will generate numerous co-benefits.

Oscar Javier Garduno Arredondo (Government of Mexico) spoke to the approach of the Secretariat of Agrarian Land, and Urban Development in providing adaptable support and in tailoring housing programmes and urban green infrastructure development in recognition of the different regional/urban contexts across Mexico (e.g. diverse bioclimatic regions, prevalence of self-construction). While the federal-level is leading these housing and green infrastructure programmes, it is tailoring them to the needs of local governments and communities.

Yunus Arikan (ICLEI) highlighted that cities have historically been and continue to be adaptable, and that a new way of development is in our grasp, as is well exemplified by this Congress' theme: "Post-Oil City". At the international stage, with COP 26 approaching, countries' NDCs need to urgently be updated and to incorporate different levels of government such as the city-level. Ensuring the participation of urbanisation ministers at the next COP should be a key goal to work towards.

The session concluded with an open discussion between the moderator and the speakers, from which several key messages emerged: i) addressing climate action at all scales is essential, but it is especially important to consider the varying place-based needs to better tailor interventions and policies; ii) planning as a discipline can enhance resilience and reduce cities' environmental footprint, by being adaptable and iterative and by implementing holistic and integrated planning to improve human liveability; iii) local governments, planners, civil society organisations and citizens and other stakeholders should be consistently engaged in policymaking and urban planning, whether at the very local scale or at the international scale such as COP26.
The ‘Real’ Smart City

The ‘Real’ Smart City Session has opened the door to the new perspectives and views on what real “smartness” and use of technology means for contemporary cities. Pietro Elisei, President-Elect of ISOCARP, gave an introductory presentation where he contextualized smart city phenomenon in the contemporary city, considering main trends such as rapid urbanisation, digital change, and global governance. Milena Ivkovic, Board Member, ISOCARP, introduced the concept of “urban observatories”, dealing with the question of how planners and place-makers can use large amounts of data in a creative and good way. In his introduction, Haris Piplas, Co-director Integrated Urban Solutions - Drees & Sommer Switzerland, presented 4 theses on how to translate ‘smart concepts’ into urban practice:

1.) quo vadis smart city  
2.) Integration of stakeholders, experts and processes;  
3.) city-to-city-learning  
4.) co-creation within city labs with the support of digital and analogue too. Anna-Vera Deinhammer, Lead of the DoTank Circular City Programme in the City of Vienna, Referring to UN-Habitat definition of the Smart City, explained the three equal goals anchored in the Vienna City Government Agreement: Zero-emission city, circular city and resilient city. Anna Schindler, Head of Urban Development, City of Zurich presented the Smart City Zurich, official city strategy that focuses on the sustainability of the city administration to be able to continuously address complex urban challenges. The strategy promotes innovation and digitisation, new methods and cultural aspects of change, with a special focus on the digital and analogue aspects.
on citizen participation in the processes that shape their everyday life. Paola Deda, Director of Forest, Land and Housing Division, UNECE, elaborated the internationally relevant policies (norms) for smart city development: key performance indicators of smart and sustainable cities (KPIs) to measure the level of smartness and sustainability. Pontus Westerberg, Chief of Digital Civic Participation, UN-HABITAT talked about people-centred smart cities – ensuring that the digital transformation leaves no one and no place behind. He referred to the Urban Agenda and its commitment to adopting smart city approach. Sinisa Trkulja, Ministry of Construction, Transport and Infrastructure, Serbia showed the urban development strategy of the Republic of Serbia until 2030 with the elaboration phase going 2017-2019 and implementation 2020-2030. Here the usage of GIS-based open data proved to be important for the inclusion of a wide range of stakeholders. Gordana Memisevic, Planning Institute of Sarajevo Canton pointed out that Sarajevo, despite all the historic challenges, is a dynamic and creative region. In the conclusive moments of the Session, she added that the introduction of digitalization and networking must be preceded by clearly defining public and private interest as in the increasingly blurry world of private interests creeping into the public sphere and taking over management and substance of public space. If taken wrong ‘Smart City,’ based on the superficial glorification of “efficiency” and "technology as saviour" can easily become a burden for urban development instead of a tool for its advancement.
The Education Forum was a session co-organised with the Association of European Schools of Planning (AESOP) to bring together planning practitioners and educators and stimulate the discussion on issues associated with the future of planning education - coming from planning practice and its needs; and the future of planning practice - as perceived by academia members acting in the area of planning.

