



Joint Conference
October 24-27, 2017
Oregon Convention Center
Portland, Oregon USA

CONGRESS RECAP



Joint Conference

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Portland, Oregon USA

*Final Congress Report of the 53rd ISOCARP
Congress*

Portland, Oregon, USA, October 24-27 2017

Smart Communities

Editor: Hongyang Wang & Slawomir Ledwon

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OAPA The Oregon Chapter
of the American Planning
Association

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International
Society of City and
Regional Planners

<https://isocarp.org/>

Table of Contents

Arun JAIN - Beyond the Hype	14
Daniel IACOFANO - Designing for inclusivity: neighborhood city region	24
Shipra NARANG SURI - In with the New, out with the Urban and avoiding an Agenda: Challenges and opportunities of the New Urban Agenda	38
Track 1: Technology, infrastructure and buildings	45
Benjamin SCHEERBARTH - Scrutinizing Greenness and Smartness in New Construction: The Case of Das Eckwerk, Berlin	46
Kelly RODGERS, Mike SELLINGER - Beyond the black box: communicating data and evidence to the public	48
Track 2: Governance and inclusive communities	51
Amit KAUR, Sumana GUPTA - A Comparative study of satisfaction level for Middle-Income Group Residents of Government housings and Public-Private Partnership housings	52
Ghada MOURAD, Heba Allah KHALIL, Mohamed ZAYED - Evaluation of the Situation in Greater Cairo with Regards to Citizen Participation in Urban Governance Through the emerging Information and Communication Technologies	64
Mischka JACOBUS, Stuart Paul DENOON-STEVENSON - Encouraging Inclusive Communities Through Zoning Reform: The case of Upper Ashbury, Bloemfontein	78
Dirk ENGELKE, Thomas KIWITT - Governing smart communities – Governance and participation in the age of digitalization	90
Xiao CHEN, Xiaoping WANG, Yifeng SHI, Fang HUA - An Inclusive Study on the Renewal of the Urban Fringe Area - A Case Study of Four Villages in Hangzhou's Shiqiao Sub-district	98
Haydee Jacklyn M. QUINTANA MALUBAY - Smart World: Reengineering the Planning Process through a Global Planning Code	114
Mthobisi MASINGA, Peter NJENGA, Mac MASHIRI, Maartin FRIEDERICH, James CHAKWIZIRA, Peter STEYN, Thamsanxa MSITHINI - Rural Land Use Management & Regulatory Guidelines for South Africa	122
Track 3: Culture, community experience and the sharing economy	137
Mani DHINGRA, Subrata CHATTOPADHYAY - Exploring the Real Smartness in an Urban Context through a deductive meta-synthesis approach (Quest to the Real Urban Smartness)	138
Shu DU, Martin TZOU - The "Sharing Economy with Chinese Characteristics" and its impact on Urban Space	148
Malgorzata HANZL, Slawomir LEDWON - Analyses of human behaviour in public spaces	158
Xiaomin ZHU, Shibing DAI, Smart communities: the coexisting of the high tech future and the intimate	

neighborhood past (Built Heritage Communities' Future)	170
Stephan REISS-SCHMIDT - Digital Transformation: Cities between Reaction and Integrated Strategies - Case Study Munich, Germany	178
Raymond LUCCHESI, Timothy MURPHY - The story of place: a framework for regenerative planning	180
Charles KELLEY, Amy JARVIS, Mitsu YAMAZAKI - Smart City Placemaking in Kashiwa-no-ha, Japan	182
Track 4 Resilience, adaptation and disaster mitigation	185
Paola RIZZI, Federico d'Ascanio, Luana DI LODOVICO - From fragile to resilient territories: the reconstruction after earthquakes in Central Italy	186
Kirk PAWLOWSKI, Lisa BROWN, Andre LEDUC - Strengthening the Disaster Resilience of the Academic Biomedical Research Community: Protecting the Nation's Investment	196
Track 5 Technology and small communities	201
Guoping XIONG - Study on Green Village Planning at the Yangtze River Delta	202
Michele MELCHIORRI - Analyzing Urban and Rural Settlements with Remote Sensing: comparing national trends of rural growth with the global Human Settlement Layer	208
Sadije DELIU-KELMENDI, Lumnije GASHI-SHABANI, Drita NUSHI, Arnet HASKUKA, Aida DOBRUNA, Rudina QERIMI, Shkelqim DACI - Smart placemaking in the newest country of Europe	216
Slawomir LEDWON, Smart(er) local communities	230
Track 6 Post-smart communities and the new frontiers	243
Guoping XIONG - The Jobless City – Revolution or Paradise?	244
Paul DIXELIUS, Helena OHLSSON - SymbioCity - from what to how	256
Slawomir LEDWON, Future small retail: urban, virtual or both	258
Conclusions 267	
Hongyang WANG - Conclusion of the ISOCARP-OAPA Joint Conference / 53rd ISOCARP Congress SMART Communities	268

Keynote speakers:



Arun Jain

is an urban designer and strategist with over 30 years of international experience

in practice, city leadership and academia. Arun has planned, designed, and directly influenced over 90 projects. He focuses on urban decision support tools, behavior sensitive infrastructure strategies, and development frameworks.

Arun has contributed in several UN forums, held academic positions, was first Chief Urban Designer and has served on several international boards (IFHP, ARUS).

Earl Blumenauer



is a congressman who has devoted his entire career to public service. Through his years as a local official in the Oregon

Legislature, Multnomah County Commission, and on Portland's City Council, Blumenauer developed a national reputation for his advocacy on public transportation, land use planning, protection of the environment, and school funding. Elected to the House of Representatives in 1996, Blumenauer has become a leading advocate for rebuilding and renewing America.



Daniel Iacofano

has more than 34 years of experience in urban planning and community design for

downtowns, transit-oriented development, neighborhoods and urban centers. He is recognized as an expert and innovator in the areas of community participation, consensus building and facilitation. He is a leader in the national re:Streets effort, exploring the future of streets. He is the author of several books including Meeting of the Minds, The Inclusive City and the upcoming Streets Reconsidered: Inclusive Design for the Public Realm.



Shipra Narang Suri

Coordinator, Urban Planning and Design Branch at UN-Habitat (United

Nations Human Settlements Programme), Kenya. An urban planner with a Ph.D. in Post-War Recovery Studies and nearly twenty years' experience in post-conflict/post-disaster reconstruction, local/urban governance, especially governance assessments, urban planning and sustainable urban development, in developing and transition countries.

Former Vice-president ISOCARP; former Co-chair, World Urban Campaign. Public speaker, guest lecturer, moderator and author. for the Public Realm.

Team Members 2017



Hongyang

Wang

General Rapporteur of the congress is Dr. Hongyang Wang.

Dr. Hongyang Wang is a professor of urban planning and design at Nanjing University, China. He researches and teaches planning philosophy and methodology, comprehensive planning and Chinese urbanization. He has been chair for preparing more than 40 regional, strategic and master plans for regions/provinces and cities across China, many of which were awarded provincial, national and international planning prizes including 2012 ISOCARP Awards for Excellence. He was the Chinese chair for European FP7 project Europe-China Urban and Regional Bi-continental research Scheme (FP7-230824 ECURBS) and a member of UN-Habitat Ad-Hoc Expert Group for International Guidelines on Urban and Territorial Planning. He is enthusiastic in synergizing often segregated parts of spaces and societies into holistic solutions towards smart communities.

Zaheer

Allam, Mauritius



Zaheer Allam is a thinker in Architecture & Urbanism and was the co-founder of an NGO that advocates for renewable energy in

Mauritius. Former UN Steering committee member, and UN speaker on sustainable energy (2014), Zaheer featured as a speaker for 350.org, where he delivered a keynote speech during the historic People's Climate March in 2014, regrouping 600,000 people worldwide. TEDx speaker on sustainable building and international correspondent for STUDIO magazine, Zaheer shares ideas for a sustainable world.

In early 2015, he was appointed as the African representative of the International Society of Biourbanism, and Chapter Chair of the International Network for Traditional Building, Architecture and Urbanism, a society patroned by HRH Prince Charles.

For his contributions to society he was awarded numerous awards namely the; Ten Outstanding Young Persons of the World (JCI -2014), 40 Under 40 (ULI -2016), Global Impact Award (Curtin University -2016), and for his contributions to the fields of Architecture and Urbanism, he was elevated to the rank of Officer of the Order of the Star and Key of the Indian Ocean, the highest distinct order of merit in Mauritius.

In early 2017, Zaheer was elected as a Fellow of the Royal Society of Arts, a 260 year old society patroned by HM Queen Elizabeth II, and featured as a 'New Leader for Tomorrow' by the Crans Montana Forum, a programme under the patronage of HM the King of Morocco..



Kaitlin Berger, USA

Kaitlin works as a land use planner in Portland,

Oregon. She holds a Masters of Urban and Regional Planning Student from Portland State University, where she specialized in Economic Development, and focused her research on regional housing trends and affordable housing development. Kaitlin is passionate about a wide variety of planning topics including: equitable and sustainable economic development, public policy, poverty alleviation, affordable housing, community capacity building, multi-stakeholder collaborative decision making processes, sustainable agriculture, and brownfield remediation and redevelopment.

Serah Breakstone, USA



Serah Breakstone is a planning consultant in Portland, Oregon where she provides a range of land use planning services to clients in both the public and private sectors. She has a comprehensive understanding of Oregon land use regulations and guides her clients through complex land use processes and represents their interests during public proceedings. Serah also helps Oregon cities and counties implement their long-range land use visions through comprehensive planning, concept planning and zoning codes. Currently, Serah is a Senior Planner with DOWL, a multi-disciplinary firm in Portland with a focus on planning, land development and environmental services.

Megan Channell, USA



Megan Channell, AICP is a Principal Planner with the Oregon Department of Transportation, where she manages complex projects of statewide significance through planning, federal environmental review, and preliminary design for project-ready hand-over and implementation. Megan has 10-years of transportation and environmental planning experience in both the public and private sector, with a specialty in multimodal transportation corridors. She has proven success in applying corridor-wide visions across multiple jurisdictions and managing multi-agency coordination efforts. She also has technical and project management experience in applying strategic planning techniques for a wide variety of CEQA and NEPA documents for transportation and transit-oriented development projects.



Xiaohui Chen, China

Xiaohui Chen is the head of the urbanisation research center

of Jiangsu province, China and Secretary-General for the Urban Planning Society of Jiangsu Province as well. She has urban and regional planning experiences for 23 years, and got the National Youth Planning Science and Technology Award of China in 2013. She is in charge of major urban and regional planning projects and provided technical assistance to local and provincial governments. She has got nine national excellent planning awards. Xiaohui has published three books by China Architecture and Building Press: "The Rural Restructuring in the process of Urban and Rural Integrated Development", "Urban-rural planning reform and innovation in aging times", and "Metropolitan Area Planning", and published 20 academic papers as well. From 2012 to 2013 she was a member of the Scientific Committee ISOCARP and has international experience by attending SPURS program at MIT, USA for one year. She organized two international workshops between Jiangsu Provincial Construction Ministry, China and Cardiff University, U.K.



Drew DeVitis, USA

Drew DeVitis is an urban planning professional

based in Portland, Oregon. Drew recently oversaw development of the City's Transportation Recovery Plan and helped initiate a resilient infrastructure planning effort while at the Portland Bureau of Emergency Management. He was also a co-author of a Manual on Pedestrian and Bicycle Connections to Transit released this year by the Federal Transit Administration. Drew received a Master's degree in Urban and Regional Planning from Portland State University and holds a Bachelor's in Environmental Studies from the University of Pittsburgh. He hopes his work can help foster more equitable, resilient, connected communities in the era of climate change.

Amanda Ferguson, USA



Amanda Ferguson is the City Planner for the City of Cottage Grove, Oregon. As the principal planner for a small town, Amanda's

position covers all aspects of local land use management in Oregon. She specializes in historic preservation, code administration, flood plain management, and emergency management. She is a Certified Flood Plain Manager and an AICP certified planner, and has trained extensively with FEMA at the Emergency Management Institute. Amanda served on the Board of Directors for the Oregon Chapter of the American Planning Association for two terms, and co-chaired three state and bi-state APA conferences. Amanda has a Master of Historic Preservation from the University of Georgia, and undergraduate majors in history and theatrical production. She is also the Artistic Director for the Cottage Theatre, a non-profit community theatre in Cottage Grove.



Hidehiko Kanegae, Japan

Dr. Hidehiko Kanegae, Professor, is a planner, also is a faculty member & ex-dean of the Graduate School of Policy Science as well as a research leader of the Institute of Disaster Mitigation for Urban Cultural Heritage (R-DMUCH) at Ritsumeikan University, Japan. His research focuses on a number of planning scientific topics including; public policy making & planning for the inheritance of historical cities, disaster mitigation measures, urban resilience and, the role of the local government in urban planning and community planning for disaster preparedness using by simulation & gaming. He holds a doctorate degree in Social Engineering from the Tokyo Institute of Technology whose supervisor was Prof. Dr. Yoshinobu Kumata. He was trained as "Young Planner (current: Young Planning Professionals: YPP)" in 1992 at the Cordoba congress and was a member of Local Organizing Committee of the Ogaki Congress 1996.



David Krogh, USA

David Krogh has over 35 years of both public and private planning experience in city, county, regional and in emergency management planning. He is one of the few planners in the State of Oregon who has working experience with all 19 of Oregon's Statewide Planning Goals, having worked with urban, rural and coastal agencies. David has a BS degree in Earth Science from the University of Wisconsin, an MS degree in Environmental Science from Washington State University, and has completed FEMA's Professional Development Series in Emergency Management (including training at the National Emergency Training Center). After retiring from government work in 2013 he consulted within the Portland Metro area until recently. He joined the American Planning Association (APA) in 1987 and received his certification as a member of the American Institute of Certified Planners (AICP) in 1991. He is currently a life member of APA/AICP and has volunteered with the Oregon Chapter of APA (OAPA) for several years. Presently, he serves on the OAPA Professional Development Committee, is a regular conference volunteer, and a planning mentor. An avid writer, he has had many guest commentaries published in both the Portland Tribune and Oregonian newspapers and specializes in planning problem solving and legal issues.

Olusola Olufemi, Canada



Dr. Olusola Olufemi is an Associate Professor of Urban and Regional Planning. With her career spanning about 30 years, Olusola Olufemi has been actively involved in university teaching, research, consulting and administration in Geography and Planning departments, at the undergraduate and postgraduate levels, in Nigeria, South Africa and Canada. She has published extensively in peer-reviewed journals and encyclopaedias; and involved in leadership roles in international professional bodies. She was a Visiting Professor at the University of Ibadan, Ibadan, Nigeria in 2013 and 2016. Olusola is a planning researcher, mentor and educator, and also an Associate with the Society for Good Health, Sustainable Development and Environmental Awareness, Ibadan, Nigeria. She presently works as an Independent Consultant in the area of Social Planning specifically Urban Management and Development, Homelessness, Gender and Food security.

Mairura Omwenga, Kenya



Mairura Omwenga is Chairman of Town and County Planners Association of Kenya (TCPAK). He is a member of the International Society of City and Regional Planners (ISOCARP) and International Associate of the Royal Town Planning Institute (RTPI/UK). He is a member of the Institution of Engineers of Kenya and registered by the Engineers Board of Kenya and also the National Environment Management Authority. Mairura is a civil/structural engineer, town planner and EIA expert. He holds BSc (civil engineering) and MA (Urban and Regional Planning) from the University of Nairobi. He is currently pursuing PhD research. He is a lecturer at the University of Nairobi, College of Architecture and Engineering. He has working experience in both public and private sectors and also runs a consultant firm.



Jon Pheanis, USA

Jon Pheanis, AICP, is a planner and project

manager with MIG, working with communities across the west and throughout Oregon. During his career, Jon has contributed on projects with a range of scales, from street and park plans, to neighborhood and comprehensive plans. Jon is especially passionate working with people and bringing their ideas to life, generating enthusiasm and trust throughout each of his projects. His experience includes successful public involvement campaigns and professional meeting facilitation across a wide array of projects and audiences. He has contributed on numerous professional articles and conferences related to great public spaces and public involvement. Jon has been a planner in Oregon for over a decade and has attended the Oregon Chapter of APA (OAPA) annual conference for nearly as long, including as speaker. Jon holds a Masters in Community and Regional Planning from the University of Oregon.

Aaron Ray, USA



Aaron Ray, AICP, is a Senior Aviation Planner with the Port of Portland. He focuses on long range planning for the Port's three aviation

facilities, with an emphasis on land use compatibility and collaboration with partner jurisdictions. Prior to joining the Port, he was a Senior Planner for the City of Hillsboro, managing a multi-year project to rewrite the City's Comprehensive Plan, its first overhaul in over 30 years. Aaron also serves as a Board Member and the Professional Development Officer for the Oregon Chapter of the American Planning Association. He holds a Bachelor's degree in Community Development from Portland State University, and a Master of City and Regional Planning from California Polytechnic State University, San Luis Obispo.

Grace Stainback, USA



Grace Stainback is a Land Use Planner in Mackenzie's planning department. Grace received a Master's degree in

Urban and Regional Planning and a Graduate Certificate in Geographic Information Systems at Portland State University this year. She obtained her bachelor's degree at the University of Florida, is a former journalist and, prior to Portland, has lived and worked in the Miami area, Spain, Ecuador and Vietnam. She hopes to combine her curiosity about people, place and culture with her formal education to help create meaningful spaces. holds a doctorate degree in Social Engineering from the Tokyo Institute of Technology whose supervisor was Prof. Dr. Yoshinobu Kumata. He was trained as "Young Planner (current: Young Planning Professionals: YPP)" in 1992 at the Cordoba congress and was a member of Local Organizing Committee of the Ogaki Congress 1996.



Damian Syrnyk, USA

Damian Syrnyk currently serves as a senior planner

with the City of Bend Growth Management Department. He has over 28 years of professional experience in both current and long range planning for two cities and one county in Oregon. Damian served as a key member of a team in developing a proposal for an urban growth boundary expansion for the City of Bend that included a significant update of the Bend Comprehensive Plan. The Bend Comprehensive plan and the UGB expansion were acknowledged by the Oregon Department of Land Conservation and Development in November 2016. Damian has also prepared population and housing forecasts, and a water public facility plan for the City of Bend. As a senior planner he has also reviewed and testified on land use and planning bills before the Oregon Legislature, or coordinated with the City's legislative liaison to provide testimony.

Damian has been a member of the American Planning Association (APA), including the Oregon Chapter of APA, since 1988. He earned his certification as a Member of the American Institute of Certified Planners in 1995. He served as an at-large member of the board of Oregon APA from 1999-2003 and from 2009-2012. He served as the Board Vice Present from 2012-2014, during which he also served as a Conference Committee Chair. He currently serves as the Chair of the Oregon APA Legislative and Policy Affairs Committee, a position he has held since 2014, and has served as a committee member since 2010.



Philippe Vaillant, France

Philippe Vaillant is an architect-town planner, a territorial

engineer in the agglomeration community «Ardenne Metropole». He currently works for the "City Policy" department. He has presented case studies at numerous ISOCARP congresses. He is one of ISOCARP's representatives at UNESCO.

He has drawn up numerous town planning documents and has been Director of the Technical and Urban Planning Department (DST) of several medium-sized towns. He is a national co-facilitator within the AITF, and the technical director of a "Practical Guide to the DST" used in more than 200 cities in France. He has conducted many exchanges of experience, through seminars and congresses at the local, regional, national and international level.

After leading on the ground the regional operation « After Mines » of the French and German Lorraine Coal Basin, he became Doctor of Geography-Planning, with distinction. He has since been an Associate Researcher at the University of Lorraine, EA 7304, and has conducted a Post-Doctorate in Australia, Kimberley, Western Australia, in partnership with the Indigenous Nyikina People and with the International Water Center (Brisbane). His international research focuses on the theme of "Mining, Environment and Society". He promotes and implements an organic, trans-disciplinary planning (A.N. Whitehead) toward convivial regions (B.Twittchet) taking into account the limited Earth resources. His attention is focused on an operational and relational way toward solidarity-based, convivial and inclusive communities, rooted in permanently changing territories, as a solution to an increasing pauperization.

Kirsten Tilleman, USA



Kirsten Tilleman is a planner with WSP USA in Portland, Oregon. Her work focuses on both environmental planning and transit system

safety and security. Specifically, Kirsten executes socioeconomic and environmental justice impact assessments; risk-based transit system safety and security analyses and trainings; land use permitting; and compliance with various applicable federal and state regulations. Kirsten earned her certification as a member of the American Institute of Certified Planners in 2017, and is board president-elect of the American Planning Association's Oregon Chapter (OAPA). She holds degrees from the Bren School of Environmental Science & Management and the Oregon State College of Forestry.



Shivon Van Allen, USA

Shivon Van Allen is a

GIS professional for a utility company in Portland, Oregon. She previously was a planning consultant in the Portland-area and has provided land use planning services for private and public sector clients. Shivon holds a Bachelor's of Science in Environmental Studies and Film from Portland State University and a Master's of Science in Geography for the University of Alabama. Shivon is interested in the roles GIS and technology play in influencing the evolution of urban and rural environments.

2017 OAPA / ISOCARP Joint Conference - Program

October 24 DAY 1	9:00 -> 17:00	Registration		
	8:30 -> 12:00	MW1 Innovation Quadrant	MOBILE WORKSHOPS (TECHNICAL TOURS)	
	13:00 -> 16:30	MW4 Transportation, Urban Development and Cultural Change in the Jade District	MW2 Willamette Falls Legacy Project	MW3 Columbia River Gorge National Scenic Area - All day -

	TRACK 1: TECHNOLOGY, INFRASTRUCTURE & BUILDINGS	TRACK 2: GOVERNANCE & INCLUSIVE COMMUNITIES	CONFERENCE TRACK 3: CULTURE, COMMUNITY EXPERIENCE & SHARING ECONOMY	SESSION TRACKS TRACK 4: RESILIENCE ADAPTATION & DISASTER MITIGATION	TRACK 5: TECHNOLOGY & SMALL COMMUNITIES	TRACK 6: POST-SMART COMMUNITIES & THE NEW FRONTIERS
7:30	Registration					
9:00	Opening Plenary: Welcome by ISOCARP/APA Presidents Cynthia Bowen and Ric Stephens Welcome by the City of Portland Keynote: Daniel Iacofano Introduction to the Tracks: Hongyang Wang and Conference Team					
10:30	Exhibitors & Poster Break					
11:00	Information & Communication Technology & Data Systems	The Portland Plan: Measuring Progress Towards Equity (Engstrom)	Making Good Great: Transforming 20th Century Industrial District into a Next Generation Employment Center (Koski)	Mitigation & Adaptation on Climate Change - Strategic Planning for Climate Change	Improving Multi-Agency Program Transparency and Accountability via a Scalable Web Platform for Performance Measure Tracking (Deniston / Burns USA)	"Made in China"
12:30	Lunch - ISOCARP Awards					
14:00	Beyond the black box: Communicating data and evidence to the public (Rodgers / Mangle USA)	Defining Inclusive Smart Communities	Smart Mobility, Digital Transformation, & Energy Efficiency Smart culture, regenerative planning and sustainable economy	Hydrological Vulnerabilities	Smart Communities	Cities Leading Through Energy Analysis & Planning (Roberts)
15:30	Exhibitors & Poster Break					
16:00	Sustainable Buildings & Urban Space	The International Guidelines on Urban & Territorial Planning UN-Habitat (Oyuela)	Smart City Placemaking in Kashiwa-no-ha, Japan (Kelley)		Technology & Society Technology & Big Data	10 Years of ISOCARP Awards: presentation of winning projects
17:30	Reception					
19:00	Pub Crawl & Trivia					

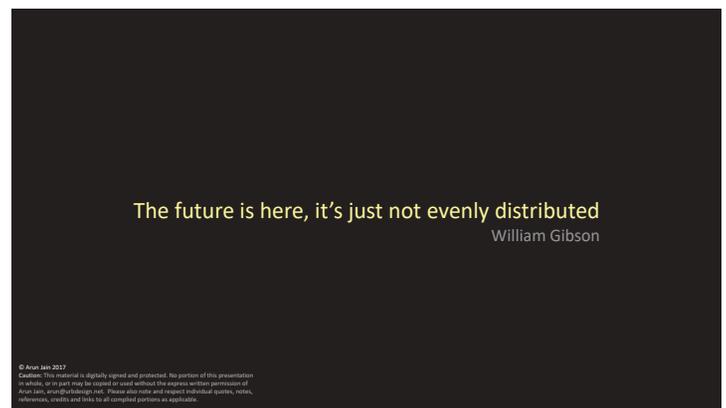
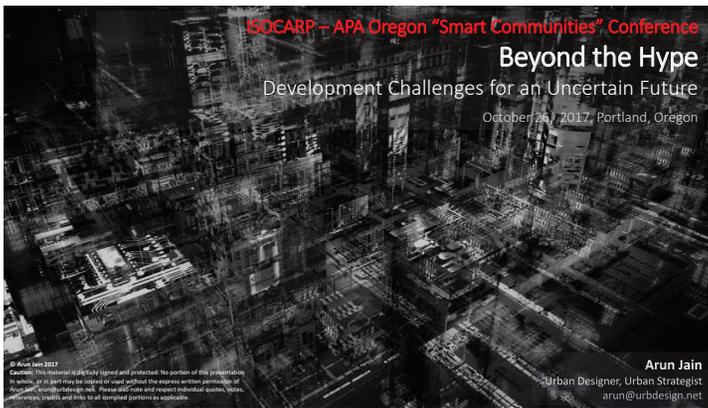
Thursday, October 26 DAY 3	7:30	Registration					
	9:00	Plenary Keynote: Arun Jain and ISOCARP Projects					
	10:30	Poster Presentations					
	11:00	The Unpaved Road to Housing Affordability: What Role Does Technology Play? (Meltzer / Parker USA)	Inclusiveness, Indigenous People, Informal Settlement & Traditional Planning	Smart Communities, Smart Technology, & New Planning Tools	Natural Disaster Mitigation Resilience Theory, Problems & Practices	Sustainable Development Goals (APA International)	Planning & Governance Technology & Big Data
	12:30	Lunch - Presentation by Doppelmayr (sponsor) and Presentation of results by Young Planning Professionals					
	14:00	Autonomous Vehicles: What the Revolution Means for You (Weber)	Governance & Citizen Participation	Story of Place: A Framework for Regenerative Planning (Murphy)	Central City Scenic Resources Protection Plan (Brooks)	Online Interactive Mapping: Tips & Tools for Small Communities (Hewitt)	People & Society Future Urban Economics
	15:30	Exhibitors & Poster Presentations					
	16:00	Smart Infrastructure & Transport	Smart City Governance Co-Creating Inclusive Places (Ludlow UK)	Shared Economies, Social Integration, & Engagement	Sustainable and Resilient Communities	Neighborhoods, parks, and food access - Creative approaches to community outreach in Salem OR (Kim / Anderson-Ogilvie USA)	Community Engagement & the Portland Green Loop (Raggett)
	17:30	ISOCARP Members Program - Bureau Meeting / Annual General Meeting					
	19:00	Dinner and Awards Ceremony					

Friday, October 27 DAY 4	7:30	Registration					
	9:00	Final Day Opening Plenary, Keynote: Congressman Earl Blumenauer					
	10:30	Break with Exhibitors & Poster Presentations (Poster Session 5)					
	11:00	Washington County Transportation Futures Study (Wardell / Deffebach USA)	Neighborhood Cohesion	Urban Planning Advisory Teams: practices from Wuhan and Bodø	Strengthening the Disaster Resilience of the Academic Biomedical Research Community: Protecting the Nation's Investment (Pawlowski)	Lighting up the Discovery Corridor - the Port of Ridgefield's Dark Fiber Optics Infrastructure (Keillor / McDermott USA)	TRACK 2 continued: Governance and Inclusive Communities
	12:30	Final Day Lunch - OAPA Awards					
14:00	Green Smart Buildings & Development	Equitable Growth Policies & Community Partnerships (Curren)	What Can We Learn from Portland's Urban Economy? (Zaman)	Digital Innovations in Urban Planning and Design from a Global Perspective (UN Habitat, Ericsson Research, Johannesburg Development Agency, Arcadis)	TRACK 2 continued: Governance and Inclusive Communities	Urbanism Next: How Autonomous Vehicles, the Sharing Economy, & E-Commerce Will Impact Cities (Steckler / Lewis USA)	
15:30 -> 17:00	Closing Plenary with Track Results and Announcement of 2018 ISOCARP Congress						



Beyond the Hype

Arun Jain, Urban Designer and Urban Strategist



1

Cities, citizens, technology & complexity

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Cities are networks of complex systems

As the external environment becomes more complex, systems also need to become more complex to prosper.
 W. R. Ashby (Introduction to Cybernetics) 1956

It takes energy to maintain any system in a complex, ordered state – and human society is no exception.
 Joseph Tainter (Complexity and the productivity of innovation) 2010

Collapse is the sudden simplification of a complex system

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Complexity

- Cities are collections of organized complexity
- Cities are incomplete open ended systems
- The key to working with complexity is embracing, not trying to (over) simplify it

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Uncertainty

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Uncertainty

The quality of your life is in direct proportion to the amount of uncertainty you can comfortably deal with...

Anthony Robbins

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Complex (urban) problems are "wicked"

HORST RITTEL

We need to relate our understanding of the problem with how far we can go with the solution...

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Cities struggle to create balance

- New mandates & expectations need a lot of support
- The scale & speed of change is unprecedented
- Cities and their governments are by nature, inarticulate & fickle

Cities need help to articulate & manage desired change (we need good default settings)

The vaunted human capacity for reason may have more to do with winning arguments than with thinking straight.

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Our world is increasing in complexity and we are struggling to keep up.

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2 "Smart"?

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Ambiguity

Smart City

A smart city is an urban development vision to integrate multiple information and communication technology (ICT) and Internet of Things (IoT) solutions in a secure fashion to manage a city's assets.

The city's assets include, but are not limited to, local departments' information systems, schools, libraries, transportation systems, hospitals, power plants, water supply networks, waste management, law enforcement, and other community services. The goal of building a smart city is to improve quality of life by using urban informatics and technology to improve the efficiency of services and meet residents' needs.

However, the concept is still in the process of maturation and lacks proper formalization.

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Lost purpose?

Architecture used to be about the creation of community, and making the best effort at symbolizing that community.

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Percent urban

Although the world is over 51% urban, it is not equally distributed...

70% of future urbanization will occur in Asia and Africa. It will happen fast...

India
 Urban pop today = 377 million
 2030 estimate = 5-800 million

China
 56% urbanized
 Av. urbanization rate 2.5%

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Can tech help the majority?

- More than 50% of the world's urban dwellers are poor
- Informal urban settlements are very hard and expensive to fix
- Tech should be able to help development entities to work at low, and very low margins
- Building "communities" should be the basis for housing

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Technology is disruptive

- Cities struggle to keep up with the market and rapid change. Out-of-date governance structures, regulation and financing do not help
- Adaptive long range visions and ideas are hard to implement because it is hard to imagine uncertain futures and do what might be unfamiliar
- Its easier for cities to leave innovation to the market, but in doing so they are forced to catch up with retroactive regulation and controls

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Technology (public vs. private)

- Private development tries to leverage what cities ask for, but they are not usually able to address the bigger issues
- Its hard for the private sector to achieve system level reliability and scale on its own (infrastructure, cost carrying capacity)
- Tech services tend to scale better in favor of diagnostics and monitoring
- Old governance does not work well with new technology

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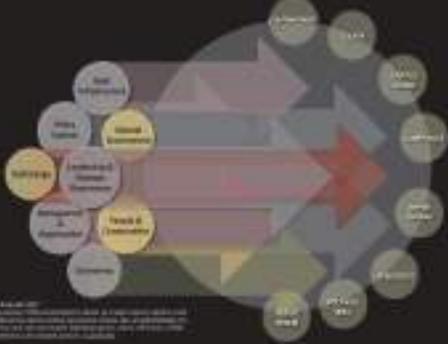
Promises & pitfalls

Technology trade-offs

Future Potential	Challenges
Better access (services, infrastructure, information)	Selective access (affordability, controlled access)
Better choices (a range of service options)	Information overload (choice paralysis)
Customization (tailor made products & services)	Obsolescence (jobs, accelerated waste production)
Enhanced experience (augmented reality)	Privacy (profiling, prejudice, regulated behavior)
Comfort, efficiency & safety (productivity)	Uncertainty & risk (catastrophic collapses, abuse)
Comprehension (better decision making)	Missed opportunities (bias, misrepresentation)
More with less? (is more sustainable life?)	Increased consumption? (Levon's Paradox)
Reliability (assured quality, services)	Dependence (on things we cannot control)

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Can tech lead from behind?



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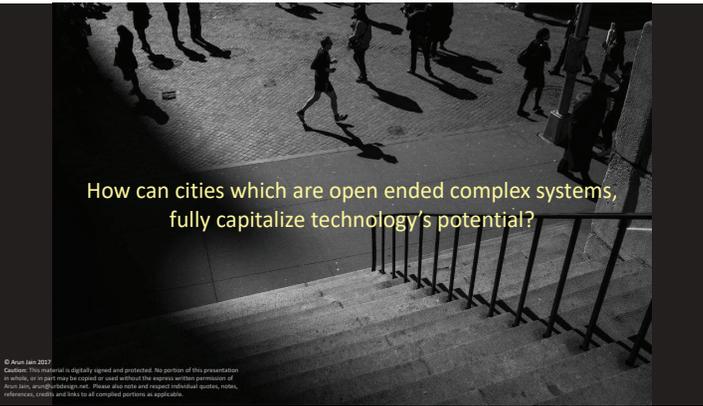
Barriers to citizen centric tech

- Uneven citizen awareness and interest
- Legacy systems that protect information for control
- Lack of regional and interdisciplinary collaboration
- Freedom from manipulation
- Trust and credibility
- Fairness
- Equity
- Reliability



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How can cities which are open ended complex systems, fully capitalize technology's potential?



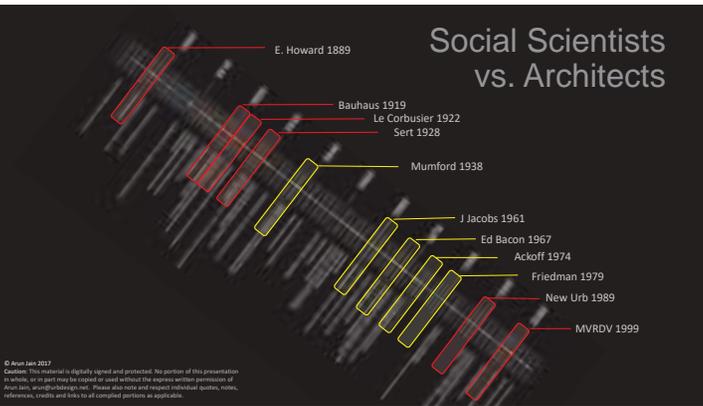
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3 Misconceptions



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Social Scientists vs. Architects



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Theory is *not* practice

- Planning as an "political" act designed to protect public interests
- Introduction of social sciences & evaluation of the role of planning
- Planning as process
- Decision theory
- "Salt-dome" (Hubert Simon 48' 69)
- Limits of Individual & social capacity
- Advocacy Planning (Paul Davidoff 69)
- Citizen Participation (Korten 68)
- Planning as a social & political act that is not value neutral (Alchauer 65, Sabharwal 69)
- "Determining a Rational Theory of Planning" (Horst Rittel 73)
- Transactive or inclusive planning (Freidman 73)
- Synoptic or Systems Thinking (model based ends & means)
- "Determining a Rational Theory of Planning" (Horst Rittel 73)
- "The Production of Space", (Henri Lefebvre 74, '91)
- "Theory of Communicative Action" (Jurgen Habermas 82)
- "Occupying Professions", "Tools for Governability" (Avun Jan 73)
- "Beyond the Stable State" (D. Schon 73)
- "The Reflective Practitioner" (D. Schon 83)
- "Rise of the Network Society" (Manuel Castells 96)
- "Global City" (Saskia Sassen 91, 01)

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Simulations are *not* predictions!

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Portland Metro vs. Oregon State

Slowing a rate of increase is *not* reduction

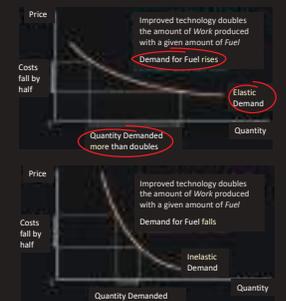
Jevon's Paradox

As technology progresses, the increase in efficiency with which a resource is used tends to increase (rather than decrease) the rate of consumption of that resource.

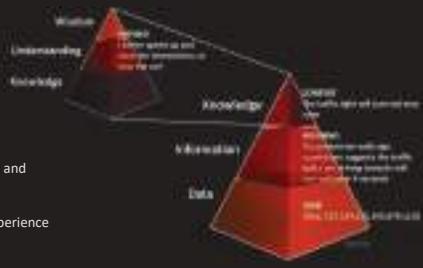
William Stanley Jevons, 1865



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Information & data is *not* knowledge



- Too much emphasis on data and information
- Wisdom requires time & experience

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The appropriate role of technology

Tech is only a tool...



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Is technology filling a gap, or creating a need?

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Turbulent Change

INSTITUTIONAL ASSUMPTIONS are changing as distributed and software-based organizations produce more resilient and cost-effective outcomes than the centralized institutions of our past overturning entire industries seemingly overnight.

Our traditional institutions are in flux and will experience dramatic change (for better or worse)

http://www.ft.com/ftcommentary_upload/download/11/11/2014_FT_TF_Map_of_the_Decade.pdf

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The future is uncertain



- Path 1 - Growth
One step ahead of disaster
- Path 2 - Constraint
Sustainable paths in a low-capital world
- Path 3 - Collapse
Local disasters, regional conflicts
- Path 4 - Transformation
Super-structured systems

* 2010 Map of the decade, Institute of the Future

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Uncertain futures in a complex world challenge our ability to comprehend and respond adaptively.

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Disruptive forces (What cities need to embrace)

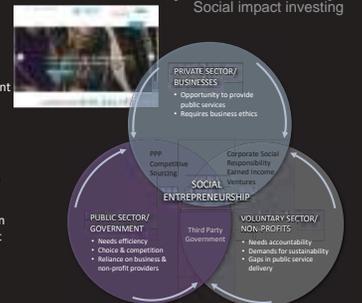
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Social entrepreneurship Social impact investing

Leveraging local capital, innovation & impact

- A vetted community based substitute for government efforts that are otherwise seen as a public "service" (marginalizes the "appeasement" aspect of public participation)
- Short-term social entrepreneurs and community change agents have a greater skin in the game
- Mid-term successes can create confidence for more complicated long range adaptive planning
- Each effort and impact investment realm has its own critical mass of involvement, and capture space that is necessary for success



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Social entrepreneurship

Social impact investing

Leveraging local capital, innovation & impact

Goldman Sachs

LISC (Ford Foundation)

JP Morgan

CDC (mix using Community Block Development Grants)

1st Gen - Institution based funding

2nd Gen - Private social impact bonds

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Participatory budgeting

Leveraging local choice

- Local communities get to prioritize their spending capacity
- Potential to extend discretionary budgeting to fund and implement larger systemic change (marginalizes the "assessment" aspect of public participation)
- Better for short and mid term spending, harder for longer term decisions
- Process must ensure freedom from local political manipulations and coercion.

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Sharing economies

Hybrid markets

- Local communities get to prioritize their spending capacity
- Potential to extend discretionary budgeting to fund and implement larger systemic change (marginalizes the "assessment" aspect of public participation)
- Better for short and mid term spending, harder for longer term decisions
- Shared housing?

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Crowdsourced policy making

Inclusive governance

Five Design Principles

- Inclusiveness** (low barriers, diverse participation, enhanced legitimacy)
- Accountability** (built into process, horizontal & vertical communication, quick feedback)
- Transparency** (peer to peer communication, equal information to all simultaneously to build legitimacy)
- Modularity** (structured to enable comprehension, enables ad-hoc and long term participation, meaningful sequences)
- Synthesis** (summarized outcomes, synthesis during and after process, tracks content duplication and feedback, assessment)

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Distributed learning

Education and constantly morphing/adapting skillsets

- Lifelong learning
- Remote learning
- Ubiquitous learning

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Distributed energy

Micro-grids

TODAY vs TOMORROW'S ENERGY CLOUD

- China and India have committed to going electric
- France and Germany are almost there
- The kWh cost of solar is dropping rapidly
- Major vehicle manufacturers are going electric
- California pledges to be 50% renewable by 2025
- Intermittent energy production is a problem, but is being offset in different ways

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Three scales

Renewable Energy Utilities

- Economies of scale
- Unequal taxes/subsidies
- Transmission costs/storage
- Institutional barriers
- High financing costs
- Time to deployment (permitting, installation, operation, maintenance)

Community Energy

- Energy system diversity
- Distribution efficiencies
- Low storage costs
- Institutional barriers
- Resilience and redundancy
- Faster deployment (permitting, installation, operation, maintenance)

Net Zero Buildings

- Manageable system integrations
- Size thresholds/constraints
- Uncertain redundancies/backups
- Client barriers/cost effectiveness
- Higher ownership/financing costs
- Systems management expertise (installation, operation, maintenance)

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How can cities which are open ended complex systems, fully capitalize technology's potential?

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5 The future?

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Behavior based decision tools

ARUS research project

Was hard to monetize the application, and build regional consensus at the institutional level

- The infrastructure for choice needs to exist
- Pilot projects need long term sponsors and investors
- The gains from predictive analytics are not always clear

Behavior based mobility study
 Funded by the Marciano Foundation

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Cope with data

- We take open data for granted
- Who owns it, who controls it?
- How much is too much?
- Granularity
- Simulations are NOT predictions
- Ensure open data is usable by the public

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Create credible transparency

DMAT (Development Management Assessment Tool)
 National Capital Parks & Planning Commission (MD)

Giving up decision making authority is not human nature...

- Create conditions in which no actor (stakeholder) can claim ignorance of the situation and consequences
- Understand the real conditions in which cities must adapt (economic, governance structures, social + political culture)

Decision support tools had unintended consequences

- Leadership's authority felt threatened
- Hard to re-work governance (poor institutional capacity)
- Changing priorities and shifting political landscapes

Palau National Sustainable Suitability Development Tool and National Policy
 Palau National Government, Republic of Palau, Micronesia

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Pursue adaptive uniqueness

Universal Streets - S Waterfront, Portland

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Plan for uncertain futures

Development concepts for the new Buckholz Pankow neighborhood

Winning studio entries for the national German Johannes-Godert Prize

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Vertical integration

Rethink how to meet complex needs

Urban Mobility

- Rail Solutions
- Components & systems
- Metros
- Trams & Light Rail
- Commuter & Intercity Transport

Road Solutions

- Parking Management
- Service
- Tolling systems
- Traffic control & information
- Flow optimization
- Planning

Cross platform integrated custom solutions

- Cities need advice on how to optimize mobility across platforms

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Tighter collaborations

- New & integrated sectoral dependencies
- Relatively small cooperation space
- Increased need for strategic approaches



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Avoid the "ostrich trap"

What is much more sensible, is to say, "Well, this is what I think now, but I am going to come back and look at this again and again. If, as the future comes nearer, I find my predictions were wrong, I am going to change what I did."

Not only that, I am going to design my decision in ways which allow me to change easily."



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Guy Burgess
 Co-Director, Conflict Research Consortium University of Colorado, Boulder

Embrace complexity



- We gain more from community scaled systems (find ways to carry and absorb the costs)
- Consider the value of decentralized community based "sheds" (find ways to carry and absorb the costs)

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Beyond the hype

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Staying ahead

- Pursue distributed learning/living/work clusters
- Pursue adaptive systems and infrastructure at all scales (city, "shed" and building) – Design/plan for uncertain futures
- Design for system transition and/or, plan for obsolescence
- Establish new financial means to carry costs for adaptive change



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Staying ahead

- Move beyond what's popular (understand what you embrace completely)
- Work from the problem backwards (if all you have is a hammer...)
- Don't let any preconceived solution drive the problem (don't be lazy)
- Simplify control and management systems (but embrace complexity)
- Don't forget our behavioral and cognitive biases (human nature)
- Embrace complexity and uncertainty (don't oversimplify)



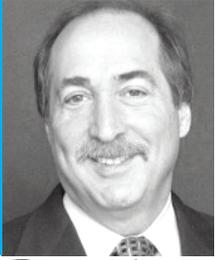
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Be brave



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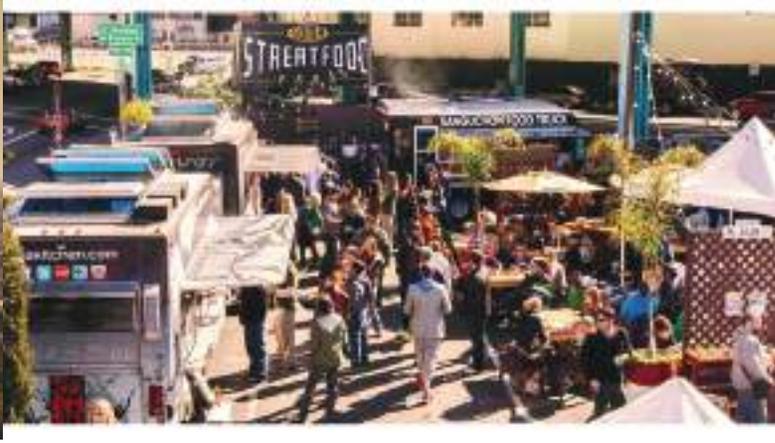
Arun Jain, Urban Designer, Urban Strategist
 arun@urbdesign.net



Designing for inclusivity: neighborhood city region

Dr. Daniel Iacofano, ISOCARP Portland







'Gentrification is here:' Birmingham residents share concerns

By [unreadable] on [unreadable]



'Gentrification is here:' Birmingham residents share concerns

Rising Rents Are Stressing Out Tenants And Heightening America's Housing Crisis



'Gentrification is here:' Birmingham residents share concerns

Rising Rents Are Stressing America's Housing Crisis

Downtown galleries, art studios face rising rents and scattered sites



'Gentrification is here:' Birmingham residents share concerns

Rising Rents Are Stressing America's Housing Crisis

Downtown galleries, art studios face rising rents and scattered sites



Gentrification, rising rents put squeeze on more Austin households

4mi Weekly [Google Home for 2015: What's Next?](#) 2/10/15 1:00pm

I've been priced out of downtown Detroit

●●●●●



Amid efforts to revitalize Detroit's downtown, some residents are finding they can no longer afford to live there.



\$3800





Inclusivity is the fundamental basis for creating great cities



Why Amazon's New \$5 Billion Headquarters May Ruin Your City

by Austin Iversen

There may be a few good reasons not to add your city to Amazon's shopping cart.

Four tall, thin, nationwide skyscrapers for Amazon's second headquarters are due this Thursday, and others have been pulled out of the plans to add the \$2.7 billion retail behemoth. From the 21-foot-tall towers that Tyson, Arizona, shipped to Amazon's Seattle headquarters, to the giant Amazon packages that Birmingham, Alabama, placed around its city center, the nation's mayors, residents and business leaders clearly believe that having one of the world's most valuable companies move its HQ here is a golden ticket to economic prosperity.

But although the \$5 billion project is sure to inject billions of dollars into the local economy and provide work for thousands of residents, some economists are warning that having the retail giant could bring on some equally giant headaches.

Traffic jams and labor pains

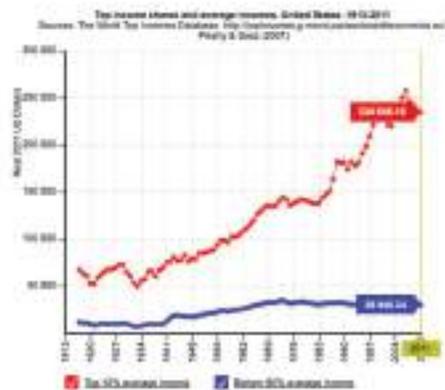
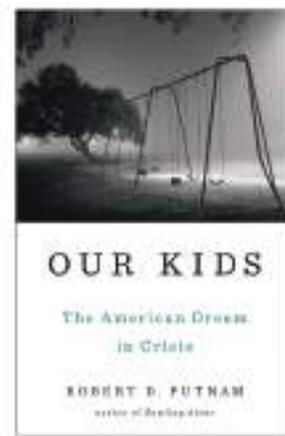
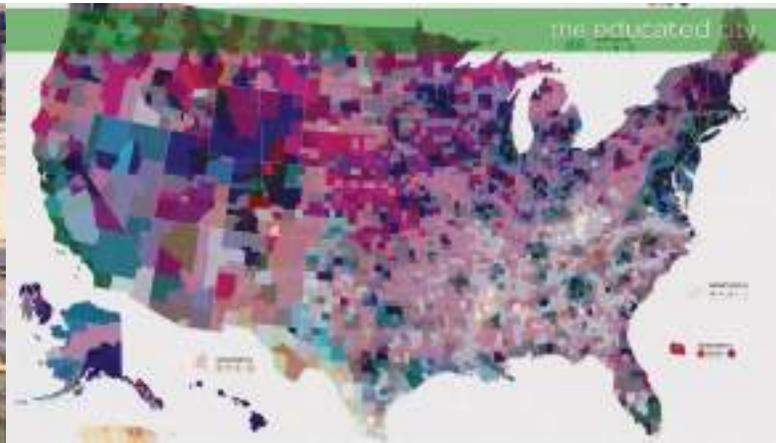
It's a big economic engine, but it's also a big traffic jam. And it's a big labor pain.

Concerned communities

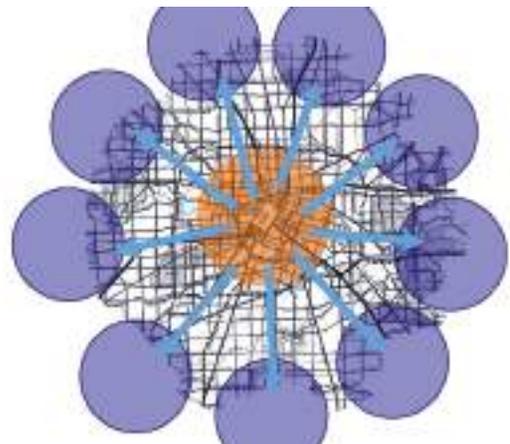
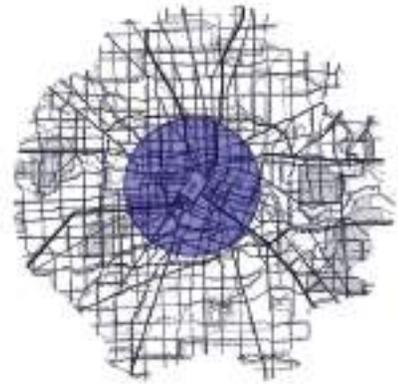
As the Amazon comes to a close this week, some communities are already worried about the impact of the new headquarters.

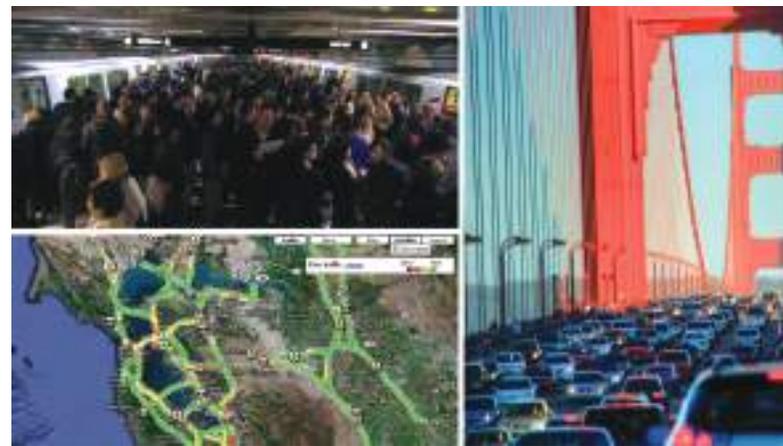
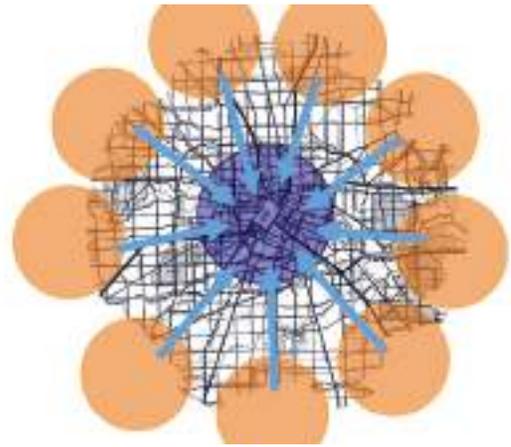
Housing boom — or bust

For some communities, when big technology like Amazon comes to a city, it's like entering the job market as housing prices rise.

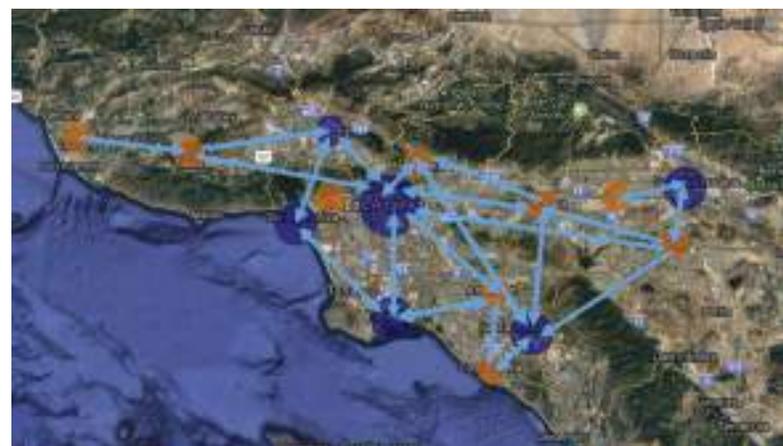
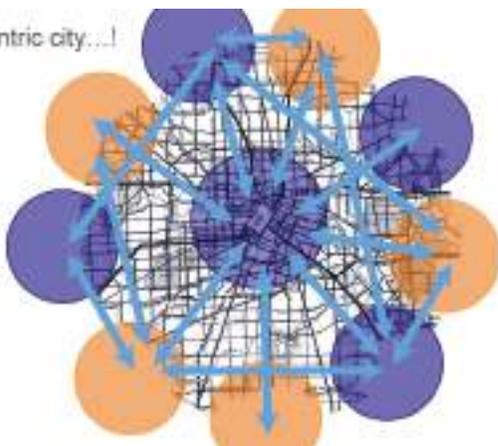


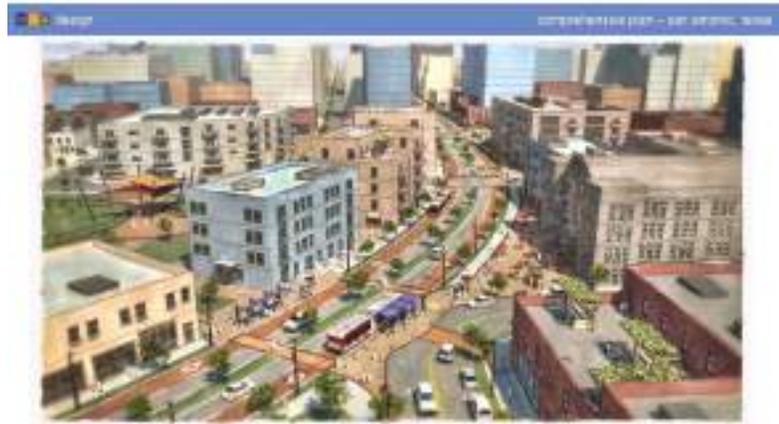






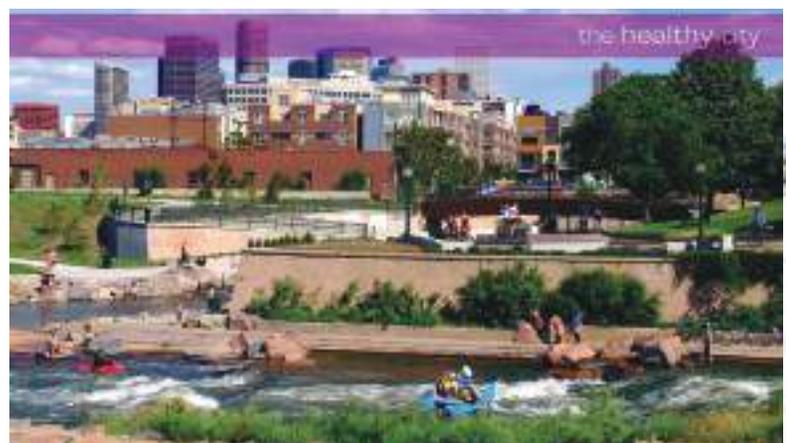
the polycentric city...!



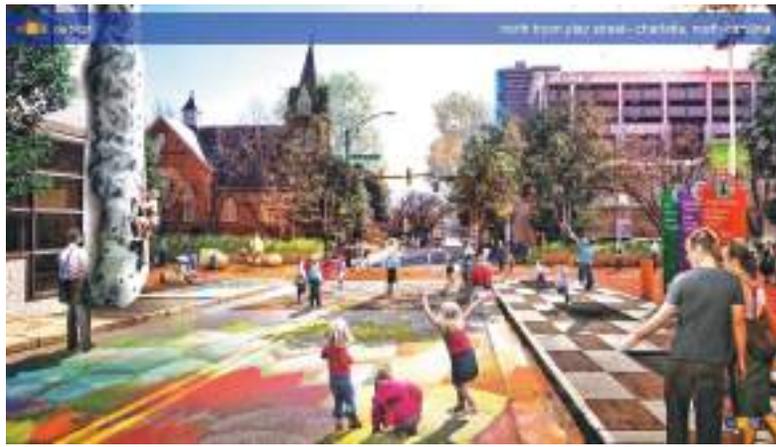


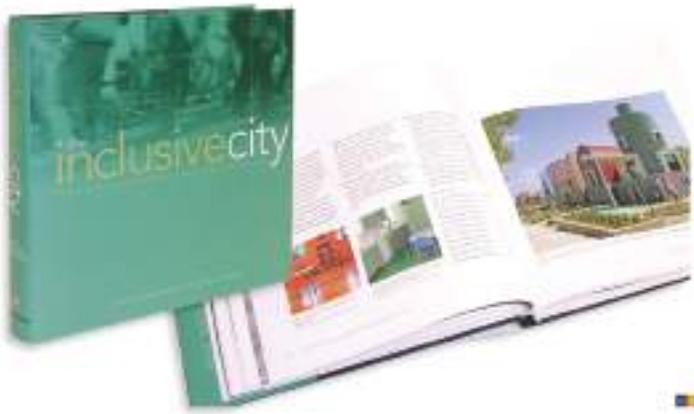
planners
 agriculturalists event planners
 economists elected officials
 public health pros artists
 public works sustainability experts
 community leaders educators
 educators downtown leaders
 traffic engineers landscape architects
 bicycle advocates













In with the New, out with the Urban and avoiding an Agenda: Challenges and opportunities of the New Urban Agenda

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

In with the **New**, out with the **Urban** and avoiding an **Agenda**:
Challenges and opportunities of the New Urban Agenda

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

An urban(ising) world



The Urban SDG and its Targets



Other elements of Agenda 2030

- Sendai Framework for Disaster Risk Reduction
- Addis Ababa Action Agenda
- World Humanitarian Summit
- Paris Agreement on Climate Change
- New Urban Agenda...

So why the New Urban Agenda?

- Urban SDG (11) comprehensive yet focused
- Recognition that "urban" was a theme that cut across multiple SDGs, not just SDG 11
- Targets included outcomes and process/ means

So why the New Urban Agenda?

- Urban SDG (11) comprehensive yet focused
- Recognition that "urban" was a theme that cut across multiple SDGs, not just SDG 11
- Targets included outcomes and process/ means
- Urbanisation also addressed in other agreements
- Hard-fought political battle

... right?

So why the New Urban Agenda? [2]

- NUA builds on SDG 11 but addresses a wider range of urbanization and human settlements issues
- Provides a spatial or locational framework for the delivery of SDGs in urban areas
- Focuses on local level implementation through local governments and other local actors
- Adds significantly to "means of implementation" through strategic spatial governance frameworks (e.g. NUPs, legislation, planning and design etc)
- Deepens the scope of several targets of SDG 11

Developing the New Urban Agenda



Key Elements of the NUA

- A shared vision
- Three Transformative Commitments
 - Sustainable Urban Development for Social Inclusion and Ending Poverty
 - Sustainable and Inclusive urban prosperity and opportunities for all
 - Environmentally resilient and sustainable urban development
- Three elements of effective implementation
 - Building the urban governance structure
 - Planning and managing urban spatial development
 - Means of Implementation
- Follow up and Review

Reflections on the New Urban Agenda

- Centrality of housing, planning, land, public space, local governance, formality and informality, safety and security, public space
- Inclusion of issues of concern of diverse group of urban stakeholders
- Introduction of "right to the city", "right to adequate housing", "decent work", "public services", "cities in crisis", "smart cities"

Beyond the urban...

- Integrated, polycentric and balanced territorial development
- National urban policies, urban-rural linkages, food security and nutrition, agriculture
- Predictable and long term financing, debt management, municipal borrowing, pooled financing, city to city cooperation
- Data, access to information, e-government strategies, science and technology

Looking through the Planning lens

- 70+ references to planning (full section), 35 references to local governments, 10 references to private sector
- Commitments (Para 15):
"strengthening capacities and engaging citizens in urban planning and design"
- *Local Governance (Para 20-22)*
- Urban prosperity (Para 43-62)
- Sustainability and resilience (Para 63-80)
- *Effective Implementation (Para 83-100)*
- Means of Implementation (Para 126-160)

The importance of context

- SDGs, A2030, NUA - agreed upon by 193 UN Member States
- Guiding frameworks
- Non-binding commitments
- Must be contextualised and shaped to local realities
- Advocacy and knowledge is critical

Opportunities and challenges

- A focus on sustainable urbanisation - potentials and challenges
- Urban planning and design in the centre
- Beyond the hardware - inclusion, resilience, culture and heritage, governance, financing
- Capacities
- Resources
- Data
- Knowledge

Role of urban professionals in implementation of the NUA

- Holding national governments to account over their commitments in Quito
- Supporting local authorities in implementation
- Demanding/ supporting reforms in national policies
- Building up and sharing knowledge
- Testing and helping scale up innovations
- Bottom-up monitoring
- Continued advocacy

Join forces with UN-Habitat...

- National Urban Policies
- MetroHUB
- International Guidelines for Urban and Territorial Planning
- Guidelines for City Climate Action Planning
- Planners for Climate Action
- Urban Planning and Design LABs
- Global Public Space Programme ...

Join forces with civil society and professional networks

- National and regional planning associations
- ISOCARP
- Global Planners' Network
- Global Planners Education Association Network
- General Assembly of Partners
- World Urban Forum (Kuala Lumpur, 7-13 February 2018)

Things to think about...

- Local actions, global impact
- Planning and politics
- Values versus tools
- Whose data? What information?

"Neither cities nor places in them are unordered, unplanned; the question is only whose order, whose planning, for what purpose?"

(Peterson, 1991)

Thank you for your attention!





Joint Conference

October 24-27, 2017

Oregon Convention Center

Portland, Oregon USA

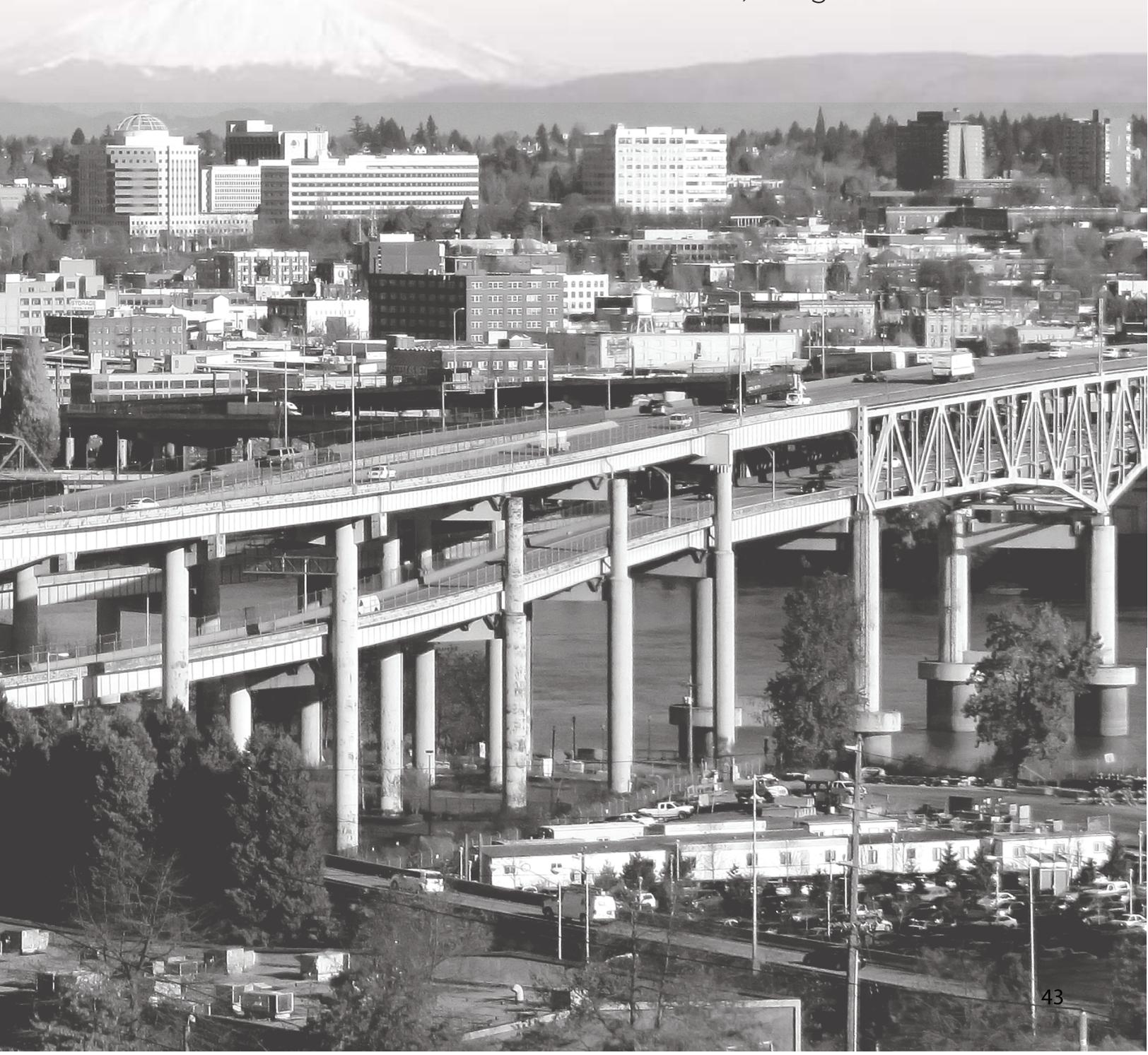




Photo by Austin Neill on Unsplash



Track 1: Technology, infrastructure and buildings



Scrutinizing Greenness and Smartness in New Construction: The Case of Das Eckwerk, Berlin

Benjamin SCHEERBARTH, Eckwerk Entwicklungs GmbH, Germany

Justified or not, the concept of the smart city and its promise of unprecedented resource efficiencies became a central paradigm in contemporary urban development agendas of both the private and the public sector. However, the day-to-day operations of the construction and real estate industries carry forward their struggle to depart from conventionality. Despite the advancement of innovative planning methods, building materials and energy-saving technologies, the way buildings are developed, built, used and ultimately demolished remains largely unchanged.

Drawing on industry insight from the planning of Das Eckwerk, an innovative bottom-up urban development initiative in Berlin, we find that the bottleneck to building greener and smarter is the linearity of value chains in urban development, real estate and architecture, which often hinder innovative solutions play out. The cornerstones of the urban development industry seem to remain a prioritization of short-term over long-

term profit, ownership over use, product over function, and independence over collaboration.

Das Eckwerk is uniquely positioned to identify, negotiate and pilot innovative business models, due to a potent symbiosis of the blessings of naivety and financial independence in the development of what essentially is a large real estate project. Originally stemming from Berlin's subcultural movement and apt in the interim use of vacant space (German: *Zwischennutzung*), the protagonists hold a long-term ground lease (British: leasehold, German: *Erbbaurecht*) for prime land in the city center.

This paper introduces three strategies exemplifying a unique approach to development, which scrutinizes greenness and smartness beyond the conventional norm of e.g. environmental building standards and certifications: (1) valuing sustainability in both the construction and the long-term use phase of the

building, (2) recognizing and separating out different lifecycles of a building (tenant turnover, technological innovation, building maintenance), and (3) systematically prioritizing use over ownership.

Among the first results of this approach are (1) a feasibility study to erect a core-and-shell building envelope with unspecified interior for long-term flexibility, (2) a strategy of selling to tenants (and procuring from providers) performance instead of goods (e. g. selling levels of brightness or warmth) to incentivize and reward resource productivity, and (3) a business model for reversing the logic of energy supply, i.e. rather than wastefully supplying for peak demand of a single building, demanding as much as can be optimally supplied and distributing excess locally.

Despite the general site and context specificity, the questions, lessons and partly precedential solutions being developed at Das Eckwerk are expected to be of relevance to urban development projects grappling with the balance of environmental sustainability, affordability and profitability.





Beyond the black box: Communicating data and evidence to the public

Kelly Rodgers, Executive Director, Streetsmart, USA
Mike Sellinger, Alta Planning + Design, USA

Introduction

The relationship between certain transportation strategies, such as complete streets, and the goals we have for our communities, such as improved safety and health, have been described and documented in the research literature. However, this information isn't readily accessible to those who need it: planners, elected officials, and the communities they serve. In a growing performance-based transportation planning context, having the evidence at hand to educate community members and decision-makers about the effectiveness of different strategies is critical. This presentation explores how evidence can be used in transportation planning through some emerging tools.

Integrating evidence into decision-making

What evidence and data is used in transportation decision-making? Who defines the evidence and what is its quality? Kelly Rodgers, Executive Director of Streetsmart, raised these questions that inform the development

of Streetsmart, a non-profit research synthesis, resource clearinghouse, and communication platform for transportation planning. Through the presentation, Kelly Rodgers explored the scientific basis of prominent transportation guidance in North America and their shortcomings. She further discussed the challenges of finding and using evidence in the transportation planning process (Table 1).

Incorporating evidence into a planning process isn't linear. Rather than taking an instrumentalist approach to evidence, Kelly suggested that evidence can illuminate a policy landscape and democratize transportation decision-making. Streetsmart aims to accomplish this by making research accessible and actionable to practitioners.

Evaluating multiple community goals
Mike Sellinger, Alta Planning + Design, presented on two initiatives to better integrate data and evidence into decision-making. The first was on the sidewalk

infill prioritization process in the City of Vancouver, Washington. This prioritization utilized research on health, equity, and safety outcomes to determine which sidewalk infill projects would best meet the City’s planning goals. These results were combined with data on where people were most likely to walk to access schools, parks, transit, and employment to create the overall prioritization of sidewalk infill projects.

The second part of the presentation demonstrated a tool created by Alta Planning + Design that allows the public to have a greater hand in weighing the value of multiple community goals and to better understand what their community’s infrastructure might look like if investments were made based on their personal priorities. This web-based, interactive tool allows users to move sliding scales for each identified community goal and see, in real-time, what the resultant prioritization framework would look like. The feedback received from the diverse group of audience members will help improve future versions of the tool.

	Issue	Claim	Critique
Practical Issues	Gaining access to information	More evidence is available through online journals	Practitioners have low awareness of journals and little experience searching for it
	Knowing how to critique and read research	Some practitioners can do this or get help from librarians	Practitioners do not understand research (e.g., technical terms)
	Time to find relevant research	More databases are available now	Practitioners do not have time to sort through databases
	Organizational fit	Professionals are used to looking for information	Policy and politics may be more important than evidence
Research Issues	Dealing with conflicting findings	Better to know when there is conflict in research	This gray zone is hard for professionals to navigate and weakens EBP in general
	Systematic compilation of research for particular conditions	Systematic reviews are available	Systematic reviews don’t account for individual context or explore why something works

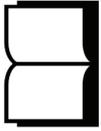
Claims and critiques of EPB. Source: Krizek et al., 2009, p. 464



Photo by rawpixel on Unsplash



Track 2: Governance and inclusive communities



A Comparative study of satisfaction level for Middle-Income Group Residents of Government housings and Public-Private Partnership housings

Amit KAUR; Indian Institute of Technology (IIT) Kharagpur; India
Sumana GUPTA; Indian Institute of Technology (IIT) Kharagpur; India

Synopsis:

This study conducted a comparative assessment of the satisfaction level of Middle-Income Group (MIG) residents in relation to the costs incurred. West Bengal Housing Board (WBHB) had adopted the provision of government group housings and Public-Private Partnership (PPP) model to overcome the affordable housing shortage in West Bengal, India. Group housings provided under both the models were selected from the similar location in the southeastern fringe of Kolkata, India. Comparison of the satisfaction levels was conducted "within premises" considering costs incurred. Mean and median satisfaction scores were computed "with cost" incurred and investment made from recorded satisfaction values on a five-point Likert scale. Exploratory factor analysis was conducted in STATA using polychoric correlation to identify the significant attributes "within premises" in case of both the housing models. Further "monetary benefits" were computed from housing to validate the computed satisfaction scores "with cost" incurred. These were computed as savings based upon the Neo-Classical School of Thought which propounded the idea that investment

made leads to savings. Savings were measured as deviations of the actual expenditure incurred on housing from the recommended standard of 12% to be incurred on housing by a MIG household. The findings of the study revealed that the PPP model is more successful despite higher costs incurred identified from higher satisfaction level of the residents. Thus it can be concluded that the involvement of the private partners has led to successfully overcome the affordable housing shortage and if the affordability of the buyer's permits, PPP model should be opted over the government group housing model.

1. Introduction and background of study

Shelter is a basic requirement of mankind. However, the shortage of this basic need still exists among the lower and middle-income groups of the Indian population. The present study focuses on the housing shortage encountered by the Middle Income Group (MIG) who move towards the cities in search of employment. They comprise 19% of the total Indian population and is the fastest growing section (Kannan & Raveendran, 2011). The cost constraints, the dearth of affordable housing led the government authorities to create new housing stock for this income group. A similar situation was also encountered by the state of West Bengal where increased demand for affordable housing was posed by the new job seekers in the state following the urbanisation. To cater to this rising demand, West Bengal Housing Board (WBHB) since its inception in the year 1972, emerged as the sole government agency responsible for dealing with the existing situation. However later Kolkata Metropolitan Development Authority (KMDA) and other State construction and urban development departments were also involved in the construction of public housing (Sengupta, 2006). Provision of group housings was adopted by WBHB to cater to the increased demand. According to the National Building Code of India (2005), group housings refers to “housing for more than one dwelling unit, where land is owned jointly, and the construction is undertaken by one agency”. Hence under the group housings constructed all required attributes along with the dwelling unit were provided within the same walls considering the buyers cost constraints. Group housings are also becoming a desirable alternative for the MIG since the burden of initial investments and later maintenance costs are collectively shared and reduced (Chattopadhyay, 2010). A number of group housings were developed in and around Kolkata and nearly 31,000 dwelling units were constructed by WBHB (Sengupta, 2006).

However, the pace of provision and quality of government housings provided was worsening and the inability of the government agencies overtime to solely meet the colossal housing requirement led to the adoption of the Public-Private Partnership (PPP) model. This model refers to an arrangement between both the parties with the aim of harnessing the advantages of each of them. WBHB adopted the PPP model in the year 1993, “to address the cleavage between the demand and supply of housing making West Bengal the first state in India to implement this model for affordable housing delivery” (Sengupta, 2006). The joint venture company “Bengal Ambuja Housing Development Limited” was formed between WBHB and Gujarat Ambuja

Cements (Sengupta, 2006) subsequently. The model adopted a cross-subsidy approach as incentives for the private sector to invest in housing. There were also prescribed standards set by the government agencies for the price, size, location of the dwelling units, the construction quality, provision of attributes within premises (Sengupta, 2006).

Therefore, carrying out a comparative assessment of the satisfaction levels of the residents between both the housing models considering the costs incurred is important as this merits further exploration and hence comprises of the major objective of this paper. The present study, however, addresses the assessment of the satisfaction level of the residents considering the costs incurred “within premises” as these are group housings where required attributes are provided within the boundaries. The major significant attributes from “within premises” contributing significantly towards satisfaction level were also identified for each of the housing models. Further satisfaction level has also been assessed with the investment made to buy the dwelling unit. Moreover to validate the reported satisfaction scores with the costs incurred, the “monetary benefits” gained from housing were also computed. These were computed as “savings” based upon the Neo-Classical School of Thought, where Keynes the major proponent, propounded the idea that savings are the result of the initial investment made, without investing in the house, savings would not have been generated. Based upon this, the “monetary benefits-savings” are computed as deviations of the actual percentage expended on housing from the recommended national standards of expenditure to be incurred on housing. The recommended national expenditure standard of 12% on housing for a MIG household has been identified from the study of Mukherjee and Das, (2012) and their study was compiled based on the findings of the McKinsey Global Institute Report (2007). Hence the main objective of the paper is to compare the satisfaction levels “with cost” incurred for availing attributes “within premises”, with the investment made and validating it with the “monetary benefits” computed. This leads to the identification of the more successful model in terms of its outreach to the intended beneficiaries.

2. Identification of the attributes to be included in the present study

2.1 Review for identification of attributes

Studies on the assessment of satisfaction level of the residents in different kinds of urban settings have been conducted by different researchers across the globe. However while assessing the satisfaction level of the residents the major thrust was

laid upon the neighbourhood characteristics which were mostly related to the physical presence of attributes and facilities, social attributes like the interaction with the other residents, friendliness, safety level and others. Besides these socio-economic attributes of the residents like age, sex, gender composition, income and educational levels were also stressed upon. Further, the internal and external household characteristics related to building size, orientation, number of rooms and others were also considered. Some of the mentionable researchers in this line include those of Lee (1968) on the study of Cambridge where the relevance of neighbourhood was emphasised upon focussing on social and socio-economic attributes like social class, natives or immigrants in the neighbourhood, the length of residence, location of the workplace. Others researchers like Sulaiman and Yahaya (1981) study in low-income households of Kuala Lumpur Malaysia, found that the physical presence of neighbourhood facilities affected satisfaction level more than housing-related attributes. Some other studies in similar lines include those of assessment of residential satisfaction at Cork, Ireland by Hourihan (1981); assessment of neighbourhood satisfaction in three housing types of North Carolina by Gruber and Shelton (1987); assessment of residents satisfaction in Tokyo by Savasdisara (1988); assessment of residential satisfaction in private low-cost housing estate of Bangkok by Savasdisara et al. (1989); assessment of residential satisfaction in low socio-economic status peripheral neighbourhoods of Madrid by Amerigo and Aragoni (1990). During the 1990s' some of the other like studies on assessment of residents satisfaction where the emphasis was laid upon physical attributes of similar nature included those of Ukoha and Beamish (1997) in the Public housing of Nigeria; Djebarni and Al-Abed (2000) in the low-income public housing of Yemen. Post 2000 till present date some of the other researchers conducting studies on assessment of residents satisfaction considering like attributes include those of Parkes et al. (2002) on English Housings; Shields and Wooden (2003) in housings of Melbourne; Chapman and Lombard (2006) research in US gated and non-gated fee-based neighbourhoods; Kellecki and Berkoz (2007) in Istanbul Turkey; Adriaanse (2007) for assessing residential satisfaction of Dutch residents; Zehner (2007) research in new towns and suburbs of Reston and Columbia for assessing neighbourhood and community satisfaction; Salleh (2008) in low-cost housing in states of Penang and Terengganu; Howley et al. (2009) in apartment developments of Dublin; Oktay et al. (2009) in four identical neighbourhoods of North Cyprus. Amongst a few of the recent researchers considering similar attributes included are Baum et al. (2010) in Australia; Mohit et al. (2010) in public low cost housing of Malaysia; Permentier et al.

(2011) in identification of the determinants of neighbourhood satisfaction in Utrecht; Garip and Sener (2012) in gated settlements in Istanbul; Buys and Miller (2012) in Australia. Further McGirr et al. (2015) in neighbourhoods of Toronto; Addo (2016) in the Greater Accra Region of Ghana considered similar attributes related to the physical, social and socio-economic attributes of the neighbourhood and similar results were obtained. Further in a study conducted by Ghasrodasti et al. (2017), in assessing the residential satisfaction of the residents of Mehr Housing Scheme, Iran emphasis has been laid upon the physical characteristics of the housing unit along with the social attributes such as social cohesion and participation.

The above review of literature clearly highlights that in assessing the satisfaction level of the residents in different kinds of urban settings the researchers have focussed mainly upon the role of the physical presence of neighbourhood attributes, social, socio-economic and household level attributes in affecting satisfaction level. The role of cost-related attributes in affecting satisfaction level was not a broad thrust area. However a few studies have emphasised upon the cost-related attributes, but these are mostly property-related costs. Some of the noteworthy contributions considering the role of costs include those of Fernandez and Kulik (1981) for examining the life satisfaction of a sample of US residents where neighbourhood estimated cost of living and estimated income inequality within the neighbourhood were considered. Emphasis was laid upon the home value in the neighbourhood and the cost of living in the community by Sigry and Cornwell (2002) study in south-west Virginia. Talen and Shah (2007) study on evaluating the neighbourhood found that declining city's tax base was most disliked by the residents in the neighbourhood. Hong (2011) in his study of Malaysia, also considered property value in the neighbourhood as an important determinant of satisfaction level. Inah et al. 2014, had considered some economic elements related to the minimum cost incurred by house dweller with respect to the means of livelihood under which the dwelling unit is being managed. Mohit and Ali (2016) in assessing the relationship that exists between neighbourhood satisfaction and quality of urban life in middle-income terrace housing, found that the value of the house and estimated cost of living affected the level of satisfaction most.

2.2 Inferences

Based on the above review conducted, it is evident that role of physical availability of neighbourhood attributes, social and socio-economic attributes along with household-level attributes in affecting satisfaction

level of residents have been considered. However, studies pertaining specifically to the assessment of satisfaction level for the residents of MIG group housings considering costs incurred are limited. Therefore the present study has identified two group housing models from Kolkata located in a similar location and a comparative assessment of satisfaction level of the residents considering the costs incurred has been conducted. As the present study focuses on MIG group housings where all required attributes along with the dwelling unit were provided within the same boundary considering buyers cost constraints, hence assessing satisfaction level with availability of attributes “within premises” considering the costs incurred is important as this has not been explored. The list of attributes included in the present study comprised of both physical and social attributes “within premises”. It consists of all the basic required attributes along with certain additional “with cost” attributes. These are listed in Table 1.

3. Methodology

3.1 Data collection

Two government and three PPP housings were selected from a similar location in the city of Kolkata for the present study. The selected group housings were situated in the newly added wards of Kolkata Municipal Corporation (KMC) along the Eastern Metropolitan Bypass (E. M. Bypass) in the southeastern fringe area of the city. This area has witnessed a major population growth since 1991. As both the housings types were in the vicinity of each other, hence these were selected for comparative assessment of satisfaction level of the MIG residents. East Calcutta Township Project Phase II and Phase IV (1993 and 1996) and Calcutta Greens Phase I and Phase II (2001 and 2003) including MIG category were the selected government housings. The household survey was conducted and 75 samples were chosen randomly. Utsarg-Utsav Housing (1998), Avshikta Phase I and Phase II (2005)

and Upohar- The Condoville (2012) were amongst the selected PPP housings. Similar data collection method was adopted and 76 samples were chosen randomly from these three housings. Figure 1 shows the spatial location of these group housings within the KMC limits.

3.2 Questionnaire design and conduct of survey

Structured questionnaires were designed for data collection. It consisted of a section of questions on basic details related to age, sex, household size, income, vehicular possession, length of stay, tenure status. Further based upon the tenure status, questions related to cost attributes towards enjoying the property were also framed. For assessment of satisfaction level with attributes “within premises”, questions on the availability and satisfaction level for each of the attributes were also recorded. Satisfaction “with cost” incurred for availing these attributes along with the investment made for buying the house was also recorded. All satisfaction responses were recorded on a five-point Likert scale varying from 1= Poor to 5= Very Good. To avoid incomplete questionnaires primary survey was conducted by first author and trained surveyors who questioned one adult respondent, preferably head of the household face to face. They were surveyed to assure the accuracy of the data collected and also to ensure completeness. Further, the survey responses were recorded depending upon the willingness of the residents to take part in the interviews.

3.3 Computation of satisfaction scores

Mean and median satisfaction scores were computed “within premises” from the recorded satisfaction values on a five-point Likert scale with attributes available and costs incurred for availing them. Satisfaction scores were also computed with the investment made for buying the house. As the value of the median satisfaction scores was same, mean satisfaction scores were

Domain	List of attributes considered	Domain	List of attributes considered
"within premises"	<u>Provision of Physical attributes</u> <ul style="list-style-type: none"> • Water Supply • Electricity • Diesel Generator Set • Drainage • Garbage Disposal • Security System • Fire Fighting System • Street Lighting • Parking • Children' Park 	"with cost"	<u>Maintenance/Service Costs</u> Maintenance of common areas and services within premises <u>Property Related Costs</u> <ul style="list-style-type: none"> • Initial investment made (converted to Equivalent Uniform Annual Cost EUAC) • EMI payable • Monthly rent
	<u>Social Attributes</u> <ul style="list-style-type: none"> • Presence of community space • Gymnasium & Swimming Pool 		

Source: Compiled by authors from literature review
 Table 1 List of attributes considered for the present study

also computed to highlight the variations in case of each of the housing models. The computed satisfaction scores with costs incurred provided an understanding regarding the fact that the satisfaction level for residents of which housing model is higher considering the costs incurred and investment made.

3.4 Identification of the significant attributes using exploratory factor analysis in STATA

As already reported in section 3.2 that questions related to satisfaction level for each of the available attributes “within premises” were also recorded on a five-point Likert scale. Hence from amongst all the attributes available, in order to identify the significant ones, exploratory factor analysis was conducted in STATA using polychoric correlation based upon the categorical nature of these attributes (i.e. satisfaction responses recorded for each of the available attributes on a five-point Likert scale). The exploratory factor analysis conducted has helped in the identification of the significant contributing attributes in case of each of the housing models.

3.5 Computation of “monetary benefits-savings”

The “monetary benefits-savings” have been computed to validate the satisfaction scores that are devised from the reported satisfaction values. These have been computed for housing as this validates the reported satisfaction level with the investment made. These benefits had been computed as “savings” where it is measured as the difference between the recommended national expenditure standard for a MIG household (12% on housing) and percentage of actual expenditure incurred recorded from the primary survey.

Monetary benefits (Savings) =
Expected Expenditure to be incurred
- Actual Expenditure incurred
(1)

3.5.1 Computation of expected expenditure to be incurred

As already reported in section 1 that 12% has been identified as the recommended national expenditure to be incurred on housing by a MIG household from the study of Mukherjee and Das, (2012). Further, there is also a specific income bracket for the identification of the MIG. In case of the state of West Bengal (as the study specifically focuses on two different housing models of West Bengal), KMDA had classified the households within CMA (Calcutta Metropolitan Area) on the basis of the income into four categories of Economically Weaker Section (EWS), LIG, MIG and HIG (Sengupta 2006) in the

year 2000. From here the income bracket for a MIG household was identified (ranging between INR 5000 - 9999). The average income for a MIG household was computed using this as INR 7499.50. The present value of this income (as in the year 2000) was projected for 2010 using an average Consumer Price Index (CPI) decadal inflation rate of 6.12% (calculated for the year 2000 to 2010). As the Dearness Allowance (DA) of 1.86 was implemented since the fifth pay commission in West Bengal, 2009, therefore an increment of 1.86 times in the income was witnessed. Hence this multiplicative factor was multiplied by the projected income as on 2010. This gave the value of the enhanced income for the year 2010 considering the DA factor. Further the increased income was again projected for the year 2016 considering a average CPI decadal inflation rate of 7.84% (calculated from 2011 to 2016). The projected value of stated MIG income (INR 7499.50) in the year 2016 was INR 42192.87. The expected expenditure to be incurred on housing was computed as 12% of this income respectively which is INR 5063.14. The income for a MIG household has been projected till 2016, as the primary survey was conducted during the year 2015-2016.

