IntechOpen

# An Overview of Urban and Regional Planning

*Edited by Yasar Bahri Ergen*

# AN OVERVIEW OF URBAN AND REGIONAL PLANNING

Edited by **Yasar Bahri Ergen**

**An Overview of Urban and Regional Planning**
http://dx.doi.org/10.5772/intechopen.75766
Edited by Yasar Bahri Ergen

**Contributors**

Xx Xx, Miguel Etinger de Araujo Junior, Tania Fresca, Eliane Paulino, Kin Sun Chan, Yifan Zou, Jasneth Mullings, Leith Dunn, Mona Sue Ho, Rainford Wilks, Carol Archer, Paulo Henrique Trombetta Zannin, Thomas Jeferson Vieira, Elaine Carvalho Da Paz, Nebojša Stefanović, Bosko Josimovic, Nataša Dabnilović Hristić, Juanita Corredor Téllez, Ronald Wennersten, James Chakwizira, Peter Bikam, Thompson A Adeboyejo



**Notice**



First published in London, United Kingdom, 2018 by IntechOpen
eBook (PDF) Published by IntechOpen, 2019
IntechOpen is the global imprint of INTECHOPEN LIMITED, registered in England and Wales, registration number: 11086078, The Shard, 25th floor, 32 London Bridge Street
London, SE19SG – United Kingdom
Printed in Croatia

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library

Additional hard and PDF copies can be obtained from orders@intechopen.com

An Overview of Urban and Regional Planning
Edited by Yasar Bahri Ergen

p. cm.

Print ISBN 978-1-78984-834-2

Online ISBN 978-1-78984-835-9

eBook (PDF) ISBN 978-1-83881-826-5

# Meet the editor

Yasar Bahri Ergen graduated from Istanbul State Academy of Engineering and Architecture, Department of Architecture, in 1973. In 1976 he completed his master's degree in Urban Planning at the Istanbul State Academy of Engineering and Architecture. From 1983 to 1984 he lived in the USA to conduct research in his field of expertise. He received a doctorate degree from Gazi University in 1987. His academic life started in 1982 and took turn from the USA to Gazi University. In 1995 he established the Department of Urban and Regional Planning at Bozok University and in 2009 he established the Department of Urban and Regional Planning at Amasya University. In 2017 he established the Faculty of Fine Arts and Design at Siirt University. In 2018 he received the title of associate professor. Currently, he works at Siirt University.

# Contents

# Preface

This research book covers the topic of urban planning, which focuses on population, labor, and employment, concentrating on individuals who are professionally oriented. The book is organized under the headings of Planning City, Regional Planning and Overview of City and Regional Planning. The research deals with the different problems of urban planning, from the planning stage to implementation and addresses general issues. Urban and regional planning generally covers a wide range of issues but this book consists of three main sections.

In the first part, general problems have been analyzed and include the necessity for public transportation, transportation systems, cultural protection and tradition in city planning, public participation, etc.

In the second section, a planning modeling analysis of urban planning and was investigated and carried out the methods of physical space planning in sample cities.

In the third section, the urban regeneration, urban transformation, and urban renewal are analyzed for the development of sample cities in the urbanization process. In this context, problems and their solutions have been studied by focusing on the planning methods in these topics.

Urban and regional planning produces usage decisions for all the design profession fields, where the occupational field conducts people-oriented training, while users create jobs and employment. Therefore, this book is an ideal guide for researchers in urban planning, and investigates and analyzes in-depth issues in all subjects in urban areas.

It is hoped that those involved in urban planning will benefit from the book.

**Assoc. Dr. Yaşar Bahri Ergen**
Siirt University
Faculty of Fine Arts
Urban and Regional Planning Department
Siirt, Turkey

Section 1

# Urban and Planning Problems

Chapter 1

# Absence of Metropolitan Planning Institutes and Territorial Disorganization

Miguel Etinger de Araujo Junior,
Eliane Tomiasi Paulino and Tânia Maria Fresca

Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/intechopen.79602

**Abstract**

With the world population becoming predominantly urban at the beginning of the twenty-first century, various interests and needs of society demand the planning and execution of public policies that go beyond the established political-administrative limits, imposing the need for institutional channels that can make the proper reading from the physical-territorial reality. The metropolitan planning institutes are essential agents in this process for an adequate analysis of the territory, which will establish the parameters for the discussions and deliberations of the society involved. In Brazil, many institutions still need to be consolidated, and the absence of metropolitan planning institutes in various parts of the country contributes to the absence of proposals and referral of projects to meet the diverse needs of the population on the scale of metropolitan regions. In this sense, the study intends to identify several aspects in which the metropolitan planning becomes essential for the adequate ordering of the territory.

**Keywords:** planning, metropolitan regions, public policies, land-use planning, statute of the metropolis, Brazil

## 1. Introduction

The political-territorial divisions currently existing in Brazil reflect a federative model, which, in theory, would seek to privilege local interests and powers, and the Brazilian Federal Constitution of 1988 expressly endowed municipalities with institutional, administrative, and financial autonomy.

However, the demand for public services of common interest to more than one municipality depends on a joint action between them, as well as the Member States whereof they are part. An urban planning that can be done in a cooperative way, insofar as it will affect different populations, becomes imperative for satisfactory results to be achieved, especially with regard to land-use planning.

Said cooperation had not been done in Brazil since the creation of the first metropolitan planning agencies in the 1970s, due to several aspects to be analyzed in this work. One also includes some situations in which the absence of regional territorial management contributes to the maintenance or worsening in the quality of life in these regions, reproducing and reinforcing class conflicts that emerge from different understandings as to the use of land in the metropolitan aspect, as focused herein.

The methodology consists of the articulation between primary information bases, derived from fieldwork in the Região Metropolitana de Londrina with secondary data, such as the legislation concerning land-use planning in metropolitan bases, journalistic and scientific publications, and official data that express the socioeconomic dynamics in this Brazilian territory portion.

## 2. Metropolitan planning as a route to territorial planning

Metropolitan planning is not a recent concept in Brazil. In the 1970s, a process was started toward its implementation after the institutional creation of Brazil's first metropolitan areas. The very law that created already included an article establishing the necessity of an integrated planning for economic and social development; basic sanitation (water, sewage, and public cleaning); use of the metropolitan land; transport and road system; production and distribution of piped fuel gas; use of water resources; and control of environmental pollution [1].

It was the first moment such practice was implemented, and by considering the nation's moment from an economic and social-development point of view, that planning did not achieve important success in terms of planning the territory. Still, that planning was able to create infrastructure to ensure general conditions for the production and reproduction in the capital, centered above all on Brazil's ongoing industrial expansion. It created more than just the basic infrastructure provided by law, since it included housing for the labor force and a subway system, among other improvements. In other words, that was a moment when planning was intended to meet the demands of the physical and territorial expansion of metropolitan regions for production itself, under the terms of Brazilian National Development Plans I and II.

From planning practice point of view, the so-called technocratic plans, strongly centralized and hierarchical, emerged. They were implemented in accordance with the interests of state governments, especially to meet capital demands, without the effective participation of the municipalities and the civil society that were part of the metropolitan regions. Planning was under the direction and design of a branch, agency, or public company in the scope of state governments, which in turn were subject to federal governments. The many studies and proposals elaborated by these metropolitan entities eventually became sector plans with no articulation and integration between them.

The 1980s and 1990s were years of resurgence from the standpoint of metropolitan planning. To begin with, the financial resources allocated to the performance of such plans were insufficient. That is, most of the metropolitan budget came from the federal government. As Brazil in that time underwent a severe economic development crisis, articulated with both the international crisis of the capitalist system and the neo-liberal economic macropolicies adopted since 1990, financial resources became scarce. In addition, Brazil's 1988 Federal Constitution transferred to state governments the responsibility for the creation and management of metropolitan regions. In this course, none of the federation's entities had sufficient budget for effective actions in the metropolitan regions. As a result, though one witnessed a period of studies made by metropolitan companies and agencies, those plans and studies did not effectively become actions.

On the other hand, particularly in the 1990s, there was an increase of debates on planning at a local level, for the creation of the municipal director plans made mandatory under the Brazilian 1988 Constitution. This was an important aspect, as it derived advances in the design and practice of planning and territorial organization at a municipal scale. It was a good moment for debates and deepening of conceptions, which finally broke apart from authoritarian positions. This period gave birth to the conception of planning as a route to the creation of plans and projects with effective popular participation, based on the integration of the different sectors involved working toward social justice. For the first time in Brazil, planning became a practice for the making of investments that could meet different demands and serve different segments of society with an interdisciplinary and integrated stand, yet not without contradictions, since a business posture toward ratifying the power of economic groups in the city's production and management prevailed in some cases. Positive course had a strong expansion as of 2003, with a federal government of a nationalist and developmental stance, which acted toward greater municipal autonomy, creating a specific ministry-Ministry of Cities-with the objective of promoting the development of municipalities through technical and fiscal incentives. With the support of the State of Paraná, another federative body, there has been a considerable increase in the main legislation on urban development, which is the Law of the Master Plan.

In addition to the support of federal and state governments, one must register the creation of the Statute of the City, Federal Law No. 10.257/2001 for municipalities with more than 20,000 inhabitants to prepare their Master Plan (**Figure 1**).

Nevertheless, metropolitan planning remained relatively disrupted. On the one hand, Brazil has witnessed the institutionalization of numerous metropolitan areas—more than 70—after 1988, especially after 2003, when public policies for several sectors concentrated on more resources for these regions. However, those newly created regions had very different criteria for industrialization, so much so that a considerable part of them does not have a so-called metropolis for their main city, even when considering the criteria established by the Brazilian "Statute of the Metropolis" Federal Law [3].

If Brazil's general urbanization advances toward concentration of population in metropolitan areas, in the face of a tendency to greater supply of employment, public services, housing, and infrastructure, among other, metropolitan planning is not yet performed as an effective instrument for solutions of more diverse issues. Reasons for that are centered on some of

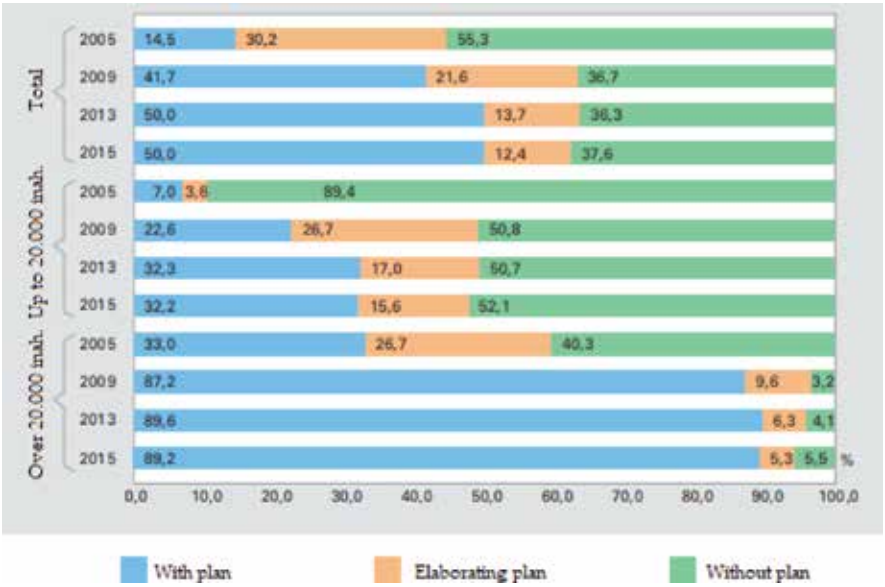



**Figure 1.** Percentage of municipalities, total, with up to 20,000 and over 20,000 inhabitants, by status of the Master Plan, Brazil—2005/2015. Source: Perfil dos municípios brasileiros: 2015/IBGE, Coordenação de População e Indicadores Sociais. Rio de Janeiro: IBGE, 2016 [2].

the following factors: (a) while entities of the federation, municipalities have come to have more representation and legal instruments since the Constitution of 1988, enabling numerous actions for their territory. It implied that, to a certain extent, municipalities began to disregard actions for proposals and solutions of numerous questions that could and should be performed together with other municipalities. The exception in this context has been the intermunicipal health consortia; (b) a second factor concerns budget, since the branches, public companies, and others that act in the scope of metropolitan planning do not have financial resources; and (c) state governments have not acted effectively in implementing policies toward the existence and effective operation of these planning entities. In other words, state governments create metropolitan regions; however, councils, companies, and agencies are not effectively implemented or invigorated, not for cost reasons, but perhaps not to interrupt the "over-the-counter policies" practiced by state representatives. Said over-the-counter policies refer to representatives' assistance by means of bills drafted under the request of city administrators for infrastructure, health, housing, and other parliamentary aid, such a beaten track of electoral practices. At the same time, the rules that establish the role of those governments in the management of metropolitan areas are still unclear.

In spite of these elements, metropolitan planning is something of a fundamental importance. If the local scale has been privileged in the last three decades; in the metropolitan scope, the regional scale is the basis for the analysis. One employs the concept of scale herein as a strategy for the apprehension of reality, which seeks to "analyze the phenomenon based on the extent of its significance; that is, the extent that gives it meaning" [4]. In such journey, the regional scale assumes the sense of apprehension of reality, yet it is linked to its functional coherence

of a whole [5]. Functional coherence is directly linked to the role it plays in the international division of labor; linked in part to the numerous flows emanating from the most distinct locations, issuing orders, decisions, values, and so on; and then linked to certain purposes, social relations of production, and reproduction, in addition to the political and rule-making data.

In this sense, the metropolitan region can be understood as a set of municipalities that are economically and socially integrated into a metropolis and other cities that can be incorporated into the process of metropolization, whether or not these are areas of continuous urban occupation. Therefore, it is not only about a territorial cut established by law, because metropolitan areas are dynamic from the point of view of their economic, social, and territorial transformation.

Prospects for the making of this metropolitan planning are stored in the future, but they have enormous potential, not only from a theoretical and conceptual point of view, but also from effective actions. Such instrument, linked to public policies at different scales, makes it possible to achieve a more qualitative territorial organization by means of interfederative governance. In order to be so, it will be necessary to overcome the barriers posed by municipalism with regard to a variety of themes, such as urban transport in its several modalities, environmental problems, land use, basic sanitation and energy, among others. It is also necessary to legitimize the branches, agencies, and companies that perform research and design metropolitan projects. Moreover, it will be necessary to establish fund sources for investments and define how the decision-making power will be shared and distributed among the various entities involved [6].

## 3. Brazilian federative system and the distribution of competences

Article 1 of the current Constitution provides that the Federative Republic of Brazil is formed by the unbreakable union of states, municipalities, and the country's capital and Federal District of Brasília, constituting itself as a democratic state ruled by law [7].

The part governing the country's political-administrative organization established the Article 18 whereby the Federative Republic of Brazil comprises the federal government, the states, the federal district, and the municipalities, all of them being autonomous entities.

One of the issues requiring further analysis, with proposals for a concrete action of the powers involved, concerns the adoption of public policies aimed at populations of different municipalities that are common among them. As their name suggests, public policies are incumbent of the public power; however, the aforementioned autonomy of the federated entities provided for in Article 18 of the Federal Constitution prevents the interference of a state or municipality in the public policies affecting another municipality, which also constitutes a guarantee of the federative system adopted.

In another aspect, this cooperative federalism is acknowledged and encouraged with the establishment of competent jurisdictions that are common to the federal government, states, the federal district, and municipalities, as expressed in Article 23 of the Brazilian Federal

Constitution of 1988. One must highlight the criticism by part of the legal doctrine concerned with this article that diluting and not clearly defining the role of each federative entity in the promotion of public policies would be an obstacle to the implementation of federalism [8–10].

Some definitions of autonomy are presented by Iris Araujo Silva [11]: according to that author, Mosskély conceives autonomy "as the capacity of a legal system to regulate its own affairs, issuing legal rules"; for Paul Laband, it is "the power of public law, not sovereign, capable of establishing, in its own right and not by simple delegation, mandatory rules of law. It is law itself" ; for Santi Romano, the characteristic feature of autonomy is "self-legislation, the competent jurisdiction to create a legal system."