The first edition of this Forum took place in 2012, during the ISOCARP Congress in Perm, Russia. Since then, a number of sessions on planning education and "bridging theory and practice" has been organised regularly by ISOCARP and AESOP.

Attended by over 100 participants, this year’s education forum was moderated by the General Rapporteur, Piotr Lorens, and AESOP representative Maros Finka. The programme kicked off with the keynote presentation of Zeynep Enlil, representing the Global Planning Education Association Network (GPEAN), who talked about the key challenges for the Planning Practice.

These challenges highlighted the "crisis of the planet" as not only an economic crisis but also a "crisis of the human condition." In regard to Planning Practice, the frenzy for profit-oriented, speculative developments as well as high energy consumption patterns in the urban world, poses risks on socio-economic conditions, as it deals with the unresolved paradox between sustainability and development. Further aggravating the challenges of...
these times is the COVID-19 pandemic, which reinforced existing inequalities and disparities, the resulting unemployment and future uncertainties, and the unequal access to services, social infrastructure, and green and open spaces.

After presenting the scenarios, the opening presentation was immediately followed by short interventions and reflections on global challenges in planning education by the following distinguished speakers: Bruce Stiftel, representing Georgia Institute of Technology; Eduardo Alberto Cusce Nobre, Chairman of GPEAN/ANPUR (National Association of Postgraduate and Research in Urban and Regional Planning); Paulo Silva, also representing AESOP/GPEAN; Liu Jian from Tsinghua University School of Architecture; Khalid El Adli, Professor of Urban Planning and Design and Director of International Programmes, FURP-Cairo University; Fedor Kudryavtsev, Associate Professor of Town Planning Department, Moscow Institute of Architecture; and Slawomir Ledwon from the Ministry of Municipality and Environment of Qatar.

The Forum also included an open discussion between the audience and the speakers, which was summarised by Isabela Mironowicz, Professor at the Faculty of Architecture, Department of Urban Design and Regional Planning, Gdansk University of Technology.

By and large, the Education Forum was received well by the Congress participants as well as other invited guests from GPEAN and AESOP. In light of this, ISOCARP will once again include in its roster of events and sessions another education forum during the 57th ISOCARP World Planning Congress in Doha, Qatar.
ISOCARP recognises the importance of human experience for the community of planners and the need to promote knowledge exchange outside the virtual sessions and meeting rooms. Therefore, within the bounds of the pandemic circumstances, this first fully virtual congress provided an interactive space that facilitated professional networking among Congress delegates during its entire duration (8 November 2020 to 4 February 2021). Through Gather.Town platform – a proximity video chat – participants were able to connect in group and one-to-one conversations in the space we aptly called the "Virtual Meeting Place".
Aside from casual conversations, the Virtual Meeting Place served as the venue for the Mentoring Sessions and virtual exhibitions. Specifically, the 11th of December 2020 was dedicated to professional networking activities and knowledge exchange between Congress Delegates and ISOCARP members. During the Mentoring Sessions experienced ISOCARP members (“Mentors”) shared their expertise and guided the Mentees on their career and professional development. ISOCARP President, Martin Dubbeling, and President-Elect, Pietro Elisei, also talked about the Society’s activities and the challenges ahead. The “ISOCARP World Cafe” section of our Virtual Meeting Place provided an opportunity to meet and greet with the Board and other active members of ISOCARP. Finally, the networking venue served as a venue for the formal publication launching of our co-hosting organisation, UN-Habitat, on their book series about Rapid Urbanisation.
Congress Declaration
Preamble