Average income of a MIG household = INR 7499.5 (based upon KMDA classification, 2000)

Projected value of this income for the year 2010 = $(7.449.5 \cdot (1+0.612)^{11})$ = INR 14421.37 (2)

Computation of Dearness Allowance (DA) = INR 14421.37*1.86 = INR 26823.75 (3)

Projected value of the enhanced income for the year 2016 = $(26823.75 \cdot (1+0.784)^6)$ = INR 42192.87 (4)

3.5.2 Computation of actual expenditure to be incurred

The actual expenditure incurred on housing is a summation of the monthly Equivalent Uniform Annual Cost (EUMC) (for owners), Equated Monthly Instalment (EMI) (if any) payable and monthly rent (for renters). The Equivalent Uniform Annual Cost (EUAC) is a method of expressing the cost of a lump sum investment in annual or periodic terms (Steiner, 1992). This is calculated using the present value of the investment made for buying the house after deducting the depreciation amount. The depreciation amount is calculated by assuming a depreciation rate of 1.58% for RCC (Reinforced Cement Concrete) building in India with the assumed life of a building to be 60 years (Schedule C of Companies Act, 2013 of India). Further, the EUAC is calculated based on the capital recovery factor (A/P, i%, n). The formula for computing the EUAC is shown in equation 5. The capital recovery

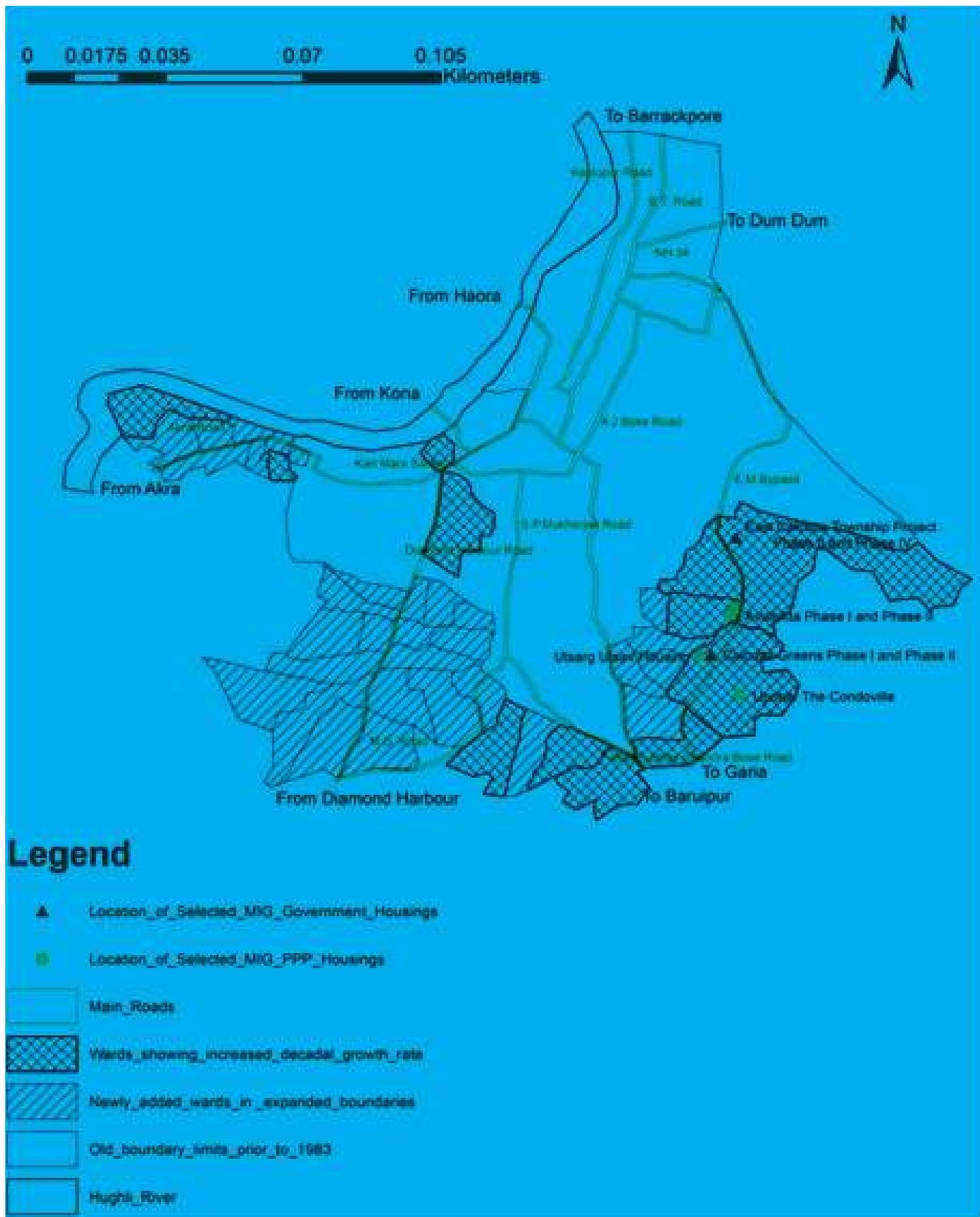


Figure 1 Spatial location of the selected group housings within Kolkata Municipal Corporation (KMC) limits

Source: Census of India, 2001 Note: Location of the selected group housings has been compiled from West Bengal Housing Board data

factor is further calculated using the formula given equation 6.

$$EUAC = P \cdot (A/P, i\%, n) \quad (5)$$

Where, P = Present Value

(A/P, i%, n) = Capital Recovery Factor

$$\text{Capital Recovery Factor} = i \cdot (1+i)^n / ((1+i)^n - 1) \quad (6)$$

Where i = decadal Consumer Price Index (CPI) inflation rate starting from the year 1970 up to 2016 (8.051%)

n = Assumed Life of building (60 years)

The EUAC was converted to a monthly value termed as EUMC and was added to the actual expenditure incurred on housing. The computation of EUMC is shown in equation 7.

$$EUMC = EUAC / (\text{remaining age of building} \cdot 12) \quad (7)$$

4. Results

4.1 Characteristics of sample

On analysing data it was seen that in case of both the models the household size was three and four. The average monthly income of the households as revealed was INR 25,000 and INR 41,550 in case of government and PPP group housing model respectively. Service is the common occupation in both the cases. The longer length of stay over fifteen years was around 25% in case of PPP group housings. However, the minimum length of stay was over five years and up to ten years in both the models. Rented households were more seen in the government model. Vehicular possession is around 70%, however residents of PPP housings possess a higher percentage of four wheelers (63.2%).

4.2 Computed satisfaction scores

The mean and median satisfaction scores were computed from the satisfaction responses recorded on a five-point Likert scale for each of the available attributes “within premises”, “with cost” incurred for availing them and with the investment made for buying the house/ rent charges paid. The following Table 2 highlights the summary of the mean and median satisfaction scores for both the housing models.

It is clearly evident from the Table 2, that the satisfaction level of the residents of PPP housing is higher as compared to that of the government housing. The residents of PPP housing pay higher monthly maintenance

charges, but additional attributes such as gymnasium, swimming pool, green open stretches are also available “within premises”, leading to higher satisfaction. Further, despite paying a higher price for the dwelling unit at the time of purchase, the satisfaction level is high for this head of expenditure as well. This indicates that by paying a higher price for the dwelling unit, all required attributes along with the basic attributes are available “within premises” leading to higher satisfaction in totality. Moreover, the type of dwelling unit and quality of construction material used for the dwelling unit is good, leading to no issues with the unit. Hence the satisfaction level with the investment made for buying the dwelling unit is also high. The renters of the PPP housings pay higher rent charges as compared to that of the government housings renters, yet the reported satisfaction level is high. This is attributed to the availability of an adequate number of attributes “within premises”. In comparison to this, the renters of government housing also pay higher rents, but the provision of attributes is less which is leading to moderate satisfaction level with the monthly rent payable. The satisfaction level of the residents of government housing is moderate with the investment made. This is attributed to the fact that the dwelling unit was provided at subsidised rate to these residents, hence the type and quality of construction material used is not good and residents have also reported many maintenance issues with the dwelling unit. This leads to moderate satisfaction level with the investment made. Further, along with the dwelling unit at a subsidised rate, lesser attributes are also provided “within premises” and lower maintenance charges are charged. These together contribute towards moderate satisfaction level in totality. Thus the involvement of the private partners led to higher prices being charged but more number of attributes were also provided “within premises”, quality of dwelling units provided is also good leading to higher satisfaction of the residents as compared to the residents of government housings.

4.3 Identification of the significant attributes using exploratory factor analysis

As already reported in section 4.2 that the residents of PPP housing are more satisfied as compared to the government housing residents, hence identification of the significant attributes that are contributing towards higher satisfaction level “within premises” was crucial. Exploratory factor analysis was conducted in STATA (V 13.0) using polychoric correlation to identify the significant attributes in case of each housing model.

Initially, before conducting factor analysis, for PPP housing model, Bartlett’s Test of

Satisfaction level	Govt Housings		PPP Housings	
	Mean Satisfaction	Median Satisfaction	Mean Satisfaction	Median Satisfaction
Satisfaction level with available attributes within premises	3.61	4	4.23	4
Satisfaction level with costs incurred for availing the within premises attributes	3.55	4	4.23	4
Average maintenance	INR 511	-	INR 1270	-
Overall level of satisfaction with investment made towards housing for owners	3.43	4	4.45	4
Average Purchase Price of Dwelling Unit for owners (at the time of initial purchase)	INR 8,67,700		INR 10,40,553	
Overall level of satisfaction with rent paid for renters	3.28	3	3.56	4
Monthly rent amount for renters	INR 18000 (approx)		INR 21000 (approx)	

Source: Primary Survey conducted by first author and trained surveyors, 2015-2016
Table 2 Summary of Computed Satisfaction Scores

Variable	Factor1	Uniqueness	% variance	Cumulative%	Eigen Value
LSWS	0.93	0.13	0.88	0.88	4.41
LSSL	0.98	0.04			
LSTWP	0.94	0.12			
LSFWP	0.98	0.03			
LSCP	0.86	0.25			

Table 3 Factor loadings and unique variances for within premises level of PPP housing

Variable	Factor1	Factor2	Uniqueness	% variance	Cumulative%	Eigen Value
LSWS	0.07	0.79	0.38	0.38	F1: 0.35	2.40
LSGD	0.38	0.68	0.40	0.40	F2: 0.35	1.12
LSTWP	0.92	0.09	0.14	0.14		
LSFWP	0.86	0.16	0.23	0.23		
LSCP	0.11	0.80	0.34	0.34		

Table 4 Rotated factor loadings and unique variances for within premises level of government housing

Sphericity and Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy were checked for identifying the appropriateness of applying factor analysis to the data set. This was tested based on the p-value of < 0.05 and KMO values of 0.869. A single factor comprising of water supply (LSWS), street lighting (LSSL), parking: two wheeler parking (LSTWP) and four wheeler parking (LSFWP) and children's park (LSCP) was extracted which explained a proportion of 0.88. The factor loadings and unique variance explained by the single factor extracted is shown in Table 3.

Similarly, factor analysis was also conducted for the government housing model as well. The Bartlett's Test of Sphericity and Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy were tested based upon the p-value of < 0.05 and KMO values of 0.589 which indicated the appropriateness of factor analysis. In this case, however, two factor were extracted: the first factor consisted of parking both two wheeler parking (LSTWP) and four wheeler parking (LSFWP). Provision of water supply (LSWS), garbage disposal (LSGD), and children's park (LSCP) formed the second factor. For better interpretation of the factors extracted, the orthogonal varimax rotation was conducted. The proportion of variance explained by the two factors was 0.35 and 0.35 respectively. The final rotated factor loadings and unique variance explained by the two factors

extracted is shown in Table 4.

Thus, the physical attributes such as water supply, garbage disposal, street lighting, parking and children's park "within premises" are more significant in affecting the satisfaction level of the residents in case of both the housing model as compared to the social attributes like community space, gymnasium, swimming pool and others. This is accredited to the fact that they are essential attributes which are required for day to day use. The availability of social attributes for the government housings are limited and are not significant. However, in case of PPP housings, adequate social attributes are provided yet the frequency of use may be less. Hence this leads to the social attributes being not much significant in contributing towards satisfaction level.

4.4 Computation of monetary benefits

As already reported in section 3.5, that "monetary benefits-savings" have been computed for housing to validate the recorded satisfaction level with the investment made. These have been measured as the difference between the recommended national expenditure standard for MIG household (12% on housing) and percentage of actual expenditure incurred recorded from the survey. The method for computation of the EUMC has already been reported in

section 3.5.2. The following Table 5 lists the monetary benefits computed for both the housing models.

From the above Table 5, it is evident that the residents of both the housing models spend more than the recommended percentage of income on housing leading to negative savings in case of the PPP group housing residents. Despite the negative savings in case of the PPP residents, satisfaction level for the owners as well as renters is higher as evident from the mean and median satisfaction scores computed with the investment made and rent amount payable. This is attributed to the presence of an adequate number of attributes “within premises”. Moreover, the dwelling unit provided is also of good quality which leads to higher satisfaction levels in totality despite negative savings. On the other hand, the residents of government housing, incur positive savings from the housing, yet the satisfaction level for the owners and renters is moderate. The percentage of income spent on housing by residents of government group housing is much higher than the recommended standard on housing, as 33.33% of the residents reside on a rental basis. As the rent amount charged is high this leads to higher percentage of total income being spent on housing. In contrast to the high monthly rent charged, the availability of attributes is less, which also lowers the satisfaction level of the renters in general.

Further, the government group housings are provided at subsidised rates, hence the provision of basic attributes “within premises” is made. Additional attributes are not available. Moreover, the quality of the dwelling unit provided is also not good, which lowers the satisfaction level of the owners with the investment made also as already reported in section 4.2.

5. Discussion

The findings of the study reveal that the despite paying higher costs the residents of PPP housings are more satisfied as compared to the residents of government housings. At the premises level, higher maintenance charges are charged but more number of attributes are available which contributes to higher satisfaction level overcoming the loss from the savings incurred for housing. Further, the satisfaction level with the investment made is also higher, though the initial purchase price of the dwelling unit was high which is attributed to the good quality dwelling units offered at the price paid. The renters are also satisfied in this housing model despite of paying higher rent due to the availability and access to adequate attributes “within premises”. The residents of the PPP housing have a higher income as reported in section 4.1, which also leads to higher affordability from the income perspective to purchase a house in this housing model and avail the attributes

	Govt Housings	PPP Housings
Average expected expenditure to be incurred on housing (assuming 12%)	INR 5063.14	INR 5063.14
Average actual expenditure incurred	INR 4135.84	INR 5423.53
Average Savings from housing	INR 927.31	INR -360.38
Actual percentage of income expended on housing (National recommended standard being 12%)	16.74	13.53
Overall Mean level of satisfaction with investment made towards housing (for owners)	3.43	4.45
Overall Median level of satisfaction with investment made towards housing (for owners)	3.5	5
Overall level of satisfaction with rent paid (for renters)	3.28	3.56
Overall Median level of satisfaction with rent paid (for renters)	3	4

Source: Primary Survey conducted by first author and trained surveyors, 2015-2016

Table 5 Computed monetary benefits-savings for both the housing models

provided. On the other hand, the residents of government housing have a cost constraint due to which they have bought the house in the government housing which offers dwelling unit at reasonably subsidised prices. Hence at subsidised prices, a lesser number of attributes are available “within premises”. High-quality dwelling units are also not provided leading to moderate satisfaction level with the investment made. However, when we look into the government housings separately they are satisfied with their place considering their affordability condition.

There are, however, a few limitations of this study. Firstly, the primary survey was conducted randomly based on the willingness of the residents to respond to the survey. Further, a homogeneity in terms of responses existed as the study was conducted in Kolkata where residents belonged mostly to the native Bengali community.

6. Conclusion

Researchers across the globe have conducted a large number of studies related to the assessment of residential satisfaction level. But researches focussing on assessing the satisfaction level of specifically MIG residents of group housing considering costs incurred remained in a dilemma over the years. Hence the present study conducted an assessment of satisfaction level of the MIG residents of Kolkata residing in PPP and government group housings which was an important initiative adopted by WBHB to cater to the affordable housing need of these residents considering their cost constraint. This assessment has enabled one to identify the better model of housing supply in the city. The PPP model emerged more successful as indicated by the higher satisfaction level of the residents despite higher costs incurred. This also proves the fact the involvement of the private players is beneficial as solely considering the government agencies. The major reasons behind this may be owed to the availability of ample financial resources and expertise which may be scarce on part of the government agencies. Higher price charged leads to provision of better quality dwelling units, higher number of attributes “within premises” contributing to higher satisfaction level for the residents. The government group housings are a desirable alternative for the buyers with lower to moderate affordability condition as it offers dwelling unit at a subsidised price and a lesser number of attributes are also provided. The residents of government group housings show moderate satisfaction level when compared to PPP housings. But if one looks into their satisfaction level individually, the residents are satisfied in these housings when looked into from their affordability point of view. Therefore, it can be concluded that if the buyer has the affordability from income perspective, then PPP housings should

be considered over government housings because by paying more the residents to have access to better services leading to higher satisfaction level.

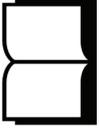
i Figures in the brackets indicate year of completion of the group housings

ii Dearness Allowance (DA) refers to the relief provided to the employees and pensioners to neutralise the impact of inflation on their earnings (Source:<http://timesofindia.indiatimes.com/india/dearness-allowance-cabinet-approves-2-per-cent-hike/articleshow/57653563.cms>).

ii <http://www.inflation.eu/inflation-rates/india/historic-inflation/cpi-inflation-india-2000.aspx>

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Evaluation of the Situation in Greater Cairo with Regards to Citizen Participation in Urban Governance Through the Emerging Information and Communication Technologies

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Synopsis:

This paper evaluates citizen participation in urban governance through the emerging information and communication technologies in Greater Cairo. It explores one of the local cases that took advantage of the emerging technologies for participation, and measures readiness of Greater Cairo inhabitants to participate through these technologies using a questionnaire survey.

1. Introduction

Greater Cairo is witnessing a great deterioration in its built environment and the inhabitants are the ones facing these urban challenges on a daily basis. Inadequate sidewalks force pedestrians to walk in the middle of the streets and risk their own lives; potholes spread along the streets, cause driving discomfort and damaged cars; lack of drainage systems cause more traffic jams than there already are; citizens can hardly find adequate public open spaces or green spaces for recreation; passers-by are disturbed from the smell and the look of garbage spread all over the place. Any decision taken regarding the built environment directly affects citizens' everyday lives. Therefore, they should be at least informed, consulted or empowered to actively participate in the urban governance process.

For decades, Greater Cairo has been managed through a highly centralized governance system. There is a lack of transparency and citizens are not allowed to take part in any decision affecting them. Even the elected Local Popular Councils LPCs that hardly represent the citizens, have no real power in the decisions taken. Not only is the governance system centralized, but it also follows a very complicated and inefficient system. Given that Greater Cairo consists of three independent administrative units: Cairo, Giza, and Qalyubia governorates. Each governorate consists of multiple districts, which are governed through the Council of Local Civil Servants with the governor on top and the LPC. It is very difficult to coordinate between these different administrative entities and make any decision in Greater Cairo (Nefissa, 2009). Within this governance system, the inhabitants are excluded and in best cases poorly represented in any decision that directly affects their lives. Even though LPCs are the only elected body in local governance, since the 2011 revolution, LPCs have been annulled pending the issuance of a new local administration law. Furthermore, there is a lack of proper communication channels between different governing bodies and the society hindering inhabitants to participate in urban governance. Consequently, inhabitants have limited options to follow. They can either become frustrated from the lack of appropriate channels to voice their concerns, or feel indifferent behaving negatively towards their built environment to satisfy their own needs, or become detached relying on the government to deal with the whole situation.

Regardless of this complicated situation apparent in Greater Cairo, the emerging information and communication technologies (ICTs) are believed to facilitate citizen participation in urban governance. According to the ICT Indicators report of October

2016 (Arab Republic of Egypt Ministry of Communications and Information Technology, October 2016), almost 63% of the total population in Greater Cairo have access to the internet. The internet and famous social media sites have attracted a large number of users over the past decade, as they facilitate communication and social interactions. Moreover, the geo-visualization interfaces, like Google Maps, and GPS equipped mobile devices, enabled inhabitants to deal with and share information that is connected to a particular geographic location.

The aim of this research is to evaluate the situation of Greater Cairo with regards to citizen participation in urban governance through the emerging ICTs. The paper starts with a theoretical study of three levels of citizen participation in spatial knowledge management, as proper building of knowledge is one of the key factors for a successful urban governance process. Then it highlights the trending technologies for citizen participation in urban governance. Furthermore; it explores El-Nargis Neighborhood Development Association groups on Facebook and WhatsApp, as a local case study, to understand how the emerging technologies had been used in participatory urban governance practices in Greater Cairo. Finally, through a questionnaire survey, the paper measures willingness and readiness of Greater Cairo inhabitants to participate in the urban governance process through the emerging technologies.

2. Participatory Spatial Knowledge Management

In urban development practices, proper building of knowledge is one of the key factors for success (Eversole, 2015). Citizen participation in spatial knowledge management is not only important for effective decision-making and problem solving, but it is also important to build stronger citizens (Hanna, 2000). This paper focuses on three levels of citizen participation in spatial knowledge management: (1) citizens' right to information; (2) citizens as producers of knowledge; and (3) knowledge partnerships.

2.1 Citizens' Right to Information

The right to information is the right of citizens to freely access public information. It is a call for transparency and accountability in governance. Joshi (2013) defined transparency as, "any attempts (by states or citizens) to place information or processes that were previously opaque in the public domain, accessible for use by citizen groups, providers or policy makers." However, making information available for the public is not enough; it has to be analyzed and clearly presented in order for the public to have a

comprehensive understanding of the ongoing events and decisions taken, and accordingly express their opinions and concerns (Bailur & Longley, 2014; Kumar & Morris, 2009). There is a limited benefit out of transparency if there is no accountability (Bailur & Longley, 2014). According to Schedler (1999), there are two main characteristics of accountability: “answerability” and “enforcement”. Public officials are required to clarify and explain their actions, and penalties should be imposed for any unacceptable behavior. Answerability is not necessarily when the public asks for explanation, but it can be a regular practice associated with any action carried out by public officials (Kumar & Morris, 2009).

The question here is, how to move from transparency to accountability? According to Bailur and Longley (2014), citizen participation is considered one of the main factors that can support this transformation. Citizen participation in this context means having access to information and regularly question actions of public officials, and consequently have the power to enforce penalties for any unacceptable behavior (Bailur & Longley, 2014). This level of participation is essential for better urban governance. It can help educate citizens and raise their awareness about the current governance system, projects, issues and resources (Holdar & Zakharchenko, 2002; TADAMUN, 2013). It is an essential requirement for higher levels of participation. It empowers the poor and marginalized. Furthermore, it can be an effective approach to fight corruption (UNDP, 2004; Transparency International & UN-HABITAT, 2004; TADAMUN, 2013). However, according to UN-Habitat (2004) information “must be timely, relevant, accurate and complete for it to be used effectively.”

2.2 Citizens as Producers of Knowledge

Inviting the public to access and use information motivates them to become more involved in the urban governance process. It encourages them to contribute with their knowledge in order to upgrade their own communities. Local knowledge as Eversole (2015) defined: “is grounded, situated, and ultimately tied to a particular context. Whether it is cognitively ‘known’ or physically ‘performed’, whether it can be explained in words or not, whether it is known by the whole community or only a few individuals, local knowledge is embedded in the local context.” What distinguishes local knowledge from other kinds of knowledge is its strong connection to a specific physical, social and cultural context; it cannot be universally applied like expert knowledge. Community members living in a specific urban context (a neighborhood for example) are those who hold local knowledge.

Therefore, it is particularly beneficial to local development projects (Eversole, 2015; Corburn, 2003). Citizens can contribute with their own knowledge in the urban governance process through defining their needs (VLGA, 2001; VLGA, 2007; Western Australian Government, 2002), suggesting appropriate actions (Western Australian Government, 2002; Meskell, 2009), and providing feedback on current urban projects and services (Corburn, 2003; UN-HABITAT, 2001; Western Australian Government, 2002). Citizens in this case are not only considered as producers of knowledge, but also as controllers of governmental performances (Cavill & Sohail, 2004). They can enforce discipline through monitoring, assessing and evaluating governmental performances (Holdar & Zakharchenko, 2002). In order for citizens to carry out their role and contribute with their knowledge in decision-making, the government should play the role of an enabler and a facilitator. This requires public officials to change their attitudes towards citizens. Public officials should be more open and responsive to citizens’ knowledge contributions, and citizens should be treated with the consideration and respect they deserve (Eversole, 2015; Thomas, 2010).

2.3 Knowledge Partnerships

Knowledge partnerships can take place between public and private sectors, community individuals and professionals, members of the same community or organization, or between several involved organizations. It can take place within a particular context or across borders (Eversole, 2015). Here, the focus will be on knowledge partnerships involving community individuals; either through bringing together different members in a certain community, or through bringing community individuals together with professionals, public officials, researchers, or any other involved organizations.

Community individuals hold different kinds of knowledge; local knowledge can be technical, cultural, or experiential. They can also have opposing points of views and different ways of doing things. It is necessary to bring together the different community members in order to learn from each other and develop a deeper understanding of their communities. It helps build stronger communities where individuals collaborate in shaping their own lives (Eversole, 2015; Evans, 2004). According to Baud et al., (2014) knowledge can be found with community individuals, professionals, politicians, and academics. Everyone holds valuable knowledge that can support development. Each type of knowledge is not only important by itself, but also when combined with other types of knowledge. Therefore, it is necessary to search for the different stakeholders and equally enable them to take part in an

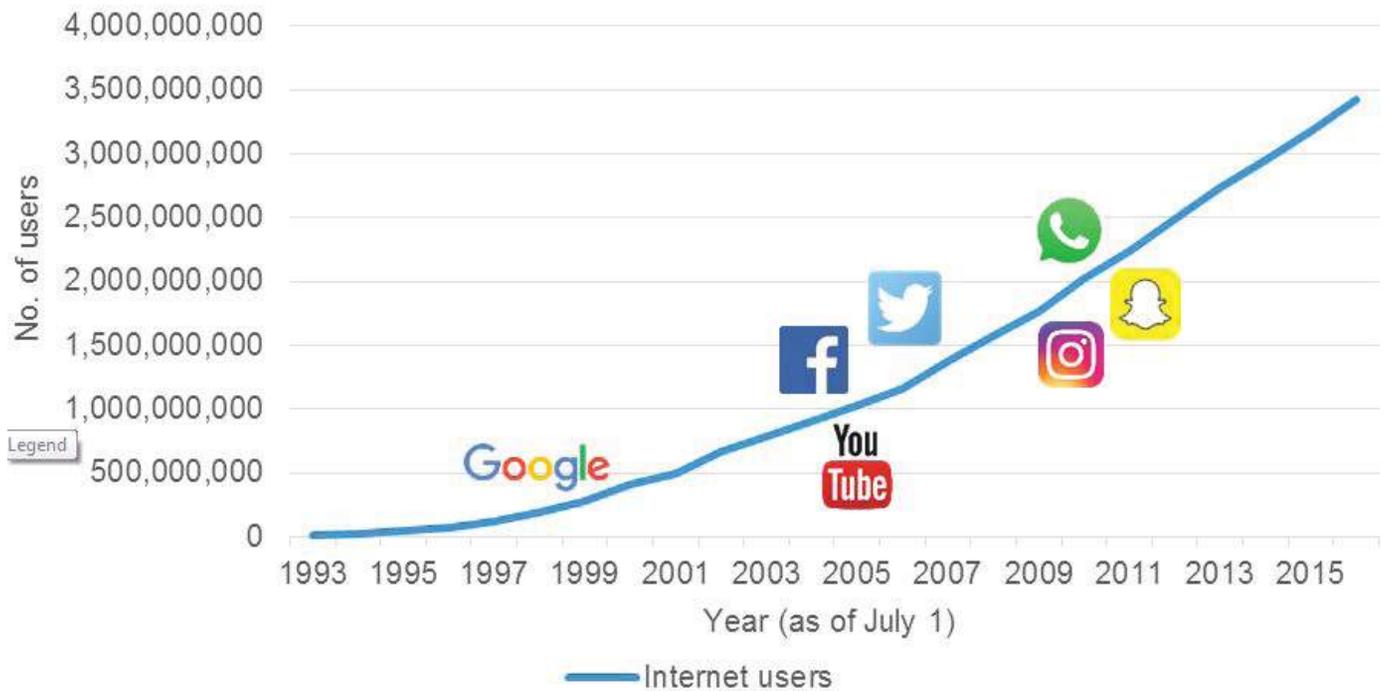


Figure 1: Internet Users in the World and the Emergence of Social Media Applications

Adapted from Internet Live Stats, 2016

interactive dialogue. Integrating different types of knowledge in decision-making will lead to the formation of new kinds of knowledge and consequently more innovative decisions (Innes & Booher, 2004; Eversole, 2015). Knowledge partnerships can also result in building new networks. It can strengthen relationships between the different actors leading to further collaborations (Innes & Booher, 2004). However, knowledge partnerships should not be carried out without a purpose, or else, it will be a waste of time for everybody. Moreover, it is necessary for the process to be well prepared and organized in order to reach effective outcomes (NCDD, 2010; St Clair, 2006).

3. Trending Technologies for Participation

The emerging ICTs are changing the ways citizens participate in governance process (Svara & Denhardt, 2010). The widespread of the internet and social media encouraged citizens to have active roles in their communities. It enabled them to produce and share information, and it facilitated interactions among citizens and between citizens and their governments. Moreover, the development of spatial technologies has enabled citizens to create and share spatial information. Together, the widespread of the internet and the development of spatial technologies, facilitated citizen participation in urban governance and spatial knowledge management (Svara & Denhardt, 2010; Baud, et al., 2014).

3.1 Internet and Social Media Widespread

Since the early 1990s, the internet was used as a one-way communication tool, with non-interactive websites known as Web 1.0. As a result, governments started opening their own websites where people can only search for information calling it Government 1.0. By the late 1990s and early 2000s, websites became more interactive known as Web 2.0, enabling people to produce and share information, like social networking sites, online forums, blogs and wikis. Governance systems became more interactive, transparent, and participatory through social media applications calling it Government 2.0 (Nabatchi & Mergel, 2010). They started opening up data for the public to use and redistribute. Since then, the number of internet users have been dramatically increasing worldwide, as shown below in Figure 1, until July of 2016, almost 46% of the world population had access to the internet (Internet Live Stats, 2016). Figure 1 pinpoints the emergence of some of the popular social media applications on the curve according to their year of establishment. It shows how the emergence of social media applications had been associated with an increase in the number of internet users worldwide.

Moreover, the number of people accessing the internet from mobile devices had been increasing gradually (Ertiö, 2013). By the end of 2015, almost 53% of the total internet users had access to the internet from smart phones and mobile devices (Stevens, 2016). This had been a great opportunity for broader citizen participation; citizens did not have to be at a certain place or time for participation. In addition, smart phones facilitate different

kinds of data collection and tracking through the different built in sensors. This new form of participation attracted previously excluded groups of people to participate, especially youth and young adults (Kleinhans, et al., 2015; Ertiö, 2013).

3.2 Spatial Technologies

In addition to the widespread of the internet and social media sites, the late 1990s also witnessed a breakthrough in geographic information systems (GIS). Geographic Information Systems enabled planners and policy makers to collect, analyze, and visualize different kinds of spatial information on maps. It made spatial information easier to understand and facilitated decision-making (Relhan, et al., 2011; Kleinhans, et al., 2015). Then, Public Participatory Geographic Information Systems (PPGIS) was developed for gathering spatial information from the public. PPGIS enabled the public to access information, and consequently have enough information to effectively participate in planning and policy-making (Kleinhans, et al., 2015; Ertiö, 2013). Finally, over the past 10 years, the public had been able to create and share maps and spatial information online independently, calling these kinds of information Volunteered Geographic Information (VGI). This was made possible through the emerging geo-visualization interfaces, such as Google Maps, and GPS enabled smart phones and mobile devices. Not only did these spatial technologies enable the public to complement experts' knowledge, but also enabled collaborative production and exchange of knowledge by different groups of people (Baud, et al., 2014; Kleinhans, et al., 2015).

4. El-Nargis Neighborhood Development Association

El-Nargis Neighborhood Development Association is a local civil organization under official recognition that empowers residents to make positive changes in their neighborhood. Residents of El-Nargis through this local civil organization created a closed Facebook group in 2011 to discuss the growing problems that residents had been facing in El-Nargis neighborhood. By the end of 2015, community leaders had created WhatsApp groups, to organize and direct efforts towards more effective results.

This section starts with a qualitative description of the participatory platforms, along with deduction of the key factors for their success and the main challenges that require further attention. Since the platforms were closed to residents of the neighborhood and local officials, data was gathered through one of the active members in that platform.

The aim of this study is to understand how the emerging technologies had been used in participatory urban governance practices in Greater Cairo.

4.1 Inhabitants Online Participatory Experience

The three levels of participation were found in the group on Facebook; residents of El-Nargis had access to information, contributed with their own knowledge, and worked together to upgrade their neighborhood. Residents used the Facebook group to ask questions about neighborhood services, or about suspicious actions in their neighborhood. Both inhabitants and local officials made important announcements on this group. They posted updates about ongoing development projects in the neighborhood. There were also regular posts summarizing meetings held between residents and local officials, and summarizing the group's main achievements. Residents also used this group to report and discuss problems regarding the built environment. Group admins then reported problems to the city administration or simply tagged helpful local officials in a comment in order to fix these problems. Finally, residents of El-Nargis used the Facebook group to plan for actions, like the peaceful protests they made to remove the head of city administration.

Community leaders also created WhatsApp groups in order to organize and direct efforts towards more effective results. They created five groups where volunteers from around the neighborhood monitor and discuss the following issues: (1) cleanliness, (2) roads, (3) lighting, (4) building violations, and (5) gardens. Each group included around 25 members. In addition to a sixth main group, where volunteers from the different groups coordinated their work and discussed neighborhood issues all together. Community leaders set regular targets for the things they want to accomplish through these WhatsApp groups. They set targets in the main WhatsApp group for all the other groups to work on. Then volunteers in each subgroup collected information in the district they live in, according to the targets set. At the end, they can have detailed information about the different problems in the whole neighborhood, and consequently make more effective decisions. Like the group on Facebook, residents used WhatsApp groups to report and discuss problems. They also posted updates about ongoing development projects. Finally, they made regular announcements about the achievements of each group, and regularly posted, summarizing their meetings with the city administration.

4.2 How Inhabitants Work with Local Authorities

Supportive and trusted members from city administration were added to El-Nargis Facebook group so that they can directly interact with residents and understand the problems faced in the neighborhood. In addition, some of the members of the WhatsApp groups directly contacted local officials for support. Offline meetings had also been regularly held between residents and city administration in order to discuss problems and collaboratively make decisions. In the end, the city administration carries the responsibility of implementing and funding these collaborative development projects. However, not everyone working in the city administration was cooperative and supportive all the way, and with the growing efforts from residents, the city administration became lazier in doing their own jobs. Therefore, residents made attempts to remove the head of city administration, and discussed the possibility of changing the existing administrative system with an independent one similar to those managing the gated communities.

4.3 Key Findings

According to an announcement made on Facebook group on April 13, 2016, residents' collaborative work with the city administration resulted in great achievements in El-Nargis neighborhood since they first created WhatsApp groups in September 18, 2015, such as paving roads, fixing street lights, enhancing public greenery, and garbage removal. The key factors for their success were found to be as follows: (1) the use of Facebook attracted large numbers of residents to the participatory process, (2) distributing responsibilities among a number of volunteers led to more effective results, (3) keeping residents updated with the latest news and achievements helped in sustaining the participatory practices, and (4) using traditional tools aside from their main online platforms helped in reaching out for

local officials and discussing development projects with neighbors and officials. However, some of the main challenges that required further attention were as follows: (1) the weak support from the government, (2) the poor organization of the participatory process through Facebook as the different forms of participation occurred at the same place, (3) the difficulty in using Facebook and WhatsApp as they are not ready for such participatory practices, and (4) the lack of a proper financial plan to support this participatory practice.

5. Questionnaire for Greater Cairo Inhabitants

A questionnaire had been carried out to measure readiness of Greater Cairo inhabitants to participate in shaping their own neighborhoods through the emerging ICTs. It focused on three levels of citizen participation; (1) access to information; (2) knowledge production; and (3) knowledge partnerships with community individuals and entities. This section starts with a brief description of the questionnaire and the study sample. Then, it presents a statistical description of the questionnaire results. In the end, it highlights some of the key findings from the overall study.

5.1 Questionnaire Description

The questionnaire was divided into seven main sections, with a total of 42 questions. Participants did not go through all questions; they skipped questions based on their answers. Both open and closed ended questions were used. Some of the questions were associated with clarifying examples to make sure that participants fully understood them.

The questionnaire started with an introductory section, where participants understood the aim of the questionnaire and filled out basic information about themselves. The second section investigated the current situation with regards to

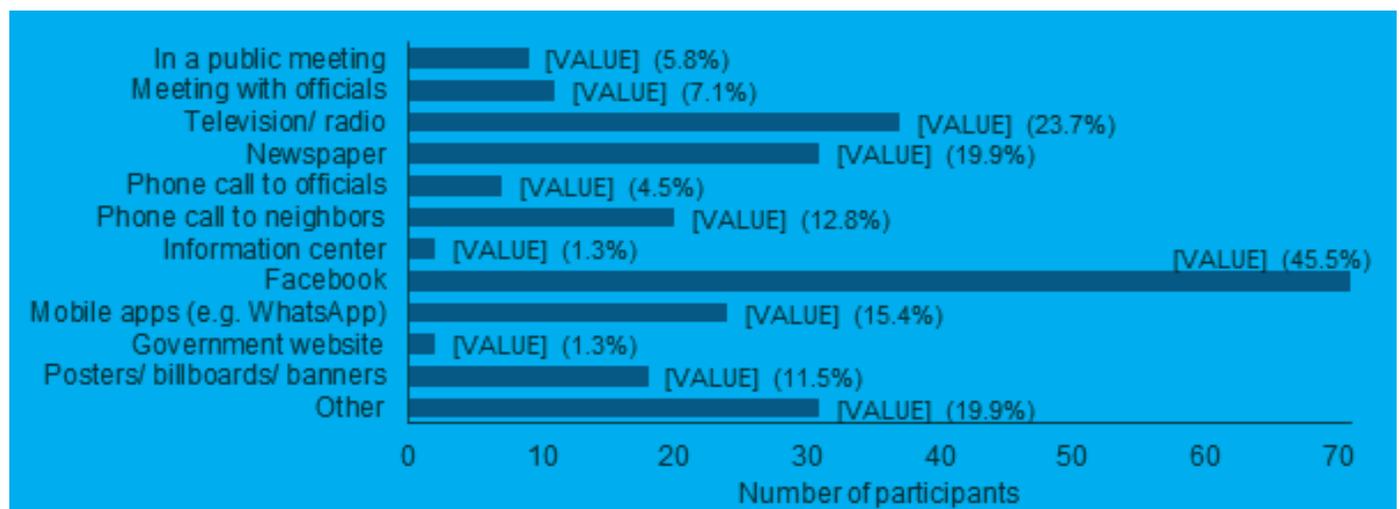


Figure 2: Means by which participants had access to information, questionnaire results

inhabitants having access to information about ongoing work, issues, or services in their neighborhoods. The third and the fourth sections investigated the current situation of inhabitants' contribution with information to upgrade their neighborhood. The fifth and the sixth sections investigated the current situation with regards to inhabitants' collaborations with community individuals and entities for neighborhood development. Finally, the seventh section investigated future possibilities for citizen participation in the urban governance process. In some questions, respondents could choose more than one answer in accordance to reality.

5.2 Procedures and Sample

This questionnaire had been distributed online via Facebook, WhatsApp, and by email. It targeted people living in the formal parts of Greater Cairo, who already had access to the internet. Before starting with the distribution, a pilot study had been carried out to ensure the clarity and ease of the questions. The questionnaire had been tested on six volunteers of different ages, living in different places in Greater Cairo. This pilot study resulted in significant changes including making the questionnaire in Arabic instead of English and adding some conditional questions to avoid directing responses towards a specific direction.

The distribution of this questionnaire lasted for three weeks. 844 inhabitants from all over Greater Cairo participated in the study. Almost 99% of the participants lived in the formal parts of Greater Cairo. The largest percentage of participants (54.3%) were young adults between the ages of 20 and 39, followed by middle-aged adults (38.4%) between the ages of 40 and 64. 63.2% of the participants were females, and the rest were males. Finally, participants had different professional backgrounds; 21.4% engineers; 14.6% academics; 12.3% students; 8.8% architects; 7.8% homemakers; 6.4% management; 3.6% teachers; 3% doctors; and the remaining (22.1%) had other different jobs.

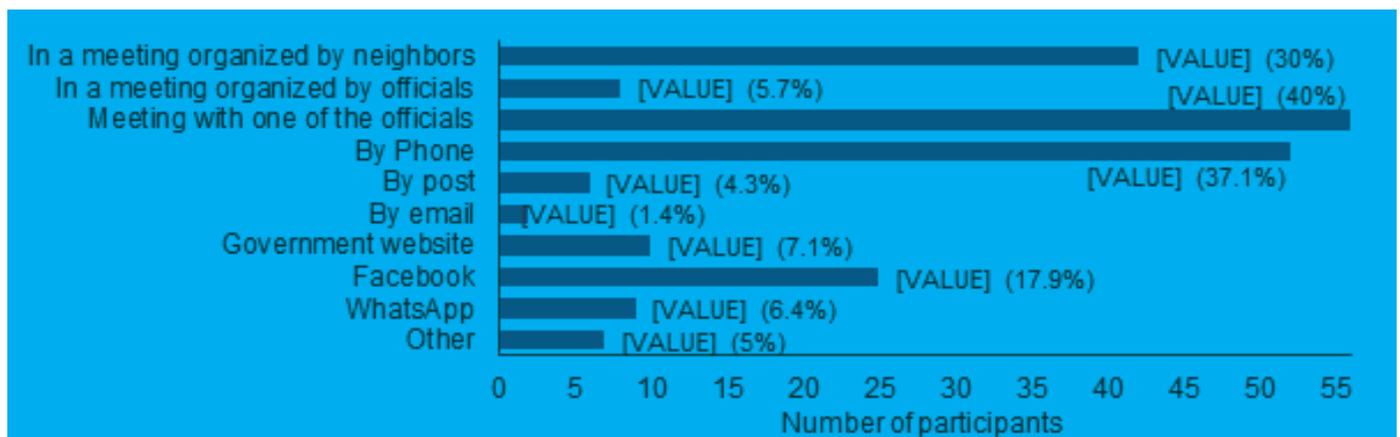


Figure 3: The way participants reported problems, questionnaire results

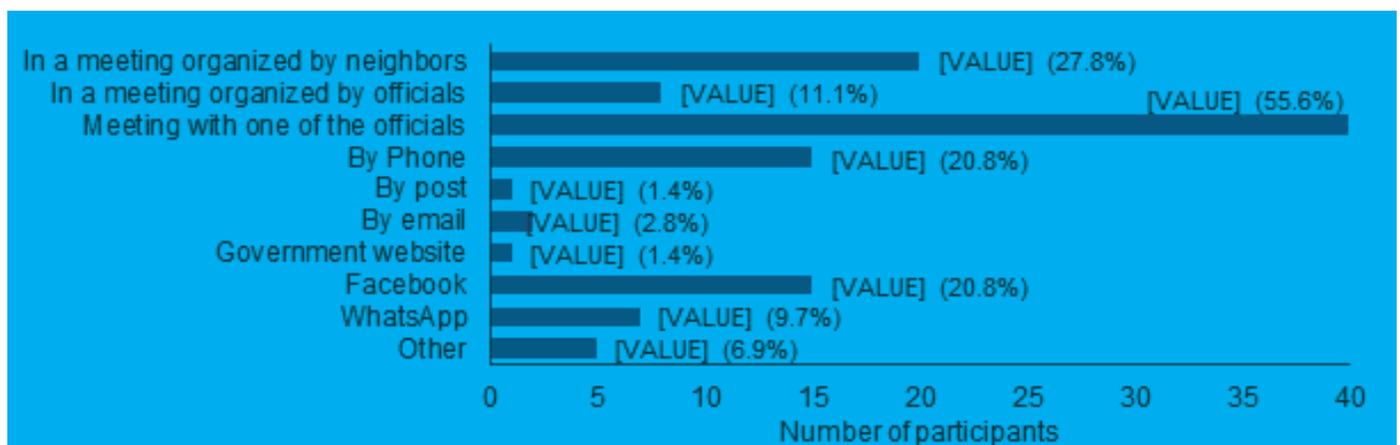


Figure 4: The way participants suggested ideas, questionnaire results

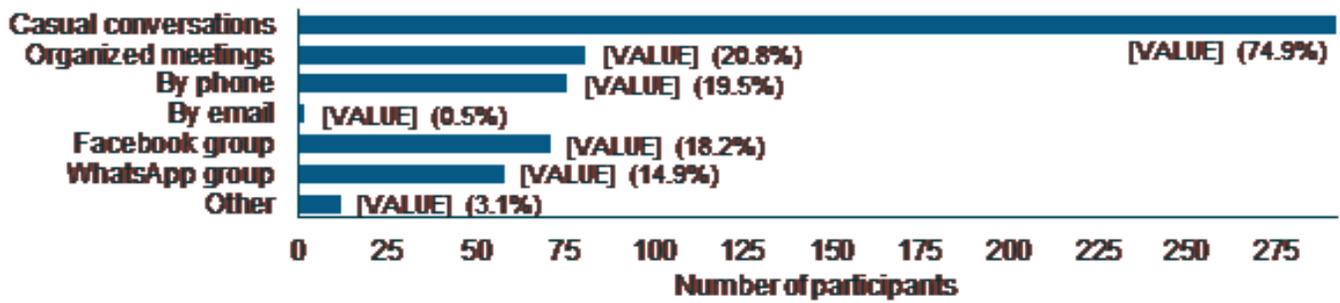


Figure 5: The way participants communicated with their neighbors, questionnaire results

5.3 The Current Situation with Regards to Having Access to Information

Section number two in the questionnaire investigated the current situation with regards to inhabitants having access to information. Only 18.5% of the total participants have had access to information about ongoing works, problems, or services in their neighborhoods. Moreover, only 22.4% of those who had access to information consider it to be sufficient. When those who had previously accessed information were asked to mention the most important pieces of information they had access to, the majority reported having

access to information related to roads and infrastructure work in their neighborhood. Facebook was found to be the most common way for accessing information, followed by the television and radio (see Figure 2).

5.4 The Current Situation with Regards to Knowledge Production

The following two sections investigated the current situation with regards to inhabitants' contribution with information to upgrade their neighborhood. The first section focused on reporting neighborhood problems and the second section focused on suggesting ideas for development. In the first section,

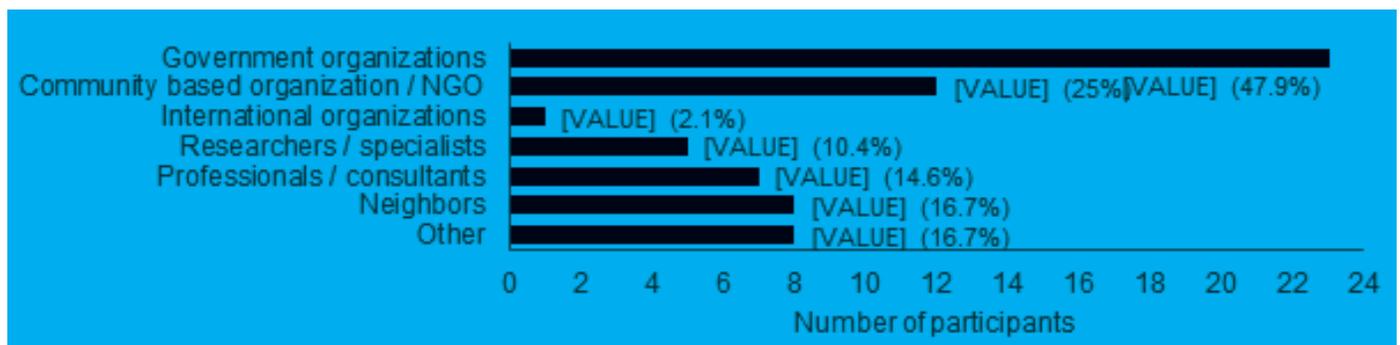


Figure 6: The different entities participants worked with, questionnaire results

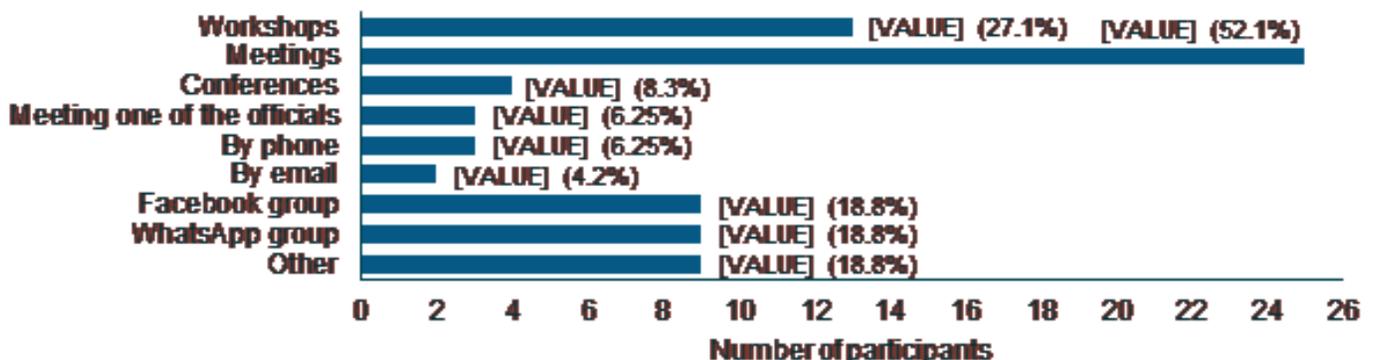


Figure 7: The way participants collaborated with the different entities, questionnaire results

the majority of participants (88.6%) reported having problems in places where they live. However, when facing those problems, participants were asked whether they have reported any of these problems to local officials or not, only a few of them (18.7%) responded affirmatively. Three main reasons were found for not reporting problems; (1) participants did not believe any action will be taken in return, (2) they did not know who is in charge, and (3) they did not know the proper procedure. On the other hand, those who reported problems to local officials did not seem to be satisfied with the results; 67.9% of them said that no problems were fixed in return and the rest said that only some of the problems reported had been fixed. No one said that all the problems reported had been fixed. The most common ways for reporting problems were through face-to-face meetings and by phone as shown below in Figure 3.

In the following section, more than half the total participants (61.5%) reported having ideas for developing their neighborhoods. Despite having quite interesting ideas, only a few of them (13.7%) suggested their ideas to local officials. The main three reasons for not reporting problems were the same for not suggesting ideas to officials; (1) participants did not believe any action will be taken in return, (2) they did not know who is in charge, and (3) they did not know the proper procedure. On the other hand, those who suggested their ideas to local officials did not seem to be satisfied with the results; 66.7% of them said that none of their ideas were taken into consideration, 31.9% said that some of their ideas had been taken into consideration, and only one participant said that all his ideas had been taken into consideration. The most common ways for suggesting ideas to officials were through face-to-face meetings, by phone, and through Facebook as shown below in Figure 4.

5.5 The Current Situation with Regards to Knowledge Partnership

The following two sections investigated the current situation with regards to knowledge partnerships that inhabitants are involved in for their neighborhood development. The first section focused on inhabitants' collaborations with their neighbors and the second focused on their collaborations with different development entities. The first section showed that almost half of the participants (46.2%) had discussed neighborhood problems or ideas with their neighbors. However, only 34.1% of those who discussed problems or ideas with their neighbors took actual steps for development based on these discussions. Most of the discussions took place in casual meetings as shown below in Figure 5.

The following section showed that only 5.7% of the total participants worked in collaboration with different entities for their neighborhood development. Figure 6 below shows the different entities that participants had collaborated with. Despite the small numbers that had participated in such collaborations, the majority (73%) expressed their satisfaction towards the overall experience. The most common way for this kind of participation was through organized meetings as shown in Figure 7. It is interesting to see the minor role of local community based organizations or NGOs in the participants' neighborhoods. This can suggest that there are a few of them in these neighborhoods, or that they are present but weak, or that their traditional methods do not include reaching out to new groups of residents.

5.6 Future ways for participation

The final section of the questionnaire investigated future possibilities for citizen participation in the urban governance process. For each level of participation, participants were asked whether they were willing to participate in the future and their preferred way for participation. It is important to highlight that since 2011 there are currently no local popular councils. They used to provide an "access" to governance, which lacked in the past 5 years.

95.4% of the total participants were willing to have access to information in the future. Interestingly, the majority preferred having access to information through the internet and social media (see Figure 8). On the other hand, most of those who were not interested to have access to information said that it was due to their lack of trust in the information that the government publishes as shown in Figure 9.

81.6% of the total participants were willing to contribute with information for their neighborhood development in the future. The majority preferred ICT-based participation, yet, a big percentage preferred face-to-face meetings for participation (see Figure 10). On the other hand, most of those who were not willing to contribute with information reported that they did not believe any action would be taken in return as shown in Figure 11.

The majority of participants were willing to participate in knowledge partnerships. 87.8% were willing to collaborate with their neighbors and 80.9% were willing to collaborate with different entities for their neighborhood development. Unlike the previous forms of participation, most of the participants preferred face-to-face meetings and workshops for knowledge partnerships (see Figure 12 and Figure 13). On the other hand, most of those who were not willing to

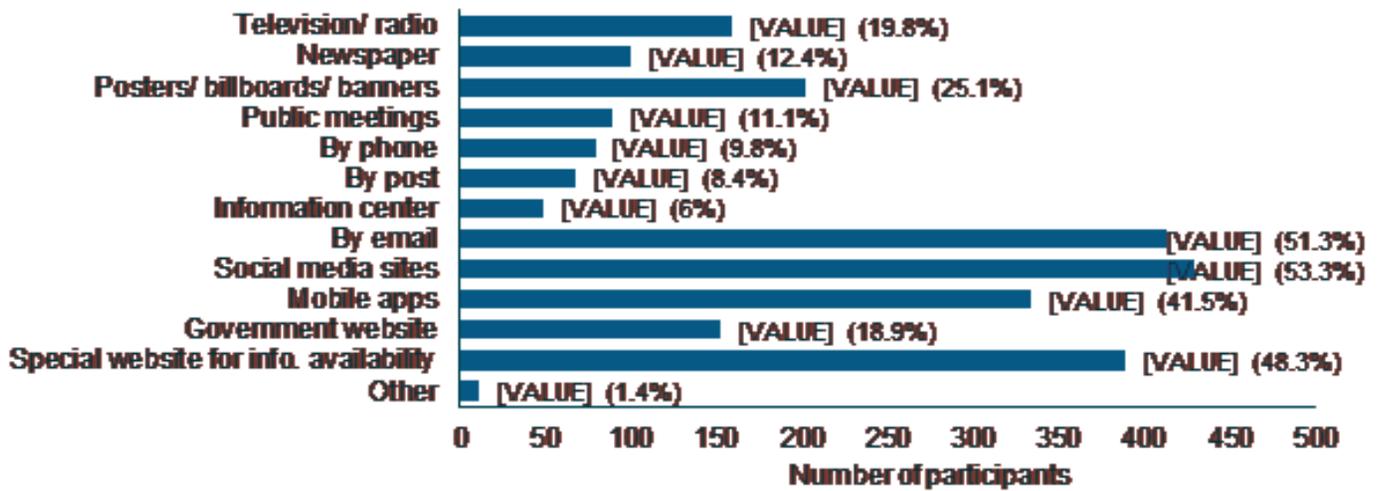


Figure 8: The way participants would like to have access to information, questionnaire results

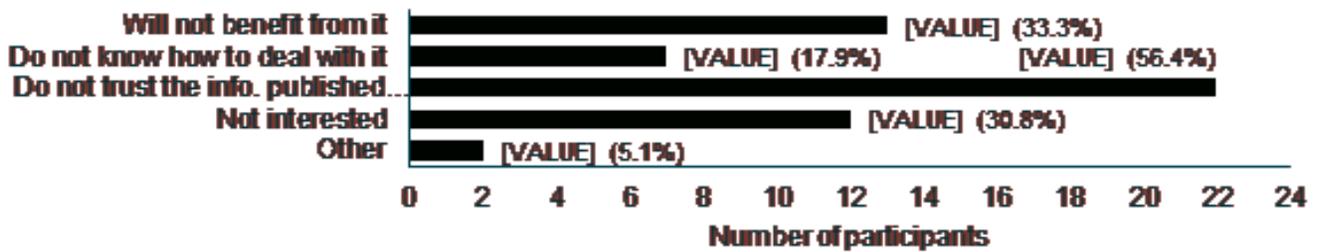


Figure 9: The reason for refusing to have access to information in the future, questionnaire results

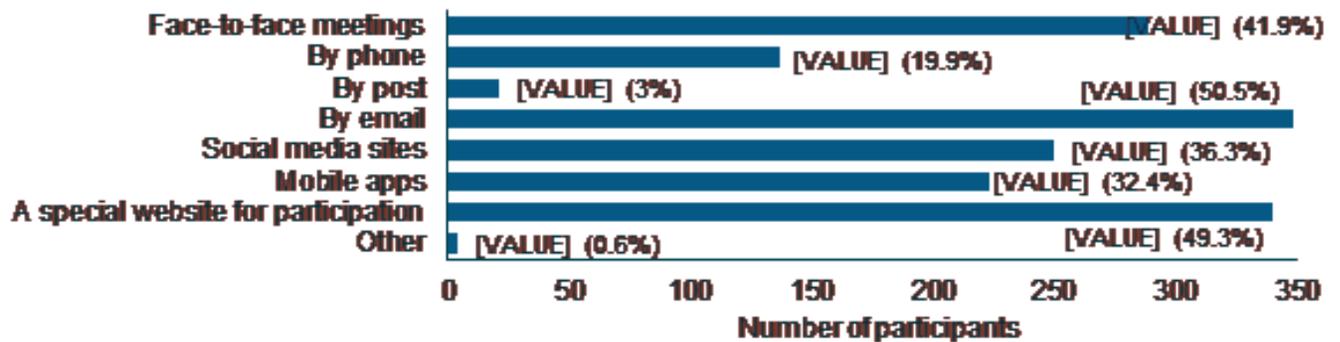


Figure 10: The way participants would like to communicate with officials to contribute with information, questionnaire results

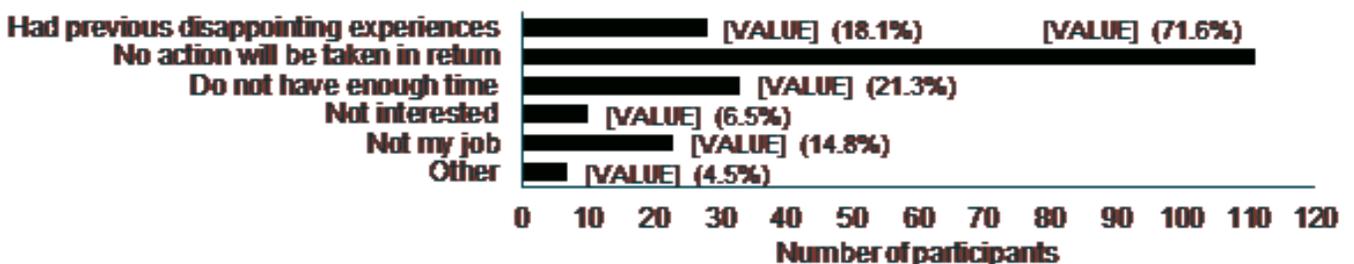


Figure 11: The reason for refusing to contribute with information in the future, questionnaire results

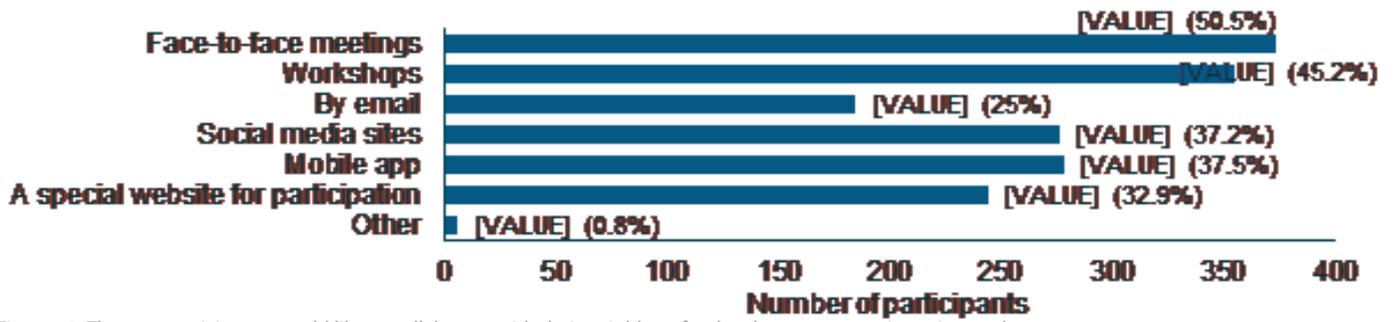


Figure 12: The way participants would like to collaborate with their neighbors for development, questionnaire results

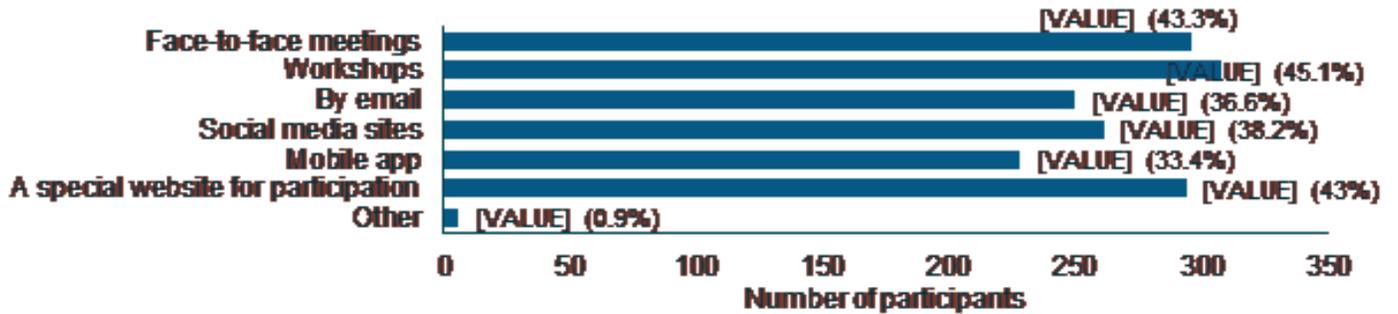


Figure 13: The way participants would like to collaborate with different entities for development, questionnaire results

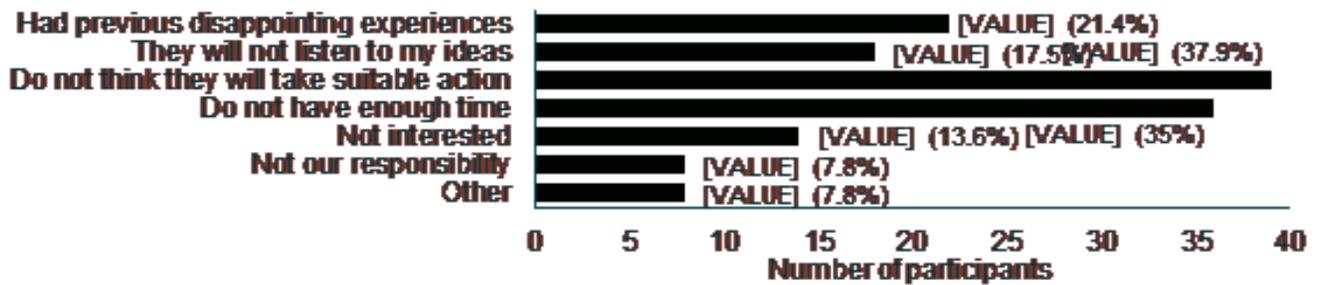


Figure 14: The reason for refusing to collaborate with neighbors in the future, questionnaire results

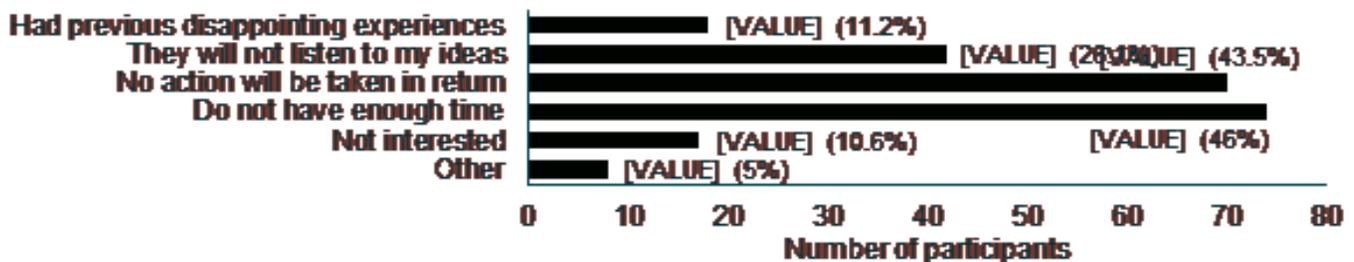


Figure 15: The reason for refusing to collaborate with different entities in the future, questionnaire results

collaborate reported that they did not believe any suitable action would be taken in return and that they did not have enough time for that (see Figure 14 and Figure 15).

5.7 Key Findings from Questionnaire

Together these results show how a small percentage of the total participants had already been engaged in their neighborhood governance; either through having access to information, or contributing with information, or working in collaboration with their neighbors and different entities for their neighborhood development. One of the main reasons that prevented participants from participating was the lack of trust in government officials. Facebook was found to be the most common way for accessing information, while more traditional tools prevailed in the other two levels of participation. However, the percentage of those using Facebook and WhatsApp for knowledge production and partnerships cannot be neglected.

On the other hand, the majority of participants expressed their willingness to participate and have active roles in their neighborhoods in the near future. Interestingly, a correlation appeared between the level of participation and the preferred way for participation. The lowest level of participation (access to information) corresponded the highest percentage of those willing to use the emerging ICTs. Participants were less inclined towards the emerging ICTs for knowledge contributions (the middle level of participation), however, the percentage of those interested in traditional tools was still lower than those interested in the emerging ICTs. Finally, in the highest level of participation (knowledge partnerships with neighbors or different entities), those willing to use traditional tools outnumbered those willing to use the emerging ICTs. One of the interesting findings was the large numbers of those willing to participate through websites that are developed especially for participation.

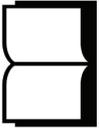
6. Conclusion

This paper evaluated the situation of Greater Cairo with regards to ICT-based participation. The study of El-Nargis Neighborhood Development Association showed how residents of El-Nargis used Facebook and WhatsApp to participate in upgrading their own neighborhoods. The group on Facebook attracted large numbers of the neighborhood inhabitants to participate, and the groups on WhatsApp helped in organizing efforts and distributing tasks among a number of volunteers. Traditional participatory tools had been used in addition to these online platforms to reach out for local officials and to discuss development projects with neighbors and officials. Keeping

residents updated with the progress and the achievements done, was one of the key factors that sustained this participatory process. Great achievements had been accomplished through this collaborative work. However, one of the main challenges that had been faced was the lack of support from some members of the city administration. Finally, the questionnaire suggested that a few participatory practices already existed. The main reason for such low participatory practices was found to be the lack of trust in the government. It also suggested that the internet and social media had been rarely used for participatory purposes except for having access to information. Despite the low numbers of those already participating, the majority expressed their willingness to participate and have active roles in their neighborhoods in the future. Most of them preferred to use the emerging ICTs for future participation, except for knowledge partnerships (the highest level of participation) where participants were more inclined towards traditional tools. The results of this study indicate that the emerging ICTs are currently complementing the traditional ways for participation in Greater Cairo. The potentials of ICTs are not fully exploited despite the willingness of Greater Cairo inhabitants to make use of them in participation. A possible explanation for this might be that there is no clear system for ICT-based participation. Another possible explanation might be the poor usage of the emerging ICTs in governance. With 30%, and growing, of current mobile users in Egypt using smart phones, ICT becomes an important vehicle to facilitate participation in local governance. It could serve as a starting point for access to knowledge as well as an organizing tool for further traditional participatory methods. Additionally, it can serve as a monitoring and feedback tool to report back to the wider community and enhance trust in the possibility of achieving progress and implementing change.

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Encouraging Inclusive Communities Through Zoning Reform: The case of Upper Ashbury, Bloemfontein.

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Synopsis:

The use of Euclidean Zoning practices as a form of development control in South Africa has been criticised for being oppressive. This exclusion is evidently depicted in the town planning schemes. This paper indicates how land use regulations have affected the livelihoods of the urban poor and indicates the impact of governance in inclusive community building.

1. Introduction

Conventional Euclidean Zoning approaches in South Africa have failed to address the needs of the urban poor. Thus, more appropriate and inclusive zoning regulations and Land Use Management Systems have captured the interests of various academics. In particular, Berrisford (2011: 210) characterises the planning law in South Africa, as 'an oppressive force for the poor'. This form of oppression brings about no significant form of societal benefits for the poor (Rubin, 2008) & (Berrisford, 2011). Although formal land use controls are under statutory compliance, there is an evident disconnect with the needs of the poor which is recognised. Various authors indicate that conventional zoning is oppressive, rigid and that the zoning system in South Africa is simply not effective. Conventional Euclidean zoning fails to consider the needs of the urban poor and is criticized for separating people and land uses. (See in this regard; Berrisford (2011), Brown (2001), Denoon-Stevens (2016), Nel (2016),

Ovens, Kitchen, Parnell and Williams (2007), Rubin (2008), Talen (2012), UN-Habitat (2009) and Watson (2009)) Furthermore, Brown (2001) asserts that municipal regulations impede the genuine attempts of the urban poor to support and sustain themselves. Rubin (2008) argues that people living in lower income areas purposefully ignore the land use regulations because they do not support or encourage activities that will support their livelihoods. Hence, this supports the contention that regulations which are inappropriate result in informal economic activity. For this reason, this research study ultimately aims to provide an appropriate set of zoning regulations that deal with these inadequacies.

In order to effectively address inapt land use regulations for low income areas, this paper will develop a series of regulation that allows for the majority of activities in the proposed residential area which will prevent land uses which are truly undesirable. More appropriate planning for the urban poor is an evident concern (See in this regard: Berrisford, 2011; Charlton, 2008; Roy, 2005; Watson, 1993; Ovens, Kitchen, Parnell and Williams; 2007) therefore this paper will adopt the concept by Glasser. Glasser (2013) states that any planning law which requires 80% of the people to change the way that they are living, is unlikely to succeed, but with a planning law that regularizes the way that 80% of the people are living, there is a greater chance of successful implementation. Although deeming something 'appropriate' can be a difficult task, Glasser's concept (2013) regarding planning law is particularly critical in determining an appropriate set of land use regulations for the proposed residential area. Given the aforementioned notion of

Glasser (2013), the main goal of this research is, through land use regulation, to permit land uses and a building form which support the livelihoods of the urban poor. Secondly, to re-evaluate stringent land uses which no longer reflect the current (2017) reality of Upper Ashbury. This will in turn provide sufficient control over permitted land uses and create opportunities which support and enable the urban poor. Given the above, the sequence of the paper will be as follows: first, a brief historical outline of Land Use Management in South Africa, its associated problems and possible solutions, followed by a historical account of the study area, Upper Ashbury in Heidedal, Bloemfontein. This will be followed by a summary of the research methods and then the results of the study which encompasses sections on the demographic and household analysis of the study area. Penultimate, a section on zoning reform for SMART communities and finally, a conclusion and recommendations is provided.

2. Land Use Management in South Africa

Land Use Management is a system comprised of various activities which ultimately result in the most effective means to allocate and utilise land and urban space (Fekade, 2000). Van Wyk (2012) further defines the concept as a tool which is used to alter the land and urban space, be it in the form of development applications such as rezoning, removal or restrictive conditions, etc. Land Use Management is a broad realm or system which intends to guide and control the growth of cities (Fekade, 2000) through a set of processes which include the acquisition and trading of land, the rights and regulations pertaining to that land, and its further development (Planact, 2007). Land Use Management in South Africa is rooted in modernist thinking and underlain by Apartheid planning techniques which advocated separating and controlling people and land. This form of separation created a spatial form which included that of several injustices such as restricting Non-White South Africans from opportunities and reserving social and economic opportunities and rights for the minority (Rubin, 2008). South Africa's planning system adopted a dual system of control, that of land use and spatial access by different racial groups (Charlton, 2008). Hendler (2015) indicates that segregated living spaces were governed by three categories. Firstly; town locations, which indicated which racial group may live where. Then, employer accommodation referred to the government permitting domestic servants to live on their employer's property for cheap labour. Thirdly, the government controlled the movement of people through "pass" laws to prevent squatting in the city.

Since South Africa's democratic dispensation (as of 1994), policy makers have advocated a complete reform of previous policies and legislation which hindered social and economic opportunities for Non-White South Africans. However, Rubin (2008) and Parnell & Pieterse (2010) indicates that since the inception of post-apartheid policies and legislation at national and local level, there has been very little progression and improvement in the thinking and practices of land use management in South African cities. This is evident in the continued use and management of land which fails to encompass the objectives of democracy, spatial efficiency and sustainability. Hendler (2015) agrees by indicating that by simply abolishing land use regulations does not result in integrated and sustainable living spaces. Parnell (2007) further critiques that although cities in the South has called for a 'developmental state agenda', in reality poor cities are still faced with overpowering poverty and mismanagement in providing the poor with a better quality of life. Nel (2016) and Rubin (2008) furthermore note that the Land Management System in South Africa suffers from two challenges to cope with alternative and more innovative land management systems. The first is municipal capacity (Satterthwaite, 2011), meaning there is a huge shortage of people who have the actual qualifications or skills to implement or manage the demands of post-apartheid policies. Secondly, Rubin (2008) alludes to the notion that there is an inability of planning departments to access newer legislation or simply no time to train people in the application and implementation thereof, especially smaller municipalities in South Africa. Given the exploration of Land Use Management in South Africa, the following includes a section on the disjuncture between Land Use Management and the Spatial Planning and Land Use Management Act, 2013 (No 16 of 2013).

2.1. Land Use Management and the Spatial Planning and Land Use Management Act, 2013 (No 16 of 2013)

The Spatial Planning and Land Use Management Act 16 of 2013, otherwise known as SPLUMA, was promulgated and now acts as the sole piece of national legislation for spatial policy and land use management in South Africa (Nel, 2016). SPLUMA mandates five developmental principles and objectives namely; spatial justice, spatial sustainability, efficiency, spatial resilience and the principle of good administration (South Africa. Spatial Planning and Land Use Management Act, 2013). This section focuses on the main disconnect between the conventional Euclidean Zoning system and the newly enacted national legislation, SPLUMA.

Given the opening assertion, Nel (2016) specifically critiques that the current

conventional zoning in South Africa is not in line with the objectives set in SPLUMA. Firstly, the principle of spatial justice; the spatial injustices have emerged from the legacy of apartheid and is evident in law enforcement as well, where in predominantly 'White' or high income areas, land use regulations are strictly enforced, whereas in 'Black' or low income areas, there is very little to no law enforcement or land management, thus neglecting to secure the health and land regulations (Nel, 2016). Berrisford (2011) adds to the debate by noting that there is an obvious disjuncture of land use regulations and law enforcement in Black and White areas which is a characteristic that vouches that zoning is an exclusive and exclusionary form of land management and control. Charman, Peterson & Piper (2013) critiques that liquor outlets, in particular, are heavily regulated in township areas, and the basis for this is in part due to a lack of zoning rights which leads to some provinces being unable to obtain liquor licenses. The issue seems more to be that LUMS enforcement in low-income areas is inappropriate given the nature and needs of these areas. Furthermore, Ben-Joseph (2004) asserts that zoning is often exclusionary given the time taken to approve development applications and conditions set, which in turn lead to higher property prices. Similarly, Schilderman & Lowe (2002) indicate that housing options for the urban poor are led by an intricate set of regulations which establishes the quality of the housing as well as the cost. Hence, the need for the urban poor to look for alternative housing solutions due to the fact that access to housing is directly linked to the standards and regulations in use, which is difficult for the urban poor to meet. Not only is access to housing difficult but equally so is the means to generate an income therein (Schilderman & Lowe 2002).

Nel (2016) states that zoning establishes who may or may not live in an area and is exclusive to certain income groups, which is naturally in conflict with the principle of spatial justice. Berrisford (2011) agrees, stating that planning law has unashamedly been used to affirm 'the interests of a small minority against the interests of the majority'. The Spatial Planning and Land Use Management Act 16 of 2013 (South Africa. SPLUMA, 2013: 18) advocates redress in section 7(a) (iii), stating that "Spatial planning mechanisms, including land use schemes, must incorporate provisions that enable redress in access to land by disadvantaged communities and persons." However, the assertions by Nel (2016) and Berrisford (2011) above regarding the current zoning scheme, say otherwise. The above quote from SPLUMA indicates redress in access to land by the urban poor. The poor, however, are denied access to land specifically for business purposes due to costly and complex land use applications. Van Wyk & Oranje (2014) concur with Nel

(2016), stating that whether the newly national legislation SPLUMA is to be a success remains to be seen. Euclidean zoning, as currently practised in South Africa, is also in conflict with the principle of spatial sustainability as Talen (2012) and Nel (2016) note that zoning is used for specific uses rather than the interaction between them, thus neglecting aesthetics and design of an urban area.

The mono-functional uses which forms zoning leads to various problems such as work spaces being relatively far from residential places, which often leads to the urban poor commuting long distances to non-residential spaces, and this also places immense pressure on infrastructural capacity and costs (Nel, 2016). Yigitcanlar, Kamruzzaman and Teriman

(2015) states that the improper design of neighbourhoods can negatively implicate sustainability, as can be seen from the apartheid design of cities where cities are compartmentalised into specific zones which are not in line with the principles of sustainability and efficient for the reasons noted by Nel (2016). Spatial resilience is another principle which is advocated by the SPLUMA. Resilience is defined by Mitchell and Harris (2012) as the ability to cope and handle a disturbance and/or change. Nel (2016) mentions that zoning creates certain strips of land uses which are characterised by people of similar demographic and

economic traits such as income and race which dominate certain areas. This leads to a lack of diversity which by inference relates to a lack of resilience of urban spaces which are confined by strict rules and regulations.

The purpose of this section is to indicate that there are still several disconnects between land use management and the newly enacted national legislation, SPLUMA. Due to these fragmentary spatial policies and ground level happenings, it remains to be seen whether the intentions of these development principles will see fruition. The following section will specify the case study.

3. Historical Background of Upper Ashbury, Heidedal, Bloemfontein.

Upper Ashbury is located in Heidedal and is defined to be a subsection of the entire Heidedal area (Mangaung Metropolitan Municipality IDP, 2012). Heidedal (then known as Waaihoek) was formally known as a Coloured township from as early as the mid-1800s. (SAHO, 2015). The first piece of regulation concerning occupation of land by Non-Whites was Ordinance 1 of 1860 which indicated that Non-Whites could not reside in towns where municipalities did not yet exist without prior permission. The Free State government decided that only three 'Non-White' areas would be permitted in the city (SAHO, 2015). These would be located in the city but separated by physical barriers such as green buffers and industrial sites



Figure 1: Upper Ashbury, Heidedal delineation Source: Google Earth Maps (2016)

(Erasmus, 2012). The Coloured population were located in an area named Waaihoek within a Black residential area in 1861. By the 1900s, Waaihoek consisted of 537 plots which were mostly built up but they did not include toilet facilities. Later, feeble shacks were replaced by sturdy and built up dwellings. This resulted in a more appealing area, (SAHO, 2015). In 1906 and 1907 the earmarked Black residential township had expanded, and in 1921 the residents of Waaihoek moved to Heatherdale (the present day Heidedal), which was later renamed Upper Ashbury, and in 1977 it was lastly renamed to Heidedal. Today, Upper Ashbury is considered a subsection of Heidedal (Erasmus, 2012). According to the formal cadastral records, (general plans) Upper Ashbury was developed from 1960 to 1966, but these general plans were only formally registered 1967. The area was initially planned for 1286 plots (plots). Upper Ashbury is currently regulated under the Bloemfontein Town Planning Scheme (BTPS) 1954 (No 1 of 1954).

4. Method

The overall research paradigm stems from a pragmatic viewpoint. Hence, the author made use of 'intervention research' which is best described by Rothman and Thomas (1994) as a design method which is utilised to essentially provide possible pragmatic solutions to research issues. This research

is based on two sources of data. Firstly, a survey was undertaken of the built form of Upper Ashbury. This was the primary source of data for this study. Noting that the plots amounted to 1212 units in the study area, a sample of 221 plots was used, which resulted in a confidence level of 95% and just under a 6% margin of error. In order to allow for a spatially representative spread of the area of Upper Ashbury, a systematic sampling technique (Kothari, 2004) was utilised to determine that every 5th household is to be surveyed. Due to a lack of available data of this nature, the most appropriate data collection method included using the area tool on Google Earth Pro to determine the calculations necessary for the coverage and street-and-side setbacks. This was then verified and supplemented with on-site photography, observation and a land use survey. The second source of data included the qualitative component which comprised of semi-structured interviews in July 2016 with four participants. The questions were open-ended thus they were analysed and themes were extracted to determine similar land use issues or solutions coming through. These interviews were a supplementary source of data.

5. Results

The purpose of this section is twofold. Firstly, to provide a demographic and infrastructure overview of Upper Ashbury. Secondly, to



Figure 2: Example of a mid-block toilet
Source: Author (2016)



Figure 3: Top view of the mid-block toilets
Source: Google Earth (2016a)

provide a household overview of the area in order to effectively present the land use contraventions and the implications thereof.

5.1. Demographic and Infrastructure overview

The total population amounts to 8943 people, with a relatively even gender distribution of 4553 (51%) females and 4391 (49%) males. The Coloured population group amounts to 7636 people, thus making up 85% of the population (Statistics South Africa, 2011). The annual household income profile of Upper Ashbury is relatively mixed, with a large portion, roughly 30.89% of the households earning from no income to R19600 (approximately USD\$1471) per annum. The annual income ranges from R19601-R307600 (USD\$1471-

\$23095) amounts to 65.26% and the income range from 'R307 601-more' amounts to a small percentage of 3.85% (Statistics South Africa, 2011). The income distribution of the area indicates that most of the households reflect a low-middle income class area. In terms of employment, there are 2652 people (45. 01%) formally employed, but equally so, there are numerous people who are not economically active (2059 people, 35. 95%) and a small portion of the people are

discouraged work seekers or unemployed, 5.38% and 14.66% respectively (Statistics South Africa, 2011).

It is critically important to note that more than half of the people in Upper Ashbury are not formally employed which subsequently indicates the importance of the informal sector and the survivalist activities occurring in the area. Statistics South Africa (2011) indicates that 7446 people have a grade 12 qualification or less. This amounts to 95.24% of the population of Upper Ashbury however only 112 people have gone onto pursue higher degrees or diplomas. Another alarming statistic is the number of people who have no schooling, this amount to 260 people. It is not a substantial number, but it is worth noting as it is the second largest education level category. Upper Ashbury is a serviced site with built-in water and sewage infrastructure. It is one of the first Coloured townships to be built after the enactment of Group Areas Act (SAHO, 2015) and the mid-block lavatory very much represented the planning of the time for Non-Whites - discriminatory and degrading. The author found 60 mid-block lavatories out of the 221 households surveyed.

5.2. Household overview

Land use regulation parameters	BTPS, 1954 (No 1 of 1954)	Upper Ashbury Reality
Permissible uses	Single Residential 2 subzone K; permitting 2 dwellings	12 visible businesses. Hence, 5.43% of plots are in violation in terms of this criterion.
Coverage	40%	Average coverage: 33.35% Maximum: 87.13% Minimum: 5.13% 33.48% > 40% coverage 66. 52% < 40% coverage
Height	No restrictions	219 single storey, 2 double storey (No contraventions)
Spaces about main buildings	None	No parameter set, hence no contraventions.
Street-setback	6m	143 out of 221 > 6m (64.71%)

Table 1: A comparison between the land use regulation parameters of the BTPS 1954 (No 1 of 1954) and the reality of Upper Ashbury

Source: Author (2016)

This section will include a full analysis on the housing of Upper Ashbury in relation to the zoning regulations. Firstly, a comparison between the BTPS, 1954 (No 1 of 1954) land use regulations and the reality of Upper Ashbury will be tabulated which will signify the contraventions found during the study. Secondly, a detailed analysis of specific regulations and proposals for reform. Thirdly, a discussion on zoning reform in South Africa for SMART communities and lastly, a conclusion and recommendations for reform in Upper Ashbury.

Number of contraventions	% of sample
None (complies with the zoning scheme)	30,14%
1	39,73%
2	26,94%
3	3,20%

Table 2: Amount of land use contraventions Source: Author (2016)

5.2.1. Overall assessment of compliance with zoning scheme regulations

Given that the BTPS 1954 (No 1 of 1954) have only put parameters on the coverage, permissible uses and street-setbacks, the author proceeded to determine how many of the total sample size contravened the Town Planning Scheme Parameters. It was found that only 30.14% of the sample complies with the zoning scheme regulations. 39.73% of the sample contains one contravention, 26.94% of the sample has two contraventions and 3.20% contain all three contraventions. This is a significant discovery in that only 30.14% of the sample complies with the zoning scheme regulations.

As indicated in the table 2, it is clear to determine that there is a high amount of regulation contravention, therefore the implication of low compliance is detailed below.

5.2.2. Detailed analysis of specific regulations, and proposals for reform.

Permissible land uses: the permitted land use in the existing scheme regulations are restrictive in the sense that it allows for only residential use. Interestingly, they are progressive in the sense that two dwellings may be built on the erf. The density nexus is also critical to consider. Currently, the density of Upper Ashbury is at 21 dwelling units per hectare which is significantly lower than the minimum suggested dwelling unit density for sustainable residential areas (CSIR, 2001; Calthorpe (in Curtis, 2012); and Ewing &

Mammon, 2008). Increased dwelling densities according to Ewing & Mammon (2008) along with mixed uses are encouraged because these are the very factors which allow for the city to grow. Increased dwelling density can occur in two ways, being (a) permitting more dwellings on each erf or (b) permitting subdivisions of existing plots, with each new erf being permitted to have 2 or 3 dwellings. The author does not possess enough information to make an assessment as to whether the density should increase due to there being no interviews conducted with the residents themselves. Still, upon speaking to the Town Planner (interview, 2016), it was noted that through his interaction with the residents, they would rather have the right to use the property for various other uses instead of be allowed to have more dwellings on their property.

The author proposes that Mangaung Metropolitan Municipality should consider permitting the maximum number of land uses on single residential plots as of right, similar to the approach taken in the Japanese and German zoning schemes (Hirt, 2007 & Price, 2014), as opposed to increasing the dwelling density in the area. The extent of the proposed additional permitted land uses includes: small- scale businesses such as spazai shops, offices and hair salons. The main non-permissible land use will be any noxious and industrial activities on a large scale which include construction, repairs, scrap yards and/or panel beating.

The Mangaung Metropolitan Municipality has a home industry or home café application form. The purpose thereof is to allow the residents with the personal right to start business in residential areas (Mangaung Metropolitan Municipality, 2016). A personal right is a right offered to the person who has lodged the application. Therefore, the right of operating a

business is attached to the person and it is not transferable without consent from the Council (Mangaung Metropolitan Municipality, 2016).

The application permits the residents to use only 50m² or 25% of their building area for a home industry. The author proposes instead that areas such as Upper Ashbury have a blanket approach to zoning and allow mixed use zoning as of right, with the exception of noxious activities. Mixed use zoning refers to various business uses, residential use or a combination thereof. In the German zoning system, Hirt (2007) explains, the term ‘mixed use’ refers to the uses small local businesses such as coffee & sweet shops, workshops, health, sport, etc., which serves the daily needs of the community.

The benefit thereof is that it will allow the urban poor with the right to part-take in

activities which support their livelihood, either through renting out rooms, spaza shops, hair and beauty salons, cafés, etc. Adopting a mixed use system such as the Japanese zoning scheme (Price, 2014) allows for the majority of uses with minimal exclusion only when it is completely necessary such as in the case of noxious industries or for environmental and health reasons. Livelihoods or opportunities to create some form of livelihood within residential neighbourhoods have been lacking in South African land use regulations. Permitting the maximum amount of land uses as of right should especially be allowed for poorer neighbourhoods such as Upper Ashbury. This system allows residents to conduct informal business activities in an effort to sustain their livelihoods without expensive development costs and applications which they cannot afford. Hence, the author proposes activities such as home-based businesses in the form of spaza shops, hair salons, renting of a second dwelling or room within a house, and car wash company be permitted without prior consent from the municipality. This allows the municipality with less red tape surrounding development applications as the maximum uses are permitted from the onset.

Coverage: The coverage in Upper Ashbury permits 40% of the erf to be built on. About a third of the plots violate this. Coverage is important because it determines how much of the land is permitted to be built on. The Japanese system (Price, 2014) advocates a minimum of 50% coverage and a maximum of 100%. The author suggests an increase in the permissible coverage due to the fact that this evaluation of regulation is based on an existing area where the majority of the plots have already violated the maximum of 40% coverage. According to the empirical evidence, if the coverage were to be increased to 80%, only 1 erf would be in violation as opposed to the majority of the plots thus when applying the 80% rule of Glasser, the majority of the plots would be in compliance with the newly set regulation. Literature indicates that the advantage of higher coverage results in the urban poor having more space to build on, potentially an extra room for rental or a business. This coupled with mixed uses takes into account the opportunity given to the urban poor to make use of a much larger portion of their property.

Height: The regulations for Upper Ashbury have no restrictions set. The implication of this results in two impacts; environmental and on property value. Upon consulting the literature, it is noted that when there are no restrictions and residents decide to build more than 2 storeys, this can cause an overshadowing onto the neighbouring property which could essentially affect their energy bill. Impacts such as height restrictions are overlooked but this is a

critical factor to consider, especially in a residential neighbourhood where property values are indirectly affected by the choices of planners in the profession who decide upon these factors. A building with three or more storeys can also be an eye sore and hence indirectly affects the property rates of neighbouring or adjacent properties. The author suggests there be a restriction of at maximum two storeys due to the reasons stated above.

Street-setback: Is there a logical reason as to why we need a 6m street-setback? In the case of Upper Ashbury, it was found that an overwhelming percentage (64.71%) of plots infringe on the 6m restriction. The visible reason was seemingly the construction of a second dwelling or for the construction of a small business such as a spaza shop. There is no logical reason given as to why there is a 6m street-setback, but on the ground this space is being used for the purpose of economic survival and livelihood creation. The historic reasons behind street-setbacks serve the purpose of future road widening (Horne, 1968). However,

Horne (1968) indicate that street-setbacks as a zoning control is ineffective as its only real purpose is for aesthetic reasons. Otherwise, in terms of traffic safety, there is no impact. Hence, the author suggests doing away with this street-setback and reducing it to a 0m setback.

Spaces about main building (left and right setbacks): The regulations for Upper Ashbury indicate there are no side-setbacks required. The implication of not having side-setbacks is site access. In the event of an emergency such as a fire, access to the site is vital. Environmental implications need to be considered when amending a scheme which has not been previously considered. The author is not suggesting a large side-setback, but just sufficient for site access in case of fires or emergency access to the back of the property, hence a 1-1.5m setback will suffice.

Given that there is a lack of exploration of reform for low income areas and only recently has the newly enacted legislation been promulgated; the following section aims to highlight whether SMART technologies can act as a panacea to zoning reform for Upper Ashbury.

6. Zoning reform for SMART communities

A 'smart city' is defined in several ways. Most commonly, a smart city is defined as the Information and Communications Technology (ITC) associated with a city to advance its 'smartness' in improving governance and planning functions which enhance the quality of life of the citizens. Secondary, some

authors define smart cities by emphasising the human component, whereby a city contains highly intellectual and innovative people who develop new ideas to effectively promote economic growth (Shapiro, 2006). Other authors define this concept to be associated with social inclusion and participatory governance (Goodspeed, 2014; Söderström 2014). Upper Ashbury needs reform in terms of the quality of life and livelihood aspects of a smart city.

Smart Planning Support Systems (PSS) in South Africa is relatively in its infant phase. These systems are designed to support municipalities with low financial and human resources (Nel, Nel & Minnie, 2016). Some of these PSS include SPISYS (Spatial Planning Information System), E-lodgement, MapAble[®], Quantum GIS (QGIS) and cellular or smartphone apps.