In order for the various autonomies to operate in tune and without conflict between them, that same Constitution structured a system of competent jurisdictions for certain activities to be developed [12]. As to the metropolitan issue, noteworthy is the observation of Sérgio de Azevedo and Virgínia Rennó dos Mares Guia [13], which is as follows:

> *Despite formally recognizing the importance of the metropolitan institutional issue, state governments and metropolitan municipalities tend to see this matter as a zero-sum game whereby the greater governance would imply in decreasing the power of states and/or municipalities.*

Additionally, the effective implementation of a Brazilian federal covenant faces two historical obstacles: (1) the issue of regional inequalities and (2) the diversity of local-elite trainings [14].

Upon analysis of the moments of Brazilian federalism, and consequently the application of the main elements of classic federalism, such as democracy, noncentralization, freedom, pluralism, and subsidiarity [15], it is observed that one cannot say that there is an ideal or pure model of federalism, but arrangements made on a common basis of the ideals of US federalism instead, duly adapted to local realities [16, 17].

The rigidity in the interpretation of these constitutional provisions leads to a plastering of the public policies that necessarily exceed the territorial limits of each municipality since, as already stated, there are situations for which interventions must cover more than one municipality, as with the case of public transportation and treatment of solid waste.

Attenuating this situation to a certain degree in Article 25, paragraph 3, the Brazilian constituent legislator of 1988 provided the possibility of creating metropolitan regions by means of a complementary law passed by the states, with the objective to "establish metropolitan regions, urban agglomerations and microregions, constituted by groups of neighboring municipalities, to integrate the organization, planning and execution of public functions of common interest."

In such case, the state will not be protecting state interests, because "[the element] that defines the metropolitan interest that specialises the services common to the Municipalities of the Region is a regional interest; a qualified regional interest, whose ownership is not of the State only, but of the State and Municipalities" [18]. Thus, once there are metropolitan regions effectively implemented from an operational rather than merely legal point of view, demands will be presented and priorities will be established.

Note that responses to these demands traditionally seek to serve the better-organized sectors, as a way of keeping political support to maintain power, or even worse, the privileges of these

segments then disguised as "remedies to public needs." Product of a regional planning that seeks to know the particularities of each municipality, the integrated action is a still rare experience in Brazil. Theoretically, planning and the places where it was placed in practice eventually benefit all the involved as it explores the potential of each site, without the competition for privileges that can be configured as negative factors in the long run, as it is the case of tax breaks, donations of public lands, among others. That is what one intends to demonstrate in a proper chapter in this study.

When defining which core activities would justify the creation of a metropolitan region, one still has doubts about the definition of public functions of common interest under the Brazilian constitutional system.

When required to rule on the matter, even the highest Brazilian judicial instance, the Brazilian Federal Supreme Court (STF), did not present a satisfactory solution. After 15 years of proceedings, the Direct Action of Unconstitutionality (ADI) no. 1842 [19] was tried only on 6 March, 2013. The action was a request for declaration of unconstitutionality of a Rio de Janeiro State Law that established what would be the public functions of common interest, under the understanding that there would have been an invasion of the competent jurisdiction of the municipalities to legislate on matters of local interest.

In the decision, the STF failed to define which of the federation's entities could determine these functions of common interest by merely stating that there should be collegiate body with no concentration of powers for a federation entity, as it can be seen from some excerpts from the decision:

> *Recognition of granting power and title of the service to the collegiate body formed by the municipalities and the federal state […] run by a collegiate body with participation of the relevant municipalities and of the State itself, Rio de Janeiro, without any concentration of decision-making power in the hands of any entity.*

Following this judgment and albeit timidly, some metropolitan institutional arrangements began to develop. Also, the legislation also sought to meet the demands of these territorial spaces, as it will be seen with the example of the Brazilian Statute of the Metropolis below.

### 3.1. Statute of the Metropolis and the integrated Urban Development Plan (PDUI)

In order to solve the issue on the need for metropolitan planning, a result of the asymmetries of the federative system, Brazilian Federal Law No. 13089 entitled "Statute of the Metropolis," was enacted on 12 January 2015.

In addition, one should highlight that the speed at which the law is being processed at the Brazilian National Congress indicates a lack of debate by various segments of society. Rather than indicating a positive aspect in the designing of public policies, such speed reinforces the tradition of Brazil as a country with fast legislative procedures that not only serve purely economic interests, but are also in disagreement with the population's social and environmental interests.

Therefore, the Statute of the Metropolis was intended to fill a gap in the federative system in case of conflicts between political entities (federal government, states, the federal district,

and municipalities) by adopting public policies backed by territorial planning studies, whose actions would not have been effected in isolation by one of these entities, as it is the case with public transport or solid waste treatment.

Some of these functions are worth mentioning, since they are related to the possibility of efficient metropolitan territorial management. If the existence of a legal framework supporting the implementation of metropolitan programs and projects does not in itself guarantee the success of this management, the absence of this framework will certainly make this mission more difficult (as previously reported).

In this sense, two points deserve attention. One is related to the composition of the advisory bodies and executive bodies, and the other regards a legal-urbanistic instrument aimed at providing a normative technical instrument: that is the *inter-federative governance* and the *Integrated Urban Development Plan (PDUI)* [20].

The first is designed to overcome the setbacks created by the management models hitherto, based on the design of the metropolitan regions, whose governing bodies invariably consisted of government representatives from one of the federative entities—the state. The Statute of the Metropolis establishes minimum criteria for the effective participation of municipalities in both deliberative and executive instances. In addition, it seeks to overcome the democratic deficit existing in previous models by determining the mandatory presence of representatives of civil society in deliberative instances.

Once again, it should be stressed that the mere legal provision does not guarantee effectiveness or efficiency, but guarantees the opening of spaces for collective deliberations [21].

The second concerns the judicialization of technical-planning instruments, with a view to granting territorial organization plans a coercive force. This has been the trend in Brazil in recent years, as demonstrated by the Brazilian Act of Administrative Corruption [22], the Brazilian Fiscal Responsibility Law [23], and in the urban planning, by the Statute of the City, Law No. 10257 of July 10, 2001 [24].

Such fact is relevant insofar as there are several experiences with so-called drawer plans; that is, never implemented hidden plans. Those endowed with a great perspective of effectiveness and enforcement, but which fail against the legal possibility of being implemented.

As to the Brazilian Statute of the Metropolis, yet another question is worthy of attention: as previously mentioned, there was concern with regard to the speed at which it was processed and approved, especially because of the lack of debate within the Brazilian society. However, the fact that congress discussion and debate were rapid does not prevent certain sectors of society from seeking, through legislators, to change its meaning or even to prevent its improvements.

At another historical moment in the debate and passing of the one that would become the most important law for urban development in Brazil, the Statute of the City (Federal Law 10,257, dated July 10, 2001) faced strong resistance from lobbies representing land-owning rentiers [25]. Since its conception as one of the objectives of the so-called base reform, which included the urban reformation in 1963, until its effective signing into law in 2001, there were 38 years of attempts to advance in the promotion of the right to the city and effectiveness of the social function of the city and the social function of urban real estate property.

Several attempts were made to change its meaning within the Brazilian National Congress.

The Provisional Decree [26] (MP) No. 818 was recently enacted on January 11, 2018, in order to change the Statute of the Metropolis. There are few changes in the original text, but they may initiate a process of weakening of said law, especially when it provides for the release from the obligation of public hearing in all municipalities that are part of the territorial unit (Art. 1, MP 818/2018, which amends Art. 12, § 2, I of said Statute), being at the discretion of the collegiate entities to decide which municipalities will hold these hearings.

In addition, in order to allow the PDUIs that may still be drafted to contribute with the work of creating metropolitan planning institutes to assist in the proper construction of these venues, as this work suggests, one must observe the constitutional commands of sharing competent jurisdictions, so as to avoid the invasion of municipalities' competent jurisdictions (e.g., to define zoning), as well as not to distort (from the legal point of view) the autonomy of these in order to make the regional planning unfeasible.

## 4. Limits of the Londrina Metropolitan Region

Taking into account the general conditions that made possible the proposal of the creation of metropolitan regions in Brazil, one must analyze a particular case: the Metropolitan Region of Londrina, the fourth largest city in the South of Brazil and the largest one in the countryside of the state of Paraná, shown in **Figure 2**.

As a starting point, some notes are necessary from the methodological point of view, in order to avoid misunderstandings, as one hereby proposed the thesis that metropolitan management would be a solution for the deep problems that characterize them.


**Figure 2.** Position of the metropolitan region of Londrina in the context of Paraná's municipalities.

On the other hand, it also means that management and planning are not extraneous to class disputes, so there are effective possibilities for change in relations that explain the asymmetries, including the strength of the metropolitan region as a political statement and fragility as a legal instrument, legitimate and effective territorial approach according to the principles of development for the common good.

As the basis of political-administrative management whether at local, regional, or even global level, the scale itself is a construction, because "scales are not given, but are themselves the object of confrontation, as the definition of the priority scales where the central clashes will occur is also an object of confrontation" [27].

In Brazil, federalism has been an instrument for perpetuating inequalities, and that is why Milton Santos [28] affirms that citizenship is above all a possibility outlined on a national scale. However, such federalism is based on strongly oligarchic local bases and this is evident not only in what is now the metropolitan region of Londrina, but also in its origin, which derives from a capitalist construction on indigenous territories that has not yet completed a century.

In the name of a regionalist ideology that embeds the dream of development as a natural becoming, and thanks to attributes so differentiated that one can easily believe in alternatives from an effective private management, the destruction of the forest, and the extermination of three indigenous nations residing here, mainly Kaingang, Guarani, and Xetá, of which only seven individuals remain [29], a situation that will not be analyzed for the purposes of this text.

The fact is that the same ideology of progress that has made them perish is the one that, as a rule, mayors, politicians, and businessmen evoke as a strategy for metropolitan development, translated into the discourse of the need to invest politically in attracting industries and facilitating the implementation of large companies. The reciprocal of this rule is the discourse of the need to flexibilize the already fragile urban, labor, and environmental legislation.

Such a simple solution is the greatest evidence that intrabusiness competition does not hurt the necessary alignment to disturb the asymmetries indispensable to the extraction of *plusvalia*. "In class societies, management of territory implies the creation and maintenance of spatial differences through which economic and social differences are implemented, legitimized and reproduced" [30].

Coherence of sociospatial formation is therefore well supported by the sense of class struggle on a local scale, where territorial management is oriented toward the strengthening of differences, because that alone provides the right to privatizing interdiction for the selective possession of socially produced material goods. These are the concrete obstacles to the idealized model of the metropolitan region as a possibility of managing for equality, not only among the citizens but also among the municipalities that compose it.

This is why it is opportune to study the history of the region as a way to identify how and what forces act in political, economic, and social terms, since its agents may be only local or global in scope, depending on the nature of the insertion. As to the capital, no regulation is convenient given the possibility of interfering in the transfer of a fraction of the wealth to

the poorer social segments and to the less prominent regions, and the state acts, as a rule, by stimulating policies generating regional competitiveness to the detriment of policies generating regional cohesion [31].

The difficulty between conjugating the common interest and the capitalist criterion of the greatest return, determined largely by areas better endowed with infrastructure and accessibility to the consumer market, is evident. This helps explain why there is a huge gap between what appears to be and what actually is the metropolitan region of Londrina, and it prompts the exercise of correlation between the essence and the appearance of the phenomenon.

The first aspirations to establish metropolitan region of Londrina appeared in the early 1970s, a moment in which regional leaders began to proclaim the speech that the progress of northern Paraná had invested with metropolitan characteristics, such as large urban agglomerations of few Brazilian cities.

The link between planned development and the institutionalization of metropolization was favored by regional history, originally forged by the Paraná Plantations Company, the English capital company to which the Brazilian government donated no less than 13,600 km$^2$ to install the largest private colonization project in the 1930s. In order to have an idea, this company designed and started the occupation of an area equivalent to a third of the Danish territory, defining hierarchies between cities and the urban and rural land structure; since that was their own property, it was up to them to decide how to divide and sell the lands to Brazilians, following their own criteria of pertinence, opportunity, and profitability.

Although this real estate operation practically repeated the same principle of colonization, which was the fundamental dismissal of the natives' right and, secondarily, the country's right of Brazilians to land, there were positive developments, since part of the area was divided into small lots for which there was a possible demand among settlers whose work in the areas of older occupation had allowed sufficient savings to buy obviously cheaper lands in the forested and still populated by Indians.

Given the prevalence of an agrarian export context based on the hegemony of large properties, the combination of unequal aptitude-the soils of northern Paraná are among the most fertile in the world- and the flourishing of a family agriculture in a moment favorable to coffee plantations allowed the constitution of a dynamic regional economy, in contrast to the rest of the state.

That was the context in which the Metronor Project began, whose initial protocol dates back to 1973 and included a linear metropolis involving 11 cities located along a 100-km road axis, delimited by Londrina and Maringá, the largest and most important cities of Paraná except for the capital city of Curitiba.

Subsequent proposition and articulations were favored by the national context, since at that time the law that created the first metropolitan regions in Brazil was passed. Nevertheless, despite having consumed an unsorted sum of public resources and more than 12 years of work of a team composed of engineers, architects, and technical planners of the government of Paraná, the proposal never left the paper and was definitely abandoned in 1989. According to Cunha [32], the fact that the project was poorly received by political forces whose prominence rested

on the centralization of resources and political-administrative control in the capital, coupled with the indifference of the regional leaderships, was decisive for the failure of the proposal.

From the institutional point of view, the second proposal for the constitution of the Londrina metropolitan region was successful in 1998. Much less ambitious than the previous one, it was originally made up of only six municipalities. The state law that implemented it [33] provided for the appointment of a council responsible for defining actions of interests that were common to the municipalities and integrated planning for the use of metropolitan land, expressly mentioning the use of water resources, control of environmental pollution, basic sanitation, and the road system.

Since then, in only one aspect one can affirm that there have been advances in its coverage area, since its territorial limits have undergone successive inclusions reaching the current 25 municipalities, with 5432.85 $km^2$ and an estimated population of 1,082,685 people [34]. Londrina is the most prominent municipality, whose GDP in 2010 corresponded to 4.68% of the state's, the highest participation among the municipalities in the state's heartland [35]. On the other hand, it took 10 years for a first and simple step toward its existence, the creation of the Metropolitan Coordination of Londrina (COMEL), whose mission would be "to promote regional integration by politically articulating the public policies of common interest between the municipalities and the state" [36]. With no assigned budget and no career public servants, it works with few commissioned staff appointed by the governor, whose last administration worked to reduce even more its meager autonomy [32]. **Figure 3** shows in detail the urban area of the cities of this region and the urban agglomeration along the highway BR 369.

As territorial management on a metropolitan scale requires much more than a law and the will of a governor, it can be said that, once again, one has a metropolis "still on paper," an expression used by Cunha when referring to the Metronor, which in concrete term had only terms of reference, projects and intentions that never went beyond the protocols set forth on papers. According to the author, "everyone wants to be part of a metropolitan region, but there is resistance when it comes to giving up local prerogatives or creating a metropolitan development fund" [32]. In fact, the very entities that integrate and disseminate the idea of metropolitan regions claim the dividends of such condition, but do not want to bear its costs, which is partly understandable because the budget assigned to municipalities is generally low. As a result, there are modest expenditures on housing, basic sanitation and other policies under the responsibility of the local government, as shown in **Figure 4**.

The financial conditions of the municipalities are revealed in determining aspects, but also determined by the environmental and socioeconomic issues. From the environmental point of view, the metropolitan management is imperative in view of the effective possibilities of generating environmental liabilities at the regional scale involving both the countryside and the city.

In this sense, everything is yet to be done, starting with the enforcement of existing legislation that provides the expropriation of properties that do not fulfill the social function, the environmental legislation being an aggravating factor.