How Our World turned in 2020

The 2020 Congress of the International Society of City and Regional Planners – the 56th World Planning Congress – was initially planned to happen in person in Doha, Qatar but was turned into an online conference bringing urban experts and practitioners together virtually from around the globe. The virtual congress opened on 8 November 2020 (World Town Planning Day) and closed on 4 February 2021. It challenges us to reflect on the Post-Oil City and how Urban Green Deals can contribute to global, national and local agendas for sustainable, resilient and equitable urban development.

2020 has been marked by the Covid-19 pandemic, imposing on the Congress a much broader and more complex agenda. The pandemic has triggered a public health crisis, has claimed over one million lives worldwide, and unleashed a devastating economic crisis with far-reaching impacts that will probably contribute to even more in-depth changes in our lifestyles.

These simultaneous crises – climate, environment, health, social, economic – are demonstrating the fragility of our world. For planners, this is highlighting the need for integrated solutions, as we realise that we cannot put the climate agenda and planning for a post-oil future aside while we take on unprecedented challenges like the current pandemic. Likewise, human, economic and environmental cost of slums and marginalisation, expose the imperative of inclusive urbanisation. They all pose the question: how resilient is the physical, social and political infrastructure of our urbanised, globalised, ecologically imbalanced world? Is more change necessary than previously thought?

The World Planning Congress and the urbanisation agenda

Since its inception in 1965, the International Society of City and Regional Planners (ISOCARP), as a global organisation, has been bringing together recognised and highly qualified, cross-sectoral planners from countries worldwide, currently 85 of them. Members of the Society share a common interest: international cooperation and inclusive knowledge-sharing in support of innovations in planning practice, training, research, and education.

In this 'Decade of Action', urban and regional professionals are charged with being key players in moving the world from goals to action. They support both decision-makers and communities to shape the essential frameworks, plans and design of urban form that will make cities inclusive and resilient, while also protecting and restoring the world’s ecosystems. Urban and regional planning has a history of more than 100 years of integrating policies, plans and designs to find solutions for complex problems through global collaboration. In 2015 the Governing Council of UN-Habitat adopted the International Guidelines on Urban and Territorial Planning IG-UTP, followed in 2016 by the New Urban Agenda (NUA) of the United Nations, and professional and political organisations across the globe have adopted charters and development agendas to deal with arising issues.

In the face of monumental issues challenging sustainable urbanisation at the global scale, the role of urban actors in achieving all 17 Sustainable Development Goals (in particular SDG-11 concerning cities) is urged for effective, collaborative, and immediate action toward the 2030 agenda and beyond! This is an opportunity for innovative new approaches to Planning and for forging of daring Green Deals, which will address at once the climate crisis, the post-Covid economic recovery, and the provision of adequate living conditions for all.

A Shared Global Message

Energised by the congress theme, Post-Oil City, and the many challenges of our time, the 2020 World Planning Congress developed together — via inclusive process over the
course of the Congress proceedings — a Declaration of shared values and collectively identified opportunities for transformative action.

The following Congress Declaration has been jointly prepared by the International Society of City and Regional Planners; and the participants and honored Co-hosts, the Urban Economy Forum and UN-Habitat, of the 56th Annual World Planning Congress.

Declaration

CONNECTED in a world-wide community of city and regional planners, planning researchers, urbanists, placemakers, city officials and administrators, and experts in related fields;

IN COLLABORATION and having learned from one another during the 56th World Planning Congress of the International Society of City and Regional Planners;

FOCUSED on the challenges of the congress themes, Post-Oil City and the transformative potential of Urban Green Deals;

INSPIRED by our shared values and collectively identified opportunities for transformative action:

We call upon all national, regional and local governments to collaborate and promote urban and other place-based research and knowledge-sharing to advance global sustainable urbanisation and territorial cohesion goals, through science-based policy and data-driven planning that accounts for disproportionate impacts across global regions and the rural-urban continuum.