SPISYS is an initiative of the Department of Rural Development and Land Reform (DRDLR) whereby a repository of open spatial information or data for the Northern Cape and Free State provinces have been captured for use by all sources be it private or municipal. This tool assists with reducing the time needed to source basic information for planning purposes. It has become such an effective tool that the DRDLR is in the process of developing a repository system for the entire country and will be called the National Spatial Planning Data Repository (NSPDR) Ecosystem. E-lodgement is an online system which processes town planning applications. Its purpose is to guide municipalities and private consultants through the process of submitting an application, as well as the approval thereof. It is linked to municipal bylaws and used predominantly within the Free State province municipalities (Nel, Nel & Minnie, 2017). MapAble[®] is a web-based geo-intelligence system that aims to bring about the ease of access to software, the skills to use the software and the general lack of available data (Nel, Nel & Minnie, 2017). It enables professionals to facilitate and collaborate to create and visualise maps through shared web-based workspaces. Lastly, QGIS is a free and affordable analytical mapping system which is best suited for a cash-strapped municipality. It is not inclusive of data and it requires a user with knowledge of similar systems (Nel, Nel & Minnie, 2017).

Given the nature of the area of Upper Ashbury and the level of expertise required, perhaps within the context of Upper Ashbury, it would be best to take a step back. In order for a city to become 'smart,' it is a critical precondition that the regulations in place are in line with the realities of citizens, otherwise we might just have high-technological governance that still does not align with the lived reality of citizens. This study subsequently provides a methodology that

municipalities can use to test the alignment between regulation and lived realities. Perhaps this then is the 'true' definition of a smart city in a developing country – not necessarily one which is technology driven, but rather a city that is aware of citizens lived realities, and which regulate in such a way to accommodate these practises.

7. Recommendations and Conclusion

This research study has effectively indicated how and why re-evaluating land use regulations for Upper Ashbury, Bloemfontein is critically important, not only for the study area in question but for similar places as well. The use of modernist and oppressive zoning techniques has been to the detriment of the urban poor. The data collected has proven that the regulations set for the study area does not take cognisance of the priorities of the urban poor. It was argued in theory that it is vital that good urban planning laws reflect the values of an area and this is precisely why re-evaluating the regulations for Upper Ashbury is essential. Alternative zoning schemes such as form-based codes and performance-based zoning have also proven to be out of the financial and skills capacity of the local government in South Africa. Hence, the author has taken a pragmatic approach to proposing new land use regulations which are better suited for the area.

The three major land use contraventions found were from the street-setbacks, coverage, and land uses. These contraventions made it clear that only 30.14% of the sample of Upper Ashbury is in compliance with the Bloemfontein Town Planning Scheme. An alarming 68.86% of the sample contain at least one to three contraventions in terms of street- setbacks, coverage or land use. Glasser's (2013) 80% rule is critically important in this regard in which it highlights that re-evaluation of the BTPS regulations for Upper Ashbury is absolutely necessary. Given that the scheme does not reflect the reality on the ground, Massey's (2014) argument of counter-conduct activities is also proving to come out strongly in this study when looking at the vast amount of contraventions. It is clear that resistance to set regulations through counter-conduct activities in Upper Ashbury is taking place. This is a clear indication that space in Upper Ashbury is important to the people as the majority of the sample made more use of the street-setback space and the coverage. Noting that some form of land use regulation is always required for the health and safety of the residents as well as environmental protection, land use regulations also need to take cognisance of the social and economic impact on people's lives. It is therefore fundamental that the livelihood priorities of people living in Upper Ashbury are taken into account.

The implication of this research on the planning profession is that Town Planners need to be aware of making decisions that will affect the livelihood and well-being of people. It is critically important to create land use regulations which are better aligned with the realities on the ground as opposed to adhering to needless land use regulations. Planners need to create spaces and cities in which all people have the opportunity to empower themselves and their lives. Hence, social and economic implications need to be considered alongside planning regulations, not only for the wealthy but for the poor as well.

iA spaza shop is an informal business run from either a room in a house or a shack and is operated from a small house where customers purchase grocery items from outside the house or shack; it is also commonly known as a much less sophisticated grocery shop (Von Broembsen, 2008:1).

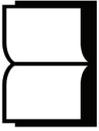
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Governing smart communities – Governance and participation in the age of digitalization

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Synopsis:

The development and prosperity of cities and especially European cities are determined by several key factors such as economic situation, demography and social participation, infrastructure and adaptation to physical conditions such as topography and climate. European cities in particular are also the result of an extensive public decision-making process and majority decisions taken in local assemblies according to administrative action. Digitalization and smart city or smart community concepts address the above-mentioned key factors, for example by opening up new economic opportunities, changing demography and social participation, optimizing the use of infrastructure or permitting more dynamic adaptation to physical conditions. In doing so, digitalization and smart city concepts also have a significant impact on public discussions and the decision-making process itself (DIN 2017). Urban activists (Alsever 2015, De Castro 2015) and city government bodies such as the Association of German

Cities draw attention to the need for smart city concepts to be designed to support the successful model of local self-governance, a development that in the end is controlled by the respective citizenship.

The smart city concept and the new opportunities generated by digitalization are not an end in themselves. Ultimately they support faster and more efficient fulfillment of the sustainable development goals (as set by the UN). In order to address these development goals, the smart city scope has to be expanded to the regional perimeter in the interests of sustainable development.

In the end, governing smart cities raises the question as to whether it is technology or the people who are the driving forces. This article discusses governance and participation in the age of digitalization in the cities themselves and also on the regional (i.e. supra-municipal) level. It concentrates on the perspective of spatial planning, with a special focus on the cities and regions of Stuttgart, Germany and

Zurich, Switzerland, where the authors are involved in practical research into the change processes caused by digitalization. Both are “reflective practitioners” in the sense of Donald Schön; this paper is therefore more a “reflection-in-action” (Schön 1987) and less a purely scientific paper.

1. Governance and change processes in the European city

Talking about digitalization and the changes it causes must take account of the decision-making process and the capacity of European cities for change. The history of European cities and also smaller independent towns in countries such as Germany and Switzerland follows a long-standing tradition of local self-government within a defined framework of legal and technical standards. Strategic development goals, commitments in terms of land use or the extension and operation of local infrastructure are defined with the competence of the local municipalities.

This is best illustrated by the three elements of sustainable development (social, economic and ecologic aspects) that usually form the basis for decision-making in the field of local development, aiming to reconcile different – sometimes even conflicting – positions within a complex political procedure.

Planning procedures in particular (e.g. updating local land use plans where most of the key factors are addressed) offer opportunities for direct public participation. Everybody is invited not just to elect the decision-makers (as part of representative democracy) but also to give their opinion about the specific circumstances, e.g. the contents of the plan, and in the case of Switzerland, to vote on the results directly.

The methodology and procedures have undergone further development in recent years, especially with the intention of encouraging more people to get involved in public participation activities. However,

the basic principle that final decisions are taken by the people or elected officials has never been questioned, thus safeguarding the important long-term, interdisciplinary perspective, which can also be subject to different political values.

The process of decision-making itself can be legally reviewed for flaws in the course of consideration.

Unlike the creation of absolutist cities or new towns set up by more contemporary developers, the aforementioned approach assures a broad inclusion of the citizenship, which has become a kind of trademark for urban development in European cities. Considering that about half of Europe’s population lives in small and medium-sized communities (ESPON 2013), this trademark leads to a strong local identity, in particular in the case study regions in Germany and Switzerland.

This kind of identity and decision-making has a great influence on the change process caused by digitalization. It is hard to imagine how smart city concepts as in Masdar City or Singapore could be implemented in the decision-making culture of European cities. The following section will focus on subjects and governance issues related to the smart city under the described circumstances.

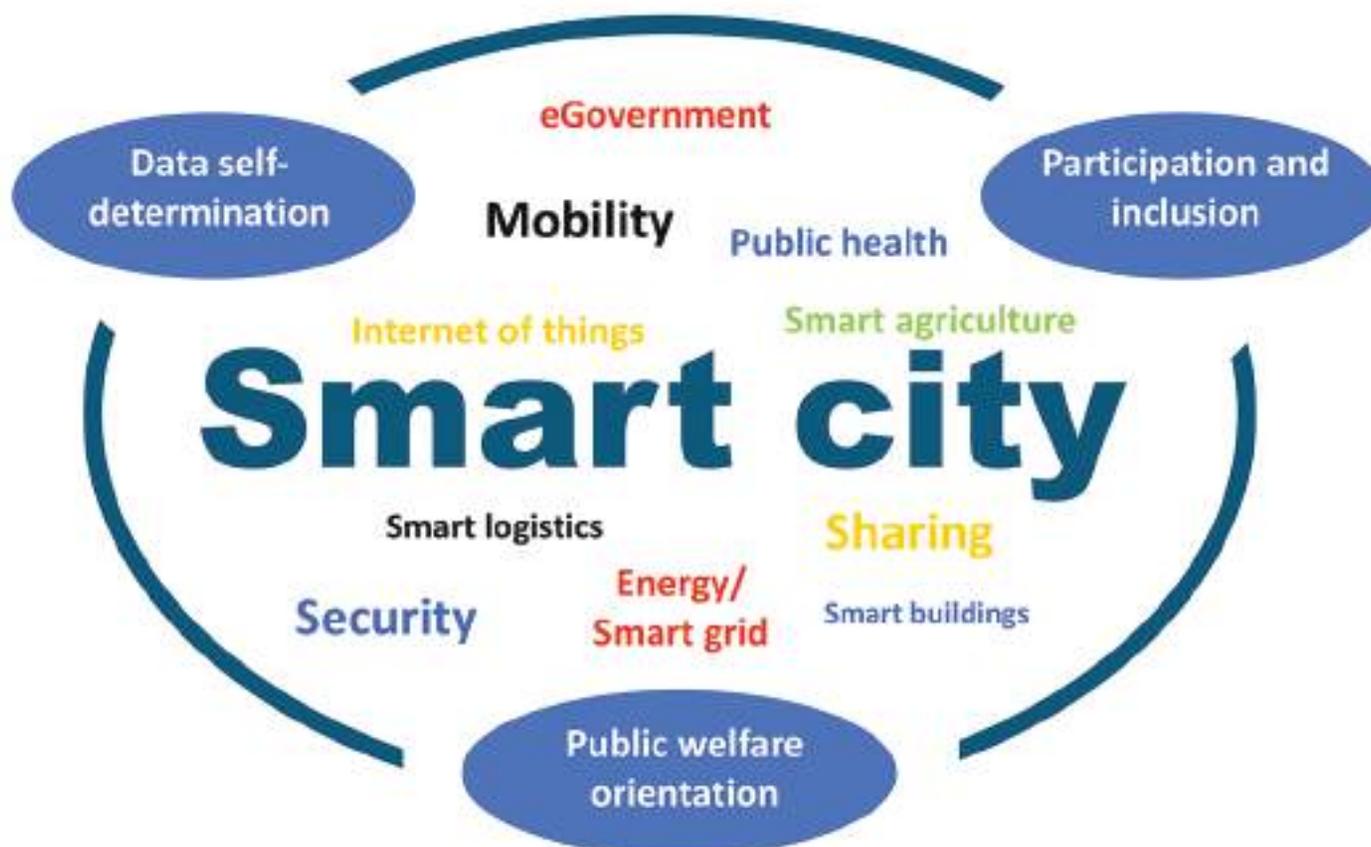
2. Smart technology: subjects and governance issues of the smart city

Smart technologies offer an opportunity to improve the efficiency of infrastructure, enhance the quality of life and achieve the sustainability goals set by the UN, as well as various national strategies. In that respect, they affect numerous aspects of urban life such as mobility or energy as well as public health, eGovernment, security, logistics or buildings. Mobility and energy are the technically most advanced – and therefore most visible – aspects of digitalization in urban technologies (Engelke 2017). Topics such as “autonomous driving” or “smart grids” are well discussed in the media in many cities.

Three main topics appear to curtail developments in the context of governance and participation in the age of digitalization: data self-determination, participation and inclusion, and public welfare orientation.

2.1. Data self-determination: collection, services and self-determination

Smart technologies generate more data, more personal data and more up-to-date data. Faster and more efficient administrative procedures, better rationale for decision-making (with positive effects also for legal compliance) and also greater transparency are the clear benefits of this development.



Subjects and governance issues of the smart city

Up to now at least, public authorities have been responsible for collecting and providing spatial data. The relevant database for political consultation and administrative procedures has therefore been available according to certain standards covering aspects of data quality as well as personality rights or data ownership. Particularly in terms of mobility-related data, third parties (e.g. TomTom, Google) or the social media (e.g. Facebook, Twitter) tend to collect and provide relevant data not necessarily in line with these standards.

It seems likely that certain aspects of public infrastructure (such as street lighting) will be outsourced to private operators (for economic reasons) who would collect (and use) data. This underlines the importance of data security because data that has not been rendered anonymous can pose a severe threat to privacy, personal security and even basic rights in general. It is therefore crucial for existing standards to be adapted to the expected intensification of data collection.

In this respect the body of German cities and towns (Association of German Cities) and the German standardization body (German Institute for Standardization, DIN) have launched a joint initiative to develop standards for smart cities (DIN 2017).

An Ethics Commission appointed by the

(German) Federal Minister of Transport and Digital Infrastructure has published a report on the ethical issues of automated and connected driving which underlines the right to self-determination when using public infrastructures, even if they are operated by private enterprises. The report emphasizes that “The voluntary nature of such data disclosure pre-supposes the existence of serious alternatives and practicability. Action should be taken at an early stage to counter a normative force of the factual, such as that prevailing in the case of data access by the operators of search engines or social networks.” (BMVI Ethics Commission 2017, ethics rule no. 15)

2.2. Participation and inclusion: getting more people digital – and more involved

Digitalization could bring several advantages regarding outreach and participation in planning and other procedures to support decision-making: enhanced comprehensibility, greater transparency, better visualization and better, more up-to-date data in general. In addition, new services and distribution channels are also expected which could improve access and support outreach to groups less attracted by classical media. Moreover, new participation formats (e.g. crowd-funded urban projects or “Hackathlons”) can lead to results that go beyond known standards – in terms of both quality and quantity (see also Assenmacher

2017).

However, it is important to bear in mind that not all people in smart cities are included in these activities. For example, more than 10% of the population in Germany and Switzerland have no internet access – and can therefore hardly be addressed by the new formats (Germany: 11%, Switzerland 12%, according to Hootsuite 2017). Even if traditional formats such as “public announcements” might also fail to reach absolutely all sections of the population, an appropriate mixture of on- and offline outreach activities is important (at least for a transition period) to achieve an inclusive system with sufficient coverage.

Getting more people digital and involved is key because digitalization is a social change process as well as being a technical revolution. Defining the balance between technically feasible solutions and innovation on the one hand and social acceptance of solutions on the other is not a contradiction, it is a social negotiation process. In planning theory, Walter Schönwandt states that problems are not at all “self-evident” or “objective”: they are “social constructions” (Schönwandt 1999).

2.3. Public welfare orientation: interdisciplinary, long-term perspective, and targeting the common good

Germany’s “Smart City Charta” (BBSR 2017) calls for interdisciplinary, cross-section use of new technologies. This will allow an overall perspective that goes beyond the bulwarks of individual departmental competences and responsibilities.

Such an integrated approach is characteristic for strategic decision-making, considering a broad range of aspects from different perspectives in order to target the common good in smart cities. In planning terms, this completeness is legally relevant and crucial for the lawfulness of any decision.

The challenges faced by lawful decision-making will increase with the massive growth in data available from more heterogeneous sources and conclusions generated from such data. Moreover, the complexity of consultation documents provided for elected local officials has already reached the limits of reasonableness (at least in cases with high public awareness, e.g. new roads, wind turbines).

However, an allegedly easy way out with decisions taken automatically on the basis of certain algorithms is not an option: the German “Smart City Charta” clearly states that elected officials/council members can never be substituted by such procedures.

With regard to strategic decisions, the

aspect of time plays an important role in this context, in two respects. Firstly, the political procedures need time for debate, negotiation and majority-building. Secondly, decision-making in spatial and city planning is characterized by a far longer perspective than usual, with time horizons of 10 to 15 years that are found in very few other fields of politics.

By contrast, being up-to-date is a typical feature of smart cities, and is supposed to allow fine tuning in the short term. More extreme positions already tend to see the possibility of a “post-voting society” where actual surveys can render democracy (as a mid-term feedback system) unnecessary. (Mokka 2017)

Despite this, the availability of up-to-date data could be an important issue to support decision-making – if it can be related to long-term perspectives and strategic guidelines.

The three aspects of data self-determination, participation and inclusion as well as public welfare orientation apply not just to smart cities. Their impact on the urban fabric is wider than the administrative boundaries of a city. The following section therefore looks at scaling up to a broader spatial level.

3. Smart cities and their flows: the need to scale up from city to region

The smart cities debate is being led by local administrative units and the respective umbrella organizations, with a focus on citizens as an important target group for further action. However, this limitation is not really appropriate. Even the ancient Greek polis was defined by the entirety of the population – the city plus the hinterland. To this day, the European city is defined by “surplus in significance”: a city is where the most important facilities are (for culture, shopping, education, medical support etc.). The focus extends beyond the city limits to take account of the catchment areas and significant impact from customers/users in the hinterland. A (much) wider catchment area is necessary to make it economically feasible to provide many of the facilities mentioned above, particularly for the small and medium-sized local units in Germany and Switzerland.

For the most part, smart solutions are aimed at improved mobility and accessibility so that it is very important to focus on all potential users/customers and not just on the residents of a certain city. Cities generate interaction with the hinterland, especially when they become smart cities. These flows define the metropolitan region, a catchment area that is characterized by traffic (people and goods), money, importance, specialization and so on.

The case study of the Stuttgart Region

in Germany shows that at least 75% of all employees do not work in the place where they live but commute to other jurisdictions. Nevertheless, they expect – of course – their commute to be reliable, comfortable and sustainable – even beyond administrative borders. Apart from travelling to work, many other functional relationships are established independently from jurisdictions, e.g. economic supply chains, flood protection, open spaces.

Despite all these interdependencies, the area itself is characterized by small-scale administrative structures. The Stuttgart Region alone has a population of 2.7 million people distributed across 179 independent (and self-confident) local jurisdictions.

These local units are coordinated by legal and procedural standards, but certain deficits are emerging especially in prospering and fast growing urban areas: the provision of affordable housing, the adaptation of important infrastructure and the development of open spaces fail to keep pace with the growing demand. Existing instruments for cost-benefit compensation do not meet the requirements of this complex situation.

Smart city concepts can be used here to support inter-/supra-municipal cooperation. But current research does not look at how smart city concepts affect the existing catchment areas and corresponding hinterland connectivity.

The authors raise the concern that the introduction of new, uncoordinated technical features might increase the already existing difficulties of cooperation between the city and its catchment area. Traffic management is one example to describe this risk: Stuttgart City discussed the closure of several roads to meet the EU standards for air quality. Neighboring cities, which would of course also be affected, were not involved in any part of the decision-making process. Traffic management also offers other examples (e.g. ramp metering traffic lights that restrict traffic flow into a city, causing congestion in neighboring towns).

This already very complex situation is further aggravated by the activities of private stakeholders. Their data has a significant influence on the routing of commuters and travelers, meanwhile almost without any sufficient consultation of local traffic management.

Improved participation opportunities can also only contribute to the sustainable development goals if supra-municipal coordination is assured. The description of the decision-making culture in the German case study shows that working and living in different places has a significant impact

on the citizen's position: all democratic rights to participation are limited to where the citizen lives. In many cases, the general intention of having all aspects of a city accordingly represented will be overruled by the particular interests, such as the desire for a quiet residential neighborhood, for example. The provision of (necessary) additional residential or commercial areas has meanwhile become a real challenge for several cities.

Both examples show the crucial role played by supra-municipal cooperation and integrated democratic decision-making procedures for successful implementation of smart city elements in spatial and city development strategies. Small and medium-sized cities in conurbations in particular are challenged by this, as they have to keep up with often more capable administrations in larger (core) cities. However, standard solutions by large system providers might not be the one-size-fits-all solution and are less suitable for addressing the broad variety of local demand. The German "Smart City Charta" therefore calls for regional alliances to find adequate solutions.

Cooperation on a regional scale can be most efficient in this perspective:

1. In Germany and Switzerland regions are mainly said to be monocentric as the catchment areas of a primary center, i.e. the biggest or most important city of the area. In most cases, the perimeters of these regions cover most activities of the population.
2. These regions have structures that can support decision-making and administrative measures on supra-municipal level.

It is this regional, supra-municipal level where smart city or, to be more precise smart region concepts offer efficient support for sustainable (and democratically legitimized) development.

4. Making new ideas come true: test labs for smart regions

Digitalization, "a fusion of new technologies, blurring the lines between the physical, digital, and biological worlds", to quote Klaus Schwab, founder and Executive Chairman of the World Economic Forum, will change cities and regions (Schwab 2016). Here smart technology can significantly improve the options of sustainable spatial planning on a regional and city level. The introduction of new technologies will have a massive impact especially on:

- the collection and provision of data;
- the organization of outreach and participation;

- individual interests and public welfare;
- political communication and management measures.

However, many open questions still remain, primarily in terms of concordance with decision-making procedures and (mandatory and binding) planning documents. Some of the core issues might not be solved by theoretical debate but call for a practical test ground: “free zones” that allow for observation of the impacts in a controlled field trial.

In Germany – and recently also in Austria and the Netherlands – the concept of an International Building Exhibition” (Internationale Bauausstellung - IBA) has become an established platform for such trials. It reflects that the building and implementation of smart regions is not a one-off solution defined by experts but rather embodies the crystallization of technical and social knowledge in a certain region.

The aforementioned aspects could therefore also be an important field for the “Internationale Bauausstellung StadtRegion Stuttgart 2027” that was launched recently and is planned to run until 2027, presenting implemented solutions as well as innovative approaches in participation and decision-making. The preconditions for making smart solutions a basic topic of this IBA seem to be positive. The federal state of Baden-Württemberg has actively contributed to the German “Smart City Charta”; Stuttgart Region with its directly elected regional assembly providing a role model for governance on the regional level; the municipalities can provide capable administrations; the universities and companies can provide a wealth of innovative capacity and excellence. Furthermore, all levels are well integrated in national and international networks.

These networks with extensive technical and social knowledge can (and should) be used to:

1. define the current state of the art of smart city elements from a global perspective;
2. make these elements meet the current challenges that can be defined in Stuttgart Region;
3. support a test ground for the field trial of innovative solutions;
4. adapt these solutions to the needs of other regions and
5. back their implementation.

There is quite obviously both demand for

and an awareness of smart solutions on the regional level.

5. Considerations for governing smart communities in the age of digitalization

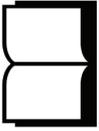
A summary of the discussions on governance and participation in the age of digitalization should mention six considerations. The considerations, elaborated by “reflection-in-action”, emphasize not only the need to act but also highlight the gaps in research into smart regions.

Considerations for governance and participation in the age of digitalization:

1. Quality and reliability of data are crucial for lawful and informed decision-making – no matter where data comes from. Standards and transparency are important.
2. Public outreach and participation can be more efficient with smart technology. But access for all – inclusion – has to be guaranteed.
3. Political decision-making with a long-term perspective that targets the common good is the core business of elected officials or the people. It cannot be given to algorithms – even in smart jurisdictions.
4. The smart city has to be designed for the users – not just the residents. Smart cities therefore need to cooperate as a smart region. Small and medium-sized cities especially have to be integrated in this broader context.
5. The change process towards a smart city needs local identity, independence and furthermore additional resources – and should not be substituted by standard solutions.
6. Smart solutions have to come true – test grounds are crucial.

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An Inclusive Study on the Renewal of the Urban Fringe Area - A Case Study of Four Villages in Hangzhou's Shiqiao Sub-district.

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1. Background

In October 2016, Habitat III passed the New Urban Agenda, aiming to build a more compact, harmonious, inclusive, and interconnected city and region. Inclusivity was a crucial component of the new agenda, stressing on development sustainability processes such as the sustainability of nature and society, reduction and elimination of injustice, and an emphasis on social equality and sharing.

As a "heterogeneous form" in the development of city, marginal communities have become an unstable factor in the context of urban renewal. With continuous developments and growing urbanization in our society, large amounts of people have become concentrated in big cities. Thus, major central urban areas in the city face pressures from scale-up and spatial sprawls, resulting in the formation of edge-fusion areas between urban and rural areas. The mixed use of urban and rural areas still exists in these

areas, which are the most complicated and changeable places in urban and rural construction. Furthermore, they are also unique regional entities with elements of transition, ambiguity, dynamics and complexity. Compared to urban community in the general sense, it is always the intermediate zone of urban and the rural areas that shows the dilemma of "two non-independence". Residents in these communities are often excluded from the mainstream economy, politics, culture and social activities, and tend to live in the bottom of urban societies due to this dilemma.

In the processes of urban renewal and innovation, where "humanization" is considered to be a fundamental value, social faults and group isolation in marginal communities are considered as serious challenges to the public value of the modern renewal paradigm. The renewal results are not immediately obvious - there are transfers and deprivations of renewal costs, insecure protections for the rights of vulnerable groups, and demolition conflicts caused

by unequal distribution of benefits during renewal. Furthermore, gentrification established by residents, living space differentiation, and missing historical and cultural factors caused by large-scale reestablishment after renewal contribute to these results.

The theory of inclusion offers a better approach for the urban renewal of urban marginalized communities. Urban renewal based on this concept does not depend on utilitarian orientation around a single economic interest or purpose anymore, but rather starts from the perspectives of social progress and social justice with more inclusion, emphasizing fairer social rights and distribution of interests while updates are in progress. This will help to fully guarantee the overall interests of the city while still reflecting public policies, comprehensively realizing the legitimate rights and interests of most residents and property rights, while also working to meet their more reasonable demands. Lastly, inclusion aims to achieve a general balance between economic and environmental benefits, local and overall interests, and individual and collective interests overall.

2. Research Overview

In recent years, China's urban planning has faced adjustments and sought a new transformative direction under a more inclusive context¹. Thereby, inclusion-based urban planning has begun to prevail². The urban fringe area serves as an important part of urban regional structures, being a focus in academic circles due to its unique spatial location, population composition, and management system, as well as its sensitive, differentiation, and unstable non-inclusive characteristics.

Existing research on urban fringe areas inclusivity mainly focus on the ideas of spatial separation³⁻⁴, social governance, institutional reform⁵⁻⁶ and the fairness of public services. There has been further research about populations living apart and poor social orders⁷⁻⁸, as well as other social problems

including employment, social security and protection of peasants rights and interests in urban fringe areas⁹⁻¹⁰. Much of this research proposes that we tackle these issues by transforming functions of government, propelling the economy, cultivating development of social organizations, and breaking the urban-rural dual system¹¹⁻¹².

Existing inclusive urban renewal methods can be divided into two categories. First, there is the "bottom-up" public participation model. Second, the "top-down" system reform model. The former is a model focusing on policy, capital, community government, aboriginal and external forces¹⁴⁻¹⁵. Ultimately, it proposes the self-transformation model of villagers or the village collective¹³.

The "top-down" renewal model uses concepts of transformation and planning methods to introduce legitimate living and healthy living factors of the non-resident/resident population into the transformative concept of a village within the city and in the reforming schemes¹⁶. It proposes that the government within the system should be decentralized, while timely guidance through planning assists to make old city renewals operate in the "market" harmoniously¹⁷. This model takes on the perspective of coordinating urban-rural relations to discuss the transformation of a "village in the city"¹⁸. Moreover, it pays further attention to coordinative efforts made by considering the impact of conflict of interests, and explores inclusive domestic renewal theories by studying other foreign inclusive urban renewal cases.

Existing inclusive urban renewal orientations place more emphasis on cooperative planning means, focusing on market mechanisms, benefit distribution, economic reform, social reform, and institutional reform, and concerns about current renewal projects. It is insufficient to only research the impact of inclusion after renewal takes place, and in the field today, there is still a long way to go to promote further study on the endogenous, cooperative and inclusive development of marginal communities.

3. Problems about Renewal in the Existing Fringe Area

3.1 Characteristics of the Fringe Area

Serving as the forefront and leading idea for urban diffusion, the urban fringe refers to the most complicated and changing area in urban construction; it is a transitional zone between urban and rural areas in land utilization, societies, and population characteristics, and seen as a pure agricultural hinterland in central cities that connects built up areas to peripheral residences without urban residents and non-agricultural use of land.

The development of cities attaches great importance to the promotion of social equity and shared community growth by reducing and eliminating inequality opportunities. By-and-large, this process is considered to be aided by increased; it focuses on increasing equal access to opportunities, participation in economic growth, and shared social and political rights, thereby emphasizing inclusive and communal development. In this angle, the urban fringe faces many incompatible problems.

3.1.1 Complexity of Staff Composition

The marginality of remote cities not only refers to a margin in physical space, but also margins of social classes and functional senses. For example, most residents living in fringe areas are migrant workers; research shows that foreign resident populations gathered and increased in large cities from 2000 to 2010. In Hangzhou, statistics show that extramural inflow population among the resident population is 2,354,400, accounting for 27.06%. The fringe areas 10-15 km away from the city center are also main entry points for these external population across the city. However, this situation that is concurrent with the influx of an external population can also be explained by counting local rural residents and a relocated urban population.

3.1.2 Multiplicity of Management Systems

The nature of the urban fringe area itself is relatively ambiguous, given that it is considered to be neither city in a strict sense, nor an extension of rural society; large areas of rural land are transformed into urban city areas due to changing borders of district and county lines, and some fringe areas have been near-entirely claimed by urbanization after China's rapid urbanization in the 1990s. Thus, villages that were originally in suburbs become villages within a city, resulting in a mixed pattern of urban and rural areas that still adopt urban and rural management systems featuring administration of city-countryside uniformly. Towns located in the urban fringe still witness two sets of management systems at the same time: "city - district - street - neighborhood committee" and "city - district - town - village". Furthermore, dynamic changes also have resulted from the nature of land itself, and the density of land development between the central city and rural areas, with complicated land ownership laws and chaotic land markets and managements playing a factor in this.

3.1.3 Separation of Space

Spatial structures change alongside population migrations due to population

mobility and instability of its development. The spatial form of the urban fringe area also presents both continuous and compact characteristics. Its functions are various and far from controllable, bringing about extensive urbanization situations that include extensive construction as a whole, unclear regional management, unreasonable functional grouping, and unordered development.

3.1.4 Dependence of Industry and Public Services

There is a close relationship between city centers and technology, capital, talent, information, and market, which closely rely on the central city to flourish. Although the infiltration of urban service function is obvious, public service facilities are far from perfect; as an important part of any urban space, they are subject to administrative systems, and are thus incapable of managing population dynamics, economic functions and society at large effectively. Due to a conflict of economic interests and administrative management requirements in urban and suburban areas, it is extremely difficult to rationally allocate construction funds and resources in urban fringe areas. Due to this, fringe-residents are unable to experience the benefits of public services equal to those in city centers purely because they live in informal housing in urban fringe areas.

3.2 Problems regarding Renewal in the Fringe Area

The process of urban renewal amplifies the issue of "incompatibility" in the fringe area, in which a series of "incompatible" social problems and contradictions occur. These include the transfer and deprivation of renewal costs, intense living space differentiations, missing historical and cultural backgrounds caused by large-scale reestablishment, insecure protection of vulnerable groups' rights, and demolition conflict caused by unequal benefit distribution. Such issues put fringe area renewal into the intersection of various social contradictions at its current stage.

There are three types of renewal for existing fringe areas according to the main bodies of research: government-led, developer-led and village collective renewal. In order to develop with inclusive renewal, several basic prerequisites are needed: knowledge of the subject's public nature, willingness for cooperation, and social integration.

1) Government-led renewal: this is usually seen with larger cities that have preexisting powerful government structures, financial means, and administrative capacity that assists the government to bear construction investment costs, such as the renewal and

transformation of “Dawangjing” in Beijing. The advantage of this type of renewal is that residents get higher levels of compensation, there is stronger resource management and integration, powerful renewal controlling, high efficiency, and an overall faster process of transformation. However the government also needs to bear huge investment costs on renewal, which is not universally applicable. Capital operation can be difficult to continue, and violent demolitions may lead to “tartar” dilemmas and floating population problems, which tend to cause later social conflicts. Furthermore, community collective economies develop without protection as a result of government requisition to collective property, reducing the income of community residents.

2) Developer-led renewal: in contrast to government-led renewal, this type of renewal is usually led by experienced and rich developers that take on more investment so that the government is not as responsible. However, the issue with using this non-state financier is that the model tends to cause unfair transfers of renewal costs, and demolition conflicts caused are thus caused by an unfair distribution of interests. Developers act primarily to maximize their profits through renewal projects and may end up competing with villagers for compensation schemes. It can be difficult for both parties to reach a consensus, which most often serves to hurt the aborigines, ignoring their interests and those of the external population. Toll breakdowns are not uncommon, and social contradictions can be intensified in this type of renewal. Observing results of this type of development will show that the developer-led model does little to tackle areas that make development transitions difficult, intensifies spatial differentiation, ignores local history and culture, and lack public space, causing serious rent-seeking issues and follow-up management crisis’. For instance, in the Guangzhou Pazhou area, land auctions have reached RMB 1.5 million / mu ~ 4 million / mu due to commercial development and transfers, while compensation for landless farmers is only at RMB 250,000 / mu; intermediaries or local governments normally obtain the most huge land value-added benefits between costs and the transfer price, while landless peasants are excluded from such benefits, bringing about social conflicts.

3) Residents (village collectives, social organization) spontaneous-led renewal: this type of renewal is based around village collectives, social organizations, and other aboriginal spontaneous organizations, such as the “village collective joint-stock company model” in Shenzhen. This form of renewal is outstanding in improving living environments, treatment of residents, and obtaining their economic interests, making residents extremely enthusiastic. Normally, it is not difficult to reach a consensus between

demolition schemes and compensation measures, meaning that there is less resistance to renewal transformations. Ultimately, this serves to protect the interests of further-out residents, reduces social conflicts, and increases efficiency in renewal. However, the adverse side of this type of renewal is that these spontaneous organizations are insufficient in capital, and thus, incapable of controlling future and forward-looking schemes. This can cause low-quality renewals, low-level development after renewal, problems with accumulation of land utilization efficiency, and issues with non-household resident populations. Therefore, higher costs are needed for transformation to fund renewals with more longevity.

These three models for renewal boast a range of advantages and disadvantages amongst them. Other adverse affects may occur, although some are solved in the process of renewal itself. Firstly, the process of renewal largely ignores the interests of external populations. Secondly, attention to space renewal often ignores follow-up maintenance and management of the community population. Thirdly, short-term focus on immediate problems ignores how renewal projects may be incompatible with future developments. The process of renewal itself doe not solve these issues of incompatibility in fringe area, and the problem of longevity remains. Therefore, the challenges of space transfer and regional accumulation are also caused.

4. Case of Shiqiao Sub-district

4.1 Status Quo of Shiqiao Sub-district

4.1.1 Marginalization of Geographic Position-- Traffic and landscape portal

Shiqiao is located in the north of Xiacheng District, Hangzhou City, and covers an area of 9.73 square kilometers. This area boasts of a unique geographical location: on the



Figure 1: Geographical map of Shiqiao

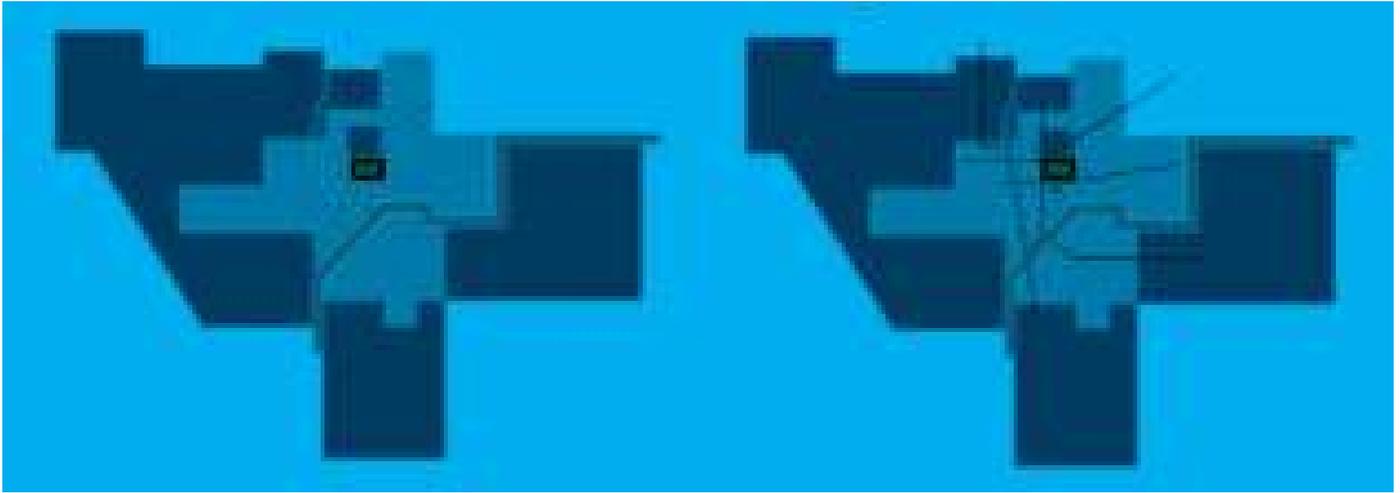


Figure 2: Landscape pattern & Traffic pattern of Shiqiao

one hand, lies in the edge zone of functional conversion between the inner city and outer city of Hangzhou, and in some ways is a typical urban fringe area. On the other hand, it is an important portal for traffic transformation and landscape conversion in Hangzhou. This area “connects” main internal Chinese cities, facing Shanghai and Nanning, and is thus an important traffic transfer portal. Shiqiao sub-district is divided by the old Shanghai-Hangzhou Railway, the Shanghai-Hangzhou high-speed rail, and the Nanjing-Hangzhou high-speed rail. Thus, it is typically known as “Tiebei region”, connecting the inner city and outer city together. This area also has mountains in the north and rivers in the south, serving as an important landscape conversion portal in Hangzhou. In the south of Hangzhou lies the West Lake and Qiantang River, while Banshan in located the north, showcasing a natural

pattern of “water in south and mountains in north”. The Shiqiao Sub-district connects the “South Water” and “North Mountain” by relying on the Shangtang canal and Grand Canal.

4.1.2 Marginalization of population composition - domination of external population and villagers

Shiqiao sub-district is a main gathering place for the external population in Xiacheng District, and is primarily used for residence. This area is affiliated with eight communities - Tiantang Garden, Shiqiao Village, Huafeng Village, Yongfeng Village, Yangjia Village, Huazhong Community, Jingrong Community, and Jingan Community. Villagers live in this area, both in villages and in city structures, consisting of an external population and urban aborigines. The external population is

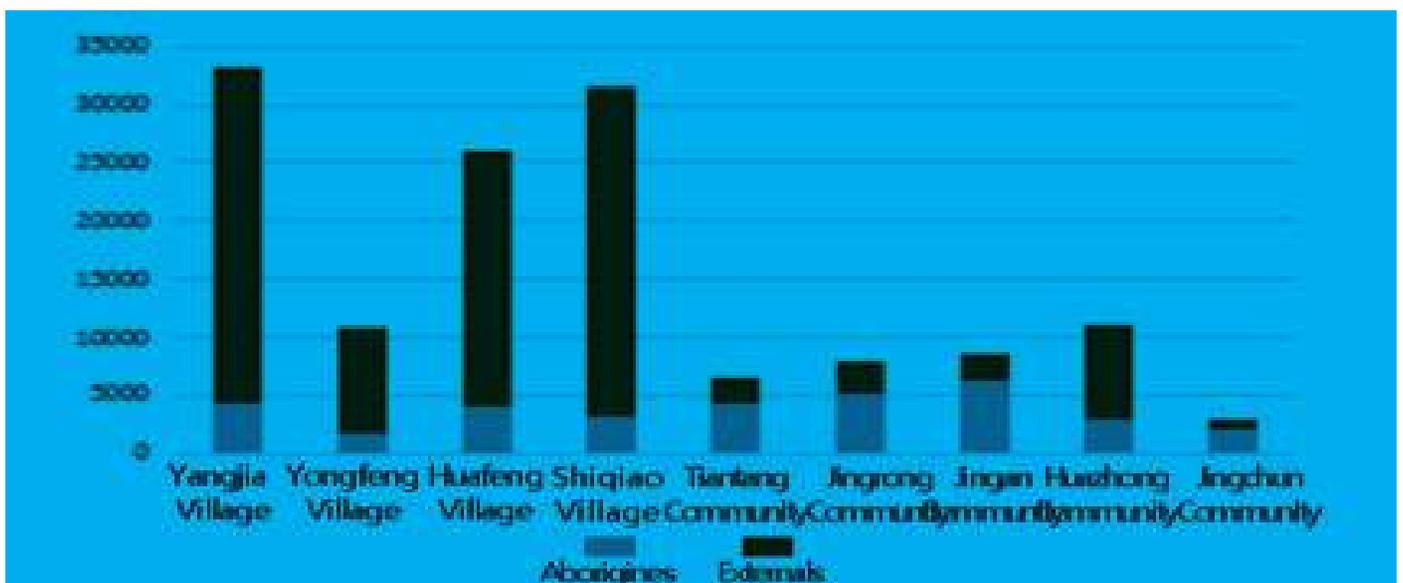


Figure 3: Population Structure in Shiqiao Area

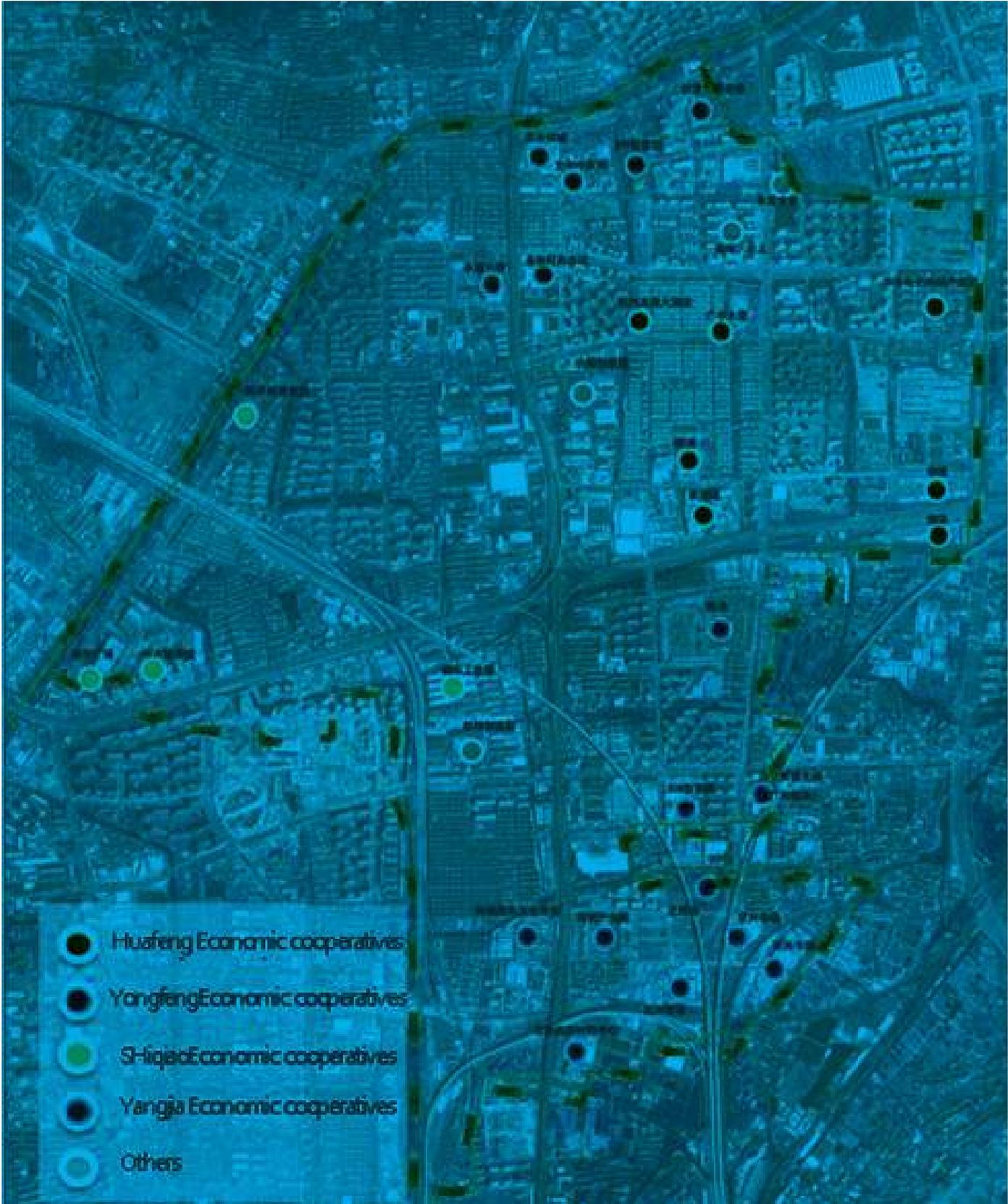


Figure 4: Economic and social organizations distribution in Shiqiao

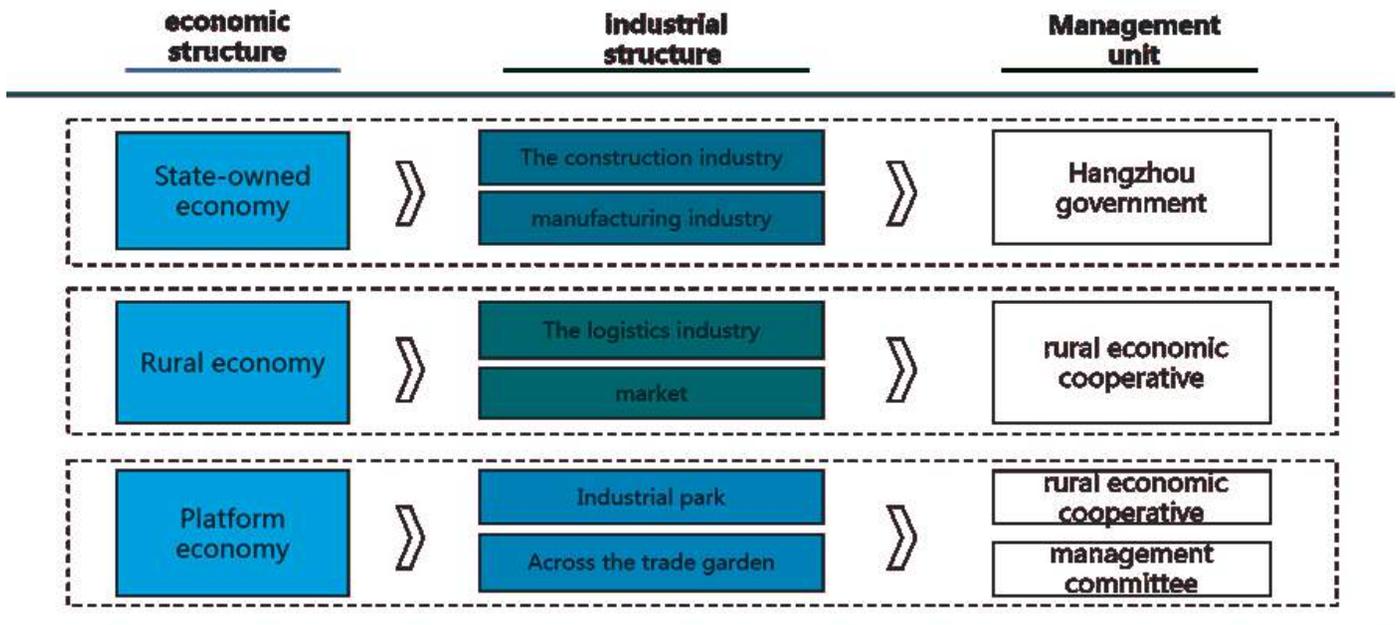


Figure 5: "Ternary" industrial structure model in Shiqiao

much higher than the registered population among whom the number of villagers accounts for over 30%. In the 2017 census, the registered population of this area was 35,671, and among them, the external population accounted for 104,934 people, with the total number of 140,605; The ratio of external population: registered population is thusly 2.9: 1. The registered population in four villages is 12,002, and the external population is 88,854. The ratio of resident population in rural buildings to other residents on streets is 1: 1.9, while the the ratio of floating population to aborigines in the four villages is 6.8: 1.

4.1.3 Marginalization of economic structure - diversified management system and income composition

On one hand, the current economic structure

of Shiqiao Sub-district presents a "ternary" characteristic, a pattern in which the state-owned economy, village economy and platform economy coexist. The state-owned economy mainly consists of construction and manufacturing, the village economy consists of market logistics, while the platform economy includes the village collective economic park and cross-border trade town.

However, on the other hand, the collective economy has a good momentum in Shiqiao - people there are considered rich with average annual family incomes of RMB 300,000; its village collective economic income is considerably higher than that in other areas, and it leads a dominant role in ternary economy. If you compare this with the economic income of Yongfeng village, this observation shows that the collective economic income in Yongfeng village is the

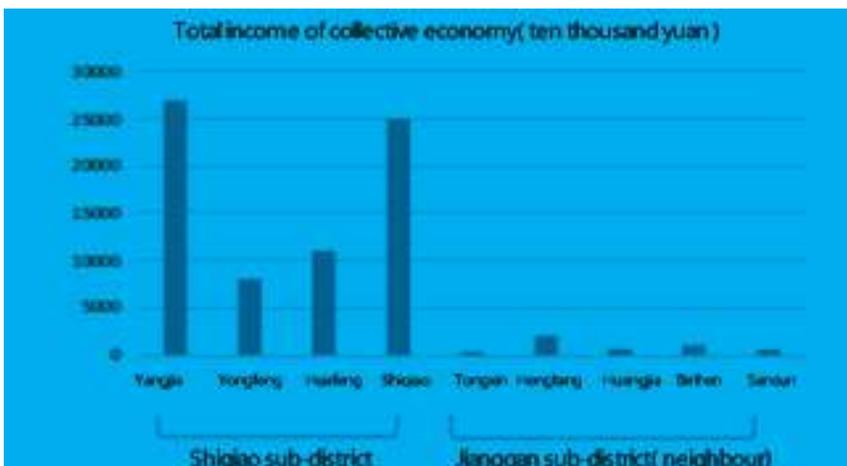


Figure 6: Comparison of collective

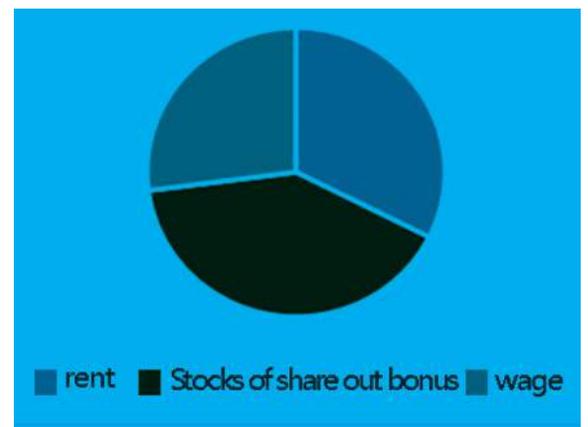


Figure 7: The composition of annual family income in

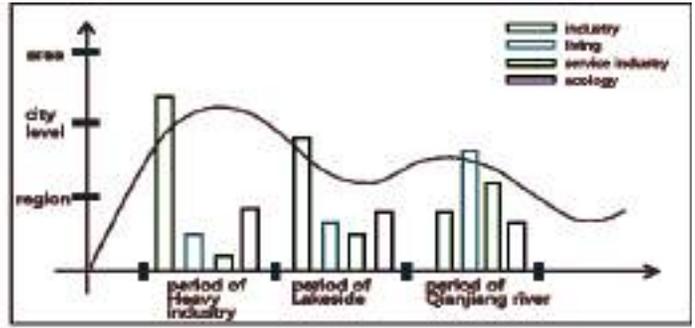
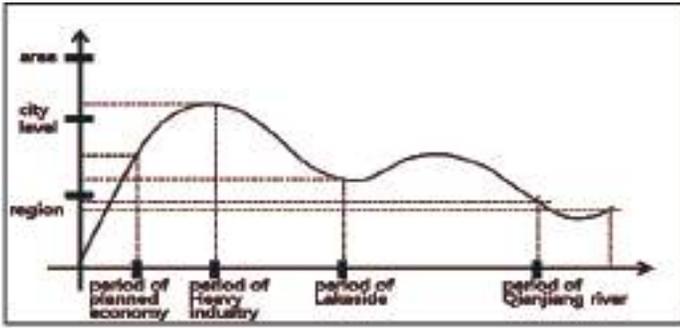


Figure 8: The concept figure of urban status evolution in Shiqiao Sub-district

Figure 9: The concept figure of internal functions evolution in Shiqiao Sub-district

lowest among four villages, while Shiqiao is much higher than the total collective economic income surrounding Jianqiao Street. However, measures of annual family income are mainly composed of rent and collective economic dividends - the income of villagers' autonomous work only accounts for one third of this.

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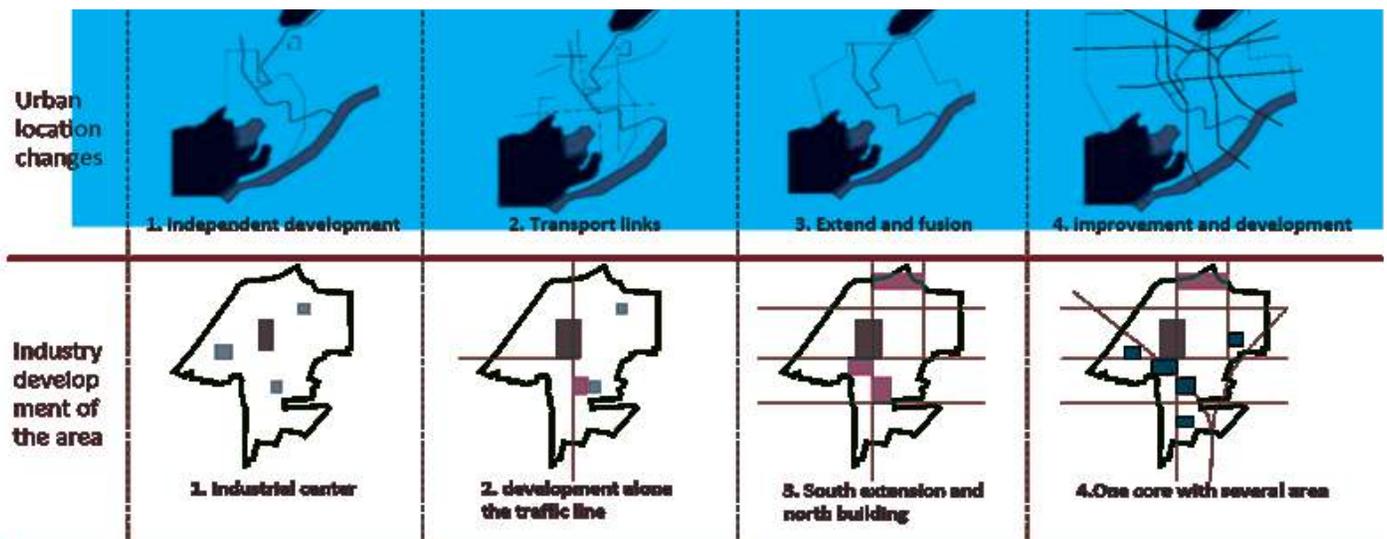


Figure 10: Sketch map for development by stages in Shiqiao Sub-district

Street. However, measures of annual family income are mainly composed of rent and collective economic dividends - the income of villagers' autonomous work only accounts for one third of this.

4.1.4 Marginalization of urban status - diversification, low-end and marginalization

Reflecting on past decades' development, it is evident that Shiqiao experienced an

era of planned economy, industry, Binhua, and Qianjiang from the perspective of city status; its city-status constantly increases area due to the development of several important state-owned enterprises, which led to a transformative period for this region as it left the industrial era and moved to a more planned economy. With government reforms and acts of opening up, Hangzhou ushered into the Binhu era, and major adjustment were made in the direction of urban development and development

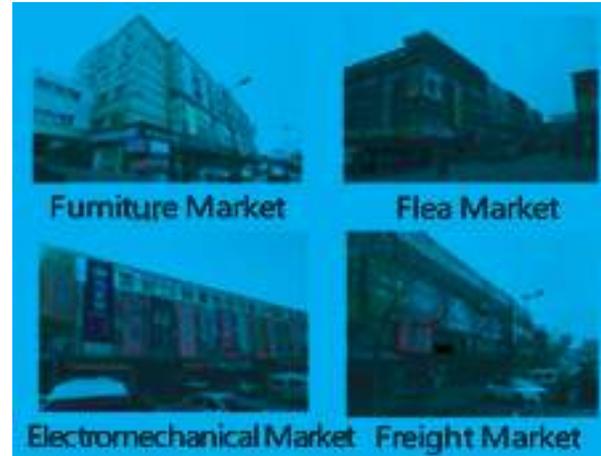
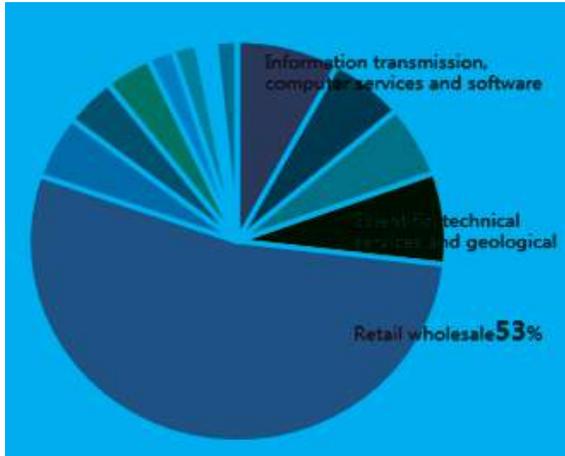


Figure 12: Enterprises in different industries in Shiqiao Sub-district

Figure 13: Pictures of retail market in Shiqiao

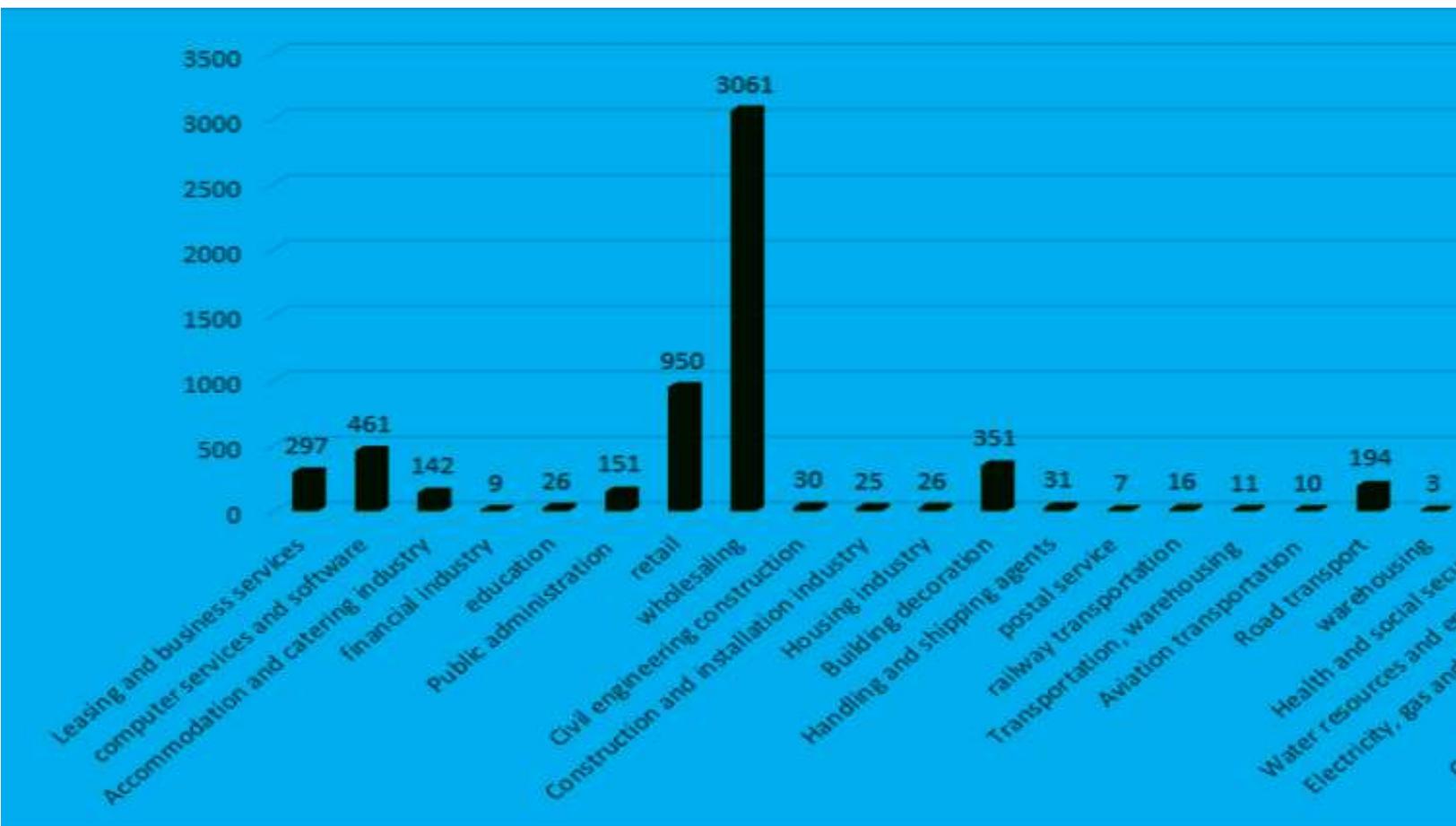


Figure 11: Comparison of income in different industries in Shiqiao Street

strategies. While the industrial function that Shiqiao relied on originally experienced a decadent trend, the status of this area did see a subsequent decline. When Hangzhou entered into the Qianjiang era, further expansions were made in the city, and Shiqiao transformed into the place where villages in the city lived, not worked. Its main industry also transformed into logistics rather than productive capital. In terms of urban functions, with the declining status of industrial functions, Shiqiao has transformed

into a multi-functional common development land, shifting from its prior absolute industrial functions.

There are fluctuations in the Shiqiao-Sub district city status, but on the whole, it has seen declines; its urban functions are in a trend that features diversification, low-end, and marginalization. Located in the fringe area, urban and rural conversions were initially completed in Shiqiao, and thus it is necessary to further carry out these conversions so as

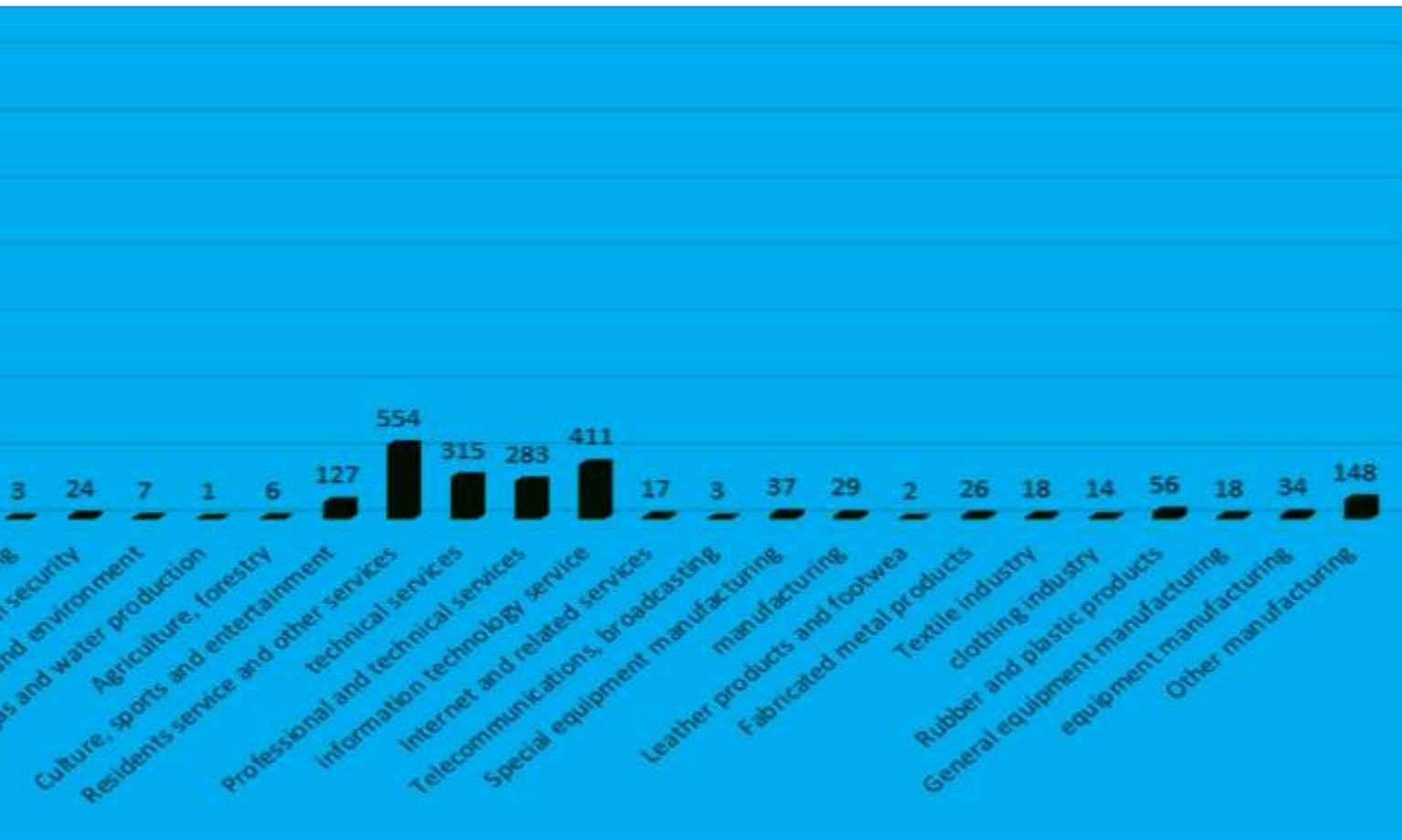




Figure 14: Spatial distribution of industries in Shiqiao

to integrate the area into the wider city.

4.1.5 Industrial marginalization - strong industry dependence and insufficient public services.

The number of enterprises and income figures of existing industries in Shiqiao show that industrial dominance is poor, boasting a certain degree of dependence on other sectors. The retail and wholesale industries are particularly big, making up 53% of the total industry. Amongst this, warehouse-based retail is the primary type of retail industry, although it has a lower value-added number. In terms of the types of enterprise themselves, out of 14,000 total, 8,000 enterprises or so are operated by individuals. Out of the then remaining 6,000 enterprises, only 1,000 have a registered capital of over 5 million.

Shiqiao is home to more markets in scattered distribution, and thus, a scale is not formed. However, there is a general pattern of “one piece and one garden” in this area. Moreover, there are over 10 professional markets that specialize in areas such as home decoration, freights, second-hand goods, hardware, flowers, and electromechanics. The secondary industry mainly refers to the manufacturing sector and textile industry; these tertiaries are in scattered distributions, and there is land where secondary industry is eliminated to give place to tertiary industry.

Furthermore, there is a ternary industrial model - the industry is composed of various factors that face difficulty in management. At present, the economic structure of Shiqiao Sub-district presents the characteristics of “ternary”: the characteristics of a state-owned economy, village economy, and platform economy coexisting exemplify this. The state-owned economy mainly includes construction and manufacturing industries, the village economy includes market logistics, while the platform economy refers to village collective-owned economic parks and cross-trade towns.

4.2. Inclusive Concepts of Shiqiao Area Renewal

The Shiqiao Sub-district is a typical urban fringe area that began its renewal with inclusion in renewal processes, spatial diversity, service objects, and long-term development plans. It placed stress on including the preexisting underlying class and their market culture (city village villagers, resident foreign population) alongside the transformation process, focusing on pluralistic innovations, diversified spaces, and stable economic industry in follow-up development plans.

4.2.1 Core Factor: People-oriented work idea

Renewal ideas in Shiqiao Sub-district are, at their core, people-oriented concepts that serves to lead a determining role regarding ways of renewal, alongside government and residents. Firstly, the renewal work in Hangzhou must guarantee residents’ interests, use monetized placement, and allow residents to purchase commercial housing or original resettlement freely. Resettled residents must be free to purchase urban commercial housing regardless of its region, quantity, size, and so on. Secondly, this free choice of commercial housing should act to ease structural contradictions, stimulate purchasing needs, and facilitate de-stocking. Thirdly, after free selection of commercial housing occurs, reposition by original residents of villages in the city must be realized, thus helping them become urban residents in the end.

It is necessary to protect the interests of the external resident population living in villages within the city, which may cause fierce conflicts with local villagers. During most renewal projects, a large number of villagers tend to relocate, while talent apartments and low-rent apartments are established to establish stronger relationships between the government and any floating populations. They are provided with newly developed forms of community services and public facilities services. If any act of renewal serves to weaken “household registration” and strengthen the “residents” and “living” concepts, it may also reduce the psychological imbalance of the floating population, encouraging them to integrate into city life by enhancing their sense of belonging. Meanwhile, while there are clear differences between the floating population and the local residents, projects should avoid discrimination that may cause social instability or social security risks.

Finally, plans of renewal must be gradually transformed. Customized transformation plans developed in stages not only give local residents sufficient time to plan their lives, but also serve to allow a smoother transition of overall. Meanwhile, the government should be allowed some buffer time to help consider other aspects they may occur as villages in the city transform, ensuring that the process of urbanization is a smooth one with reduced conflicts of interest. Another benefit of gradual transformation is that it better understands and tackles disputes in demolition caused by improper treatment - persuasion of the local population and education regarding the renewal is more effective when there is sufficient time for it to take hold.

4.2.2 Spatial allocation: Inclusion of Spatial Diversity

The original space allocated for the Shiqiao Sub-district is in an urban and rural mixed state, while the quality of environmental is moderate. The area surrounding in north base is generally high, and the middle is low; there is only one road separating new commercial housing and rural buildings, which causes a disharmonious landscape style. The existing traditional market (lighting square, home port city, etc.) is nearby a viaduct and fast roads with a large volume, demonstrating a certain landmark. Rural buildings (which have four layers at most) in the Huafeng village have been built in an unbroken line with a similar volume and single landscape. There are also many differences between industrial plants with large quantities in Hangzhou turbine and C&U Group and their surrounding buildings, and the core landscape resources available in this area are located three north-south water systems away. The south base is divided into several small pieces by fast roads, a viaduct, and the high-speed rail, while industrial spaces and living spaces are mixed. Old industrial park buildings are retained in Jingwei Industrial Park and the Xinhua Art District, and the overall landscape in this park is coordinated. The freight market in Shida Road takes up a larger area, and the landscape is significantly different from its surroundings; most of the buildings in Yangjiaqin Garden are rural structures in an unbroken line, which are not harmonious with the newly established multi-story residential architectural landscape in the northeast corner.

The planned renewal schemes must take placement, ecological landscape, public services, and preexisting cultures into consideration. They should be constructed in lands with optimal locations (away from subway stations, optimal ecological environments, and further away from the viaduct) on the basis of the existing land placement. Ecologically, they should attempt to build a much-needed network of natural ecosystems, forming a network of slow-line systems by combining them with elevated high-speed rail green space and park green space. This will assist in creating a spatial landscape that integrates blue and green, maximizing ecological benefits by utilizing the 14 water systems at present. Culturally, it is necessary to build a cultural heritage zone alongside the canal, preserving its historical and cultural values as well as its ecological value. In terms of infrastructure, education facilities should be planned according to new supporting provisions while meeting population support requirements. They should be formed as a multi-faceted and multi-level planning layout.

4.2.3 Industrial configuration: inclusive development in the future

In order to realize the independence of industry and economic development, we should work to adjust industrial management structures and promote industrial upgrading with diversified management of economy and industry, as well as strong original dependence. As for the industrial selection, it can make selections in resource derivation, external opportunities, external trends, and

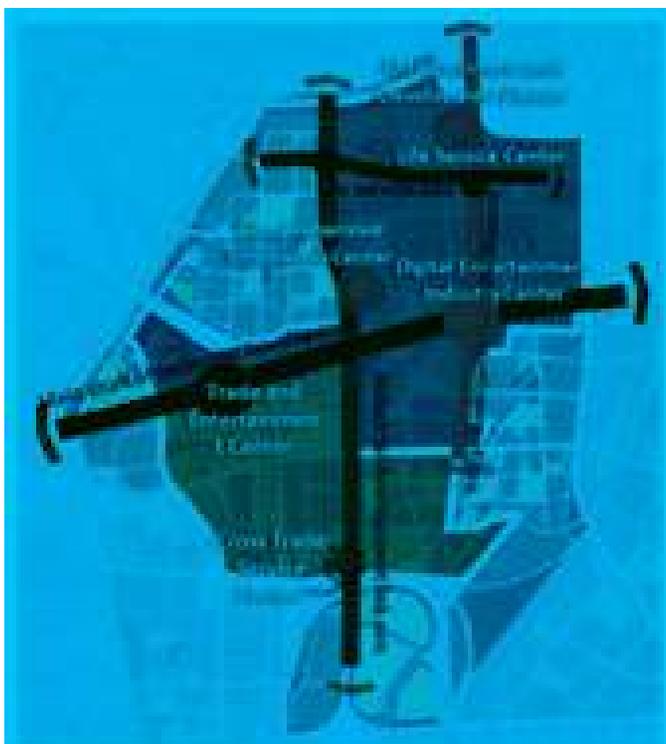


Figure 16: Industrial spatial structure planning in Shiqiao



Figure 17: Industrial spatial layout planning

benchmarking demonstrations, making analysis to help optimization the upgrade of existing industries, existing resources derivation, and introduction of emerging industries. This will serve to select leading industries, classify them, and guide the planning of industry itself, reshaping industrial systems in the Shiqiao Sub-district.

Industrial development should take the interests of recently employed people into consideration - residents' future incomes in area development must be thought about. Development should thus adopt methods of gradual selling or optimization methods related to areas of industry like wholesale and retail, transportation and warehousing, and manufacturing as pillar, which feature in original poor basis and large quantities. Over-dependence on manpower, land, and transportation costs serves to cause many deep-seated contradictions about how best to utilize the land. The wholesale and retail industry refers the pillar industry, which presently brings about extensive economic income and provides jobs for the locally external population. Therefore, it will be retained in recent and gradual selling, or an optimization method will be adopted in the future. As for the manufacturing industry, it more widely uses advanced technologies. For instance, the Hangzhou Turbine industry has leading abilities in scientific and technological fields, such as R&D. This accounts for 70% of the national steam turbine industry locally; renewal projects can work to combine such scientific research with the technical service industry in Shiqiao Sub-district.

Emerging industries can be introduced into the region by combining their construction with those of venues for the 2022 Hangzhou Asian Games - gaming venues will be established in the Shiqiao Sub-district, so progress shall be made in the gaming industry in forthcoming years. Furthermore, it will be transformed into a digital entertainment industry in the future by combining the existing information

service industry from the perspective of its own development so as to form mutually beneficial promotional tactics and support of wider industries. The gaming industry within the digital entertainment industry is similar to other types of game research and developments - both serve to promote each other in the industry. The gaming industry is a foundation for development of other digital entertainment industries, while the development of the animation industry tends to facilitate that of derivative platform, such as entertainment experience, theme derivatives, and so on.

A summary and analysis of the factors above shows that industrial development strategies and systems of planning in the Shiqiao Sub-district are as follows: an industrial development pattern of "three-intelligence and two-high" is formed around principles of industrial transfer and interaction, complementary functions, service cooperation and reciprocity, co-ordination, and win-win; the cross-border trade industry of the original platform economy is retained while an upgrade of intelligent logistics is carried out; the original state-owned intelligent manufacturing industry is transformed into one of functional research and development, improving the living environment, and providing both villagers and the mobile population with modern jobs by combining original information services, introducing in the opportunistic gaming industry, and supporting the development of high quality life services and high-level production services.

5. Conclusions

In a word, renewal schemes will be proposed with clearer aims and targets once the root causes of the urban fringe are clearly realized in the context of inclusion. The urban fringe is a reflection and reaction to marginalization, ambiguity, and incompatibility from complex staff compositions and management systems when spatial separation occurs,

Recent (to 2020)	Forward (to 2030)
<p>Focuses on basic industries and derivative-based industries, and appropriately introduce new industries</p> <p>2.5 production: machinery manufacturing research and development</p> <p>Tertiary industry: trade retail, cross-border electronic trade, wholesale and retail trade</p> <p>Sports and entertainment</p>	<p>Enhancement of the derivative industry, drop out of low-end wholesale and retail industry, and prosperity of emerging industries</p> <p>2.5 production: high - tech research and development</p> <p>Tertiary industry: cross-border commerce, information services, health care, modern tourism, gaming, digital entertainment, cultural industries, and modern logistics</p>

Table 2 Leading Industry Development

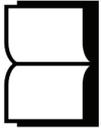
and the creation of industry and public service systems with strong dependency. While existing urban renewal methods have partially solved some of its original problems, we are still far from solutions regarding the non-resident resident population, maintenance of the community population, follow-up management, future urban space development, and retaining the livelihood of residents.

Regarding renewal projects in the Shiqiao Sub-district from the perspective of inclusion, people-oriented work is a central idea to any project of inclusive renewal, giving priority to the residents' interests, villagers, and external population. This helps solve the issue of incompatibility issue during renewal. It is necessary to tackle problems such as the diversity of space, livelihood of resident populations, and future economic and industrial development in the area post-renewal. Most beneficial to the region would be to use perspectives of spatial and industrial configuration. Meanwhile, we need to connect social elements and resources together, and strengthen the cohesion of the area so as to create an urban fringe featuring in social diversity, cultural inclusion, and class inclusion.

Urban renewal of the urban fringe area will not happen overnight, but rather, is a long process that should not be rushed. Thus, there must be an objective understanding of its complexity. It is a long-needed change for modes of in urban development and overall urban-rural managements to promote inclusivity within urban renewal with heavy responsibilities.

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Smart World: Reengineering the Planning Process through A Global Planning Code

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Synopsis:

From a big picture vantage point, reengineering the planning process through a global planning code is a smart initiative that will revolutionize planning practice for the whole world. Extraction of the vital elements for such a Code from the UN Habitat Conference inputs is the first step.

1. Introduction: Simplicity for Sustainability

This is a think piece and, at the same time, an advocacy paper. As a concrete proposition, it would require a more in-depth and wider breadth of study including broad consultations with experts and stakeholders. But as an advocacy, this paper underlines the need for one, unified, and global planning code and it shall be proven all throughout this paper. It is a pitch on the whole rationale for why a Global Planning Code is urgently and vitally required. The imperative rests on the need for SUSTAINABILITY.

The world today is a highly complex one where everything seems totally complicated – even relationships are. Architect Alejandro Aravena said “the more complex the problem, the greater the need for the solutions to be simple.” Sustainability would not have been an issue or a challenge had resources been infinite but all resources are finite.

This is why inefficiency and redundancy are considered unsustainable practices. They waste time and vital human and material resources that the world, especially at this point of its billions of years of existence, can very well do without. Constantly “reinventing the wheel” is inefficient, redundant, and not smart.

One basic, glaring and vital example to point out is global food waste. Global food loss and waste amount to as much as one-third to one-half of all food produced. Wastage occurs at all stages of the food chain. The processes from production to consumption are replete with inefficiencies, redundancies and unsustainability, on the whole.

Another urban challenge is the amount of garbage humans generate. It is definitely rising exponentially. By 2100, it is projected that the growing urban population of the world will produce three times the garbage produced today. This level of wastage has tremendous consequences – physical and fiscal – for all the cities of the world. [1]

To view unsustainability clearly, the flipside – sustainability – must be defined. In the 1987 Brundtland Report entitled “Our Common Future,” the concept of sustainable development had been defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It entails a holistic approach where “limits” or “carrying capacity” are seriously taken into account. Likewise, sustainability is regarded as humanity’s avowed goal of homeostasis or human-ecosystem equilibrium also known as balance. There are many visible examples of disequilibrium, imbalances and inequalities that currently characterize world systems.

Planning as a process should generate hope for the planet. Per se, it is a positive and proactive initiative. However, even as a process, Planning has seeming inefficiencies, riddled with redundancies, paradoxically. In a highly proclaimed SMART World, there definitely exists ways and means to address this. And the answers may not really lie from high-level calculus, derivatives and algorithms but from elementary math lessons starting with sets and subsets.

2. Premises and Praxis

From a big picture vantage point, reengineering the planning process through a global planning code is a smart initiative that will revolutionize planning practice for the whole world and definitely for the good of the planet. This would especially benefit developing countries that spend so much more in order to plan, if they can afford the process at all. With lack of capability, expertise needs to be sourced externally, and this definitely costs more.

In essence, current land use planning practice is a constant reinvention of the wheel. Planning, itself, is an iterative process. However, there are parts of the process that could actually be held constant given certain parameters.

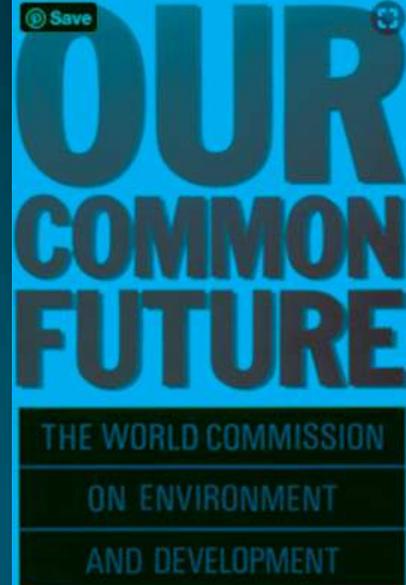
In this smart ICT age where almost every part of the planet is mapped, a question was posed in the Science Focus magazine as to whether the whole of planet Earth had already been mapped. The answer was a qualified “yes” – though not to a uniform level of detail. Mick Ashworth, cartographer and consultant editor of The Times Atlas of the World stated that “most of the Earth has been mapped down to a scale of 1:500,000 (1cm: 5 km.), though some polar regions and parts of Central and South America remain to be covered even to this level of scale – and to some extent this is good news. The maps for some areas, especially in Africa, are also many decades old, and thus pretty unreliable.” [2] But still, the world is mapped. The latest edition of the Atlas contains over 200,000 place names. This means that even small villages are included in the index and on the maps. It is a benchmark of cartographic excellence, trusted by governments, media and international organizations as reference source.

Given this, a global planning code can look at the totality of the Earth where planners can classify the whole world into ridge-to-reef typologies. Through the process of deduction or deductive reasoning – a basic form of valid reasoning that begins with a general statement, or hypothesis, and examines the possibilities to reach a specific, logical conclusion – planners can then match the appropriate spatial strategies for the biggest region or the smallest community.



"The more complex the problems, the greater the need for the solutions to be simple."

Architect Alejandro Aravena



Deduction follows the scientific method to test hypotheses and theories. [3]

Typologies constitute roughly half of the process. They can be a powerful tool in a qualitative study and can be most useful when systematically applied as shared techniques. This giga or terra or perhaps even a more mammoth (term)-scale planning process will definitely entail discounting political/country boundaries, as an exercise. The output will be ridge-to-reef typologies.

The International Union for the Conservation of Nature (IUCN), whose vision is "a just world that values and conserves nature," is impelled by its mission to "influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable." Known as the "voice of nature" in the world stage and established in 1948, IUCN consists of both government and civil society organizations and provides public, private and non-governmental organizations with the knowledge and tools that enable human progress, economic development and nature conservation to take place together. [4] IUCN adopts the ridge-to-reef (R2R) planning process - tracing water resources from the watersheds to the world's oceans.

After having classified land from the summit to the seas, codes can then be formulated. The whole world is a SET. The land classifications are the SUBSETS. For each subset, codes can be formulated; thresholds can be comprehensively established.

An IF-THEN process for every typology can be prepared with corresponding implementing regulations drawn from the framework. For instance, "IF ridge, THEN the following considerations and restrictions;" "IF rivers, THEN these regulations;" "IF coast, THEN the following DOs and DON'Ts." This

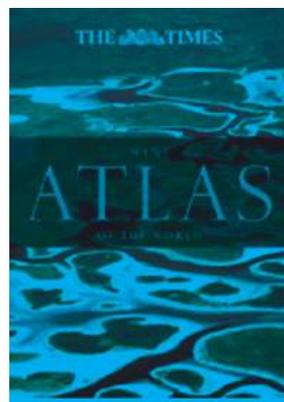
constitutes half of the total process. Broad strokes, at the onset, could be considered a huge help already in streamlining the process. Through the maturation of this very process, more details can be articulated. Dialogue can ensue thereby giving more clarity and fairness to the resultant code.

Planning for the remaining unique features of an area constitutes the other half; roughly half; probably more, probably less, depending on the area. But in the end, this had shortened the process to a proportion that is smart, more efficient, less redundant. By doing deductive reasoning, planning can save "half" of the total effort. This constitutes REENGINEERING by streamlining the process. This would then revolutionize planning practice. Focus can then be directed towards implementation, the twin and waterloo of Planning. Mother Earth will be all the better for it.

3. Current Planning Process

3.1 Inefficiency and Redundancy

In doing Planning in the Philippines, I am a witness to the inefficiency all Planners face. Each local government unit is mandated by law to undertake a land use planning process from the first one when the law was initially



Sidebar: The Imperatives

In a dynamically evolving, changing world, there are certain imperatives that cannot be overemphasized. These include:

- (1) avoiding wastes and inefficiencies; this applies to governance, policy formulation and implementation, also personal practices);
- (2) speed in delivery (there is really no more time to spare);
- (3) intentionality and focus;
- (4) balance in the face of tremendous inequality; there is no balance when the world's equilibrium tilts towards a one out of seven billion world population living in informal settlements – wallowing in abject poverty; living in spaces unfit for human habitation;
- (5) legitimacy (formalism in the face of high informality – Kibera, Kenya – informal settlements are not even in the map and therefore are not legitimate and virtually non-existent, even when they are “in-your-face;” and
- (6) the imperative of making honest judgment calls and taking full responsibility towards survival and self-preservation.

passed in the 90s, and then every three years succeeding it. Fulfilling the intent and the letter of the law is very low. It is also rendered meaningless as it is merely sheer compliance.

The country is yet to enact a National Land Use Law after several attempts of the Philippine legislature to pass one – clearly irreconcilable given the conflicting vested interests of its members. Having done Planning at myriad levels including level of the city or the local government unit, it is evident that with a larger platform – such as the Provincial Development and Physical Framework Plan, several local units would definitely benefit from not having to reproduce background and baseline information that could be projected from the bigger and higher vantage point of the larger scale planning area – the province.

Most provinces have an average of thirty (30) to forty (40) municipalities, cities or local government units within its territorial and administrative jurisdiction. Magnifying this into the national level where there are more than one thousand four hundred (1,400+) local government units for the thirty million (30,000,000) hectares of the country, this would translate into efficiency for the process, avoid superfluity and focusing efforts only onto the truly essential aspects to be planned.

Indeed, with half the effort emanating from an already typified baseline referenced from the typology, a standard LOOK for all places in the world would arise. It is not very ideal to look like every other place. The other half of the effort, the UNIQUE portion, would receive greater attention, even at the level of the details. This consists of the more important and valued parts. This is the core of the being of a place. This spells one's IDENTITY.

As a member of the American Planning Association for about a decade now and reading about the Planning practices in different countries, and in addition, exposure to various planning narratives from international conferences attended, I have observed that the same Philippine planning experience holds true for most other developing countries, as well. In contrast, developed countries have simplified their planning processes and thereby ensured that it gets done. With most other developing countries, there is lack of technical and planning capability. There is that need for constant capability-building programs in order to formulate a Plan. Upon quick online survey, data on the extent of countries of the world that are unable to do proper Planning, is not available. [This is one study possibly for ISOCARP to undertake to give value to city and regional planning the world over.]



This reality has become apparent through the whole process of formulating the New Urban Agenda post UN Habitat III. Local government units in developing nations continue to experience knowledge gaps in dealing with spatial dynamics and urban development. To be specific, this ineptitude is manifest in addressing the urban challenge of informal-settlement upgrading and likewise around geospatial analysis infrastructure. Coupled with outdated planning education and instruments, these local government units in developing countries simply are unable to address the challenges confronting them. [5]

Rethinking and retooling are requisites for urban planners of the future. They must act creatively — and differently - change not only in skills, attitudes and also in mindsets. This is the most critical aspect of urban transformation. Planners will need to acknowledge and engage with the realities of cities of the developing world, the Global South. Issues of urban informality, outdated legal frameworks, the negative effects of climate change and increasing land-based urban conflicts — planners will need to address all of these urban dynamics. Yet in many cities today, planners tend to wish away the existence of urban informality, poverty and political systems that give no room for professional practice. [6]

With such a tall order, a new way of delivering the Planning service needs to be introduced and widely adopted. This new way of Planning and a Global Planning Code is the needed power to energize the process.

4. A Vision for a Reengineered Planning Process through a Global Planning Code

For this think piece cum advocacy paper, it is necessary to establish and define what a code is. A CODE, from the purview of this paper is a set of conventions governing a particular sphere; it is also a set of rules and standards adhered to by a society/economy/polity.

With ICT providing platforms for smart actions, the question can a global code with more teeth be enacted, begs to be asked. I have often wondered about the magnitude and scale of the planning inefficiency including implementation failures magnified globally. In reverse, with a Global Planning Code, how much inefficiency can be averted with the benefits accruing to Mother Earth?

There are simple examples on how this can be done. Models include the Ten Commandments where serious Christians shake in fear to violate. The Code of Hammurabi, where until now, the applicability of the underlying principles has not changed - an eye for an eye, a tooth for a tooth.

There are building codes adopted by most countries; some need updating though. In the Code of Hammurabi, buildings and parapets are included in the program.

However, the call for a simple code that could really apply to all planned urbanization processes the world over is hereby issued and advocated. For, not to do so is a total disservice to the population and intelligence or “smartness” of this world.

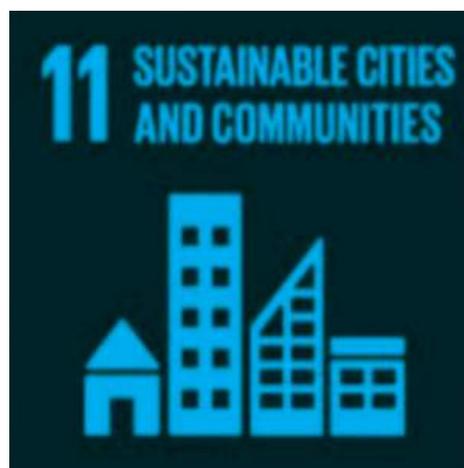
There are ostensible formulas and standards that can be extended to build this Global Planning Code. One such principle is the Pareto Rule where the 80% of the commonalities outlined above is characterized under the various typologies and where 20% encompasses the uniqueness of an area.