In the metropolitan region, the agricultural model is incompatible with the constitutional right to a balanced environment, due to the absolute predominance of two types of monoculture:

http://dx.doi.org/10.5772/intechopen.79602

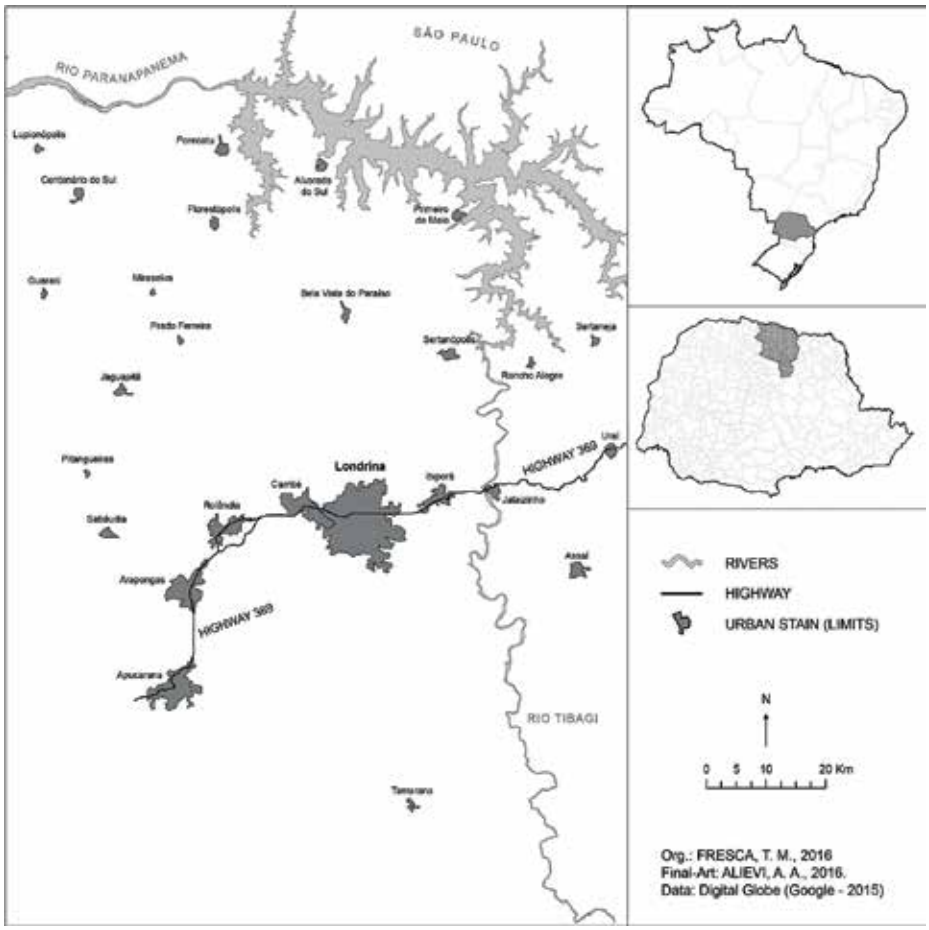



**Figure 3.** Urban areas of the cities of metropolitan region of Londrina-PR, Brazil.

sugar cane and temporary crops. Brazil's flagship agribusiness culture, soybean, leverages the second model and is also the one culture in which most pesticide is consumed. This crop was responsible for the dumping of 21 kg of pesticide per hectare grown in the city of Londrina in 2015 [38]. It is an agricultural model that, additionally to the contamination of food and rural workers, irreparably compromises soil biota and aquatic life. Effects are already seen in the critically decreased levels of the fish, not to mention the typical fauna of the Atlantic forest, which was extinguished together with the forest [39].

The association of poisoning with mechanization has brought irreversible consequences to soils and water resources in view of laminar erosion. The problem has been aggravated by the new patterns of planters and harvesters, which are incompatible with the soil conservation systems by microbasins implanted in Paraná in the 1980s. Although it consumed billions of Brazilian Reais, this project was the most comprehensive and successful experience in terms of the compatibility between agriculture and environmental conservation in the twentieth century in Brazil.

| Figure 4. Municipal expenditures with local management | US$ | % RML |
|---|---|---|
| Alvorada do Sul | 5,146,788 | 1.6 |
| Arapongas | 25,996,333 | 8.1 |
| Assaí | 6,365,958 | 2.0 |
| Bela Vista do Paraíso | 4,066,078 | 1.3 |
| Cambé | 29,557,080 | 9.2 |
| Centenário do Sul | 4,054,142 | 1.3 |
| Florestópolis | 3,346,018 | 1.0 |
| Guaraci | 1,798,308 | 0.6 |
| Ibiporã | 25,140,776 | 7.8 |
| Jaguapitã | 4,945,343 | 1.5 |
| Londrina | 158,973,685 | 49.3 |
| Lupionópolis | 1,705,323 | 0.5 |
| Miraselva | 1,322,496 | 0.4 |
| Pitangueiras | 1,681,606 | 0.5 |
| Porecatu | 4,284,373 | 1.3 |
| Prado Ferreira | 1,510,926 | 0.5 |
| Primeiro de Maio | 3,892,710 | 1.2 |
| Rolândia | 19,091,140 | 5.9 |
| Sabáudia | 3,265,230 | 1.0 |
| Sertaneja | 3,042,157 | 0.9 |
| Sertanópolis | 6,762,805 | 2.1 |
| Tamarana | 3,582,974 | 1.1 |
| Uraí | 3,230,226 | 1.0 |
| Total | 322,712,476 | 100.0 |

**Figure 4.** Municipal expenditures with local management. Source: Ipardes, 2016 [37]. No data from Jataizinho and Rancho Alegre.

Nevertheless, farmers are gradually destroying terraces because they disrupt the operations of machines currently available in the market, which are increasingly larger and designed for topographic and pluviometric conditions distinct from those of the tropical climate. As a result, the amount of water infiltrated in the soil is decreasing, the perverse consequence being a reduction in the flow of springs associated to the silting of rivers. The impacts thereof are visible in the enhancement of the processes of abstraction and treatment of water for urban consumption.

Although such situation involves determinations in the local to the global scales, confrontation demands a metropolitan action, because in this case the only boundaries that nature recognizes are the watersheds, by excellence a scope of the management of water resources, environmental pollution, and basic sanitation. Any action toward the prevention or containment will always be inefficient, if not innocuous, within the political-administrative borders of the municipalities alone, which is precisely what occurs in the aforesaid region.

Another problem is the generation of solid waste, though legislation has evolved both to mitigate growth curves and to find more effective disposal solutions. In spite of being widely

http://dx.doi.org/10.5772/intechopen.79602

enforced, there is sufficient legislation in the state of Paraná, starting with the proposal of consortia in cases of isolated municipalities and metropolitan solutions for already-established metropolitan regions. The territorial dimension for the second case comprises a minimum population of 200 thousand inhabitants per region and maximum radius of 200 km within the scope of the operation, applicable to the metropolitan region of Londrina.

This parameterization is part of the State Policy of Water Resources, which regulates the management by hydrographical basins according to the characteristics of users of water resources users and the similarity of physical and socioeconomic aspects. As to parameters for generation and type of final disposal of waste, it was verified that the lower Tibagi hydrographical unit to which the metropolitan region of Londrina belongs is one of the three with the largest generation of residues of the state [35], which provides an additional reason for metropolitan management.

In addition to environmental compatibility, another element could be enhanced on this scale: efficiency, which applies both to collection and transshipment procedures and waste treatment. It is not enough to consider the estimation that 26% of the waste is recyclable, 56.5% is organic, and 17.5% is disposable waste, for once again the territory is presented itself in its concreteness. The smaller the cities, the lower the generation of waste and the greater the participation of the organic waste, for obvious reasons: the average pattern of income and consumption. Considering the data established for the state, 27.5% of the inhabitants of the metropolitan region of Londrina live in the 20 municipalities whose per capita daily average is 0.65 kg. In contrast, the estimated average for 52.1% of the population is 1.15 kg/inhabitant/day [35]. What might seem auspicious to the first group is really a problem.

Among the recurrent problems observed, one highlights the difficulty of selling materials sorted in small municipalities or away from industrialized centers. Small volumes of recyclables require the accumulation of material sorted for sale, requiring more space, and often favoring the performance of middlemen who are willing to pay lower prices. As a result, most waste that is suitable for reuse is either disposed inappropriately or destined for landfills, which reduces its useful life and thus the cost of management.

In the metropolitan region of Londrina, there is a recycling industry of fluorescent lamps, one of aluminum, one of glass, two of paper, two of metal, two of edible oil, and twelve of plastics, most of them in Londrina [35], which is absolutely insignificant in view of the quantity of reusable waste generated daily.

In the metropolitan region, there are already some initiatives of intermunicipal consortia for the management of solid waste [40], but without the participation of Londrina, whose administrations have not made any effort for the metropolitan management to actually occur, although such municipality is the one with the better conditions to trigger it, including the central geographical position in the metropolitan region, not to mention the density of all networks and flows that converge to it.

One must undoubtedly consider transcendent aspects of local administrators' moods, since two competing objectives can be identified in regional policies: reducing inequalities, which would require actions to generate sociospatial cohesion, or increasing attractiveness; hence, competitiveness favors the most prominent municipalities, economically speaking, leading the smaller ones to strategies and agreements that are disproportionately detrimental to collective interests [31].

For the sake of job creation and development, this has been a common routine in the metropolitan region of Londrina, and for the time being, its legacy has been the public financing of large private enterprises, the largest beneficiaries of the booty of the war of places. From the perspective of regional-cohesion management, the said metropolitan region is a fiction, judging by some indicators that are currently configuring its metropolitan dynamics as shown in **Figure 5**: only 5 of the 25 municipalities account for the generation of 87.2% of formal jobs, although 82.2% of the population lives there. The cities of Arapongas, Rolândia, Cambé, Londrina, and Ibiporã have their head offices located along the main access road to the state of São Paulo, with which the densest economic ties are established.

The asymmetry of flows is also expressed by other indicators not detailed in **Figure 4**: it is exactly in the abovementioned municipalities that the share of agriculture in the generation of GDP is the lowest, with Londrina being the extreme case with 1.3%. Of the 25 municipalities, only 2 others, Florestópolis and Porecatu, fall within the ranks of these 5, but it is precisely because of the hypertrophy of the primary sector, basically constituted by the monopoly of the sugarcane culture for the production of sugar and ethanol, that explains it, since a single sugarcane plant practically processes all the raw material produced in both cities.

That is the best example of the vicious dynamics of monoculture in the face of the challenge of boosting the local economy. As an illustration of it, Florestópolis is the municipality of the metropolitan region with the largest proportional share of industry in the generation of GDP reaching 65.6%, and Porecatu is the fourth with 44.9%. Notwithstanding, these municipalities present similar poverty indicators to those of municipalities in which the industrial sector is irrelevant, if not absent. While the five most prominent municipalities have the lowest poverty rates, ranging from 5.9% for Arapongas to 11.0% for Ibiporã, in Florestópolis, the rate is 18.2%, and in Porecatu, it is 14.8% [41].

Those indicators require the problem of the metropolitan region of Londrina to be considered beyond rhetoric, since territorial policies have confrontations within class contradictions as their denominator. These are the ones that express the different intentions, often antagonistic. Because of that, it seems appropriate to take the territory as a delimitation established by relations of power: "what defines a territory is firstly power, and in that sense, the political dimension is that which, first of all, defines its profile" [42].

Likewise, the centrality of power, understood as a plural concept that generates reactions, counterpowers, requires an even more precise definition: "knowing and operating over a material reality presupposes—and even postulates—a system of relations within which power circulates, since it is consubstantial with the whole relation. Power is neither a spatial nor a temporal category, but it is present in every production that relies on space and time" [43].

| Figure 5. Municipalities | Area km² | Population | Formal employments | GDP (US$ 1,000) |
|---|---|---|---|---|
| Alvorada do Sul | 424.2 | 11,237 | 1,546 | 56,858 |
| Arapongas | 382.2 | 118,177 | 33,935 | 984,867 |
| Assaí | 440.3 | 15,999 | 2,663 | 104,540 |
| Bela Vista do Paraíso | 242.7 | 13,656 | 2,261 | 109,311 |
| Cambé | 495.4 | 105,347 | 21,758 | 896,751 |
| Centenário do Sul | 371.8 | 11,246 | 1,582 | 44,871 |
| Florestópolis | 246.3 | 11,087 | 3,074 | 53,145 |
| Guaraci | 211.7 | 5,492 | 815 | 25,880 |
| Ibiporã | 297.7 | 53,356 | 11,205 | 658,667 |
| Jaguapitã | 475.0 | 13,398 | 6,006 | 160,524 |
| Jataizinho | 159.2 | 12,615 | 1,603 | 47,247 |
| Londrina | 1,652.6 | 553,439 | 167,727 | 4,497,601 |
| Lupionópolis | 121.1 | 4,911 | 795 | 21,640 |
| Miraselva | 90.3 | 1,875 | 244 | 9,020 |
| Pitangueiras | 123.2 | 3,140 | 411 | 18,023 |
| Porecatu | 291.7 | 13,754 | 2,704 | 137,968 |
| Prado Ferreira | 153.4 | 3,718 | 658 | 25,647 |
| Primeiro de Maio | 414.4 | 11,986 | 1,920 | 64,423 |
| Rancho Alegre | 167.6 | 3,963 | 465 | 23,056 |
| Rolândia | 459.0 | 64,726 | 19,523 | 581,213 |
| Sabáudia | 190.3 | 6,702 | 3,068 | 93,335 |
| Sertaneja | 444.5 | 5,633 | 1,053 | 64,708 |
| Sertanópolis | 505.5 | 16,485 | 3,972 | 147,550 |
| Tamarana | 472.2 | 14,143 | 1,568 | 70,366 |
| Urai | 237.8 | 11,662 | 1,414 | 54,014 |
| Total | 7,417.7 | 1,094,347 | 291,270 | 8,951,225 |

**Figure 5.** Municipalities. Source: Ipardes, 2016 [37]; IBGE, 2017 [34].

These postulates allow one to establish the necessary counterpoint to deal with territorial policies without misunderstanding that the classical approaches to state and territory could induce, by waiver, the exercise of the dialectic in favor of the duality in such matters as complex as this one. One cannot ignore the monopoly of the state in its proposition and spatial control, but equally, one cannot disdain the reason, place, manner, and addressee to whom policies and the respective reactions unleashed are dimensioned.

Thinking the territory as the foundation of the state, and this state as the fundamental element of politics, Castro [44] identifies it as an arena in which power and control are at the heart of disputes, usually oriented to the dynamics that define the organization of the material basis of society.

Taking territorial policies as actions emanating from the central, regional, and local powers over the various territories, which are constituted as special types of public policies, the author reaffirms that their unequal distribution among such scales and in terms of densities within the interior of each of them affects the exercise of citizenship, because he understands that it is the network of institutional resources that favors it.

> *We take civil, political and social rights as an analytical resource […] civil rights as those fundamental to life, liberty, property, equality before the law, guaranteeing life in society; the political rights that define the rules, the limits of collective and individual action and guarantee participation in the government of society and social rights as a guarantee of access to collective wealth through the right to education, health, retirement, work and fair pay. If in the case of the first two rights law is the institution that guarantees equality, less institutional resources are required for it to be formally applied to all residents throughout the territory, in the case of the latter, it is the organizational basis of the institutions that confers conditions of access to social rights. That is, while the exercise of civil and political rights fundamentally requires an adequate judiciary apparatus, the exercise of social rights requires an infrastructural basis, supported by the public institutions that guarantee the offer and access to services where the citizen is [45].*

In this way, it is understood that associating territorial policies to the infrastructural base of state responsibility is to politicize the debate on the right to the city, paraphrasing Lefebvre [44], to whom it is added, the right to the field, designated by the necessary protagonism of those who by their hands institute the forms that give vent to the social contents, and this has a unique name: work. Therefore, the dialog with the political and administrative spheres is imperative to understand both the setbacks and the possibilities of a metropolitan region like Londrina.

## 5. Final considerations

Until 1988, the creation of the metropolitan regions was incumbent of the federal government, and in spite of the low priority in the investment agenda, as it has been the conduct of this repulsive state to the planning as a criterion of socioeconomic development, they were assured a budget allocation compatible with the implementation of a minimum operating structure.