We advocate a territorial approach to climate action and resilience by promoting place-based policy responses to accelerate efforts to mitigate climate change and to more effectively adapt to its localised impacts. A territorial approach allows decision makers to better incorporate context-specific climate change drivers and impacts, and to tailor support and measures in local and regional Urban Green Deals. The scale and complexity of the challenges posed by the growing climate emergency, compounded by health, economic, social and biodiversity crises, highlight why such an approach is needed to scale up ambitious climate action from across all levels of governance – thus through collaborative action of governments, civil society, academia and (planning) professionals.

We acknowledge that amidst the current pandemic, cities and towns have moved quickly to respond. It is now imperative that our short-term response and recovery is leveraged to advance and inform long-range planning and is integrated with long-term sustainable development agendas. A dynamic approach will be essential for adaptability and resiliency of cities.

We advocate that good urbanisation and sustainable towns and cities are the engines of prosperity, opportunity and a better quality of life for all people and their nations. The planning- and allied professions should advocate for the implementation of the International Guidelines on Urban and Territorial Planning (IG-UTP) and its 12 key planning principles. They should all play a central role in the pandemic response and recovery, and in shaping pandemic-resilient urbanism.

We acknowledge climate change and nature degradation, inequalities, urbanisation, rapid population changes and technological revolution as the five “megatrends” that will shape our world over the course of this century and require urgent concurrent and integrated policy interventions by the international community.

We acknowledge that in the face of global crises we need to move from
agenda to action and implementation — scaling up solutions to meet critical global goals. This will require accountability today for environmental costs that will be felt tomorrow; must take into account that different regions will be impacted differently; and must address the informal “majority world”. This action will rely on systems level change and innovation — such as in digitalisation, big data, new global economic models, and multilateral financing structures — as well as on multilateral Urban and Regional Green Deals.

We recognise that global crises and challenges — climate change, environmental degradation, pandemics, economic crises — have disproportionate impacts on the most vulnerable global populations. Addressing widening digital divides, wealth gaps, inequitable access to basic resources, and rapid informal urbanisation, needs to feature prominently in all urban solutions.

We recall - in the search for better policy coordination - that national and sub-national urban policies can rally and coordinate various actors for a common vision, and can promote transformative, productive, inclusive and resilient urban development for the long-term. While such policies can be tremendously effective, it is important to consider our responsibility for advocacy and for holding governments accountable when they ignore inclusion, transparency, equity, data or science.

We call for a sufficient funding of planning institutions and for capacity building for all stakeholders, and for inclusive planning practices that embrace indigenous and local knowledge. This will be required to respond to multiple crises and to build back better and greener requires not only planning expertise from national and local governments, civil society and academia, but must include all communities and local stakeholders.

We call for public space and the rethinking of the public realm to be a priority issue, Not only is well-designed public space a matter of aesthetics, improved social interaction, and the celebration and preservation of cultural heritage and diversity, but it lies at the nexus of sustainability, public health and social equity. To achieve greater climate resilience, sustainable mobility, pandemic resilience, and social justice outcomes, the post-oil era brings great opportunity for urban public spaces to play a strategic and pivotal role for an integrated approach to equitable and sustainable formal and informal urbanisation. Democratic public spaces —of and for all — must be central to planning for the post-oil city.

More than any time in history, the problems facing our planet are dire and require definitive, urgent and collaborative planning action. Planners are uniquely positioned to lead communities in this work, and we call upon city, regional and national governments, as well as international institutions and organisations, to deliberately and persistently facilitate the engagement of planners and placemakers, and to adopt urban and territorial planning as a key tool for conceiving and implementing Sustainable Development Goals, towards achieving stable recovery and shared prosperity, in harmony with our natural environment.