This means that rather than reinventing the wheel each time the planning process is undertaken, efforts are minimized and are only targeted towards the 20% of the uniqueness or differences of an area or locality - the ridge, the river, or the reef, and so on.

The 20% spells the identity for a Planning area. In the deliberation processes, comparisons and contrasts are resorted to as part of the deduction procedure, to be specific, in Focus Group Discussions (FGDs), or in charrettes. There are, of course, exceptions to the rule. And this is where the caveat essentially lies.

5. The Proposed Code Virtually Applied on UN Habitat III Goal

To reiterate and to reemphasize the point, with ICT providing platforms for smart actions, the question can a global code with more teeth be enacted, begs to be asked. And indeed, for this effort projected onto the world stage, only global institutions can provide some teeth. The United Nations, specifically the UN Habitat, can work on this code, a possible offshoot of the New Urban Agenda. These types of institutions are already in place. Though power over countries and organizations is not really a UN



edge, it does command moral suasion.

As a planning policy area, SETTLEMENTS are a huge, global, urban challenge, most specifically informal settlements. Focusing on SETTLEMENTS is a case in point here, the core mission of UN Habitat conferences, to positively respond to the glaring and manifest data that one-seventh of the world population visibly lives in slums unfit for human habitation, wallowing in abject poverty and blight.

This part draws on my participation in (1) the United Nations Habitat III in Quito, Ecuador in October 2016, (2) at the Preparatory Committee for UN Habitat III in Surabaya, Indonesia in July of 2016, and (3) the Urban Thinkers Campus in Geneva, Switzerland in October 2015.

UN Habitat world conferences are held every twenty years to set world policies on housing and urban development, and specifically for UN Habitat III, an action-oriented document that sets global standards of achievement in sustainable urban development. The first UN Habitat took place in 1976 in Vancouver, Canada. The second one happened in 1996 in Istanbul, Turkey. And the third and most recent one was conducted in Quito in 2016.

Thirty years post-UN Habitat Conferences, and still poor and blighted urban colonies of informal settler families the world over abound with seemingly no sustainable solution in sight. Various strategies had been tried, tested, experimented, piloted, implemented and still one out of seven billion people lives in squalor, unfit for human habitation. This sets off the alarm that actions are either wanting or are truly proceeding in the wrong direction.

Though the magnitude of the challenge is huge, it is not insurmountable. Governments allocate funding annually in their legislative appropriation. However, inefficiency in funding use translates to slums and homelessness. Cities alliances have been formed to share best practices. However, more and strategic collaboration is needed.

Housing is among the 17 priorities included in the Sustainable Development Goals for the whole world to work for. And rightfully so. As Nobel Prize recipient and two-term President of Costa Rica, Oscar Arias Sanchez, on his administration's housing centerpiece platform, "we are convinced that a land free of slums will be a land free from hatred."

In the General Assembly of Partners for UN Habitat III conference in Geneva, a whole process was conducted through the Urban Thinkers Campus to come up with a groupthink to define the future we want and the "City We Need." In this process, where the author participated in, the focus for action is the CITY.

Likewise for the Preparatory Committee 3 for UN Habitat III held in Surabaya, Indonesia. The focus was the best practice model exemplified by the local actions of the City Government of Indonesia's second city, Surabaya. Its two-term Mayor, Tri Rismaharini, also and fondly called "Ibu Risma" or Mother Risma, is nurturing her constituents into a stable housing program that is already addressing and minimizing the housing challenge. Surabaya accomplishes this by providing subsidized public rental units that comprehensively responds to the whole range of requirements of urban living and livelihood. The author had seen proof of this firsthand and it is captured in the images below.

Finally, in the most recent culmination, UN Habitat III in Quito, Ecuador, the strong stance and steady voices emanated from the league of World Mayors. The call is to recognize that the housing challenge can best be addressed by local governments and more effectively at that. Clearly, local and regional authorities have a critical role to play. The 400+ strong Mayor-participants in the conference fought for recognition where local and regional governments are not merely implementors but partners, worthy of a "seat on the table."

To apply the Global Planning Code, collaborators must first sit down to define





the typology to which a SETTLEMENTS CODE can be applied. Slope is one important determinant of settlements typology and location. Compactness and managed density are ideal goals. Infilling on brownfields is a spatial and structural strategy that can match the huge land size requirement for housing informal settler families. Extraction of the vital elements for such a Code from the UN Habitat Conference inputs is the first step.

than half of humankind call home, and one-seventh sadly call homelessness.

Transforming how Planning is done will bring back real HOPE to our increasingly hapless world. It is every Planner's responsibility.

6. Conclusion: Of Good Stewardship and Moral Responsibility

Reengineering the planning process is an innovation that is crucial to Earth's sustainability. Its value cannot be overemphasized. It has the massive potential to truly be a game changer. It is, therefore, a cudgel that ISOCARP as an organization with the mandate of honest-to-goodness Planning for the world can (and should) take on. ISOCARP can lead the way.

It is empowering, first to the developing countries that need Planning the most, but then eventually redounding the benefits to developed countries as well, as the general advantages will accrue to the whole planet. This therefore has profound implications for the whole of humankind and all of creation.

A beacon call that Pope Francis, in his latest environmental encyclical, *Laudato Si*, has issued, he called this "Care for our Common Home." In the end, it is certainly and categorically the application of the major lesson on good stewardship.

For the Settlements policy area, a simplified but unified global code will definitely make real the vision to start making a dent into debilitating and ever-growing challenges in this dynamically-urbanizing world now more

Endnotes

- [1] <http://www.worldbank.org/en/news/feature/2013/10/30/global-waste-on-pace-to-triple>
- [2] <http://www.sciencefocus.com/qa/has-all-earth-been-mapped>.
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Rural Land Use Management & Regulatory Guidelines for South Africa

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Municipal Planning and specifically Spatial Planning and Land Use Management (SPLUM) in rural areas has largely been ineffective. Development of rural areas has been impeded by inadequate technical and governance capabilities of municipalities in dealing with the physical complexities and multiple administrative systems inherited from the past governance system. The failure to include rural areas into formal municipal planning processes/systems has created gaps which manifest themselves in poor economic development, inadequate infrastructure provision, slow land reform, declining agricultural production and uncomplimentary land uses.

Aggravating this is the tangled division of powers and functions between various spheres of government, compounded by the jurisdictional contestations in rural areas under traditional leadership. The outcome of the exclusion of rural areas from municipal planning processes has culminated in the formation of settlements that are dysfunctional — physical enclaves of under development

and fragmentation. Moreover, rural communities face specific and contextual challenges that differ from place to place, over time and by scale. Apart from inadequate municipal planning coverage and a paucity of infrastructure and services, rural areas face challenges arising out of the structure of national and sub-national economies that is leading to decline (or slow growth) of rural value addition, diminishing economic opportunities and consequently out-migration of the productive population groups to urban areas and major metros. As an integral part of the methodology, KENA Consult have undertaken relatively extensive stakeholder engagements to canvass input from a cross-section of stakeholders. In this regard, the stakeholder engagements canvassed ideas and opinions about rural areas, their land uses and their practices. These engagements were directed specifically at information custodians especially from the various government, municipalities, and quasi-governmental institutions. Some of the yielded results were that

eight of the nine provincial admins have traditional leaders and require land use management practices that incorporate customary practices. Points of consideration raised to incorporate traditional land uses. Furthermore, there were concerns on how the land would be surveyed since the majority of the country is rural. Some of the issues pertained to land appropriation since most of the rural areas are situated on state land. In addition, the work has generally been received well since no measure of the sort has been incepted before. Henceforth, it is critical that municipalities adopt their SDFs and Land Use Schemes in order to fully implement these guidelines.

1. Introduction to the Guidelines

Rural Land Use Management & Regulatory Guidelines for rural areas, in part, refers to a process of developing a framework that seeks to integrate land uses in rural areas to formal municipal planning processes. In addition, the linkages between the guidelines and mainstream local level planning tools and instruments such as integrated development plans (IDPs), land use schemes (LUSs) and spatial development frameworks (SDFs) are articulated.

1.1 Synopsis of Contemporary Rural Land Use and Management Issues in South Africa

Municipal Planning and specifically Spatial Planning and Land Use Management (SPLUM) in rural areas has largely been ineffective. Development of rural areas has been impeded by inadequate technical and governance capabilities of municipalities in dealing with the physical complexities and multiple administrative systems inherited from the past. The failure to include rural areas into formal municipal planning processes has created gaps which manifest themselves in poor infrastructure provision, slow land reform, declining agricultural production and uncomplimentary land uses.

Overall, municipalities in South Africa face multiple and complex challenges that relate to:

- Inadequate rural land use management policies, plans and interventions
- Fragmented and extended rural municipal geographies that present service and coverage delivery difficulties, and
- Inadequate financial resources and budgeting to enable coverage of rural areas.

It is against this backdrop that incentivising rural development is a prime objective of South Africa's development policies. It is recognised that the social and economic transformation of South Africa would be incomplete without the implementation of fundamental interventions to address the challenges faced daily by the majority of people in rural areas. A key development priority for South Africa is therefore the promotion of social and economic rights to enhance social inclusion, reduce poverty and ensure the protection of the environment. A pivotal development endeavour of the country is to bring rural areas into the development mainstream by focusing on innovations in respect of land regulation, land tenure systems, land reforms and land governance systems as key resources in rural areas and markets.

The Spatial Planning and Land Use Management Act 16 of 2013 (SPLUMA) requires the adoption of a single and inclusive Land Use Scheme (LUS) that will operate in a municipal administration area. The land use schemes, spatial policies and frameworks must cover both urban and rural areas, taking into specific account the historical, capacity and governance challenges that have constrained integration of rural areas into formal planning processes. The need for a guideline document relating to rural land use and management as one practical intervention to assist with the promotion of inclusive, sustainable and integrated rural-urban development landscapes in South Africa cannot be over-emphasised. Challenges created through various historical processes are recognised as part of the underlying structural problems to be addressed through the implementation of these Guidelines.

1.2 Objectives of the Guidelines

The Rural Land Use Guidelines are a strategic instrument to help in the achievement of various policy objectives as set out by the National Development Plan (NDP), Comprehensive Rural Development Program (CRDP) and Spatial Planning and Land Use Management Act (SPLUMA).

The RLUMRGs are envisaged to provide the necessary guidance in the definition of rural areas, framing of desired rural spatial planning outcomes and facilitate interaction between the various spheres of government

towards achieving such desired outcomes. The Guidelines provide for a rural specific approach to spatial planning and land use management.

The principal aim of the Guidelines is to provide a framework for integrating land use in rural areas into formal municipal planning processes in a way that allows adaptation to the diversities of different rural contexts of South Africa. Figure 1 enumerates the objectives of the Guidelines.

2. Towards a definition of Rural Areas

The transformation of local government after apartheid in 1994, led to a large-scale re-demarcation of municipal boundaries. This process removed the administrative distinction between urban and rural areas, recognising the strong inter-linkages between towns and the countryside. While this has been a largely positive development, it has complicated the administrative determination of what constitutes a rural area and, by extension, a rural municipality. Consequently, there is no national, legal definition for 'rural areas' in South Africa.

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2.1 Rural Differentiation

Figure 3 indicates a range of rural typologies across rural South Africa (based on the CSIR classification (2014) and earlier work undertaken by Mhlongo et al, 1999). It is clear from Figure 3 that the distribution of high density rural areas, for example, in parts of Limpopo such as Venda and Giyani; parts of Mpumalanga such as Bushbuckridge and Nkomazi, the Eastern Cape such as Port St Johns and KwaZulu-Natal, is relatively



Figure 1: Objectives of the Guideline



Figure 2: Rural areas in transition

well-pronounced. While sparse rural areas are found throughout the country, they are most prevalent in the Northern Cape and the Western Cape.

It is important to underscore the fact that there is a high level of diversity within 'Rural South Africa'. For example, it is useful to differentiate between: small market towns, agri-villages, informal settlements, farm villages & scattered homesteads in commercial farming areas, displaced townships, peri-urban informal settlements, villages & scattered homesteads in former homelands.

3. Rural Land Use Development and Management Vision and Mission

The vision for rural land use development & management encapsulated in the guidelines is to facilitate the deployment of a functional rural land use development & management system & practice aimed at achieving integrated, sustainable, inclusive & vibrant rural communities. Such a system will ensure the improved quality of life for rural dwellers by facilitating economic activity, ensuring food security and facilitating access to basic services, such as quality healthcare and education. [Box 1: Vision of rural South Africa]

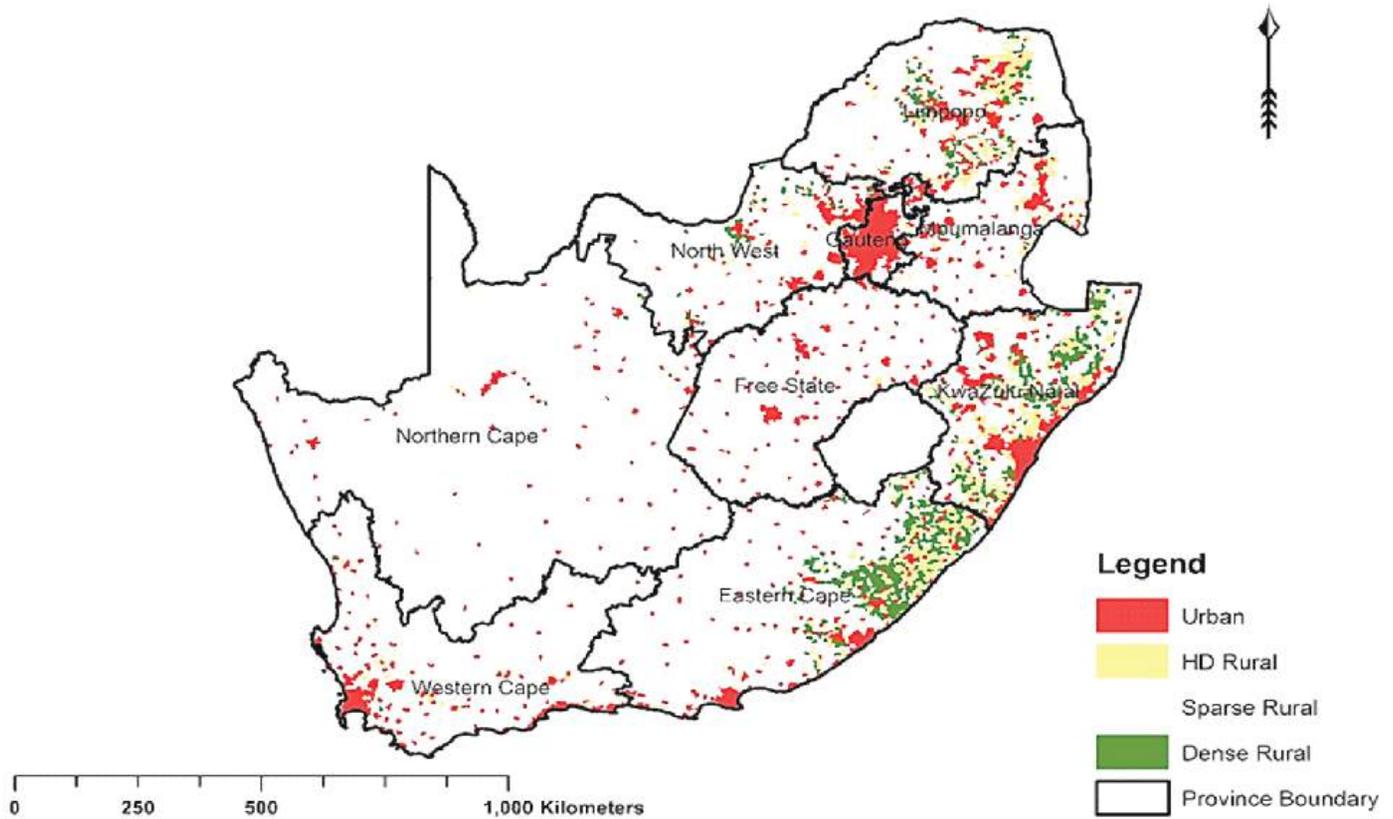


Figure 3: Location of rural areas in South Africa (based on CSIR classification)

Figure 4 shows an illustration of the envisaged rural vision in a real rural spatial setting in South Africa – rural differentiation notwithstanding.

3.1 Working definition for the purpose of the Guidelines

These Guidelines apply the definition by the Rural Development Framework (1997) as it fits well with the other definitions & provides a functional context:

“...A rural area in this context refers to areas that were previously known as homelands. It also extends to villages & areas under the control of traditional authorities, community property associations & also areas that were dispersed from the central areas of municipalities & did not form a part of a formal municipal town planning scheme & was included in a peri-urban areas town planning scheme 1975...” “...to provide for the incremental introduction of land use management for the entire municipal area including areas not previously subject to a land use scheme...” (S24 (2) (a)) of SPLUMA. [Box 2: Mission of Rural Guidelines in South Africa]

Whilst the guidelines are targeted at assisting municipalities improve the planning and management of their rural areas, they are premised on the assumption that all spheres

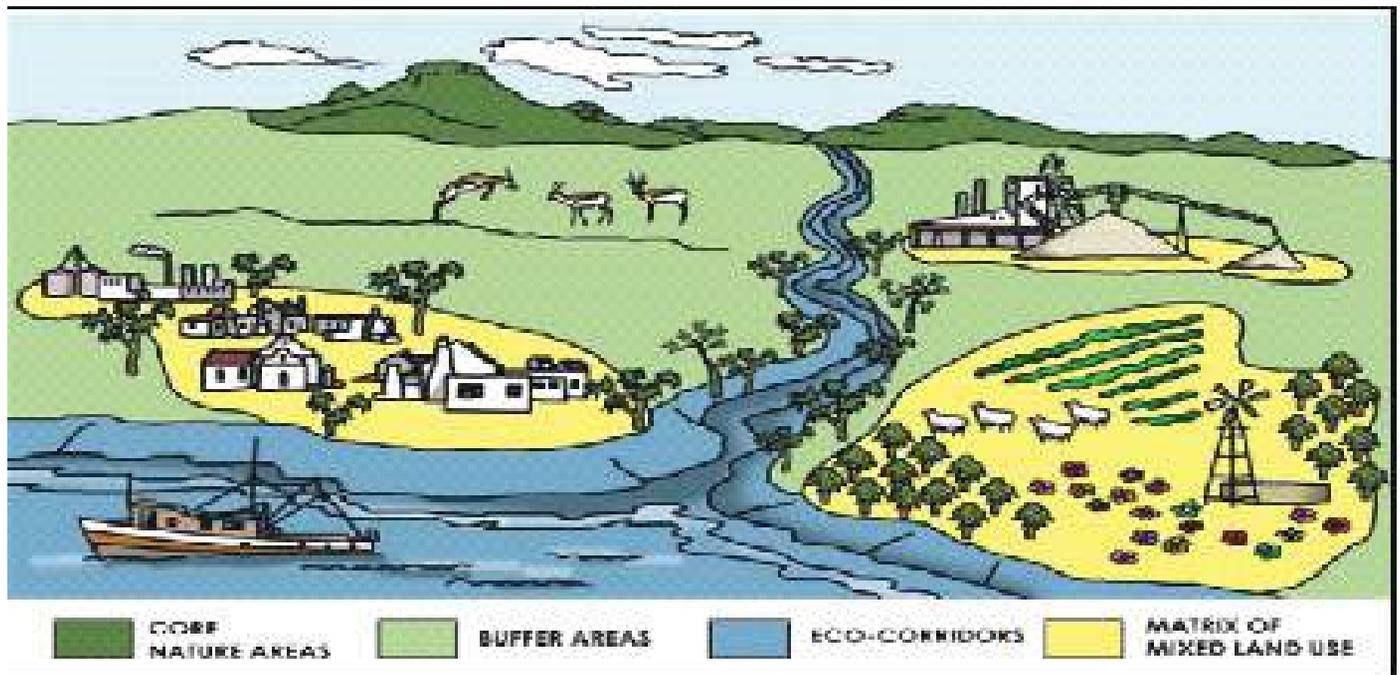


Figure 4: A conceptual spatial vision of a smart & sustainable rural village

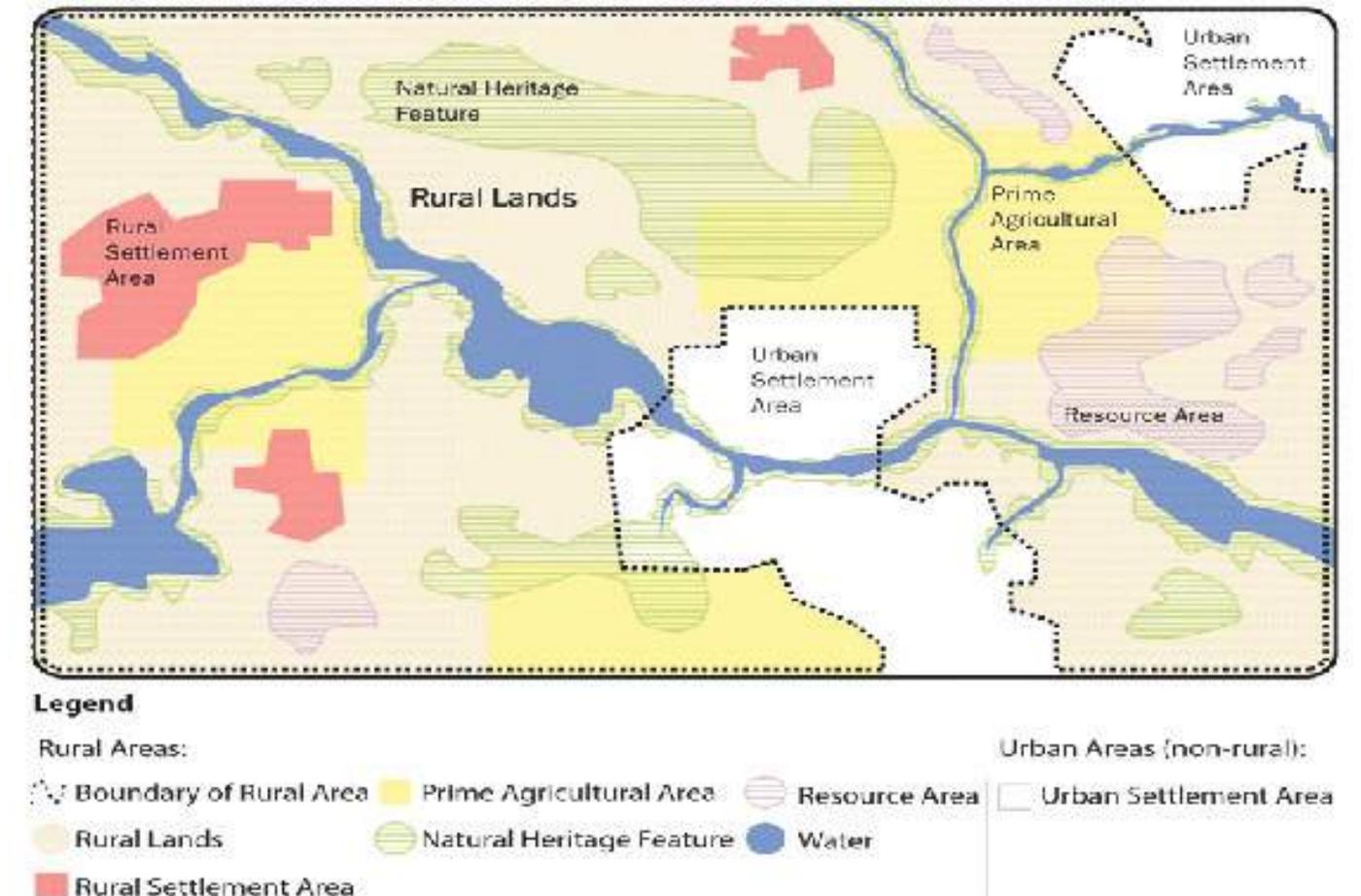


Figure 5: Preferred rural settlement typology

of government will commit themselves to the constitutional principle of cooperative governance. This means that national and provincial government must:

- Timeously communicate their rural development intentions and activities to the relevant local authority
- Actively support municipalities with the difficult task of synchronising and aligning diverse rural programs in their Integrated Development Plans (IDPs), and
- Allocate the necessary resources to implement, monitor and maintain rural investments.

4. Municipal Planning and RLUMRG

Chapter Four provides the coordinating thread that links the Rural Land Use Management and Regulatory Guidelines to long-term rural development plans, IDPs, SDFs, LUSs and land development applications (LDAs).

It is premised on the reality that a one size fits all approach to municipalities is neither realistic nor feasible, given the varying contextual conditions (e.g. socio economic challenges and existing potential) that exist, even within the same province. Figure 6 depicts a schematic illustration of the spheres of government and planning legislative and policy directives that provide direction regarding the alignment and coordination of IDPs, SDFs, and LUSs in the wider legal and socio-economic-political environment of the country.

In South Africa, IDPs are the principal strategic planning instrument for municipalities and a connecting thread for planning, budgeting and implementation at the three spheres of government. IDPs are especially important at the municipal level where they are drawn up (based on a drafting method designed by the CSIR) and implemented. IDPs are the instruments upon which the Local Government Turnaround Strategy (COGTA, 2009) is premised. An IDP aims to coordinate the work of local and other spheres of government in a coherent manner in order to improve the quality of life for all the people living in an area.

4.1 SDFs and RLUMRG

Municipal Spatial Development Frameworks (MSDFs) must contribute to and form part of the municipal integrated development plan – assist in integrating, coordinating, aligning and expressing development policies and plans emanating from the various sectors and spheres of government as they apply within the municipal area. SDFs must further outline specific arrangements for prioritising, mobilising, sequencing and implementing



Figure 6: Spheres of government and associated planning legislation directives

public and private infrastructural and land development investment in the priority spatial structuring areas.

4.2 RLUMRGs and LUSs

A Land Use Scheme (LUS) must give effect to and be consistent with the municipal spatial development framework and determine the use and development of land within the municipal area to which it relates. The intended outcome is to promote economic growth, social inclusion, efficient land development and minimal impact on public health, the environment and natural resources. Currently in South Africa, property rights are managed through “zoning” as indicative rights of what land use can be exercised on a property. These property rights are assigned, managed and amended through the controls and mechanisms of a Land Use Scheme.

RLUMRG aims to support the effectiveness of municipal planning by ensuring that rural areas are incorporated into the formal planning processes. The Guidelines provide procedures to incrementally integrate “rural informalities” into a formal system of spatial planning and land use management, within the ambit of municipal planning processes.

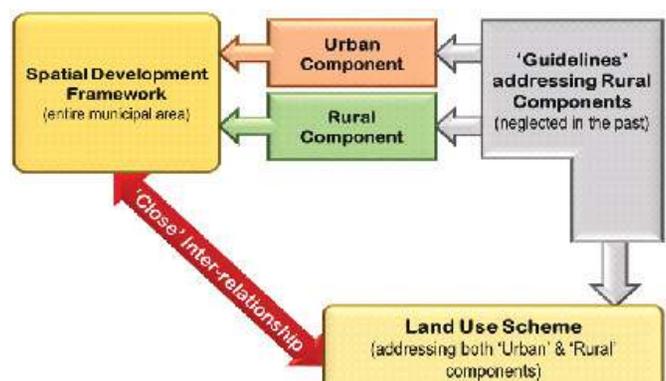


Figure 7: SDF and LUS linkages

SPLUMA OVER- ARCHING PRINCIPLE	RLUMRG GUIDING PRINCIPLE	PLANNING INTENT
Spatial Justice	Sense of justice	<ul style="list-style-type: none"> • Meeting fundamental needs of rural communities, especially the poor • Restitution & redistribution of land & natural resources • Rights-based democratic governance • Participatory rural planning processes
Spatial Resilience	Sense of environmental limits	<ul style="list-style-type: none"> • Incremental gains over time, working with what is available • Maintaining functional eco-system services • Enhancing biodiversity & the preservation of natural habitats • Connecting ecological corridors & maintaining ecological buffers to mitigate against the impacts of climate change • Transition to renewable energy alternatives & energy efficiency • Zero waste via reuse of waste outputs as productive inputs • Connectivity along rural movement corridors, towards viable public transport • Sustainable construction materials & building methods • Sustainable use of water & other natural resources
Spatial Efficiency	Sense of place, identity & branding	<ul style="list-style-type: none"> • Response to landscape context • Sensitivity to spiritual qualities of rural areas • Respect of rural settlement form • Integrated & safe rural communities
	Avoid incompatibility	<ul style="list-style-type: none"> • Ensure that local, regional or national natural & built environment resources not unreasonably constrained by nearby incompatible uses
	Avoid & reconcile land use conflict	<ul style="list-style-type: none"> • Avoid & reconcile land use conflict & interface issues between land uses in adjoining zones & land uses within the same zone
Good Administration	Sense of history, culture, tradition & heritage	<ul style="list-style-type: none"> • Recognition of indigenous values • Recognise indigenous cultural heritage, with early culturally-appropriate consultation with the relevant traditional leadership & indigenous communities • Valuing cultural diversity & rural community • Sensitivity to cultural landscapes • Response to rural settlement patterns & built vernacular
Spatial Sustainability	Sense of craft, Agro-tourism & emerging rural industries & economic transformation	<ul style="list-style-type: none"> • Growing & broadening the rural economy, greater equity & fair trade • Farming security & sustainable food supplies • Adding value to agricultural products • Strengthening rural tourism (Agro & nature based) • Rural livelihood skills development

Table 1: Guiding principles of the RLUMRG

4.3 Rural development plans and RLUMRGs

High quality rural development plans lie at the heart of a high quality planning system. Planning and development issues today are complex and frequently overlap with other policy areas such as economic development, transport and education provision. The development plan must recognise the wider policy context and set out a strategic spatial framework – a clear view ahead in development terms – for the area the development plan covers. This spatial framework, while acknowledging wider social, economic and environmental trends, needs to focus on the “big picture” planning issues, possibilities and considerations that will underpin how the development process in that area is to be structured in order to achieve the plan’s objectives for the wider community.

5. Roles and responsibilities of stakeholders

The efficient and effective implementation of SPLUMA requires clear unbundling of the roles, functions and responsibilities of different role players enabling sustainable resource mobilisation and utilisation.

5.1 Role and function of municipalities

The roles and functions of local government are specifically addressed in Chapter 7 of the Constitution of the Republic of South Africa (1996). Matters of importance for development and planning in municipalities are found in Sections 152 and 153 of this Constitution. Section 152 states that the objects of local government are to:

- Provide democratic and accountable government for local communities
- Ensure the provision of services to communities in a sustainable manner
- Promote social and economic development
- Promote a safe and healthy environment, and
- Encourage the involvement of communities and community organisations in the matters of local government.

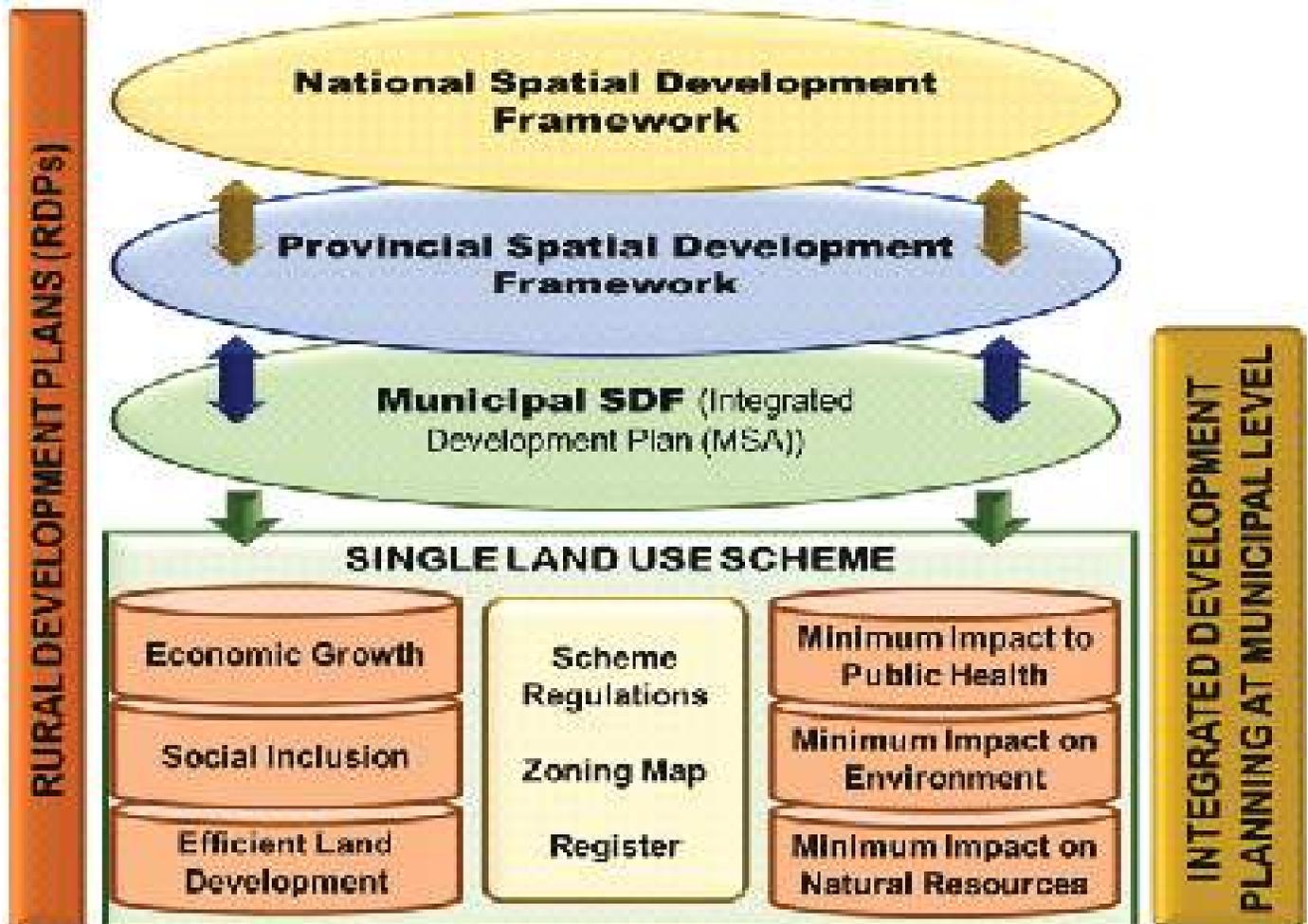


Figure 8: LUS, MSDF, PSDF and NSDF linkages

5.2 Role and Function of Traditional Councils

5.2.1 Rationale for Engaging Traditional Council in Municipal Development Matters

Significant parts of these Guidelines will be implemented in former homelands and other areas under Traditional Councils and Community Property Associations. Furthermore, since the advent of wall to-wall municipalities in the year 2000, the institution of Traditional Leadership cannot and should not be overlooked because many municipal policies touch on land management issues that are within the jurisdiction of Traditional Councils. Administering of land matters in the case of Traditional Councils includes demarcation and allocation of land for various land uses, primarily for residential, businesses, as well as for subsistence farming in a communal manner (Brynard and Musitha, 2011:114; Bikam and Chakwizira, 2014:145).

However, the current responsibility of administering land in a formal planning system is assigned to municipalities through SPLUMA and its land use management systems, such as the Spatial Development Framework (SDF) and wall-to-wall Land Use Schemes. It is important to note though that SPLUMA does provide for roles and responsibilities with particular reference to the roles of traditional councils, for example:

- S20(2) – MSDF must be prepared in accordance with the provisions of the MSA S23(2)
- Subject to MSA and Traditional Leadership and Governance Framework Act, a municipality, in performance of its duties must allow for the participation of traditional councils
- S24(2)(c) – Incremental introduction of LUS in areas under traditional leadership.

In addition, S29(1)(b)(iii) of the MSA provides for traditional authorities to be identified and consulted in drafting of an IDP and SDF. Added to this provision, and as enumerated in Box 3, S4 of the Traditional Leadership and Governance Framework Act (41 of 2003) outlines the roles and functions of traditional leaders in terms of, inter alia:

- Supporting municipalities in the identification of community needs
- Facilitating the involvement of the traditional community in the development or amendment of the integrated development plan of a municipality in whose area that community resides
- Participating in the development of

policy and legislation at local level

- Participating in development programs of municipalities and of the provincial and national spheres of government
- Promoting the ideals of cooperative governance, integrated development planning, sustainable development and service delivery.

Section 4(1) of the Traditional Leadership and Governance Framework Act, 41 of 2003 states that Traditional Councils have the following functions:

- Administering the affairs of the traditional community in accordance with customs and tradition
- Assisting, supporting and guiding traditional leaders in the performance of their functions
- Supporting municipalities in the identification of community needs
- Facilitating the involvement of the traditional community in the development or amendment of the integrated development plan of a municipality in whose area that community resides
- Recommending, after consultation with the relevant local and provincial houses of traditional leaders, appropriate interventions to government that will contribute to development and service delivery within the area of jurisdiction of the traditional council
- Participating in the development of policy and legislation at local level
- Participating in development programmes of municipalities and of the provincial and national spheres of government
- Promoting the ideals of cooperative governance, integrated development planning, sustainable development and service delivery
- Promoting indigenous knowledge systems for sustainable development and disaster management
- Alerting any relevant municipality to any hazard or calamity that threatens the area of jurisdiction of the traditional council in question, or the well-being of people living in such area of jurisdiction, and contributing to disaster management in general;
- Sharing information and cooperating with other traditional councils; and

- Performing the functions conferred by customary law, customs and statutory law consistent with the Constitution.

Based on the foregoing, it is clear that Traditional Leaders through their Traditional Councils have a definite role and function in spatial planning, land use development and management. Thus the need for municipalities and other stakeholders such as developers to engage and involve traditional councils in rural land use development and management processes cannot be over-emphasised.

5.2.2 Modalities for involving and engaging Traditional Leaders

The institution, status and role of traditional leadership and traditional councils, according to Customary Law, are recognized, subject to the relevant Constitutional provisions. SPLUMA provides that subject to Section 81 of the Municipal Structures Act, 1998 and the Traditional Leadership and Governance Framework Act, 2003 (TLGFA, 2003), a municipality, in the performance of its duties including land use planning, development and management must allow the participation of traditional councils. It is thus important to ensure that traditional councils play a formal, visible and pivotal role in land development matters in rural areas under their jurisdiction. In this regard, Traditional Councils should (Mashiri et al, 2017):

- Actively participate in development committees as well as provide inputs in the development of legislation, policies and plans including Bylaws, SDFs and LUSs
- Proactively galvanise communities within their areas of jurisdiction to actively participate in spatial planning and land use management processes
- Facilitate land development applications in rural areas under their jurisdiction, including providing official letters of recommendation in support or otherwise of such land development applications, and
- Proactively lead an iterative, inclusive and consultative process to broaden land use classes by soliciting for and compiling a list of land uses that are largely peculiar to communal areas to be included in the development of wall-to-wall land use schemes. Such a process of expanding the land use and spatial planning meta-language together with actual land uses is intended to reflect and entrench rural areas' cultural diversity and requirements.

Given their resources and the socio-political and developmental capital that could accrue to the municipal jurisdiction as a result of harmonious and cooperative governance, municipalities are encouraged to proactively

facilitate some of these activities.

6. The Guidelines

This chapter presents the Rural Land Use and Regulatory Management Guidelines. Covering typical rural land use typologies, the chapter advances the need for municipalities, in consultation with traditional councils and other stakeholders, to set thresholds or standards with a view to assisting in guiding, directing and managing current and future development in rural areas. The guidelines also recognise that the mix of land uses in rural residential areas is integral to the local subsistence economy and should thus be promoted while also making provision for local economic enterprise development that requires larger spaces than that provided in traditional rural settlement areas.

The following land uses may be considered for rural areas:

- Conservation and agriculture related uses
- Rural industry linked to the imminent potential and accessibility of the raw materials
- Accommodation establishments
- Smallholder agriculture
- Rural housing - based on the local typologies
- Infrastructure installations - engineering infrastructure and ICT infrastructure for institutional uses such as schools, clinics and government departments
- Tourism and recreational facilities - at various scales linked to unique and pristine environmental feature
- Climate and flood risk management - which incorporate the approach to progressively introduce land use management in certain areas where natural growth was mismanaged and there is a conflict with resources i.e. floodplains, erosion and sensitive areas
- Rural business - acknowledgement of the economic structure and dynamics of the settlement typology and scale, and
- New settlements - assisting and guiding the development of new settlements on the 'Key Principles' outlined previously

6.1 Planning for Communal lands

Communal areas consist of various land use typologies including, amongst others, settlements, agriculture, communal grazing

and communal conservation areas that require protection in terms of bio-diversity.

The main objectives for managing Communal Lands are as follows for e.g:

- Protect and conserve vegetation, water, fish and wildlife resources, productive soil resources for agriculture and forestry, and other resources vital to the sustenance of the local economy
- Carefully manage and enhance the use, production, conservation or extraction of soils, timber, minerals and other natural resources

6.1.1 Regulation for Rural Residential Settlements

The designation and development of existing/new Rural Residential area should be undertaken where the following minimum conditions are met for e.g:

- Land use compatibility and resource protection should be achieved by the design of the new development
- Environmental impacts and hazard risks should be adequately mitigated
- Compliance with national, provincial and local land use regulations, as they exist or as they are amended, to provide for establishment of new rural residential (and related uses) should be observed
- Plan for rural residential (and related uses), taking cognisance of the organic growth of households and families in the area of jurisdiction should be developed;

6.1.2 Development standards for Rural residential

In evaluating proposals for development within rural residential and related uses, the following aspects should be considered for e.g:

- The potential impacts of such development on the visual, timber, agricultural and other resources contained in the rural lands immediately surrounding the rural residential subdivision

7. Way Forward

7.1 Desired Outcomes & Implementation Mechanisms

The ultimate desired outcomes of the Rural Land Use Guidelines are:

- Coherence in how South African municipalities undertake rural land use planning & clarity regarding the contents of

these plans

- Alignment of municipal rural land use planning with the rural spatial plans prepared by other institutions
- Clarity to the Government's social partners on the location, nature & form of development that could be accommodated beyond the "urban edge"
- Uniformity in how municipalities manage the pressures for rural land use change & management; and
- Cooperation, alignment & integration between the spheres of government

7.2 Desired Outcomes & Implementation Mechanisms

The initiative should be broadly underpinned by a strategy that covers:

- Legal & institutional framework development: refinement of land policy, the development of secondary legislation & developing land management organizations at central & district levels
- Development of a national system & program for land tenure regularisation: systematically bring land to first registration & to allow all citizens equal access to the new systems
- Development of low cost, effective & simplified land administration system at national & decentralised levels & operational guidelines: to secure land rights & promote investment through regulated land transactions, &
- Development of a national land use master plan for land planning & development control to ensure rational use of land & effective development as well as environment protection

7.3 Review of the Guidelines

- The guidelines are based on current rural LUM information, knowledge & practice for South Africa
- Further investigation, research & innovation in rural LUM & practice may in future establish new practices & redefine best practice for rural LUM in South Africa.
- The guidelines will therefore be revised as new information relating to the design, operation & management of rural land uses becomes available
- Major reviews are envisaged once every five years if necessary

- Between reviews, technical notes will be used to disseminate information on developments in practice
- The eventual alignment of the guidelines will be synchronised with the first SPLUMA compliant SDFs & LUSs approval in municipalities throughout SA

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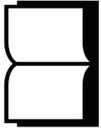
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**Track 3: Culture,
community
experience and the
sharing economy**



Exploring the Real Smartness in an Urban Context through a deductive meta-synthesis approach (Quest to the Real Urban Smartness)

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Synopsis:

The study applies a deductive meta-synthesis approach to re-conceptualize the 'Smart Cities' ideal. The critical review of literature shows that despite being so popular, the term 'Smart City' is vague, multi-dimensional and fuzzy. There are several research gaps in the existing Smart Urban Development Framework (SUDF) such as lack of integrative urban planning techniques and missing focus on traditional communities. The primary issues with this conflating and self-lauding label are its market-led urban agenda and underlying domination of neoliberal urban spaces, leading to entrepreneurial urban forms and neglect of the cultural industries (Hollands, 2008).

There are six existing urban dimensions covered in majority of the literature viz. Economic, Social, Environmental, Living, Mobility and Governance. Based on the critical literature review and experts' opinion surveys, two factors are found to be missing, despite their high relevance in the SUDF. These are Physical and Cultural dimensions, which

can be collectively known as Place-based or Territorial Urban Attributes of a Smart Community. In this study, authors propose a community-oriented, holistic and contextual definition of Smart Cities based on a detailed definition analysis. The three-pronged objectives of urban smartness are to promote a sustainable, livable and equitable urban development. The research concludes that a Real Smart Urban Landscape is shaped by the local characteristics, priorities, and needs of cities and its citizens (Yigitcanlar, 2015) and hence urban development should be integrative in its approach.

2. Introduction

The notion of Smart Cities is significantly popular to address grave urban challenges such as socio-economic inequality and climate change in an effective and innovative manner. Over the years, the term 'Smart' is used interchangeably with connected as well as inter-connected wireless communication and has already become a global brand; ranging from anything like smart water and smart boards to smart villages and smart cities. The term 'Smart' has succeeded the previous urban science disciplines to foster intelligent, responsive and sustainable urban development (Neirotti, et al., 2014).

Anthopoulos (2015) identified three primary economic sectors associated with the Smart Cities viz. IT (IBM, Infosys etc), Electronics (Siemens, Cisco etc) and Construction (POSCO etc). The main Smart city market is grounded in the USA followed by emerging Asian economies such as India and Korea. Yigitcanlar (2015) in his article on Smart Cities cited Halpern's discussion that whether the 'Smart City' ideal is a result of 'Smart Communities' through the use of smart technology or vice versa. He stated that the current global process is nothing, but a self-branding approach to gain more and more popularity by cities. Despite all the global efforts and plans of action, a fully-fledged smart city still doesn't exist (Yigitcanlar, 2015). It is further noticed that the scale of this concept has been primarily limited to small-scale townships and infrastructure up-gradation projects only.

Margarita (2014) in her study concluded that strategic planning is missing from existing Smart Urban Development Framework (SUDF) and is an abstract idea based on a single belief that innovative technological solutions can transform a city into a smart one. A high-tech variant of smart cities may just apply some short-term spatial fixes neglecting the needs of its traditional and marginal communities (Hollands, 2008). The critical literature review on Smart Cities show that the current SUDF is of self-promoting, self-congratulatory and self-branding nature only to fulfill the market ambitions. This over-emphasis of ICT component may lead to underplay of critical urban issues (Gaffney and Robertson, 2016) (as cited in Hollands, 2008); exposing the local people and society to high risks and making them vulnerable.

Hollands (2008) pointed out in his article that the latent urban issues such as social inequality, urban gentrification, and conflict between environmental sustainability and economic growth may develop behind this Smart City label. He also condemns the increasing tendency to focus on urban place-marketing instead of urban place-making which leads to a disastrous urban form. It has further been pointed out by

various academicians that ideas which are developed for Masdar or Songdo may not translate correctly into the local socio-economic and spatial context of traditional cities in India or Europe. In fact, within a city, the planned interventions might give internally differentiated results, privileging some places, people, and activities over others (Taylor, et al., 2014). Angelidou (2014, 2015) had discussed the need to adopt human-centered approaches to address the problems of the urban environment and put technology at the service of its people and not vice versa. Shapiro (2006) and Hollands (2008) argue that the 'smart-er' cities begin with their human capital rather than blindly believing that ICT can automatically create a smart city.

The broad aim of this research is to identify the research gaps in existing SUDF and derive a comprehensive and community-oriented definition of Smart Cities. The study contributes to the literature on Smart Cities by exploring the existing concept of Smart Cities by applying a deductive meta synthesis approach. Expert Opinion Surveys are also carried out to substantiate the findings from the critical literature analysis. Though many research articles have put ICT and urban innovations at the core of the smart city, but authors have strongly felt that smartness can't be attributed to the technology alone (Yigitcanlar 2015) and need not necessarily be the most critical factor for defining smart city (Hollands, 2008). The research concludes that it is highly possible for an existing urban system to function smartly by harnessing its natural setting and local planning models in a given context; without employing any of the modern digital technologies. The social and ecological dimensions are even more critical which should not be neglected by the planners and decision makers; keeping in mind that technology is a mere enabler and not the sole objective of urban development.

3. Conceptual understanding of Smart Cities ideal

3.1. Origin and Evolution

The term 'Smart City' was first time used by Van Bastelaer in 1998 (Anthopoulos, 2015) but even today its meaning and context appears vague. The problem lies in the scale and complexity of its domain and that's why different schools of thought such as Smart Growth, Living Labs, and Creative Industry offer different approaches to this fuzzy concept. The United Nation's Focus Group on Smart Sustainable Cities defines them as the one which harnesses the ICT for improvement of their citizen's quality of life and standard of living; while addressing local sustainability issues (The International Telecommunication Union (ITU) - Focus Group on Smart Sustainable Cities, 2014).

Dhingra & Chattopadhyay (2016) have discussed a phase-wise evolution of the concept of Smart Cities. It began after the 1980s industrialization, when the negative impacts of urban migration became profound on the city resources. With pressing urban challenges, the idea progressed further through the Kyoto Protocol in 1997 with major thrust on the environmental issues; but the focus was shifted towards innovation and smart technology after the digital boom in 2000. Over the last few decades, many global initiatives are undertaken to address urban issues such as environmental degradation, inequitable economic growth and social development of urban communities. The multitude of challenges has led to several urban movements, bringing different city categories in the global discourses (De Jong, et al., 2015) such as creative cities, green cities, low carbon cities, eco-cities and smart cities. However, in practice, these terms have overlapping objectives and are used interchangeably by many urban professionals and policy makers.

De Jong, et al. (2015) in their research attempted a comprehensive bibliometric analysis of twelve most frequently used city categories and developed a meshed network to show their hidden interrelationships. Figure 1 is a modified version of the meshed network in which the Sustainable City category is centrally located acting as an umbrella term, which is the most frequently

occurring and has prominent global presence, followed by other categories such as 'Smart City', 'Eco-City' and 'Green City' at notable distances (De Jong et al., 2015). The proximity of city categories to each other in the network shows their mutual co-occurrences in the literature and their size of dots represents the frequency of their occurrences in literature analysis done by De Jong et al. (2015).

This study also reveals that the concept of 'Digital City' was prominent since early 2000 with IT boom while the use of 'Smart City' increased exponentially since 2009, so much so that it over-shadowed the term 'Sustainable City' to a great extent (De Jong et al., 2015). The 'Digital City' has higher frequency but is distant from the focal 'Sustainable City' node; but it is closer to the 'Smart City', 'Ubiquitous City' and 'Intelligent City' nodes. Other city categories such as 'Resilient City', 'Knowledge City' and 'Livable City' are at farthest locations in the network diagram, pointing towards their own individual zone. The 'Smart City' forms one of the major axes with the 'Sustainable city', indicating the closer association of 'Sustainable' with the 'Smart' instead of 'Digital'. It can be concluded from this study that the 'Smart City' category conceptually regards more attention to the overall urban sustainability, while the 'Digital City' category centers more around ICT component in urban areas.

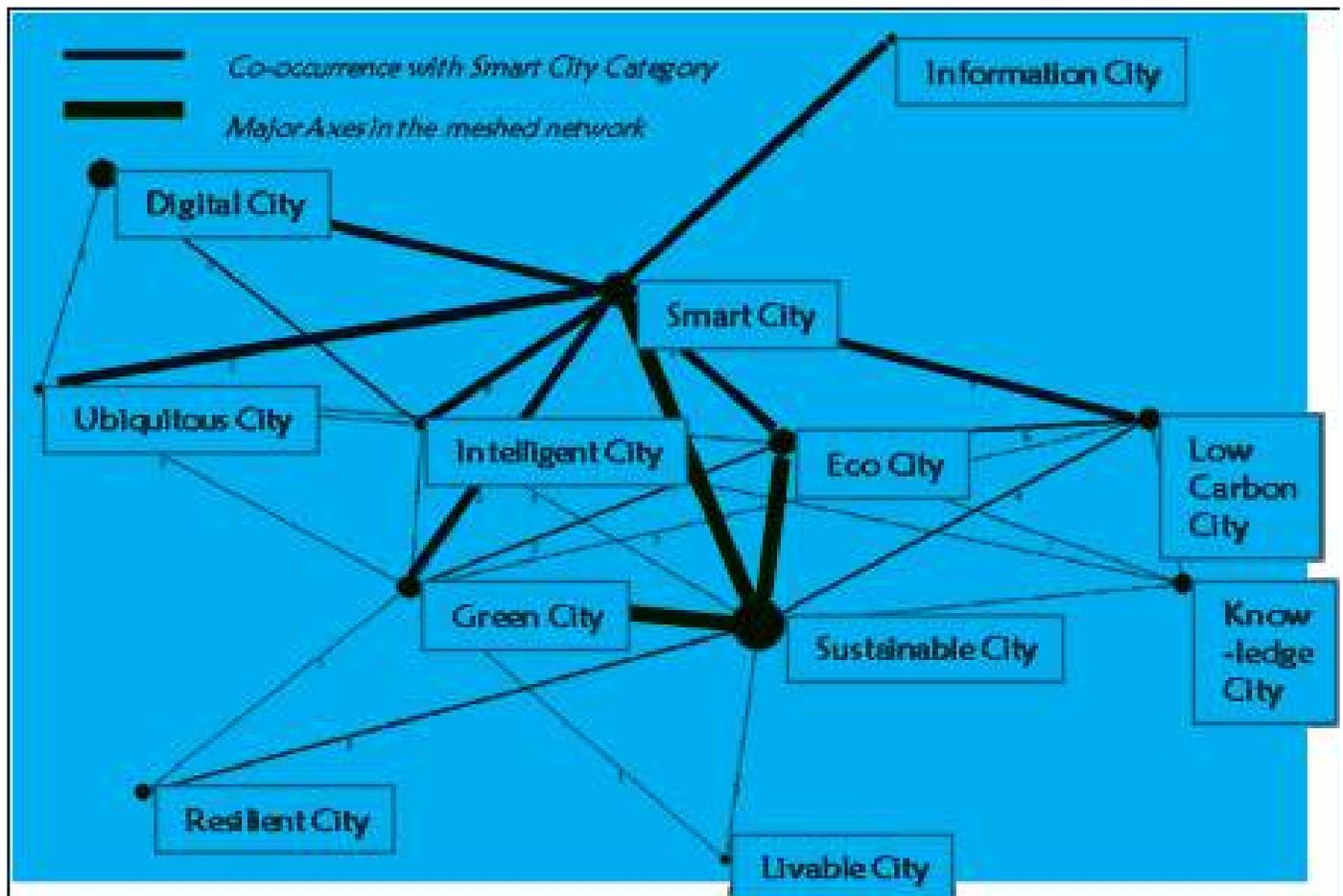


Figure 1: Inter-relationship between popular city categories Source modified from De Jong et al., (2015)

3.2. Smart Urban Dimensions

Cities are complex systems comprising of several sub-systems. Smart Cities ideal is also divided into many sub-themes such as urban and regional planning, economic development, environment and sustainability, ICT and technology (Cocchia, 2014). Integration of a city's various systems such as transportation, energy, education, healthcare, buildings, physical infrastructure and public safety is quite important in creating a smart city (Albino, et al., 2015) (Santis, et al., 2012). Albino et al. (2015) and Shapiro (2006) in their studies stated that inculcating intelligence into each of these sub-systems is not enough and hence, it should be conceptualized into different features for academic and theoretical clarity. A multitude of urban dimensions interact with each other to make cities Smart, Sustainable, and Livable (Santis, et al., 2012).

Similar to the vague definitions of Smart cities, there is no universal set of urban dimensions of Smart Cities. Hence, the authors have carried out an exhaustive literature analysis and reached to an understanding that there are six existing dimensions of Smart Cities. The Economic dimension occurred around 82% times in the existing literature followed by Environmental (77%), Mobility (64%), Governance (64%), Quality of Life (59%) and Society or People (59%).

The key research issues identified from the SUDF critique are neglecting the social aspect of a place (Knaap and Talen, 2005) (Yigitcanlar 2015) (Angelidou, 2014) (Tanzela 2015) (Taylor, Matthew. and Alan., 2014) (Hollands, 2008), ignoring the architectural and urban design solutions to evolve a spatial environment (Monsoor, 2016) (Yigitcanlar 2015) (Angelidou, 2014) (Tanzela., 2015), not considering the critical non-technical and soft attributes of cities such as the historical and cultural legacy of mature communities (Claire. and Catherine., 2014) (Shelton, et al., 2014) (Yigitcanlar 2015) (Hollands, 2008), avoiding issues of segregation and polarization of traditional communities in building a high-tech society (Hollands 2015) (Hollands, 2008), not capitalizing on existing city resources and neglecting the territorial dimension (Angelidou, 2014) (Claire. and Catherine., 2014).

4. Literature Search Methodology

Authors have applied 'Niehaves Model' as adopted by Anthopoulos (2015) for the deductive meta synthesis approach. A rigorous literature search is conducted for more than 150 sources, with priority being given to peer-reviewed journals and recent articles. The entire process is divided into four parts as discussed in Figure 2. The Domain part specifies the disciplinary field

in which the literature search is conducted. The broad domain of this study is the Smart City with four sub-domains viz. Definitions and Concept, Features and Characteristics, Critique and Live Case Studies. International peer-reviewed publications such as 'Australian Planner', 'Journal of Urban Technology', 'Cities', 'Cambridge Journal of Regions, Economy and Society', 'City', 'ACE: Architecture, City and Environment', 'Habitat International', 'International Journal of Computers & Technology' and 'International Regional Science Review' are the main sources for analysis; followed by non-systematic and unpublished grey literature such as government reports, books, conference proceedings and PhD thesis.

A focused search is maintained throughout by cross checking the inputs derived from the systematic literature review with the objectives and desired outcome of the study. The search strategy starts with the general skimming of the article followed by scanning of its title, abstract, keywords, and conclusions. The articles which completely focus on ICT component of Smart Cities are rejected and rest are accepted for another round of screening. In second screening, articles which are quite recent, especially after 2005 are given more priority and a detailed reading is carried out. Also, a feedback loop was created in which the references of the identified articles are checked and if found relevant, is selected for review process.

5. Analysis

The analytical approach avoids reporting the literature review as it is and rather attempts a meta synthesis approach, which primarily analyses the existing literature and derives hidden conceptual underpinnings. The analysis section is divided into three sub-sections- first part analyzes the various definitions of Smart City, second part establishes the research gap in the existing SUDF and third part validates the critical literature review with an online expert survey.

5.1. Definition Analysis

The adjective 'Smart' is multi-dimensional and ill-defined, fitting to one's needs and priorities. Many scholars have discussed that there is no universally accepted definition of Smart Cities, primarily because of its multi-functional domain and fuzzy label (Neirotti et al., 2014). The problem is rooted in misconceiving what smart cities actually are and hence the multitude of solutions with smart and intelligent are used interchangeably throughout (Angelidou, 2014)(Angelidou, 2015). However, all definitions being studied so far in this study share some common and overlapping characteristics, which don't appear to be contradictory and isolated (Cocchia, 2014).

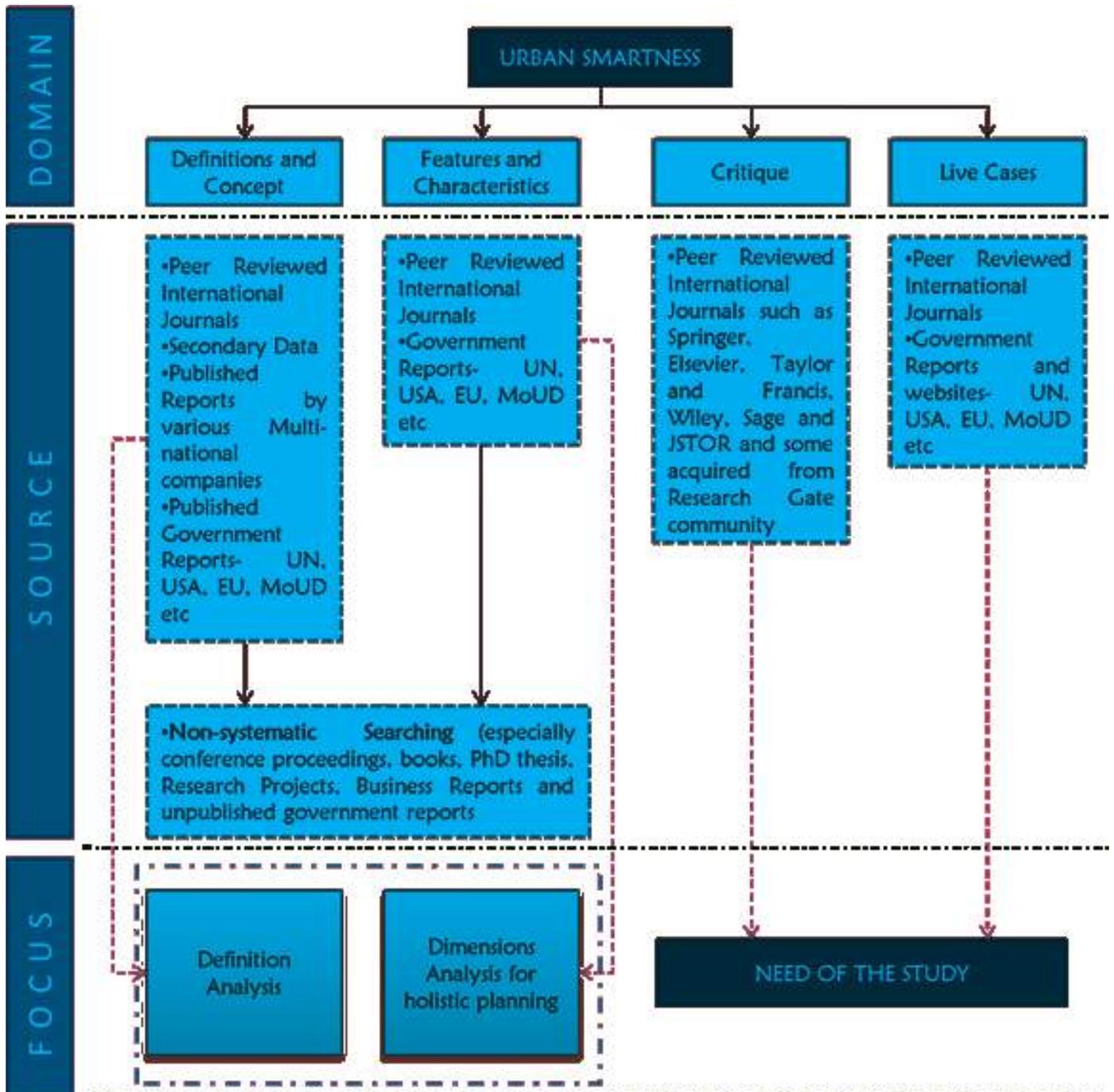


Figure 2 Literature Review Methodology (Source: Authors)

The study analyzes the existing definitions of Smart Cities by splitting it into two subjective parts- one part deals with the HOW component focusing on the interventions, ICT and urban technological solutions and the second part deals with the WHY component focusing on the goals and objectives of Smart Urban Development. Literature is identified using Niehaves Model and the relevant 70 definitions help to conceptualize the fuzzy 'Smart' label. A keyword analysis reveals 21 most commonly occurring terms in all these definitions. Table 1 shows that Quality of Life occurred the maximum number of times (~44%) followed by Sustainable (~40%), Environment (~24%) and Citizens (~24%). This helps to understand the relative importance given by scholars and academicians to various urban aspects when it comes to smart cities planning.

In fact, most of these keywords show an overlap and can be grouped together under the single domain which denotes the broad objectives of achieving urban smartness. For example, environment, ecology, carbon footprint and climate change can be clubbed together under Environmental Management as one of the Smart Cities' objectives. There are six such domains of urban smartness which are identified. Quality of Life domain occur a maximum number of times (~64.29%) followed by Human Capital (~62.86%), Sustainable Development (~40%), Environmental Management (~55.71%), Urban Development (~44.29%) and Economic Growth (~11.43%) as shown in Table 2.

The key domains which were identified from above analysis serve three common agendas viz. improving Quality of Life (Livability

Aspect), Optimum utilization of available existing resources (Sustainability Aspect) and equitable social and economic growth of citizens (Inclusivity Aspect). Hence, we conclude through our meta-synthesis that Smart City is nothing but is the one that adopts and promotes a Sustainable, Livable, and Equitable urban future.

5.2. Missing Urban dimensions from existing SUDF

The Critical Literature Review of existing SUDF shows that the concept of Smart cities is polarized and not holistic; thus lacking certain very important urban dimensions. Few of them which are reported in various peer-reviewed articles are listed in Table 3 with special emphasis given to the needs of existing communities and traditional cities. Albino et al. (2015) presented that an assessment tool for smartness should be custom-made as per the city’s vision, because a universal fixed system may not function well in different urban scenarios worldwide.

The most fundamental and theoretical model of the Dutch philosopher, Herman Dooyeweerd’s multi-modal reality, is applied to investigate all the critical aspects which interact with each other in an urban setting.

The irreducible aspects or dimensions altogether make up a holistic pattern, making a distinction into 15 modalities (Dooyeweerd, 2010). Sustainability is one of the major application areas for Dooyeweerd’s philosophy as seen in “Sustainability indicators in urban planning evaluation,” (1998), Raadt (1997) and P. Lombardi, et al., (2007); where authors have utilized his notion of irreducible aspects giving a principled understanding of sustainability. According to him, each aspect has a complex internal structure comprising of its components, elements, levels, and inter-relationships which are distinctive in nature.

The need to incorporate existing traditional communities and their settlements bring us closer to understand the science of human settlements formally known as Ekistics, which was introduced by Doxiadis in the 1970s. It tries to explain the basic principles man applies while building his settlements. This science is very complex comprising of five basic elements viz. Nature, Man, Society, Shells (Buildings) and Networks, which primarily depends on the interaction of man with his surroundings (Doxiadis, 1970). One more element which connects all these elements together is Synthesis which is analogous to Spatial Dimension. Table 4 compares the universal set of 15 urban

Keywords	% Occurrences
1. Quality of Life	64.29%
1.1. Quality of Life	44.29%
1.2. Welfare/Well-being	8.57%
1.3. Livable	5.71%
1.4. Cultural	5.71%
2. Sustainable Development	40.00%
2.1. Sustainable	40.00%
3. Environmental Management	55.71%
3.1. Environment	24.29%
3.2. Carbon and Climate Change	2.86%
3.3. Resources	20.00%
3.4. Ecology/Ecosystems	2.86%
3.5. Energy	5.71%
4. Urban Development	44.29%
4.1. Urban Planning/ Development	21.43%
4.2. Service Delivery	15.71%
4.3. Infrastructure	7.14%
5. Human Capital	62.86%
5.1. Social	15.71%
5.2. Citizen	24.29%
5.3. Equity	2.86%
5.4. People	5.71%
5.5. Collective Intelligence/ Inclusiveness	5.71%
5.6. Human	4.29%
5.7. Governance	4.29%
6. Economic Growth	11.43%

Table 2 Key Domains of Urban Smartness (Source: Authors)

S.No	Missing Components	Source
1	Social and People/Human Capital	(Knaap and Talen, 2005); (Thorne and Griffiths, 2014); (Angelidou, 2014); (Shelton, Zook and Wiig, 2014); (Monsoor, 2016); (Yigitcanlar, 2015); (Hollands, 2008)
2	Environmental	(Hollands, 2008)
3	Economic	(Hollands, 2008)
4	Cultural	(Hollands, 2008); (Yigitcanlar, 2015)
5	Spatial	(Knaap and Talen, 2005); (Thorne and Griffiths, 2014)(Shelton, Zook and Wiig, 2014)(Monsoor, 2016)
6	Traditional Communities/ Urban Spaces and Society	(Thorne and Griffiths, 2014); (Yigitcanlar, 2015); (Hollands, 2008); (Angelidou, 2015)
7	Existing Resources and Old Systems	(Thorne and Griffiths, 2014); (Angelidou, 2014); (Monsoor, 2016); (Neirotti et al., 2014); (Angelidou, 2015)
8	Urban Planning and Architecture	(Thorne and Griffiths, 2014); (Angelidou, 2014); (Hollands, 2008); (Yigitcanlar, 2015); (Neirotti et al., 2014); (Angelidou, 2015)
9	Built and Natural Environment	(Yigitcanlar, 2015); (Angelidou, 2015)
10	Quality of Life	(Thorne and Griffiths, 2014); (Angelidou, 2014); (Angelidou, 2015)
11	Local and Historical Identity / Characteristics	(Thorne and Griffiths, 2014); (Yigitcanlar, 2015); (Hollands, 2008)
12	Physical and Territorial	(Angelidou, 2014); (Shelton, Zook and Wiig, 2014); (Yigitcanlar, 2015); (Neirotti et al., 2014); (Angelidou, 2015)
13	Mature Cities	(Shelton, Zook and Wiig, 2014)

Table 3 Missing Components in Smart Urban Development Framework (Source: Authors)

modalities with urban dimensions of existing SUDF, Elements of Human Settlements in Ekistics (Doxiadis, 1970) and missing urban aspects of smart cities from the critical literature review. It is observed that physical, spatial and cultural dimensions are missing from current SUDF; although the physical and spatial categories were included in Ekistics and constitutes many overlapping elements.

Cross Validation by Experts' Online Surveys

Besides the literature analysis of the peer-reviewed journals on a critique of Smart Cities and its urban dimensions, a small online expert survey was conducted to validate the findings. The experts from diverse professional background ranging from Architects and Urban Professionals to Engineers in Energy and Civil industries were surveyed using questionnaire on www.questionpro.com platform; through professional networking websites such as LinkedIn and ResearchGate. The experts rated the identified 15 broad urban aspects on a Likert scale of 1 to 5 according to the perceived importance of each aspect in SUDF; 1 being the lowest and 5 being the highest. The average rating for each dimension is presented in Table 5.

Figure 3 shows that the experts' highest average rating is 4.45 out of 5 for Mobility, closely followed by Quality of Life, Economic,

Spatial, and Environmental dimensions. One of the most interesting things to note is very high importance given to Spatial, Cultural and Physical Elements of a city than the other existing dimensions in SUDF such as Governance and Social. However, there is very thin difference between physical and spatial urban dimensions and thus they are clubbed together under physical dimension. The eight dimensions which are proposed for revised smart urban development framework are Mobility, Living, Economic, Environmental, Governance, Social, Physical and Cultural. According to the authors these two missing urban dimensions which still needs to be translated in existing SUDF can be collectively known as Territorial Urban Dimensions of Smart Cities.

6. Conclusions

The concept is popular not only amongst the city governments but also among large MNCs (Anthopoulos, 2015), leading to a shift of focus on sustainability to ICT to address deeply rooted urban issues. This type of smart growth which is driven strongly by market forces is not certain to cater to social equity and environmental progress (De Jong et al., 2015)(Neirotti et al., 2014)(Allwinkle and Cruickshank, 2011)(Gaffney and Robertson, 2016). A large fraction of Smart City advocates tends to regard infrastructure oriented strategies as fragmented, stressing

	Dooyeweerd's theory of Urban Modalities	Ekistics Elements of Human Settlements	Existing Dimensions of Smart Cities	Missing Dimensions from Critique
1	Quantitative (numerical accounting of available resources)	X	X	X
2	Spatial (space and its extensions)	Synthesis	X	√
3	Kinematic (transport and mobility)	Networks	Mobility	X
4	Physical (Buildings, Built up, infrastructure)	Shells (Buildings)	X	√
5	Biotic (environmental)	Nature	Environmental	√
6	Sensitive (sense, feelings, perception)	Anthropos (Man)	Quality of Life / Living	√
7	Analytical (conceptualization and evaluation)	X	X	X
8	Formative (historical, cultural)	X	X	√
9	Lingual (communicative)	X	X	X
10	Social (relationships and human capital)	Society	Social	√
11	Economic (financial)	X	Economic	√
12	Aesthetic (harmony, beauty)	X	X	X
13	Juridical (responsibilities, rights, and laws)	X	X	X
14	Ethical (love, generosity, self-giving)	X	X	X
15	Pistic (creedal, communities, visions)	X	Governance	X

X :- not present; √ :- present

Table 4 Analysis of Urban Dimensions (Source: Authors)

Dooyeweerd's Aspect	Associated Aspect	Urban	Average Expert's Rating	Experts' Ranking	Existing SUDF	Missing Dimensions from critique
1. Quantitative	Numerical Accounting		3.40	9	X	X
2. Spatial	Spatial		3.95	3	X	√
3. Kinematic	Mobility		4.45	1	√	X
4. Physical	Physical		3.65	6	X	√
5. Biological	Environmental		3.90	3	√	√
6. Sensitive	Living		4.05	2	√	√
7. Analytic	Planning techniques		3.50	8	X	X
8. Historical	Cultural		3.85	4	X	√
9. Communicative	Communicative		3.15	10	X	X
10. Social	Social		3.60	7	√	√
11. Economic	Economic		4.05	2	√	√
12. Aesthetic	Aesthetic		3.15	10	X	X
13. Juridical	Legal		3.60	7	X	X
14. Ethical	Ethical		3.05	11	X	X
15. Creedal	Governance		3.75	5	√	X
Legend:-						
Revised Urban Dimensions of Smarts Urban Development Framework **						
X :- not present; √ :- present						

How would you (as an expert) rate the given dimensions of an urban system according to their importance to achieve Smart Urban Development in Indian Context?

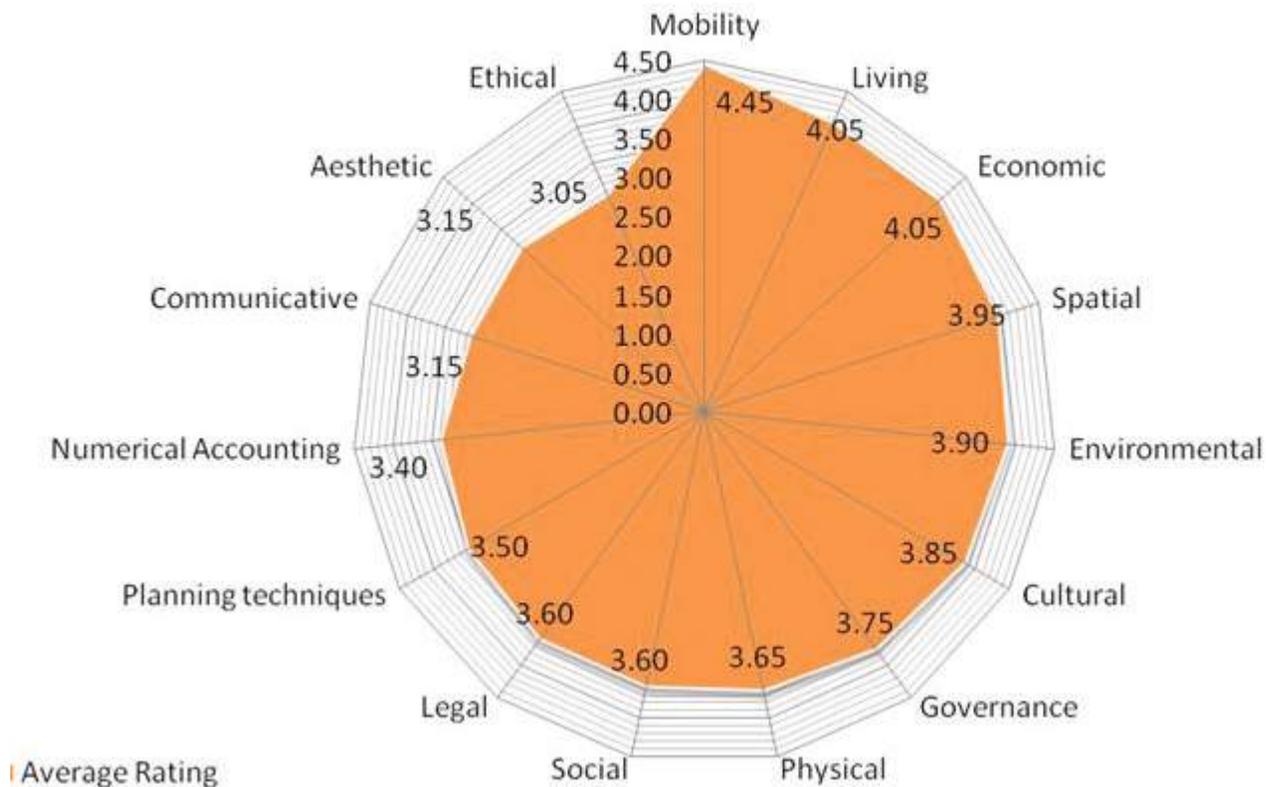


Figure 3 Average Rating to Urban Dimensions by Experts (Source: Authors)

the idea that ‘Technology is not enough’, meaning that it does not guarantee real smartness of our cities (Angelidou, 2014). A singular focus on efficiency could cause a restricted view of societal values such as social cohesion and quality of life, questioning the sustainability and livability dimensions of new cities (Angelidou, 2014). The most recent literature on Smart Cities emphasizes that they are significantly beyond technology and needs to effectively contextualize and embedded in wider social and physical system (De Jong et al., 2015).

Smart Cities should be the driver of change in the urban planning process but it currently ignores the soft infrastructure development, which can further lead to increasing social polarization, urban segregation, and techno-economic polarization inducing urban dichotomy (Yigitcanlar, 2015). A disjuncture between image and reality i.e. the real difference between a city being intelligent and simply lauding ‘Smart’ label is observed by the authors. Hollands (2008) in his paper discusses that a progressive smart city needs to start with human capital instead of blindly following ICT to transform our cities with the power shifting from large MNCs to local people who actually live in these cities.

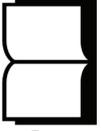
This study applies a deductive meta-synthesis approach by analyzing the qualitative literature on Smart Cities; suggesting that there is an ample scope for

defining Smartness in an urban context to remove its ambiguity and fuzziness. Based on the definition analysis, the Smart Cities are conceptualized as urban communities which strategically improves the quality of life and well-being of its citizens; adopts sustainable urban planning and infrastructure design practices for urban services such as water supply and transportation management; promotes practices aiming at environmental protection and management and focus on equitable social and economic growth of its people by leveraging the hidden potential of its human capital. The three-pronged objectives of urban smartness are found to be sustainable, livable and equitable urban development.

Authors argue that ICT acts only as an enabling tool to achieve the goals of Smart Cities and hence, should not be regarded as the sole objective in urban development projects. Authors have reviewed the definition of Urban Smartness in terms of the local communities and their context. Besides the six frequently occurring urban dimensions of Smart Cities in literature, authors suggest two pivotal place based or territorial dimensions which are found to be missing from existing SUDF viz. Physical and Cultural. The authors conclude from their study that a real smart city landscape should be holistically integrated with the complex ecosystems of people, their institutions and heritage.

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The “Sharing Economy with Chinese Characteristics” and its impact on Urban Space

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Synopsis:

Urban space in China has been dramatically impacted in recent years by new-economy phenomena such as car sharing, and more recently, bike sharing. In this “Sharing Economy”, private companies have expanded massively by creating alleged underused assets platforms leveraging tremendous amounts of investments at the same time. This model, which this paper defines as “Sharing Economy with Chinese Characteristics” is frequently being adopted in China. Two cases – car sharing and bicycle sharing – will be analyzed to further explain how the model works and its effects on cities.

1. The “Sharing Economy with Chinese Characteristics” - SECC

1.1 A controversial definition

The concept of “Sharing Economy” is sometimes referred to as “Collaborative Economy” or “Collaborative Consumption” (Felson & Spaeth, 1978). Rachel Botsman & Roo Rogers (2010) argue that Shared Economy is the transfer of ownership to the right to use, and ultimately forms the pattern of collaborative consumption. Belk (2014) points out that in the Internet era, the Economy is used by people to obtain economic or other compensation, by coordinating the acquisition or distribution of resources. Therefore, it should not rely on the large-scale supply of commodities and services by private enterprises, but a loose supply of personal goods based on personal choice enabled by Internet technology. The former definition is what Belk calls a “Pseudo-sharing” Economy. Sharing Economy should be indeed a supplement to traditional economy, not a substitute.

In China, the Sharing Economy has been elevated to an important status in the past two years, with high expectations by the government. As indicated in this official remark quoted in Economic Daily, a state-run newspaper: “At this stage, [it] is a new type of economy that uses Internet technology to optimize the use of decentralized resources, hence improving the efficiency of new forms of economic activities. Sharing Economy has created a lot of new forms of economies in China that can resolve the excess of production and bring a large amount of employment.” Vigorously promoting the Sharing Economy “will help optimize the allocation of resources, promote efficiently the balance between supply and demand, and enhance economic growth.” (Zhou, 2017). These expectations seem even to go beyond the inherent scope and definition of the Sharing Economy.

Meanwhile, the interpretation of the concept is also quite controversial among the academic community in China. Some scholars insist on keeping the original definition of Sharing Economy (Qiu, 2016), pointing out that the current “new forms of economy” observed are not shared economies (Dong, 2016). Other scholars are tempted to adjust the definition of the concept (Zhu & She, 2017), to be in line with the official chorus and match the new economic phenomena happening in China.

1.2 The “Chinese Characteristics” of the business model

The original concept of the Sharing Economy is composed of five key elements: under-used assets, right to use, connections, information, and mobility of the commodity

(Wang & Zhou, 2016). Unlike commercial transactions in the traditional economy which are guaranteed by a legal framework, the exchange and use of under-used assets in the Sharing Economy are based on trust. It implicitly creates an “asymmetry of information” between the user and the owner: the owner withholds information about the goods before leasing them, while the user knows much more about usage.

Although many people in China believe that Chinese society holds stronger moral standards than Western countries, interpersonal trust in China now seems weaker than in the United States or in Japan (Wang & Yamagishi, 1999). This lack of trust constitutes an inherent cultural obstacle in the development of the country’s Sharing Economy, making it difficult to exploit the potential of under-used assets. Hence, in China, Sharing Economy companies often only fulfill four of the five requirements: the use of under-used assets is often neglected, even non-existent. Companies find it difficult to obtain shared resources from the hands of individual owners.

Facing this lack of under-used resources, Chinese Sharing Economy companies address the problem in two ways: bundling under-used assets with human resources through the active participation of owners to balance the information asymmetry, or creating “new resources” and making them available on the market through commercial distribution channels. The latter is the popular current model in China. We name it “Sharing Economy with Chinese Characteristics”, referred to in our text as SECC.

With the lack of under-used assets resolved, this second form of Sharing Economy has greatly expanded in China, becoming the reference model. Under the showcase effect of some leading companies, these “artificial” unused resources and their subsequent needs have been constantly fabricated, in almost any imaginable field of application: cars, bicycles, umbrellas, basketballs or even rechargeable batteries. Although some companies using the model have secured their financing and capital, we argue that from the perspective of resource utilization and sustainable urban development, the SECC model is likely to be a failure.

1.3 Uneven and polarized development of SECC

After seeing Airbnb, Uber and other Sharing Economy companies having achieved great success in the United States, China’s Internet companies quickly jumped in the movement as well, relying on China’s huge market and the relatively autonomous Internet culture, hoping to emulate them and reach the same success in business.

However, there is a noticeable difference between the business phenomena of Chinese companies and their American counterparts. Airbnb value is currently estimated at 25.5 billion USD and Uber's evaluation at about 68 billion USD. Tujia, a real estate start-up in China raised 300 million USD in August 2015 and is now valued at 1 billion USD, while the short-term rental company Xiao Zhu (meaning Piggy) which follows the Airbnb model raised 60 million USD in July 2015 and is valued at 300 million USD. In the past two years, Tujia and Xiao Zhu have not been able to raise more investments, and China's first company to copy Airbnb's short-term rental model, Airizu (meaning Lovely Day Rent), has already closed. In contrast, companies in the field of transportation have developed considerably. On April 28, 2017, the "Chinese Uber", Didi announced that the company had raised 5.5 billion USD in investments, reaching a valuation of 50 billion USD.

The unequal and polarized success of the Sharing Economy in different business fields underline the obstacles and paradoxes of the concept, which can be explained first by the inherent limitations of the economic model itself and also by its acclimatization in the Chinese economic context. The SECC model has met tremendous success in the field of urban transportation in particular, making also the strongest impact on urban space.

1.4 Sharing Transportation with Chinese Characteristics

Transportation is one of the key challenges of sustainable urban development. Major cities in China are facing serious transportation issues such as traffic congestion, length of commuting time for residents, and air pollution due to vehicle emissions that are far above acceptable limits, all of which are impacting strongly on the efficiency of urban operations and on the quality of life. The increase of mobility needs has led to the development of diverse means of transportation. In this context, the development of "Sharing Transportation" in Chinese cities has rapidly grown, leveraging relatively successful examples of SECC and witnessing the emergence of companies with high and unprecedented market value gathered in a very short time. However, given the inherent shortcomings of the SECC model, while solving some of the existing urban transportation problems, these new modes of sharing mobility have also created new traffic, and new environmental and social problems.

2. Car sharing in China: the Didi model

2.1 Car sharing development in China

Didi is currently the leading company of the SECC model for urban transportation. Founded in 2012, it started with an Internet

booking platform for traditional taxis. Standing out from the fierce competition of about 40 similar enterprises, Didi became in the second half of 2014 a platform of more than 100 million users, achieving more than 5 million booking orders daily. Almost at the same time, Didi jumped into the Sharing Economy, rapidly developing a car sharing business aside from the taxi platform activity. At the beginning of 2015, Didi made a strategic merge with Kuaidi, its biggest competitor in China. Then, in mid-2016, Didi and Uber Global reached another strategic agreement with the acquisition of Uber China's brand, business, data, other assets and operations in Mainland China. Didi had become the absolute monopolistic urban transportation company, and the nation's best illustration of the SECC model.

2.2 The business model of Didi

At the beginning of its establishment, Didi was not involved with the Sharing Economy but was focusing on developing an Internet platform model for the traditional taxi. The market strategy was to implement a large subsidies system which allowed Didi to quickly gather a massive quantity of subscribers, facing at the same time a high cost of deployment. Traditionally, taxi drivers have a relatively stable income, resulting from the existing and longtime established pricing system between the municipal governments, taxi companies and taxi drivers. As a platform providing a new service to taxi drivers, Didi failed in getting a share of the revenue coming from the personal income of taxi drivers, who are very sensitive and protective of the standard price of a ride.

This resulted in a pressure for Didi to continue, on one hand to attract investments, and on the other, to urgently develop new markets. In August 2014, under the concept of the Sharing Economy, Didi launched an Internet car booking service called Zhuanche (meaning Private Car) which is similar to a private limousine service: this became the new axis of growth for the company. This strategy is still using subsidies as the main model of development, even for car sharing. Didi started to increase its subsidies to Zhuanche drivers and to decrease the number of traditional taxi drivers. As the taxi demand remained roughly unchanged, Zhuanche and taxi businesses started a competitive relationship, resulting in conflicts. In number of cities, the large-scale phenomena of "anti-Zhuanche" protests were led by taxi drivers.

In 2015, during the competition with Uber, Didi launched another car sharing offer called Kuaiche (meaning Fast Car) which is less expensive than Zhuanche. Gradually, several other services appeared on the Didi platform, such as the hitchhiking, bus sharing, driver service and other businesses.

2.3 The Didi model and its impact on urban space

Under the high subsidy system, full-time Zhuanche drivers in Beijing can earn 20,000 to 30,000 RMB (about 3,000 to 4500 USD) per month, about 6 to 8 times the average net income of taxi drivers, and 3 to 4 times more than the average citizen income. The cars used for Internet booking saw a huge growth in a short period of time, with some people buying cars to become full-time Zhuanche drivers. As the clients are mainly users of the taxi, the increase in the number of Zhuanche cannot reduce the number of taxis, nor can they replace the needs of private vehicles. Instead, the Zhuanche have increased the traffic, burdened road network operations, and caused even more congestion. It is ironic that many people believe Zhuanche could ease the difficulty of getting a taxi at peak times, reduce the use of private cars, and generally improve the flow of traffic. After the cancellation of the subsidies, some drivers have chosen to withdraw from the Internet car booking industry, but the vehicle is still an additional car in the city, increasing the pressure on the roads and parking spaces.

The Didi software allowed passengers to pay tips in advance to attract drivers, resulting in some taxi drivers starting to only pick up clients who booked via the platform during peak hours for the extra bonus. The phenomenon of refusing to take clients has worsened the difficulty of getting a taxi. Besides, Didi's monopoly position has eventually exacerbated inconvenience among vulnerable groups such as the elderly. Non-Smartphone users also have more difficulty to use Didi's taxi services.

2.4 The sustainability of the Didi model

Engaging transportation business activities with a personal private car is illegal in China, as a business license is needed in order to operate. The rapid development of the Internet car booking system has also meant a rapid development in the "gray areas" of the law (Tang, 2015). Despite some controversial cases of violations of the law, overall there had not been a severe control of the industry, and in practice the industry found an easy way to get around the law. Indeed, the Zhuanche booking platform first put a personal car under the name of the car leasing company, then hire drivers through another labor dispatch company, and signs a "Four party agreement" between the booking platform, the car leasing companies, the labor dispatch companies, and drivers. Then, in July 2016, the Ministry of Transportation, Ministry of Industry and Information, and seven other ministries and commissions issued the "Internet booking taxi management and services interim measures" and subsequently, many municipalities launched associated

"implementation rules". Didi's Internet booking system was significantly affected.

Most municipalities' "implementation rules" require local household registration and local vehicle license plates, as well as restrictions on emissions. This means that the vast majority of drivers and most vehicles did not meet the regulation requirements. Didi stated that in the Shanghai area alone, only 10,000 of the 400,000 registered drivers held a Shanghai household registration.

In a hardly profitable taxi market, with strengthening regulations on Internet car booking systems, and uncertainty in the attempts of newly launched businesses, the future development of Didi is uncertain. Didi's current market value is based on the large amount of investment capital accumulated. If the company has not created any innovative timely product or service of rupture, it lacks sufficient profitability, and is still relying on continuous financing to continue to operate.

3. Bicycle sharing in China: Ofo, Mobike

3.1 Bicycle sharing development in China

After Didi, the new rising star of the SECC is the "dock-less bicycle sharing" business - bicycles can be dropped off or picked up from anywhere using an embedded GPS chip by scanning a QR code using the mobile app. Due to its phenomenal growth since it appeared in 2015 on the streets of major Chinese cities, bicycle-sharing is now cited as one of the China's "Four Great New Inventions" in modern times. There are currently dozens of companies competing to have a share of the pie, the two largest companies being Ofo and Mobike. Ofo's largest investor is Didi, and the largest investor in Mobike is Tencent, one of China's largest Internet companies, also a major shareholder of Didi.