The decentralized management paradigm established by the Federal Constitution promulgated that year implied the transfer of the incumbency of metropolitan regions to the states. Although auspicious, the impact of such measure was very negative, since the federal government did not transfer the corresponding resources, and it was up to the respective states to maintain existing structures and all those yet to be created.

The fact that the metropolitan region of Curitiba was created in 1973 explains, therefore, some of the conflicts mentioned in terms of the viability of the metropolitan regions in the north of Paraná. One verifies that for both, the federal and the state governments, the immediate burdens, namely inherent costs of such structures, determine their negligence, and it is not considered the bonuses of coordinated planning and management in the areas where the urban densities threaten all kinds of virtuous dynamics.

Found in the vast majority of metropolitan regions in Brazil, such situation then prevents the planning and implementing of public policies of common interest at a regional level, which would reduce costs and increase efficiency. Notwithstanding the situation, recent legislative production in the year 2015 (Statute of the Metropolis) emerges as a considerable reinforcement of the legal framework, inasmuch as it imposes the making of a plan and an integrated

planning in these regions, in spite of the old vices pointed out in the neglect of metropolitan management that are still present (and strong) in Brazilian society.

## Author details

Miguel Etinger de Araujo Junior*, Eliane Tomiasi Paulino and Tânia Maria Fresca

*Address all correspondence to: miguel.etinger@gmail.com

State University of Londrina, Londrina, State of Paraná, Brazil

## References

[1] Brazil. Complementary law No. 14, dated June 8, 1973 [Internet]; 1973. Available from: http://www.planalto.gov.br/ccivil_03/leis/lcp/lcp14.htm [Accessed: April 25, 2018]

[2] Perfil dos municípios brasileiros. 2015/IBGE, Coordenação de População e Indicadores Sociais. Rio de Janeiro: IBGE; 2016. Available from: https://biblioteca.ibge.gov.br/visualizacao/livros/liv95942.pdf Accessed: June 7, 2018

[3] Brazil. Federal Law No. 13089, dated January 12, 2015. [Internet]; 2015. Available from: http://www.planalto.gov.br/ccivil_03/_ato2015-2018/2015/lei/l13089.htm [Accessed: April 26, 2018]

[4] Castro IE: Escala e pesquisa na geografia: problema ou solução? Espaço Aberto. 2014 [Internet]. Available from: https://revistas.ufrj.br/index.php/EspacoAberto/article/view/2435/2080 [Accessed: April 26, 2018]

[5] Santos M. A natureza do espaço: técnica e tempo, razão e emoção. 2nd ed. São Paulo: Hucitec; 1997. 260 p

[6] Tourinho HLZ, Silva ML d. Desafios para o planejamento e a gestão metropolitanos na Amazônia: uma abordagem introdutória. Revista Eletrônica de Humanidades do Curso de Ciências Sociais da UNIFAP. 2016;**9**:55-75. DOI: 10.18468/pracs.2016v9n1

[7] Some excerpts in this chapter were taken entirely from coauthor Miguel Etinger de Araujo Junior's doctoral thesis: Regiões metropolitanas brasileiras e autonomia municipal: eficácia da norma constitucional brasileira e da experiência estrangeira na gestão dos interesses regionais/Miguel Etinger de Araújo Junior; 2011. Available from: http://www.bdtd.uerj.br/

[8] Camargo A. Federalismo cooperativo e o princípio da subsidiariedade: notas sobre a experiência recente do Brasil e da Alemanha. In: Carneiro JMB, Hofmeister W, editors. Federalismo na Alemanha e no Brasil Orgs. Vol. I. São Paulo: Konrad Adenauer Foundation, Série Debates, no. 22; 2001. p. 77

[9] Kugelmas E. A evolução recente do regime federativo no Brasil. In: Carneiro JMB, Hofmeister W, editors. Federalismo na Alemanha e no Brasil Orgs. Vol. I. São Paulo: Konrad Adenauer Foundation, Série Debates, no. 22; 2001. p. 37

[10] Bercovici G. Desigualdades regionais, Estado e Constituição. São Paulo: Max Limonad; 2003. pp. 61-63

[11] Silva IA. As regiões metropolitanas e a autonomia municipal. In: Revista Brasileira de Estudos Políticos. Belo Horizonte: UFMG; 1981. p. 90

[12] Bastos CR. Curso de Direito Constitucional. São Paulo: Saraiva; 1998. p. 98

[13] Azevedo S d, Guia VR d M. Reforma do Estado e federalismo: os desafios da governança metropolitana. In: O Futuro das Metropoles: Desigualdades e Governabilidade. Rio de Janeiro: Observatório IPPUR/UFRJ – FASE; 2000. p. 530

[14] Abrucio FL. A reconstrução das funções governamentais no federalismo brasileiro. In: Carneiro JMB, Hofmeister W, editors. Federalismo na Alemanha e no Brasil Orgs. Vol. I. São Paulo: Konrad Adenauer Foundations, Série Debates, no. 22; 2001. p. 100

[15] Corralo G d S. Município: Autonomia na Federação Brasileira. Curitiba: Juruá; 2008. p. 156

[16] Encinar JJG. El Estado Unitario-Federal: la autonomía como principio estructural del Estado. Madrid: Tecnos; 1985. pp. 86-89

[17] See position of Baracho, José Alfredo de Oliveira. On General Theory of Federalism, Not as a Dogma, but on the Existence of Several Obligatory Elements in a Federalist Regime. {Ut1}. Teoria Geral do Federalismo, Rio de Janeiro: Forense; 1986

[18] Meirelles HL. Direito Urbanístico Brasileiro. São Paulo: Malheiros; 1995. p. 146

[19] Brasil. Brazilian Supreme Federal Court. Direct Acion of Unconstitutionality no. 1842/RJ. Available from: http://www.stf.jus.br/portal/processo/verProcessoAndamento.asp?incidente=1714588

[20] Brazil. Federal Law No. 13089, dated January 12, 2015 [Internet]. Available from: http://www.planalto.gov.br/ccivil_03/_ato2015-2018/2015/lei/l13089.htm. [Accessed: May 2, 2018]

[21] Habermas J. Direito e democracia: entre facticidade e validade. v. II. In: Translated to Portuguese by Flávio Beno Siebeneichler. Rio de Janeiro: Tempo Brasileiro; 1997. p. 22

[22] Brazil. Federal Law No. 8429, dated June 2, 1992. Availabe from: http://www.planalto.gov.br/ccivil_03/Leis/l8429.htm [Accessed: May 2, 2018]

[23] Brazil. [Accessed 2018-04-28]. Availabe from: http://www.planalto.gov.br/ccivil_03/leis/lcp/lcp101.htm [Accessed: May 2, 2018]

[24] Brazil. Federal Law No. 10257, dated July 10, 2001. Availabe from: http://www.planalto.gov.br/ccivil_03/leis/leis_2001/l10257.htm [Accessed: May 2, 2018]

[25] Bassul JR. Reforma urbana e Estatuto da Cidade. Vol. 28. Santiago: EURE (Santiago); 2002. p. 84

[26] A Provisional Decree is a legal rule provided for in article 62 of the 1988 Brazilian Constitution, enacted by the President of the Republic and enforced as law after having been approved by the Brazilian National Congress, which becomes valid as of its issuance until eventual convertion into regular law

[27] Vainer CB. As escalas do poder e o poder das escalas: o que pode o poder local? Anpur. 2001;**9**:140-151 p. 146

[28] Santos M. Por Uma Outra Globalização: Do Pensamento Único à Consciência Universal Rio de Janeiro: Record; 2006

[29] Gazeta do Povo [Internet]. 2018. Availabe from: http://www.gazetadopovo.com.br/vida-e-cidadania/quem-sao-e-onde-moram-os-xetas-by2i152zblx7waeq2ipmq20y6. [Accessed: April 28, 2018]

[30] Corrêa RL. Corporação, práticas espaciais e gestão do território. Revista Brasileira de Geografia, Rio de Janeiro. 1992;**54**(3):115-121 p. 35

[31] Barbosa AG. Região e escala regional: os impasses para a implementação de politicas regionais no Brasil atual. Geographia. 2012;**14**(27):76-100 p. 83, 84, 90, 91

[32] Cunha FCA. A região como fruto de enunciados políticos e o descompasso entre institucionalidade e espacialidade nas regiões metropolitanas de Londrina e Maringá. Revista Formação. 2016;**3**(23):05-22 p. 14, 20

[33] Paraná. State Supplementary Law no. 81, dated June 17, [Internet]. 1998. Availabe from: http://www.legislacao.pr.gov.br/legislacao/pesquisarAto.do?action=exibir&codAto=8483&codItemAto=653417#698836. [Accessed: April 28, 2018]

[34] IBGE. Brazilian Institute of Geography and Statistics. Population Estimate [Internet]. 2017. Availabe from: https://www.ibge.gov.br/estatisticas-novoportal/sociais/populacao/9103-estimativas-de-populacao.html?=&t=o-que-e . [Accessed: April 28, 2018]

[35] Paraná. Integrated and Associated Solid Urban Waste Management Plan of the State of Paraná [Internet]. 2013. Availabe from: Curitiba: SEMA, 2013. file:///C:/Users/ClimaPC-2/Downloads/2-5-1%20Plano.pdf. [Accessed: April 28, 2018]

[36] Comel. Metropolitan Coordination of Londrina [Internet]. 2018. Availabe from: http://www.desenvolvimentourbano.pr.gov.br/modules/conteudo/conteudo.php?conteudo=55. [Accessed: April 20, 2018]

[37] Ipardes. Anuário Estatístico do Estado do Paraná 2016. Availabe from: http://www.ipardes.pr.gov.br/anuario_2016/4economia/tab4_6_11.htm [Accessed: April 20, 2018]

[38] Emater. Paraná company of technical assistance and rural extension. In: Use of Social Network in Rural Technical Assistance. Londrina: Emater; 2015 (Report, unpublished)

[39] Dean W. A ferro e fogo: a história e a devastação da Mata Atlântica brasileira. São Paulo: Companhia das Letras; 2004

[40] Melo AC. Gestão de resíduos sólidos na região metropolitana de Londrina-PR: possibilidades de soluções intermunicipais. Thesis (Doctor's Degree in Geography). Londrina: State University of Londrina; 2016

[41] Ipardes. Paraná Institute of Social and Economical Development. Multiple Paranás: The Socioeconomic-Institutional Spaces in the 2003-2015 Period. Curitiba: Ipardes, [Internet]. 2017. Availabe from: http://www.ipardes.pr.gov.br/biblioteca/docs/varios_paranas_relatorio_2017.PDF [Accessed: April 20, 2018]

[42] Souza ML. Território da divergência (e da confusão): em torno das imprecisas fronteiras de um conceito fundamental. In: Saquet MA, Spósito ES, editors. (Orgs.). Territórios e territorialidades: teorias, processos e conflitos. São Paulo: Expressão Popular; 2009. pp. 57-72 p. 59

[43] Raffestin C. Por Uma Geografia do Poder. São Paulo: Ática; 1993. p. 6

[44] Castro IE. Geografia e Política. Rio de Janeiro: Bertrand Brasil; 2006. p. 12, 16

[45] Lefebvre H. La producción del espacio. In: Tradução de Emilio Martínez Gutiérrez. Espanha: Capitán Swing; 2013

Chapter 2

# Urban Noise as an Environmental Impact Factor in the Urban Planning Process

Elaine Carvalho da Paz, Thomas Jeferson Vieira and
Paulo Henrique Trombetta Zannin

Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/intechopen.78643

**Abstract**

This research focuses on an analysis of the perception of urban noise in the daily lives of the residents of two different areas: (1) a residential neighborhood and (2) a city center, respectively, considering (1) an acoustically ideal urban environment and (2) an acoustically polluted urban environment. To this end, a random sample of individuals from both areas was asked to fill out a questionnaire. Sound pressure levels were also measured in each of the evaluated areas. The World Health Organization (WHO) considers a quiet area as one in which the measured sound pressure level is up to 55 dB(A). The average measured sound pressure levels were 53.5 and 72.9 dB(A), respectively, in the quiet area and in the area considered acoustically polluted. Data were subjected to a multivariate factor analysis. The main complaints reported by the interviewees were as follows: headache, irritability, poor concentration and insomnia. Interviewees in the city center stated that street traffic noise was the main source of annoyance, while the residents of the residential area stated that the main source of discomfort was air traffic noise.

**Keywords:** noise pollution, urban environment, environmental noise, sound pressure level, noise annoyance

## 1. Introduction

Research has revealed a significant association between environmental noise and deleterious effects on humans [1, 2]. According to Babisch et al. [3]: "66–70 dB(A) is to be regarded as the threshold of health impairments which can be verified by epidemiological methods at population level." Based on the abovementioned data, Maschke [4] states that: "from the point of view of preventive medicine, an equivalent sound pressure level of Leq = 65 dB(A) should be

maintained as the limiting value of exposure to traffic noise during the day. For residential areas, the World Health Organization recommends a maximum equivalent continuous sound level, Leq, of 55 dB(A) [5].

A comparative analysis of subjective evaluations (population responses) by inhabitants of areas of high and low noise incidence, such as a residential area and the downtown area of a city, with noise levels lower and higher than 65 dB(A), respectively, may provide information indicating that there are potential negative effects on the inhabitants' health [3]. This is a research strategy that allows one to correlate perceived organic effects and individual sensitivity to noise in urban regions, and it can be corroborated by objective evaluations, that is, sound-level measurements [6].

Some studies have been conducted in Brazil, whose findings were obtained by using questionnaires and through measurements of sound levels [7, 8]. This chapter includes all the statistical development necessary to explain the reaction of the interviewees in relation to noise, which was not presented in Paz et al. [8]. In this context, the purpose here is to make a comparative analysis not only of the results obtained with the values established by Curitiba Municipal Law No. 10,625 and those recommended by the WHO, but also of the perception of urban noise in the daily lives of the residents of a residential area and a downtown area of mixed occupation in the city of Curitiba, Brazil [5, 9]. The idea is to characterize two distinct situations: (1) an acoustically ideal urban environment and (2) an acoustically polluted urban environment.

Evaluations were performed based on the responses to a questionnaire that was presented to a random sample of residents from each area. The data were classified and treated statistically by means of multivariate factor analysis. Equivalent continuous sound levels, Leq, were also measured in each area and expressed in dB(A).

## 2. Materials and methods

This study analyzes the quality of environmental noise in Curitiba, Brazil, based on questionnaires and measurements, comparing two distinct urban areas—a residential one and the city's downtown area.

Initially, a representative portion of each area was selected for the application of the questionnaire. The questionnaire was filled out by the residents of each area between 7 a.m. and 7 p.m., in the presence of the researcher. The quantitative perception of noise was determined using the Likert Scale, ranging from 0 to 6, with the following criteria: (0) no increase, (1) very little, (2) a little, (3) average, (4) a lot, (5) intense and (6) extreme. Multiple choice questions were used to determine the interviewees' qualitative perception of noise, such as awareness of the population about the issue of urban noise, identification of the occurrence of psychophysiological disorders and determination of which types of sources cause the greatest annoyance. The questionnaire included information about the interviewees' identification and registration.

The survey sample was selected randomly and comprised 105 interviewees, 63% men and 37% women, in the residential neighborhood of Jardim das Américas and 130 interviewees, 52% men and 48% women, in the downtown area – Centro. The criterion for selection was individuals over 16 and less than 70 years of age.

The data on noise perception were treated statistically using the STATISTICA 5.0 software, and multivariate factor analysis of the data was chosen in view of the characteristics of the samples of the two populations. The extraction method used here was the Principal Components method, and the criterion to determine the number of factors was the "Kaiser criterion," that is, the number of factors equal to the number of eigenvalues greater than or equal to 1 (**Figures 1** and **2**).