Both companies have successfully completed several rounds of financing, with current total investments amounting to more than 1 billion USD. Competition is fierce between the two market leaders, with research institutions often releasing reports of one surpassing the other.

According to the "2017 First Quarter China's Major City Cycling Report" jointly released by Ofo and Transport Planning and Research Institute of Ministry of Transport, until April this year, a total of 38 bicycle sharing companies were operating a total of more than 10 million bicycles in China. Since November 2016, the number of shared bicycles has expanded by 50 times. The total number of users is reaching more than 100 million people, covering the main first, second and third-tier cities, with Mobike and

Ofo occupying more than 80 percent of the market.

3.2 The business model of bicycle sharing

The fierce competition between Ofo and Mobike almost duplicates the story of Didi and Kuaidi in the field of Internet car booking, raising investments, attracting users through subsidies regardless of cost, creating consumption habits, and then trying to defeat their business opponents. On the operations, both companies have regularly issued low-cost and even no-cost packages. At the end of June 2017, Mobike launched a free pass for up to 30 days, then a provision of 5 RMB for unlimited rides for 90 days, and randomly issued “red envelope” gifts. This low-cost strategy started to attract some users that were not used to cycling. The trend of this business model that is regardless of the cost leads to an excessive supply of assets to compete for the market. It seems that one can only win the competition by providing bicycles to anyone, anytime, anywhere, and at all costs.

This bicycle sharing system is the typical model of unused assets created by a company and reintroduced on the market

using the company’s sales channels. It has been reported that Ofo and Mobike will respectively introduce 15.6 million and 17.8 million bicycles in the market in 2017. China’s production capacity of bicycles in 2016 for domestic and export use was 53.03 million units, while the annual domestic demand of bicycles is about 20 million units. The two companies are putting far more shared bicycles on the market than the national demand.

This production rate is also far beyond the demand. According to a bicycle penetration rate of 2.5 percent, the average number of bicycles that a first-tier city (such as Shanghai, Beijing, Guangzhou or Shenzhen) can absorb is about 300,000 to 600,000 units. If the number of users served by one bicycle is 150-200 people, the demand is even lower. Beijing has today more than 700,000 shared bicycles on its streets, far beyond the regular demand for rental bicycles. However, with the cost of each bicycle being more than 200 RMB (Ofo) or a few hundred RMB (Mobike Lite model), even 10 million units represents only 40 to 60 percent on the scale of the combined financing of 1 billion USD of the two companies.



Fig.1 Shared bicycles overcrowding the streets of Beijing (Photography taken by Martin Tzou on July 28, 2017)

3.3 Bicycle sharing and its impact on the city

The biggest innovation of the dock-less bicycle sharing system is that it resolves the problem of having to return the rental bicycle to a specific docking station. It also fulfills short-distance travel needs in large cities. In many cities, some areas were not inaccessible by public transport. Yet, current public rental bicycle docks are few and not convenient, and the bicycles themselves offer a poor riding experience; therefore, many people prefer dock-less bicycles instead of renting the traditional public bicycle.

However, if using a 2.5 percent penetration rate to calculate the bicycle-serviced population in China, and given the two bicycle sharing companies' annual production, the two companies will potentially serve 1.366 billion people in 2017, equivalent to the entire Chinese population. With an urbanization rate of 57.35 percent, there is obviously a significant surplus of shared bicycles in Chinese cities. The excessive supply has led to rapid and massive invasion of public space, and monumental amounts of waste. Subway exits, sidewalks, streets and alleys are now all filled with different colors of sharing bicycles, and random parking of the bicycles has started to bring problems for neighborhoods (Fig. 1).

Hangzhou is the first city to issue a local regulation about bicycle sharing in China, also defining bicycle sharing as an Internet rental bicycle. In the "Guidelines to promote the development of Internet bicycle sharing - Trial version" published on 26 April 2017, the city officially stated that the City is not limiting the number of bicycles. Yet, the excess in that city has already started to cause overcrowding in the urban space, and even the removal of 23,000 units in a "sharing bicycle cemetery" (Fig. 2) under custody did not reduce the increasing trend of bicycles.

On the afternoon of July 10, 2017, the Hangzhou Urban Management Committee met with nine Internet bicycle sharing operators, warning them to stop introducing new bicycles before they released new regulations. The scope of interdiction of parking was brought to 50 meters from subway station entrances and 30 meters from bus stations. The previously removed 23,000 vehicles in custody could be recovered. Beijing and other cities are also calculating what a reasonable number of bicycles would be for their locations, and are regulating, as a way to limit the excessive development of shared bicycles.

In addition to temporary detention and delimitation of restricted areas for parking,



Fig 2. "Cemetery" of sharing bicycle in Hangzhou, China (Xianghu Net, June 28, 2017 <http://www.xianghunet.com/news/detail/764201>)

local governments are taking various other measures to manage the usage of sharing bicycles. On July 15, 2017, the Shenzhen Traffic Police issued the first batch of “Shared bicycle ban order” on 13,000 people that infringed the new law, forbidding them to use shared bicycles for a week. On July 18, 2017, the Beijing Dongcheng District started to regulate and plan more than 600 parking areas for non-motorized vehicles with electronic fences, urging bicycle sharing business operators to integrate online and offline management.

Excessive supply, in a sense, is also a response of the operators to the theft of shared bicycles and material damages. High loss caused two shared bicycle companies - Wukong Cycling and 3Vbike - to announce their withdrawal from the market. In early June 2017, the six-month-old company Wukong Cycling closed. Its founder Lei Houyi stated that 90 percent of the company’s 1,200 sharing bicycles had gone missing. The financial loss was about 3 million RMB. A similar scenario occurred for 3Vbike: the shared bicycle platform company also had to announce the closure of its business.

Aside from the excessive supply issue, bicycle sharing is also facing the problem of using public resources. The bicycle sharing system requires the use of a parking place which is on public amenities, yet the public space is a common resource of the whole society. Bicycle sharing companies do not pay for the use of the land, which can be a significant amount of space: it is obviously unfair.

There is another more serious issue often ignored, which is the fact that bicycle sharing is not that environmental friendly. Shared bicycles are considered to be low carbon and green, because they promote cycling as a non-polluting means of urban mobility. Yet, in fact, what sharing bicycles replaced most is walking and bus travel. Compared to walking, bicycle sharing is not more environmentally friendly. And as for an alternative to bus travel, since it does not reduce the number of bus services, it not only does not reduce carbon emissions but also makes the bus transportation system less efficient, which will generate extra government subsidies. Besides, the growth of shared bicycles is also adding another travelling method on the limited road capacity, enhancing competition. Another factor in the bicycle business is that for bicycles to be lighter in weight, shared bicycles are mostly made of aluminium, and producing aluminium requires a lot of energy which increases global environmental costs.

4 The internationalization of China’s bicycle sharing companies

Chinese bicycle sharing is also making an impact in cities abroad. The over-production of shared bicycles in China has “spilled”

overseas. For instance, Mobike has started to supply Singapore, Manchester, London, Fukuoka, Sapporo, Florence, and Milan, and Ofo also plans to run in Silicon Valley and London. Yet in contrast, many cities in Europe and the United States do not seem to have the scale effect to generate population dividends. In European and North American countries, car ownership rates are higher than in China while to a certain extent, urban congestion rates are generally lower, which makes the car commuter the mainstream user. In Mobike’s market analysis of Singapore, the proportion of cycling commuters is only 1.5 percent. At the mobility level, cycling to commute is more of a lifestyle choice, a substitute for using the car; the user might be tired of driving, or chooses the bicycle for environmental beliefs, often coupled with the motivation to be healthier and have more exercise. In fact, in developed countries, many commuters who cycle have jobs at least at the semi-professional level. Not many people cycle purely for commuting.

On August 1, 2017, the municipality of Amsterdam issued on its Facebook page a document that the city will be cleared of shared bicycles within a few months. The clean-up would begin within the city center of Amsterdam and in the East of Amsterdam. The city government believes that users have the right to park their bicycles in public spaces, but it is not legal for companies to store their bicycles in and rent them from public spaces. Differences in regulatory rules outside of China make the success of overseas expansion of the Chinese bicycle sharing model less optimistic.

3.5 The sustainability of the bicycle sharing model

As with Didi, the bicycle sharing business has not yet found a stable profit structure and business model. Ofo founder Dai Wei said that the current vehicle usage of Ofo is high, the daily income is relatively stable, and that while “last year [2016] did not generate profits but was close to even, 2017 will certainly be profitable.” Ofo said that the rental costs are the main source of revenue. Mobike, while having higher costs for hardware, has stated several times that it is still too early to talk about profits. Founder Hu Weiwei has even said: “If at the end [Mobike] fails, then let’s take it as an act of philanthropy”.

Although the two companies have not found a profitable model and the subsidy war on “burning money” has been ongoing for some time, there is still no winner, and no plans for a merger. The trend seems to be to go on producing at even higher costs

and renting at even cheaper prices to keep their customers, which implies an even more violent competition, likely resulting with even more tragic results: more environmental degradation, over-consumerism, and excessive landfill.

The development of official regulations has had less impact on the bicycle sharing business than it has had on car sharing. Currently, the most stringent terms for regulating bicycle sharing reads: "Each city, based on its local characteristics, public travel needs and the development of Internet bicycle sharing services, shall study and build a vehicle supply mechanism adapted to its urban space carrying capacity, parking facilities, public travel needs, in order to provide guidance to the Internet bicycle sharing operators to supply vehicles reasonably and in an orderly manner, insuring a healthy and orderly development of the industry along with safe and stable operation."

The number of bicycles supplied directly affects the convenience of the service and the loyalty of the user, but the power to determine the access and delivery of the bicycle stays in the hands of the local government. So, the standards that local governments use to choose bicycle sharing companies become critical. Whether the selection of shared bicycles is fair determines not only the best ratio of operators, but also provides an adequate competitive space for future entrants. Even not considering future competition, in cities already saturated by shared bicycles, how to reallocate the existing resources is also a challenge.

Some of the bicycle sharing companies have begun to deal with the downsides and flaws of SECC model. In November 2016, Ofo launched its "City Big Sharing" program through which global bicycle manufacturers - and their products and accessories - can access the Ofo platform, providing different users with a wide range of personalized bicycle services. In parallel, the same program is also open to ordinary urban users, encouraging them to share their own bicycle on the sharing platform, with the reward being free lifetime use. So far, the Ofo platform for individuals to share their own bicycle interface has not been operational. The official attitude is somewhat vague and ambiguous: on one hand, bicycle sharing is defined as an Internet bicycle rental service, yet on the other, they state that the Internet rental bicycle is a typical business of the Sharing Economy . What is more confusing is that, on many occasions, the government and the public still believe the actual Internet rental bicycles as real shared bicycles, linking the Sharing Economy to a commercial model. A shared cycling model based on a true Sharing Economy concept is still far from reality.

In the bicycle sharing business - different from the Didi platform - after deducting labor costs, most of the capital left is transferred into products. Once the operating model or product is restrained and limited, the bicycle sharing business will have difficulties even more quickly than the car sharing. Its exit from urban areas would only leave the city with a large number of bicycles that cannot be used.

4. Conclusions

Due to the particularity of the Shared Economy, the old regulatory framework for businesses cannot be fully applied, hence there has been an emergence of a new and large gray area. China expects to see more efficiency in the allocation of resources through the Sharing Economy that could bring economic development to cities. To date, the governments' attitude has been relatively loose in regulating Sharing Economy businesses, even supporting their expansion in many ways. Yet, as snacks cannot replace dinner, the Sharing Economy cannot replace the traditional economic model: it can only be an alternative and a supplement. In the absence of clear regulations, Sharing Economy companies are tempted to abandon or disregard the initial concept of sharing, to attract more investments or to find more profitable business models.

The new modes of operation have not been able to find a balance between real demand and supply, because in the "Sharing Economy with Chinese Characteristics", the large demand is first artificially made up by free or extremely low-priced items, and then made believable by creating an excess of supply, regardless of cost. To meet the so-called additional needs, additional capital is required. The tragedy is that once this non-economic model is terminated, a large excess of wasted products will be left in cities.

The supply of goods made for satisfying an unnecessary demand has already caused confusion, congestion, and even protests in the urban space. These illusory "Sharing Economies" have failed to prove that they can be economically viable, and have also provided an unsustainable model of services in the city. Such ups and downs are forcing users and local governments to make difficult and extreme decisions, either supervising attempts of development, or banning operators, legitimate ones or not. In reality, both alternatives are likely to happen, gradually.

End notes:

Although there is no proof of corporate profits available, several leading companies are still raising significant investments, and new leading companies continuing to emerge.

In January 2014, Didi started to give subsidies to both passengers and drivers, increasing from 10 RMB to 20 RMB (compared to the starting price of Beijing taxi which is only 13 RMB). This subsidy gradually declined in May and August respectively, to eventually being cancelled both to passengers and to drivers. It evolved into a system of a “red envelope” bonus, carrying on the implementation of subsidies.

Cheng Wei, CEO of Didi, declared spending 15 billion RMB of subsidies in the second half year of 2014, in Amazing inside news: why the more money raised, the more money Didi is making? China Webmaster, May 22, 2017.

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The rates of the Kuaiche are cheaper than Zhuanche both on the starting price and the price per kilometer.

According to the Article 64 of the “Road Transport Regulations of the People’s Republic of China (2016)”: “If the road transport business license has not been obtained, and business is engaged in road transport without authorization, the road transport administrative organ at or above the county level shall order it to cease to operate; if there is any illegal income, the illegal gains shall be confiscated and a fine is imposed at 2 to 10 times the income; legal or illegal income of less than 20,000 RMB shall be imposed a fine of 30,000 to 100,000 RMB.” Available from: http://www.gov.cn/gongbao/content/2016/content_5139501.htm [Aug 15, 2017]

On January 7, 2015, M. Chen Chao, user of Didi Zhuanche software in Jinan, Jinan West Station, was identified by law enforcement officers as performing illegal operations, with a fine of 20,000 RMB. Quoted as the “First Zhuanche lawsuit case in China”, the “Private Car” driver won the case at the end, with the

cancelling of his administrative punishment. Didi driver wins first Zhuanche case, administrative punishment cancelled, Sina Law news, February 22, 2017. Available from: <http://news.sina.com.cn/sf/news/ajjj/2017-02-22/doc-ifyarrcc8562233.shtml> [Aug 15, 2017]

Ofo was the first to appear in the Beijing University Campus on June 2015

Along with the High-Speed Rail, Zhifubao (Chinese mobile payment system) and online shopping, bicycle-sharing was quoted as one of the China’s “Four Great New Inventions” in modern times, a slogan issued from a survey made by the Beijing Foreign Language University among foreign students from 20 countries. The popular “four great new inventions” make foreign students fascinated by Chinese life style, Sina News, May 19, 2017. Available from: <http://news.sina.com.cn/c/2017-05-19/doc-ifyfkqwe0259801.shtml> [Aug 15, 2017]

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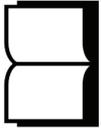
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Analyses of human behaviour in public spaces

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1. Introduction

The now evolving studies of human behaviour and body movement, including research in kinesics and proxemics, video analyses and more contemporary methods of tracing human behaviour, thanks to big data sets, e.g., GPS and Wi-Fi signals, should be drawn together and contribute to the larger picture of human behaviour analysis for urban design applications. While researchers in this rapidly emerging field are contributing valuable insights to the study of human behaviour, their investigations are dispersed and refer to variegated and unrelated topics. The analyses, conducted for several distinct purposes, overlap to some extent, at the same time leaving many other possible applications behind. While a design framework is often cited as the reason for conducting these analyses, a still more systematic way to approach behaviour analyses in urban design is required with the potential to supplement and extend the classic methods with new layers referring to

temporary and spatial behaviour. In order to introduce a useful tool for the design of urban space, the correct methodology needs to be established. The very first step is an examination of the state-of-the-art behaviour analyses conducted in the current paper, with the focus on the urban design scale.

The survey which follows starts with a summary of classical methods applied in urban design workshop. Furthermore, we briefly review the possibilities of the application of automated methods, starting from video motion analyses, through small group conversation analyses to Location Based Services (LBS) and experimental methods which combine several tools. Both the pros and cons of the available methods are discussed. Assessment of the usability of the discussed methods is conducted and discussed with a focus on the applicability in the urban design workshop. Finally, I conclude by indicating the possible future research paths.

2. The conventional methods of analyses of human behaviour in outdoor space

The criteria, which refer to the design objectives, were established based on the experience of the analysis of pedestrian behaviour conducted by Whyte (2009, first published in 1980) in order to assess the functioning of small plazas in New York. The methodology was later developed by his followers, including the experience of such organisations as Project for Public Spaces and firms such as the Gehl Architects, and may be further extended based on practical experience. The main method used in these analyses is the direct observation of human behaviour in urban spaces. In addition, interviews with people surveyed are also conducted. Direct observation, accompanied by graphical notation in the form of plans and graphs showing the actual use of physical space, is also complemented with video recording and photographs made with time-lapse cameras at a range of time frequencies.

In the study by Whyte (2009), a part of the focus on walking behaviour, the majority of the observation is concentrated on the social situations happening in a given place. People, in this case, were counted, described and photographed. A study was conducted to count people walking, standing and sitting in various parts of the plaza, based on the collected photographs. Then the densities were derived from this data taking into account the time framework and spatial location (Whyte 2009, pp. 70-71). The method has been adopted by the Project for Public Spaces and several other urban design practitioners.

A very similar methodology is also used in the analyses performed by Gehl (Gehl and Svarre 2013) and his firm, as a background study for their urban design projects in various locations all over the world. Activities taking place in outdoor spaces may be classified into several categories based on different criteria: (1) purpose: recreational and purposeful activities, (2) repetition pattern: single events, repetitive activities, chains of events and continuous change. Two main types may be distinguished with regard to location attributes: (1) moving - walking, running, and (2) stationary activities: sitting and standing, as well as other occupations connected with staying in one place, e.g. playing. The external conditions influencing human behaviour which should be carefully registered in order to enable similar studies at a later date, include: weather, season, time of day, day of the week and month. Also the specific local climate, able to influence human comfort, should be taken into account.

Measuring “city life” involves qualitative assessment of how many activities are performed and how different people

perform them. Some qualitative classification referring to such features as age, sex and physical disabilities are noticeable based on observations. Others, like: job, education, ethnicity or economic situation may be assessed only after conducting a survey. According to Gehl and Svarre (2013), there are several types of measure used in the observation of humans in public space: counting, tracing, tracking, looking for traces, mapping, photographing, test walks and keeping a diary.

(1) Counting is usually conducted over an extended period of time to compare various seasons, as well as times of day or week. It is essential to register sample pictures in fixed, repetitive moments of time. The minimum time to conduct the count being 10 minutes, in sites which are thinly attended a longer interval is necessary to reduce uncertainty.

(2) Mapping that serves to collect a subject's locations in a delimited space provides essential information where people stay: on the edges, in the middle, or their distributed in the space. Another classification of location distinguishes public, semipublic or private zones.

(3) Tracing, which means drawing people's movements inside or crossing the limited space as lines of movement on a plan, gathers information such as: walking sequence, choice of direction, flow, the most and the least used entrances, etc.

(4) Tracking (shadowing) involves following people and measuring: average speed of pedestrians, time required to cover a certain distance, and duration of activities. Walking speed is not a constant feature, on the contrary, it is influenced by factors such as: weather, age, mobility, health, errands, being alone or being in a company, etc. Tracking assumes following randomly chosen pedestrians for a given time or distance, or voluntary subjects may consciously agree to be followed. On a larger scale consent is not necessary, as technology allows one to anonymise information in publicly or commercially available sources of data on human subjects' movements.

The requirement to make precise and comparable registrations is a springboard to use automated methods, for example the counting may be enhanced with the use of a pedometer. In general, the difference between performing registration by human subjects and automatic registrars is in the interpretation of the collected information. In the case of automatic acquisition of data, careful and time-consuming evaluation is later required.

In terms of the usage of a public space, there are three main categories of activities: necessary, optional and social (Gehl and

Svarre 2013). Necessary ones include shopping, walking to and from work, school or the bus stop, etc. Optional activities such as strolling, jogging or sitting if there is a convenient spot, resting, and the like, happen when people have time and find pleasure spending time outdoors. Social activities may accompany both and may assume contact with people whom a person already knows or strangers. The last type of encounter is rare, and often takes the form of a triangulation - a situation when people who do not know each other start talking due to an external catalyst, such as street art or some unexpected conditions, e.g., power failure or strange weather. Another kind of social contact is passive observation.

In the studies of urban places conducted on the background of anthropology (e.g., by Low 2000 or Richardson 2009), the focus is on human behaviour in urban places with the use of methods similar to those outlined above, and on the various social situations which take place there. All the above discussed methods, used as a background study in urban design, are based on time consuming and strictly manual analyses of gathered materials and data. Nevertheless, they provide the basic framework which should serve as a reference when looking for tools for computer enhanced analyses for urban design.

3. Methodology

The proposed classification scheme is based on an evaluation matrix that compares various methods of analyses of pedestrian behaviour in outdoor spaces from the standpoint of its usefulness for the requirements of urban design (Table 1). The proposed list of criteria refers first to the current objectives of analyses as well as to the basic characteristics of data: (1) purpose of collecting the data, (2) method of gathering the data, (3) quantity and quality of gathered data, percentage of the gathered crowd, author of the review or case study, and other properties defining the data. The evaluation also includes the potential application of data gathered with the use of a given method, based on the method's typology defined by Gehl and Svarre (2013). A similar comparison of the available methods for the purpose of monitoring pedestrian movement was also done by Millonig et al (2008, 2009). In those studies the focus being rather on larger scales, however, the explanation of the technology applied is worth mentioning. In contrast, this current study concentrates on the analyses of human behaviour in general, not only walking, in the scale of urban design, thus focusing on outdoor urban spaces.

Reviewing the methods, we will first of all start from the three major fields dealing with the analyses, simulation and representation of

crowds: computer vision, computer graphics and pedestrian evacuation dynamics. The efforts to develop a common platform of research observed recently (Ali et al. 2013, Moeslund et al. 2006, Millonig et al. 2009), may provide a good opportunity to initiate studies on automated analysis of human behaviour for the purposes of urban design. The computer vision specialists develop methods aiming at: (1) crowd representation by means of visual methods, (2) tracking of groups and individuals, (3) detection of abnormal behaviour, (4) classification of motion patterns, and interaction modelling (Ali et al. 2013). The computer graphics deal with broadly understood modelling and simulation of crowd and group behaviour at various scales. The evacuation dynamics develops pedestrian simulations and analyses evacuation, with the emphasis on the validation of results.

Secondly, we will review small group behaviour analyses, which, partly overlapping with the vision studies, focuses on communication situations. Although this is a part of this study which has not been discussed so far as part of the automated methods of data acquisition for urban design, its objectives and emphasis on the communication situations are of interest, especially when dealing with urban design scales. Next, another important field whose research objectives partly overlap with the current one is transportation, and especially analyses of pedestrian mobility (Millonig et al 2008, 2009). This field has observed an important development recently thanks to the Location Based Services (LBS) development.

Finally, we will review some experimental methods answering more directly the objectives of urban design as well as mention the attempts undertaken in social studies and anthropology, where the observation of human behaviour remains the traditional subject of interest. The current review used the most significant review papers published recently in the above mentioned specific disciplines. In some cases, in order to fully explain the available methods, we refer to more detailed case study analyses.

4. Video motion analyses

Moeslund (2011) distinguishes three main types of application of video analyses: (1) surveillance, (2) control and (3) analysis. While surveillance applications automatically monitor large human gatherings, analytical ones use various tools for, e.g., annotation of video or content based retrieval. Control applications assume using parameters derived from motion or pose as a base for simulations. In the process of the video motion analyses, Moeslund (2011) discerns the following steps: (1) initialisation - detection of humans, (2) tracking, (3) pose

estimation, and (4) recognition. Conventional video motion analyses offer several ways to detect human subjects. In the simplest one, a model of a human shape is found (Zhao et al. 2008). More sophisticated methods apply a voting scheme to the contours around each individual (Rodriguez and Shah 2007) or distinguish just the torso of a pedestrian (Leibe et al. 2005). Another procedure is based on the assumption that each individual exhibits a unique motion (Brostow and Cipolla 2006).

In further analytical steps, objects are tracked either based on the interaction among detected interest points or with the use of data association methods (e.g., Betke et al. 2007). The first method allows for an improvement of the tracking of each object. The last is particularly useful in cluttered scenes, thanks to their ability to associate detection results of consecutive frames or even to track partially occluded pedestrians by detecting body parts, rather than the full individuals (Wu and Nevatia 2006). More in depth reviews of the currently available methods are provided by Ali et al (2013) and Moeslund et al. (2006, 2011). They are intensively developed with the objective of making group behaviour analyses efficient and fully automatic.

When dealing with the visual representation of crowds, the common research path emerges as follows. After tracking individuals and groups (Izadinia et al. 2012; Dehghan et al. 2014), interactions among the pedestrians in the crowd are mathematically modelled. These two analyses serve to separate and classify motion patterns (Mehran et al. 2010), and allow for the detection of normal and abnormal behaviour (Kratz and Nishino 2009). In computer graphics, crowd modelling refers to the representation of virtual humans at various scales and levels of detail and covers group behaviour and agent-based motion simulation, aggregate flow, motion planning for large scale crowds and obstacle and collision avoidance (Ali et al, 2013). The evacuation dynamics deals with analyses of motion, interaction and the self-organisation of crowds. Assuming that "a crowd is any collection of individuals or pedestrians where the behaviour of one individual is influenced by another" (Ali et al, 2013, p.3), many of the methods conceived for its analyses are useful from the point of view of urban studies as well. The current study excludes however the holistic methods of analyses, i.e., dynamic textures or particle based representations, while focusing on the tracking of group behaviour, motion patterns and human interactions in the scale of public, outdoor spaces.

5. Small group behaviour analyses

In a comprehensive review discussing the automatic methods of analyses of

small group behaviour, Gatica-Perez (2009) explores the experiments coming from several scientific communities, i.e.: multimodal processing, machine learning, human-computer interaction, ubiquitous computing, computer vision and speech and language processing. He examines the possibilities of pattern recognition in multiparty interaction, with regard to the following observable behaviours: turntaking, addressing, social relationships in small groups, including roles, and group members' emotions. The last covers perceived interest and attraction and such individual personality traits as dominance and extraversion. The observation takes into account nonverbal signals that are perceived both as aural, such as tone of a voice and its prosody, and visual: posture, body gestures and more detailed: eye gaze and facial expressions. The definition of a small group (Jovanovic, Akker 2004) assumes the size of a gathering up to seven participants and conversations occurring between all of the members, of whom any may initiate the communication. In larger group discussions these usually consists of a series of conversations between a group leader and changing interlocutors. The current synopsis focuses on methods using visual exploration, more appropriate for studying human behaviour in outdoor spaces.

The addressing and turn taking patterns are the subject of research of social psychology and nonverbal communication. Addressee identification research (Jovanovic, Akker 2004) distinguishes a few separate groups of conversation participants, firstly dividing them into (1) active participants and (2) non participants. Among active participants the authors further discern: (1) a speaker, (2) an addressee and (3) side-participants. While in the group of non-participants there are listeners who may be further divided into bystanders and eavesdroppers. The main sources of analysed information in this case are speech, gaze direction, gesture and context. The last one is of special interest to our research. The categories of context listed by Jovanovic and Akker (2004), as contributing to addressee detection, are: the history of interaction and meeting action, user context and spatial context, which covers: "participants' location, locations of the environmental objects, distance between participants, participants' visible area".

The turn taking patterns are automatically recorded with the use of such tools as: a multisensor room, multiple cameras and microphones, including lapel microphones and a microphone array. Despite the attempts to develop more automatic analysis, the most reliable method of recognition, however costly, is still the manual labelling of acquired data. The visual cues are extracted from tracing the participants' body motion and pose as well as the motion and location of heads, represented by skincolour blobs (Gatica-Perez 2009). In multistream and

multi layered systems, layers describing the individual and group activities are overlapped, thus providing more reliable results.

Based on an analysis of conscious or unconscious nonverbal behaviour, the computational modelling researchers automatically identify a person's internal state in small group conversations. Gatica-Perez (2009) lists the following states: "nervousness, anxiety, embarrassment, frustration, anger, joy, attraction, confusion, consistency, boredom, and interest". Interest - the most significant behaviour for the current research - means the degree of engagement during the interaction and is examined based on speech modality.

The researchers of the wearable computing community (Pentland 2008), in the well-received study on the perceived interest levels, used the following methods: manual estimation, automatic computing from a number of acoustic cues, and the estimation of body motion from accelerometers. Among the studies on personality traits, namely: dominance, locus-of-control and extroversion, only the first one seem in the scope of our interest in the current research. Given the abundance of research in social psychology and sociology on roles in small groups, computational models addressing this topic reflect the multiplicity of perspectives and refer to disparate cases. Hare (1994) classified roles into: (1) functional: control, access to resources, status and group identification; (2) sociometric: central, friendly, or isolated position within a group; and (3) emotional. The last group is further divided into prototypical: hero, clown, and scapegoat, and dramaturgical roles: protagonists, antagonists and audience members. Pianesi et al. (2008) explored functional role recognition in small groups, starting from a definition of the coding scheme. The two classification systems applied (1) task-based roles: orienteer, giver, seeker, recorder, and follower, and (2) socioemotional-based roles: gatekeeper, protagonist, supporter, attacker, and neutral. The first division was based on the distribution of tasks related to the coordination and mission of the group, the second one referred to the carrying on of the relationships between the group members. The information was derived from the semi-automatic audio cues and automatic visual cues, the last one extracted from two measures - one for the body and one for the hand - with the use of the motion features computed on skin regions. The majority of the automated small group exploration addressed teamwork situations and was conducted indoors. The recorded conversations discussed by Gatica-Perez (2009) come, with a few exceptions, from the collections recorded and designed with the goal of studying group interaction.

6. Pedestrian mobility studies

Mobility studies employ several methods of tracing and tracking human subjects at various scales. Apart from video-based technologies, which have already been discussed above, they cover the range of methods of the so called Position Determination Technologies (PDT), which comprise technologies tracking the location of human subjects with the use of wireless devices (Millonig et al. 2009). The main techniques in this group include: (1) GPS data collection, (2) mobile phone data, (3) WLAN data. Social media and card transaction analyses, similarly to research on Bluetooth and RFID data are going through an intensive period of development, however in all cases the issues of privacy and maintenance of proper anonymity are essential (Resch 2013). The issues of privacy protection should take into account the variegated legal environment of different countries as well as ethical concerns. From the point of view of community planning, the involvement of participants seems the most appropriate solution, which will be further addressed in the Discussion section of this paper. Among the experimental methods which are more suitable for smaller scales, laser scanning and sensor floors are briefly overviewed at the end of this section.

6.1 GPS

GPS data signals, with the highest accuracy values up to 3m (which could be enhanced locally with the use of augmentation services, compare the site gps.gov) and a precision decrease in locations surrounded with highrise buildings due to signal reflection and multiple occlusions, are not sufficient for the purposes of the observation of pedestrian behaviour in outdoor spaces. Although attempts have been made to use GPS to track people in urban areas for the purposes of tracking pedestrian mobility, e.g., the study by Van der Spek et al. (2013) in the town centre of Delft or studies by Hovgesen and Nielsen (2004) or Shoval (2008), since the precision of the signal is limited, such observations may pertain to larger urban areas and are not suitable for the analysis of a single street or square. Not applicable to direct tracking or shadowing in urban design scale, Global Positioning Services are however useful in the process of video motion analyses for the calibration of gathered video data to the unified coordination system.

6.2 GSM/UMTS

Mobile phone data acquisition relies on GSM/UMTS positioning. The cell coverage's inherent properties determining the correct signal supply significantly limit the accuracy of the available location of users' coordinates (for details consult Millonig et al 2009).

The growing market of Localisation Based Services (LBS) is one of reasons for the increasing availability of location information. However, the available precision still needs to be amended. While some mobile systems record location data in a permanent way, others note only users' activities, such as calling, starting data transfer, etc., data acquired is not complete. All in all, mobile phone data location accuracy is not sufficient for tracking human subjects in outdoor spaces (Hoteit et al. 2014).

6.3 WLAN networks

More details may be obtained while using LAN access analyses, as discussed below. Users' signals in WLAN networks may be another potential source of data on human behaviour (Santi 2012). The basic assumption in this kind of analysis is that the change of a user's AP in a WLAN network means a change of the user's location. This assumption is considered true except for, so called, pingpong transitions, which may be filtered out. The lack of continuity in the tracing of a user's signals means however that mobility is not explicitly characterised in terms of location and trajectory. Instead, it may be implicitly described through the analysis of migration patterns between APs in the networks, with the artificial APs introduced to the model to emulate the inactive periods (Santi 2012). It should be noted however that WLAN traces do not allow continuous tracking of a user's position over a period of time, but just a user's AP association pattern. Hence, the statement on the limited degree of user mobility in a WLAN refers to the users' repetitive WLAN access pattern exploring a small portion of APs in the network (Santi 2012). WLAN environments may be classified into two categories (Santi 2012): (a) models firmly reflecting user AP/registration patterns in WLAN traces, which may also serve to predict the user's next association (e.g., Jain et al. 2005), and (b) models aimed at modelling a user's physical mobility (Kim et al. 2006). Taking into account prolonged periods of associations with a single AP, the users' behaviour in the WLAN networks may be described as 'nomadic' rather than as 'mobile'. The growing popularity of VoIP networks creates the opportunities for more exact tracing of physical location.

6.4 Bluetooth analyses

Patterns in human activities may be analysed and registered thanks to largescale datasets, however, the limited accuracy of data measurements (Miller 2005) constrains their applications to city scale analyses. Other sources of data, such as social media or bank card transactions (Yoshimura et al. 2014), are also more suitable for greater scales. More potential lies in Bluetooth proximity-detection analyses of human behaviour, in

which (1) the detecting scale is fine-grained. Yoshimura et al. (2014) list the further advantages of the Bluetooth proximity-detection approach to small scale analysis: (2) previous registration not necessary, which enables collection of large data sets over an extended time, (3) the unobtrusive character of Bluetooth, (4) accuracy inside or in the proximity of high structures. There are also constraints of this method of observation, i.e. the actual share of people using Bluetooth technology: for example, in the exploratory study conducted in the Louvre Museum a limited number of approximately 8,2% of visitors had Bluetooth signal turned on (Yoshimura et al. 2014), which would make the information required for urban design purposes fragmented.

6.5 Laser scanning

Automated methods of data acquisition may use the full electromagnetic wave spectrum, including those which lie outside the visible range, e.g., thermal waves. The limitations result from the need to make data acquisition eye-safe. Instead of standard cameras, laser scanning, both visible and invisible, may be applied. In the research conducted in the Pedestrian Accessibility and Movement Environment Laboratory (PAMELA) UCL (Bauer and Kitazawa 2008), the initial tracking experiments were performed with the use of two laser range scanners for the sake of pedestrian motion model calibration. The scanners, with a frequency of 10 Hertz, located in two opposite corners of the platform at a height of 1m, emitted and grabbed reflected infrared beams, which were synchronised and combined in a joint coordinate system to provide a two-dimensional plan of the scene. The range of scanning did not exceed 30m and some occlusion problems persisted. A point cloud derived from the laser scanning may be further processed in order to detect individual objects and track them over time, e.g., with the use of a Hidden Markov Model tracking. Other researchers try to put scanners at foot level - ca 20 cm above the floor, e.g., Zhao and Shibasaki (2005) or Shao et al (2007). In newer research from the same research group (Cui et al. 2008), the combination of multiple laser scanners and video camera allowed for more reliable acquisition of data.

6.6 A sensing floor

The market offers multiple commercial products both for counting and surveillance as well as for detecting the movement of people. Most tools are designed for indoor environments but there are also devices which may be used outdoors. Apart from cameras and laser scanners operating in all the available frequencies (thermal, infrared, visible, etc.), enabling both detection and counting of subjects as well as tracking,

there are also tools such as sensor equipped floors or mats. The last, being a recent invention, are designed in a way which makes indoor applications more appropriate. Two types of floor systems based on different methods of step detection are available: the first one using capacitive proximity sensors (1), and the second one based on pressure sensitive floors (2). While floor pressure sensors, reacting to the external pressure, are more suitable for indoor applications, the capacity proximity sensors enable tracking regardless of the type of flooring, including, e.g., stone tiles, with the exception however of conductive materials (Sousa et al. 2013). Representative for the first type, the SensFloor system combines microelectronic modules and capacitive proximity sensors in the form of a grid (typically 0,5x0,5 m) with a textile roll (max length 50 m) (Sousa et al. 2013, Lauterbach et al. 2012). In addition, as the maximum outer layer thickness should not exceed 5 cm, some outdoor applications seem possible, however, the areas of important traffic must be carefully rethought. The sensing events evoked by people walking are transmitted wirelessly (868 MHz) to the transceiver, which then analyses the time series and reconstructs the movement trajectories. The experiments are conducted on walking pattern analyses with the use of devices such as pedometers in order to detect individual pedestrians (Sousa et al. 2013). Sensing floors, offering solutions eliminating some problems the computer vision methods deal with, i.e. angular observation occlusion, require planning of the observation strategy at the stage of design and construction of a site. On the one hand this condition excludes many possible urban design analytical cases, on the other it may become an effective and efficient part of the actual design proposal itself, providing opportunities to create more flexible design solutions

6.7 Radio Frequency Identification (RFID)

Radio Frequency Identification (RFID) is a well-established technology that enables identification of objects. RFID tags, classified into two categories, active and passive, differ due to the presence of an internal power supply and, consequently, cost, size and available signal range. Passive tags may be only read from direct proximity, which limits tracking possibilities to larger scale or indoor applications, with a track consisting of a series of points acquired when a subject passes next to the RFID reader, e.g. when moving through several rooms or passing next to gates. In single space solutions, multiple trials were conducted to track objects using mobile antenna and passive RFID tags distributed at regular distances all over the area. Recently, researchers started examining other options, with passive RFID tag moving and stable antennae (Choi et al. 2015), which could be useful as a method of

tracking people in open, outdoor spaces..

7. Experimental methods

The objectives of collecting data from automatic analyses are to provide the framework for successful urban design. In this case successful means fulfilling the needs of users, shaping the environment that enhances encounters and making social situations happen. Successful in this sense also means the way of use that does not create unnecessary obstacles, which answers the requirement of comfort and which makes use of public space more intuitive. At the same time an examination of people's behaviour in outdoor situations may help make the settings more flexible.

In recent times, some attempts to solve the above defined problem were undertaken by Nielsen et al (2014), who tracked and recorded pedestrian behaviour and dynamics with a system based on the use of Computer Vision methods enhanced with thermal cameras and Geographic Information Systems (GIS). This study is particularly interesting as it was done with the recognition of the objectives of urban design. Referring to the methodology applied, researchers used two thermal cameras with a fixed field of view in order to constantly monitor the area of interest: (1) from a point close to a nadir view, in order to eliminate occlusions, (2) from a more oblique angle. The people with equipment were differentiated from the general group of pedestrians (cyclists, strollers). The control points were measured with high precision GPS and applied to the video-acquired scene. The T-Analysis software algorithm allowed for the assigning of IDs to each user of the space and further for tracking individual paths. The conclusion was that the automatic method is not sufficient for exploration of individual behaviour, although useful for motion pattern recognition and pedestrian dynamics.

Seer et al (2014) conducted an interesting study addressing actual behavioural analysis. The researchers, looking for accurate and detailed data on pedestrian movement and interaction behaviour, applied Microsoft Kinect sensors, which enables both capturing of video footage as well as three dimensional depth data. Data from the 3 sensors located above the scene were further calibrated to the World Coordination System, which enabled the collection of nearly 2700 trajectories of people passing through the scene. However, in the case-study referred to, the data collected was afterwards used for the calibration of variations of the Social Force model. Applications for tracking human subjects as well as behaviour observation are easily available, more so considering the low price of Kinect sensors. The combination of several 3D sensors are currently the most reliable source of data on human behaviour in

public spaces, publications on this topic are legion, e.g. (Brscic, D. et al., 2013.)

8. Results and discussion

The proposed evaluation matrix allowed for the comparison and assessment of the methods of analyses of pedestrian behaviour in outdoor spaces, such as squares and streets, from the standpoint of its usefulness for the requirements of urban design (Table 1).

A comparison was performed with regard to the initial choice of criteria referring to the methods of analyses of the urban design workshop (Gehl and Svarre 2013, Whyte 2009). Looking from the heuristic standpoint, in order to assess the applicability of the reviewed types of analyses to the workshop of the urban designer, the following approaches should be adopted. First the 2D location, where counting and tracking of human subjects is required. Further steps should be completed with the identification of the types of activities of individuals, i.e. walking, running, standing, sitting, etc. Then the activities performed need to be described and classified, e.g., based on the classification schemes defined by Gehl and Svarre (2013) and Whyte (2009).

Table 1 sets together the following classification criteria:

- Scale / accuracy - defines the size of an area covered by analysis and the positioning accuracy which may be achieved under normal circumstances.
- Counting - indicates whether the method allows researchers to count people gathered in a given spot.
- Tracking / tracing - points out the availability of following people and presenting their paths in a plan drawing.
- Activities classification - determines the possibility to describe the type of activities performed by surveyed people.
- Communication situation analysis - points at the availability of recognition of communication situation characteristics.
- Cost / data availability - the most important part of expenses.
- Constraints - the most significant limitations.

The experimental methods listed at the end of the former section prove that the best results may be obtained when combining several observation methods together.

Moreover, an integration of public opinion as a complimentary source of information

is advisable, due, first, to privacy protection requirements, which impose the demand to obtain consent for data acquisition. Second, the inherent objectives of urban design analyses, which, by definition, serve the improvements of the functioning of outdoor spaces, suggest that voluntary sharing of data may supply a better answer to the various needs of the users of the space. The research on the way people use a given place first uncovers its sociometric layout both inside and with regard to the connections with the larger neighbourhood where it is located. Second, it allows us to recognise the basic types of activities which happen there, thus giving some insights on both the current as well as the potential culture of usage of the space. The recognition of common habits with regard to a designed space as well as other locations in the proximity of similar social preconditions and of a function resembling the one to be introduced in a place may give some design guidance. As, usually, the culture of the usage of space remains constant for a given social group and character of activities, spatial constraints of the actual human behaviour become much easier to define.,

None of the methods discussed above take into account the relation between the environment and human behaviour. In most cases discussed in computer vision studies, the observation was performed to further calibrate the model, the simulation of behaviour considered the actual method in urban design. While modelling and simulations are useful, also knowledge on the actual way people use space is salient itself. Designers are first interested in the connections of the site with its direct neighbourhood to avoid destroying the sociometric layout in an unintentional way. Second, certain types of behaviour, specific for a given community and for a defined type of social situation, convey into the larger picture of the culture of usage of space. Recognition of the typical behaviour common for variegated situations may be crucial in the design of new spaces encouraging social and communication situations.

The defined catalogue of preferable ways of using outdoor spaces constitutes a valuable manual for designing new spaces in a way which increases the social acceptance of a neighbourhood. In most cases, habits do not change easily, interventions should be thus introduced in a cautious way, answering the real needs of a given community. In a nutshell, learning about the current use of space is one of the possible methods, next to the public involvement methods, and surveys, which may give designers an insight into what formal solutions will answer the actual needs of a given community, framing various social situations in a successful, thus accepted, way. In a more futuristic approach, we may also discuss the settings which adapt formally to the situation which takes place in

	Scale / Accuracy	Counting	Tracing/ Tracking	Activities classification	Communication situations analysis	Costs / data availability	Constraints
direct observation	detailed	manual/ counter	manual	manual	manual	staff	time consuming
time laps photographs	detailed	manual	manual	manual	manual	cost of devices	time consuming analyses
video recording	detailed	manual	manual	manual	manual	cost of devices	time consuming analyses and post processing
video analyses	detailed	available, several methods	available	not performed	not performed	cost of devices and post processing	occlusion, top views preferable
group behaviour observations - wearable devices	detailed	available	usually static	available	available	equipment cost	not applicable for outdoor situations
laser scanning	detailed	available	available	not verified	not performed	equipment cost	experimental stage
Kinect 3D	detailed	available	available	available	not performed	cost of devices and post processing	experimental stage
SensFloor	detailed	available	available	not performed	not performed	equipment cost	experimental stage
RFID	detailed	detailed	experimental stage	not performed	not performed	equipment cost	experimental stage
GPS data collection	large/ approx. 3-50m	approximation	not available	not available	not available	provider licences	useful for video calibration and as an additional tool
mobile phone cells data	large/ approx. 100m-5km	approximation	not performed	not available	not available	provider licences	provider network density determines accuracy
Bluetooth	small to medium/ 5-10m	approximation	nodes proximity	not available	not available	equipment cost	limited percentage of users
WLAN data	small to medium/ 5-10m	approximation	nodes proximity	not available	not available	post processing costs	limited possibilities of tracking

Table 1: Systems' classification

a given space, providing truly flexible formal solutions for various activities. Recognition of the patterns of usage of space is also crucial for design and implementation strategy. Usually, gradual or more conscious planning of a sequence of consecutive activities may lead to greater public acceptance. People, being and feeling involved in the process, marking their presence and demonstrating various social situations, may obtain an opportunity to directly influence the final design of a site with regard to their own comfort and actual needs. Observation in urban design applications should be conducted parallel with a participatory process, this way making acquisition of data a voluntary activity done on purpose to influence the resulting design.

9. Conclusions

The results of the survey prove that the current state-of-the-art automated acquisition of data for design is not sufficient. Most data gathering activities must be completed manually or require important and time consuming interpretation. Whereas networking and computing technology, along with the miniaturisation of sensors and popularisation of smartphones, opens a range of new ways to capture data that may and should be further developed. The questions which should be answered include those on the actual culture of usage of a space proper for a given social group as well as mobility patterns of a given site, with an emphasis on pedestrian behaviour. The main objectives of studies of human behaviour in the urban design scale: 1. count, 2. displacement 3. tracking, 4. tracing, 5. behaviour analysis, 6. communication situations analysis. Among the currently available methods of automatic behaviour analyses the most successful are those which unite various tools and media, including 3D sensors and laser scanning. Significant constraints result from the small scale of urban design analyses, which reduces the applicability of GPS and mobile phone data. The continuous nature of most outdoor locations as well as atmospheric conditions further limit the possibilities to use some methods, e.g., sense floor or RFID.

Moreover, the objectives to collect data from automatic analyses are to provide the framework for successful urban design. All the above mentioned studies neglect the role of the situational context, concentrating on verbal communication and body motion or mobility patterns. Providing that for urban design purposes the observation serves to fulfil the needs of the users and shapes the environment so that it enhances encounters and makes social situations happen, then success in this sense means the way of use which does not create unnecessary obstacles, which answers the requirement of comfort and which makes use of public space more intuitive. At the same time, examination of

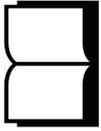
people's behaviour in outdoor situations may help make the settings more flexible. In recent times some attempts to solve the above defined problem were undertaken and the directions of this research should be further pursued.

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Smart communities: the coexisting of the high tech future and the intimate neighborhood past (Built Heritage Communities' Future)

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Synopsis:

Residential community heritage, reused adaptively as the renewal district, is also facing the increased demands of becoming the smart community. These smart historical buildings aim to reconcile the need for habitual living with the demands of technology, providing an intelligent future. During the regeneration of historical residential communities, improvements are necessary to address noise levels, energy consumption, drainage systems, as well as electrical grids or natural gas lines, etc. These challenges are often difficult to address due to the conservation principle of authenticity and integrity and are further complicated by the involvement of multiple stakeholders. Common non-historic residential districts, however, are facing indifferent neighborhoods, which arouse ubiquitous nostalgia feeling of the owners or occupants. They hope to have the intimate neighborhoods. Whether the more intelligent technologies are adopted in the residential district, the neighborhoods are less intimate, which will be discussed in this paper.

Keywords: Historic residential

communities; Smart; Nostalgia economy; Empowerment

1. Introduction

The restoration principle of authenticity to the historical buildings bring much limitation of modern technology such as energy saving measure and relative infrastructure to the living in historical communities, but the logistic, smart app, convenient service provides the smart life way as well. Historical residential buildings are facing the demand to change the noise levels, energy saving, water usage and sewage as well as electric net infrastructures while the new residential districts are facing the indifferent neighborhood relations. The smart residential historical communities is to connect habitual living way and high technology.

1.1 Background

Smart houses have been developing over the past several decades. This has been possible as many intelligent technologies have managed to establish practical uses in communities through the cooperation of users, authorities, and academia. Although the incorporation of smart technologies was initially “people-oriented” and aimed at creating comfortable spaces, the added influences of the eco environment are shaping future living concepts. Incorporating “built heritage” as a vital part of a city’s regeneration also demands intelligent technologies, such as the internet of things (IoT), as well as information and telecommunication (ITC). The promotion of such concepts brings about not only the possibilities of more comfortable and green lives, but more importantly, it provides great prospects for the industry. Historical buildings have long been protected, not as only physical buildings, but rather as entire historical communities. The increasing resistance to the gentrification of communities demands versatile strategies, such as the incorporation of nostalgia economy. This paper redefines the concepts of nostalgia and communities. Nostalgia is no longer reserved for the countryside, but should also be applied to urban regeneration. Community revitalization can combine nostalgia economy with intelligent technologies and optimum planning for the improvement of facilities, whether it be in villages like Taomi in Taichung or urban communities such as Bugao Lane in Shanghai. Historical community revitalization is governed by the principles of intelligent urbanism, which requires the strengthening of infrastructure, public spaces, the incorporation of appropriate intelligent technologies, integration of institutions, and community empowerment, while maintaining a nostalgia economy basis.

1.2 Method

Being in the theoretical phase and case studies process, this paper outlines the

general framework, redefining concepts about nostalgia and communities and providing the basis for further investigations. In this research, the data can be categorized into firsthand primary data coming from the field and secondary data derived from papers. Field data consists of the physical characteristics of both the building and surrounding environment, as well as information obtained from questionnaires administered to involved persons, including owners, occupants etc. The questionnaires were conducted openly and unstructured, and contained questions regarding worldview, ideology, and social systems, particularly those relating to the management and arrangement of space and activities. Data were obtained from several sources and cross checked with alternative data, thus providing a database. Study cases are selected from Taiwan and Shanghai which are regenerative historical communities, affected by nostalgia economy. Those communities were typically upgraded with different strategies and methods. By Comparing and analyzing those different cases, this paper tends to get the possible integrity strategies to upgrade the historical communities and trigger possible research fields in future.

2. Smart communities

Although the conservation principle limits the incorporation of some advanced technologies into historical buildings, modern logistics, smart apps, and applied service still provide partly intelligent life. Therefore, the overlapping of concepts in historical communities and non-historical communities involves many aspects like the eco-friendly, management and training people. The smart communities are the bonding between smart cities and intelligent buildings. The tangible part of intelligent buildings and the intangible part like IoT and neighborhood etc, makes the buildings group into the smart communities, and then into smart cities.

2.1 Intelligent buildings(IBs)

The concept of intelligent buildings has changed during recent decades from a conceptual framework for the representation of future buildings to the inherent constituents of influential policies for design and development. The incorporation of networks, data processing equipment, automation, ITC and building management systems (BMS) characterize the main constituents of IBs (Amirhosein Ghaffarianhoseini 2017). Overlapping concepts of IBs and energy-oriented features are clearly demonstrated in the environmentally friendly and sustainable strategies, based on the incorporation of the ancient and the modern socio-cultural dimension and design techniques, like using local materials, natural ventilation,

etc. Considering the interdisciplinary nature of IBs, they should be the product of an integrated team including clients, consultants, architects, contractors, and managers. It is crucial to stress the role of innovation as an enabler via cloud computing, sensors, smart materials, self-healing, robotics, using chaos and network science etc. Heritage buildings may also demand greater reliance on technologies like person centric mobile sensors, since they are less intrusive, potentially less damaging to the heritage structure, and may capture data in places unavailable to networks directly (Alberto Vanolo 2016)

The above review shows how definitions of IBs have changed over time. The Chinese Code (GB/T50314-2000) describes IBs as those which 'provide buildings automation, ICT and an optimal composition integrated with the system, service, management, and provide users with high efficiency, comfort, and safety'. But recent tendencies attempt to include 'smartness' and 'sustainability' in the concept of IBs. This means that environmental soundness has become a crucial component. Moreover, sustainability has extended beyond the one-dimensional focus of energy-oriented aspects and now also addresses people-oriented issues, involving life quality and economic sustainability. These changes tend to combine individual intelligent buildings into sustainable communities, uniting them more effectively.

2.2 Smart city

Cities, it is argued, will have become 'smart' "when investments in human and social capital, traditional (transport) and modern ICT (first uses of the term at the end of 20th century), and infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance" (John Counsell 2017). The availability of ubiquitous data collection throughout the smart city coupled with sophisticated analytical systems are also key components to the 'smart' concept. Saunders & Bedeck claim there are five elements necessary to achieve the goals of a smart city. These are to establish: 'a civic innovation lab using collaborative technologies; open data and platforms to mobilize collective knowledge; that human behavior; investment also in smart people; collaborative technologies for all parts of society.' Finally, enhanced possibilities for business and human communication are increasingly gaining prominence as one of the major hallmarks of a smart city (John Counsell 2017b). For this, education inherently plays a dominant role. Citizens need not only institutional education but a lifelong learning paradigm and matching services, attitudes to gain mastery over advanced possibilities. In addition,

they need to satisfy requirements posed by emerging smart city concepts based on complex relationships between humans and between humans and machines. Although the concept of smart cities is still not fully defined, people-oriented strategies related to continuous education, business, identity, and sustainability (environment and economic) are becoming the pivotal components in smart communities. This paper addresses these concepts as they pertain to historical communities' intelligent aspects.

3. Smart historical communities empowerment and nostalgia economy

3.1 Smart historical communities' revitalization

High-quality urban renewal projects are dedicated to the preservation of the city's historical patrimony. Smart historical communities have technology limitations, since the planning fabric, materials, and buildings' facades tend to preserve the original architectural characteristics (e.g. exterior wall insulation materials are not allowed to be applied to the historical building, lest destroying the facade's authenticity). How do occupants of heritage buildings embrace technologies, and thus both augment their efficacy and enhance their wellbeing? How do the heritage revitalization strategies preserve physical materials and still satisfy the demands of intelligent communities? Furthermore, the revitalization of historical communities demands viable economic strategies capable of funding the initial refurbishment; the repayment of investments, and the ability to generate income for continued maintenance. Historic buildings pose significant challenges in affording and achieving adequate measurable retrofit for both the building and its surroundings, while simultaneously conserving their value and significance. Ultimately, historic buildings are essential for the revitalization of city centers, not only for their preservation of culture but also for their ability to enhance the economy. In Europe, historic rehabilitation creates 16.5% more jobs than new construction (John Counsell 2017c).

The most important advantages of applying smart strategies to the existing historical communities are: Stakeholders are already present, allowing for innovative ways to collaborate and secure funding; Revenue sources now tend to extend from products to services (platforms and applications), eliminating the need for large investments on smart infrastructure; Innovation techniques and a bottom-up approach (crowd sourcing, user engagement, living labs, open data etc.) to accelerate the innovation process. However, there are also disadvantages: Complex ecosystems of people, institutions, and stakeholders requiring effort to organize;

Outmoded infrastructure, hindering the realization of the smart vision. The strategy has to be highly selective and based on a prioritization process. Amsterdam, for example, chose to address open data and energy, while Rio de Janeiro chose transportation and security. Selectivity, synergies, and prioritization are three core values in planning smart communities, especially to existing historical communities. Infrastructure-oriented smart strategies are not suitable for historical communities, and technology itself is not enough to make people smart in thinking or acting. A more complete view is adopted in smart historic communities by taking advantage of all available resources, including the knowledge, creativity, and intellectual capital of the populace. Utilizing the collective creativity and resourcefulness of people is more powerful than any machine or individual intelligence. Co-creation enables both users and producers to become active innovators fueling aspirations for longer term goals. People-oriented approaches are an indispensable characteristic of smart communities, and therefore smart historic communities put technology truly at the service of their inhabitants and not vice versa. Because multiple stakeholders are involved, developing smart communities stresses the importance of collaboration among public and private sectors, and most importantly, the engagement of people, in order to produce sustainable and livable smart communities. So, the development of smart historical communities involves enhancing two main aspects: hard infrastructure (i.e. transportation, water, waste, energy) and soft structure, or the people of the city (i.e. social capital; nostalgia economy, knowledge, inclusion, participation, innovation, social equity, well-being, etc.).

Intelligent urbanism includes ten key principles: environmental sustainability, heritage conservation, appropriate technology, infrastructure-efficiency, place making, social access, transit-oriented development, regional integration, human scale, and institutional integrity (Amirhosein Ghaffarianhoseini 2017b). In terms of revitalizing historical communities, it involves nearly all aspects of these principles. Places that can establish strong identities for themselves, while developing relationships with their neighbors, hold the greatest promise for economic, social, and civic success (Robert Jones 2016). The key is to educate communities on areas of greatest need and provide leverage points within the context of a holistic view of investments, with a focus on specific targets and priorities, which sheds light on the historical buildings' revitalization as a whole community.

3.2 Communities' nostalgia economy

The concept of nostalgia is related to

space and location and closely associated with peoples' emotions, identity, and culture. One of culture's functions is the shaping of people's minds and behavior, consequently guiding their spatial behavior and place experience. When a space is given culture and meaning, that space becomes nostalgic to both the occupant(s) and passersby, enhancing its value. Nostalgia is the projection of people's emotions into a place. Sense of place is achieved when a special place provides a symbol, belief, value, or feeling to an individual or group. Local attachment is formed through interactions between people and places, affecting cognition, emotions, and behavior. Nostalgia then is the culmination of potential characteristics from the local convention, the experience, and the social construction. As such, we need to respect the local place and its people when we make decisions concerning a community's revitalization. We need to preserve the life experiences at the core of heritage places and renewal places, while at the same time addressing their history, culture, and heritage.

The concept of nostalgia was first from describing the homesick feelings exhibited by Swiss soldiers, but for community revitalization, it involves the following: Firstly, the context of nostalgia should be considered from a spatial perspective, just like size, distance, and mobility. Secondly, nostalgia concept should be considered as having three distinct dimensions: body, living experiences, and social construction. From both spatial dimension and place dimension, they all answer the basic questions of morality: how do we treat ourselves, how do we treat others, and how do we treat nature (LIU Peilin 2015).

Finally, nostalgia originates from memories of the past. In this sense, nostalgia is not only belonging to the countryside but also to the city, since urbanization has been proceeding for years, and a city's people have shaped their memories from their childhoods spent living in the initial city. The mass demolitions often bring about feelings of nostalgia for them, as they are forced to say goodbye to original spaces and places. During urbanization, people must experience transition from the "old home" to the "new home", which often includes integrating into the new home, as well as into the economic and political system of daily life. Meanwhile they remain attached to their old home, interacting with old friends and participating in local affairs. When people change into a new home, if they are exposed to a new cultural environment, their emotions change during the process of interacting with others. Thus, new emotional attachments and experiences produce successful emotional changes in favor of the new environment. However, the extended nostalgia concept includes two aspects, recreational and existential nostalgia (Christina Goulding).

Even if they experience positive changes, they still possess the recreational nostalgia from their memories. This is the basis of the nostalgia economy in this paper. We also need 'cultural awareness', namely thinking towards local cultural construction. Shikumen Lilong is Shanghai's nostalgia whereas the traditional garden is Suzhou's nostalgia. Nostalgia is a historical memory, and the collective memory created by the aesthetic judgment of the city environment and its constituent elements includes the macro visual aspects and micro memory. As a collective memory of historic cities, the sense of belonging depends more on a person's memories of events or places, and the preservation of traditional rituals, historical sites, and landscapes. Thus, nostalgia within a city becomes an important means rousing the collective memory of its citizens. Memory is collected and aroused by tourism's development or personal daily experience.

4. Case studies

4.1 Historical communities revitalization in Taiwan

Since the 1990's, Taiwan has promoted the "Community Empowerment Movement." Civil pioneers took the initiative to establish communities, which garnered the attention and support of the government. It successfully solves problems like environmental degradation and loss of the traditional culture. Selected cases in Taiwan are the representatives covering different historic communities developing mode. The early communities(Family village) were regenerated by single tourism mode targeting potential consumers. And the later Taomi village was regenerated by dynamic nostalgia economy mode along with keeping the original residents and heading for creative refining culture. By improving infrastructures, encouraging local participation, strengthening education, and promoting multilateral collaboration, Taomi village is protected and reused as a dynamic unit.

Rainbow village, one of the Taiwan's more than five hundred family villages, built for the family of Nationalist Party (KMT) from 1949 to1960, is becoming a tourism spot, located in Taichung city. It is protected temporarily due to the childish and colorful hand-painted walls (Fig.1) from an unknown elderly people. The village was originally on the demolition list, but is now recognized for its role in linking the elders and youths, successfully bonding people from different backgrounds, while providing a foundation for new memories and symbols. However, this renovation is just valuable for small-scale sightseeing limited to several painting houses since occasionally, the painting attract people's attention without specific planning. The other cottages around keep

the same situation or even just bothered by the travelers. This is a spontaneous macro regeneration of a historical community from the bottom up.

Sisinin village, which is close to Taipei 10, was built in 1948 and was the first preserved family village to be placed on the preservation list. However, since the owners of houses were not family members of the military, most of them were demolished, leaving only the three rows of houses preserved for exhibition, souvenir shops, and cultural experience activities, thanks to resistance to their demolition from scholars. This is supported by authorities different from rainbow's spontaneous protected community. But it still just possesses a single function of sightseeing.

Taomi village is a successful example of combining tourism with original residents, different from the aforementioned cases, which embody the nostalgia economy. It has developed with the communities empowerment policies, coupled with nostalgia and local culture, following an earthquake in 1999. During post-disaster reconstruction, with help from the 'New hometown culture and education foundation' and 'special biology center', Taomi village satisfied all parties involved by rebuilding the environment, repairing the house, and restoring local ecological habitats for frogs. The work like people training, seeking operation for recovering life and the community had been carried out for many years. Many jobs were offered to assist the reconstruction of post-disaster, shaping the positive economy mode. Therefore, until 2000, the government provided a lot of resources to the community rebuilt. And the community empower policy is also officially promoted to one of the main urban and rural development policies. With the good harnessing from the local culture and ecological habitat's resource like the frog group, Taomi village attracts a great number of tourists. And every owner is also the good tour guide who is still living where they had lived in the past. They are not only in a good relationship with neighbors, but erecting their community with intelligent technologies. This case is an example of "Bottom-up" development of a historic district, and government participation has played a vital role in decision making process. It is a smart community with learning ability and self-adjustability.

To sum up, such investments cannot succeed without whole community empowerment. Throughout the process of revitalization of historical villages, the bottom up approach, with the support of authorities, is more effective. To initiate the community participation approach, villagers were invited together to create their own home. Even if the villager doubt that in the



Figure 1: Rainbow village photo by author



Figure 2: Sisinan village photo by author



Figure 3: Taomi village http://www.sohu.com/a/151155958_528922



Figure 4: Bugao Lane photo by author



beginning, but in the end occupants and owners get benefits from the community. The benefits are from both living condition and tradition inheritance. The community focused approach will inevitably encounter obstacles, but only with patience and unremitting consultation and communication, can common ground be reached. On the basis of mutual support and benefits, such communities can build a better home

together. These community empowerment policies relieve capital pressure and embody the characteristics of smart people-oriented in smart city. It's not only about the capital of society and other organization outside but also the whole villagers' participation, public affairs, and the public space of the village altogether. Due to the positive participation attitude of villagers, the data collecting is practiced with better support

and maintaining from the Taomi village. Due to occupants involving, the collection of data about the activity monitoring is prone to be more available. Therefore, these data provide an effective base for the strategy. This is also the benefits from intimate neighborhood namely nostalgia economy.

4.2 Historical residential Communities in Shanghai

Some communities in Shanghai have experienced restoration for adaptive reuse, among which, Xintiandi and Tianzifang were developed by different commercial firms, mainly for tourism, through the top-down and bottom-up strategies respectively. A typical regeneration case for protecting original residents is the Bugao Lane (CITE BOURGOGNE), which was refurbished with modern amenities, such as flushing toilets and a natural gas pipeline. According to the in-depth interview, essences of people's lived experiences were discovered. One of the elderly owners gave up the chance to move out of the house, but rather selected to remain there. The factors like the convenient health care and the good neighborhoods contribute to staying here for almost 70 years. This is simple nostalgia. However, the preserved original road couldn't allow double lanes for cars, which lowers people's life quality coupled with the limitation of car-parking (right in Figure 4). This community was preserved with the purpose of keeping the original people and life without gentrification, which is also different from only focusing on tourism development, but the improvement of facilities still requires extended planning, integrated with the surrounding area for both improving functional demands and economic sustainability.

From the cases, Taomi village and Bugao Lane, the original people (owners or occupants) were kept in both cases as the result of the vital regeneration strategy. The difference is that the latter encountered the limitation of refurbish due to the universal authenticity preservation principle and the pressure coming from the city high land value which results in over financial burden of facilities' improvement. However, it is still possible to keep the original life and at the same time, to improve the related facilities by the nostalgia economy borrowed from the experience of Taomi village even if the location difference of two cases (suburb and urban). For instance, during the revitalization of Bugao Lane, integrated with Shanghai Culture Plaza nearby, the Shikumen traditional elements can be dug to develop the creative culture product with occupants' participation. It is possible to provide the vivid life experience by renting partly like home stay to the tourist. This was also the original function of Bugao Lane in 1930s to rent for profit, which is satisfied to

the demand of authenticity conservation principle to keep the original function. Besides, the car parking is solved at the basement of the Plaza by the parking time shift of the residents in Bugao Lane and visitors in the plaza.

5. Conclusions

Nostalgia economy for a reconciliation communities is salient which mitigate the residents loneliness and bring belongs and identity to them. The urban planning for the residential district not only focuses on the intelligent part but also emphasizes on the erecting organization. The public space and civic organization can unite residents together by smart technologies and managements. This paper discusses the existing method towards the nostalgia economy mode by some specific historic districts' regeneration which adopted different strategies. Those strategies play a role in removing indifferent atmosphere of neighborhood and in making the historic communities dynamic. The coexisting of intelligent technologies and traditional merit helps to make life better for residents living in the historic communities and make the cities more resilient. Specific appropriate strategies for different kind of communities in different places need further research.

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Digital Transformation: Cities between Reaction and Integrated Strategies - Case Study Munich, Germany

Stephan REISS-SCHMIDT, Germany

Summary:

Scientific, cultural, economic and social change has tremendously accelerated since the turn of the century. Looking back on the changes of the last fifty years, it can be assumed that just as much change will occur over the next twenty years. Digitalisation in fact changes the profession and the process of planning itself: the core content of planning as a discerned, scientific based and integrated practice disappears in the haze of an increasingly complex setting, with flagging political support and suffering from fragmentation into innumerable special disciplines. Digital transformation is a fundamental challenge for cities and their policies for planning, utilities and administration. The ICT- and infrastructure industries often promote simplified business- and technology-driven visions of "Smart Cities", based on exploiting "Big Data" from private and public sources. But digital transformation means much more for cities and their citizens: it implies with multiple,

accelerating and disruptive developments and new risks for technology, business, society, democracy and everyday life.

In Germany until recently digitalisation was largely ignored as a driving force and as a challenge for sustainable urban development. Only few months ago the German Federal Government published the "Smart City Charter – Making digital transformation at the local level sustainable" following a discussion and research-process with experts drawn from cities, universities, research institutes and business. The charter is based on four key guidelines for sustainable local digital transformation:

- Digital transformation requires goals, strategies and structures.

- Digital transformation requires transparency, participation and co-creation.

- Digital transformation requires infrastructures, data and services.

- Digital transformation requires resources, skills and cooperation.

Munich, with more than 1.5 million inhabitants, is the third and most prosperous German city. Strategies, guidelines and projects of digital transformation are considered there as an integrated part of the urban development strategy PERSPECTIVE MUNICH. In 2016, together with Lyon and Vienna, Munich began a project funded by the European Commission: “SMARTER TOGETHER - Smart and Inclusive Solutions for a Better Life in Urban Districts”. The project’s overarching vision is to find the right balance between smart technologies, their social and cultural impact and participative governance to deliver smart and inclusive solutions which improve a citizen’s quality of life.

The case study shows how cities can be successfully proactive in the process of digital transformation. Success factors comprise an integrated approach, co-creation and experiments in urban living labs. Important open questions are: Will the final result of digitalisation be a kind of completely data- and market-driven, post-democratic “digital dictatorship”? Or is the final result an integrated innovation strategy without social digital divide, based on democratic decision processes?



Figure 1: Smarter Together Munich, project area Neuauubing-Westkreuz: locations of district living lab, smart lampposts, mobility service stations, smart energy-networks and -efficiency projects, smart district app. Source: City of Munich/MGS



The story of place: a framework for regenerative planning

Raymond Lucchesi and Timothy Murphy, Regenesi Group, USA

1. The Value of the Story

The Story of Place forms the ground for effective Regenerative Planning and Design. It is a living articulation of the essence of a given place that reflects the values of its cultural, human, economic, natural and geologic history; the current state of health of those systems; and most importantly, the potential for the highest integral expression of each.

Describing the potential of each place can create the community will to discover new callings and pursue reciprocal relationships in support of that place's unique essence.



Figure 1: project of transformation of the brownfield Las Salinas in Viña del Mar, Chile, into a center of innovation and creativity.



Smart City Placemaking in Kashiwa-no-ha, Japan

Charles Kelley, AIA, LEED AP, ZGF Architects, United States

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Mitsui Fudosan, one of Asia's largest developers, engaged advisors and urban planners to improve Kashiwa-no-ha using smart city placemaking techniques. Located 18 miles north of Tokyo, transit-oriented development Kashiwa-no-ha Smart City pioneers an urban planning approach for a resilient neighborhood with an active and vital community. Since 2004, it has been refined to include community aspirations, respond to disasters and support environmental and social initiatives. In 2016 Kashiwa-no-ha Smart City became the world's largest LEED® Neighborhood Development Plan Platinum-certified smart city.

Conceived as a 656,000 square-meter mixed-use employment district, the ZGF-led vision plan organized new concepts for open space, with costs and benefits shared by businesses and residential communities, intending to attract new development supporting residents and workers in nearby hospital and biomedical research facilities.

The vision plan was implemented through Urban Design Center Kashiwa-

no-ha (UDCK), which represents public and private partners, as well as local academic institutions to unite community and business interests. The smart city's success relies on the constant and supportive guidance from UDCK; this structure is now a prototype being replicated across Japan. UDCK creates a forum for discussion about how development supports business and community goals.

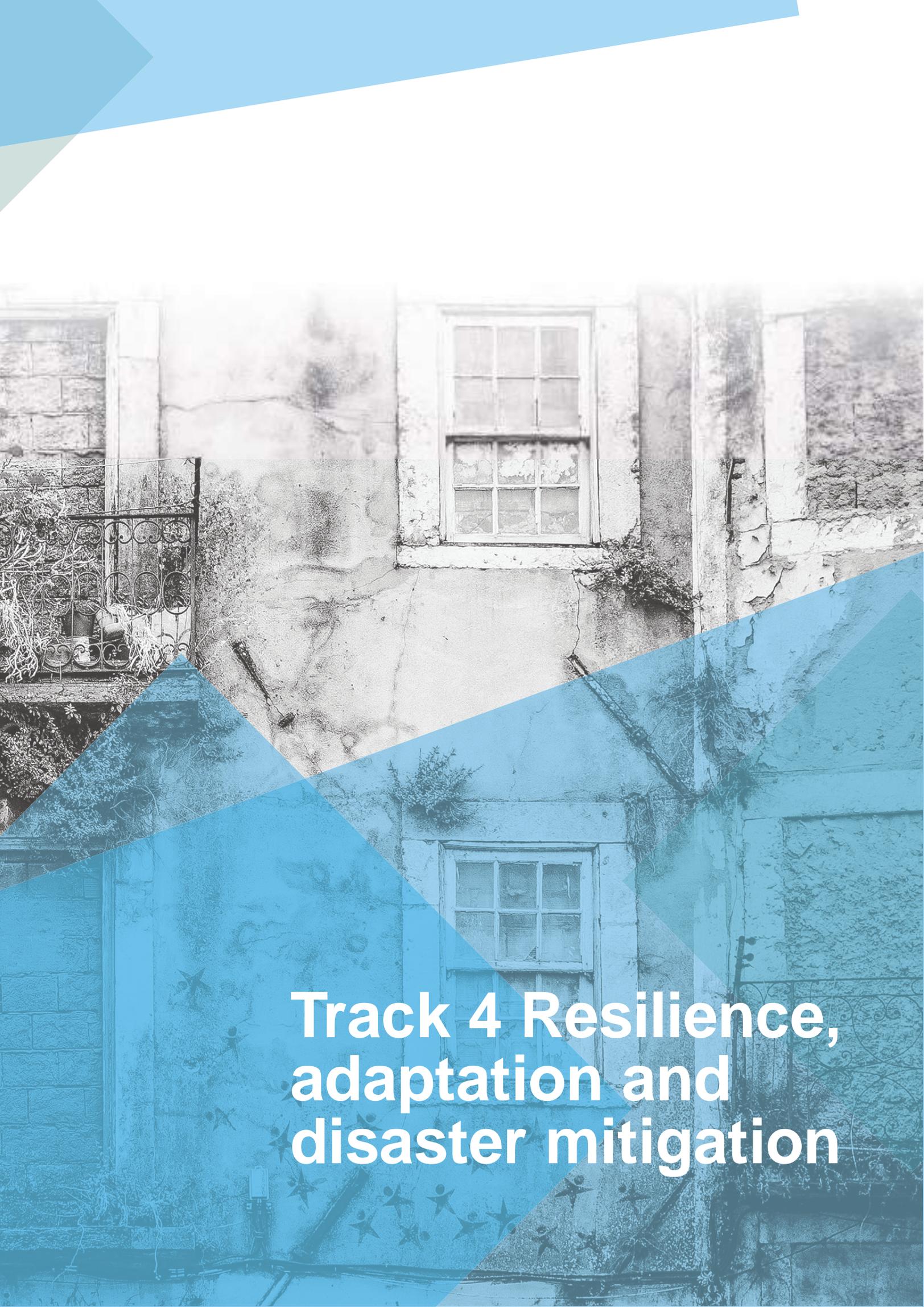
Large-scale sustainable living is reinforced through a centralized energy management system; energy conservation, creation and storage; local production of food; and low-carbon urban transportation. Active and vital streets connect and energize the updated civic realm, as living and working in the same neighborhood supports efficient resource use, builds social cohesion and improves livability. This synergy is demonstrated by the transformation of an inaccessible stormwater detention facility into a civic commons—a biophilic and sustainable community amenity.

Kashiwa-no-ha is environmentally and

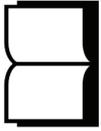
technologically innovative—an acute interest after 2011's Tohoku earthquake and Fukushima Power Plant disaster when energy conservation became a critical issue. Community behavior is a supporting strategy. For example, the Area Energy Management System monitors energy levels through a smart phone app informing people in high-use areas how to reduce consumption, while display monitors show building performance information. Today, the Smart City is a mix of building uses—hotel, hospital, laboratory, commercial—connected via a district energy and power distribution system to share heat loads and reduce peak usage, allowing occupants to live off the grid until regional power and water are restored. Through smart city placemaking, from policy to urban design, Kashiwa-no-ha is an incredible example of a technologically integrated, advanced mixed-use development establishing neighborhood facilities supporting a variety of generations, lifestyles and uses for a resilient community.



Photo by Alistair MacRobert on Unsplash



Track 4 Resilience, adaptation and disaster mitigation



From fragile to resilient territories: the reconstruction after earthquakes in Central Italy

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Synopsis:

Increasing resilience is a necessary part of risk coping and management strategies; it may involve vulnerability reduction, including disaster prevention and mitigation measures at community levels. It can also be regarded as one of the most stressful and frustrating tasks for both community members and urban planners. The latter, along with local administration representatives, are working under great stress as far as emergency management is concerned. It makes it either neglected or insufficient. Communities, on the other hand, hardly ever perceive the risk they are facing by living in disaster-prone areas. In this context, the paper presents a multidisciplinary approach and cross-sectional collaboration that allows for a successful reconstruction process. The importance of risk information, communication and management in order to help communities to utilize their urban spaces in a more playful and proactive way in an emergency are highlighted. The approach is primarily one of a self-experience reflection, and the case studies are introduced in order to expand the discussion on disaster-resilient communities and how to build them.

1. Reshaping consideration of disaster recovery

The history of human settlement in Italy dates back to the period of the Roman civilization. Many Italian cities are rich with priceless world heritage sites. However, the geography of this country located in an earthquake-prone zone makes dwellers and the heritage sites at risk of earthquakes that could lead to other disasters, such as landslides and volcanic eruptions. In addition, this risk is increased by an uncontrolled urban expansion into areas that are vulnerable to disaster, thus making disaster risk management even harder to achieve. Failures and successes of recent urban restoration from multi-hazard events should become a lesson to be learned for setting a code of conduct for disaster risk managers and urban planners.

Nevertheless, best practices from the other countries may not be suitable to adapt in Italian cases, due to the complexity of multi-hazard risk along with different context of social structure. Nowadays, Italy faces challenges of an ageing society, silver economy, and a great deal of investment in conservation and restoration of heritage sites leading to a slowdown in urban development: in other words: “urban decay”. Surprisingly, disaster recovery caused by unusual circumstance opens a way out to urban restoration and revitalization after a disaster. Thus, urban developers and planners are entering into a new era of transforming vulnerable spaces, spatial features and urban infrastructure to be more resilient. Disaster recovery should not focus merely on a conventional reconstruction plan taken literally as “rebuilding as it was”, but it should rather be reframed with a consideration of “transforming a fragile urban fabric into a better place to live with a risk”. Therefore, it is necessary for an urban planner to work under the disaster risk management framework, turning disaster recovery in a sense of reconstruction into a sense of restoration and revitalization.

1.1 Ambiguities of key term: resilience

The themes of urban vulnerability and increasing resilience are crucial for this discourse, and the very concepts of vulnerability and resilience are hard to define. We are facing ambiguities and doubtfulness on connotation of those key terms. It seems that over the time, risk management has moved from “reaction” resulting from vulnerability reduction schemes towards “adaptation” through increasing resilience. However, what it means to increase resilience remains unclear, for the concept itself is ambiguous, as interpretation of resilience must not be reduced to surviving a catastrophe. But the controversial issue of this shift is rooted in the ambiguity in

determining resilience: either the concept of urban resilience has a generalized output and definite urban forms as a final product transferable to another case, or it is a progressive process of urban transformation without a definite final form to pursue. The early idea of definite form is generalized by a misconception that “increasing resilience decreases vulnerability” where resilience assessment is limited by a technical definition and a narrow set of indicators, which is the reverse of the fragility or vulnerability index – a restrictive approach focusing on ability to withstand a shock. To define resilience using only static parameters and static criteria is more than presumptuous: it is inefficient. The concept of urban resilience is wider than a focus on physical characteristic as it focuses on qualities of functional interaction between physical elements of human settlement and social structure that builds the city. Therefore, the resilience is not only about ability to resist shock, but also a capability to keep the essential urban activities operational and to recover in a timely manner. (Promsaka and Rizzi, 2013, 2014)

This should be acknowledged that “to rebuild as it was” does not necessarily indicate the success of a disaster recovery based on an urban resilience aspect. It is important to note that even resilience acknowledges vulnerability in a sense of steadiness of physical elements, and that increasing resilience does not always mean decreasing vulnerability. Similarly, a non-resilient urban system doesn't have to be vulnerable. A restoration and revitalization process of a disaster recovery rooted in the principles of resilience requires both self-organising and re-organising capacities. In order to allow adaptation to stress and changes. As long as communities in a disaster-prone area perceive their risk and keep increasing their adaptability, their risk awareness will foster them to stimulate innovative strategies to live with risk. Such innovative restoration strategies will increase resilience without losing the traces of the past. The future city depends on how well we take this situation as an opportunity to re-shape it.

2. The conceptual model of urban resilience to disaster

A conceptual model of urban resilience to protect against disaster risk is interpreted as both an outcome, and a process of disaster preparedness and recovery. This recovery should be considered a restoration process, rather than a regular reconstruction. Whereas urban resilience to natural disaster means that components of urban systems - built and natural environment, human capital, and socio-economic activities - are able to withstand disaster impacts without qualitatively losing its basic functionalities and physical structures that are necessary to maintain livelihood of their users. Urban

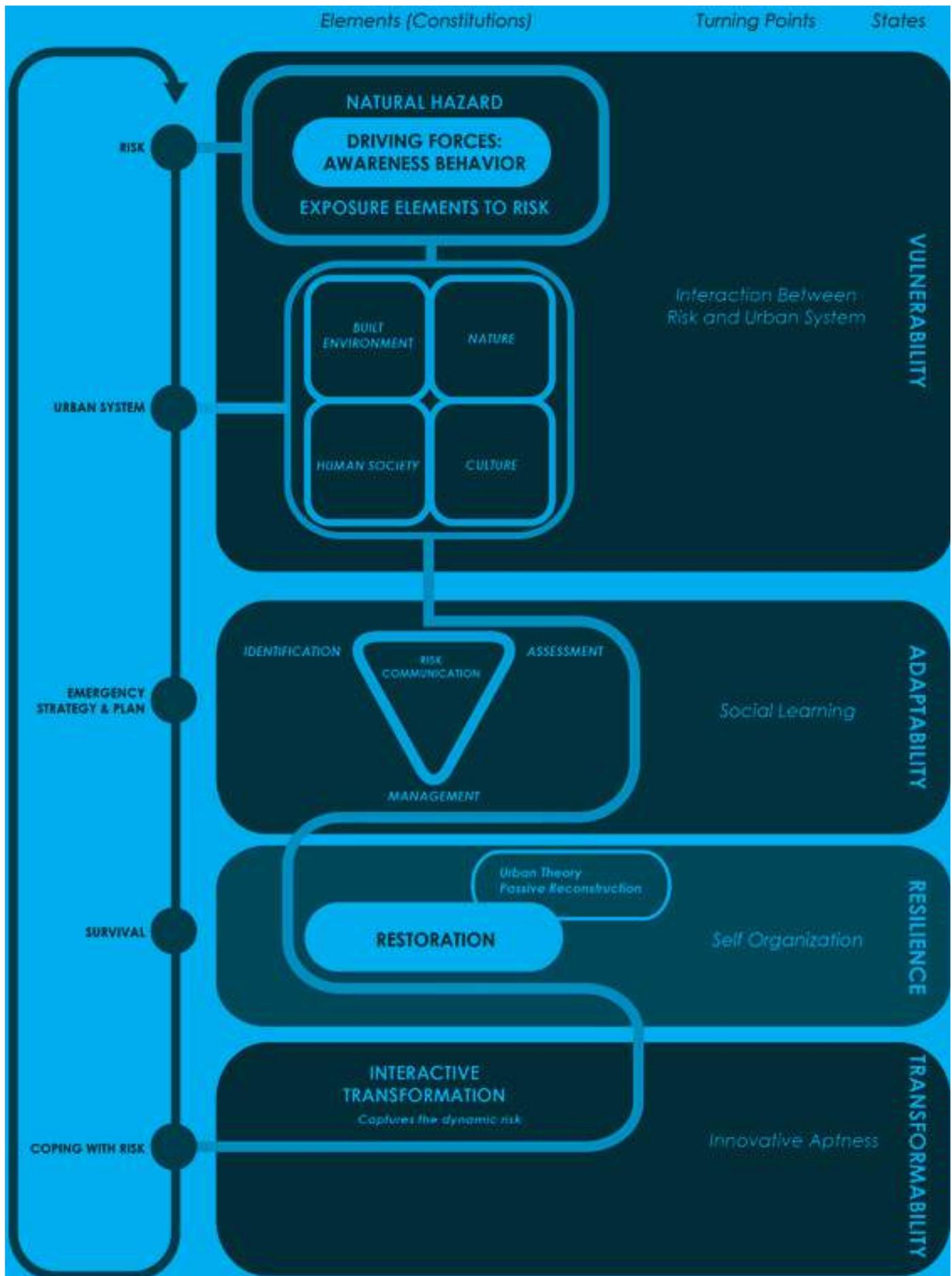


Figure 1: A model of interaction between urban system transformability and risk (Promsaka S. and Rizzi P., 2015)

resilience as considered here is the dynamic process that shifts urban systems from vulnerable to resilient, and then advances into innovative urban transformation. Nevertheless, this active movement requires sufficient adaptive capacities and a better social learning process as a set of catalysts to a resilient urban transformation

- This susceptibility is an outcome of the interaction among natural hazards, exposure elements, and exogenous drivers, which contributes to human pressures experienced as vulnerability and sensitivity to the disaster impact.

- The disaster sensitivity of the system can be mitigated. The structure that is able to absorb the impacts of hazard events will enable the urban system to re-generate resources to maintain its infrastructure as well as to reserve standard livelihood of its residents (towards adaptive capacities of each individual system in the changed structure)

- After a disaster, the resilience depends on how quickly and how well the urban system recovers from the hazard events. In this case, social learning processes become a crucial key in strengthening rapid recovery and enabling desirable adaptive capacities (towards development of self-organization processes).(Rizzi, Denti, Marcia, Promsaka,

2016)

The spatial planning for disaster resilience

In this study, the need of enhancing institutional capabilities to self-organize and create innovative urban planning measures is highlighted. To enhance those capabilities, a process of social learning can be conducted in a way that supports the integration between disaster mitigation measures, and spatial policy formulation and implementation. This integration is, in short, named “spatial planning for disaster resilience”. The spatial planning for disaster resilience addresses three crucial characteristics of resilient systems:

- 1) stability and the transformability of physical infrastructure;
- 2) institutional capabilities to self-organize and to bounce back;
- 3) social learning capabilities to create adaptive measures for coping with risk.

Addressing disaster resilience having considered these three above-mentioned characteristics in spatial planning provides an alternative to frame problems, in order to respond to the uncertainty of disaster risk and vulnerability of urban fabrics.

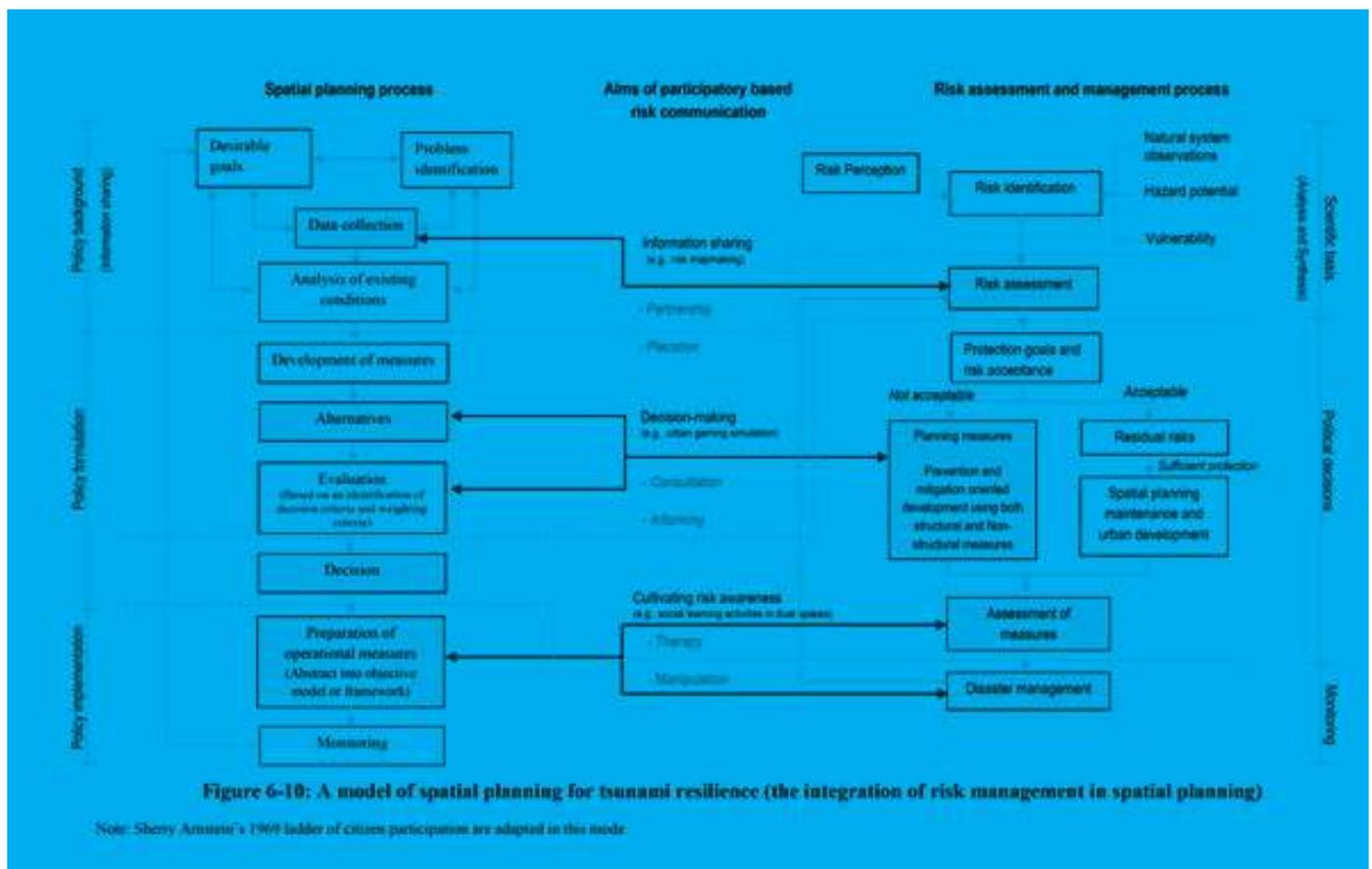


Figure 2: Integration of spatial planning, risk management and participatory planning (Promsaka, S. Rizzi P., 2016)

Urban resilience to disasters is a broad concept, covering a wide range of elements. For this study, the concept of spatial planning for disaster resilience focuses mainly on the essence of social learning and self-organization, which constitute the evolving institutional resilience of spatial planning authorities. However, the urban resilience to disasters consists of both physical infrastructure and social structures.

Therefore, the further study on urban resilience should investigate the robustness of physical infrastructure and the transformability of spaces, which can increase comprehensiveness of research.

3. Italy is a seismic country but with a short memory.

One of the most challenging effects of the last swarm of shakes between 2016 and 2017 in central Italy unveiled again the weakness and sensitivity of communities and territories to the unexpectedly short frequency of earthquakes. People suddenly realized that it is not a “one time in one’s life” event, but “a series of events more or less dreadful”. This shift is important to frame further policies for the entire country with a concern for different hazards (keeping in mind it’s a multi-hazard country). However, it is although it is a commonly held belief that tsunamis do not affect Italy, a 2006 earthquake (M5) with the epicentre close to Stromboli, which luckily did not cause victims or severe damages, caused a small tsunami. In Italy, there is a low probability of tsunamis, however it’s better to keep in mind that “low” differs from “none”.

If we think of Campania, a Vesuvius eruption is what we will have in mind, but the most recent event that occurred in Ischia on 21 August 2017 was an earthquake. It was a result of both the activity of the volcano and the peculiarity of the geology of the island. Along with, the fragility of the urbanized area: poor quality of its built environment and controversial localisations for new investments, the earthquake left 2 dead, 52 injured and 1500 homeless. When Ischia was destroyed back in 1883, the number of victims was 2.300 in a population of 4.000. It was reconstructed. So, does this mean that it was resilient?

Resilience is a result of how systems cope with the “day after”, but it cannot be achieved if we do not think about the innovation stimulated and/or introduced, level of participation, and cooperation among different scale of planning and decision making policies and, last but not least, impossible without setting the state of art at the moment of the dramatic event.

A brief overview of general data and history of the most severe Italian earthquake could

offer a key.

3.1 Overview of the last most severe earthquakes in Italy

In the second millennium the Central Mediterranean area suffered 1300 severe earthquakes. 500 of them occurred in Italy: more than 30 between 1900 and 2017, 8 of which between 1968 and 2017. Analysing the cases we prefer to use the term “process/project” rather than the one of “model” as often can be found in literature (for instance “Friuli or Emilia or Abruzzo Model”).

The case studies were selected as representative for the evolution of the approach of institutions dealing with risk and disasters.

As pointed out, there are no models that could be applied top-down to all situations and cases, and not only for the different effects of the earthquake related to magnitude, casualties, damages, losses etc. (c.f. a short resume of the result and process of reconstruction in the mentioned cases below).

The dynamics of the reconstruction is a timeline where, with all the constraints of the political situation, economic trends, social challenges, and incidences of corruption, as well as the long hands of organized crime, some key aspects, approaches and issues are included and developed: the site and temporary/permanent and/or physical/geographical location; the future perspective of communities; prevention, emergency and reconstruction management, the parallel paths of policies and urban planning, the future of the Italian landscape (Tacconi, 2016), and, last but not least, the total cost of earthquakes.

1_ physical/geographical and temporary/permanent is the issue of “reconstruction: where and how?”. The answer is multi-faceted: where it was as it was, where it was but new, new and in a different place.

A_ Where it was, as it was. This is the approach of reconstruction after disaster in Friuli, Umbria and Marche, Emilia. It maintains the identity and sense of place, but it’s difficult to follow: the former built environment and/or construction technology and material do not match the new building code, the housing standards is poor according to the current standards of comfort, it requires an ad hoc process that is difficult to standardize. The most well known example is Friuli: a long process executed site by site and case by case, based on damages and characteristics of a territory for which technicians decided where to build, according what typology and using what type of materials. The success of the process was related to the high level of awareness

PLACE	Belice	Friuli	Irpinia	Umbria Marche	Abruzzo	Emilia	Center Italy
DATE	1968	06.05.1976 11.09.1976 15.09.1976	23.11.1980	23.09.1997	2009	20.05.2012 27.05.2012	24.08.2016 30.10.2016 18.01.2017
MAGNITUDE	6.1	6.5 5.9 6.0	6.9	6	6.3	5.9 5.8	6.0 Ancona (R) 6.5 Norcia (PD) 5.5 Castellana (AQ)
HOMELESS	57.000	80.000	280.000	22.000	67.500	41.000	17.000
BUILDINGS DAMAGED (DA)			275.000				
DESTROYED (DE)	9.000		75.000			7.700	
(DA)+(DE)		31.000		20.000	35.736		21.000
AFFECTED POPULATION	1.300.000	500.000	6.000.000	165.000	144.415	552.312	25.000
VICTIMS	352 dead 576 injured	993 dead 2.400 injured	2.914 dead 8.848 injured	11 dead 100 injured	309 dead 1.500 injured	29 dead	298 dead (2014) 34 dead (2017)
AFFECTED AREA	5.500 km ²	5.000 km ²	5.000 km ²	strip of 50 km between the two regions	2.375 km ²	2.700 km ²	1.728 km ²
INDUSTRY DAMAGED (DA)				2.000 business 1277 supported			
DESTROYED (DE)							
(DA)+(DE)		450 (30%) service	1.186 business			606 industries 469 service	190 industries 372 building 1.356 service
AGRICULTURE	90% severely damaged or destroyed	20.000 animal died	no record	1.194 damaged (902 now in function)		1.143 940 supported	1.894

Tab. 1 by Paola Rizzi, Sources: ISTAT, INGV, DCP, Centro Studi CNI su dati Ufficio Studi Camera dei Deputati, Regione Emilia Romagna, Commissario delegato per la ricostruzione Presidente della Regione Abruzzo

[1] data analysed by Luana Di Lodovico

PLACE	Belice	Friuli	Irpinia	Umbria Marche	Abruzzo	Emilia	Center Italy
INVESTMENTS Mln €	9.179	18.540	52.026	13.463	13.700	13.300	—
SITE OF RECONSTRUCTION		in situ	mixed	in situ	mixed	in situ	mixed
PERIOD OF RECONSTRUCTION	1968-2028	1976-2006	1980-2023	1997-2024	2009-2029	2012-	2016-
STATE OF RECONSTRUCTION	on going	ended in 1986	on going	ended in 2004	on going	on going	on going
PARTICIPATION Y/N		YES no structured spontaneous	—	—	NO Movements spontaneous	YES regional law	Not yet
GOVERNANCE OF RECONSTRUCTION	state	multi/level	state	multi/level	state	multi/level	state
REGULATION LAW (number)[1]	27	7	24	16	224	4	17 (on-going)
REGULAR INTERVENTION TOOL [1]	—	—	—	PIAT Integrated Plan of Development of Affected Areas	—	MUDE General Digital Model for Buildings	MUDE General Digital Model for Buildings
SPECIAL INTERVENTION TOOL [1]	—	AdP Program Agreements	—	—	Reconstruction / Plan AdP Program Agreements	AdP Program Agreements	—

Tab. 2 by Paola Rizzi, sources: ISTAT, INGV, DCP, Centro Studi CNI su dati Ufficio Studi Camera dei Deputati, Regione Emilia Romagna, Commissario delegato per la ricostruzione Presidente della Regione Abruzzo

[1] data analysed by Luana Di Lodovico

PIAT Piano Integrato di sviluppo delle aree maggiormente colpite dal terremoto

MUDE Modello Unico Digitale per l'Edilizia

Accordi di programma

Multilevel: State, Region, Province, Municipality...

and involvement of population.

B_ Where it was as a new town/a new town was re-located (1) the reconstruction “ex novo” applies for economically depressed, or environmentally at risk areas. It is usually unsuccessful, unless followed by adequate political actions in the conducive circumstances, as in the case of Gibellina. The most famous examples are the 33 cities built or rebuilt after the earthquake of 1783 in Calabria and Campania. The king Ferdinand IV took the chance to re-shape the form and functions of the destroyed cities. The most recent example is the “New Towns”, which were built as temporary houses after the 2009 earthquake. In the first case, the new town is not necessarily an engine to develop a depressed area. In the latter, the new towns are not temporary, and will be used once people will go back to their restored homes. However, some unanswered questions still arise: namely regarding questions of ownership, management and maintenance, as well as the dismantlement of the abovementioned houses.

2_ The future perspective of communities: the decision of “where and how” to reconstruct is always linked with the society, economy, history, demography and culture of the people and communities living in that area. The previous economic trends influence future development: in Friuli but also in Umbria and Marche after 1997 earthquake small centres in the mountains which already suffered for a depopulation after reconstruction were left, and all the small traditional, agricultural, family-owned commercial and handicraft enterprises disappeared.

3_ Prevention, emergency and reconstruction management: disaster events are often if not always followed by an evolution of protocols, codes and procedures. In Italy there were at least some turning points after Irpinia (1980) that followed Friuli’s event: the Civil Protection was created and developed, however, at the same time a comparison between the two cases shows that meanwhile Friuli was and still is the only one case of a complete reconstruction, Irpinia is still the most disastrous one. As for the prevention and its management, it was not after the Puglia-Molise (2) event had occurred that new approach, criteria and method for risk mapping and evaluation were created. The event also showed the weakness of the schooling and educational infrastructure, and a new set of norms about retrofitting and construction of new school buildings was issued.

4_ Policies and planning: when a disaster hits a place, for a city or a country it is not only a problem of destruction, but also a problem of disruption of the flows of decisions, issues, previous plans, visions etc. These are

slow process and it requires time to apply them. The first concern is the urgent need of quick recovery and reconstruction. And here the crucial issue lies: the continuity. The reconstruction’s main criteria are: be quick, improve safety, comfort and quality of life, increase services and infrastructure looking for a positive trend for the economy. The issue is: what about a previous state of a territory that is poor, in decay and moreover without or with bad plans and strategic vision of the future evolution?

4. First conclusions

History has shown that the cases where reconstruction was successful are the cases where an equilibrium was created between the spatial planning and the risk assessment and management processes: such as in the Friuli, Umbria / Marche and Emilia cases. The multilevel governance decreased the number of laws and regulations. However, it requires negotiations and co-ordination processes in which many and often very heterogeneous parties are involved. It increases the time needed to start the reconstruction but, once started, it accelerates the process. Participatory processes allow to avoid conflicts and keep the solutions realistic whilst decisions made and executed at the central level, however fast and, as a result, apparently efficient, in the long term perspective lead to conflicts, as well as under- and over-estimations. In L’Aquila, for instance, one of the regulations introduced the concept of unità equivalente: the owners of the houses destroyed in the 2009 earthquake ceded their properties to the local authorities receiving a generous equivalent in order to purchase a new estate. The aim of the concept worth 170,000,000 euros was to allow the authorities to administer and control properly the process of reconstruction as a formal owner. It was presupposed that people will re-buy their homes once reconstructed, but only 50% of the 600 families, that received the subsidies, did. Others bought houses in other parts of the region or as far as Rome, Cagliari, or Courmayeur. The only lesson the central government learned from this resulted in abolishing the norm in the new tranche of financial aid for the central Italy.

4.1 About the Central Italy earthquake

It’s important to underline some issues related to the demography, society, geography and economy of Central Italy struck by earthquake in 2016-17.

According to the data offer by ISTAT (2016) (3), the area divided into three regions (Abruzzo, Lazio and Umbria) is ageing: 28,3% of population is over 65 years old (+6,3 % of national average) and 10,2 % under 14 (-3.5 % of national average) and the average income pro capita is 78% of the national average,

and is an economy based on agriculture (7 farms/100 inhabitants vs 2,7 farms/100 inhabitants of national average), 50% of the area is included in Natural Protected Zone and it is low density (around 14 ab/km²). Last but not least, the buildings are dated prior to 1971, before the new building code was applied. The approach is to rely on the central drive, but history has shown how delicate it is to balance the top down and bottom up approaches.

Emilia is showing how to govern the reconstruction dealing with the process: engaging community in the disaster recovery process reciprocally builds the disaster recovery plan.

Nowadays, a sort of a Meta-Plan (Strategic Agenda) that includes a spatial planning process (multilevel), multidisciplinary approach-to control science, political decisions and monitoring the risk assessment and management process and participatory processes (see Fig 2) is necessary.

5. An ongoing process...

The effects of extreme natural phenomena are indeed amplified by the political and planning choices that lead to high land usage and building in vulnerable and risk areas, as well as the fast and progressive degradation of buildings, urban and territorial infrastructure, and the progressive disruption of urban functions without a strategic vision of the city. Now, it's fundamental to work out a system/frame which includes and updates all the local skills and data, often already set by several Regions, but with the specific view on disaster mitigation and sustainable development. This is the first step: to create a digital network platform. It will be accessible for administrations, institutions and professionals and it will have a double goal: to create a dynamic knowledge of the territory, and to help and support decision makers in generating efficient policies and plans which support sustainable development and increase resilience of the territories.

This M-Plan (Strategic Agenda) supports the design and updating of the General City Plan. The Plan will frame the main point of the development model of the territories through the conservation/promotion of local identity and feature, the safeguarding of the area, the control of land consumption, increasing the criteria standards of services and environment, and last but not least in creating a proper relationship among the energy-environment-landscape.

There is a need to re-define, or define, a model of evolution and development, which is going to shift the vulnerability and fragility of these territories to resilience. The reconstruction is not only a mere process of re-building, but its aim is to recreate and

improve the chance for the future evolution of a city, a territory and its inhabitants. To enhance the development, we need to remove all the obstacles related to the poor state of anthropic (houses, infrastructures, monuments, heritages, etc.) landscape and natural resources. These are barriers caused by the lack of knowledge of the nature and state of territory, and the lack of prevention of disaster, and of the state of neglect and decay. There is a need to overcome the reconstruction/restoration plan as synonymous of "what it was as it was" but through the M-Plan enhance a new perspective of development and safeguarding of the city. The M-Plan is a tool that on the one hand enables the planners to state the problems properly and, on the other hand, to tune, regardless of the participatory processes, the map of shared goals (strategy agenda), the topic of urban safety (including in the system the mandate of Civil protection Plan, of Seismic MicroZoning, of CLE etc.) and the development model.

(1) It is a principle that it must be followed for the high risk still in the place (Portis after Friuli earthquake in 1976) or it's a decision taken to stimulate a new re-birth (after 1783 earthquake in Calabria), or an ambiguous action to recover quickly (New Towns after Abruzzo earthquake in 2009).

(2) Puglia-Molise is the case not included in this study: it was an M 5.7 earthquake which caused 28 victims for the collapse of a school. All the area was considered the low risk area. After the event a new classification of vulnerability to earthquake was studied and applied.

(3) Focus statistiche, Caratteristiche dei territori colpiti dal sisma del 24 agosto 2016, ISTAT www.istat.it

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Strengthening the Disaster Resilience of the Academic Biomedical Research Community: Protecting the Nation's Investment

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Context for the ISOCARP 2017

International Conference Presentation
Created by President Abraham Lincoln in March 1863, the National Academy of Sciences (NAS) was charged to provide scientific analysis and advice to the United State Government and to help plan new federal agencies whose capabilities would be needed by the nation. 154 years later the National Academies of Sciences, Engineering, and Medicine has evolved and grown as science as progressed and as the nation and the world have become ever more dependent on the role of science to enhance the vitality of the scientific enterprise; to guide public policy with science; and to communicate the nature, values, and judgements of science to government and the public.ⁱ Global innovation is in large part driven by academic research. The biological and biomedical academic research community and the knowledge products, workforce, and financial benefits it produces serve communities and states, and, by extension, the nation and the world. The enormity of the investment

of the US federal government and that of many other entities that sponsor academic research is a reflection of this reality. And yet, these investments are not uniformly secure. They are vulnerable to disasters natural and manmade. Local, regional, national, and global resilience is an imperative that should be sought throughout all sectors of our society, and the academic research community's contribution to global resilience is critical. In early 2016, largely in response to the devastating impacts of Hurricane Sandy on New York City particularly academic research universities, NAS formed a committee of subject matter experts in the scientific, technical, and medical professions for a consensus study. The study was funded by the U.S. National Institutes of Health, the Howard Hughes Medical Institute, the Doris Duke Charitable Foundation, and the Alfred P. Sloan Foundation. The committee explored the effects of natural and man-made disasters on the academic research community and produced a dynamic and results-oriented

consensus study released to the public in August 2017. The report describes the extent of the impact of prior disasters on the academic research communities in the United States and their partner-local communities; and provides ten recommendations and guidance for individual researchers, research institutions, and research-sponsoring agencies regarding actions to be taken that can mitigate the impact of future disasters on research facilities and their neighboring communities.

The session presentation—guided by one of the non-medical members of the committee (Mr. Kirk Pawlowski, Consulting Architect, Vancouver, Washington); the study director (Ms. Lisa Brown, Washington, DC); and a reviewer of the study (Mr. Andre Le Duc, Chief Resilience Officer, University of Oregon, Eugene, Oregon—shared the committee’s critical findings which are expected to play an impactful role in determining a more effective and integrated approach to resilience planning among the current multiple United States federal agencies, state, local planning agencies, NGOs and nonprofits.

The session focused on the committee’s recommendations and findings specific to the key tools required to support disaster response and recovery planning, the development of a more resilient built environment, the capital financial considerations in funding a more resilient community, and the long-standing network of risk management professionals in positions of leadership at United States academic research institutions who continue to collaborate in enhancing the concepts of the disaster resilience university.

The accelerating shift to resilience planning has been recognized as having strong similarity to the gradual adoption of global “sustainable design standards” that has occurred over the past 20 years. Resilience to disasters is on the same path and with time, will likely become commonplace. One recent risk management industry publication in the United States cites the strong relationship between institutional strategic planning, developing building-performance rating

systems to compare capital investments with community continuity risks and creating “resilience management” tools: “Resilience is the natural evolution of sustainability. Events like Hurricane Katrina and Superstorm Sandy have made it painfully clear that it is not enough for our buildings to be a low impact on the environment—the environment must also have a low impact on our buildings”.ii

2 Protecting the Nation’s Investment: A Resilient Community

Each year, approximately \$27 billion is invested in life sciences research at academic research institutions in the United States. These institutions are hubs of employment, productivity, and scientific progress, driving economic development and generating knowledge that affects local, state, regional, national, and global communities in myriad ways.

When disaster strikes the academic biomedical research community, the impacts can be felt at all levels: impact on the safety and well-being of humans and research animals; disruptions to the careers of individual researchers; departure of research faculty and students; loss of data, samples, reagents, specialized equipment, and other materials; damage to buildings and physical infrastructure; interruptions to the institutional research mission; impacts on research funding and research sponsor investments, among other impacts.

Resilience—the ability to prepare for, absorb, recover from, and more successfully adapt to adverse events—should be both prioritized and institutionalized in the academic biomedical community. To achieve resiliency, the academic biomedical research community can undertake actions needed to develop, sustain, and improve its ability to mitigate against, prepare for, respond to, continue operations during; and, perhaps most important, recover from natural and man-made disasters. The figure below shows that the goals of these efforts should be to protect human life, research animals, other research assets including data and the research built environment, to maintain the integrity and continuity of the research enterprise. iii

3 The Roles of Institutions, Individual Researchers, and Research Sponsors

3.1 Institutions

Resilience involves a long-term commitment

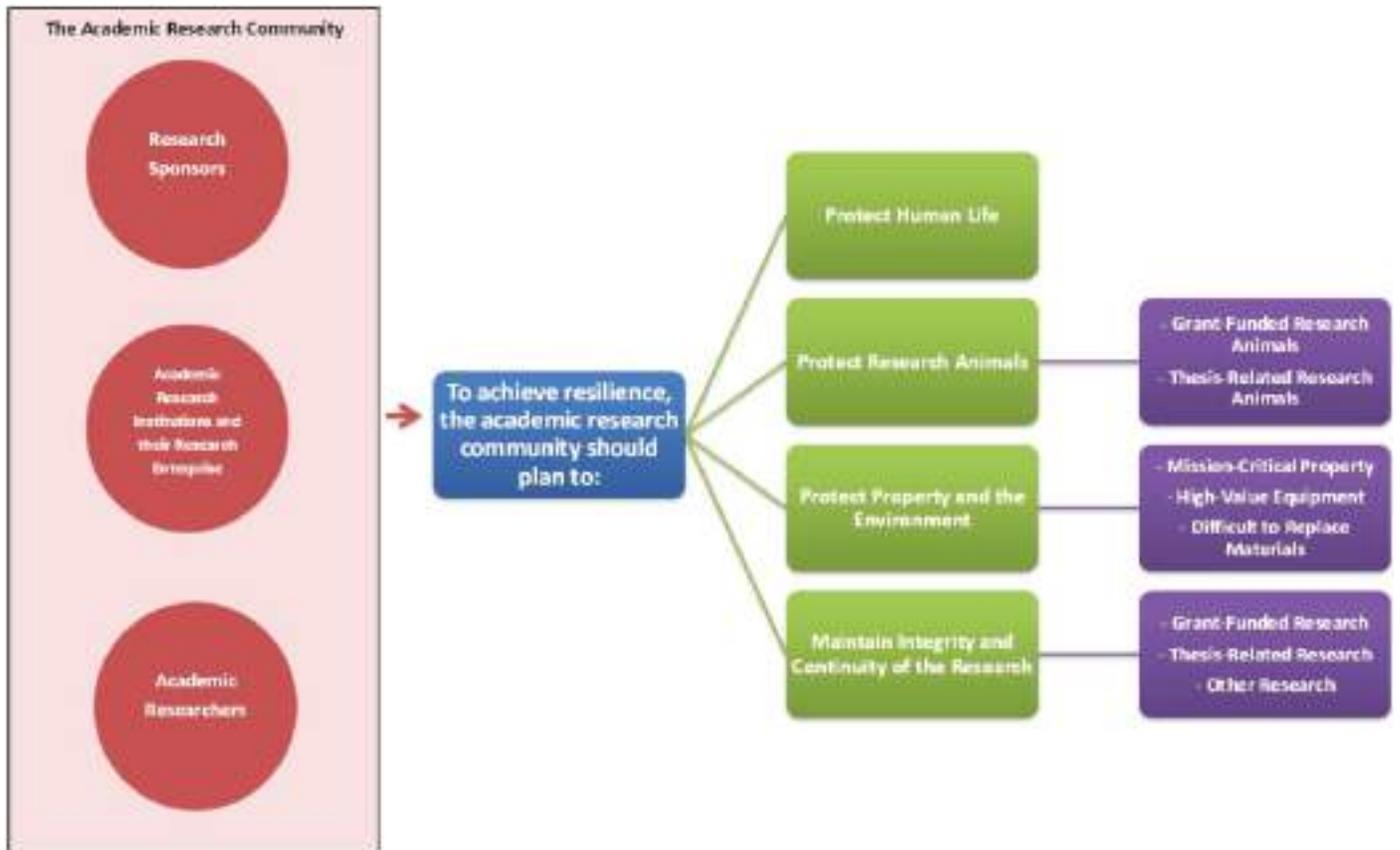


Figure 1: A model of interaction between urban system transformability and risk (Promsaka S. and Rizzi P., 2015)

that requires every stakeholder of the academic biomedical research community to accept responsibility and act on it, from the individual researcher to the institutional leadership and research sponsor.

Support for disaster resilience in the research enterprise should come from a high level within institutional research leadership: a chief resilience officer for the research enterprise. This individual should represent the interests of the research enterprise and be integrated within the more comprehensive institutional disaster preparedness infrastructure, complementing the broader resilience efforts conducted by each institution.

It is also critical that the academic research institutions develop strong ongoing community partnerships with private, non-profit, and public sector entities to facilitate business continuity, mitigation and recovery planning; information sharing, and mutual assistance. Institutions should actively engage with key local, state, regional, and national agencies to establish a mutual understanding of the unique disaster resilience efforts necessary for the research enterprise.

Other steps academic institutions should take include:

- Implementing mandatory disaster resilience education and training programs for all research students, staff, and faculty;
- Developing an institutional financial investment strategy for disaster resilience efforts for the research enterprise;
- Establishing performance-based standards for the built environment to ensure that research facilities adequately protect experiments, research related assets, and research animals;
- Conducting disaster resilience efforts to preserve the lives and prevent the suffering of research animals.

3.2 Individual Researchers

Individual researcher-based efforts are also essential to achieving resilience. In general, many researchers rarely consider what might happen to their research should a natural or human-caused disaster occur. Principal Investigators, who in the best position to understand the specialized needs of their specific research activities, should play a pivotal role in safeguarding and preserving critical research data, samples, and reagents by actively engaging in disaster resilience planning with their institutional leaders.

Researchers can also contribute to resilience

by maintaining a culture of compliance and striving to engage in safe work best practices in their day-to-day laboratory research activities to minimize the cascading negative impacts which typically follow a disaster event.

3.3 Research Sponsors

Sponsors of research should consider taking a more assertive role in protecting their investments in the research enterprise through introduction of resilience initiatives and development of policies to incentivize resilience at academic research institutions. High-level attention and coordination from research sponsors is needed to ensure that efforts to achieve resilience succeed.

A consortium of research sponsors (both federal and private sector sponsors), academic research institutions, professional associations, and private-sector stakeholders should convene to jointly discuss efforts that research sponsors can take to enhance the disaster resilience of the academic biomedical research community.

4. The Committee's Recommendations for Advancing Disaster Resilience

The following summary for advancing the disaster resilience of the academic research identifies the necessary actions recommended by the committee to achieve a resilient academic research community. All levels of the academic research community have the power to alter the narrative and promote resilience through the following comprehensive and integrated actions of institutions, individual researchers, and research sponsors.

For academic research institutions and academic researchers:

- Designate a qualified, senior individual with institutional oversight of disaster resilience planning efforts for the research enterprise
- Develop a strategy to implement comprehensive and integrative disaster resilience planning efforts for the research enterprise
- Develop, enhance, and leverage local, state, and national partnerships
- Ensure preservation of research data, samples, and reagents
- Implement disaster resilience education and training programs
- Improve the disaster resilience of animal research programs
- Develop performance-based standards

for the design and operations of research facilities

- Develop a plan for financial sustainability to ensure continuity of research operations

For research sponsors:

- Convene a consortium of stakeholders to discuss efforts to enhance disaster resilience for the academic research community
- Recognize the biological and biomedical academic research community as a subsector of the United States' Healthcare and Public Health Critical Infrastructure Sector

5. Conclusion

Improving the disaster resilience of the academic biomedical research community will mean an unparalleled partnership across the emergency management and academic research sectors. Resilience is an imperative that should be sought throughout all sectors of American society. The committee's recommendations show that actors at all levels of the academic biomedical research community and our local communities have key roles and can take steps to promote improved resilience.

To read the full report and download a free version, please visit: nationalacademies.org/DisasterResilientLabs

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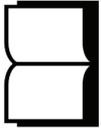
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**Track 5 Technology
and small
communities**



Study on Green Village Planning at the Yangtze River Delta

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Synopsis:

The Yangtze River Delta is the alluvial plain, Fertile soil, mild climate, many lakes and rivers, dense water, good water features, Yangtze river delta region is the most developed agriculture area in China, The village in this region has been the first to enter the new stage of production space, living space , ecological space and social and economic structure transformation. Aiming at the realistic and widespread problems in Yangtze river delta Village such as the village distribution density, small size, loose structure; empty courtyard, tall residential space, land waste and inefficient use of space; garbage spreads from part to whole, fertilizer and pesticides brings Non-point source pollution; disorderly domestic sewage ,runoff water pollution and so on. Research on the technology of eco-village planning and design, include green courtyard design, livable residential design, village style protection, village clean energy utilization, garbage collect and recycling use, sewage and runoff

village governance, water system planning and water purification, organic waste and animal manure harmless dispose. Through formulate Guidelines for ecological village planning, rural livable residential design, energy saving and high efficiency application guide, develop and promote the standardization of rural sewage treatment device, low power directional guide aeration device, organic garbage and animal excrement fermentation device and other equipment. Jiang village is located in Nanjing international slow city, o Gucheng Lake east, Jin hill and Jiang hill south, 4 square kilometers, 3100 people, Taking JiangShan Village of Nanjing international slow city as an example, it will provide comprehensive technical support for beautiful village planning and the ecological environment improvement of. the Yangtze River Delta. At the same time , Respect local, highlighting the characteristics ;Protect low mountains and slow waters;blend Water and green, Maintain ecological space, green space and natural mountain landscape, respect the life custom and

the traditional village layout pattern; combined the topography, vegetation, water and other natural factors, form regional Delta water features, achieve water ecological civilization.

1. Background and significance of the study

The Yangtze River Delta is an alluvial plain at the Yangtze River estuary, which boasts a fertile soil, pleasant climate, numerous rivers and lakes, densely distributed waters and beautiful water landscape. Rural areas in the Yangtze River Delta, which is the agriculturally developed region with the strongest comprehensive strength in China, have taken the lead to enter a new stage of social and economic restructuring and production field, living space and ecological space transformation. At the same time, the rural areas in the Yangtze River Delta are also facing a series of contradictions and problems such as the common phenomenon of hollow villages, the grim situation in ecological environment, outdated infrastructure, building chaos, etc.

A study on the ecological planning and design of villages characterized by efficient and orderly production, ecologically sustainable and intensive space development based on the geographical features and village characteristics of rapidly urbanized areas in the Yangtze River Delta, is an urgent need for the construction of resource-saving, environment-friendly, ecological and beautiful villages, and it is of great practical significance to the protection of rural mountain and water resources, construction of a green village system, and achievement of ecological civilization.

2. Status quo and progress of study on rural ecological planning and design

Since the 1970s, the developed countries began to recognize and reflect on environmental damage, resource depletion, and unsustainable lifestyles, thus leading to the study and practices of rural ecological planning and design and the change from industrial construction to ecological construction, and rural development policies supported rural ecological planning, and construction around four themes, namely “making best use of natural and cultural resources”, “improving rural living quality”, “increasing the value of local products”

and “promoting existing technologies and developing new ones”. The eco-village concept was first proposed by the Danish scholar Robert Gilman in his report *Ecovillages and Sustainable Communities*. In the 1970s, Germany carried out a study on ecological building, and Japan put forward the concept of “environment-symbiotic house”. The American Institute of Architects and United States Environmental Protection Agency launched an “ERG Program” in 1990. The main content of eco-village planning and construction includes: 1) Green building model. Eco-village construction emphasizes the use of solar energy, energy conservation, water conservation, landscaping, green materials, technology integration, etc. as well as the recycling of various resources and the arrangement of simple and easy energy-saving measures. Cases include the BedZED eco-village in Borough of Sutton, South London, the eco-village in Hamburg, Germany, etc.; 2) Village and ecological landscape model. The scientific planning and design shall be carried out to achieve a reasonable layout and structure and beautiful landscape. The contents of planning and design include the site selection of buildings in the villages, land use type, utilization of resources, ecological landscape, etc.; 3) Cultural and organization management model. Most of the residents in the eco-villages are urban residents, so cultural and organization management model shall emphasize the ecological management and lifestyle. Generally speaking, the study covers rural ecological planning and design, rural ecological environment construction, rural ecological settlement research, rural ecological landscape construction, rural ecological land use, etc., and ecological factor analysis technology, GIS technology, wastewater treatment technology, land treatment technology, photochemical processing technology, sediment extraction technology, pioneer species introduction technology, community dynamics control, and behavior control technology, as well as other technical means are used.

China’s study on rural ecological planning and design started from the vigorously developing ecological agriculture construction in the 1980s. According to the requirements and objectives of ecological agriculture construction, China has established more than 2,000 ecological agriculture demonstration sites across the country since the early 1990s, including more than 50 counties piloting national projects and more than 100 counties piloting provincial projects. These ecological agriculture demonstration sites include a large number of ecological agriculture demonstration villages with distinctive features, namely “eco-villages”. From the perspective of object of study, China’s study on eco-villages has been considering farmland ecosystem and village ecosystem, with focus on the material, and

energy circulation and exchange between the two systems and their coordinated development. The contents of China's study on rural ecological planning and design can be summarized as follows: (1) Study on eco-village planning and design. The study on eco-village construction model and development direction shall focus on the analysis and assessment of eco-village cases; (2) Study on the ecological technology and ecological engineering of eco-villages, such as ecological planting, breeding technology and engineering, material and energy recycling technology and engineering, modern ecological residence, etc.; (3) Study on eco-village assessment methods and standards. The Ministry of Environmental Protection of China introduced the National Eco-village Construction Standards (Trial), developing 15 assessment standards from 6 perspectives, including economic level, environmental health, pollution control, resource protection and utilization, sustainable development and public participation, which shall be met in the construction of national eco-villages. In terms of practice, although the provinces have developed technical documents on village construction, such as the Guidelines for Village Planning of Jiangsu Province, the Technical Guidelines for Village Construction Planning of Shandong Province, etc., to guide village construction from village planning and layout, infrastructure, public facilities, landscape, and other aspects, they have not yet formed the rural ecological planning and design system. The "Civilized Eco-village" project launched by Beijing in 2004 comprehensively stated the content of eco-village construction, which was the beginning of a more perfect eco-village planning. The "Civilized Eco-village" project includes the renovation of village and town appearance, environmental protection infrastructure construction, industrial restructuring, non-point source pollution control, circular economy demonstration, solar and biological energy use, mine restoration, afforestation, and other ecological environmental projects.

3. Object and methods of study

3.1 Object of study

Jiangshan Village is located in the International Slow City of Nanjing. Lying on the east coast of the Gucheng Lake and against the Jinshan Mountain and the Jiangshan Mountain in the south, the village covers an area of 4 square kilometers and has a population of 3,100. A series of problems such as rural environmental pollution, outdated facilities, rural feature, and style degradation, weak sustainable development capacity of rural areas, etc. become increasingly prominent.

3.2 Methods of study

(1) Ecological sensitivity analysis

First, the Delphi method is used to score and assign values to each single factor, then the analytic hierarchy process (AHP) is used to determine the relative weights between indicators, and the Arcinfo platform is used to develop ecological sensitivity standards to assess the sensitivity level and weight of each single ecological factor of rural land. The single factors are overlaid to form single-factor layers based on the sensitivity level of each single land use factor, and the layer of comprehensive sensitivity is worked out through weighted multi-factor analysis. Finally, existing roads, waters, etc. are overlaid to work out the ecological sensitivity model.

$$S_i = \sum_{k=1}^n B_{ki} W_k$$

In the formula, S_i represents comprehensive score

B_{ki} represents the sensitivity level of the first factor of the spatial unit;

W_k represents the weight of the first factor;

N represents the number of factors.

(2) Analysis of quantitative characteristics of plant community

Indicators of quantitative characteristics of plant community include density, abundance, frequency, coverage and important value.

Density refers to the number of a certain plant per unit area. Relative density is normally used in calculation, i.e. the percentage of the density of a vegetation type to the sum of densities of all vegetation types. The formula is as follows:

$$D(\text{Density}) = \frac{N(\text{Number of individuals of a certain plant in the sample land})}{S(\text{Area of the sample land})}$$

$$\text{Relative density} = \frac{\text{Density of a vegetation type}}{\text{Sum of densities of all vegetation type}} \times 100\%$$

Coverage refers to the percentage of land covered by each kind of plant in the community. Relative projective coverage and relative prominence are normally used in calculation. Relative projective coverage is the percentage of the coverage of a certain plant to the total coverage, and relative prominence is one of the indicators to assess the prominence of each vegetation type in the community. The formula is as follows:

$$\text{Relative prominence} = \frac{\text{Breast-height basal area of a plant}}{\text{Sum of the breast-height}}$$

basal areas of plants of same life form $\times 100\%$

Relative projective coverage=Area covered by a plant/Total area covered by plants of same life form $\times 100\%$

Relative important value of arbor=Relative density+Relative prominence

Relative important value of shrub=Relative density+Relative projective coverage

(3) Analysis of plant community diversity

This includes species diversity index, number of species (S), Simpson dominance index (D), measurement of concentration, namely the opposite of diversity, evenness index (Jsi), etc. The formula is as follows:

Simpson dominance index (D)= $1-\sum Pi^2$, in the formula, $Pi=Ni/N$

Evenness index (Jsi)=($1-\sum Pi^2$)/($1-1/S$)

In the formulas, Ni is the number of individuals of the i -th plant in the sample land, N is the number of individuals of all plants in the sample land, S is the total number of all species, and Pi is the probability that the individual is under the i -th category.

4. Empirical analysis

4.1 Ecological design of rural spatial layout

Based on the ecological investigation, with the support of RS and GIS, this paper uses multi-period remote sensing data to get the spatial distribution of the Jiangshan Village, and constructs ecological suitability assessment indicators suitable for the villages in the rapidly urbanized areas of the Yangtze River Delta through the calculation of village density, frequency and dominance, and the analysis of productivity change in the assessed areas. The main contents include the selection of ecological factors such as geological disasters, soil erosion, vegetation type, river network and water system, etc., determination of the weight of each single factor and weighted overlay, assessment of ecological suitability of the land, prediction of spatial evolution of the Jiangshan Village, and optimization of the spatial layout.

This paper analyzes the composition principle and spatial distribution characteristics of Jiangshan Village based on the spatial analysis technology of GIS, determines ecological sensitivity grading standards, determines and grades comprehensive ecological suitability and determines village land suitability on the basis of comprehensive natural conditions and grading assessment, divides village land into several levels of sensitive areas and defines the ecological

security pattern of the village.

The ecological environment and ecological space as well as the green mountains and natural landscape shall be protected in accordance with the principle of integrating into nature and highlighting characteristics, local customs and traditional village layout shall be fully respected, and regional rural style and features shall be formed through combination with terrain, vegetation, waters, and other natural factors.

4.2 Ecological design of rural courtyards

Residential courtyards in Jiangshan Village are divided into agritainment-oriented courtyards, business-oriented courtyards, planting-oriented courtyards and simple residential courtyards in ecological renovation. For courtyards that are used in commerce, semi-enclosed form (fence, wooden paling, low wall, etc.) is suitable because it can make the courtyards visible. At the same time, small structures (pergola, small corridors, etc.) shall be arranged in such courtyards to provide shelter for people when they have meals; courtyards that are used for life can be renovated according to the wishes of villagers, and either open form or semi-enclosed form can be chosen. As for pavement in the courtyards, local ecological materials shall be selected, such as slabstone, tile, etc.

In order to make a building warm in winter and cool in summer and save the cost of conventional energy, the building orientation and the surrounding environment shall be arranged rationally. The interior space, the exterior appearance and the color shall be cleverly designed. An appropriate combination of building materials and construction measures shall be taken, and some non-conventional energy collection and use devices shall be designed based on the architectural structures. Therefore, the design shall be characterized by low investment and low technology. Specifically, in the design of the general layout, plane, section and details and the selection of materials for external walls, roofs, external windows, etc., application of natural ventilation and solar energy, and other renewable energy shall be reasonably guided through the way of architecture to effectively reduce energy consumption in the building. In the Yangtze River Delta, cooling in summer mainly relies on natural ventilation, effective sun-shading measures, etc., so rural residential buildings shall have ventilation design. Good indoor ventilation can not only improve the indoor hot environment, but also dilute and remove indoor contaminants caused by smoke emissions and improve indoor air quality.

**Catering-oriented
farmhouse**

There shall be a kitchen, a dining space and a small piece of vegetable field in the courtyard of a catering-oriented farmhouse.



**Accommodation-oriented
farmhouse**

The courtyard of an accommodation-oriented farmhouse shall be open to the public and shall have wooden tables and chairs and other resting landscape.



Villager's home

A villager's home shall have vegetable field and fruit trees.



Table1: Courtyard ecological design

4.3 Ecological design of rural public places

Hard landscape interface shall be softened, flexible, green and open space shall be created, green species and plant layout shall be rationally arranged, and vegetation coverage shall be increased with more forest land and local tree species and less lawn and garden varieties to reduce the cost of virescence maintenance. Public green space will soften the interface with the natural landscape so that they can penetrate and integrate with each other.

Soft ground shall be increased in public space, and water-permeable hardened pavement and floor materials or semi-water permeable pavement combining virescence and hardened pavement shall be used to restore the original underlying surface that has been damaged as much as possible. Roof, walls, squares and other space shall be extensively used for three-dimensional landscape in architectural environment design, and soft coverage on the interface between buildings and space shall be increased to reduce the heat island effect and create an ideal micro-climate.

During the life cycle of village landscape (planning, design, construction, operation and recycling), resources and energy consumption shall be reasonably reduced to effectively decrease the generation of waste and improve the ecological environment of villages with rivers and lakes to the maximum extent, thus promoting the intensive use of land, water network and other resources and the optimization of the ecological environment and achieve the overall improvement of ecological efficiency.

4.4 Rural ecological water system planning and water purification design

Flood storage and drainage is the primary function of the village water system. Due to the great differences between the rural and urban underlying surfaces, village runoff is also different. The impact of rural underlying surface on rainfall runoff and flood formation process shall be analyzed. Village runoff change in the case of different rainfall frequencies under the background of the hydrological model shall be studied, appropriate rainwater runoff parameters that are suitable for the rural underlying surface shall be proposed, and rural ditch and pond system shall be constructed based on the structural characteristics and distribution characteristics of village houses.

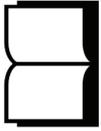
Water in rural ditch and pond mainly comes from precipitation storage and some domestic sewage. Among them, early rainfall will carry a large number of non-point source pollutants into water, and domestic sewage itself will directly lead

to water pollution. Compared with other water systems, rural ditch and pond system is characterized by small spatial size, low environmental capacity, a difficult balance of water amount, etc. Water environment target shall be established based on water balance calculation, pollution sources shall be identified, circular water purification methods integrating flow creation and aeration, soft enclosure diversion, contact purification, etc. shall be studied, and waterfront buffering structure and pollutant interception and purification technology shall be studied through their combination with landscape construction to finally determine the water quality maintenance program and put forward a shore width suitable for the water system and the corresponding composition of plant community.

5. Conclusion

The villages in the Yangtze River Delta as a traditional agriculturally developed region have entered a new stage of social and economic restructuring and production space, living space and ecological space transformation. At the same time, due to the lack of scientific planning and design and practical ecological technology, a series of problems such as inefficient use of agricultural resources, rural environmental pollution, backward supporting facilities, rural feature and style degradation, weak sustainable development capacity of rural areas, etc. become increasingly prominent. The ecological planning and design technology put forward in the paper is suitable for the region to achieve the ecological improvement of the rural land layout, public space, rural courtyards and infrastructure, which is conducive to improving the rural living environment in the Yangtze River Delta.

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Analyzing Urban and Rural Settlements with Remote Sensing: comparing national trends of rural growth with the Global Human Settlement Layer

40 Years of Urban and Rural Development Explained with Remote Sensing: a comparative analysis at national level with the Global Human Settlement Layer

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Synopsis:

Contemporary technological assets allow an unprecedented opportunity to analyze the growth of human settlements at global level. The Global Human Settlements Layer (GHSL), produced at the European Commission Joint Research Centre offers unique opportunities to analyze the process of settlements expansion. The GHSL contains remotely sensed and automatically processed geospatial data which account population and built-up areas in different years: 1975-1990-2000-2015 and has a global coverage.

The Human Planet Atlas 2016 (Pesaresi, Melchiorri et.al. 2016) showcased a preliminary analysis of the GHSL data focusing on global urbanization dynamics. The Atlas relies on the European Union definition of cities and settlements to define in a common way urban and rural human settlements in a consistent way across the globe allowing consistent analytics.

This paper takes the national statistics of built-up areas and urban-rural population to propose a comparative analysis of

the dynamics of expansion of rural settlements in countries and continents. The Human Planet Atlas 2016 reports that Europe and Northern America are the least urbanized continents where less than 74 in 100 people live in urban clusters, this figure is below global average (85 in 100 in 2015). This key finding sheds lights on the relevance of smaller human settlements in these two continents vis-à-vis the global narrative of urbanization. The paper proposes an analysis of national trends of rural settlements in more than 200 countries. The relevance of this research, supported by premier evidences and data, can help in understanding the processes of suburbanization, sprawl and urban-rural population shifts which are taking place all around the globe. On the basis of this framework contribution it is possible to develop research at subnational level in more than 200 countries where the GHSL contains multitemporal data.

1. Introduction

The narrative of global development has been increasingly associated with the process of urbanization, both in research and policymaking. Urbanization has also entered the agenda of the global governance which recognized that the majority of global population lives in cities (UNDESA, 2014). The momentum has surged in the world polity, while the United Nations Department for Economic and Social Affairs (UNDESA) started releasing the World Urbanization Prospect which accounts global population living in cities. The series of reports released by UNDESA (2014) provided statistics about the majority of global population to live in cities since around the beginning of the XXI century.

The process of urbanization is multisectoral in nature and effects. It has distinctive economic (Capello and Camagni, 2000; Davis and Enderson, 2003) and sociological connotations (Wirth, 1938; Molotch, 1976). These two principal determinants identify cities as the key drivers for the development of societies and economies. The transition of population from rural to urban areas has been described mostly through economic motives (Fields, 1975; Lucas, 2004) as a shift towards the opportunities urban areas offer, especially in developing countries and in the global south since the 1950s. The process of urbanization is common to most countries of the globe: The Human Planet Atlas 2016 (Pesaresi, Melchiorri et.al. 2106) reports 85 in 100 people in the globe live in urban areas, and that urbanization (the ratio between population in urban areas and the national population) has increased over the last 25 years in all regions of the world apart from Europe (p.48, *ibid.*).

From a statistical analysis standpoint, this paper analyses the global trends of urban and rural settlements development in terms of population and built-up areas on a country basis. It presents the results of data analysis made possible by the data extracted from the Global Human Settlement Layer - GHSL. The GHSL is a multitemporal database obtained through automatic machine learning data processing. The GHSL team, at the European Commission Directorate General Joint Research Centre has combined satellite imagery and census data (in cooperation with CIESIN) to release a global layer containing geospatial data about built-up areas and population for the years 1975-1990-2000 and 2015.

The room for this research article is both on methodological grounds and on the global application of the "Harmonized Definition of Cities" - Degree of Urbanization Dijkstra and Poelman, 2014, modelled at global level upon the GHSL baseline data, to analyze at national levels the

dynamics of urban-rural development. The methodological component attempts to provide a contribution to the challenges of comparative analysis in urbanization studies. Data driven research depends on the quality and consistency of input data, that in the case of population are extremely subject to national disparities: across border the factors which determine whether a settlement is to be considered "urban" or rural are rather variable, often they depend on administrative or census criteria, and might even be arbitrary. This study proposes the analysis of population and built-up areas dynamics for the epochs contained in the GHSL. It also includes some findings related to urbanization and agglomeration -share of built-up in urban clusters.

The paper first presents the methodology used for the data analysis, explaining the content of the database and the ways in which data have been analyzed. Second, it provides the results dividing the population and built-up categories. Two additional sections present the result of urbanization and agglomeration analysis.

2. Methodology

The methodological component of this research contains elements of big data analysis applied to territorial studies. The aforementioned difficulty to carry out rigorous comparative analysis about urbanization statistics at a fine scale and with global coverage is challenged by adopting the grid based GHSL in combination with the OECD- DG Regio Settlement Model. The GHSL divides the earth surface in 1km grid cells. For each cell the GHSL accounts the percentage of built-up coverage (with remote sensing Landsat information as input) and its modelled population through the globally harmonized geospatial statistics for national population (developed by CIESIN). On the basis of this information it has been possible to identify three settlement classes:

- urban centers, compounds of contiguous grid cells with at least 1500 inhabitants per square kilometer - and at least 50 thousand inhabitants per compound;
- urban clusters, compounds of at least 300 inhabitants per cell, and with at least 5 thousand inhabitants per compound;
- rural grid cells, all cells outside urban clusters;

Oftentimes in rural grid cells built-up and population are identified, but these settlements do not meet the population quantity and density totals to be classified in neither of the two urban classes because they are thinly populated areas. Accordingly, the Harmonized Definition of Cities is largely a people based definition. The criteria of the

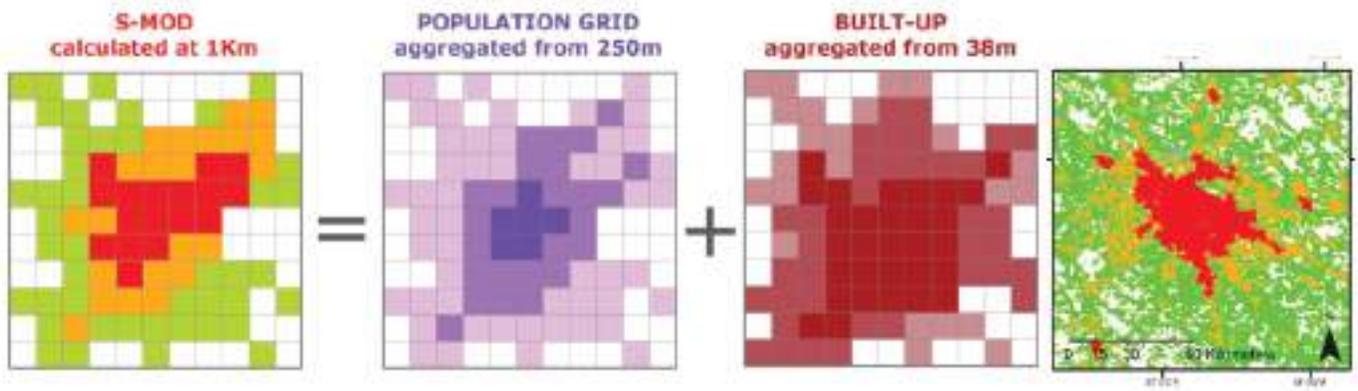


Figure 1 GHSL Settlement Model Components (in Pesaresi, Melchiorri et.al. 2016) and example in Moscow

model are commonly applied to the grid, and so to the global earth surface: this excludes the limitation of inconsistent classification and accounting across national borders.

The database which has been constructed according to this rule consists of 210 countries for which it has been accounted population (inhabitants sum) and built-up areas (in square kilometers) for the three settlement model categories for the years 1975-1990-2000 and 2015. For the purpose of this study, only the urban and rural categories (and their sum as national totals) have been analyzed. This baseline data has been combined per geographical area and according to functional aggregates. National data have been aggregated: per region of the world (according to the United Nations Population Division Department of Economic and Social Affairs World Population Prospects 2015 revision) and consequently as global sum. For population and built-up plain data growth rates across

epochs and between 1990 and 2015 have been calculated. In addition, two ratios have been calculated: one accounting urbanization (concentration of population in urban clusters as percentage of national population), the other agglomeration (concentration of built-up areas in urban clusters as percentage of national built-up).

3. Results

This section presents the results of data analysis and it contains findings about urban-rural population and built-up development over time.

3.1 Global Population

Over the last 40 years the share of global population living in rural areas has decreased, from 22% in 1975 (equivalent to around 800 million people) to 15% in 2015 (1.1 billion people) - Figure 2. This global figure is

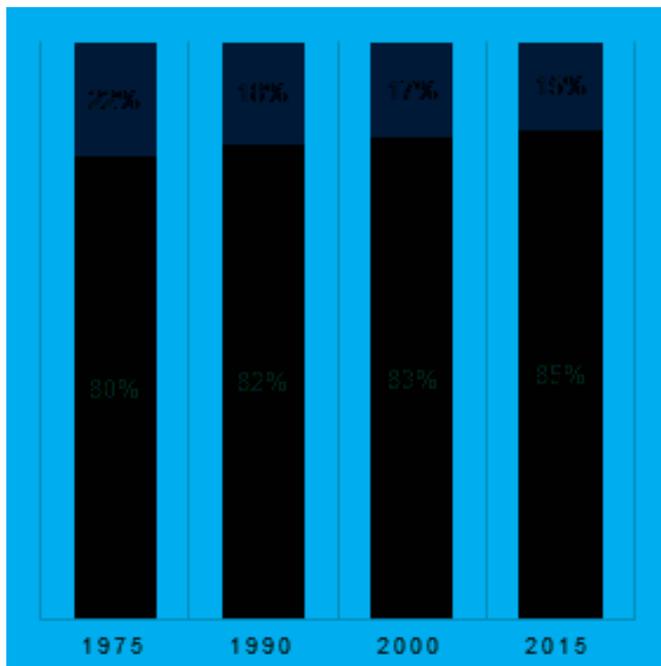


Figure 2: Share of Global urban-rural population between 1975 and 2015

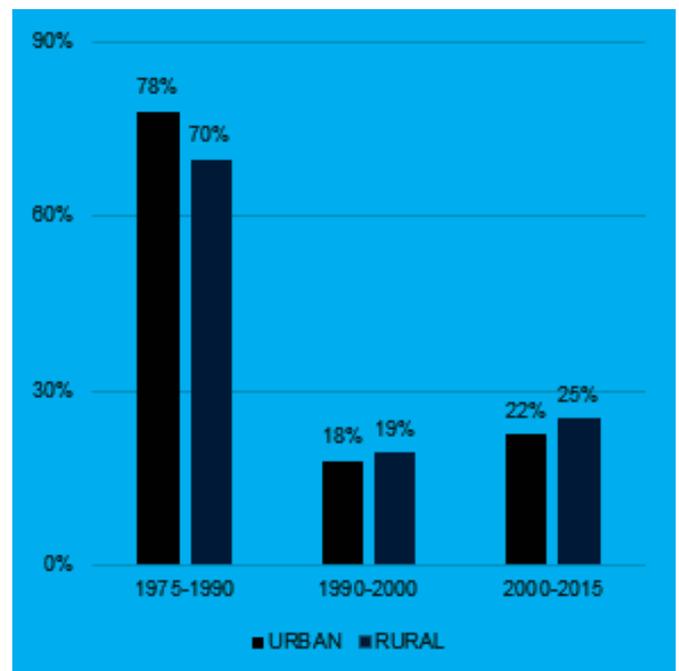


Figure 5: Urban and rural built-up growth rates per period

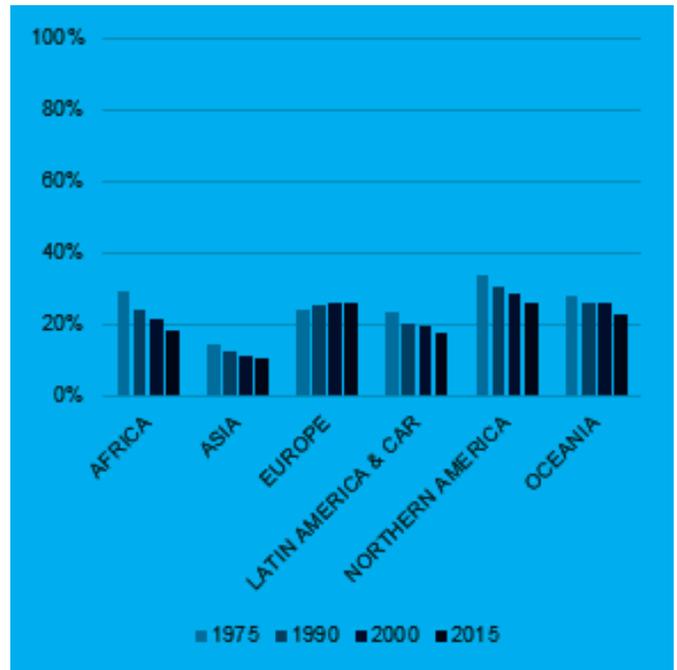
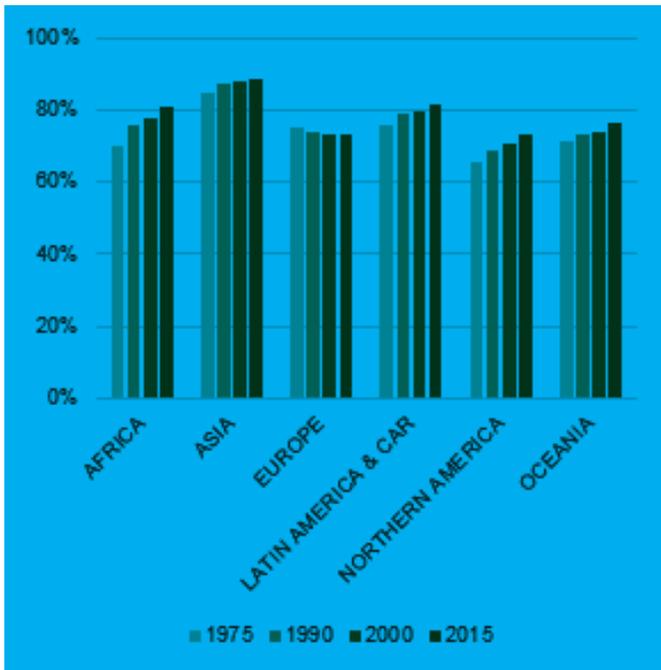


Figure 3: Share of urban and rural population in the regions of the world per epoch

subject to regional disparities: Europe and Northern America are the least urbanized regions where more than ¼ the population (26%) is accounted in rural settlements.

Over time the share of global population living in rural settlements has been declining since 1975; only in Europe it remains stable (slight increases and decreases by less than 1%). This dynamic is driven by the population growing faster in urban areas than in rural ones in all regions but Europe. In Europe, rural population increase has been higher than the urban one in the periods 1975-1990 and 1990-2000. On a regional basis, the rural population growth rates of Africa (and in Asia from 1990 onwards) increase over time; they decrease in Latin America and the Caribbean.

3.2 Global Built-up

In 2015, 26% of the global built-up areas are accounted in rural areas. Regional patterns portray the cases of Europe (39%) and Northern America (33%) in which the share of built-up in rural settlements is the highest. It is also interesting to point out that after Europe and Northern America, Africa is the third region with the highest share of national built-up accounted in rural areas. Rural built-up in Africa has doubled in 25 years (1990-2015).

The most important pattern of built-up growth in rural areas is its faster growth if compared (at global level) to the growth rate of urban built-up: Figure 4 shows that built-up grows faster in rural than in urban settlements.

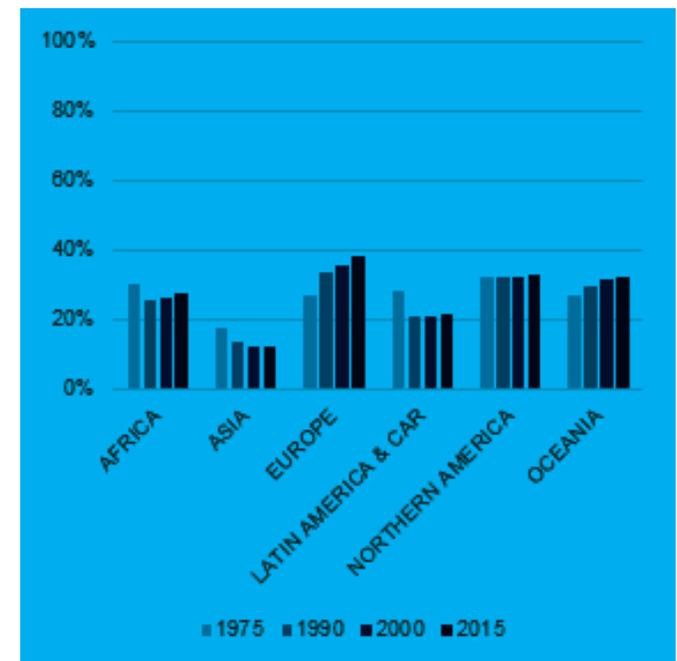
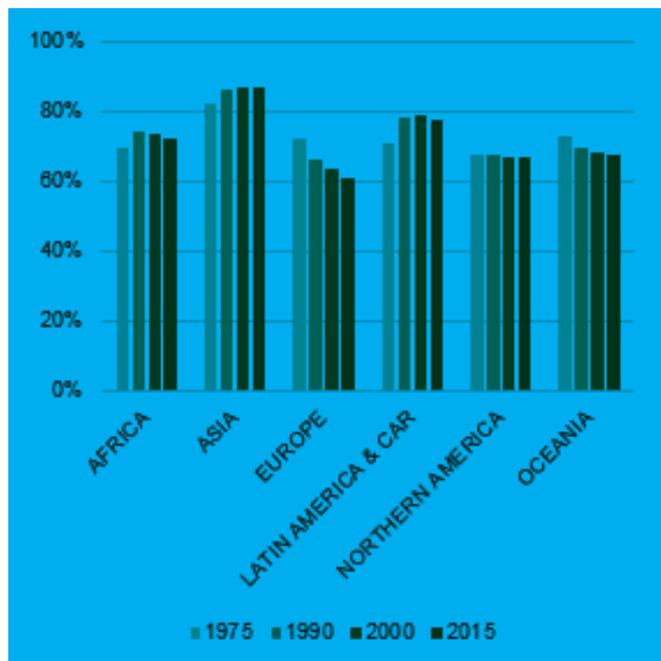


Figure 4: Urban-rural shift in the relative share of built-up areas between 1975 and 2015

3.3 Global Built-up areas and population Dynamics

The combination of built-up and population growth between the observed time periods shows the pattern of urban and rural development subject of this research. Figure 6 shows at least three elements: first that spatial and demographic growth of urban areas has been substantially much higher in absolute terms if compared to that in rural areas. Second, that the relatively “flat” line of rural development is driven by a mere built-up growth, while built-up areas more than double (from about 80,000 km² in 1975 to more than 200,000 km² in 2015) population has increased less significantly (from 800 millions in 1975 to 1.1 billions in 2015). third, that the correlation between population and built-up growth in rural versus urban areas is considerably disproportionate. Rural areas grow mostly in built-up: it increased by more than 2 times between 1975 and 2015, while by a factor of 1.8 in population (nearly doubled). Urban areas have increased population by a factor of 2.6 in built-up and by 2.9 in population. The following two sections 2.6 and 1.9 disaggregate this global trend per country.

3.4 National Population Dynamics

It has been mentioned how the process of urbanization is a key phenomenon of the contemporary era. The series of charts (Figure 7) below correlates the increase of national population to the one of urban (left) and rural (right). The first presents a stronger correlation between national population and the one in urban areas, and also wider increase of urban population compared to the of rural settlement and national population. Countries plotted above the black dashed line encounter a relative change in urban population greater than the national

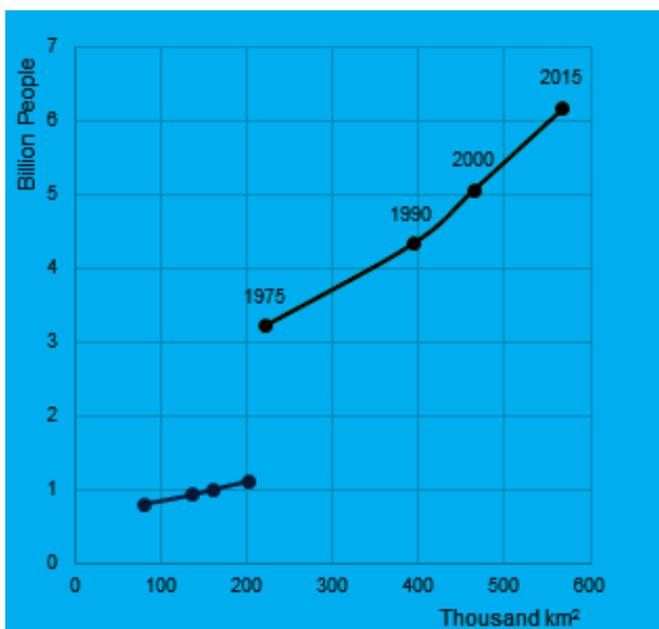


Figure 6 Global development of built-up and population in urban and rural settlements between 1975 and 2015

population change, those below (especially in the right part of the figure).

In 17 out of the 210 analyzed countries, between 1990 and 2015, it is accounted a net population decrease (among which: Albania, Armenia, Bulgaria, Belarus, Estonia, Russian Federation, Ukraine and Georgia). In the majority of them both urban and rural population decreases: only in few cases (including Albania and Estonia) urban population does not decrease. Only in the case of the Russian Federation the decline in national population is determined only by a declining urban population and an increasing rural population. In 96 out of the 210 analyzed countries rural population has increased more than urban population between 1990 and 2015 –with a potential consequence on the degree of urbanization.

3.5 National built-up Dynamics

Figure 8 compares the relative change of built-up areas in cities (right) and in rural areas (right) against the overall national relative built-up change between 1990 and 2015. Negative built-up areas change are determined by urban-rural or vice versa land classification transition between 1990 and 2015.

3.6 Urbanization

A relevant amount of urbanization analysis at the national level with the GHSL is contained in the Human Planet Atlas 2016, which reports global urbanization reaching in 2015 85% (topping nearly 90% in Asia), while it is below 50% in only 11 countries (including Bhutan and Namibia) – Pesaresi, Melchiorri et.al, 2016).

While the global tendency of urbanization is about increases, in 61 countries urbanization has decreased .

3.7 Agglomeration

Agglomeration accounts for the share of national built-up concentrated in urban areas and the total built-up areas detected in a country; on a global aggregate it is declining from 82% in 1975 to 74% in 2015 (Pesaresi, Melchiorri et.al. 2016). Only in few countries agglomeration of built-up in urban areas is below 50%, these cases include 23 countries (including Bhutan, Benin, Bulgaria and Slovakia). Agglomeration is the highest (above 90%) in countries like: United Arab Emirates, Kuwait, Qatar, India, Indonesia, the Philippines; while it is the lowest (below 40%) in counties including: Russia, Norway, Congo and Namibia.

The most common dynamic, observed in 195 countries, consists in the growth of built-up in rural areas at greater rates than in urban areas.

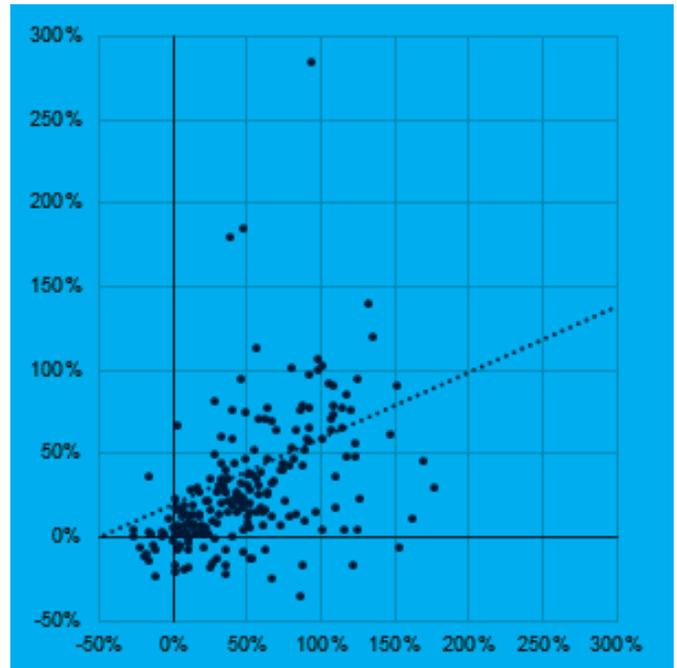
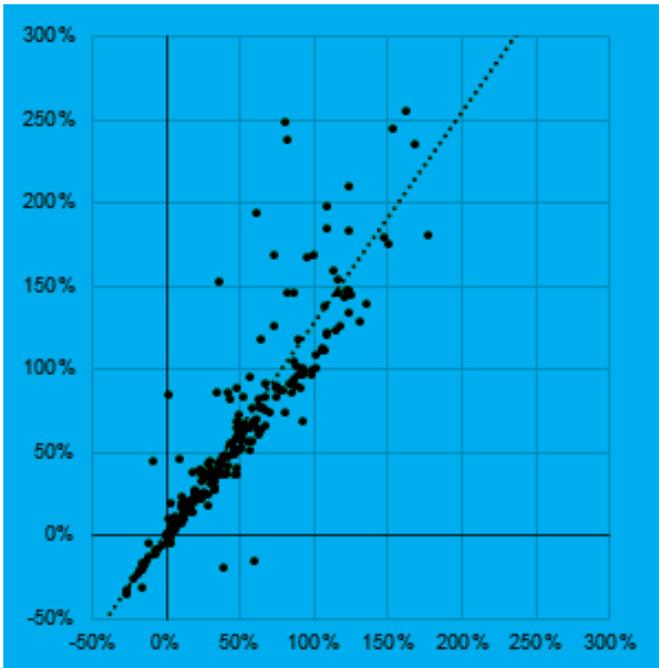


Figure 7: Urban and Rural population changes (y) compared to national (x) between 1990 and 2015

4. Discussion

Data analysis has provided a series of important findings. First, the broad dynamic at global proves that rural and urban areas have rather distinct patterns of development per driver and proportion, as shown in table 3 (below). It synthesizes the factors of growth of built-up and population in rural settlements and in urban clusters between 1975 and 2015 (factor of 1975 values). Remarkably built-up increased in 40 years by 2.5 times in rural areas while population by 2.6 times, in urban areas there is instead a tighter correlation. The above implies that built-up areas expanded in cities by the same factor as in rural areas however, population has not. This pattern generate substantial unbalances in the Land Use efficiency, under consideration as SDG11 indicator.

Second, Figure 9 shows that the degree of urbanization and the one of agglomeration have a strong correlation. Most frequently, countries most urbanized are also the most agglomerated ones (upper right portion of the chart). The majority of most urbanized and agglomerated countries are in Asia, on the contrary the majority of least urbanized and agglomerated are in Europe.

Observing the multitemporal trajectories portrayed in the population and built-up areas thematic sections (3.3, 3.4, and 3.5) it emerges that built-up areas tend to expand, and disperse, in rural areas while population tends to concentrate in cities. These findings seem to support the global narrative of urbanization and of built-up density convergence between urban cores and surrounding territories.

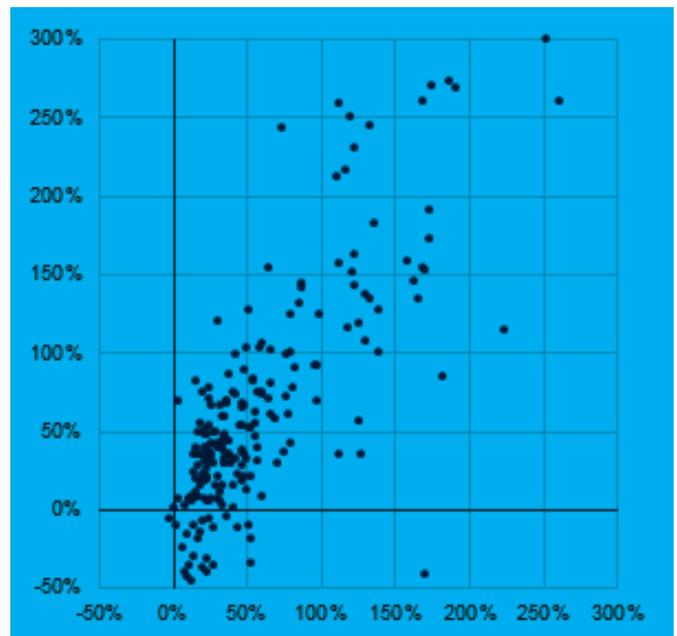
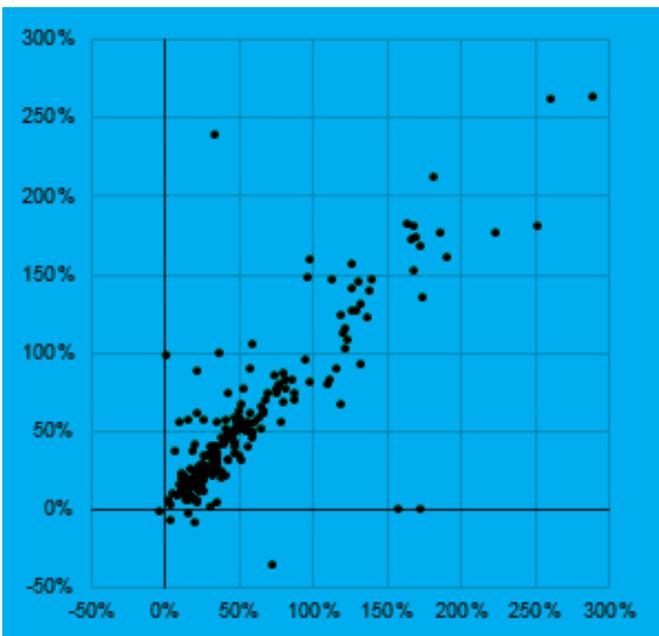


Figure 8: Urban and Rural built-up changes (y) compared to national (x) between 1990 and 2015

Rural growth factor 1975-2015		Urban growth factor 1975-2015	
built-up	Population	built-up	Population
2.5	1.4	2.6	1.9

Table 1 Comparison of urban and rural growth factor 1975-1990

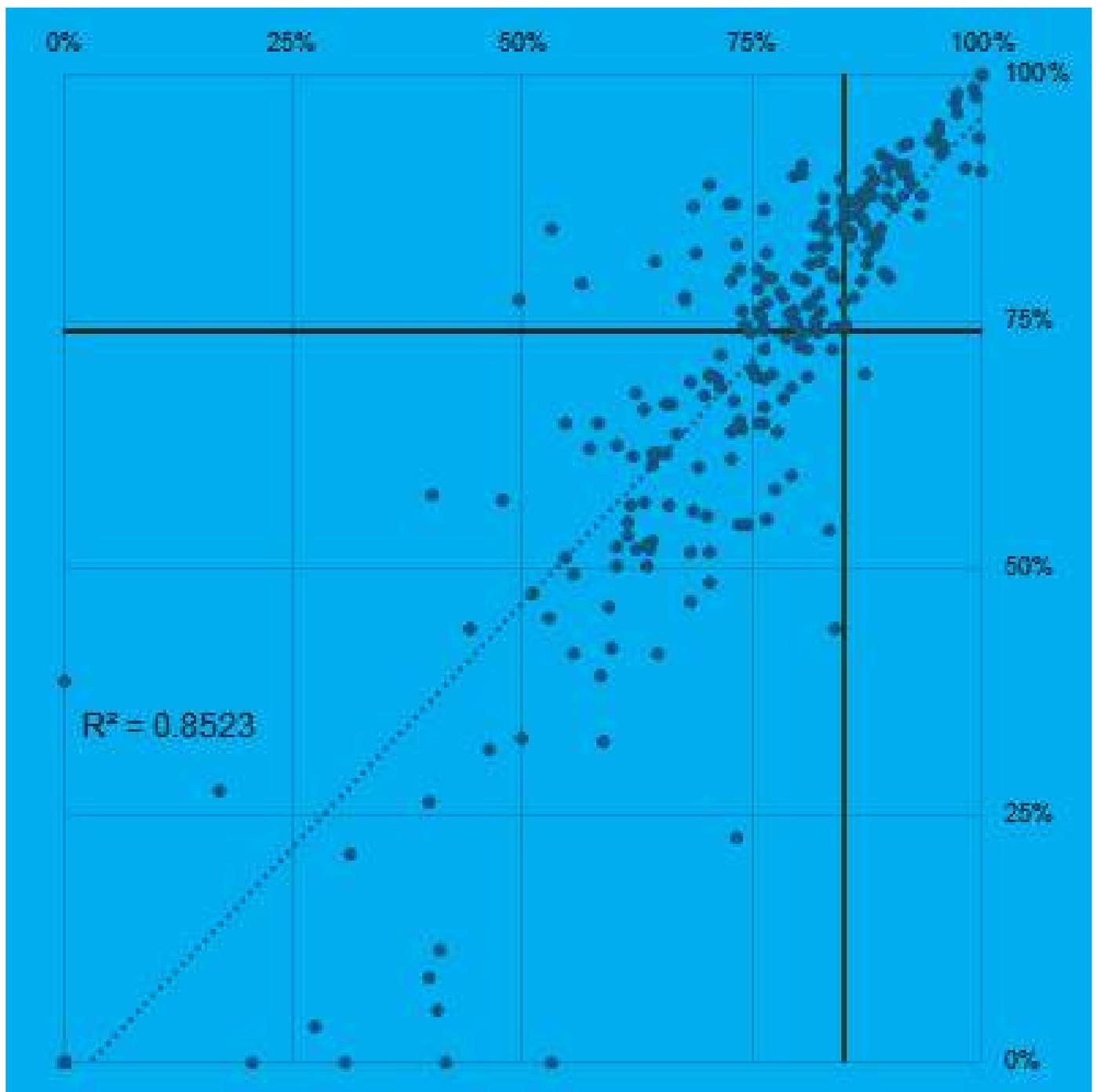


Figure 1: A model of interaction between urban system transformability and risk (Promsaka S. and Rizzi P, 2015)

End notes:

Urbanization= (Urban Population)/(National Population)

Agglomeration= (Urban built-up areas)/(National built-up areas)

Countries include (ISO A3 Country Codes): MSR, TLS, PLW, EST, COG, GEO, AND, LVA, DJI, GGY, NIC, VCT, BIH, ZWE, MNE, BGR, LCA, MDA, ROU, TON, LTU, QAT, GAB, HUN, SUR, ARM, VIR, UKR, VEN, IRN, ASM, SVK, RUS, GUY, MMR, FRA, POL, HRV, MNP, BLR, COL, JAM, CUB, CZE, BWA, BLZ, SLV, KAZ, PRY, GUF, ZMB, FIN, SRB, CAF, BRB, CHL, IDN, JPN, ARG, SEN, BDI

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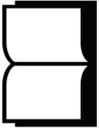
Datasets:

GHS Built-up grid; GHS Population Grid; GHS Settlement Grid
<http://ghsl.jrc.ec.europa.eu/datasets.php>

Disclaimer

The specific reference for input data to the GHSL are contained in Pesaresi (2016).

The database prepared for this study does not necessarily include statistics for the following countries (ISO Country Codes): ATF, BES, BLM, BVT, CCK, COK, CXR, FLK, FRO, GIB, HKG, HMD, IOT, KIR, LIE, MAC, MAF, MCO, MSR, NFK, NIU, NRU, PCN, PIS, PSE, PYF, SGP, SGS, SHN, SJM, SMR, SP-, SXM, TCA, TKL, TUV, UMI, VAT, VGB, VIR, WLF, XAD, XCA, XCL, XNC



Smart placemaking in the newest country of Europe

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Synopsis: A paper that presents the outcomes of an innovative approach for placemaking in Kosovo, a country with the youngest population in Europe, developed with high school and university students of the capital city of Prishtina and rural Gračanica, through emotional mapping with geoblog mobile app and website.

1. Background

Kosovo is the newest country of Europe with the youngest population. According to official statistical data, about one third (1/3) of about 2 million population is younger than 18 years old. Although youth as a social group, bear the weight of building the country's future, youth participation in decision-making/policy-making remains at very low levels. Kosovo has made considerable progress in terms of preparing national policies for young people, including their participation in spatial and urban planning processes. However, these steps have not been accompanied by concrete initiatives to support youth participation and create opportunities for their pro-active role in these processes.

Development of urban public spaces requires adequate knowledge and interaction of all participants: from planning professionals, politicians to residents of cities themselves. Youth issues do not always get the attention they deserve from decision-making and policy-making structures both nationally and locally. At the same time, the organization of the youth themselves to seek their rights, get involved or become part of decision-making is too vague and uncoordinated. Engagement in the spatial and urban planning processes will help them to develop their civic potential, community organizing, leadership, and decision making skills. This will have an impact on raising the level of social responsibility amongst youth for the common good and building a democratic society.

Rapidly developing mobile and internet infrastructure in Kosovo have increased the possibility of citizen engagement in decision making processes for the issues related to urban planning and design. As the young are very skilled technology users, the geoblog and mobile application is considered as an effective platform for their engagement in the designing of public spaces.

2. Current trend in treatment of public spaces in Kosovo

For more than a decade Kosovo municipalities (local governments) are still coping with a challenge of undergoing a transition period from a conventional planning system to the new one that is more inclusive, participatory and strategic. The new legislation adopting this approach ensures that planning instruments are legally binding documents at both central and local level (see figure 2), according to which, plans should have a long-term vision aligned with strategic priorities following with actions that are realistic and responsive to the community needs. Turning these strategic plans into real interventions that improve the urban environment and quality of life of the citizens

also requires adequate detailed urban design and landscaping proposals.

Considering that Kosovo cities, have witnessed a rapid growth in the population in cities and towns, especially in the period after the War, which subsequently had an impact in the physical environment in urban areas, the demand for provision of physical or social infrastructure, such as roads, open spaces and schools, as well as water, sanitation and electricity, is constantly increasing. These demands are fueling the competition for city space, with the multi-apartment buildings and cars dominating over the others. Public urban spaces are scarce in Kosovo cities in general, especially in the outskirts areas facing urban sprawl thus challenging more sustainable patterns of urban development. In some cases, even the new planning instruments failed to incorporate a system of public spaces, allowing for ad-hoc interventions that are unlikely to respond adequately to the current needs and enable people to get more from their surroundings.

The importance of the public spaces have received worldwide recognition, reflected in the Sustainable Development Goals (SDGs), calling for the provision of "Universal access to safe, inclusive and accessible, green, and public spaces, in particular for women and children, older persons, and persons with disabilities," by 2030. Such global policies are starting to influence country's policies, acknowledging the importance of public space. In the case of Kosovo, this has been more reflected at the local level governments. The elected leaders are understanding more and more the benefits of urban planning and urban design as a way to make a positive difference to improve the quality of life and urban prosperity. Despite the challenges of the lack of human resources and limited budgets they have, in partnership with donor's support, have been able to turn uncared and unusable spaces into places which maximize the aesthetic and functional qualities of public spaces. Inspired by best practice public space designs, and using various community involvement techniques including those of modern technology, such projects contributed not only to changing the physical environment, but also in building a sense of ownership of the ones involved and their responsibility for the management of these facilities.

A space becomes a place when it has significance and quality that extends beyond its basic uses. In this respect, a good design is only one among various means for improving the public space. Perhaps, more important than the design, is the ability to create a civic culture of public space and build awareness of the commons and of sustainable urban design during the design process thus contributing to development of smart communities and sustainable urban



Figure 1. Position of Kosovo in the region

Figure 3. Logo and slogan of YPLAN-KS

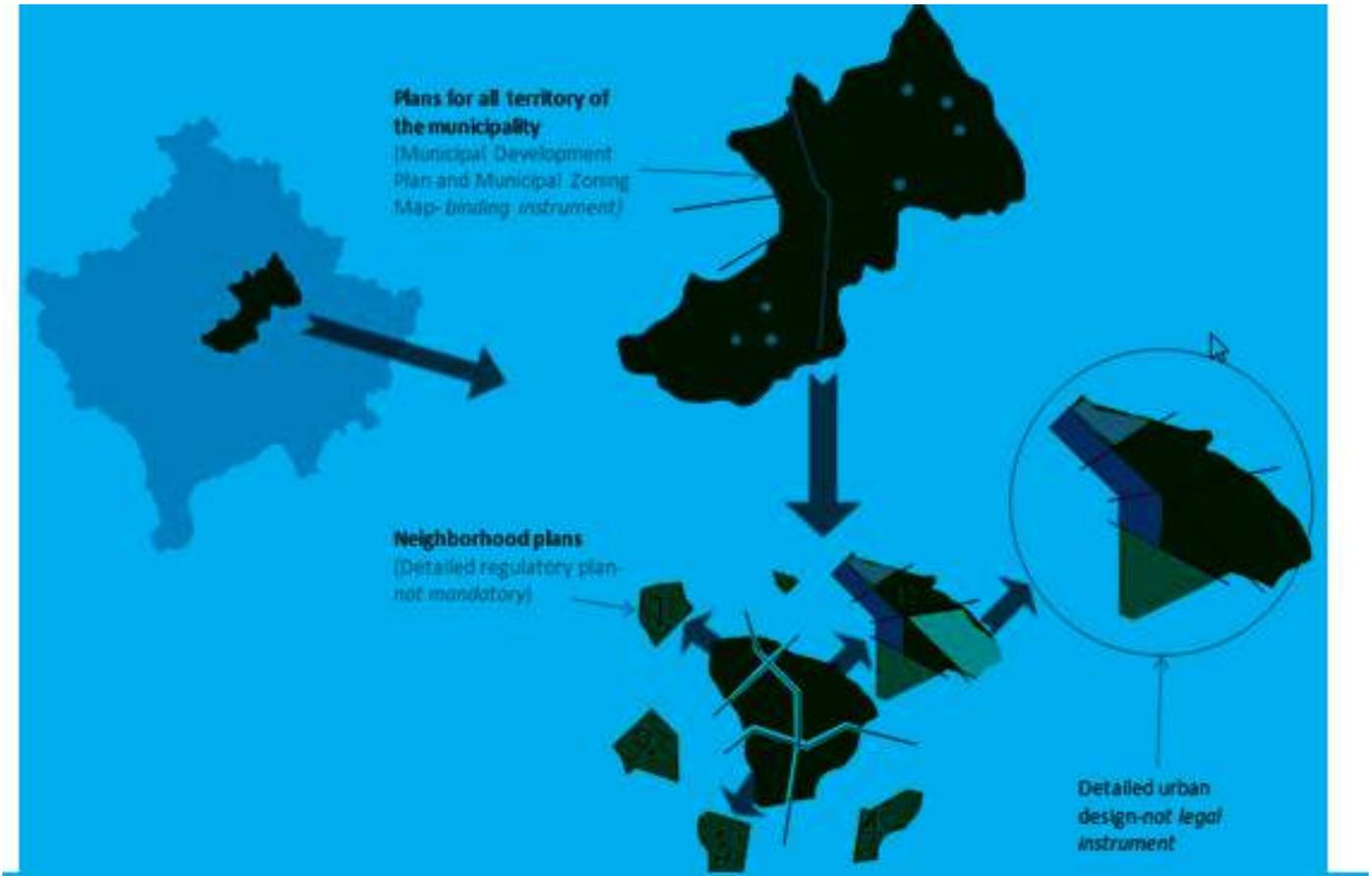


Figure 2. The relationship between planning and urban design instruments

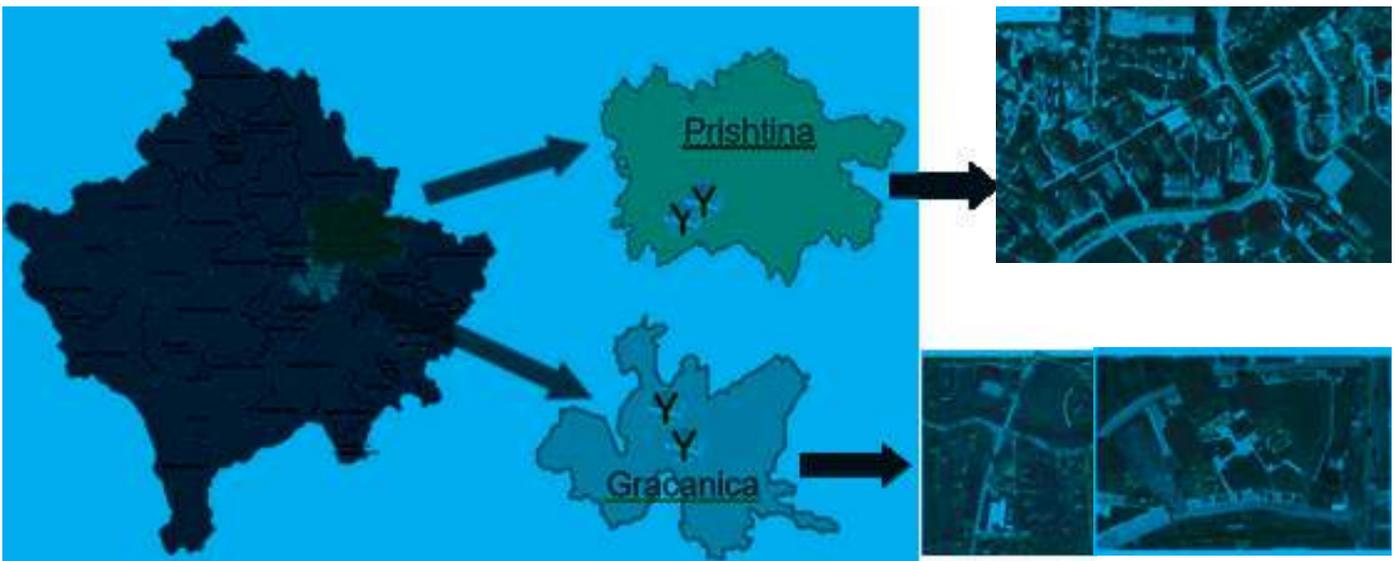


Figure 4. Position of YPLAN-KS public spaces in Pristina and Gračanica and in Kosovo

solutions. This paper considers this from the perspective of Kosovo- by providing outcomes of the project “Young place-makers initiative-YPLAN-KS”. The project aims to create the first generation of Young Place-makers in Kosovo, enabling them to gain insight into how public space is to be analyzed, planned and designed, applying creative techniques for public participation through the use of modern technology.

2.1. PRO-Planning approach to place-making

PRO-Planning, the Kosovo Center for Urban Research is the first think tank in Kosovo that deals with spatial and urban planning from the civil society point of view. It strives to improve the living environment by working with community and institutions to contribute to the people- centered and research-based sustainable spatial development.

Research, publications and analysis of spatial/urban developments, urban design and

housing are one of the main activities. PRO-Planning provides advice, legal professional support and technical assistance to municipalities in strategic and sustainable spatial and urban development and management. In the framework of community based urban design projects, it has conceived and successfully developed YPLAN-KS project.

3 Case study-YPLAN-KS

What is YPLAN-KS

YPLAN-KS is a place-making project of innovative approach in Kosovo, a country with the youngest population in Europe, developed with high school and university students of the capital city of Prishtina and rural Gracanica, through emotional mapping with geoblog mobile app and website. It was developed in the span of 9 months, 2016-2017. The project locations were chosen in agreement with the municipal authorities and in accordance with planning documents.

The project location in Prishtina is in the neighbourhood “Banesat e Bardha”. The location has an area of 48 acres and extends to a width of 107m and a length of about 40m. There are about 3,300 inhabitants in total, according to data from the Urban Regulatory Plan. The terrain configuration is variable and the site has good access.

In Gracanica, the site is located in the settlement Laplje Selo, which according to the Municipal Development Plan is to be developed into a municipal sub-centre. It has a total area of 132 acres (including multi-apartment buildings) and extends over a

width of 150 m and a length of about 100 meters. According to the data from the field, on the site itself live about 60 families, but there are a lot of visitors from elementary and high school students, which are located just across the site. The terrain is mostly flat; the central position in the settlement makes it quite visible and an eye catcher, if regulated. The space has good connectivity and access from all sides.

Why YPLAN-KS

Changes in society, the need for greater sustainability and people’s increased expectations enhanced the importance of creating new public spaces that meet a high standard of design, are sustainable and create opportunities for citizens, men and women, boys and girls, to enjoy social life outside their own households. As mentioned above, in Kosovo cities, there is a lack of well-designed public spaces, especially at neighborhood level. Smaller public spaces are often neglected and abandoned, in spite of their social importance. The streets and public spaces are the principal forum for social interaction, they connect the places we have to get to in order to meet our needs (school, work, healthcare, shops, etc.) and are the perspective from which many of our day to day experiences are gained.

Although these spaces are created and dedicated mainly to young people, they have little or no influence on their creation. Municipalities usually engage private companies for designing and developing public spaces which aim to execute the contracted works without leaving much possibility for participation of those that will use these spaces.