The first step consisted in ascertaining the level of awareness of the population regarding the problem of urban noise. The next step involved classifying the degree of annoyance generated

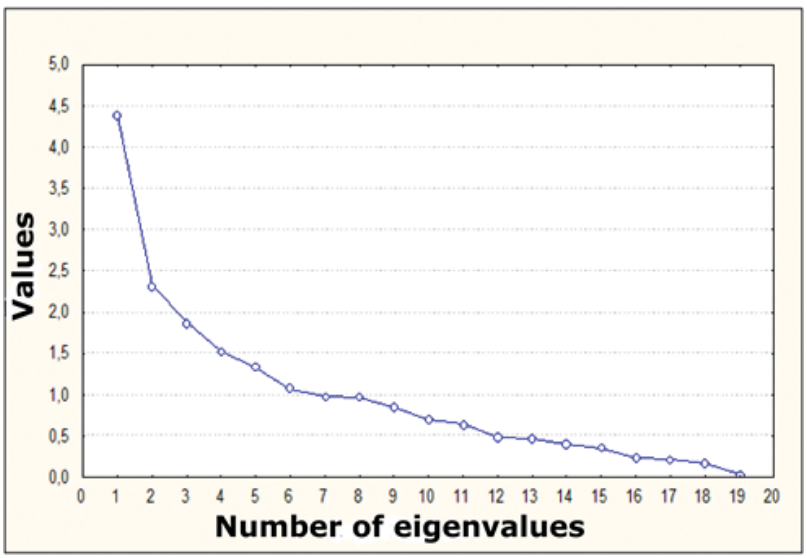



**Figure 1.** Eigenvalues for the residential neighborhood.

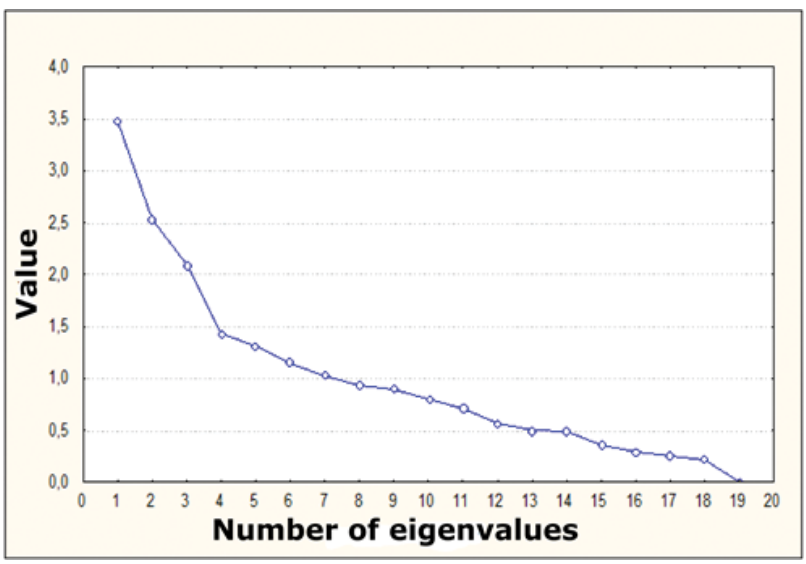



**Figure 2.** Eigenvalues for the downtown area.

by urban noise. Note that this step involved only two variables, so each variable was subjected to a descriptive univariate statistical analysis.

The following step consisted in a multivariate factor analysis of the observations obtained by the Principal Components method, using varimax normalized rotation to rotate the axes.

The subjective evaluation began with 19 variables for the two populations. The first step was to identify the interdependence of the variables for each population based on the statistical tests for the F-Normal distribution (**Figures 3** and **4**). This procedure revealed that the variables showed a normal distribution at a 5% level of significance, that is, the observations were well grouped. After checking the normality conditions of the two populations, a factor analysis was performed to identify the factors, that is, unobservable variables with low linear correlation, which would group the highly observable variables correlated into groups (factors).

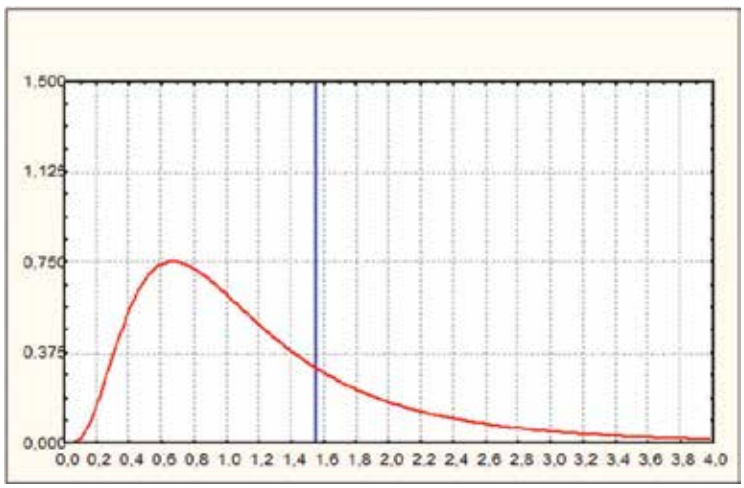



**Figure 3.** F-normal distribution for the downtown area.

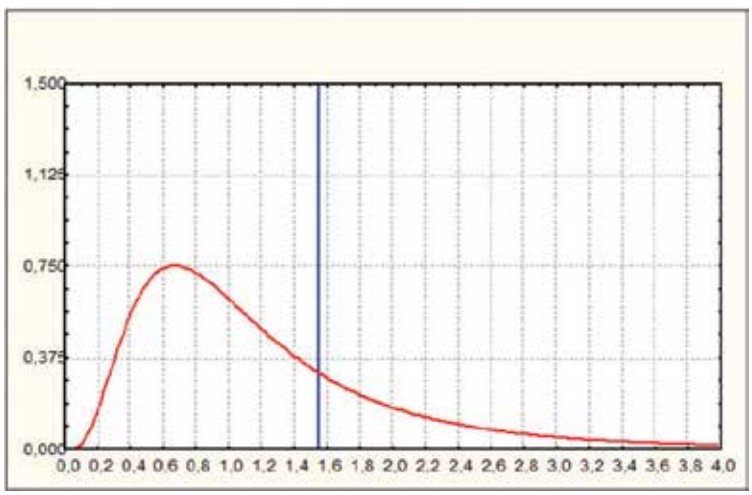



**Figure 4.** F-normal distribution for the residential neighborhood.

It should be noted that the variables were given the literal algebraic designation (X1, X2, …, X19) as a function of the input conditioning of the observations in the analysis software.

This factor analysis involved the following steps:

- Descriptive statistical calculations of the variables (mean, standard deviation, mode frequency, minima and maxima, median, mode and variance) (**Tables 1** and **2**).
- Calculation of Correlation Matrices
- Calculation of Covariance Matrices
- Calculation of Eigenvalues (**Table 3**)
- Calculation of factorial weights, commonalities and specific variance, first without rotation of the axes, and then with varimax normalized rotation. **Tables 4** and **5** list the results of the first two parameters, with rotated axes. **Table 6** presents the commonalities of the residential and downtown areas.
- Calculation of the residual matrix and of the factor score coefficients, with and without rotation of the axes;
- Calculation of the factor scores;
- Classification and Analysis of the factors.

| Var. | Note | Mean | Min. | Max. | Var. | Std. Dev. | Median | Mode | Mode freq. |
|---|---|---|---|---|---|---|---|---|---|
| Residential area | | | | | | | | | |
| X1 | 104 | 1.98 | 0 | 6 | 1.49 | 1.22 | 2 | 2 | 30 |
| X2 | 104 | 2.30 | 0 | 5 | 1.86 | 1.36 | 2 | 2 | 29 |
| X3 | 104 | 1.44 | 0 | 5 | 1.71 | 1.31 | 1 | 0 | 31 |
| X4 | 104 | 2.49 | 0 | 6 | 1.65 | 1.28 | 2 | 2 | 32 |
| X5 | 104 | 1.93 | 0 | 6 | 2.04 | 1.43 | 2 | Multiple | — |
| X6 | 104 | 0.11 | 0 | 1 | 0.10 | 0.31 | 0 | 0 | 93 |
| X7 | 104 | 0.54 | 0 | 1 | 0.25 | 0.50 | 1 | 1 | 56 |
| X8 | 104 | 0.61 | 0 | 1 | 0.24 | 0.49 | 1 | 1 | 63 |
| X9 | 104 | 0.12 | 0 | 1 | 0.10 | 0.32 | 0 | 0 | 92 |
| X10 | 104 | 0.21 | 0 | 1 | 0.17 | 0.41 | 0 | 0 | 82 |
| X11 | 104 | 0.12 | 0 | 1 | 0.10 | 0.32 | 0 | 0 | 92 |
| X12 | 104 | 3.51 | 0 | 6 | 3.73 | 1.93 | 4 | 6 | 21 |
| X13 | 104 | 1.84 | 0 | 6 | 4.16 | 2.04 | 1 | 0 | 43 |
| X14 | 104 | 2.74 | 0 | 6 | 3.24 | 1.80 | 3 | 3 | 28 |
| X15 | 104 | 3.00 | 0 | 6 | 3.46 | 1.86 | 3 | 4 | 24 |
| X16 | 104 | 1.66 | 0 | 6 | 2.42 | 1.56 | 1 | 0 | 31 |
| X17 | 104 | 1.83 | 0 | 5 | 2.09 | 1.44 | 2 | 0 | 27 |
| X18 | 104 | 0.31 | 0 | 1 | 0.22 | 0.46 | 0 | 0 | 72 |
| X19 | 104 | 0.67 | 0 | 1 | 0.22 | 0.47 | 1 | 1 | 70 |

**Table 1.** Results of descriptive statistical analysis of residential areas.

| Var. | Note | Mean | Min. | Max. | Var. | Std. Dev. | Median | Mode | Mode freq. |
|---|---|---|---|---|---|---|---|---|---|
| **Downtown area** | | | | | | | | | |
| X1 | 130 | 3.32 | 6 | 6 | 1.86 | 1.36 | 3 | 3 | 45 |
| X2 | 130 | 4.02 | 0 | 6 | 1.58 | 1.26 | 4 | 4 | 51 |
| X3 | 130 | 2.87 | 0 | 6 | 2.69 | 1.64 | 3 | 3 | 37 |
| X4 | 130 | 4.16 | 0 | 6 | 1.76 | 1.33 | 4 | 4 | 47 |
| X5 | 130 | 2.81 | 0 | 6 | 1.80 | 1.34 | 3 | 3 | 43 |
| X6 | 130 | 0.19 | 0 | 1 | 0.16 | 0.40 | 0 | 0 | 105 |
| X7 | 130 | 0.43 | 0 | 1 | 0.25 | 0.50 | 0 | 0 | 74 |
| X8 | 130 | 0.63 | 0 | 1 | 0.23 | 0.48 | 1 | 1 | 82 |
| X9 | 130 | 0.12 | 0 | 1 | 0.10 | 0.32 | 0 | 0 | 115 |
| X10 | 130 | 0.26 | 0 | 1 | 0.19 | 0.44 | 0 | 0 | 96 |
| X11 | 130 | 0.12 | 0 | 1 | 0.10 | 0.32 | 0 | 0 | 115 |
| X12 | 130 | 4.22 | 0 | 6 | 1.91 | 1.38 | 4 | 5 | 41 |
| X13 | 130 | 1.27 | 0 | 6 | 3.52 | 1.88 | 0 | 0 | 77 |
| X14 | 130 | 1.53 | 0 | 6 | 3.13 | 1.77 | 1 | 0 | 57 |
| X15 | 130 | 3.42 | 0 | 6 | 2.59 | 1.61 | 4 | 4 | 47 |
| X16 | 130 | 2.01 | 0 | 6 | 2.29 | 1.51 | 2 | Multiple | — |
| X17 | 130 | 1.55 | 0 | 6 | 2.19 | 1.48 | 1 | 0 | 41 |
| X18 | 130 | 0.30 | 0 | 1 | 0.21 | 0.46 | 0 | 0 | 91 |
| X19 | 130 | 0.70 | 0 | 1 | 0.21 | 0.46 | 1 | 1 | 91 |

**Table 2.** Results of descriptive statistical analysis of downtown areas.

| Factor | Eigenvalue | Total variance% | Accumulated eigenvalue | Accumulated% |
|---|---|---|---|---|
| Residential area | | | | |
| **1** | 4.38 | 23.06 | 4.38 | 23.06 |
| **2** | 2.32 | 12.20 | 6.70 | 35.26 |
| **3** | 1.87 | 9.86 | 8.57 | 45.12 |
| **4** | 1.53 | 8.05 | 10.10 | 53.17 |
| **5** | 1.33 | 7.01 | 11.43 | 60.18 |
| **6** | 1.07 | 5.64 | 12.51 | 65.82 |
| **Downtown area** | | | | |
| 1 | 3.47 | 18.28 | 3.47 | 18.28 |
| 2 | 2.52 | 13.26 | 5.99 | 31.55 |
| 3 | 2.09 | 11.01 | 8.08 | 42.55 |
| 4 | 1.43 | 7.52 | 9.51 | 50.07 |
| 5 | 1.30 | 6.87 | 10.82 | 56.94 |
| 6 | 1.15 | 6.03 | 11.96 | 62.97 |
| 7 | 1.03 | 5.41 | 12.99 | 68.39 |

**Table 3.** Eigenvalues for the residential and downtown areas.

| Residential area | | | | | | |
|---|---|---|---|---|---|---|
| **Var.** | **F1** | **F2** | **F3 to F6** | | | |
| | **Temporal perception** | **Atypical noise** | **Sources and complaints** | | | |
| X1 | 0.81 | 0.10 | 0.03 | −0.09 | 0.10 | −0.04 |
| X2 | 0.80 | 0.07 | 0.09 | 0.01 | 0.18 | −0.01 |
| X3 | 0.61 | −0.25 | 0.19 | 0.07 | −0.28 | 0.28 |
| X4 | 0.88 | 0.03 | 0.12 | 0.05 | 0.04 | −0.06 |
| X5 | 0.59 | −0.13 | 0.31 | 0.37 | −0.22 | 0.18 |
| X6 | 0.10 | 0.01 | −0.14 | 0.15 | 0.14 | 0.71 |
| X7 | 0.00 | −0.05 | −0.02 | 0.03 | 0.74 | 0.04 |
| X8 | −0.05 | −0.22 | 0.26 | −0.12 | 0.37 | 0.45 |
| X9 | −0.09 | 0.07 | 0.11 | 0.82 | 0.00 | 0.28 |
| X10 | 0.25 | 0.06 | −0.03 | 0.47 | 0.21 | −0.29 |
| X11 | −0.15 | 0.16 | −0.30 | −0.13 | −0.71 | −0.18 |
| X12 | 0.24 | 0.12 | 0.56 | 0.18 | 0.29 | −0.34 |
| X13 | −0.05 | 0.06 | 0.83 | 0.05 | 0.06 | −0.02 |
| X14 | 0.29 | 0.18 | 0.54 | −0.31 | −0.12 | 0.15 |
| X15 | 0.14 | −0.12 | 0.80 | 0.10 | 0.08 | −0.14 |
| X16 | 0.29 | −0.03 | 0.54 | 0.00 | 0.11 | 0.35 |
| X17 | 0.37 | −0.19 | 0.36 | −0.19 | 0.30 | −0.37 |
| X18 | −0.02 | −0.96 | 0.00 | −0.03 | 0.11 | 0.01 |
| X19 | 0.02 | 0.96 | 0.05 | 0.04 | −0.09 | −0.04 |
| % Expl. | 0.35 | 0.18 | 0.45 | | | |

**Table 4.** Factorial weights for the residential neighborhood.

As shown in **Tables 4** and **5**, seven main factors were identified for the downtown area and six main factors for the residential neighborhood as a function of the linear correlation between the observable variables. The factors were grouped into three main statistical indicators, called "Temporal Perception," "Perception of Atypical Noise" and "Sources and Complaints."

The indicators explain about 98% of the phenomenon of urban noise pollution for the residential neighborhood and about 81% of the phenomenon for the downtown area, demonstrating that the model created here is a close simulation of reality. This is confirmed by the analysis of the commonalities, as well as by the analysis of the other parameters such as residual matrix and specific variance. Sound levels were measured during the daytime (7 a.m. to 7 p.m.) at

| Downtown area | | | | | | |
|---|---|---|---|---|---|---|
| **Var.** | **F1** | **F3** | **F4 to F7** | | | |
| | **Temporal perception** | **Atypical noise** | **Sources and complaints** | | | |
| X1 | 0.73 | −0.09 | −0.01 | 0.13 | 0.00 | −0.15 |
| X2 | 0.77 | 0.15 | −0.17 | −0.02 | −0.09 | 0.02 |
| X3 | 0.52 | −0.07 | 0.13 | 0.09 | 0.43 | 0.11 |
| X4 | 0.81 | 0.09 | −0.03 | 0.01 | 0.14 | −0.06 |
| X5 | 0.51 | 0.09 | 0.32 | −0.13 | 0.27 | 0.37 |
| X6 | 0.10 | 0.03 | 0.14 | −0.08 | 0.71 | −0.16 |
| X7 | −0.07 | 0.03 | 0.11 | 0.18 | 0.19 | 0.19 |
| X8 | 0.08 | 0.06 | 0.19 | 0.82 | −0.04 | 0.13 |
| X9 | 0.04 | 0.08 | −0.20 | 0.15 | 0.67 | 0.07 |
| X10 | 0.10 | 0.10 | −0.02 | 0.03 | 0.06 | −0.88 |
| X11 | 0.05 | −0.15 | −0.01 | −0.65 | −0.19 | 0.19 |
| X12 | 0.45 | −0.12 | 0.02 | 0.50 | 0.05 | −0.15 |
| X13 | −0.05 | −0.02 | 0.88 | 0.09 | −0.16 | 0.05 |
| X14 | −0.01 | 0.11 | 0.84 | 0.14 | 0.14 | 0.00 |
| X15 | 0.37 | 0.15 | 0.01 | 0.21 | −0.12 | 0.13 |
| X16 | 0.08 | −0.18 | 0.21 | −0.05 | 0.16 | −0.17 |
| X17 | −0.05 | −0.10 | 0.11 | −0.02 | 0.00 | −0.13 |
| X18 | 0.04 | 0.98 | 0.04 | 0.05 | 0.05 | −0.05 |
| X19 | −0.04 | −0.98 | −0.04 | −0.05 | −0.05 | 0.05 |
| % Expl. | 0.27 | 0.16 | 0.38 | | | |

**Table 5.** Factorial weights for the downtown area.

different points in each area (downtown and residential neighborhood), making a total of 60 measurements (**Figures 5** and **6**), using Brüel & Kjaer 2238 sound-level meter. Evaluator 7820 software was used to obtain an average value of the equivalent sound level of each area, based on the histograms of the mean equivalent levels as a function of time (**Figures 11** and **12**). The measurements were taken following the guidelines of the Brazilian Standard NBR 10151 [10], which assesses community and neighborhood noise levels.

| Var. | For six factors (Residential area) | For six factors (Downtown area) |
|---|---|---|
| X1 | 0.68 | 0.60 |
| X2 | 0.69 | 0.72 |
| X3 | 0.64 | 0.51 |
| X4 | 0.81 | 0.70 |
| X5 | 0.68 | 0.60 |
| X6 | 0.58 | 0.58 |
| X7 | 0.56 | 0.56 |
| X8 | 0.47 | 0.75 |
| X9 | 0.77 | 0.52 |
| X10 | 0.41 | 0.80 |
| X11 | 0.69 | 0.64 |
| X12 | 0.61 | 0.51 |
| X13 | 0.71 | 0.83 |
| X14 | 0.54 | 0.80 |
| X15 | 0.71 | 0.58 |
| X16 | 0.51 | 0.66 |
| X17 | 0.57 | 0.70 |
| X18 | 0.93 | 0.97 |
| X19 | 0.93 | 0.97 |

**Table 6.** Commonalities.


**Figure 5.** Measurement points in the downtown area (Centro).


**Figure 6.** Measurement points in the residential neighborhood (Jardim das Américas).

## 3. Results and discussion

The analysis of the questionnaires clearly revealed the interviewees' opinions about the presence of urban noise. Of the total sample of interviewees, 95.5% in the downtown area and 98% in the residential neighborhood believe that noise can be harmful to health. Sensitivity to increasing noise levels was expressed by 78.25% of the interviewees as "increased" and "greatly increased" in the downtown area, and 71.7% between "increased a little" and "increased" in the residential neighborhood, as indicated in **Figure 7**.

Three statistical indicators were identified in the multivariate factor analysis of the data, namely: "Temporal Perception," "Perception of Atypical Noise" and "Sources and Complaints."

The indicators explain about 98% of the phenomenon of urban noise pollution for the residential neighborhood and about 81% of the phenomenon for the downtown area, demonstrating that the model created here closely represents reality. An analysis of the statistical indicator of Temporal Perception revealed that 61.5% of the interviewees from the downtown area and 57.15% from the residential neighborhood perceived an increase in noise levels, particularly during the week in the morning and afternoon, and during weekend nights (**Figures 8** and **9**).

http://dx.doi.org/10.5772/intechopen.78643

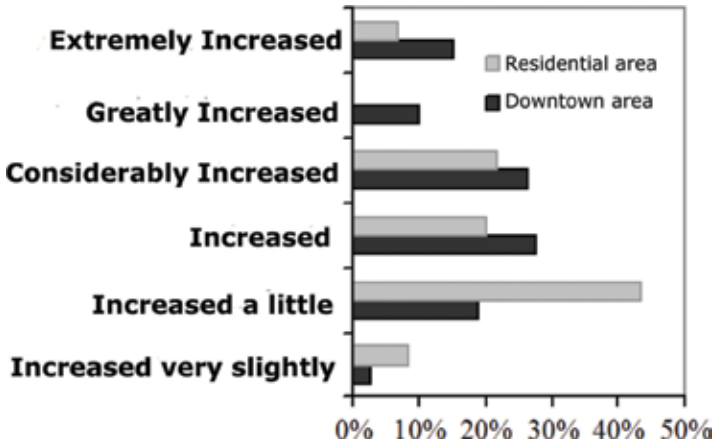



**Figure 7.** Perception of increasing noise.

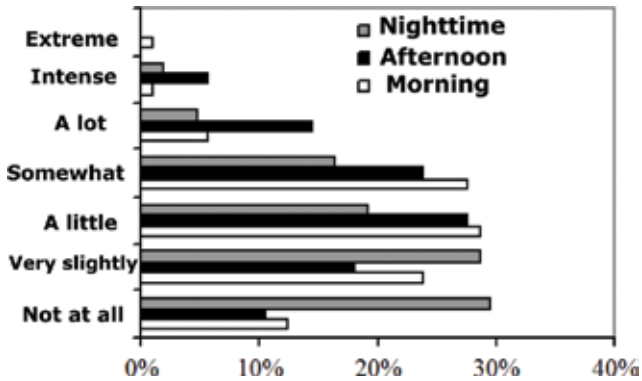



**Figure 8.** Temporal perception of noise in the residential neighborhood.

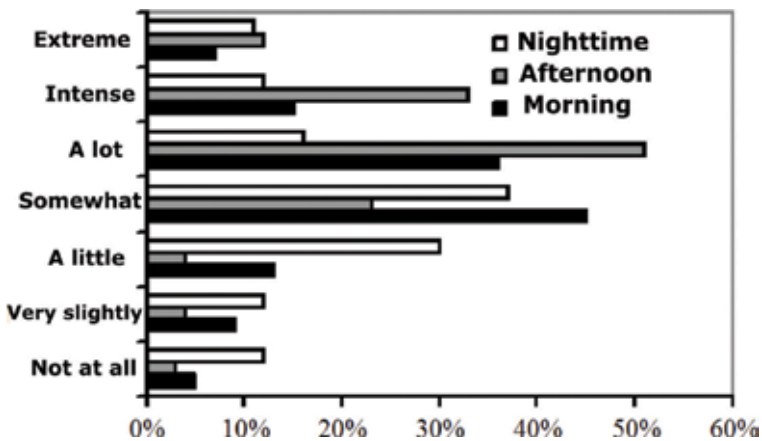



**Figure 9.** Temporal perception of noise in the downtown area.

An analysis of the statistical indicator of Perception of Atypical Noise (sources of annoyance in other buildings; perception of sporadic noise sources) revealed that 70% of the interviewees downtown and 30% of interviewees in the residential area feel disturbed by noise from atypical sources.

The indicator Sources and Complaints, which comprised the largest number of correlated variables in the study, pertained to information about existing and/or perceived types of noise sources in the urban environment, and about the occurrence of the main psychophysiological complaints described by the interviewees. In the two areas under study, the most frequent complaints about the effects of urban noise were irritability and poor concentration (**Figure 10**). These results are comparable to those found by Paneto et al. [11], which addressed the theme "*Relationship between urban noise and the health of users of public spaces….*" Paneto et al. [11] applied a questionnaire to 375 people, and the main reactions to noise exposure were as follows: irritability (58%), difficulty to concentrate (42%), sleeping disorders (20%) and headaches (20%). In addition, traffic noise was considered the most annoying type of noise (**Figure 11**). Also for Paneto et al. [11] the main source of noise is traffic noise. According to Paneto et al. [11], "*possible measures to mitigate urban noise including planning vehicle flows, reducing vehicle traffic speed, improving street pavement conditions, inspecting vehicles to determine their noise emissions, and establishing permits for heavy vehicles to*

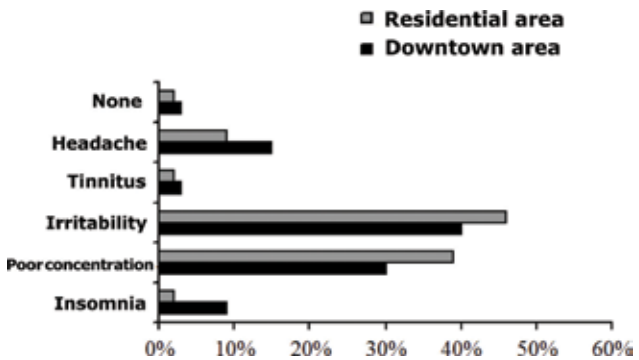



**Figure 10.** Main complaints described by the interviewees.

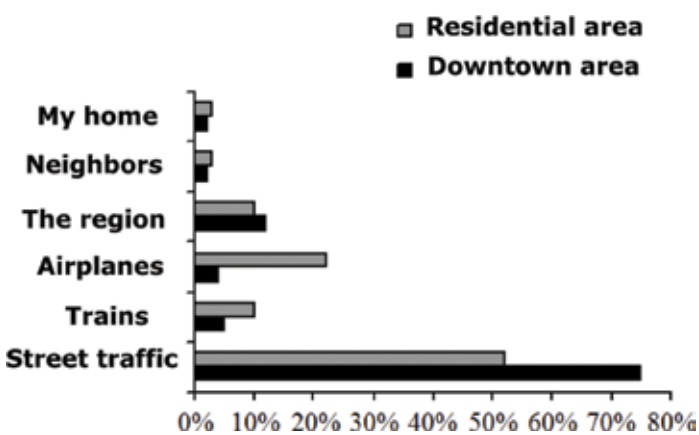



**Figure 11.** Perception of noise source that causes the greatest annoyance.

*circulate in the vicinity of preset areas times*." Paneto et al. [11] also stated "*suggest that interventions could be carried out to favor pedestrians, such as the construction of acoustic barriers at strategic locations, and the zoning of squares and parks, to render these public environments healthier*".

It should be noted that the second most annoying type of noise reported in the residential neighborhood was airplanes. This is explained by the fact that the residential neighborhood of this study lies in an aircraft landing flight path.

The mean measured equivalent sound levels, Leq, were 72.9 dB(A) in the downtown area and 53.3 dB(A) in the residential neighborhood, indicating a significant difference between the two areas in question, as illustrated in **Figures 12–14**.

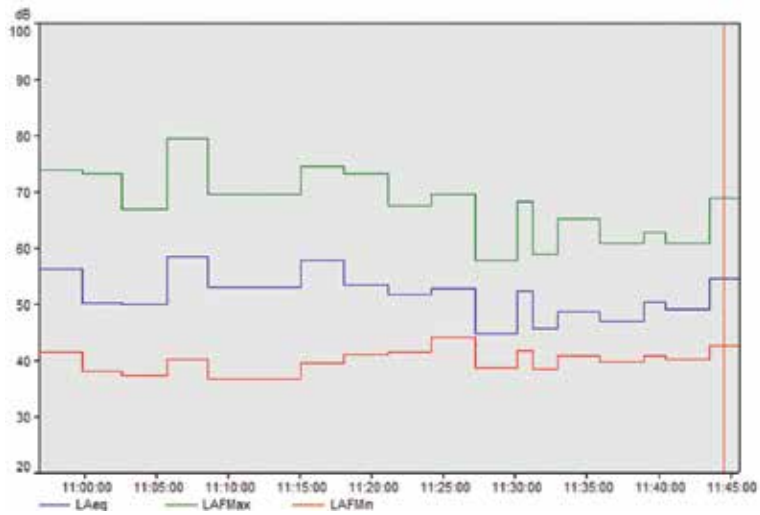



**Figure 12.** Histogram of measurements taken in the residential neighborhood.

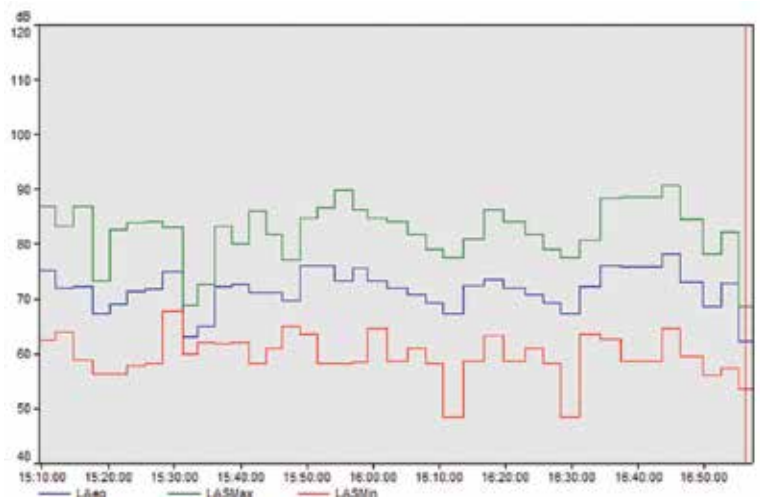



**Figure 13.** Histogram of measurements taken in the downtown area.

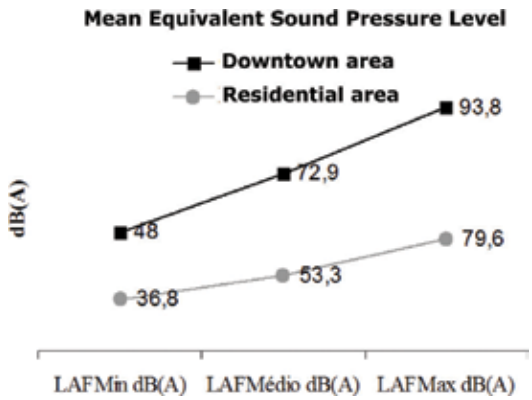



**Figure 14.** Mean equivalent sound pressure levels (minimum level $L_{AFMin}$, mean level $L_{AFMean}$ and maximum level $L_{AFMax}$).

Urban noise pollution is present in virtually every country in the world. Noise pollution studies are therefore needed to find solutions to improve the quality of life in cities.

Urban noise has often been cited as an environmental impact that affects society negatively, which is why it has been analyzed with greater care in reports submitted to government environmental agencies. The results presented in this chapter showed a detailed explanation of how to characterize noise in a community. This characterization can assist in decision-making for urban planning, environmental control and environmental licensing [12].

The problem of noise pollution should be considered a priority in environmental planning, in order to improve urban soundscapes and education on environmental health so as to increase people's well-being and quality of life in cities. Any intervention in an urban environment that leads to variations in a determinant parameter or variable of the noise emission process should be assessed predictively and proactively in the medium and long-term, in view of its possible effects on the environment where it is implemented. Hence, scientific tools must be developed to measure the impact of noise pollution in urban areas [12].