How we started

The project YPLAN-KS is inspired by “Young place-makers initiative”-YPLAN Romania, which involved high school students in activities of planning and urban redevelopment in Bucharest, to build an integrated contemporary, dynamic policy for public spaces regeneration. Likewise the project in Romania, YPLAN-KS used tools such as geoblog for mapping. In the Kosovo case geoblog is adapted for local and project needs, adding more questions and options with the aim to emotionally map the Prishtina and Gracanica public spaces. The project was introduced to and has obtained the support of the Municipalities of Prishtina and Gracanica and targeted high schools authorities. The project then was awarded a grant from KCSFiii, which manages the Democratic Society Promotion, a project financed by the Swiss Cooperation, Office in Kosovo and Ministry of Foreign Affairs (DANIDA).

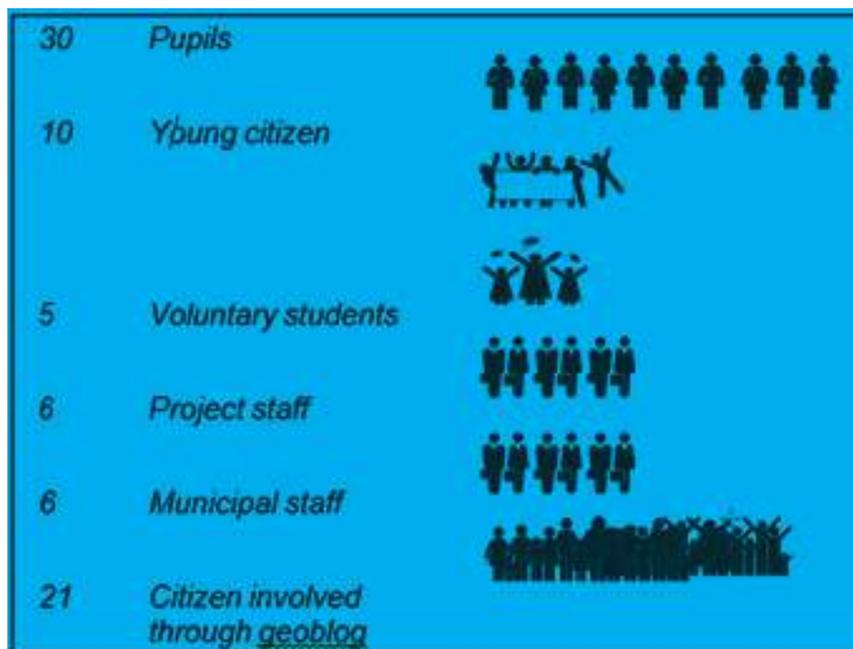


Figure 5. Participants of YPLAN-KS

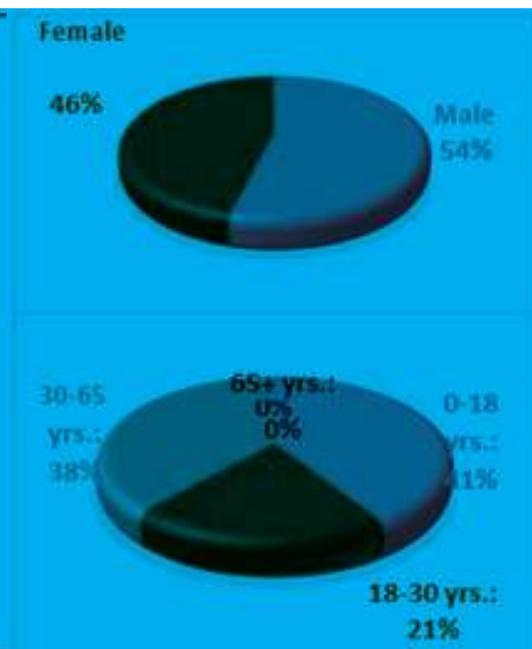


Figure 6. Geoblog data on participants segregated by gender and age

Who are YPLAN-KS participants

The project involved high school and university students as well as citizens from two Kosovo municipalities: Prishtina and Gračanica and is developed in partnership with respective municipalities. In Prishtina, the participants were students of the Technical School, the architectural and civil engineering section, while in Gračanica, in absence of such a section the project targeted students of Gymnasium "Pristina". It was foreseen to have 15 students from each school, although in Prishtina municipality the interest to participate was continuously high, so the number was higher, up to 20.

The coordinators from schools were also among the stakeholders. Their role was to select the participants, inform the students about activities as well as participate themselves in most activities. Except high school students, in both Gračanica and Prishtina projects, there were also 5 voluntary students involved who actively participated throughout all phases.

The municipal authorities continuously participated with 3 to 4 representatives per municipality, coming from the Department of Urbanism, Education and Public Services. Additionally, the project involved also inhabitants that live in or in the surrounding of the project areas through the use of geoblog. The selection criterion was to have a pool of students that are:

- committed and pro-active
- motivated
- inhabitants of the project area (at least a portion of them)

d) gender-balanced, and

e) not in the final year, due to graduation obligations as well as due to the fact that the timeframe of the project goes beyond the school year end (June 2017).

How have we worked

Techniques used in the same urban design project implemented in different political and urban/rural contexts with high school and university students are:

- training for public space design and experience exchange with a similar project;
- geoblog development and training for its use;
- emotional mapping of the public places on the field through geoblog;
- area audit (using rapid appraisal and SWOT analysis) and design agenda workshop;
- envisioning and designing workshops;
- detailed design drawings and public presentations.

3.1.1 Training for public space design and experience exchange with a similar project

The students' empowerment started with initial training, in which participants were introduced to the project and the process, principles of public space design and the importance of urban planning and design. The module was held jointly by PRO-Planning staff and a consulting trainer

experienced in public space design as well as the Municipalities of Prishtina, respectively Gracanica.

A seminar “Learning and experience sharing from YPLAN Romania project” was held to present the experience, results and findings after the completion of the project “Young Placemakers Initiative-YPLAN Romania”, the project which worked together with high school students in Bucharest. Representatives from YPLAN Romania conveyed their experiences from the project implementation in Bucharest. Besides raising awareness among and designing with youngsters of highschools, YPLAN-RO also had a phase of implementation and dissemination of results.

Following the seminar, the project continued with a training on how to use the geoblog for electronic participation and emotional mapping. The training was provided by the same ICT company that was engaged in developing the mobile app and website of YPLAN-KS. The youngsters were trained how to install the app on the phone, how to choose the language, and show their user data, how to do data entry through the app, and how to enter data through the geoblog.

3.1.3 Emotional mapping on the field through geoblog

Emotional mapping was done in the field through the bilingual geoblog in Albanian and Serbian language. This geoblog was developed and used through mobile app called YPLAN- KS available on Playstore for Android mobile systems and website www.yplan-ks, which could also be accessed by phones that run on different systems than Android through internet surfing apps. Both apps required fast and high mobile data internet.

There were four spatial questions:

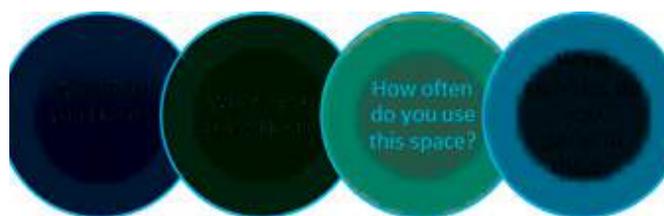


Figure 10. Four main questions of geoblog



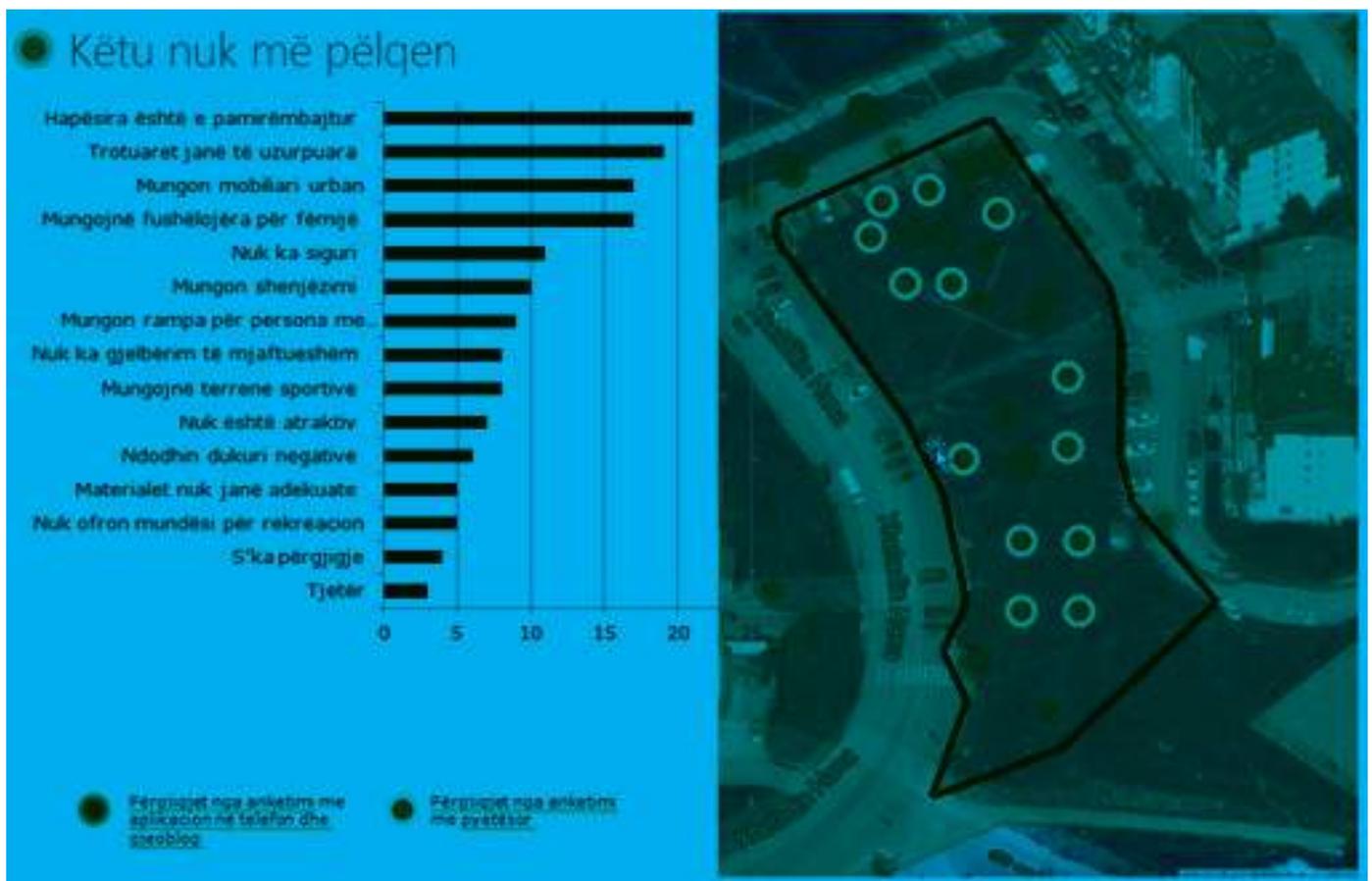
Figure 7. YPLAN-KS participants of Gracanica during initial training (left) and experience exchange with YPLAN Romania in Prishtina (right) (source: PRO-Planning)



Figure 8. Training on how to use the YPLAN-KS geoblog on the mobile app and on the website (Source: PRO-Planning)



Figure 9. Evidencing public spaces in the Prishtina's neighbourhood "Banesat e bardha"(Source: YPLAN-KS, PRO-Planning)



The geoblog provided statistical and geographic analysis of emotional mapping of each part of both public spaces. The dataset comprised of 1490 marked places.

The analysis of the survey shows that both areas have a number of places that can be converted into public spaces for groups of users of different ages. Tools such as application on the phone and geoblog have enabled a better visual representation of the emotional perception of the inhabitants of these areas.

Each question had also options that popped out after the pin was located in the map, providing underlying reasons for a certain emotional perception of a place.

Places that inhabitants like were identified, be it because they have better access to them or are well connected, safer, and so on; most reasons why citizens do not like certain places are due to lack of maintenance, lack of safety because in some of them incidents occur, lack of greenery, playgrounds, urban furniture, and the like. They also identified the places that they often visit and use, showing the activities that take place in them, the most numerous of which are: meeting with friends and playing various games. Types of uses that are mostly asked for to complement these spaces are: greenery, providing urban furniture, children's playgrounds, walking paths, tiling arrangements and pedestrian paths, and so on.

3.1.4 Area audit (using rapid appraisal and SWOT analysis) and design agenda workshop

An area audit with participants of both selected sites was conducted with the purpose to provide a detailed assessment and analysis of existing urban environment qualities, features and characteristics of the sites according to the placemaking principles through simple techniques such as rapid appraisal and SWOT analysis. These provided insights for the development of a design agenda for the public spaces design.

3.1.5 Envisioning and designing workshops

After recalling the results of the area audit and design agenda, the workshop provided training on using the envisioning technique for developing a spatial concept for public space design. The participants were also given insights on how to respect the principles for designing public spaces accompanied by practical examples.

This knowledge was practiced afterwards during group work, when participants were localizing and connected the uses and contents from the design agenda. The youngsters also formulated a vision

of the public space, expressed by a slogan and a logo. This exercise triggered lively discussions, which required a lot of negotiations facilitation by the

project staff members. After presenting the scenarios, all participants agreed on the common contents and locations of contents in the integrated scenario, which will be detailed through urban design.

3.1.6 Detailed design drawings and public presentations

Following the concept design completion, the project continued with detailed design drawings. Careful consideration in this step is given to putting forward a shared vision and reflecting on the qualities agreed of the design concept. However not all community and participant's ideas could be accommodated in the project sites, and additional efforts were made by the planners involved in the project to explain which ideas are appropriate and can maximize the use of the place. This has required additional consultation activities with participants. During this phase high-school and university students have been engaged a lot in the design process.

A design confirmation workshop was held prior to its finalization and public presentation. This event was a good opportunity for pupils to demonstrate their acquired knowledge and design skills by interpreting design drawings to the representatives of local and central government authorities, community, school's representatives, teachers and pupils, representatives of donors, etc. It also included a public display of the designs providing the most relevant information about the project that is easy to read and was supplemented with hand-outs supplied to the public. This activity got the attention of media.

4 Results and outcomes of YPLAN-KS

In planning and urban design processes in Kosovo, young people are generally perceived as passive users of the public space, without any active role in its development. Their interests are often disregarded and adult uses of public space are over-prioritized. The aim of the YPLAN-Kosovo project was to raise awareness among young people about their right to influence decision-making on the sustainable urban development through their empowerment for active involvement in the design process for the improvement of the public spaces (place-making). The project outcomes have proved that when given the right support and opportunities, young people are capable of making valuable contributions in creating inspirational



Figure 11. Some of geoblog results: Mapped places people like and dislike in Gracanica public space



Figure 12. Some of geoblog results: Mapped places people do activities and spend time in Prishtina public space(Source: YPLAN-KS, PRO-Planning)



Figure 13. Youngsters and municipal authorities designing the selected public space in Prishtina (left) and Gracanica (right) (Source: YPLAN-KS, PRO-Planning)



Figure 14. 3D visualization of the detailed urb-architectural design of the public space in Prishtina (Source: YPLAN-KS, PRO-Planning)



Figure 15. An angle of Gracanica public space before and after the urb-architectural design (Source: YPLAN-KS, PRO-Planning)



Figure 16. Public presentations of public spaces final design (Source: YPLAN-KS, PRO-Planning)

and thriving public space. The use of the advanced technologies such as participatory technique has raised great interest from the target group – high school and university students of two municipalities, since they said, that this was the first time they had been involved in activities providing them an opportunity to:

- Understand the planning system and its instruments and their importance in relation to the design of public spaces as well as the main place-making
- Acquire knowledge and skills to use modern technology to identify and conduct emotional mapping of public spaces;
- Acquire social and technical skills for designing public space for the benefit of the whole community.

Besides other means, the project also raised awareness through television media and social media (Facebook), inviting the citizens living or frequenting the public spaces areas that were a subject of YPLAN-KS to give their opinion about them through the geoblog.

5 Findings and lessons learned

The findings of this project and the lessons learned that would help, should the project be expanded or replicated elsewhere are:

- Inclusion of qualitative and subjective data can bring valuable inputs for analysing existing situations of public spaces. Such data are giving spatial and real time indication;
- Emotional maps allow users to get involved in the process of city planning and decision-making;
- The issue of ensuring internet coverage for each participant on the site has to be well planned and tested upfront;
- The developed application only for Android operating system prevents users of iOS or other ones to use the mobile app;
- There was a lack of participation from elderly people in the geoblog, which shows that they should be involved differently, probably through paper survey;
- The impact of the project would have been higher if implementation would have been part of YPLAN-KS project;
- Coordinating different stakeholders, such as school representatives, high school students, municipal representatives and university students was quite challenging due to their obligations and it required additional effort

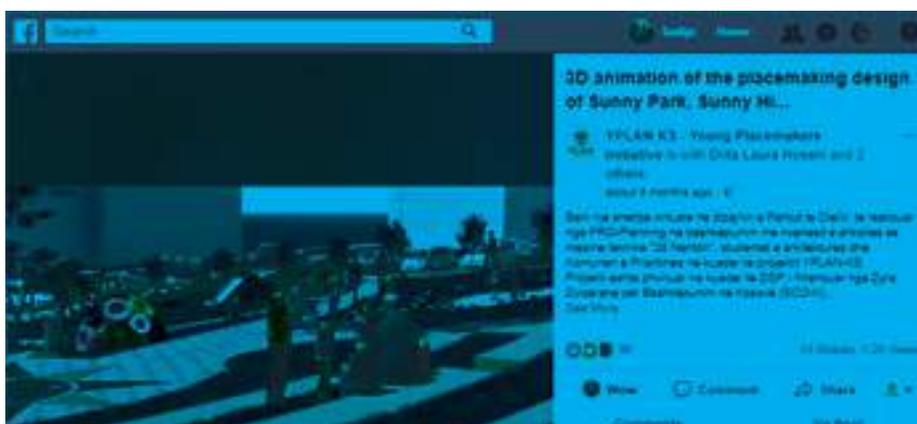
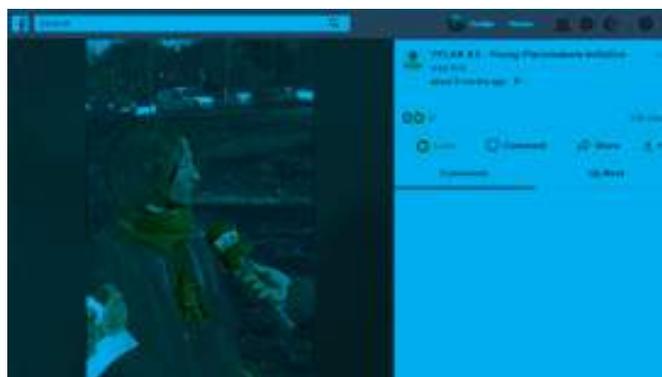


Figure 17. YPLAN-KS promotion through the KlanKosova and KTV television channel and YPLAN-KS Facebook page

- Timing is very important. In case of YPLAN-KS, national and local elections have decreased the interest of the municipal high representatives to participate in the project activities

- Working with minorities was considerably challenging keeping in mind that the war effects are still fresh

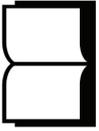
i The Sustainable Development Goal 11, Target 7

iiii MuSPP (2004): The need for urban design in Kosovo: Turning spaces into places

iii Kosovar Civil Society Foundation

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3. YPLAN-KS geoblog, accessible at: www.yplanks.com
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Smart(er) local communities

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Synopsis:

This paper is a critical assessment of how modern tools influence the way local communities are organised and interact. Although in the shown examples most of interactions are virtual, the leading common aspect is locality. Nowadays it is crucial to understand how these can help to build stronger local communities.

1. Introduction

The way modern technology has opened any interaction over distance is unprecedented. Until now, cities evolved based on the forces that placed physical proximity as the driving and binding force. The exchange of goods, thoughts, knowledge and relations was only possible when people, items and built form were close to one another. Now the luxury of using the internet, global networks and technology has enabled the free flow of thoughts, contacts and interactions – all over the world. People can immediately communicate via email, chats and have video calls, as though they were right next to each other. They organise in groups, according to common themes and over social media and are no longer limited by locality.

Nowadays there are many technologies and services that allow people to get even more engaged with their communities, surroundings and city. They are more eager to contribute, even anonymously, to describe the world they see. Examples are the creation of Google Earth models with SketchUp, or adding information on Wikimapia. Other people will fund proposals that they care about through crowd funding projects or engage in participatory budgeting of public projects. Services such as Uber and AirBnB use the resources of the global community, but only in the local context. These two are services that manage the most resources (accommodation rooms and taxis), without owning any of them. Therefore they are purely dependent on the community's assets. Also there are many applications that add other, virtual layers to the space around people. Strava allows amateur athletes to compete virtually with each other, but also provide a great database of information about activities and movement of cyclists

and runners.

This paper will discuss the emerging trend of community involvement in smarter planning with the use of the latest technologies. It will investigate the matter of implementing global trends and services at the local level, by presenting many tools and applications that can be successfully implemented to aid the local communities and allow them to more intelligently use the local resources.

2. Smart tools for local communities

When discussing smart cities, there are many tools that are used to optimise the usage, resources and planning on the larger level. But also there are many that can help the locals to organise and plan for their neighbourhoods and nearby places at a local level. The aim of this paper is to explore which technologies and their applications can contribute to empower smarter communities, and make recommendations for their implementation in other contexts.

The following possibilities are discussed further in the paper:

1. A virtual organisation of the local community, by bringing the locality close together through the use of technologies.
2. Smart participation that allows people to participate in the planning processes around them and influence their locally built environment.
3. Creating maps and contribution to building the model of the city.
4. Providing additional data for better understanding and planning within the local context.



Figure 1: Facebook connections – geographical location no longer an obstacle in connections. Picture: Michael Coghlan (CC)

2.1 Local virtual community

One of the great advantages of the Internet is that it connects computers and their users – people – all around the whole world in less than seconds. Chat platforms, communicators, live videos and most of all social media has allowed for people to stay connected worldwide. They can create virtual communities that spread all over the planet and connect people that have something in common. But what internet connection is lacking is the locality. It usually fails to limit its resources to a specific geographical location.

The easiest way of organising a local community online is to form a group within an existing platform, like Facebook or mailing list, for example on Google Groups. But this is mainly to serve locals that already know each other. Now there are online websites that allow, or actually limit, access to the resources only to those that are local to them. Examples are: Nabo in Australia (<https://www.nabo.com.au/>), Neighbourly in New Zealand (<https://0077xww.neighbourly.co.nz/>) and Nextdoor in San Fransico, CA, USA. All of them grant access only to those people who live within a specific neighbourhood.

Nabo, Neighbourly and Nextdoor, among many other local community services, offer a platform for locals to get connected. The participants can form a social network to get to know each other. This also allows them to share local information and stay informed about what is happening in the neighbourhood. They can post safety updates or even plan and store resources for disaster and emergency planning. There are virtual community boards, where people can post about lost and found items or advertise their services (babysitting, cleaning etc.).

There are many websites that sell goods globally or nationally. But now there are ones that allow the sale, exchange or sharing of resources locally. For example, the Argentinian global service – OLX (<http://www.olx.com/>) – which is present in 45 countries, allows its users to filter sale posts by proximity to a specific location. Therefore the virtual sales becomes more like a local market. This reduces the distance between seller to buyer. And there is no need to have a physical presence in the city, such as an outlet or shop.

There are other platforms that go beyond

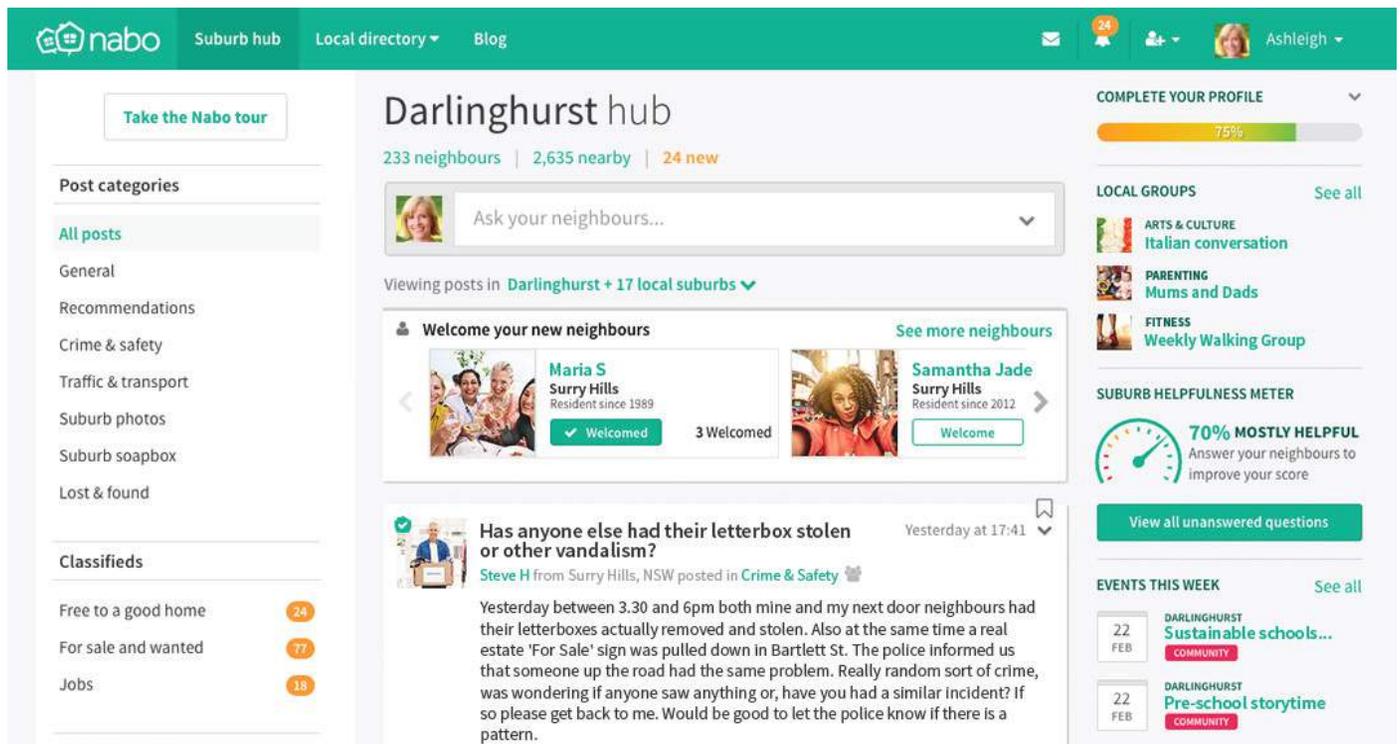


Figure 2: Nabo website – screenshot. Source: nabo.com.au

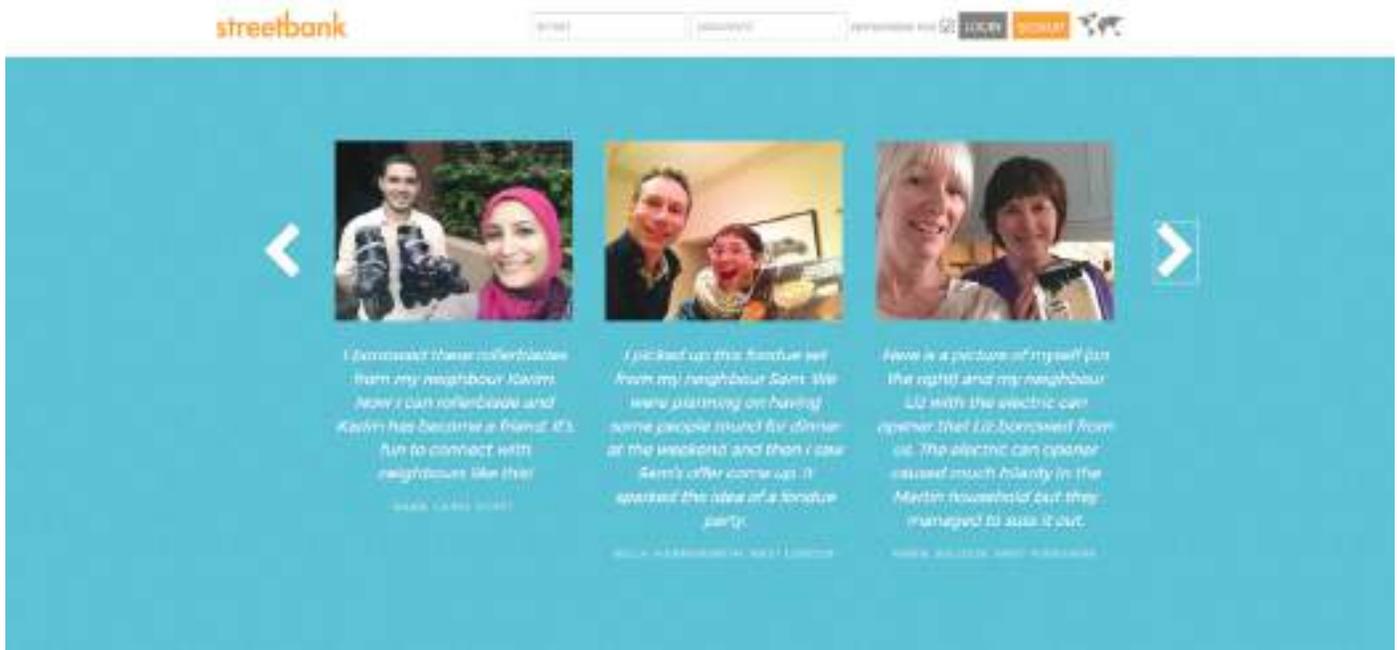


Figure 3: Comments on Streetbank website. Source: streetbank.com

a simple commercial exchange. A charity in England and Wales named Streetbank (<https://www.streetbank.com/>) is a simple, yet powerful concept of sharing local resources within a community for free. They offer three options: (1) giving away items that are no longer used; (2) sharing things that are used occasionally, for example items like drills, ladders etc.; and (3) sharing skills – helping neighbours with expertise like language, gardening, cooking, DIY and fixing things. This brings community interaction to a higher level than just selling items. It helps

to create a stronger and more sustainable community that is more self-dependent.

There is also quite a growing market for sharing leftover food within local communities. In developed countries, the percentage of food being thrown away may be as high as 40% (Gunders 2012). Without technology, it would not be possible to allow for the instant connecting of those who have unwanted surplus with those who can eat those leftovers. German Foodsharing (<https://foodsharing.de/>), for example, has



Figure 4: Food sharing. Source: foodsharing.de

contributed to saving over 10,200 tonnes of food. Olio (<https://olioex.com/>) is another great application connecting neighbours to share food instead of throwing it away. By using these technologies, it is possible to save food, prevent waste, limit the carbon footprint and be rational about local resources. Those services also help to strengthen the social bond within the community.

There are more and more applications under the category of “neighbourhood watch apps” that aim to improve safety within the community. For example, Neighborhood Crime Watch App allows citizens to report suspicious activities within their local area and share information like photos and description of the incident. Two other applications are more complex. Neighbourhood Watch App (developed by The App Office based in Nottingham, UKP) and similar Rutland Neighbourhood Watch (by TheAppOffice.com) allow sending push notification to citizens within a specific area based on the GPS location of their phones. This allows for the instant targeting of a group with relevant safety information.

Modern applications also allow for the interaction between local governments and the citizens. An example is My Local Services, which was developed by Local Government Association of South Australia. The app allows users to access local information from the council, like a website. But it goes beyond that by delivering the key messages back

to the app. Locals can use its map to find nearby resources, like parks, playgrounds, libraries and events. It also allows for better waste management by reminding users about collection times and advising on other options of collecting waste. There is also a feature of push notifications to the users that would inform them about upcoming events and incidents.

2.2 Smart Participation

The issue of getting the local communities involved in the planning process of the community has always been a concern. Nowadays, however, the use of modern technologies has helped to bridge the gap between decision makers - politicians and planners - and the local society. Citizens can take an active part in planning their cities, being empowered to create better places for living (Gurstein 2014).

In order to reach out to the community, various tools can be used. One of them is an online platform called Crowdbrite (<http://www.crowdbrite.com/>). It works as a virtual meeting space for hosting workshops, charrettes or any other meetings. It allows users to collaborate, comment and respond to any proposals and even to propose their own ideas. Its simple design is suitable for almost all ages, from young children to those already retired, and yet they all can work together in the same way. Polls are interactive and give immediate feedback to the organisers.

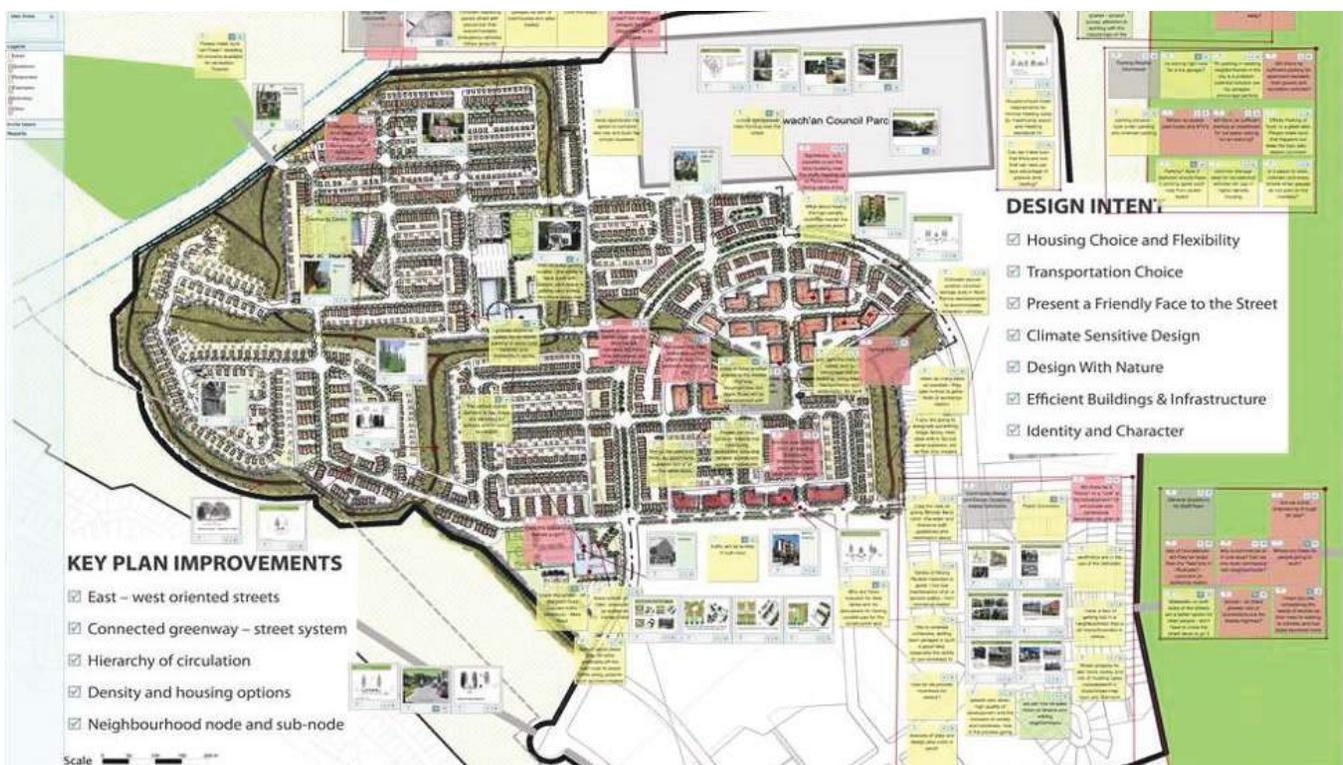


Figure 5: Public consultation of a subdivision plan. Source: crowdbrite.com

involvement in planning the expenditures, there is a powerful tool called Citizen Budget (<http://www.citizenbudget.com/>). It has been used in over 50 cities, including Montreal, Seattle and Edmonton. It is an interactive platform that not only presents options to its citizens, but also the financial impact of their choices. So it not only informs, but also provides feedback to the decision makers about the preferences and can allow for two way discussion on the proposals. The contents of the application can be customised to match the needs of a particular city. There are other alternative tools too, for example: <https://www.budgetallocator.com/> or open source <https://pbstanford.org/>.

2.3 Creating maps

One of the ways of having citizens involved in spatial planning is by contributing to the gathering and creating of data. With the growing popularity of crowdsourcing in many areas, geographical information can be created by the society. Volunteered Geographic Information was first defined as in 2007 (Goodchild 2007): “the widespread engagement of large numbers of private citizens, often with little in the way of formal qualifications, in the creation of geographic information, a function that for centuries has been reserved to official agencies. [...] I term this volunteered geographic information (VGI) a special case of the more general Web



Figure 8: Portland map. Source: openstreetmap.org

Nowadays there are many services that enable VGI, but one of the most popular ones is OpenStreetMap (<https://www.openstreetmap.org/>) that, not only adding the content but also allows for the creation of the map. This concept is very similar to Wikipedia, where volunteers can edit the map by including new information about space. The data entry is basing on manual field surveying, using GPS devices and tools, tracing aerial images or other sources. The contributors do not have to be professionals, although some of them are. The software is easy to use. Here users contribute in the creation of the base map. What is important is that the use of the map itself is free and therefore, it has been useful in many other

projects.

OpenStreetMap is replacing dependency on GoogleMaps. Interestingly Google is also using crowdsourcing to add to its mapping resources (Summerhayes 2015). It is aided with the use of the free software Google SketchUp, which allows users to model 3D objects using a very simple and intuitive interface. With SketchUp one can create any object but, by adding a geopositioning feature and exporting it to Google Earth, users are equipped with a very powerful tool to create a 3D model of their cities. Many contributors have worked to provide data and thus many cities were built virtually in Google Earth. Later on, Google provided not only the viewing of the models in its application, but also downloading them from the repository to use in other projects. What the community is contributing is to



Figure 9: 3D model of Portland. Source: Google Earth



Figure 10: Description of Oregon Convention Center. Source: wikimapia.org

A very popular service, also based on Wikipedia's concept is Wikimapia (<http://wikimapia.org>). Here, every user can add information about a place using a polygon and description. The content is gathered at different levels – from regional to local. As some of the content is created at the community level by residents, it can provide data information that would not be available otherwise. But this also means that it may be inaccurate or not verified. Nevertheless it can be a useful source of information about the

space.

Another step is to have customised map layers, or additional data, that can be overlaid and displayed by others. There are many services like that. One of the popular ones is My Maps by Google. Here everyone can add their content and share it with the public, closed groups or individuals.

2.4 Surveying and providing data

Apart from creating the base map and updating basic information, the community can get involved in more complex tasks of describing or surveying of their surroundings. There are numerous examples of how the community can contribute to provide data for further use in planning.

Geo-wiki is a platform for projects that address global land cover issues and is meant to engage citizens in environmental monitoring. Separate sub-projects are available on this page. Participants in these ongoing projects join the citizen science



Figure 11: Instruction of using FotoQuest Go. Source: fotoquest-go.org

FotoQuest Go Austria (<http://fotoquest-go.org/>) uses the features of gamification in order to have better engagement with its contributors. The application has defined “quests” (points in space) that the users have to find and get to as close as possible. Once there, the person would take photos as requested. Afterwards their quest submission is reviewed by a team of researchers and if approved, the person would receive a credit of 1 Euro. Then the quest is removed and the individuals will receive their money through a PayPal account at the end of the project. The main objective of the project is to track changes to landscapes. This can be done best by site visits, which are performed by users of the application.

The author has also developed an application and system of surveying in order to gather detailed data about the spatial distribution

of retail outlets and services. In Poland, for example, there is no centralised registry of businesses with their georeferenced location. Such a dataset would be invaluable in monitoring the changes of retail network and planning the location of new outlets and centres (Ledwoń 2013). Here an application was developed that included a system for categorising the stores. As it was used for several years with the same structure, the comparison was very accurate.

Citizens can also contribute by providing data that does not require a lot of effort from themselves, but rather a consent to participate. The Toronto Cycling App was developed to gather data about the use of bicycles in the city. Users, who sign up for the app, record their activity and optionally can provide basic information about it (e.g. purpose of the trip). Data is collected anonymously and is used to better understand the usage of the cycling infrastructure, how the structure works and to identify any gaps. To create the Toronto Cycling Network Plan, data was used from over 3600 cyclists who used the app.

WALKscope Denver (<http://www.walkscope.org/>) is a platform funded by Mile High Connects and run by WalkDenver and PlaceMatters using LocalData (<http://localdata.com/>) technology. It aims to create better and safer streetscape for pedestrians in Denver. Citizens taking part in this project collect data about sidewalks, intersections and pedestrian footfall (Wolfe 2016). This data provided a thorough survey of the infrastructure, which was used in reports. All information can be accessed via a website through interactive maps. Viewers can browse different categories of the survey (sidewalk quality, intersection quality and pedestrian counts – all with sub-categories). Additionally the users can upload photos.

3. Summary and discussion

This paper has discussed the opportunities of using technology to create smarter communities that are informed, engaged, empowered, sharing and more resilient.

There are a few different methods of community engagement, like:

1. Creating local virtual communities for better interaction between the local members.
2. Smart participation in planning, organising and proposing projects.
3. Creating maps, adding data and local content.
4. Surveying and providing unique data that is purpose driven and delivered by local agents.



Figure 12: Using SurSer application. Source: own work



Figure 13: Cycling heatmap of Portland. Source: strava.com

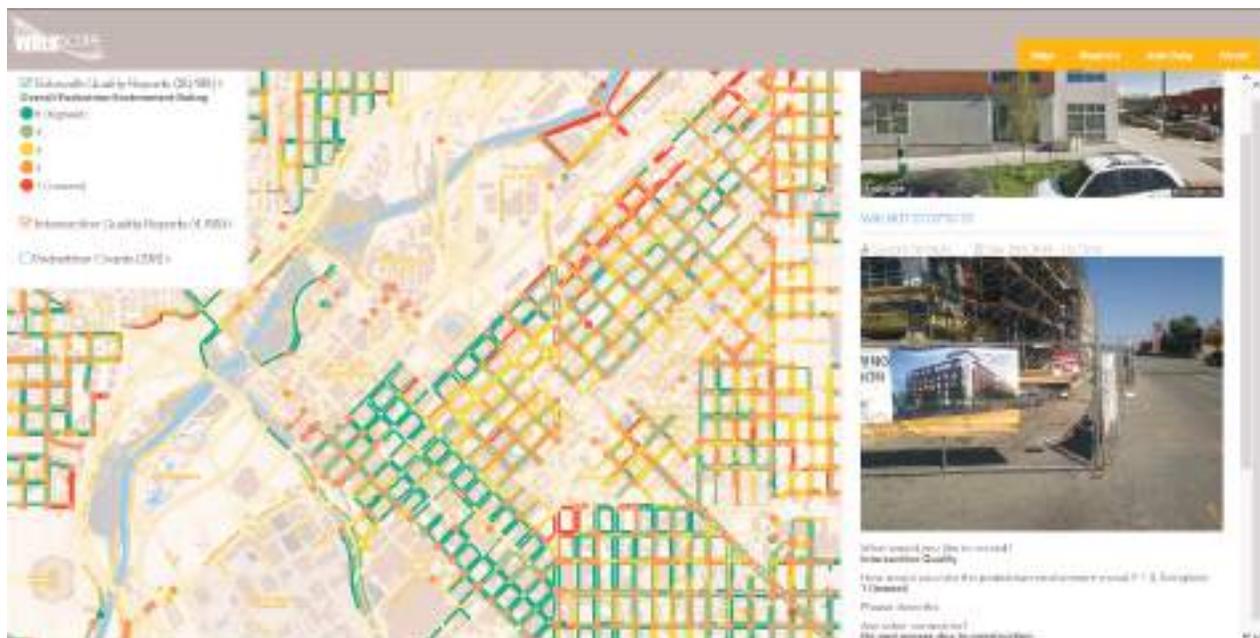


Figure 14: Results of the surveys at WALKscope Denver. Source: walkscope.org

These technologies allow people to:

- Share or exchange resources within the community;
- Build stronger communities, for day to day business, planning and also resilience and disaster mitigation;
- Produce maps for areas that don't have one
- Input additional spatial data, where it is missing;
- Describe the neighbourhood and the community;
- Survey specific items;
- Be involved in the planning and participating.

3.1 Discussion of cases

Although commercial services and platforms do exist, most interactions are within communities or non-profit organisations. These communities need support, but also a way to reach the decision makers.

For them, there are many opportunities to use free apps or services, which open access to all citizens and activity groups. Nevertheless customised projects are much better as they offer what is exactly needed for a specific case. There is more engagement with the users and results can be tailored to the expectations and the research.

For more complex systems there is a need to involve more stakeholders like service providers, local partners, interest groups, non-governmental organisations, municipalities, planners and decision makers.

Many applications and systems allow for bottom up initiatives, which are even a stronger way of engaging citizens in planning. They address exactly those issues that the community would like to solve, which strengthens the personal relation towards the project.

It is very important to find reasons for citizens to get engaged. Many abovementioned projects do not offer them any economic benefits, but rather satisfaction or personal gain of having achieved something better for the community.

One of the main drawbacks of using modern technology to shape a community's future is excluding those who do not have access to the latest technical resources or the knowledge nor skills to use it. This seriously limits the inclusion of the older generation

and low income society. In many cases some citizens may simply be not informed or aware about the possibilities. There should be measures taken to include these groups as well.

Also there is a limit to the expertise of the local community in planning. Although they might be very engaged and provide useful input about the local needs, their opinions and proposals will most probably not take into consideration all the complexity of the problems.

3.2 The way forward

In order to fully grasp and take advantage of the current possibilities of using technology to build stronger and smarter local communities, certain measures have to be taken into account.

First of all there are many platforms, applications, solutions and means to engage that can be used in many situations and locations. They just need to be implemented for a specific case. Planners can research those options and use the ready-made tools.

For the successful inclusion of the newest tools, there has to be knowledge among planners, municipality workers and decision makers that such options exist. Many professionals do not know about the local resources. It is advisable to discover the local sources and aim to include them in the planning process - either as a source of information or partners. The organisation should have a dedicated project or person to research the sources.

A more proactive approach from planners is needed. There are many technologies, applications and portals that can be used, but they need to be launched, promoted and implemented. There is also a lot of data that is already available, but needs to be gathered and analysed.

Many planning processes, procedures and laws do not anticipate use of the modern technologies in the planning and decision making. These should be reconsidered to make the best possible use of the local community resources, knowledge and needs, especially through new means of communication.

Most importantly the results of these bottom up projects or involvement have to reach the decision makers in the municipality and community. Although many described projects do not need any actions from planners and governors, the input coming from these projects is invaluable. Planners should be aware that there are additional data layers available and should know how to use them, how to gather new information to have an inclusive, empowered community.

The future will see the emergence of unprecedented projects. Already there are many mashups of the existing apps, plugins and websites. We should expect the citizens to get even more involved in planning than before. Perhaps the future is in citizen led planning?

The most important issue is to maintain a balance of the traditional planning and decision making approach with the new information coming from communities.

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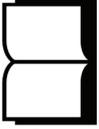
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**Track 6 Post-smart
communities and the
new frontiers**



The Jobless City – Revolution or Paradise?

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Synopsis:

The 4th Industrial Revolution is changing the nature of work. Around 80% of existing jobs will be automated. If these are not replaced by new, as yet unthought-of, un-automatable work, then there are only two possible futures: revolution or paradise. So, how will we plan and build the jobless cities in which we can enjoy our no-work future?

1. Past Revolutions in Urban Planning

Strangely, urban planners and designers spend a lot of time examining the past and worrying about the present, but put little effort into studying the future – and I am as guilty as most. We enjoy reading about and visiting delightful examples of our predecessors' work around the world, usually from Hippodamus of Miletus (498 – 408 BC) onwards, and bemoan that our “urban tradition has yielded to banal and monotonous development, humdrum in design and dominated by traffic. [and that] We have repeated standard housing types and layouts, retail boxes and road layouts so many times, with little or no regard for local context, until we find that now almost everywhere looks like everywhere else.”¹ When we do think about tomorrow it is as an almost automatic part of the planning process and usually assumes a continuation of current trends: extant growth rates are projected forward, current land use budgets are, more or less, the same in every plan and are assumed to be valid for decades to come (see figure 1) and so on.

One useful aspect of planners' excellent knowledge of urban history is that it allows me to quickly highlight, in the following paragraphs, those past technologic and scientific revolutions that have led to parallel revolutions in urban planning.

The Agricultural Revolution (10-12 millennia BCE²) may have resulted in a gradual domestication of grains, vegetables and livestock, leading to the development of cities³ or could have originated from accidental crops that sprang up around the animal yards of the first, trade-based settlements, creating a positive feedback loop that led to the development of the first cities.⁴ Jane Jacobs, the originator of this second hypothesis, also identified the wrong-thinking of the earlier theory: “The fallacy is to mistake the results of city economic development for the preconditions to city economic development” [my emphasis].⁵ Unless there is a major breakthrough in archaeology, we are unlikely to be able to resolve this “chicken and egg” dispute, but either way, the result was the first revolution in urban planning, the one that brought our profession into existence.

This necessarily brief overview must skim past the first cities of Egypt and the Indus, Greece and the effects of democracy, Rome and its military efficiency, and even the fall of Constantinople and the Dark Ages. They and other events in that long span of time all influenced the planning of cities, or lack of it, but – planned by the line and the level, or by the easiest track for a pack animal – these cities were small and their cores defined by “a walled precinct, a citadel, made of durable

materials, even if the rest of the town lacks a wall or permanent structures. This holds from Uruk to Harrapa.”⁶

The Second Revolution in Military Affairs was the application of gunpowder to warfare. The first was the development of the stirrup, which made the mounted warrior supreme in medieval warfare and possibly facilitated the rise of Feudalism, but otherwise had no great impact on the shape of cities, which continued throughout this period to defend themselves from infantry and cavalry from behind high, adobe or stone walls. However, from the middle of the 14th Century, gunpowder and metallurgy gradually evolved to produce cannon, propellant and balls strong enough to breach these walls and for about three hundred years cities were more easily captured and wars less conclusive, and therefore longer. The prime example being the Hundred Years' War (1337-1453).

The eventual response to the arrival of artillery was the development of military engineering to a fine art. The foremost proponent of this art was the Marquis de Vauban (1633-1707), who, in the forty years from 1667, directed the upgrading of the fortifications of around 300 cities and the building of 37 new fortresses and fortified military harbours across France.⁷ His last work, Neuf-Brisach (1697) in the French region of Alsace exemplifies the style (figure 2) with precise geometries of low, very thick, earth-filled walls and supporting ditches and banks, all determined to maximise the effects of the range and sweep of the guns and muskets employed in defence, or to minimise the effects of those likely to be employed by the attackers. This same exactness of geometry flows through into the urban form behind the walls, clearly demonstrating the rebirth of formal urban planning.

Closely after the arrival of gunpowder, came the revolution of sail. Both were related, because the advances in ship building were partly a result of the need to carry more and more cannon on naval ships. Supported by advances in navigation, these small, but capable ships led to an Age of Exploration (late 15th to 18th century), and consequently invasion, slavery, colonialism and mercantilism. It also led to an explosion of colonial settlements in which formal urban planning usually dominated, exemplified by The Laws of the Indies, still an exemplar of urban design guidelines today.⁸

The 1st Industrial and the Agricultural Revolutions of the late 18th and early 19th Centuries worked synergistically to transform cities. The first by pulling large populations into even larger manufacturing centres and the second by pushing them out, as farm work was mechanised and previously common pastures enclosed for the benefit of the wealthy. The cities hosting these new

Table 22

LAND REQUIREMENTS FOR MANUFACTURING INDUSTRY: METROPOLITAN REGION

Industry.	Percentage of employment in each industry.	Calculated number of employees in each industry.	Suggested density. (Persons per acre.)	Land required. (Acres.)
Electricity and gas	2.2	6,000	20	300
Asbestos, cement products, cement plasterboard	4.5	12,000	20	600
Bricks and earthenware products	3.0	8,000	8	..
Basic chemicals and explosives	1.9	5,000	2	2,500
Fertilizers	0.5	1,500	8	200
Soaps, matches, etc.	1.9	5,000	50	100
Heavy engineering and foundries	9.5	26,000	20	1,300
Light engineering and tools	3.4	9,000	50	180
Electrical engineering	3.0	8,000	100	80
Motor vehicles and accessories	9.1	24,500	25	980
Agricultural machines	1.6	4,500	15	300
Non-ferrous rolling and foundries	1.0	2,500	50	50
Sheet metal and wire	3.1	8,500	35	250
Spinning and weaving	3.9	10,500	50	210
Hosiery and knitted goods	3.7	10,000	100	100
Miscellaneous textiles	1.8	5,000	50	100
Furriers and leathersgoods	0.7	2,000	100	20
Tanners and fellmongers	1.4	4,000	15	270
Clothes, hats, shirts, etc.	10.1	27,500	100	275
Boots and shoes	3.7	10,000	100	100
Miscellaneous clothing	2.0	5,500	100	55
Millers, sugar refining, meat slaughtering and export, canned foods	7.1	19,000	25	760
Bakeries, bacon, butter, ice-cream, etc.	1.6	4,500	50	90
Breweries, tobacco, milk	0.8	2,000	50	40
Timber, joinery and sawmilling	2.5	7,000	15	470
Woodwork and wood carving	0.4	1,000	20	50
Furniture	2.3	6,000	50	120
Tyres and rubber goods	1.6	4,500	20	225
Paper and paper-board	0.9	2,500	30	85
Newspapers	1.0	2,500	500	5
Printing, stationery, etc.	3.6	10,000	80	125
Precious metals	1.3	3,500	100	35
Plastics	1.0	2,500	100	25
Scientific and musical instruments, photography, toys and sporting goods	4.0	10,500	100	105
Parking	320
Roads and amenities	2,085
Totals	100.0	271,000	..	12,510

Figure 1: A typical land use budget from Stephenson, G and Hepburn, J. A (1955) Plan for the Metropolitan Region Perth and Freemantle 1955 - Report, WA Government Printing Office, p65

industries grew rapidly, the old stone walls were exceeded and frequently removed, and the more recent Vauban-style banks and ditches overbuilt. Defence was now provided by large standing armies and navies protecting the borders of the nation and enforcing its rule in distant colonies. The resulting urban squalor was exemplified by the "dark satanic mills" of Blake's preface to Milton a Poem.⁹

The development of the Garden Cities and The City Beautiful movements on either side of the Atlantic are well known stories - unfortunately they did not occur in advance of the slums, disease and early death that

resulted from the industrial revolution, but about a century later, led by the advances in hygiene and sanitation that were part of the 2nd Industrial Revolution, a concept introduced by Patrick Geddes in his *Cities in Evolution*.¹⁰ Whether this was a true, new revolution, or a progression of the original is, for our purposes, moot. What was important was the combined centrifugal effect of steam ships, new lands, railways and the telegraph, spinning new settlements far and wide across the 'discovered' continents. These colonial settlements were invariably planned, and the planners eventually developed a body of knowledge that enabled the Garden Cities and the City Beautiful movements and their

equivalents elsewhere.

“The Second Industrial Revolution continued into the 20th century with early factory electrification and the production line, and ended at the start of World War I”,¹¹ providing the preconditions for one of the many impacts of the Great War on urbanism: the internal combustion engine. The Great War accelerated the refinement of the car, the lorry and the airplane, and trained many thousands of men to drive or fly them, but the impact of the automobile on cities was delayed by the Great Depression and the 2nd World War. However, by the 1950’s it was clear that another revolution in urban planning was underway. As with agriculture, artillery, sail and steam, the technology was unstoppable and the detrimental effects obvious (to those who wanted to see), but, just as the pace of change has speeded up, the response to addressing the resulting inefficiencies of each revolution affecting the planning of cities has happened faster, from millennia to centuries and recently to decades.

It took only about thirty years before the more advanced planners, architects and designers banded together and responded to auto-dominated urban sprawl with practical solutions. In the United States this took the name “The New Urbanism”, which has more than a passing similarity to City Beautiful: “Like New Urbanism, the 19th century [City Beautiful] movement redeemed city planning principles whose influence had waned, and recognized that the design of physical space is important to the identity and cohesiveness of a community.”¹² In the United Kingdom it does not have a clear name, and is perhaps more a loose alliance of the Prince’s Foundation for Building Community, English Partnerships, the now superseded Commission for Architecture and the Built Environment (CABE) and the still active Town and Country Planning Association (TCPA), founded by Sir Ebenezer Howard himself, in 1899. New Urbanist practice is also strong in parts of Australia and New Zealand.¹³

The New Urbanism, and its overseas cousins have led a gradual roll back of decades of auto-dependent sprawl while simultaneously (and necessarily) developing a practice that has progressed rapidly from rediscovering the techniques behind the delightful works of past urbanist planners, architects and designers, such as Camillo Sitte, Raymond Unwin and John Nolan, to a body of knowledge and skills that is now well able to plan, design and build sustainable towns and cities: but is it ready for the Digital Revolution or has humanity reached its final limits?

2. The Limits to Growth

Whether history will refer to our current era as the 4th Industrial Revolution, the Digital

Revolution, the Information Age or something else is not our concern. What is important is that there will continue to be a civilisation with historians and philosophers with the time and energy to argue about such things, because the alternatives are most likely:

- Mutually assured destruction by nuclear weapons;
- Mismanagement of the environment, leading to a sixth great extinction (that will eventually include homo sapiens sapiens);¹⁴ and/or
- Mass migration, revolution and war through inadequate responses to rapid 3rd World urbanisation.

Collectively, we can refer to these as the “Limits to Growth” which have long been forecast to reach criticality in the middle of this century¹⁵, and which, if not overcome will lead to either no human civilization, no humans, or no planet at all, an experiment in survival that is clearly not one that any sane person would want to see played out on their own species and on their own planet.

While the first two of humanity’s limits to growth are well understood, the third is probably only common knowledge amongst urban planners, and some staff of the United Nations and related agencies.

“In 1950 three quarters of a billion people lived in large towns and cities, or 30% of the total world population of over 2.5 billion. In 2009 this had grown to 3.42 billion, just over half of a total population of over 6.8 billion. The United Nations Secretariat forecasts ... that by 2050 6.4 billion, 67% of a total of almost 9.6 billion people will live in urban areas.

“Just over a third of that growth is expected to be in China, India and Nigeria, but the remaining two-thirds will be in the countries around those countries: a massive arc stretching from North Africa through the Middle East, across Asia and into the Pacific.

“An additional 3 billion urban residents in forty years translates into a need to build a new city for a population of one million people, complete with hospitals, schools, workplaces, recreation and all the rest, at a rate of six a month”¹⁶

It is a sorry testimony to the accuracy of the analysis conducted by Donella H. Meadows, Dennis L. Meadows, Jørgen Randers, and William W. Behrens III in Limits to Growth that 2050, the rapidly approaching middle of this century, is the date of the demise of our civilisation that they warned us of almost five decades ago.

To add the challenges of the Digital



Figure 2: Aerial view of Neuf-Brisach 2003 (Wikipedia)

Revolution to this very scary list of existential issues might seem trivial, or superfluous, but I suspect that our response to this issue has the potential for significant mitigation of the three threats listed above. Of course, any attempt to address how urban planning might contribute to solutions to any of these challenges reveals a very sane reason for not looking too intently into the future: inevitably the discussion that follows will be taken as a prediction, instead of what is intended, which is a discussion of possibilities. It is only when given an actual commission that a planner must commit to predictions.

3. The Digital Revolution

The Digital Revolution has been defined as “the change from mechanical and analogue electronic technology to digital electronics which began anywhere from the late 1950s to the late 1970s with the adoption and proliferation of digital computers and digital record keeping that continues to the present day. ... Central to this revolution is the mass production and widespread use of digital logic circuits, and its derived technologies, including the computer, digital cellular phone, and the Internet.”¹⁷

According to the authors of *The City of Tomorrow* “Traditional urban patterns cannot coexist with cyberspace”, and “To pursue this agenda effectively, we must extend the definition of architecture and urban design to encompass virtual places as well as physical ones, software as well as hardware”. The authors explain, “rather than the network subsuming and replacing space, the two are becoming increasingly enmeshed.” And “The new city is a fundamentally different space—one where digital systems have a very real impact on how we experience, navigate and socialise.”¹⁸ I have recently taken issue with some aspects of this thesis¹⁹, but, whatever the effects of so called “Smart City” technologies on the layouts of our towns and cities, it is undoubtedly clear that these same digital systems will have a very real impact on how we are employed – or not!

However, before looking at the impact of the Digital Revolution on employment, it is necessary to quickly overview its impact on our profession.

4. The Revolution in Urban Planning

“Current planning systems struggle to produce quality plans for new urban areas at anything like that rate [i.e. six new one-million person cities a month]. Notwithstanding geographic information systems, on-line lodgement and word processing, plan making techniques and approvals processes have barely changed over the last hundred years: start with a metropolitan planning strategy, convert this to local statutory ‘land use zoning’ plans, prepare detailed master plans for new or regenerating areas and then pass these to surveyors and civil engineers for implementation (engineering design, procurement and construction). But each step takes two to five years. Typically, planning takes something like ten years from initiation to a significant level of development on the ground, but only if each plan in the chain is good enough to achieve political support and be implementable. If not, twenty years is still a ‘good’ result.

“After the planning is done and the infrastructure is underway the planning approvals process kicks in, a process so fraught with complexity and value judgements that development application delays are the bane of every architect and developer. In some places all aspects of urban planning and design are subservient to the statutory process, when it should be the reverse.

“The one advantage of this slow grind is that it allows for extensive community, peer, political and judicial review: a net of safeguards against dangerous and inappropriate development.

“However, to house an additional 3 billion

people in cities by 2050 administrations seeking to manage urban development and population growth in a resource efficient and environmentally sensitive manner will increasingly turn to recent innovations that are already being deployed piecemeal around the world, e.g.:

- Daily satellite imagery;
- Drones;
- Big data, powerful algorithms and deep learning;
- Transect based planning;
- Form based codes; and
- Automated applications approvals software.

“These and other technologies, if properly integrated, promise plans for new cities in months and planning permits in an instant, revolutionising the relationship between the national or provincial legal framework and more local integrated planning, but at the cost of many existing safeguards. Combined, they will create a revolution in urban planning, but will the outcome be “garbage in, garbage out”?²⁰

5. Artificial Intelligence, Automation and the Economy

The technologies listed above, are those that have the potential to assist in urban planning, but this discussion requires us to add to the list all of the technologies that are likely to impact on employment. Those that appear to be most significant, at the time of writing, include:

- Autonomous vehicles, not just self-driving cars and trucks, but also warehouse picking and delivery robots, home delivery robots and the like;
- 3-D printing, not just of plastics, but of metals, food and microscopic organic structures, including DNA;
- Automated agriculture, both in the field and in the factory;²¹
- Quantum computing: in May 2017, IBM announced that “it has successfully built and tested its most powerful universal quantum computing processors.” The first is a 16 qubit (quantum bits) processor that will allow for more complex experimentation than the previously available 5 qubit processor. The second is a first prototype commercial processor with 17 qubits and leverages significant materials, device, and architecture improvements to make it the most powerful quantum processor created to date by IBM.²² It has been suggested that it will require a

quantum computer with a processor of at least 100 qubits to be useful, but if Moore's Law holds, and it looks like it will, that device should arrive in around 2022 and with it a computer that can handle a whole new range of mathematical problems.

The possibility of economic disruption from such technologies has not been lost on governments. In December 2016, only a few weeks before the expiry of President Obama's term in office, the Executive Office of the President issued a report on Artificial Intelligence, Automation, and the Economy.²³ It included a case study of the occupations threatened by the introduction of automated vehicles, mainly bus, truck and taxi drivers. It estimated that between 2.2 and 3.1 of 3.7 million jobs would be lost to automation,²⁴ a range of 59 to 84% of all existing transport jobs in the United States, and a pattern likely to be repeated in many industries and professions, even medicine and law.

A year earlier, in June 2015, the Committee for Economic Development of Australia (CEDA) issued a report titled Australia's Future Workforce,²⁵ which similarly concludes that "The nature of employment - the type of work humans do - is going to change dramatically in the coming decades. For many, this change will lead to disruption of their current work and a drop in demand for traditional skills. For others it may mean new opportunities in new fields and industries, but we do not yet have an understanding of what new jobs, and in what number, will be created to facilitate or nurture this change. Given the rate of change of technology, preparation for dealing with this disruption must begin now."²⁶ However, if we "set aside the self-empowerment and belief that employment can provide people (as it may be generationally dependent), we can also conclude on a more optimistic note. If we assume that the purpose of employment is purely to meet our needs as defined by the bottom two layers of Maslow's hierarchy of needs (physiological and safety), then it is anticipated the machines will take care of those needs, leaving humans free to pursue the upper layers of Maslow's hierarchy. The change could result in a new generation free of poverty and the burden of labour, thereby unleashing the next wave of human innovation and creativity in directions we can never imagine" [my emphasis].²⁷

These are but two of many reports on this topic, all arriving at similar conclusions, that I will summarise as either "there will be a massive loss of jobs, of the order of 80%, but it will be okay, because new jobs will be created from somewhere", or "there will be a massive loss of jobs, of the order of 80%, but it will be great, because we will be free of poverty and the burden of labour". The problem with the first conclusion is that hope

is only a strategy for politicians, not for urban planners, and if hope turns to hopelessness then revolution will surely follow, as many a political leader has discovered in the past, usually too late. The challenge of the second conclusion is that a city where no one works has never been built before.

6. Cities for the Citizen

No one works! It sounds shocking and a little extreme, because there will presumably be a few jobs that computers cannot do well (nursing babies, teaching infants and comedy, perhaps?), but there are historic parallels in which even these things were not done by the citizens. Parallels, that is, if we equate the human slaves of the ancient world to the robots and other automata of today. Clearly I am referring to the ancient Greeks, where the elite lived a life of leisure and the slaves did everything else. However, while the ancient Greeks could be a useful case study, because their economic and social arrangements were so clearly reflected in the plans and designs of their cities, it is not clear that slavery and automation are economically equivalent (and they are certainly not socially equal) and direct democracy of a few thousand citizens is not the same as representative democracy of tens or hundreds of millions.

Of course, the aristocracy of the past few hundred years have some similarities with the ancient Greeks. The aristocracy, as opposed to the merely wealthy, can be defined by the condition of not having to do anything. The decision as to whether such lives are worthwhile is then a matter for philosophical discussion and individual choice, but the aristocrats of the past who engaged in good works or achieved great things did not do so under the imperative of generating an income, and could also spend time on conversation, entertainment, sports, handicrafts, etc., as they wished. They were, and continue to be, a leisured class. However, they are few and rarely group together in densities sufficient to demonstrate any urbanism of note, so there is little to be learnt that is relevant, except perhaps that the elites of all cultures have lived such lives for centuries, without complaint, demonstrating that a lack of income is a much bigger problem than having nothing to do.

A more useful parallel is Sir Ebenezer Howard's Garden Cities Movement. As planners we remember the "Three Magnets Diagram" of town, country and town-country and the exquisite and practical urban design, but we forget that Howard knew all about the fundamentals of sustainability (environment, economy and equity) long before that science was even born. The enterprises that became Letchworth (established in 1903, architects and town planners Barry Parker and Raymond Unwin, current population approximately 35,000) and Welwyn Garden

City (established in 1920, architect and town planner, Louis de Soissons, current population approximately 50,000) were premised on a new social order and a new economic model: in Howard's own words, "Among the essential differences between the Garden City and other municipalities, one of the chief is its method of raising its revenue. Its entire revenue is derived from rents."²⁸

Essentially, the town earned income by owning its own estate, containing farms, factories, shops and offices and used the rent from these to provide municipal services, including education, enabling municipal rates (a.k.a. property taxes) to be kept to a minimum and thereby increasing affordability.

One important principal of such an arrangement appears to be that the usual local government functions and the "development corporation" be kept separate. At Letchworth the original local government was the Letchworth (Civil) Parish Council (1908-19), while the First Garden City Ltd. (1903-63) owned the entire estate.

The local government functions are now provided by the North Hertfordshire District Council (since 1974), while the Letchworth Garden City Heritage Foundation (since 1995) owns and manages the 5,300-acre (21 km²) Garden City estate - including offices, factories, shops, houses, community amenities, farms and land. This includes powers related to planning applications (which would normally be the preserve of the local council) in order to safeguard the character of the Garden City. It has assets of over £127m. No dividend payments are made to the residents, but instead, the profit of £7m a year is invested into the local economy.²⁹

£7m a year, if divided between around 10,000 households (35,000 people at, say, 3.5 persons per household), would be £700 per household per year, which is a significant benefit to the community of Letchworth, but not sufficient to maintain the town and render 10,000 pay packets unnecessary. Nonetheless, the Digital Revolution combined with an increase in scale, perhaps to a population of one million, could make this a model one worth reworking for our future jobless cities.

The Digital Revolution increases profits by decreasing labour, but there is no evidence yet that it decreases floor space. What will decrease is the need for worker transport, including parking. Therefore, robotised industrial land requirements might decrease by around 50% as parking areas are turned to more productive uses, but the roads and railways will probably be retained for the movement of raw materials and finished product. As the volume of production rises

the value of the land rises and therefore rents can rise. There is no reason why a modern version of Howard's co-operatives could not capture that value. Equally, urban and indoor agriculture reduces the agricultural hinterland required thereby reducing land costs for a new city and transport costs in bringing that produce to town. Areas of saving that could also be captured by a well-planned co-operative.

Vivek Wadha, writing in the Washington Post³⁰ said that "We need a new version of capitalism for the jobless future". Perhaps a revival of co-operative ownership could be part of that model, an economy where:

- The citizens own the city;
- The city consists of all of the usual land uses (residential, schools, hospitals, etc.) renting these out, or operating them itself, as the citizens decide;
- The city owns the land of production (mining, agricultural and industrial);
- The city receives rents from the business owners or in-kind food and products;
- The city maintains itself and provides for the needs of its citizens in the form of food and clothing rations, access to education, health, recreation, entertainment, etc.; and
- The city distributes any surplus income to the citizens as a dividend and/or special purpose grants.

Of course this raises considerable issues of local democracy that I cannot hope to cover here, except to note that the CEDA report quoted above, rightly points out that such issues "may be generationally dependent", that is they change over time, and that democracy at all levels evolves in response to the changes of the societies that it serves and so local democracy will no doubt rise to the challenge caused by these changes to the growth and changing patterns of cities.

7. The Planning, Architecture & Design of Jobless Cities

So, most jobs will disappear and they may or may not be replaced and there may be a self-financing model for jobless cities, but what about the planning, architecture and design options for jobless cities. Clearly, the responsible professions should, at least as a contingency, explore some options with the intent of ensuring that outcomes are much closer to paradise than to revolution.

Of course, artists, philosophers and prophets have considered these possibilities already, notably John of Patmos' vision of the New

Jerusalem in chapter 21 of the Book of Revelation. A millennium and a half later, circa 1563, Pieter Bruegel the Elder painted *The Tower of Babel* (figure 3), possibly, and with eerie prescience, to express the futility of much of human endeavour. It also clearly provides us with a Renaissance image of an archology. Philosopher-architect Buckminster Fuller advanced the concept further in his unbuilt *Old Man River's City* project; a circular multi-terraced dome building for 125,000 occupants (East St. Louis, Illinois, 1971), while New Age religious leader Raël foretells of archologies in which no one works, but where the citizens do not get bored "because we provide them with numerous activities. The individual's true value is recognized, and everyone wants to show that they have worth. Whether it be in art, in science or in sports, each person wants to shine in order to become eternal, or simply to be admired by the community - or by a [prospective partner]. Some people like to take risks, and to deprive them of the risk of dying would take away their joy of living, and that is why dangerous sports are very popular."³¹ While the expression is very different, the confluence of thought with "unleashing the next wave of human innovation and creativity in directions we can never imagine" from the report on Australia's Future Workforce, quoted earlier, is remarkable.

As explained earlier, "An additional 3 billion urban residents in forty years translates into a need to build a new city for a population of one million people, complete with hospitals, schools, workplaces, recreation and all the rest, at a rate of six a month" and clearly, building one new city of any form will have no impact on a problem of this magnitude. So, perhaps multiple experimental cities are required on each continent, the successes being quickly replicated (in type, not in exact design, which should always be bespoke) and then replicated again, increasing exponentially, until all of humanity that wishes to live in cities can do so in to a satisfactory standard.

So, what are the options: scattered, idyllic rural villages, dense European urbanism or so far untested sci-fi archologies? The discussion of Letchworth (population 35,000) above, indicates that while the land ownership model may be relevant, the size is probably much too small, so that probably excludes idyllic rural village as an option, leaving archology, dense European city, or something in-between. A quick review of examples may be useful.³²

8.1 Arcologies

The first standard columnar skyscraper was the Home Insurance Building (1884, by William Le Baron Jenney). It was only ten storeys high, but it introduced the skyscraper to Chicago and eventually to

cities everywhere, and made Pieter Bruegel's conception of the Tower of Babel a physical possibility. In 1970 Italian-American architect, Paolo Soleri (1919–2013) took the next step and established the settlement of Arcosanti as a research centre dedicated to the study of, and eventual design and construction of an archology - a city in a building. Arcosanti continues to operate and runs regular five-week workshops, consisting of a seminar week followed by four weeks working on the site. No one has yet built an archology, but there are some structures that demonstrate that the possibility is not too far away (but please note that the sustainability requirements mean that a true archology is more than just a very big building).

8.2 Largest and Densest

Currently, the largest buildings are:

- By useable volume: the Boeing Everett Factory (Everett, Washington, USA) which has a gross floor area (GFA) of 398,000 m² and a volume of 13.3 million m³;
- By footprint: the Aalsmeer Flower Auction building (Aalsmeer, North Holland, Netherlands), which covers 518,000 m² (740 m x 700 m);
- By floor area: the New Century Global Center (Tianfu New Area, Chengdu, China) with a GFA of 1,760,000 m². Just under one-third of the floor space is devoted to shopping, with the rest providing for offices, conference rooms, a university complex, two commercial centres, hotels, an IMAX cinema, a "Mediterranean village", a pirate ship and skating rink, and a water park containing a 5,000 m² artificial beach; and
- By height: the Burj Khalifa (Dubai, UAE), which contains 334,000 m² GFA spread over 163 floors and rising to a height of 828 m.

Currently, at 41,515 p/Km², central Manila is the densest settlement on the planet, but is hardly a model worth emulating. However, there are a number of places with densities of around 25,000 p/Ha that provide excellent living standards, including the Parisian suburbs of Levallois-Perret, Le Pré-Saint-Gervais, Vincennes and Saint-Mandé, and Neapoli, a suburb of Thessaloniki, Greece. While some of the above incorporate new construction they are generally mid-rise mixed-use districts, so I will refer to them collectively as "traditional European urbanism". Theoretically, less than half a square kilometre of building in this form would house one million people. Allowing for manufacturing, civic and cultural functions, and recreation perhaps a city of one million in one square kilometre is feasible, surrounded of course by the required agricultural hinterland and parklands. Although, even



Figure 3: The Tower of Babel ('great' version) by Pieter Bruegel the Elder (Google Art Project)



Figure 4: Rotterdam's Market Hall by MVRDV (© E. Stephen Goldie, October 2015)

this area may be significantly reduced by the automation of agriculture. Not that a city of one million in one square kilometre is a target of any sort, just that it is likely that the more compact the city the more sustainable it will be, at least environmentally and economically.

8.3 Other Notable Buildings

Galaxy Towers, New Jersey, USA (1976, by Gruzon and Partners) contains 1,075 residential units, shopping and entertainment in three 44-story towers and two 16-story connecting structures.

Shanghai Tower, Lujiazui, Pudong, Shanghai, China (2015 by Gensler) is currently the world's tallest building by height to highest usable floor. It is the world's second-tallest building by height to architectural top (behind Dubai's Burj Khalifa, 828 m) and the world's third-tallest structure (behind Tokyo Skytree, 634 m). It has a GFA of 380,000 m² above ground and 170 m² below ground and cost US\$2.4 billion. It is an office building with shopping and entertainment with a maximum capacity of 16,000 workers and visitors per day. It has a double glass façade, giving it very high levels of energy efficiency.

Rotterdam's Market Hall (2014, by MVRDV) is perhaps a mini-archology, but it is more notable in that it is a significant diversion from the columnar skyscraper format. Apple Park (a.k.a. Apple Campus 2), Cupertino (estimated for completion in 2017, by Foster & Partners) is also in a different format: a large circular building of four floors containing approximately 260,000 m². It is also notable for the sustainability measures that it has introduced across the whole of its 71-hectare setting.

Masdar City, Abu Dhabi, UAE, KAUST, Saudi Arabia and Tsukuba Science City, Japan are all highly planned, specialized, research and technology-intensive model cities that incorporate a living environment. They are designed to be test-beds for sustainability. Masdar was initiated in 2006 and is planned to cover 6 km² with low to mid-rise buildings that will be home to 45,000 to 50,000 people and 1,500 businesses, primarily commercial and manufacturing facilities specialising in environmentally friendly products, but with the 60,000 factory workers, cleaners, and other support staff commuting to the city daily. As of 2016, fewer than 2,000 people are employed in Masdar, and only the 300 students of the Masdar Institute live on site.

8. Conclusions

It is highly likely that over the next two decades there will be a massive loss of industrial and service jobs in the western world, of the order of 80%, at exactly

the same time as the mechanisation of agriculture in the global south is driving rapid, third-world urbanisation. Issues that humanity needs to deal with while also preventing nuclear war and avoiding biological annihilation.

This quick review indicates that both traditional European urbanism or a city-in-a-building archology could provide the physical models for the jobless cities that we should have started to build yesterday. Which of these will work best is likely to be determined by the degree to which each city's planning and design minimises environmental impact, maximises sustainability and, most critically, supports a functioning economic model that will "meet our needs as defined by the bottom two layers of Maslow's hierarchy of needs (physiological and safety) ... thereby unleashing the next wave of human innovation and creativity in directions we can never imagine."³⁴

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SymbioCity - from what to how

Paul DIXELIUS (Development Director) and Helena OHLSSON (Urban Specialist), SKL International, Sweden

Supporting the implementation of the New Urban Agenda
Cities are the drivers of political, economic and cultural development. Making urban areas attractive, safe, healthy and livable is therefore crucial for a more sustainable future. Climate change is a global concern, but its effects are local, and local mitigation and adaptation measures are therefore essential. In practical terms, the urban challenges are manifested by a lack of long-term vision, structural inefficiencies, limited involvement of citizens in decision-making processes, lack of coordination between different departments and tiers of government as well as between different urban systems. SymbioCity addresses these challenges by putting special emphasis on concrete changes on the ground.

SymbioCity is a holistic and inclusive approach to sustainable urban development. It integrates environmental, socio-cultural, economic and spatial dimensions; and includes institutional as well as long-term and visionary

perspectives. In various ongoing projects in developing or transition countries, SymbioCity supports the implementation of the New Urban Agenda by bridging the gap between sectors and stakeholders. The ultimate goal of SymbioCity is to improve all residents' quality of life, health, comfort and safety. SymbioCity does this by promoting participatory processes and inclusion of citizens, private sector and civil society to share different insights, experiences and perspectives. By putting special emphasis on gender perspectives and the urban poor, SymbioCity aims to contribute to poverty reduction and improved living conditions for all.

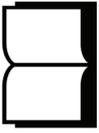
Our international experience shows that local leadership and ownership are key factors to succeeding in transforming an urban environment in a positive direction. Elected local representatives have a key role in promoting policies and programs that improve economic, socio-cultural and environmental conditions for the citizens. Urban planning is, however, often left to planners and engineers. Successful city leaders understand the need to involve the citizens in the urban development and are able to absorb and communicate the needs of the city to develop long-term visions that involve all stakeholders. Being a leader and following a vision often means taking uncomfortable decisions.

SymbioCity functions as a vehicle to stimulate dialogue with different interest groups at local level to help local stakeholders raise awareness and understanding of the key challenges facing

the city. Another important feature is helping cities to work “vision-based” instead of “problem-based” by looking at the assets the city can leverage in addressing the identified challenges. Cities are supported to find different ways forward and thereby helped to turn problems into solutions. The SymbioCity Secretariat at SKL International in Stockholm, takes the local reality affecting the implementation of the New Urban Agenda as a point of departure and explores new ways forward with the goal of improving quality of life for all.



Figure 4: Rotterdam’s Market Hall by MVRDV (© E. Stephen Goldie, October 2015)



Future smart retail: urban, virtual or both?

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Synopsis:

The paper presents various aspects of technologies used in retailing and how they impact the way customers shop nowadays, and will probably do in the future. It discusses the possible future scenarios of changing the built form of cities to incorporate these changes.

1. Background

Retail from the very beginning was an urban and physical function of the city, focussed around the exchange of goods. Shops were organised in a core area, benefitting from the aspect of concentration. Later on, the concept of a shopping centre was introduced, where individual shops were grouped within a larger development that provided a completely new environment. Retailers profited from the conglomeration aspect, footfall from other shops and the fact that the whole centre was managed by one entity, which allows marketing of the centre as one shopping destination, not a single shop. At the same time, consumers were happy to accept this new opportunity to shop in a perfect environment. Although it resembled the traditional downtown, with streets and shop fronts, it was climate controlled, thus independent from weather, clean, nicely designed and offered a completely new experience of shopping.

The next breakthrough came when the internet technology grew stronger and became more accessible and popular among people. This is when the first online shops opened and customers could make purchases in a virtual world, which would later be delivered to their homes. These online stores were cheaper, as they did not have to rent actual space, display real products or hire as much staff to assist customers as their physical counterparts – the brick-and-mortar stores. All they needed was a virtual storefront – a website – and distribution network to deliver products to the customers. This competition came as a threat to physical stores and there was concern about the future of traditional retailing. And there was an impact, which – together with other market forces and an oversupply of retail space – resulted in many closures and left many dead malls unoccupied.



Figure 1: Intel Labs researcher Nola Donato demonstrates augmented reality dressing room. Photo: Intel Free Press (CC)

Nowadays we experience that technology is playing a key role in almost every aspect of life. This includes how people shop and experience the city. Therefore recently a new

wave of changes came to retail in order to match this phenomena. It has affected both worlds: the real brick and mortar as well as the virtual. Many of those changes are reflected in how the shops are organised, their sizes, location within the city and what role will they have in the future.

2. Modern trends in retailing

2.1 Showrooming and webrooming

One of the first impacts of the internet shops was taking away sales from the brick and mortar outlets, as customers were making their purchases online. However, at the same time another trend came into being – showrooming. Here the customer would see the product in a shop and then order online. The reasons for this is in the main difference between the brick and mortar shop and internet based one: in the latter the customer cannot touch, see, try out and manipulate the products. All they see is a photo and description. For many people, this experience is crucial to be able to decide on what they want to buy. As many products are the same no matter where one buys them, customers started to use the physical shops as showrooms, where they could actually see the item, and then place an order in a virtual store at a lower price.

Showrooming puts all the costs of display items, showroom and staff on the side of brick and mortar stores, while the sales revenue comes to their virtual competitors. On top of that, the competition is not only between the real and virtual, but also between online-based retailers. With the quick emergence of comparison shopping engines (Google Shopping, Shopping.com, Nextag, PriceGrabber and many others in different countries), it is easy to look up and compare prices between many virtual stores. Therefore, the customer does not have to walk from one shop to another on a high street, but can do all the comparison shopping by just using a web browser.

Interestingly enough, there has been a rise to an opposite trend called “reverse showrooming” or “webrooming” (Adler 2014, Khan 2016). This is when the customer researches for a product online and then makes the purchase in a real store. The benefit is that the customer comes prepared and finally decides on the product in the shop. It is convenient for the client, as the product is readily available; they do not have to wait for delivery and there is an easier way of returning the product. What is observed nowadays is that more customers “webroom” (69%) rather than “showroom” (46%) (Adler 2014).

2.2 Omni-channel retailing

Once the competition from online stores

emerged, the traditional stores also increased their presence in the virtual world. Using both channels helps them to be competitive and fight for customers. This is called omni-channel retailing. At the beginning, it was more about a basic online presence, but with time, the concept developed further. The stores realised that they could compete with delivery prices and times once the product was delivered to the store and not the customer's house. In this case the buyer has to pick it up from the brick and mortar outlet. This meant that the delivery would be part of a bulk delivery to the store, not the individual.

Going further there has been a development of four types of purchases, all offered by the same company. The customer can choose to (1) do shopping online and have home delivery (just like other ecommerce shops), (2) shop online and pick up at store (decreasing the delivery time and cost), (3) shop at the store and have the product delivered home or (4) shop and take the merchandise right away (the traditional way).

This trend lets shops capitalise on both showrooming and webrooming, by allowing them to exist in both worlds at a time.

With the virtual technologies, there is also an impact on the floor space needed for these reorganised shops. With the significant increase of the internet sales, there will be oversupply of physical space. For example in the UK it is estimated that up to 20% of retail space is already surplus to current needs (Jones Lang LaSalle 2012). In the Netherlands, with the predicted estimate of online sales growing from 9% to 27% by 2020, there will be an excess of 2.0 to 2.5 million square metres of retail space (Kesteloo, Hoogenberg 2013). This means that retailers should plan for their investment and assets, both virtual and real. There is not only the need for the reduction in size of the brick and mortar shop, but also reorganising the proportion between the sales area and backroom, as online sales and delivery



Figure 2: Shoes.com store. Photo: Evan Dion Photography Inc.

will become more popular. It is expected that, the city structure will be affected by this reorganisation, as there will be empty retail spaces – so these will need to be occupied and retail network will need to be reorganised.

2.3 “Click-to-brick”

An interesting phenomenon occurred as a reaction to the above blend of two worlds. The virtual stores started opening up their own brick and mortar venues, although initially many never planned to do so. This is a reaction to the real shops entering the virtual world with omni-channel retailing; the ecommerce businesses had to make a presence in the cities.

One of the main virtual players – Amazon – opened Amazon Books and now is planning to expand this network. Of course, the primary goal was to have a brick and mortar bookstore that clients could walk into in the real world. However, another factor driving this was to address what was not possible online – discoverability (Robischonv 2017). A typical bookstore would aim to have as many titles on display as possible, and thus needed a large space. Amazon Books is different, as they display fewer books, and even arrange them with book covers facing the customer keep them facing the customer, not by the backbone. The selection is made based on Amazon's immense online store database of what people might like to buy. People enjoy coming to these stores and taking the time to browse, even though the stores are not very big.

Other companies follow the same idea. Shoes.com, when opening their first brick and mortar store, also deviated from the traditional concept of a shoe store. It was much smaller and organised into three rooms: the “home room”, the “dressing room” and the “editor's room” (Dare 2016). The main idea was to offer a shopping experience and interaction with the products and other customers. There was even a large cafeteria-style space for socialising. The showcased products constantly changed. Unfortunately the store was closed as the shoes.com company had to cease operations in result of financial problems (Silcoff 2017).

2.4 Virtual outlets in real space

There is another trend becoming more popular and changing the retail space in cities. In 2011, Tesco opened the first truly virtual store in a subway station in Seoul, South Korea. The concept was simple: to use the walls of the station to display the products; the products were not real, but images arranged similarly to shelves in a real store. The customers using their phones could scan the codes of products and in this way fill their virtual basket. Then the

products would be delivered to their homes the same day, when they returned home (Petit de Meurville, Pham, Trine 2015). It is interesting is that the “virtual” arrangement of products (display, picking) was very similar to the “real” experience customers are used to, unlike online shop websites – this is truly emulating reality.



Figure 3: Tesco subway store, South Korea. Photo: Joanne Wan, Flickr (CC)

The above development was then followed by other retailers like Jetshop (Sweden), Toys”R”Us (USA), Ahold/Peapod (USA) and others around the world (Roman 2016). What is essential for the success of these virtual stores is the location in places with busy footfall and ideally where customers have to spend time waiting. Therefore, transportation hubs are the best locations. For busy customers this may even be the only way that they could visit those stores, as their brick and mortar outlets often mean additional commuting time. And an organised delivery makes shopping more convenient as the client does not have to carry their shopping home.

There is an obvious impact on how cities’ retail networks are changing with the growing popularity of such virtual stores. They do not need much space, sometimes just a “storefront” (like Tesco’s subway store). Thinking of traffic, this helps to limit trips by citizens, but still, there is more traffic generated by the home delivery. An ideal balance is to have smaller pop-up locations for pickup where there is already an existing footfall. This concept was successfully implemented by Peapod, with stations located in key locations around the city. This market of online grocery stores is growing and there are competitors already present in the market, like Amazon, Instacart, ShopRite and FreshDirect.



Figure 4: Peapod delivery truck. Photo: Paul Sableman, Flickr (CC)

2.5 New distribution channels

As the two worlds of shopping have blended, adapted to new demands and changed, the importance of product delivery is increasing. Most of the channels at some point will need to deliver the purchase to the customer.

One pizza delivery company – Fresh Brothers in Los Angeles, USA – has been able to address the issue of traffic congestion and problems with delivery to their customers (Kelso 2014). They already had two restaurants, one in Beverly Hills and the other in Brentwood, when they wanted to enter the market in Westwood, where there were many potential customers at the UCLA campus. However, opening a new store would have been expensive and its location too close to the others. Although delivery from the other locations would not have been difficult, customers did not want to place orders, as they thought that the traffic was too heavy to deliver from a different part of town. Indeed, a study did conclude that the traffic was bad, but there was a pattern to when it was faster to deliver from one of the outlets. To take advantage of that, the restaurant opened a virtual store that was named Westwood and even had a local number, but never existed in the real world. The system would automatically determine which store had a faster delivery time and deliver the order from there. In this way Fresh Brothers solved the delivery problem by creating the notion of a real store that actually didn’t exist, only in the virtual world.

In order to avoid any traffic congestion, delays and to speed up delivery, Amazon launched a pilot programme to ship parcels using small unmanned air vehicles – drones (RetailDrive 2016). This type of transport can shorten the delivery time in cases of heavy land traffic. Strategic locations of smaller distribution centres (drone beehives) can allow for less than 30 minutes from purchase to deliver to the customer. Drones can also drop parcels to almost any destination,

regardless of the road network. It does not need to have a pilot or be operated by a human; the concept requires a limited workforce. The first successful delivery via Amazon Prime Air was on December 7, 2016. Although this project is very innovative and bold, there are still a few issues to overcome, mainly in terms of compliance with aviation regulations.



Figure 5: Amazon Prime delivery drone at the Intrepid Air, Sea and Space Museum in New York.

Photo: William Warby, Flickr (CC)

Wal-Mart considered the idea of having its customers making in-store purchase to deliver orders to other people who had placed their orders on-line (CNBC 2013). Delivery was traditionally being done by a professional courier company, which added to the price and created additional traffic congestion. This new idea of the customers who just made a purchase delivering to others on their way home would have been much cheaper and more convenient for the online customers. In exchange, the delivery person could receive discounts and other benefits. This idea is still in the planning phase, especially given some concerns about the legal, regulatory and privacy issues. Nevertheless this could be a very interesting option and fits in well with the trends of emerging crowd-sourcing and sharing economy future of smart cities.