## 4. Conclusion

The answers to the questionnaires indicated that most of the population of this study is aware of the harmful effects of noise exposure, and this level of awareness in the two areas is considered high, that is, 95.5% in the downtown area and 98% in the residential neighborhood.

The responses to the questionnaires revealed that 78.25% of the interviewees in the downtown area and 28.3% of those interviewed in the residential neighborhood believed that the level of urban noise was increasing. This belief was corroborated by the measured mean sound pressure levels, which were 53.5 dB(A) in the residential neighborhood and 72.9 dB(A) in the downtown area, respectively.

In the two urban areas of this study, the most commonly reported effects of noise exposure were irritability and poor concentration. In addition, street traffic noise was cited as the most annoying type of noise.

A comparison was made between the parameters adopted for reference, that is, 55 and 65 dB(A), respectively, established for the areas of this study by Curitiba Municipal Law No. 10.625, and the level recommended by the World Health Organization of 55 dB(A) for residential areas. This comparison revealed that the urban noise levels in the residential neighborhood were acceptable, while those in the downtown area were unacceptable, in terms of acoustic comfort.

The sound levels measured in the residential and downtown areas indicated that the former can be classified as an acoustically controlled zone in relation to the mixed zone—the downtown area. Hence, it was concluded that the residential neighborhood can be classified as an ideal zone and the downtown area as an acoustically polluted zone. These distinct areas, with their specificities, can therefore be used as factors of reference for other evaluations.

The methodology and the results obtained and presented in this chapter are of interest to professionals working in the areas of environmental management of cities, in architecture, urban design, in environmental noise control, and so on. Finally, it is of great importance for urban managers in their decision-making, seeking to find solutions to the problems of urban planning, in what concerns the control of environmental noise pollution.

## Acknowledgements

The authors gratefully acknowledge the German Government, through the German Academic Exchange Service – DAAD (Deutscher Akademischer Austauschdienst) and the Brazilian Government, through the National Council for Scientific and Technological Development – CNPq, for their financial support, which enabled the purchase of the sound-level meter and the software used in this study.

## Conflict of interest

The authors declare that they have no conflict of interest.

## Author details

Elaine Carvalho da Paz, Thomas Jeferson Vieira and Paulo Henrique Trombetta Zannin*

*Address all correspondence to: paulo.zannin@pesquisador.cnpq.br

Laboratory of Environmental and Industrial Acoustics and Acoustic Comfort–LAAICA, Federal University of Paraná – UFPR, Brazil

## References

[1] Belojevic G, Jakovleviac B, Alesksc O. Subjective reactions to traffic noise with regard to some personality traits. Environment International. 1997;**23**:221-226. DOI: 10.1016/S0160-4120(97)00008-1

[2] Maschke C, Leitmann T. Epidemiological Examinations to the Influence of Noise Stress on the Immune System and the Emergence of Arteriosclerosis. Umweltforschungsplan des Bundesministeriums Für Umwelt, Naturschutz Und Reaktorsicherheit Im Auftrag des Umweltbundesantes, Berlin; 2002. pp. 1-7

[3] Babisch W, Elwood PC, Ising H. Road traffic noise and heart disease risk. In: Ising H, Kruppa B, editors. Noise and Disease. Stuttgart: Gustav Fischer Verlag; 1993

[4] Maschke C. Preventive Medical Limits for Chronic Traffic Noise Exposure. Berlin: Forum Acusticum; 1999 March 14-19 on CD

[5] World Health Organization. Résumé d'Orientation des Directives de l'OMS Relatives au Bruit dans l'Environmental (Summary of WHO Guidelines for Environmental Noise). Available from: http://www.who.int/home.page [Accessed: May 15, 2003]

[6] Garcia A, Faus LJ. Statistical analysis of noise levels in urban areas. Applied Acoustics. 1991;**3**:227-247. DOI: 10.1016/0003-682X (91)90007-2

[7] Zannin PHT, Calixto A, Diniz FB, Ferreira JA. A survey of urban noise annoyance in a large Brazilian City: The importance of a subjective analysis in conjunction with an objective analysis. Environmental Impact Assessment Review. 2003;**23**:245-255. DOI: 10.1016/S0195-9255(02)00092-6

[8] Paz EC, Ferreira AC, Zannin PHT. Estudo comparativo da percepção do ruído urbano. Revista de Saúde Pública. 2005;**39**:467-472. (in Portuguese)

[9] Prefeitura Municipal de Curitiba. Lei Municipal No. 10.625 de 19 de dezembro de 2002 (Curitiba Municipal Government (2002). Municipal Law No. 10625 of 19 Dec 2002) Curitiba: PMC; 2002. pp. 1-9. (in Portuguese)

[10] Associação Brasileira de Normas Técnicas – ABNT (2000) NBR-10.151, Avaliação do Ruído em Áreas Habitadas visando o Conforto da Comunidade (Brazilian Association of Technical Standards – ABNT (2003) NBR 10151, Noise Assessment in Populated Areas, Seeking the Comfort of the Community). Rio de Janeiro: ABNT. pp. 1-4. (in Portuguese)

[11] Paneto GK, de Alvarez CE, Zannin PHT. Relationship between urban noise and the health of users of public spaces—A case study in Vitoria, ES, Brazil. Journal of Building Construction and Planning Research. 2017;**5**:45-57. DOI: 10.4236/jbcpr.2017.52004

[12] Zannin PHT, Editor. Noise Pollution in Urban and Industrial Environments—Measurements and Noise Mapping. New York: Nova Science Publishers, Inc.; 2016. p. 342. ISBN: 978-1-63485-269-2 (hardcover)

Chapter 3

# Urban Development in Bogotá: The Metro Case of Study

Juanita Corredor Tellez

Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/intechopen.79829

*"Every landscape is a product of small or major engineering actions and, therefore, the practice of engineering is a political practice per excellence. And, of course, from the perspective of our approaches, it is an ideological practice that reflects in the landscape a vision of society and an imprint of the image that society has of itself and of the universe."—Gerardo A. Engineering and territory: An indissoluble political relationship. Magazine Palimpsesto. 2006;**5**:60-67. National University of Colombia.*

**Abstract**

Bogotá is a growing city with a lot of difficulties shared by most of the Latin American cities nowadays, like the social and economic segregation, that tempt to produce areas of accentuated poverty, inequity, and insecurity, while other areas of the city have services and a better environment; problems related with the distances and the traffic that makes these cities difficult to move around; and among other problems. It seems like the city planning focused on the transport system as a key step to push urban development has been marking the course of the public policies around the city planning in Bogotá, in the last nearly 70 years. The Bogotá Metro is a massive transportation project that has been the subject of debates and studies since 1950 when the major Fernando Mazuera decided to eliminate the tram by burying its rails. The purpose of this text is to reflect around urban development in Bogotá and how this thought about transport infrastructure, as the key step of the urban development, has been marking the city planning policy in Bogotá the last two government periods. For this purpose, the institutional discourses and practices are going to be analyzed. The main argument of this reflection is that in the current period of the government, the idea of development through the transport infrastructure and the plans, through which this idea is carried out, accentuate the social, economic, and spatial segregation, as well as the fragmentation of the city, producing territorial reconfigurations that intensify social inequalities and tensions among the multiple and diverse social actors in the territory.

**Keywords:** urban development, transport infrastructure, relocation, segregation, fragmentation, integration, connectivity

## 1. Introduction

Urban planning in Bogotá has been marked by policies that emphasize social, economic, and spatial segregation, allowing the market to freely determine the growth of the city, its relationship with the market and global trends, and even the concepts of beauty, value, ethics, and esthetics in the city, as well as deciding who will enjoy the privileges of the development of the city [1].[1]

This last one is a problematic issue because the development of the city, including its infrastructure, is part of the general good that prevails over the particular, which is the base of the social and ecological function of property in Colombian land law. But to fulfill the social and ecological function of the property, it is necessary to reflect on who will be benefited or privileged to enjoy these urban developments and greater value of the land and how.

The last two periods of government in the city of Bogotá have been making a great effort to build a Metro as the main project of their government proposals. Although the legal framework for infrastructure development in Bogotá is the same, there is a different political approach that can be distinguished in both governments.

In the period of government between 2012 and 2016, led by Gustavo Petro, despite the tradition of privileging the private sector of construction, he proposed a subway system linked to integrated urban plans allowing people to take part in the development of the city, through their participation in specific projects with opportunities for this population to remain in the affected area. The permanence became a central argument that leads us to the question that underlies the problems around city planning, about how to build a model of integral planning where we fit all and where the land of conservation and urban land are the platform for the construction of the social weave?

The Metro, as a subway system in Gustavo Petro proposals, was integrated to the concept of expanded center of the city, a regional approach that includes the long-term planning connected with the first ring of towns around Bogotá and the intention of creating policies and legislation to develop the city in this way. This transport model came from the integral vision of the city that involves the delimitation of land uses as well as dispositions around the heights, types of development, housing, and collective equipping, all this tending to build integration and connectivity (**Figure 1**).

The revitalization strategy of the expanded center emphasizes on the identification and intervention of zones due to their proximity and accessibility to existing employment zones and the offer of social, cultural, and financial services in the first ring around the urban center. Identifying the potential for reconversion of uses, the responsible densification with the urban habitat, the generation of new public space, and the offer of lands enabled for social housing, therefore, to allow the inclusion and social and economic integration.

[1]This trend of growth in the city, apparently since the 1980s, has been identified by authors such as Marie-France Prévôt Schapira, professor at the University of Paris 8 (CRAG) and the Institute of Higher Studies in Latin America (Paris III), and researcher at the CREDAL (Center for Research and Documentation on Latin America).

http://dx.doi.org/10.5772/intechopen.79829

**Figure 1.** Delimitation of the extended center of the city [2].

According with the City Plan[2] in Gustavo Petro period of government, the revitalization of the expanded center strategy included actions such as the updating and expansion of the aqueduct and sewerage networks; the construction of conduction, drainage, and water reuse systems; the generation of green public spaces that make visible and generate new urban meanings around water; the promotion of densification processes through integrated urban projects; and the use of greater buildings and uses to finance urban redevelopment through low-cost housing projects and high-quality construction and space, strengthening the role of the communities to recognize and reconstruct the territory based on the promotion of creative practices, the enjoyment of cultural diversity, and the care of the environment.

The Metro was not the only concern but the integrated transport system, including the adequation of the tram and its rails strengthening regional connectivity, the footpaths and the bicycle paths, and the actualization of the current transport network "integrated public transport system (SITP)"[3] as it can be seen in the **Figures 2** and **3**.

On the other hand, the current government from 2016 to 2020, led by Enrique Peñaloza, stopped the project and proposed a transport system above the current system called TransMilenio. In this project, there is neither concept of integrated urban plans nor the possibility of link up the affected people in a scheme that allows them to remain in their territories through renovation and revitalization instruments, and the line is shorter covering only almost the central areas of the city which concentrate the greatest houses and services (**Figure 4**).

[2]Extract and personal translation from the City Plan of Bogotá [3]

[3]The SITP includes TransMilenio, but is not an excusive term to refer to. TransMilenio is a system based on the integrated transport network of the city of Curitiba. The SITP includes TransMilenio and the urban busses.

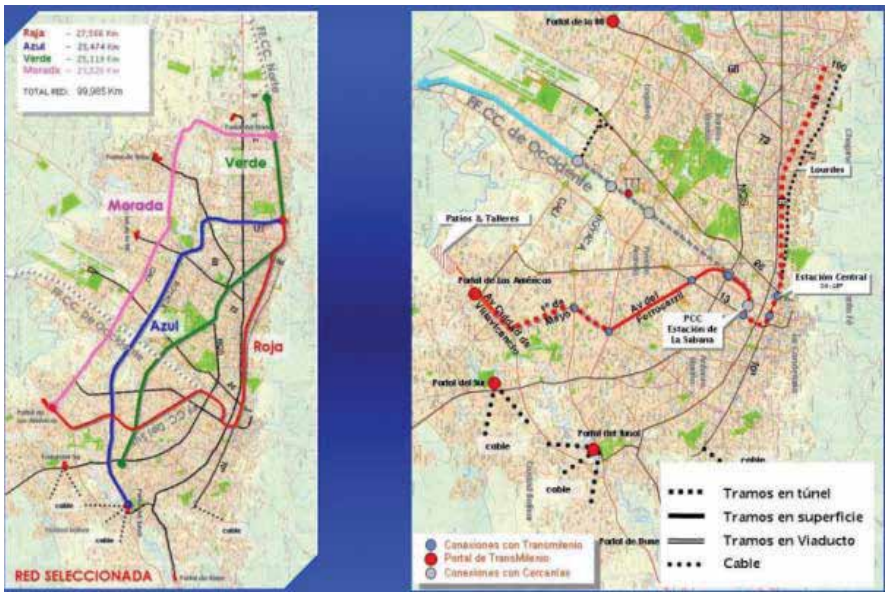



**Figure 2.** Conceptual design of the first subway line in Bogotá 2012 [4].


**Figure 3.** First subway line in Bogotá 2012 [5].

The Metro proposed by Enrique Peñaloza is cheaper and faster to build because it just requires adequation and rehabilitation of the public space around the stations. It does not need a recollection water system, the investment on other systems of the infrastructure like

http://dx.doi.org/10.5772/intechopen.79829


**Figure 4.** Bogotá Metro 2016. Bogotá Subway 2016. (http://www.vanguardia.com/politica/410725-la-nacion-solo-aportara-909-billones-para-el-metro-de-bogota). Image that shows that the line is shorter and there is only connectivity of the Metro with the lines of TransMilenio projected to be developed also in the current period of government.

energy, expansion of the aqueduct and sewerage networks, the participation of the people, nor plans to integrate city systems and the city with the towns around the first ring. The model proposed in a private-public association consists in creating the financial conditions to build the Metro, which is going to be financed by the private recourses, allowing these investors to grow in altitude their buildings, choosing the best locations and getting the benefits of the greatest value involved in the urban interventions.

Both conceive the transport infrastructure as a key to the development of the city, but as we explained earlier, both approaches underlie different conceptions of development. Today, it seems that the projects that link up people in the development of the city are still utopian and with less possibilities of concretion, as well as the idea, around integrated urban plans for the social integration, economic development, and environment protection.

On the other hand, there are also issues such as the layout and areas where the stations of the system will be located and problems related to the design of the system. Both the layout and its design are fundamental to the extent that it depends on who will access both the transport system and the benefits it brings in the surrounding areas and how.

When talking about the transportation system, there is a procedure to purchase the properties needed for the infrastructure. In any case, people have to sell their properties, but the approach is different in the case of projects that link up people as opposed to projects that expel people. And there is also a big difference in the layout, location of the stations, and in the financing and land management schemes.

It is desirable, a city planning approach based on the direct provision of housing, education, and food security, where the transport infrastructure system can be an articulating axis. Likewise, land policies are desirable that tend to create a market system to guarantee goods

according to people's ability to pay. Policies that seek to prevent accumulation as a path to social power, where the right to common goods such as knowledge and land, are the main assets to which people must have access. It is desirable that these goods be created, administered, and protected by popular associations with the aim of satisfying common social needs, following the approach of Harvey [6].

From this reflection, it can be concluded that the approaches that license the private investments on the city create more fragmentation. "The notion of fragmentation emphasizes the complexity of the socio-spatial dynamics related to metropolization (outbreak, separation, secession) resulting from the aggravation of social inequalities, the rise of poverty and the brutal impoverishment of middle classes," following Marie-France Prévôt Schapira [1]. The approach concludes in pollution, shortage of accommodation, insufficient coverage of urban services, etc.

This discussion leads to the following question: Beyond the differences, is it possible to identify the emergence of a new model, more dispersed, less hierarchical, that replaces fragmented city to organic city, integrating population into the city through the development of the salaried sector and a planned urbanism?

Urban Marxist structuralist sociology (Castells, [7]) devoted itself to understanding how the processes of domination and dependence generate immense peripheries or" urbanizations," but the spatialization of new forms of urban poverty has not been studied, as if they had remained in the simple equation of the past: misery neighborhood equals poverty equals illegality. The observation of the widening forms of poverty in the city shows, on the contrary, that its extension is not accompanied by homogenization. And the conclusion is that these forms of exacerbated territoriality and restricted identity are further accentuated by the reduction of mobility in the city.