2.6 Products made in shops

Current trends are focussing on locality of the retail cycle, on getting local products to stores, rather than having them delivered from thousands of kilometres away. Being able to manage that process is a crucial item for a smart and sustainable city. There are initiatives that go beyond only looking for the closest local provider of a certain product, as the new trend is to have the product made in the shop.

An Adidas pop-up store in Berlin offers a unique possibility to knit clothes at the premises, which are custom made and ideally tailored based on a scan of person's body (Murray-Nag 2017). The buyer can choose what they want and receive it straight from the store. The company does not have to guess what people would like to wear and invest in a long production process of around 12 months the result is immediate. This type of store is no longer a sales venue for mass product, but a unique craftsman shop. On top of that, it offers the customer an experience which is not possible in the virtual world.



Figure 6: Adidas Knit for You store.

Photo: Like_the_Grand_canyon, Flickr (CC)

Another concept considers growing the food products on the premises (RetailDrive 2016) and the American company Target is already preparing to implement such a possibility. They are considering vertical farms to grow vegetables indoors in a controlled environment. A similar idea is being looked at by Roundy's Supermarket as they hope to build a hydroponic greenhouse farm in Rochelle, IL. In Montreal, Canada there are plans for IGA Extra to open the first shop with a rooftop farm of 1.5 acres with over 30 types of vegetables. They will be sold as "Frais du toit" - "Fresh from the roof" (Ayalon 2017). Perhaps it may be difficult to have the full growth cycle at the shops, but definitely, it is a trend to consider for the future. The benefits of vertical farming and growing food closer to the customer are many: less water, a smaller area space needed, healthier food and being independent from weather risks

(Ryan 2016).

2.7 Stores without physical products for sale

What was a real constraint for some stores to enter central urban areas was the size of the showroom that was needed to sell their products. One kind of retailers that was typically located outside central areas were car dealerships. They needed a large space to exhibit all the models on sale, and even bigger parking area to store the actual products - cars.

Nowadays, with the use of technology and the trend to create experiences rather than immediately sell physical products, it is possible to redesign and downscale auto showrooms. There are examples like Audi City (Trotter 2015), INTERSECT by Lexus (Spirou 2013) and many others. "Dealerships are changing in format, size and concept - there is an increased emphasis on developing flagship or completely digital retail stores in heart of city centres, where the brand meets the customer in his own living and working environment - the city" (Singh 2014). In Audi City the number of cars on display was limited to only a few; the others were viewed digitally by the customer. They could browse models, display them on a screen and order a test drive, for which the car was delivered from another showroom. There was also a cafeteria area to relax and interact.



Figure 7: Samsung 837 Social Galaxy. Photo: Kyle McDonald, Flickr (CC)

Samsung introduced a similar concept in order to create interaction with the brand, rather than a store with items to purchase and take away. The company opened a "store" in NYC that actually does not sell any products (Welch 2016). This is more an experience destination than a typical shop. The company described it as "physical manifestation of the company's brand". The three levels of the shop are arranged in front of a large screen with theatre layout seating. There are special events held at the venue and the audience can experience the latest

gadgets. Therefore, this "shop" is more of an attraction destination than a real outlet.

3. Conclusion: future impact on cities

Nowadays technology is impacting all areas of life and this includes how cities are evolving. For the retail sector this also has meant changes that will continue to evolve and change urban form.

The first and main impact was shifting a share of the sales from the brick and mortar stores in cities to the virtual sphere of the internet, thus reducing the number of outlets in cities. As a result there is less physical sales floor space in cities than there would have been had all purchases been in the real world. There was a concern about how it would impact cities, and already there is an oversupply of real floor space. Apart from that, not every retail space can go virtual. Services, such as barbers, beauty salons, food and beverage - dining, coffee shops etc. and of course entertainment of many sorts, which need the physical presence of the customer, will remain. These outlets will be part of the cityscape.

Although at first the retail world split into two - real and virtual - later on they blended together again. Showrooming is the process where the customers visit a brick and mortar store and then purchase online. Soon this was countered by an opposite trend of webrooming that meant customers researched the product online and then bought it from a real shop. It seems that nowadays customers are very flexible in the regards of shopping and exploring both worlds at the same time.

Many retailers choose to have a presence in both realms with omni-channel retailing. These offer all alternatives to clients, as the customers prefer to have a choice. We should expect this trend to be more popular. On the one hand more online stores will start opening their physical outlets, perhaps not as big as their counterparts (click-to-brick). On the other hand the brick and mortar stores will be exploring virtual worlds and offering more purchase options online. This will need a rearrangement of the logistics network, as some items will be purchased in-store, while others will have to be delivered. Delivery methods will also evolve, including new means of transportation and perhaps delivery by other customers. It will all mean that smaller shop units will be needed.

A report states that "Future store formats are flexible and not easily categorized. We expect combinations of the abovementioned store roles to appear: pop-up stores within complementary systems, a virtual showroom alongside a drop-off point, segment concepts on wheels, and many other combinations" (PwC Strategy& 2014). Perhaps the future

evolution can turn stores more into a showroom of the products to touch, feel and test, but the purchase will be done elsewhere, probably online. Some of these outlets may be run by brand owners, rather than merchants.

Shopping now is more an experience for customers rather than just a task of getting a new product. They want to explore the possibilities, try products, socialise and exchange thoughts with others, spend time and feel special. With these needs comes the introduction of areas for socialising in shops (like cafes, lounges) that allows contact with other people present in the shop, but also virtually and online (for example through providing free internet access). The production of customised items on site also makes those places unique. Pop-up stores, rock star chefs, art programs and food experience, trendy and fashionable locations

instead of numerous cars on display, can appear in dense urban areas.

It is also possible to imagine the future shopping centres going completely virtual. A set of outlets could be a part of one online system of browsing, picking products, virtual fitting rooms (allowing for the trying on together items from different stores) with a centralized payment and delivery system.

Some of the challenges for cities to overcome is to be able to adapt to the trend of scaling down the size of retail outlets (Haasch 2014, Kohlstedt 2016). There is a need for more consideration in how to redevelop existing large spaces that may not be suitable for future retailers. Breaking them up into smaller units is one of the options. The other is redevelopment into different uses (residential, educational, community etc.).



Figure 8: Augmented reality aids clothes shoppers. Photo: Brother UK, Flickr (CC)

- all this is what will make brick and mortar stores attractive and competitive to their virtual counterparts.

The planning of services network and high streets is now more about the juxtaposition of services and shops, social activities and experience. The visit to the "city" is still something that customers need, especially since it offers experiences that are not available online. Stores now appear in places that were not suitable or fit for them before. Virtual market storefronts that contain just images of products significantly decrease the size of outlets and can be placed almost anywhere. Others can be very small popup collection points for purchases made online. New car showrooms, that are much smaller in size due to offering virtual experiences

Other future trends will include an individualised sales experience that puts the client in a special position. Niche retailing, very local products or services, innovative approaches, signature items should be the future differentiating one store from another. "In the future this 'halo effect' of technology will impact the shop floor, turning stores into inspiration house, service centre, showroom or fulfilment point" (PwC Strategy& 2014).

The abovementioned trends will shape the smart retail services in cities. We should also expect that new technologies will bring different, yet unforeseen innovations as well.

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Photo by Amador Loureiro on Unsplash





Conclusions



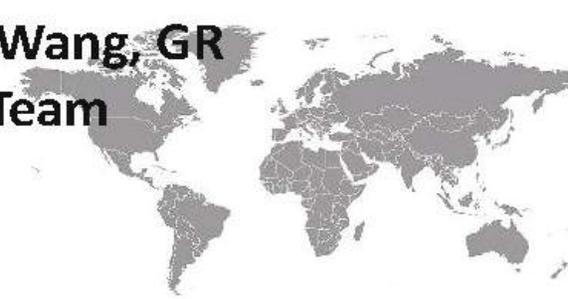
Conclusions of the ISOCARP-OAPA Joint Conference/53rd ISOCARP Congress SMART Communities

Prof. Dr. Hongyang Wang, GR and Congress Team

ISOCARP-OAPA Joint Conference/53rd ISOCARP Congress
SMART Communities

Conclusion

**Prof. Dr. Hongyang Wang, GR
and Congress Team**



■ CONCLUSIONS BY TRACKS

- What We Learned & Takeaway for Practice
- Challenges for the Future & What's Needed



TRACK 1: TECHNOLOGY, INFRASTRUCTURE AND BUILDINGS



TRACK 1: TECHNOLOGY,INFRASTRUCTURE AND BUILDINGS

Key Findings in Track 1 include –

- There are no universally applicable solutions to community problems
- Urban design should be responsive to changing technology and community needs
- Street density and diversity leads to more liveable urban space
- New energy and technology solutions bring new opportunities and sustainable development
- Automatic, driverless transport technology is a double edged sword – useful but may harm cities too



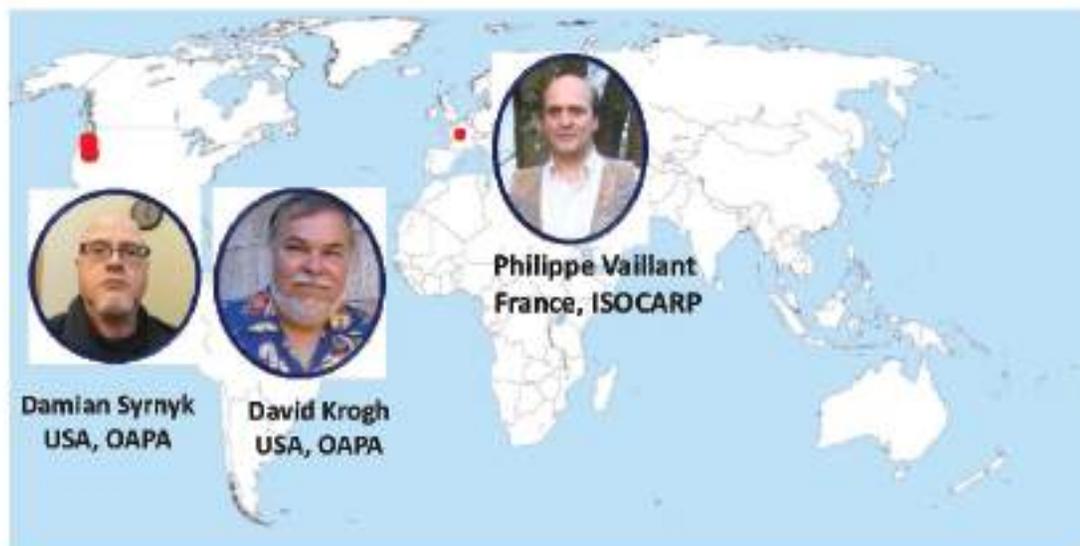
TRACK 1: TECHNOLOGY,INFRASTRUCTURE AND BUILDINGS

Challenges for the Future and What is Needed

- Greater stakeholder participation will be required to achieve effective community development
- New technology solutions will require longer and wider community testing
- Radical measures required in building construction - separate technology and building structure lifecycles
- Impact of the autonomous, driverless transport require more analysis
- Application of Spatial analysis technology in improved delivery of community services



TRACK 2: Governance & Inclusive Communities



TRACK 2: Governance & Inclusive Communities **DAY 1**

Defining « inclusive smart communities »



Session 1
Session 2
Session 3

- DATA method (Inde)
- Regional level for coordination (USA)
- Ethic: Global Planning Code (Philippines)
- IG-UTP from UN (International Guidelines on Urban & Territorial Planning)
 - SD2 : Institutions (including economy)
 - R 5 : Science Planning
 - R 4 : Gouvernance
 - SD3 : Territory
 - SD1 : Society / Culture
 - R 6 : Belonging to the territory
Common Goods, territorial Goods
Public, Collective and Universal Goods
- Portland Plan Not achieved on all topics **Solutions ?**
- Population involved in 100 smart Cities (India)
- Deliberative Planning (China)

The definitions cover all the spectrum of resilience: how hold them together ?



TRACK 2: Governance & Inclusive Communities **DAY 2**



Session 4



Session 5



Session 6

Inclusiveness, informal settlements, traditional planning / Governance

- Data Self-Determination
 - Open Data ?
 - Importance Little - Middle Cities
 - Multi-Scale
 - Energy Policy ?
-
- Public Welfare Orientation
 - PEOPLE FIRST (All cases studies)
 - SPLUMA (South-Africa)
 - Devolution (Kenya)
 - Empowerment
 - Gaming
 - « Smarticipation »
 - Reel needs of people
 - Identity
 - Sense of Place

All studies have strong links between them



What We Learned & Takeaway for Practice (TRACK 2)

- Public outreach and participation can be more efficient with smart technology. But access for all – inclusion- has to be guaranteed
- Long-term oriented and common goods targeting political decision-making cannot be given to algorithm- even in smart jurisdictions
- Small and middle town in intermediate regions are intended to articulate a top-down and bottom-up planning
- Smart inclusive cities need to cooperate as smart inclusive convivial regions
- We have a lot to learn from aboriginal peoples to conserve nature and resources, and to move towards a happy sobriety
- Devolution and active subsidiarity provides latitude for broadened and deepened citizen participation in Land Use Planning
- An organic mode of thought, new synthesis of science and spirituality, promote dialog amongst people, free and prior consent respect, *the co-construction of a more inclusive planning*. It leads to the creative transformation of the territories at different interrelated scales.



Source :
1 – NIEKE Siyabonga
2 – Dr MUSOGA Herbert



Challenges for the Future & What's Needed (TRACK 2)

- Organic convivial inclusive smart community concepts have to be designed to support a successful model of local self-governance and development that is ultimately controlled by respective citizenship.
- The governance and participation in the age of digitalization is to be discussed in relation to all size's cities and convivial regions, to ensure inclusive planning.
- Connections between natural, rural and urban environments are required to ensure the balance of Earth's limited resources and inclusive food security.
- *The Land is the Source of the Law, First Law !*



Source : <http://www.who.int/mediacentre/news/2014/05/20140515/nature-to-the-rescue.html>
<http://www.who.int/mediacentre/news/2014/05/20140515/nature-to-the-rescue.html>
 Finding innovative and sustainable ways to work together with, rather than against, nature for effective risk reduction is crucial.



Source : <http://www.kwa-zulu-natal.gov.za/development/urban-planning>



Source : <http://www.who.int/mediacentre/news/2014/05/20140515/nature-to-the-rescue.html>



Source : <https://www.flickr.com/photos/theresa/youth/>



The development of traditional settlement master plans: A response to undocumented indigenous planning practices in rural KwaZulu-Natal.

Author: Mr Siyabonga Njeke
 KZN Department of Co-operative Governance and Traditional Affairs

- Key findings
- The apartheid government advocated institutional racism focussed on separation of settlements, economic exclusion of certain races and structured underdevelopment. Elements of these structures still exist of late.
- Unaddressed continued spatial fragmentation in rural and peri-urban areas of KwaZulu-Natal can be attributed to various discriminatory practices.
- Questions for discussion
- How did the apartheid regime achieve the above?
- What role can traditional authorities and communities play in shaping settlements ?



TRACK 3: CULTURE, COMMUNITY EXPERIENCE AND THE SHARING ECONOMY



TRACK 3: CULTURE, COMMUNITY EXPERIENCE AND THE SHARING ECONOMY

• What We Learned

The concept or terminology 'Smart' is fuzzy, it is a marketing term.

- When it comes to Smart Communities, no one definition fits all: Communities are complex, each community has its own identity and uniqueness.
- Communities are smart with or without ICT
- Quality of life is paramount in achieving Smart Communities
- Smartness and Sustainability goes together
- Digital Transformation changes all, changes everything, everyday life
- Sharing economies has its pros and cons; Sharing economy came so fast and learning as we embrace it
- Holistic approach in dealing with DT and Sharing economy within Smart Communities



TRACK 3: CULTURE, COMMUNITY EXPERIENCE AND THE SHARING ECONOMY

• Takeaway for Practice

- Smart Community is not smart unless it has meaning and purpose; leverages the hidden potential of human capital
- Smart communities are people-based or citizen-centred
- Real smart communities are based on the premise of local culture and place making
- Characteristics of smart communities include: liveability, resiliency, connectivity, scalability, wise-wisdom, fun, respect, transparency, efficiency, equitable, policy driven not technology driven, interdisciplinary, authenticity, community empowerment, identity and memory
- Smart communities must become learning systems, living systems (actualization of place)
- Smart Communities have to be inclusive of both people and their companion animals



TRACK 3: CULTURE, COMMUNITY EXPERIENCE AND THE SHARING ECONOMY

• Takeaway for Practice

- Protection of natural resources; Heritage conservation; culture no ecology
- Protection of Digital Transformation infrastructures and utilities in Smart communities
- Appropriate technology matters, utilizing smart devices
- Avoid digital divide in the planning and designing of smart communities
- Understanding and analyzing Behavioural patterns in public spaces require smart use of appropriate technology
- Behavioural patterns also differ from the utilization of different spaces
- Smart planning education focuses on Learning by Doing: Incorporation of Experiential Learning in planning curriculum; Students are leaders of learning



TRACK 3: CULTURE, COMMUNITY EXPERIENCE AND THE SHARING ECONOMY

- **Challenges for the Future**

- Anticipating and Coping with Disruption
- Uncontrolled growth
- Oversharing
- Anticipatory planning- dealing with negative externalities that arise from overproduction in the sharing economy (avoid creating new problems like bicycle cemetery, lack of space to park bicycles etc)
- Avoiding overdose of energy consumption



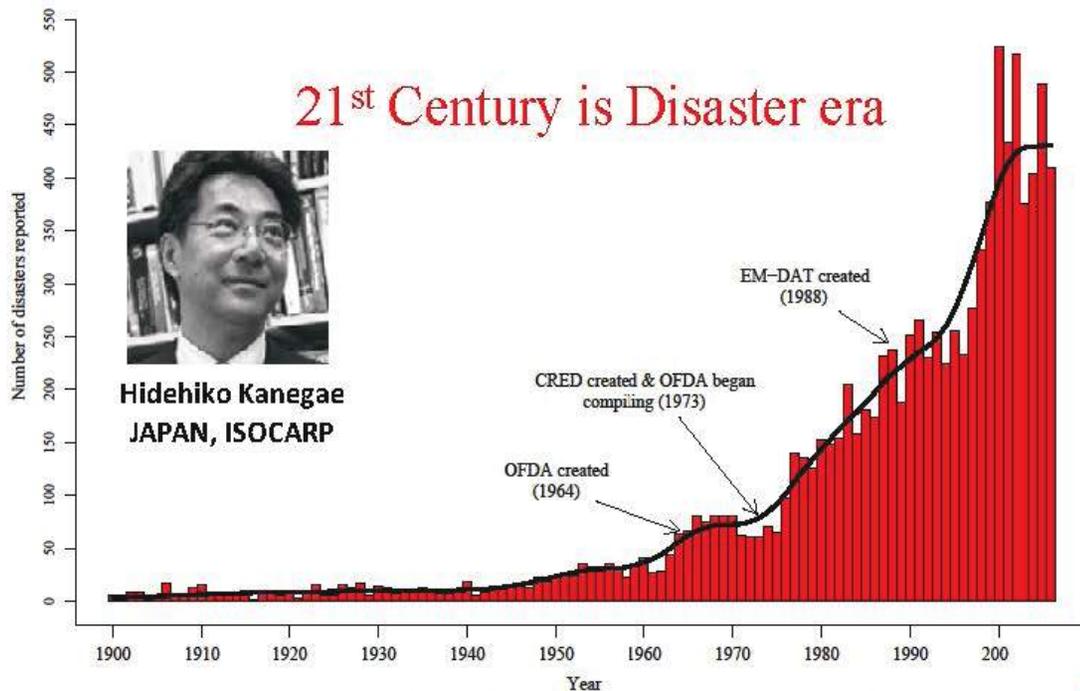
TRACK 3: CULTURE, COMMUNITY EXPERIENCE AND THE SHARING ECONOMY

- **What's Needed**

- Innovation + Entrepreneurship for the next generation
- Turn words into action, Turn actions into results
- Collaborative governance
- Low cost adaptive reuse; Regenerative planning and design; Retrofitting spaces
- Zone with care
- Embrace nested spheres of engagement
- Value and Viability very important in the planning and design of Smart Communities
- Planning process adaptable to the Living System (actualization of place)
- Developing new apps, web map, GIS, web tools like map craft that are interactive and can be used collaboratively
- Embracing Smart grid, smart energy
- Being SMART TOGETHER



TRACK 4: RESILIENCE, ADAPTATION AND DISASTER MITIGATION



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JAPAN, ISOCARP



Amanda Ferguson
USA, OAPA



Drew DeVitis
USA, OAPA

World Trend of Natural Disasters



TRACK 4: RESILIENCE, ADAPTATION AND DISASTER MITIGATION

Session 1: Strategic planning for climate change (Hidehiko Kanegae & Drew DeVitis)

Session 2: Hydrological vulnerabilities (Hidehiko Kanegae & Amanda Ferguson)

Session 3: -

Session 4: Natural disaster mitigation – Resilience theory, problems and practices (Hidehiko Kanegae & Amanda Ferguson)

Session 5: SS: Central City scenic resources protection plan (Session Proposal)

Moderator: Brooks, Speakers: Brooks; Loehlein)

Session 6: Sustainable and resilient communities. (Hidehiko Kanegae & Drew DeVitis)

Session 7: SS: Strengthening the Disaster Resilience of the Academic Biomedical

Research Community: Protecting the Nation's Investment (Session Proposal Moderator: Pawlowski, Speakers: Brown; Leduc)



TRACK 4: RESILIENCE, ADAPTATION AND DISASTER MITIGATION

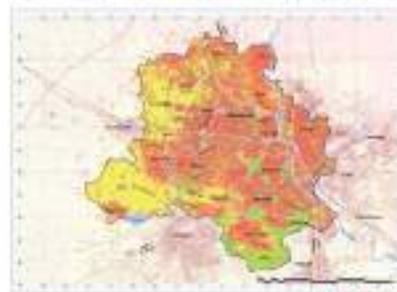
Session 1: Strategic planning for climate change

Moderators: Hidehiko Kanegae & Drew DeVitis

1. "Spatial modeling for landscape vulnerability assessment with climate change through TACA and GIS in Heilongjiang, China", Tingting YU;
2. "Effects of Climate Change on Lagos Coastal Communities – Case Study of Selected Lagos Coastal Communities in Eti-Osa LGA of Lagos State, Nigeria", Aliu OGUNFOWORA;
3. ADAPTATION SUPPORT TOOL for implementing the New Urban Agenda in cities", Lena NIEL;
4. Climate Resilient Urban Development Strategies for a Mega city: A Case of NCT of Delhi", Mahak AGRAWAL.

Summary: Assessment, 2 of Adaptation,

- carrying capacity indicator is needed for monitoring CC
- Urban Nature-based solutions can be used in urban planning and design to improve the level of resiliency of cities using the Adaptation Support Tool
- Planning changing of landuse, SDG's & New Urban Agenda, Governance & Socio-economic Climate Proof



Scenario 2-
Carrying
Capacity
Guided
Development-
Sur face
temperature of
Delhi, 2041

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TRACK 4: RESILIENCE, ADAPTATION AND DISASTER MITIGATION

Session 2: Hydrological vulnerabilities

Moderators: Hidehiko Kanegae & Amanda Ferguson

1. "Urban Underground Potential in Dakar, Senegal Reversing the Paradigm of 'Needs to Resources", Michael R. DOYLE;
2. "Research on green infrastructure construction in mountainous watershed cities- with Guangyuan city as an example", MAO Feng;
3. "The Research on Multi-Scale Urban Flood Control and Storm Drainage Based on Economical Security of River Basin", TAO Zhang;
4. "Urban Waterfront", Pedro GARCIA.

Summary:

- Geopotential & planning
- Green Infrastructure
- three-level flood control and storm drainage strategy
- urban waterfronts solutions by long term strategies in symbiosis with nature.

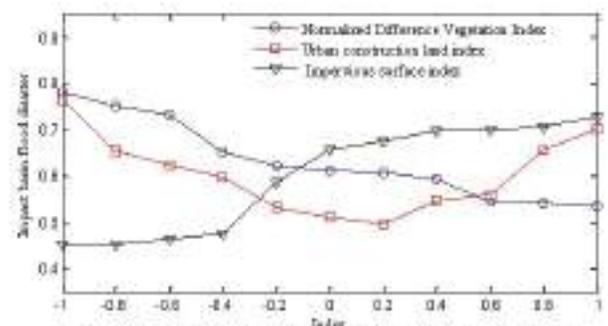


Image 2 Influence of various landscape pattern indexes on flood disaster

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TRACK 4: RESILIENCE, ADAPTATION AND DISASTER MITIGATION

Session 4: Natural disaster mitigation – Resilience theory, problems and practices

Moderators: Hidehiko Kanegae & Amanda Ferguson

1. "From fragile to resilient territories: the reconstruction after earthquakes in Central Italy", Paola RIZZI;
2. "Mining Collaborative Planning for Disaster Preparedness and Response", Connie OZAWA;
3. "Special Purpose District Woes, State Land Use Goals, and Land Behind Levees in Oregon", Rowan, Colin;
4. "Strategy of improving urban resilience in urban comprehensive disaster mitigation", Ma Chao.



Summary:

- Resilience covers recovery process
- Multidisciplinary approach and cross-sectional collaboration that allow successful reconstruction process.
- Lack of ripeness & Divergent views among stakeholders
- Who is the boss? No clear authority for land use decisions behind levees in Oregon
- Combination disaster



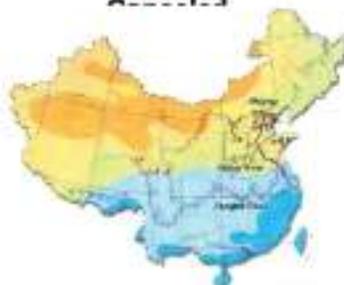
TRACK 4: RESILIENCE, ADAPTATION AND DISASTER MITIGATION

Session 6: Sustainable and resilient communities.

Moderators: Hidehiko Kanegae

CityRAP tool Process

1. "Mis-Romanticism of Intermediary cities and participation: The case of Moroni", KALMAKOFF Jacob;
2. Canceled;
3. "The exploration on the Ecological Ways of Traditional Chinese Settlement Construction", Yang Deng
4. Canceled



- Regions short of water resources
- Regions with limited water resources
- Transition regions with water resources
- Regions with considerably rich water resources
- Regions with rich water resources

The distribution map of China's water resources

WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
PHASE 1 Crash Course	PHASE 2 Data Collection and Organisation			PHASE 3 Data Analysis & Prioritisation	PHASE 4 Preparation, Review and Validation of the Resilience Framework of Action (RFA)		
4-day workshop for building the understanding of key concepts of risk and resilience and the tool methodology	Municipal Self Assessment	Participatory Planning at neighbourhood level	Data compilation and Organisation	Focus group discussions and Prioritisation of issues needing specific attention to build resilience	Drafting and Reviewing the RFA by the municipality involving various stakeholders		Finalising and Validating the RFA with city officials and different stakeholders

Summary:

- Participatory Resiliency Planning
- Traditional complete circulation system is effective



TRACK 4: RESILIENCE, ADAPTATION AND DISASTER MITIGATION

Stimulating Questions: View points for Resiliency & Disaster Risk Reduction

- How do we transform our cities resilient with Smart Communities?
- → Not yet connected between planning and Technological Singularity.
- How can we survive under huge impacts of natural disasters in this era of rapid mega-urbanization?
- → Participatory Resiliency Planning is needed including recovery decision consensus in advance in Multi-level.
- What can we do mitigation or adaptation under such a high natural disaster risk in 21st Century?
- → Experts and Professionals in planning already started Adaptation rather than Mitigation in climate change around the world.

It needs more scientific and technologies to integrate disclosure including 3D vertical landuse covering underground seismological and watershed flows/streams.

- SDG's, New Urban Agenda, Sendai Framework in municipal/community level assessment are not enough.

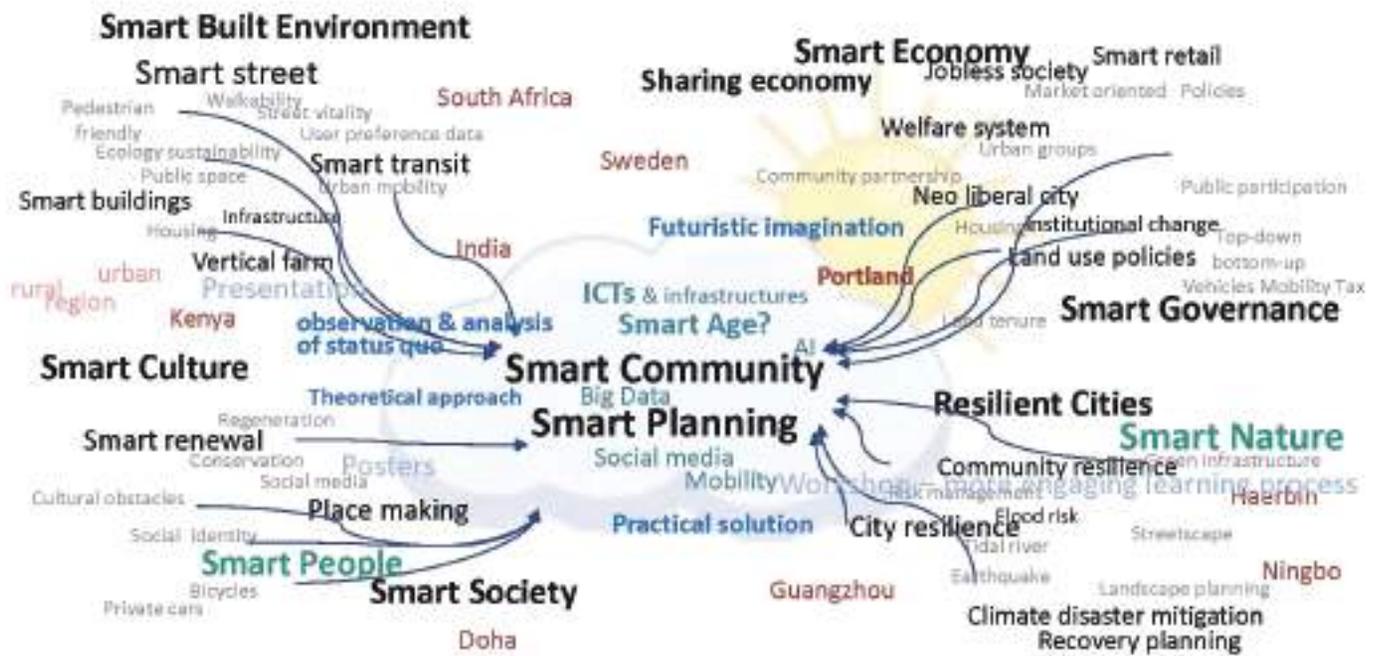


GENERAL CONCLUSION ■ THE QUESTIONS

In a networked informational era, what is/are/will be Smart Community(-ies) and how could PLANNING contribute to its/their building? **Can we identify some coherent focus/pivot/framework from the seemingly infinite scope of Smart Community and demanded actions, so as to solve the antinomy “if planning is everything, maybe it is nothing”?**



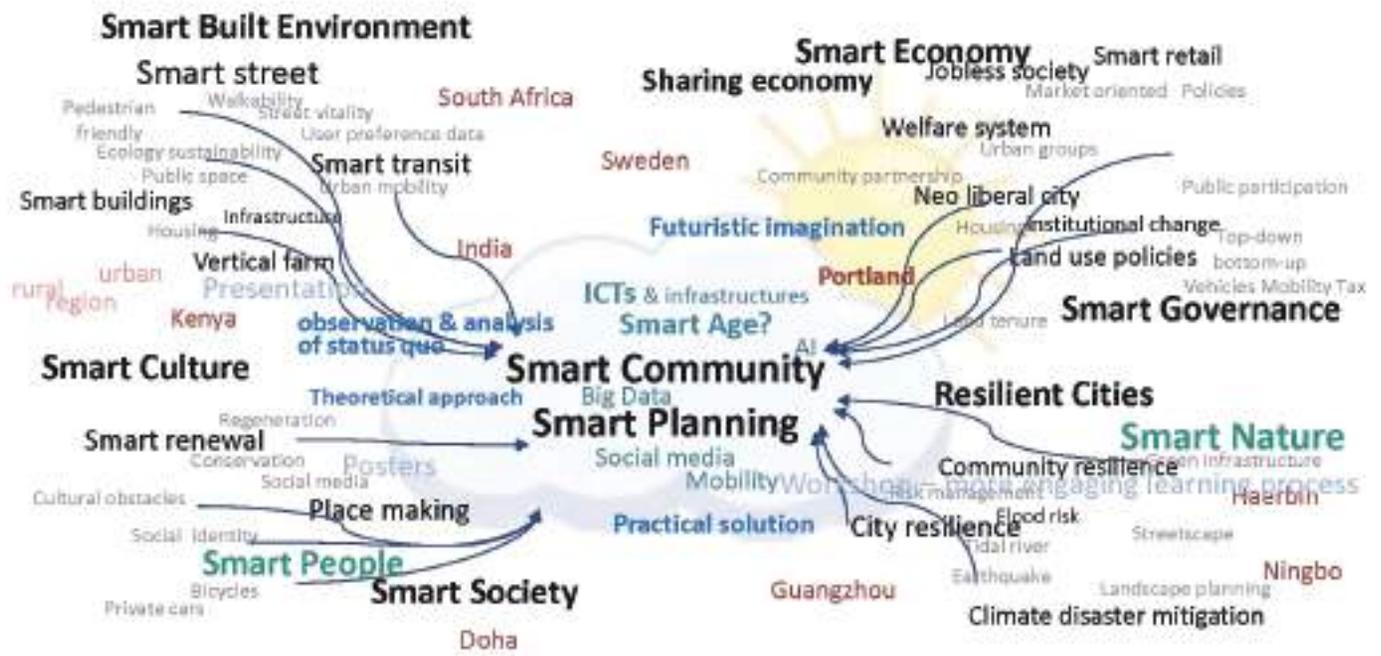
GENERAL CONCLUSION ■ The “CLOUD” of our congress



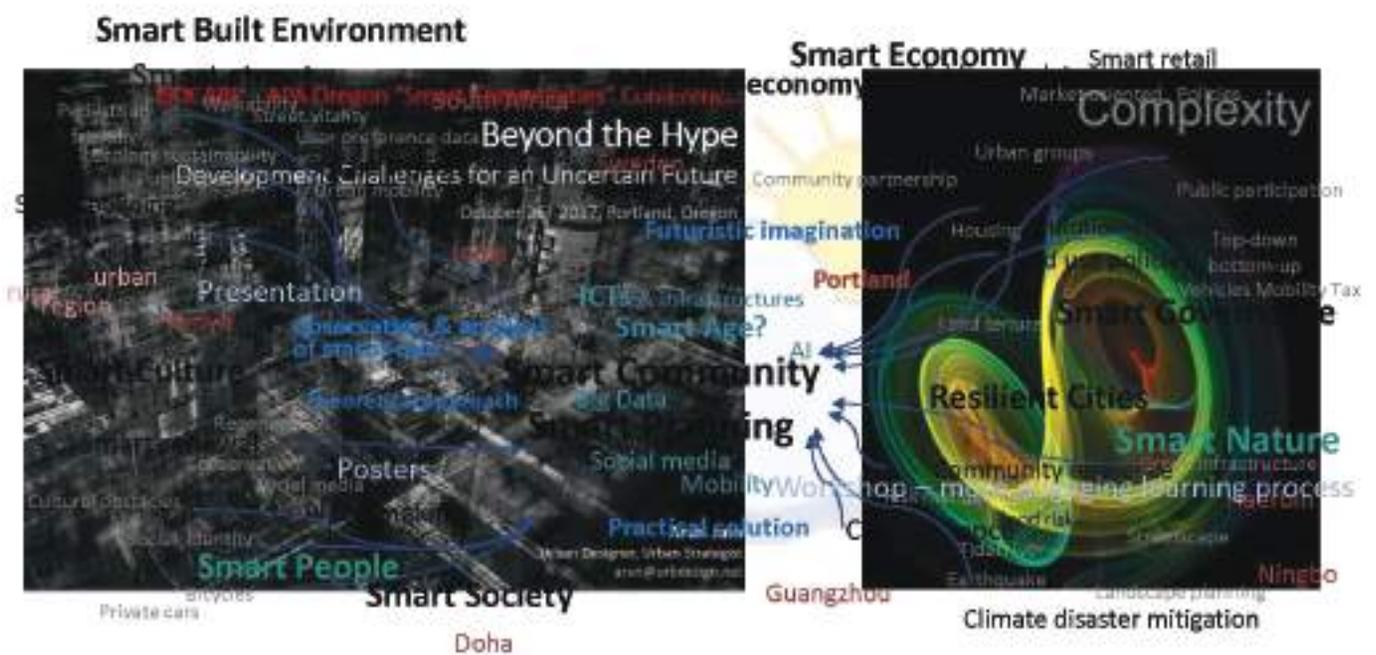
GENERAL CONCLUSION ■ The “CLOUD” of our congress



GENERAL CONCLUSION ■ The COMPLEXITY we have to accept?



GENERAL CONCLUSION ■ The "COMPLEXITY" we have to accept?



GENERAL CONCLUSION ■ The SOLUTION

Comprehensive

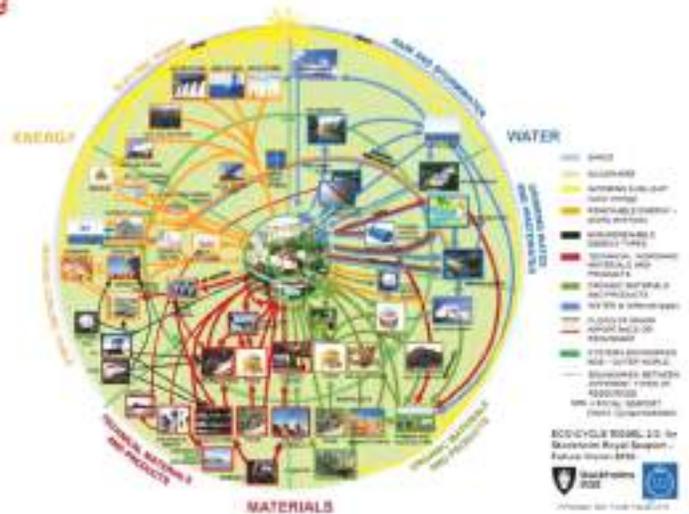
Holistic Synergy System Contextual Complexity
Everything Nothing
Something of everything

GENERAL CONCLUSION ■ The SOLUTION

Comprehensive

Holistic Synergy System Contextual Complexity
Everything Nothing
Something of everything

1. To a certain sense, **something is everything**, but *not* in the *determinism* sense. Things are relations & relational. So sth affects everything. But it's the whole relation that determines, though change starts from sth.



GENERAL CONCLUSION ■ The SOLUTION

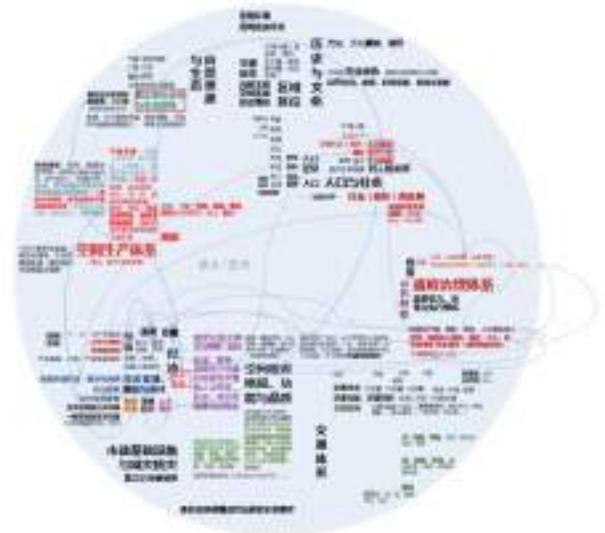
Comprehensive

Holistic Synergy System Contextual Complexity

Everything Nothing

Something of everything

2. Things are relations & relational. So
- (1) values, goals or whatever are all relational conformities. All conflicts are relational conflicts.
 - (2) To search solution is to search relational conformity, and hence holistic optimum (optimal holisticity).
 - (3) Proper action is to search partial intervention with optimal holisticity.



GENERAL CONCLUSION ■ The SOLUTION

Comprehensive

Holistic Synergy System Contextual Complexity

Everything Nothing

Something of everything

3. Why fail to find optimal intervention? Things are relations & relational, so
- Things (everything, from attributes to things themselves; such a discourse is following usual non-relational understanding) are changeable.....
 - But people trapped in “scientific”/objective/determinism way of thinking: objective parts, EXACT attributes, linear logic, holisticity=all parts....
 - Should be relational/holistic, changeable, relation hence holisticity (\neq parts together but *all* parts structured in certain way), DIVERSIFIED ATTRIBUTES of conformities, CONJECTURE, synchronical logic, holistic thinking (holistic conjectures, verifications till the most conformed conjecture)

GENERAL CONCLUSION ■ The SOLUTION

Comprehensive

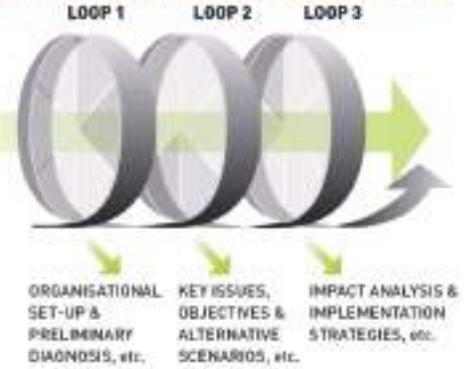
Holistic Synergy System Contextual Complexity
 Everything Nothing
Something of everything

Current awareness & rectification of the weakness of linear/deductive logic (Atomism)



1. Operational working procedure and its link to the conceptual model.

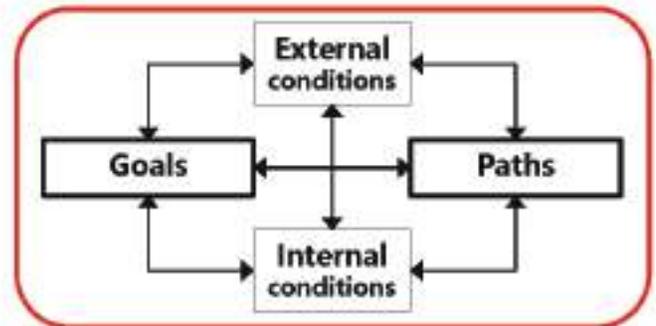
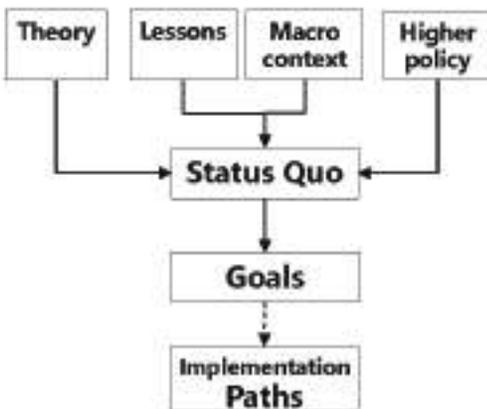
APPLICATION OF THE MODEL – PLANNING PROCESS/WORKING PROCEDURES



GENERAL CONCLUSION ■ The SOLUTION

Comprehensive

Holistic Synergy System Contextual Complexity
 Everything Nothing
Something of everything



The 53rd ISOCARP Congress was the world planning congress immediately following the HABITAT III, the vicennial global summit for urbanization and planning. This means, from a classical planning perspective which would put 20 years as the long term for strategic visioning, the congress was the first action congress to implement the New Urban Agenda and the International Guidelines on Urban and Territorial Planning. For both of the core documents of Habitat III, ISOCARP played a key role as the most representative community of global planners.

The Congress deliberately selected “Smart Communities” as the central theme, converging the two movements that have fundamentally transformed and will continue dominating urbanization and planning sphere, the global habitat movement (since Habitat I) and the development of information and communication technologies (ICTs). It was the ICT sector that delivered the smart city initiative. But the global habitat movement is essentially tackling smart urbanization and planning issues from a typically planning way. However, none of the divergent journeys had led to satisfactory solutions for smart sustainable planning and urbanization. The ICT tide had been bringing about new infrastructures, new products and economies, new ways of organization, new spaces, new life styles, new ways of knowledge production, and new individuals, new powers, new politics and new societies. Some may consider these as “smart”. But many have realized that all of these can be important supports for but none is automatically “smart”. For more people, “smart” vaguely refers to some kinds of “logic” of the world such as connected, networked and systematical. But for the most, after all, it is the value meanings of “smart” that hide deep in their mind, e.g. clever and proper. In this sense, the habitat movement would have even more relevance to smart city and planning. Such understanding of “smart” certainly has fundamental legitimacy. But it also opens the door to all apparently desirable values and tools, such as green, equal, inclusive, justice, healthy, efficient, forward-looking, comprehensive, and planning, design, policy, governance, finance, democracy, etc. Eventually, “smart something” is becoming the newest universal language and substantially empty concept in planning: it means everything and hence nothing. Is such a dilemma also applicable to planning in general?

Striving to be a congress of implementation following Habitat III after 40 years of global habitat movement, working in partnership with the Oregon Chapter of the American Planning Association (OAPA), the 53rd ISOCARP Congress aimed to confront the critical challenges or even crises for planning today. The Congress Team enthusiastically invited more than 600 global planners and

trans-disciplinary colleagues to contribute criticisms, debates and out-of-box constructive solutions for the urgent smart planning and smart urbanism agenda. The Congress realized the diversified meaning and aspects of “smart”, from the smart technology, smart infrastructure and smart space, to the smart economy, smart society and above all, smart people. But above all kinds of “smart”, the Congress, the annual party of global planners, sought to reaffirm the “smart” identity and scope of planning as the art to create synergetic spatial solutions according to a specific context. That is, beautiful spatial synergy is the core planning sense of “smart” which will articulate, support and create other kinds of “smart”. Therefore, it is true that planning may have to take into account essentially everything. But planners’ major expertise is our comprehensive synergetic capability of understanding planning contexts, creating planning schemes and managing planning implementations. Planning scheme is to design spaces with the best possible social, economic and environmental effects. And today, all of these have to be synergized with the elements of ICTs:

- Smart understanding of our planning context: We are in what kind of new planning context, socially, economically, environmentally and spatially because of the influences of new factors such as (not exclusively) ICTs? How are the factors like internet, big-data, AI and e-government etc. reshaping our society and economy?
- Smart planning methods: How to improve our planning methods with the new possibilities of technologies and tools including ICTs, to conduct more scientific and human-oriented data-collection, analysis, scheme creation and verification, and public participation? Is the big-data as powerful as assumed by some?
- Smart planning schemes and smart urban future: In an era with ICTs and other new developments, what are the innovative synergetic spatial schemes which can help make buildings, infrastructures, spaces, economies, societies, people and nature smarter? How to create harmonious synergies between/among the big and small, historical, modern and postmodern, development, culture and nature, work, life and health, technology and human, people of different ages, genders, abilities and beliefs, and region, city, towns and villages? With ICTs, what kind of new spaces are our cities, regions and communities evolving towards, and what new utopias can we imagine? And certainly, with the support of ICTs and modern transportations, scale has been condensed and so should be the distance among people. These help make our new urban world a world of Smart

Communities.

- Smart planning implementations: In today's society, a market and governance system which has been greatly changed due to many reasons including internet, what are the new ways for plan-promotion and implementation?

It is in an ICT era to reaffirm the duty and technologies of planning as the trans-disciplinary, sector and people coordinative spatial solution creator. The congress explored the above questions from six "horizontal" sectoral tracks:

1. Technology, infrastructure and buildings.
2. Governance and inclusive communities
3. Culture, community experience and the sharing economy
4. Resilience, adaptation and disaster mitigation
5. Technology and small communities
6. Post-smart communities and the new frontiers.

The Congress had a wonderful international Congress Team including the General Rapporteur and 6 other ISOCARP members, each as a co-rapporteur for one of 6 tracks, and 12 OAPA colleagues making the strong local team. A history record 370 abstracts of papers and workshop session proposals for the six tracks were received. About 150 were selected and scheduled in fifty concurrent sessions and one poster session in addition to the four plenary sessions. In the fifty concurrent sessions, there were twenty-three paper presentation sessions (SPs), which presented more than 100 theoretical or case study research papers, and twenty-one workshop sessions (SWs), which involved 59 presentations and enthusiastic organizer/speakers-audience interaction, and 6 special sessions including ISOCARP-HABITAT, ISOCARP-UNESCO and UPAT special events.

Here we firstly go through the conclusions of the six tracks, and the general conclusion will be followed in the end.

Track 1: Technology, Infrastructure and Buildings

Mairura Omwenga, Kenya, ISOCARP
Kirsten Tilleman, USA, OAPA
Aaron Ray, USA, OAPA

Track 1 was facilitated by a three member team with Mairura Omwenga as the leader. Track 1 was focused on ICT, buildings and infrastructure in the planning and development of smart cities and communities. The key questions were:

- What are these mixes of human activities in our cities and communities?
- How smart and green are city buildings and public spaces? Which are the smart methods of building design and construction?
- Which are the smart city infrastructure and transport solutions? Are cities prepared for the autonomous vehicle?
- Which are the smart and green energy solutions for our communities?
- What technology is available for planning, design and management of smart cities?

The presentation of track 1 was split into 8 sessions - 4 paper/case study sessions and 4 session proposals sessions:

- Information, Communication Technology and Data System
- Session Proposal: Beyond the Black Box - Communicating Data and Evidence to the Public
- Sustainable Buildings and Urban Space
- Session Proposal: Unpaved Road to Housing Affordability: What Role does Technology Play?
- Session Proposal: Autonomous Vehicles; What the Revolution Means to You
- Smart Infrastructure and Transport
- Session Proposal: Washington County Transportation Future Study
- Green Smart Buildings and Development.

Track 1 had very interesting presentations from participants drawn from many parts of the world, including Africa, North America,

Europe and Asia. After three days of captivating presentations and discussions, it was clear that buildings, infrastructure and technology play a key role in the planning and development of smart towns and communities. Key issues and conclusions from the track 1 were:

- The autonomous vehicles are now a reality. The effects and implications of the autonomous vehicle on people, communities and cities are however immense but not well known. Town planners must be ready to lead and answer many of the lingering questions.
- A lot of data and information is collected and analysed in planning and development of cities. New and innovative technology is however required to disseminate this information to policy makers and the public in order to make informed decisions.
- The future demands that high rise buildings be, not just green, but vertical farms. This calls for an innovative trinity of high rise buildings, plant factory technology, and smart green infrastructure.
- It was noted that the bottleneck to building smart is not the availability of smart and eco-innovative technologies but rather the disincentive linearity of the value chains in urban development.
- Coordinated transportation and land use planning provides greater opportunity in regional transit investment.
- In order to sustain a healthy economy and better quality of life, it is important for county and regional governments to adopt long term 50-year transport and land use plans rather than the shorter 10-20 year plans.

Track 2: Governance and Inclusive Communities

Philippe Vaillant, France, ISOCARP
 Damian Szymyk, USA, OAPA
 David Krogh, USA, OAPA

Inclusiveness means not leaving anyone on the roadside. And this, in all the dimensions of the ordinary, personal and community life of everyone (E. Mounier). The world has never been so rich. At the same time, it has never been so unequal and destructive of societies, the environment, biodiversity and millennial institutions. The world is now limited in resources. So, to face with resource constraints, a cross-cutting approach is necessary. Faced with riches, an inclusive world is possible! It is possible to change look, mentality, individual and collective posture ... and transform the world towards inclusiveness!

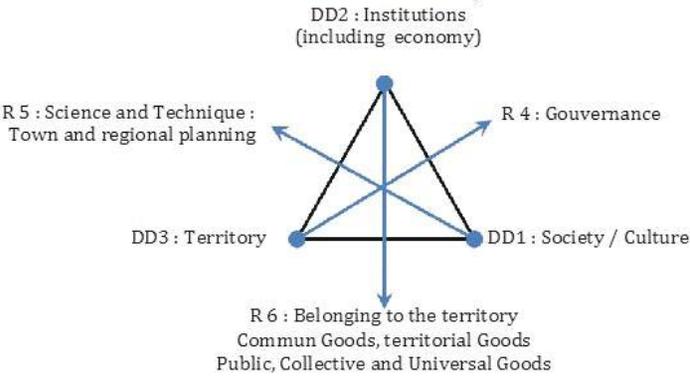


An increasingly unequal world, a growing poverty, a growing digital divide ... are compelling to invent a new organic, inclusive, intersubjective transcultural way of thinking and to invent a new Framework for Planning.

It takes few words to say this is essential, but it takes all the words to make it real, and put into play, putting into motion all the dimensions at the same time. The urban planner has a privileged contribution to give to the world. To achieve inclusiveness, today, we must combine sustainable development with a view to the resilience of societies and cultures on their territory, through their institutions. It is proposed to observe inclusivity in the following interactions:

Fig. 1: Schematic conjugation of sustainable development to the resilience of societies and cultures on their territory through their institutions, to inclusiveness (Source: P.Vaillant ISOCARP Brisbane, Delft 2015, NGO-P.Vaillant Yamoussoukro Forum UNESCO-2014)

Fig. 1 : Schéma de conjugaison du développement durable vers la résilience des sociétés et des cultures sur leur territoire à travers leurs institutions, en vue de l'inclusivité (Source : P.Vaillant ISOCARP, Brisbane, 2013 & Delft 2015, P.vaillant ONG-UNESCO Forum Yamoussoukro 2014)



This scheme applies to the different territorial scales, including cities (about 100 km², radius of 6 km), agglomerations (2000 km², radius of 25 km) and regions (about 32 000 km², 100 km radius) create convivial and inclusive regions (W. (B.) Twitchett, thesis 1995 and ISOCARP, 2003. See also ISOCARP 2004, 2005, 2008, <http://www.twitchett.org/isocarp-congresses>). Is not now the regional level that articulates urban, rural and natural planning, from the potential, but mostly territorial limits (UN-PPPV-49 & 136). Show the three axes, or vectors, from the sustainable development:

- Governance, based on territory, is specific to each society and its institutions. The territory is the basic brick of governance. (P.Calame 1997, 2013, Foundation for Human Progress -FPH-) In the old wisdom of indigenous peoples, "The Land is the source of the Law" (CF Black, 2011). Is this not the meaning, for example, new approaches like economy relocalization, the increasing importance of the Social Solidarity Economy, residential economy, the functional economy, short circuits, producer-to-consumer schemes, local currencies and local citizen participation?
- Science and technology, including planning, are society-based, are carried by institutions on a territory. Society and its culture are the source of science and technology. (B.Latour, 2013, I.Stengers, 2010),
- Common, territorial, public, collective or universal Goods, well maintained, fertilize the territory and the society. Water, sustainable development, climate ... Public and private institutions (whose economy is only one dimension) are - or should be - the place of community expression of Common Goods. (E.Osborn, 2010, J.Rifkin, 2011, 2014). The social climate is also part of the common good, as well as connection to the territory, sense of belonging.

This transversal way of seeing, thinking, acting is organic, processual, transcultural (AN Whitehead, PR-1978, A. Berque, 2013,

DR Griffin, 2007, J. Grange, 1997 & 1999, P.Vaillant, 2008). It is friendly and fraternal by combining unity and diversity. These inclusive processes allow for "co-growth of things together", "con-crescence". Each concrescence shape the experience of everyday drops (Whitehead 1978-PR 334-328) path to inclusiveness.

All drops of experience from around the world come together in this intelligent way (Smart Way Toward inclusiveness) to become transformation vectors of our societies towards inclusiveness. The declination of the scheme on the theme of inclusiveness, crossed with the proposed contributions, leads to the following themes:



An organic methodological method was proposed for setting links presenting drops of experiences, encourage comparisons, and feed the dialogue and exchange of experience, in a dialogical relationship (P. Freire, 1993 J.Marin, Unesco 2014): Learn from the other, different, and enrich ourselves with our differences. On the other hand, the exchanges on the selected cases, and the debates were fed by the link with the exhibitors, the posters, and the numerous papers.

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Track 3: Culture, Community Experience and the Sharing Economy

Olusola Olufemi, Canada, ISOCARP

Kaitlin Berger

Aaron Ray, USA, OAPA

The challenges facing humanity and human settlements have never been greater as the Planet Earth's projected population is estimated to reach 9 billion by the year 2045. Providing for food, water, energy and safety needs requires collaboration among agencies/institutions, effective engagement of people, and integration of new ideas, knowledge, communication and technology. More importantly, it requires smart planning, that is, new ways of conceiving, planning, and designing communities; new skills in analysing, diagnosing, assessing information and data; and smart ways to manage people and infrastructures.

Planning for smart, complete and intelligent communities require safeguarding old and new memories, changing lifestyles and consumption patterns, adopting technologically relevant communication patterns, resource efficient. However, "no less challenging is the dynamic and prevailing development of ICT which provides planners with remarkable opportunities for solving different urban problems and making cities better places for people, while at the same time grapple with challenges not previously experienced" (Bajic-Brkovic, 2013:6).

Rau (2012:15) asserts "in many countries planners are increasingly exposed to and challenged by a hyper-dynamic context that tends to characterize socio-economic as well as environmental change in a highly interrelated, increasingly urban world". This "requires a 'fast forward' respond to guide urbanizing territories towards eco-efficient, low carbon, socially inclusive solutions and lifestyles, maybe even transcending the 'growth' mode for a 'quality' mode of general development. Thus, approaches to planning in hyper-dynamic contexts must integrate social inclusion, community planning, cultural integrity, and ecological safety and efficiency from the onset" (Rau, 2012:21).

Many communities are transforming to be smart and intelligent by embracing digital technology, and being competitive, seemingly the rebranding and digital transformation forms the bedrock of planning and design of future cities. The Smart Communities movement is the phenomenon of villages, towns and cities getting almost ubiquitously connected to the Internet, and using the connection to involve citizens in networked activities--ranging from electronically accessed government services, telehealth and distance education to e-commerce (Moser, 2001).

The phrase Smart Cities is not new. It may have its origins in the Smart Growth (Bollier, 1998) movement of the late 1990s, which advocated new policies for urban planning. Portland, Oregon, is widely recognized as an example of Smart Growth (Caldwell, 2002). It has since evolved to mean almost any form of technology-based innovation in the planning, development, and operation of cities, for example, the deployment of services for plug-in electric vehicles (Portland, 2011). It is expected that Smart communities would exhibit the following characteristics: safe, clean, accessible, affordable, diverse, compact, eco-efficient, memorable, preserves cultural heritage and involve sharing goods and services.

In the same vein, the sharing economy, access economy or collaborative economy continues to give new meaning to citizens' values, collaborative consumption and community identity. The Sharing Economy includes the shared creation, production, distribution, trade and consumption of goods and services by different people and organizations (Matofska, 2016). The sharing economy may take a variety of forms, including using information technology to provide individuals with information that enables the optimization of resources (Hamari et al, 2016). Sharing economy activities fall into four broad categories: recirculation of goods, increased utilization of durable assets, exchange of services, and sharing of productive assets and the desire to increase social connections is also a common motivation (Schor, 2014).

Track three presentations include 14 papers from nine countries namely Germany, India, China, Italy, USA, Poland, Indonesia, Japan and Turkey. Broad themes range from shared bicycles on university campus, integrated development approach to creating a smart, creative and vibrant community village with green and healthy lifestyle; deductive meta-synthesis approach on urban smartness; analysing human behaviour for urban design applications using big data-GPS, Wi-Fi signals. The use of smart phones enables citizens to reinvent cities in accordance with their shared values. The European Union funded project Smart Together in Munich shows the relevance of urban laboratories and co-creation for cultural and social innovation processes. The EU funded project Smart Together in Munich asserts the relevance of urban laboratories and co-creation for cultural and social innovation processes; the co-existence of high technology and intimacy or lack thereof in historical residential neighbourhoods in smart communities. Other themes included the rethinking planning measures on conservation and regeneration in a historic village; individual's choices on urban mobility which seeks to understand how learning platforms affect behaviour using an interactive web-based platform and the

integration of companion animals in urban residential areas.

Track three also had four Session Proposals based on USA experiences. The content of the sessions included; Creative land use strategies that will help integrate employment density and connectivity rooted in the principles of preserving industrial land; Smart Place Making and Learning about an incredible technologically integrated, advanced mixed use development establishing neighbourhood facilities supporting a variety of generations, and lifestyles; Story of Place, a methodology for engaging community stakeholders in an inquiry into the unique potential of their place; and What we can learn from Portland's urban economy.

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Stimulating Questions:

- What constitutes a smart community/city? How culturally sensitive are smart communities? How smart is the planning education?
- What critical indicators are important towards designing and building smart communities?
- In what ways can planners find the appropriate balance between smart technologies, institutional and governance challenges in order to deliver smart, inclusive solutions and to improve citizen's quality of life?
- What is a sharing economy? How can shared intelligence and shared identity be

nurtured within a sharing economy to foster smart and regenerative planning?

- What kind of planning methodologies and tools exist or could be developed (innovative) to produce smart city placemaking in the sharing economy?

Altogether, the 8 sessions were:

- Smart Mobility, Digital Transformation and Energy efficiency
- Smart Culture, Regenerative Planning and Sustainable Economy
- Smart Communities, Smart Technologies and New Planning Tools
- Shared Economies, Social Integration and Engagement
- Session Proposal: Making Good Great: Transforming 20th Century Industrial District into a Next Generation Employment Center
- Session Proposal: Smart City Placemaking in Kashiwa-no-ha, Japan
- Session Proposal: Story of Place: A Regenerative Planning
- Session Proposal: What can we learn from Portland's Urban economy?

What we Learned

The concept 'Smart' is fuzzy, and more or less it is a marketing term. Therefore, when it comes to Smart Communities, no one definition fits all because communities are complex, and each community has its own identity and uniqueness. Communities are smart with or without ICT. Planners should note that the quality of life is paramount in achieving Smart Communities and Smartness and Sustainability goes together.

Track three participants also emphasised that Digital Transformation changes all, changes everything, changes everyday life. It takes a Holistic approach to deal with digital transformation and the sharing economy within smart communities. On the other hand sharing economies has its pros and cons; sharing economy came so fast and planners keep learning as they embrace it.

Defining Smart Communities in Planning

Smart Community is not smart unless it has meaning and purpose; leverages the hidden potential of human capital. Smart communities are people-based or citizen-centred. Real smart communities are based on the premise of local culture and

place making. The characteristics of smart communities include: liveability, resiliency, connectivity, scalability, wise-wisdom, fun, respect, transparency, efficiency, equitable, policy driven not technology driven, interdisciplinary, authenticity, community empowerment, identity and memory.

Takeaway for Practice

- Smart Cities are connected, engaged and intelligent Communities with shared values and identities.
- Sharing economies bring about significant socio-cultural and economic shift
- Sharing economies brings about a paradigm shift- is it utopian or dystopian in nature?
- Demands of the Sharing economy for land use planning and urban design
- Smart communities must become learning systems, living systems (actualization of place).
- Smart Communities have to be inclusive of both people and their companion animals.
- Protection of natural resources; Heritage conservation; integration of culture and ecology
- Understanding and analyzing Behavioural patterns in public spaces require smart use of appropriate technology.
- Behavioural patterns also differ from the utilization of different spaces.
- Smart planning education focuses on Learning by Doing; Incorporation of Experiential Learning in planning curriculum; Students are leaders of learning.
- The future of cities is increasingly becoming digital. Planners must have the skills to synthesize large and disparate data sets in a timely manner for sustainable planning purposes.
- Utilizing Urban Informatics and Technology to make services more efficient in Smart Communities. Appropriate technology matters, utilizing smart devices.
- Digital capabilities and New Knowledge, tools and techniques-measuring and managing cities using algorithms. Avoid digital divide in the planning and designing of smart communities.

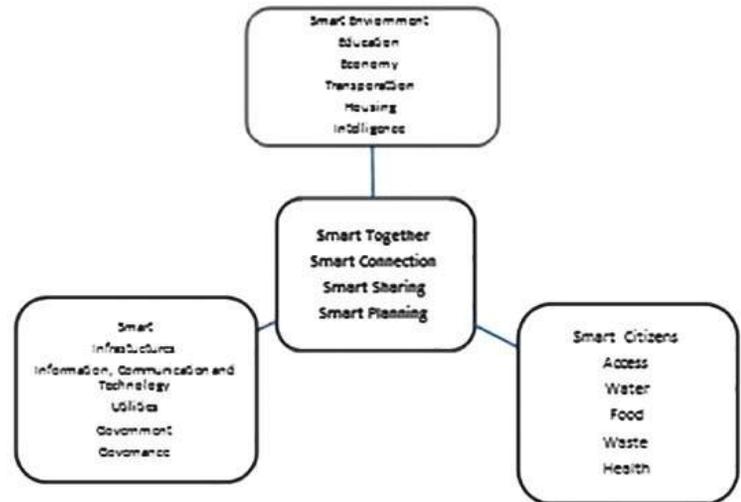
- Utilizing Urban Informatics and Technology to make services more efficient in Smart Communities. Appropriate technology matters, utilizing smart devices.
- Optimizing efficiency in planning for shared economies and smart communities.
- Geo-spatial Utilization and management of Real-time and large datasets in regeneration and land use planning
- Municipal planners must embrace the Digital Transformation and be able to analyse how city evolves and interact using ICT, Big Data to improve quality of life of citizens.
- Protection of Digital Transformation infrastructures and utilities in Smart communities.

Challenges for the Future

- Oversharing
- Planning and Big Data [Volume, Variety, Velocity, Veracity and Value]
- Planning for digital innovation, transformation and digital disruption
- Smart planning vis-à-vis increasing urbanization, uncontrolled growth, demographic challenges (scooters, strollers) food insecurity, homelessness, increasing energy consumption and unemployment ('wicked problems').
- Sharing economies solution or disruption to smart planning? Anticipating and coping with Disruption.
- Anticipatory planning- dealing with negative externalities that arise from overproduction in the sharing economy (avoid creating new problems like bicycle cemetery, lack of space to park bicycles etc).
- Human capital versus Technology -Digital Economy-Planning for Digital Cities
- Digital transformation versus Digital governance
- Green infrastructure, low carbon footprints; Avoiding overdose of energy consumption-green energy proliferation
- How the 'Smart' ideal is changing or will change the Planning pedagogy and Planning practice and Profession

More to learn.....Lifelong Learning.... Smart

Together.....Smart Connection.....Smart Planning (Figure 1)



What's Needed

To achieve shared prosperity and to integrate all the facets of SDGs (#11) in smart communities Planners have to:

- Fasten your belts in Creativity, Imagination and Re-Tooling and embrace smart and intelligent thinking
- Emphasise collaboration and partnerships; collaborative governance and embracing nested spheres of engagement
- Embrace nested spheres of engagement
- Plan with Citizens-Wisdom of crowd and social connections (Discretionary Planning)
- Plan with Scalable Digital Infrastructure
- Emphasise Innovation and Entrepreneurship for the next generation of planners
- Adopt Low-cost adaptive reuse; regenerative planning and design; retrofitting spaces
- Zone with care
- Note that Value and Viability is important in the planning and design of smart communities
- Develop planning processes that are adaptable to the Living System (actualization of place)
- Develop new apps, web map, GIS, web tools like map craft that are interactive and can be utilized collaboratively in academics and practice.

- Embrace smart grid and smart energy in our communities
- Be SMART TOGETHER.

Specific conclusions drawn from the session workshops include:

- North Milwaukie utilized identification of tools to assess the area's potential by incorporating green infrastructure. The project used natural resources as branding elements to attract employment with economic development and land use strategies that foster innovation to gain understanding of the importance of an economic development strategy to implement eco-industrial district in a highly developed area.
- Kashiwa-no-ha, Japan, 18 miles north of Tokyo adopted the smart city placemaking techniques as the urban planning approach for a resilient neighbourhood with an active and vital community. The city is a LEEDS platinum-certified smart city in the world in 2016. Kashiwa-no-ha is an incredible example of Smart city placemaking from policy to urban design. It is a technologically integrated, advanced mixed-use development with environmentally and technologically innovative elements.
- The Story of Place reveals the potential, unique to the place for regeneration of the relationship between a community and the ecological systems that nourish its culture, economy and identity in the world. It creates a strong sense of shared identity that fosters creative and cooperative planning; grows shared intelligence about what makes a community distinctive and valuable; develops stakeholder motivation and commitment; while providing a unifying framework for integrating planning thinking.
- The Portland economy showcases the importance of a flourishing economy and what we learn from Portland and what Portland learn from foreigners walking through the city.

Specific conclusions drawn from the session presentations include:

- A methodology on learning mechanisms towards becoming a 'smart citizen and society is presented using the cognitive model developed by Michael Bedek. The cognitive modeling is structured on seven domains: self-efficacy, perceived behavioral, attitudes, utility evaluation, subjective norms, and motivational, socio-structural and demographic factors through a survey and operationalized through an index, which targets to understand and relate the individuals' energy consumption and

behavioral change.

- Together with Lyon and Vienna the City of Munich started in 2016 a project funded by the European Commission in the program Horizon 2020: "SMARTER TOGETHER - Smart and Inclusive Solutions for a Better Life in Urban Districts". The project's overarching vision is to find the right balance between smart technologies, organizational and governance dimensions in order to deliver smart and inclusive solutions and to improve citizen's quality of life. Success factors seem to be an integrated approach, co-creation and experiments in living urban laboratories. The crucial question is, whether and how cities can keep (or get back) political management of the use of data and algorithms in the public domain. Or is the final result of digitalization a kind of completely data- and market-driven, post-democratic "digital governance"?
- The coexistence of high tech and traditional merit help make life better for residents and make the cities more resilient. Smart communities not only bring more convenient life to people but also belonging and identity.
- Rethinks the planning measures on conservation and regeneration in the pilot village of Banghu Xu, Guangzhou, China where most of the existing buildings were built two hundred years ago. Most of the historic buildings here have remained vacant in recent years for a variety of complex reasons, and villagers chose to build new houses in adjacent areas. Finally we made conservation and regeneration plan to activate this area and create revenue, and outlined an operation mechanism, which combined top-down governmental leadership with bottom-up local activism in the community. We also attracted investment from developers through the plan to promote implementation. In this mechanism, all the stakeholders are mobilized to balance the interests and share the revenue, which contains the villagers, overseas Chinese who own property in this settlement, the village committee, government, developers, planners and social groups.
- The experiential planning studio in Istanbul Technical University, Turkey reveals how planning education can be a cornerstone of responsive, participatory and inclusive urban settlements. What are the pedagogical tools and methodologies for going smart? Results showcase the ways of developing detailed insights.
- A deductive meta-synthesis approach on the concept of urban smartness. A new context-free and community oriented definition of Smart City is proposed. "A Smart City is an urban community which strategically improves quality of life and

well-being of its citizens; adopts sustainable urban planning and infrastructure design practices for urban services such as water supply and transportation management; promotes practices aiming at environmental protection and management and focussing on equitable social and economic growth of its people by leveraging the hidden potential of its human capital". The study concludes that a progressive smart city must seriously start with human capital rather than blindly believing that ICT can transform cities with shift of power from MNCs to local people, grounded in the context of a city.

- The now evolving studies of human behaviour and body movement, including research in kinesics and proxemics, video analyses and more contemporary methods of tracing human behaviour, thanks to big data sets, e.g., GPS and Wi-Fi signals, should be drawn together to contribute to the larger picture of human behaviour analysis for urban design applications. The proposed classification scheme is based on an evaluation matrix that compares various methods of analyses of pedestrian behaviour in outdoor spaces from the standpoint of its usefulness for the requirements of urban design. The proposed list of criteria refers first to the current objectives of analyses as well as to the basic characteristics of data: (1) purpose of collecting the data, (2) method of gathering the data, (3) quantity and quality of gathered data, percentage of the gathered crowd, author of the review or case study, and other properties defining the data.
- The platform aims to calculate individual energy consumption while providing interaction between the users through a forum, sharing data and social network connections such as facebook and twitter tools all of which are targeted to provide feedbacks to the individual about energy consumption patterns. Within the framework of this paper, citizen's real-life experiments on urban mobility are examined in urban neighborhoods of Kadikoy, a central district of 500.000 inhabitants within the Istanbul Metropolitan Area in Turkey.
- By introducing the spatial dimension, it is expected to improve the model accuracy and reliability and to deliver a more accurate estimation at the single property level in the Italian real estate housing market.
- Findings show that teachers and students share a higher degree of cycling and use frequently in a Huazhong University of Science and Technology, China. It shortens the daily traffic time thereby improving travel efficiency. Transportation layout of main facilities (the library, the teaching buildings, the dormitories and the school gates, etc.) and the road condition are the affecting factors that cause sharing bike system to flow along the fixed one-way

roads in the university community. Such situation, to a certain extent, stimulates the reconstruction and improvement of the slow transport facilities (bike lane); promotes the adjustment of campus traffic layout (traffic transfer and bicycle repair shop), refinement of management, reduction of motor vehicles and popularization of green low carbon concept, all of which facilitates a more harmonious university community.

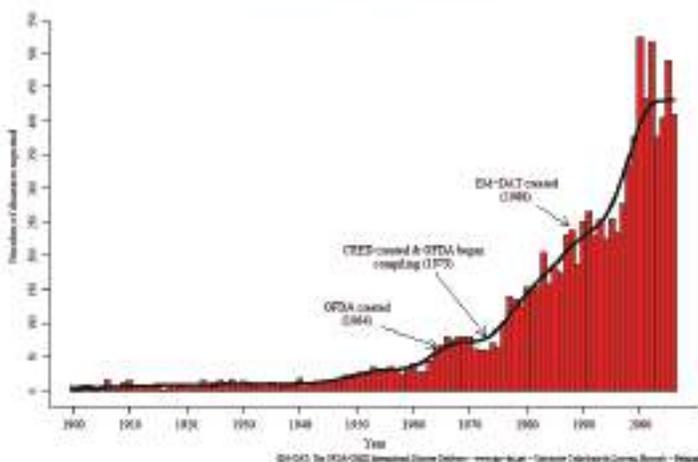
- The "sharing economy" designates usually an economic model based on the temporary transfer of the right to use assets between strangers, for the primary purpose of obtaining certain remuneration. The five key elements of the sharing economy are: underused assets, right to use, connections, information, and mobility. The main outcome of our study is that, not only create disorder in the public space, these "fake sharing economies" fail in bringing a new model beneficial to the Chinese cities, as they are being deviated from their initial meaning. Finally, as for an attempt of generalization of a constructive model, we propose to explore the potential of "community based" developments model in China, that can break the difficulty of trust and be the cradle of China's true shared economy.
- Bicycle sharing has created bicycle cemeteries due to excessive production and planning cannot catch up with the change on urban spaces.
- The case of Jimbaran Hijau (Silicon Bali) is destined to become a village of tomorrow where the new smart generation of globalized world can be gathered and an excellent destination for living, work and play.
- Competing spaces for children and dogs especially in parks. Children have to share parks with companion animals. Provision of dog parks and dog spaces to eradicate competition of spaces with children.

Track 4: Resilience, Adaptation and Disaster Mitigation

Hidehiko KANEGAE, Japan, ISOCARP
Amanda Ferguson, USA, OAPA

The international disasters database (EM-DAT: Centre for Research on the Epidemiology of Disasters (CRED), University catholique de Louvain, Brussels, Belgium) reported number of (natural) disasters reported less than 50 events in 20th century but increasing exponentially toward the end of 20th century, now reported natural disasters over 10 times from 20th century in 21st century in its “World trend of natural disasters 1900 – 2010”. The United Nations Office for Disaster Risk Reduction (UNISDR) also stated that “Global economic losses from disasters up to \$300 billion every year, warns UN report, calling for higher investment in risk reduction strategies” in Global Assessment Report on Disaster Risk Reduction 2015. The UN Secretary-General warned: “World threatened by dangerous and unacceptable levels of risk from disasters”. 2014 Revision of World Urbanization Prospects reported “Globally, more people live in urban areas than in rural areas, with 54 per cent of the world’s population residing in urban areas in 2014. In 1950, 30 per cent of the world’s population was urban, and by 2050, 66 per cent of the world’s population is projected to be urban”.

Natural disasters reported 1900-2006



In the 21st century, our habitation cities are facing the highest risk and threat ever. How can we survive under such huge amounts of impacts of natural disaster in a rapid mega-urbanization era? By way of mitigation, adaptation, making cities resilient? USISDR initiated firstly the Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters (HFA) and continuously setup The Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework) is the first major agreement of the post-2015 development agenda, with seven targets and four priorities for action as “UNISDR’s Strategic Framework

2016-2021”.

Track 4 covers multi-aspects and scopes of threat, weakness, vulnerability, hazards, risks of natural and complex enforcements into urbanized area i.e. volcanic impacts, lava & pyroclastic flow, earthquake, fire & tsunami, hurricane/typhoon/tropical storm/heavy rain/flash/ flood & landslides, Hydrological hazard & storm-surge/tidal-wave, winter storm/blizzard, climatological/meteorological disasters) except typical man-made disaster like terrorism, civil-war, war or uncertainty.

Stimulating Questions:

Around 70% of the world population will live in cities in 2050 faces high vulnerabilities in their habitation cities!

- How do we transform our cities in a resilient way with Smart Communities?
- How can we survive under huge impacts of natural disasters in this era of rapid mega-urbanization?
- What should we do, mitigation or adaptation under such a high natural disaster risk in the 21st century?
- Let us share good and worse practices for disaster risk reduction!

To build the resilient nations and communities for Disasters shifting from Hyogo Framework, we have to follow the Sendai Framework (2015-2030):

- 1) Understanding disaster risk
- 2) Strengthening disaster risk governance to manage disaster risk
- 3) Investing in disaster reduction for resilience and
- 4) Enhancing disaster preparedness for effective response, and to “Build Back Better” in recovery, rehabilitation and reconstruction.

Track 4 primarily tries to cover multiple aspects and scopes of hazards, vulnerability, and risks of natural disasters with smart communities.

- Strategic planning for climate change
- Hydrological vulnerabilities
- Natural disaster mitigation – Resilience theory, problems and practices

- Session Proposal: Central City scenic resources protection plan
- Sustainable and resilient communities
- Session Proposal: Strengthening the Disaster Resilience of the Academic Biomedical Research Community: Protecting the Nation's Investment.

What We Learned & Takeaway for Practice

- Carrying capacity indicator is needed for monitoring CC
- Urban Nature-based solutions can be used in urban planning and design to improve the level of resiliency of cities using the Adaptation Support Tool
- Planning changing of landuse, SDG's & New Urban Agenda, governance & socio-economic climate proof
- Geopotential & planning
- Green infrastructure
- Three-level flood control and storm drainage strategy
- Urban waterfronts solutions by long term strategies in symbiosis with nature
- Resilience covers recovery process
- Multidisciplinary approach and cross-sectional collaboration that allow a successful reconstruction process
- Lack of ripeness & divergent views among stakeholders
- Who is the boss? No clear authority for land use decisions behind levees in Oregon
- Combination disaster
- Participatory Resiliency Planning
- Traditional complete circulation system is effective.

impacts of natural disasters in this era of rapid mega-urbanization?

- Participatory Resiliency Planning is needed including recovery decision consensus in advance on Multi-level.
- What can we do mitigation or adaptation under such a high natural disaster risk in the 21st century?
- Experts and professionals in planning already started Adaptation rather than Mitigation in climate change around the world, but it needs more scientific and technologies to integrate disclosure including 3D vertical landuse covering underground seismological and watershed flows/streams. SDGs, the New Urban Agenda, the Sendai Framework in municipal/community level assessment are not enough.

In response to the stimulating questions: some final view points for Resiliency & Disaster Risk Reduction include:

- How do we transform our cities in a resilient way with Smart Communities?
- Not yet connected between planning and Technological Singularity.
- How can we survive under the huge

Track 5: Technology and Small Communities

Xiaohui Chen, China, ISOCARP
Hongyang Wang, China, ISOCARP

Throughout history emerging technologies have driven major shifts in the way cities and their societies have been planned and functioned. Today, with the development of artificial intelligence, the internet, autonomous vehicles, virtual reality, and quantum computing, we find ourselves again on the brink of a new urban transition.

It is argued that the onset of high technology will dramatically transform our countryside landscape. The technology of highways and internet of things are uniting the scattered small rural communities into a vast connected network, linking tightly to their adjacent urban areas. The vertical hierarchical agriculture marketing system is broken, shifted into a flat one of C2C, and the distant-oriented culture recognition of village being changed into character-oriented. So village communities of special recourses such as distinct features or agriculture productions will gain more opportunities than the past, when only those near big cities or important ports developing more. However, the hot spot of rural areas driven by high-tech getting more capital from cities are becoming landscape homogeneity and getting social dismembered. How to benefit the rural community members and preserve their culture heritage are urgent issues for urban planners.

It is therefore worthwhile taking a moment to ponder on this immediate transition, considering exactly what kinds of shifts small communities are experiencing and how, unlike previous transitions, our urban and rural human settlements can collectively and individually ensure that the benefits are based upon and shared among all people. Under the umbrella topic of Smart Communities, this track of conference aims to facilitate a better understanding of the effects and challenges of the cumulative growth of contemporary urban technologies within the communities and planning sectors.

Stimulating Questions

- When the high technology is dramatically transforming the urban and rural area, what kinds of shifts are small communities experiencing?
- How to obtain fair opportunities and increasing social interaction by improving the access to information and technology?
- How to resolve rural-urban crisis by adopting the appropriate technology?

- How to make technology and big data become effective planning and analysis tools?
- How can we better use the applications and tools to plan smarter communities?

Components in this Track

- Session Proposal: Improving multi-agency program transparency & accountability via a scalable, performance measure tracking web platform
- Smart communities
- Technology and society
- Technology and big data
- Session Proposal: Online interactive mapping: Tips & tools for small communities
- Session Proposal: Neighborhoods, parks, and food access-Creative approaches to community outreach in Salem OR
- Session Proposal: Lighting up the discovery corridor - the port of Ridgefield's dark fiber optics infrastructure

What We Learned & Takeaway for Practice

- The advancement of technology will increase the possibility of citizen engagement in urban planning processes and boost the level of social responsibility for the common good.
- Application and tools can be successfully implemented to the local communities for smarter use of the resources.
- Spatial data infrastructure could create a knowledge-based planning process which can implement strategies for livability and quality of urban life.
- Industrial development entails not only quantitative growth of industries, but an industry that embrace opportunities in innovation and technology.
- Programs supporting lifestyle diversity, amenity and starting up business can be effective tools for technology community and urban regeneration.
- The interactive connection between basic data and daily space will fulfill smart city from traditional housing transformation and urban life.

- Defining virtual social network could improve the level of social integration and hence quality of social life.
- Effective participation in resilience planning can be a solution for small communities which is vulnerable to the effects of climate change.
- Web GIS portals plays the role as the instruments for co-production of smart communities through data sharing and participatory planning.
- POI (Point of Interest) data and metro ridership data could be used to analyze the relationship of TOD communities factors.
- Transportation data can be accessible and user friendly with a better data protocol.

Challenges for the Future & What's Needed

- Technology has to be developed with intended users and thereby creating the environment need for adoption.
- With the limitation of lack of government action, the potential of new information and communication technology to solve urban problems could be hampered.
- Infrastructural provision, citizens' participation as well as resources utilization should be enforced to enhance the use of ICT.
- Technology is the transitional tool of rural development planning and reduce work-distances and help to develop small communities smartly.
- Geospatial data have become a resource for territorial analysis and a need for place making.

Track 6: Post-smart communities and the new frontiers

Zaheer Allam, Mauritius, ISOCARP
Hongyang Wang, China, ISOCARP

Cities are witnessing an increasing rate of densification and expansion, coupled with a flow of transient movement. Indeed, globalisation has brought an increasing dependency on transportation, whether through cars, buses, light rail, or aeroplanes, rendering our cities as a platform for hosting business, commerce, and other activities. Such a busy environment brought its fair share of challenges in regards to traffic, energy, water, waste, and the other components that contribute to the functioning of the city.

With the advent of internet connectivity and with the increasing knowledge of the causes of climate change, various communities adopted various 'smart' and innovative solutions to tackle such issues to better achieve a sustainable and resilient urban fabric.

However, with the increasing technological progress, and the effect of Moore's law on pricing, new models are emerging to better tackle finance, governance, movement, business, commerce and others. The city witnesses a change in policies as it re-invents the way it functions.

This track shall dwell into this transition, and showcase emerging trends to better channel resources to address contextual challenges.

Components in this track

- Cities of the future
- Technology and Big Data
- Planning & Governance
- People & Society
- Future Urban Economics

What We Learned & Takeaway for Practice

- New technologies shall provide new ways to interact with our city and shall ultimately impact on urban typologies
- Application and tools can be successfully implemented to the local communities for smarter use of the resources.
- Spatial data infrastructure could create a knowledge-based planning process which can implement strategies for livability and

quality of urban life.

- Planning data can be extrapolated from emerging technologies; like autonomous cars & mobile phones.
- As we turn towards technological implementation, feedback from city users can be obtained faster and with more precision.
- Urban regeneration can happen through digital interventions, limiting cost and speed.
- There are gaps between academia and practice for emerging technologies as those need time to perfect for various contexts.
- With automation, employment shall change, impacting on urban economics.
- Retail and other activities may be heavily influenced and distance and user dynamics may change.

Challenges for the Future & What's Needed

- There is a strong need to better enhance the link between academia and practice in regards to emerging technologies.
- There is a need to encourage digital interventions and to increase internet and technology penetration.
- Digital interventions need to be tailored equally to cultural domains and not limited to direct economic growth.
- Technology has to be developed with intended users and thereby creating the environment need for adoption.
- Emerging tools like autonomous cars and mobile phones can be essential tools for planning data, but pose a threat to piracy.

General Conclusion

Hongyang Wang, General Rapporteur, China, ISOCARP

In a networked informational era, what is/are/ will be Smart Community(-ies) and how could PLANNING contribute to its/their building? Can we identify some coherent focus/pivot/ framework from the seemingly infinite scope of Smart Community and demanded actions, so as to solve the antinomy "if planning is everything, maybe it is nothing"?

Is this the complexity we have to accept?

The Cloud not only represents what had been presented and discussed on the Congress, but also symbols the ever-expanding scope of planning. It is rich, but also makes the field desperate. If that is the only way by which we can solve problems confronting people, then we have to accept it. But the four decades of global habitat movement (Habitat I to III) suggests that solutions of such spirit could not sufficiently solve problems.

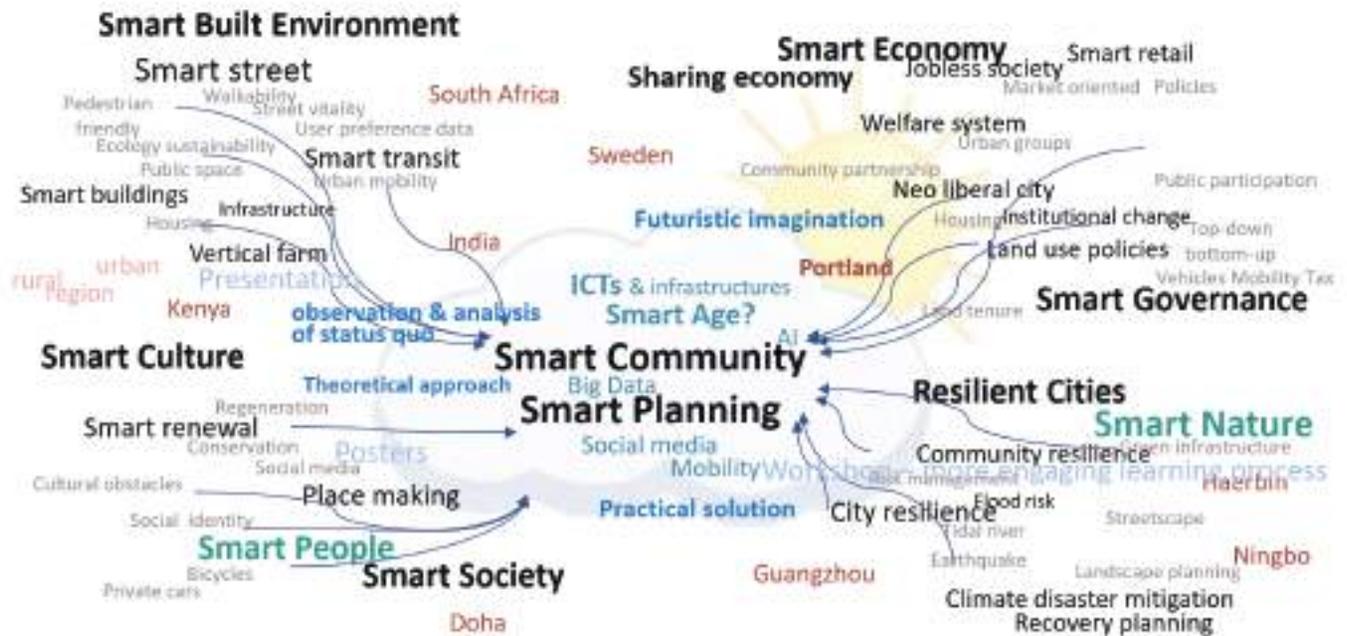
A paradigm shift is needed: from the philosophy of atomism to the philosophy of holism

In fact, the planning profession or even human society has long had some "perfect" terms "accommodating" the complexity: comprehensive, holistic, synergy, contextual, and the like. But in the end, these ideas did not seem to have changed (or rather have exactly led to) the trend of planning to become everything. I would argue that the philosophy behind this hide the utmost smartness for human society including planning of course. That is, human society has long been trapped in the philosophy of Atomism or "scientific"/objective/ determinism way of thinking: objective parts, exact attributes, linear logic and the perfect solution being all perfect parts added together. This inevitably leads the planning to become everything.

However, the true nature of things is like this: Things are relations & relational. So values, goals or whatever are all relational conformities. All conflicts are relational conflicts. To search solution is to search relational conformity, and hence optimal holisticity. Proper planning is to search partial intervention with optimal holisticity, namely not everything but something of everything. As things and holisticity are relational hence changeable depending on relations, to find optimal holisticity and corresponding partial intervention demands a specific type of thinking: holistic thinking. This involves non-transcendental holistic conjecture and

verification by synchronical logic, till the relatively most optimal holisticity appearing.

After all, human civilisation is determined by human thinking. Now, in our complex era, the most significant issue of smartness lies in the fundamental ontology, epistemology and methodology of human society. We have to recognise its fundamental flaw. There has to be a revolution in our thinking pattern. That is, the smart thinking is the most critical factor for smart community.



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