## 2. The Bogotá Metro in the time

In 1981, the Sofretu Ineco CS Consortium was contracted to design the first Metro line for the Colombian capital [8–10].[4] The study, advanced in the presidency of Julio César Turbay Ayala and Hernando Durán Dussán, proposed a subway system with three lines and a total of 75.8 km. The project supposed a future population in the year 2000 of 7.5 million people that will be reached within the perimeter of the capital city, in the year 2011. If we consider the towns of the first ring, we have already overcome this population.

As the results, the Bogotá subway entered to compete for national resources against the Medellin Metro project. Finally, the priority was given to the Antioquia capital project, postponing the decision on the Bogotá Metro.

In 1987, the national government, headed by the President Virgilio Barco, proposed the development of a Metro system again. This project foresaw the construction of three lines of 46 km,

[4]The following chapter is a summary and personal translation from the books published by the District Department of Planning of Bogota, under the direction of William Camargo Triana, who latter was going to develop the concept of integrated urban projects as the way to represent the link between revitalization and transport system development, as director of the Urban Development Institute (IDU), during the government period of Gustavo Petro.

http://dx.doi.org/10.5772/intechopen.79829

on the existing layout of the railway network. Twenty-six countries were invited to submit proposals for the development of the project, giving special importance to the financing offered in the award. Eight offers were received, and finally, the Italian firm Intermetro SpA was selected for the execution of the project.

The proposed Metro was developed in unconsolidated areas of the city, low demand, taking advantage of the low cost that would imply the availability of public land. The study did not propose a scenario of urban development that was articulated with the Metro. Finally, it was decided to include an additional section that accesses the center, outside the lines.

At the end, the proposal of the Italian consortium was not clear in technical terms and its financing. International studies and local specialists hired by the national government concluded that the project was not convenient, in the administration of Cesar Gaviria.

Again in 1996 a subway project was proposed by the Japan International Cooperation Agency (JICA) as a Transport Master Plan. The study was a donation from the Japanese government to the city of Bogotá and was developed in the government period of Antanas Mockus, as major of the capital. The JICA Transport Master Plan was developed in parallel with the integrated mass transportation system study (SITM). This is maybe the first moment in which it is possible to identify in the institutional discourse the appearance of the term "integrated system."

The objective of the JICA study was not to determine the layout of the subway nor its technical characteristics but to propose an integral scheme of development for the future of the city, which included the development of an integrated transport network contemplating several modes (trunk, transport collective, ferrous modes) that would be developed according with the growth of travel demand, as well as proposals to improve the flow of private transport and traffic management. The first line of the JICA had a length of 32 km.

The JICA foresaw the start of the construction of the Metro line in 2006 and the start of the operation in 2016. Shortly after the JICA study was completed, the Capital District proposed a land management plan (POT) that visualized a different territorial implementation scheme, limiting the possibility of development in the north of the city that was a priority in that plan. As a result, the POT and the projects related to mobility in the city did not adopt the main proposals of the JICA Transport Master Plan. Some of the plans for the development of north of the city had the problem of proposing urbanization projects in wetlands.[5]

In 1997, the Systra Bechtel Ingetec (SITM) consortium proposed a scheme of three Metro lines, similar to the one proposed in 1981, complemented by a bus trunk scheme. This study was developed by the national government, with Ernesto Samper as president. The majors of the period were Antanas Mockus and Enrique Peñalosa. According to this study, the first Metro line was going to cover a length of 29.3 km. The SITM studies, similar to what happened with the JICA studies, did not have an official view of what the development of the city should be, since the POT is subsequent to the results of the study. It was assumed then a development loaded toward the west of the city, considering in this occasion the important development that was being generated in the north–south axis.

[5]This is a very important problem in Bogotá, not only in the north of the city but all around and even in central areas.

The period in which the study was conducted was quite critical in fiscal terms. One of the conditions to be able to carry out the project was to achieve an adequate scheme of public-private participation for which an investment bank was hired. As a result, the city implements a mass transit system type bus rapid transit (BRT).

As it can be observed, there are several projects that have been raised in a preliminary way by economic associations, private companies, academics, and promoters of Metro systems, among others. It is important to underline in the projects presented that the Metro is not unique and that the variations in terms of capacity, type of structure, and therefore cost can be significant. In general, Metro studies have failed to integrate the vision of the city with its transport system. The demand projections and the assumptions of development of the city that have assumed in the studies have not been fulfilled.

The same happened with the trunk networks that were not linked in an adequate way to the integral urban project vision. The first interventions that were made, such as the Caracas Avenue, did not include the recovery of public space parallel to the corridor. Subsequently, in the intersections of the Medellin Avenue (80 Street) and the Americas Avenue, the intervention was not adequately coordinated in terms of mitigation of the impact of the layout and design in the surrounding areas. As a consequence, there are urban scars associated with abandonment that were generated and progressive deterioration without recovery, due to the lack of management in leftover lots and lack of an appropriate standard for these cases of intervention on road infrastructure.

## 3. Bogotá Metro as a possibility for integrated urban projects (PUI): Proposals and discourses in the Gustavo Petro government 2012–2016

The Metro project has been defined as a project for the contribution to the improvement of mobility in the urban level, since it implies an infrastructure different from the conventional transport systems, which will require a wider action that goes beyond the segmented vision of mobility and directly impacts the urban weave; the economic, cultural, and social activities of the environment; and the behavior of the citizens in the face of the implementation of a new system.[6] The project prioritized mass and collective transportation to reduce the costs and times associated with the mobility of people and proposed the implementation of a multimodal system that combined mass transportation, metro, trams, collective metrocable, and bicycle lanes as is referred in the City Plan "Development Plan, economic and social and public works for Bogotá Capital District 2012–2016."

The definition of the layout of the first Metro line (PLM) was trusted to the SENER Consulting Group, by the district administration, who carried out the studies for the conceptual design

[6]For this extract definitions given by William Fernando Camargo Triana in his documents written as director of Lines, Transportation, and Public Services in the District Planning Department were taken. Comprehensive urban projects associated with the areas of influence of the mass transportation network—First Metro Line.

http://dx.doi.org/10.5772/intechopen.79829

of the Metro mass transit network and operational design, legal, and financial scheme, within the framework of the integrated public transport system SITP for the city of Bogotá. Line 01 was designed with a total length of 29 km, 31 stations along its route. Starting at 127 Street, then through the 11th to Lourdes (in Chapinero), continuing along the 13th Street to San Victorino (in the center), continuing until the station of the Savana, it crosses the iron corridor until the avenue Primero de Mayo, in the south, and finishes in the sector of Tintalito, in the southwest. The central station will be located on 26 Street with 13 Avenue where the passengers will be exchanged between the Metro and TransMilenio. The central control station (PCC) of the Metro system will be located at 13th Street with 18.

In the words of Blanco and Apaolaza [11], "One of the main challenges that geographers and urban planners face when thinking about mobility in Latin American cities is how to accurately assess the effect produced by severe social and territorial inequality." In an attempt to explore this question, they identify three key issues related to the inequality-mobility relationship: "(a) mobility as a facilitator in the access to goods, services, and opportunities at different urban scales and its direct effects on poverty and social exclusion; (b) socially and territorially conditioned assets and competences among individuals when managing mobility needs and territorial control; and (c) the uneven appropriation and use of the city, both in terms of proximity and connection to metropolitan networks."

The subway as a possibility for integrated urban projects in the Gustavo Petro government was focused on transport and mobility at the metropolitan scale according to income level and territorial location of households, highlighting the importance of territorial features when addressing mobility patterns of particular socioeconomically vulnerable groups, including mobility of informal settlers in urban peripheries; mobility of domestic workers in gated communities; and mobility of residents at risk of displacement in gentrifying neighborhoods. The key findings stress on how the particular territorial conditions can intensify or attenuate the preexisting socioeconomic inequality. And this is how his policies fulfill the three key issues related to the inequality-mobility relationship proposed above.

One of the main problems that public authorities face when undertaking programs and projects of public utility or social interest has to do with the acquisition mechanisms of the properties required and specifically with the use of the instrument of expropriation. The main tension that underlies the use of the expropriatory instrument is the definition of the value of the expropriated property.

It must be remembered that often such projects are carried out on central areas of the cities occupied by low- and middle-class population and that usually involve the intervention of private real estate capitals in search of locations capable of generating intense and rapid processes of valorization. In this context, the application of a price control instrument may end up reinforcing a very generalized characteristic of this type of process: expulsion of the resident population or what is the same gentrification as is known in the specialized literature. In this way, they can be completed by facilitating the capture of capital gains by private real estate agents who can be beneficiaries of the expropriation processes undertaken by the public power to facilitate and promote such processes.

On the contrary, to allow the original owners of such areas, where programs and projects of urban renovation or revitalization are developed, and to participate in the real estate valuation that the project itself can produce can be a way to facilitate its permanence in the area or at least a good opportunity to increase their assets, giving them greater ability to pay, in case you choose to go to a new location. At the end, "facilitating" the capture of part of the real estate valuation by the original owners can be, in a context of broader analysis, a more equitable measure of distribution of charges and benefits among the different actors. This explanation given, by Juan Felipe Pinilla [12], reflects very well the spirit of the revitalization of Gustavo Petro City Plan which emphasis the Metro as an axis to articulate plans and programs allowing the affordability of housing, social services, and infrastructure, promoting accessibility, connectivity, and social integration. In this sense, an effort to build a discourse and proposals on the base of social integration, connectivity and sustainability, connecting social dimensions with spatial components and the land policies, can be observed.

However, even in spite of the efforts to develop a city model consistent with the discourse of social integration, Bogotá has been dominated by the development model. This can be observed in the resistance of people toward concepts such as social mix and forms of political and territorial integration, through persistence in very discriminatory representations of the places of poverty and their inhabitants.[7] And it is also almost evident that the private capital has a lot of strength because it has controlled throughout the history of the city its development, a planned development that only benefits a small portion of the population, different than the other large percentage of neighborhoods developed through community action and self-construction, many of them developed illegally.

It is known around the world the concept of "urban crisis" to refer to the problems of the growing cities around transport system, housing, infrastructure, and problems related with the nonrenewable resources, among others. Therefore, the notion of "urban crisis" does not analyze the dysfunctionalities that for many are not new (pollution, shortage of accommodation, insufficient coverage of urban services, etc.), but it underlines the blockade of the model of national-popular integration. The creation of territories for "themselves," linked to related residential strategies, on the one hand, and the sedimentation of poverty in the areas of exclusion, on the other, are really the extreme and symmetrical forms of that process.

Because of this, it is very important to keep thinking if is it possible that an emergent new model, which is more dispersed and less hierarchical, is built to replace fragmented city to organic city, and keep thinking about how to build an integrated city, under the prevailing models of metropolization and globalization, capable of fighting what seems to be the inevitable process of fragmentation and the creation of urban borders and that accentuate poverty and inequality.

[7]This can be observed in cases like the proposal to buil social houses in centric areas of the city, in which the reaction of the people living in neihborhoods around was very resistant and other cases documented though participation in metteings, open inteviews, and observation.

http://dx.doi.org/10.5772/intechopen.79829

## 4. Bogotá Metro as economic development: Proposals and discourses in the Enrique Peñalosa government 2016–2020[8]

The construction of the elevated Bogotá Metro or viaduct is an idea that emerged in the value engineering exercise carried out by the national government in 2015, by SENER for Bogotá. The result of this study, as well as the construction of the project by sections, was accepted by the district administration in January 2016, to make viable a Metro that was designed. In fact, by this time, the administration had already carried out the socioeconomic studies of the affected properties and had even offered some of them. But as a result of the change of government, the project was stopped. The main arguments are the devaluation of the peso against the dollar could not go beyond of 53rd Street, the total uncertainty due to the quality of the soils, the time of work under ground, the cost of transporting kilometers of public services networks, and the risks and the cost overruns that are still to be analyzed.

In 2016, the national and district government promoted a study of alternatives, typologies, and costs by the SYSTRA [13], a subsidiary of the Paris Metro. In the analysis exercise, using as reference the existing studies, SYSTRA evaluated and compared 8 path length options, with high and underground sections, through 31 indicators (environmental, urban, constructive, social, financial, and risk). In this exercise, the greatest relative weight was found in the economic component, where it was found that:

With the recourses designated to build a kilometer of underground subway, it could be built 1.48 km of elevated Metro. The cost of operating the elevated Metro is 28% less than the underground because it does not require mechanized ventilation, or pumping for water extraction and only night lighting. The elevated meter can be built faster because the grins can be prefabricated in a workshop and then quickly installed on the columns, including the stations. The elevated subway work presents lower construction risks in Bogotá; the assessed risks of the underground solution are related to the excavation under bodies of water and the desiccation of the soil, which in Bogotá would produce settlements in the buildings up to several blocks away. Operational risks were also considered, and underground trains are more complex to handle emergencies such as fires, attacks, or accidents and stranded trains.

The sum of the analysis, and the conclusion of the government of all these criteria, concluded that the viaduct or elevated typology was the most convenient for Bogotá. Was highlighted that the thanks to the geological studies to be carried out represented a serious risk in the process of building an underground and with high costs and risks of destabilization of buildings, drying, and interruption of public service networks.

As it can be observed, there is an emphasis in the financial matters than the long-term vision of the city that could result in a faster project to build to show immediate results to the city but far from the integrate the systems of the city in a scheme involving social, economic, and spatial integration and connectivity.

[8]The chapter takes for the discourse analyzing the definition found in the current web page of the Metro that shows the project (http://www.metrodebogota.gov.co/por-que-elevado) [13].

## 5. Conclusions

The new motilities are accentuating preexisting inequalities. Where there was local urban poverty, a new urban poverty emerges that reveals different ways of inhabiting conflicts between those who dispute the land, power conflicts between territorial agents, among others. The causes and responsibilities of urban inequality and the lack of territorial opportunities of households are questioned. But to some extent, territorial conflicts emerge as the search for equilibrium of classes, forms, or mechanisms of improve social mobility.

Socio-spatial conflicts are assumed as forms in which different collectives make their interests representative. Therefore, the conflict between agents and territories arises not as antagonistic positions but rather as the search to reconcile interests. There is a need to reduce inequities as the responsibility of different agents who are in conflict but who require a new citizenship to claim the right to land, to housing, and to citizenship, ensuring a mobility and the social construction of territory and territoriality.

A socio-spatial model is needed as a space of rights of access and circulation that denote public freedom, in terms of Henri Lefebvre [14]. In terms of professor Ricky Burdett [16] for the Quito Papers conference, toward the open cities, there is three concepts that should be taken into account: (1) Porosity: notion of open places to a variety of people, instead of closed to specific groups. Planners have the tools to create open spaces where interact the diversity of people, communities, and groups that inhabit the city, which have different social, economic, and cultural conditions. (2) Synchronicity: a concept to exemplify the mix of uses, all in the same place. The author explains that it is not a mixture in the traditional sense, but a phenomenon of many types of activities happening at the same time. (3) Informality: as incomplete forms of the city.

The general design criteria contemplated for the implementation of the Metro in the government of Enrique Peñalosa as well as building the most significant system of public transport in the city consisted of integrating the users as the most important determinant of the project. As a contribution to the urban space, elements such as trees, furniture, and squares were studied, generating a large number of square meters of public space of different hierarchy.

These proposals had previously been implemented for the TransMilenio system resulting in areas without collective use and without appropriation by users. In most accesses to pedestrian bridges, there is no linkage of urban uses (commercial and services mainly), which degrades the character of these sectors and contributes to the loss of land value.[9] Consequently, there is a crisis of public space in two main dimensions: as a multipurpose element, as a place of exchange and collective life, and as an element of continuity, articulation of different parts of the city, community expression,and citizen identity in terms of Jordi Borja [15].

Another problem with this system is the property impediment to advance architectural and landscape improvements in trunk lines. This is due to the fact that in some cases the leftover properties along these urban infrastructures do not comply with the minimum area required

[9]An example of this could be the third millennium park, which is a public space created in a deteriorated area, next to one TransMilenio Station.

http://dx.doi.org/10.5772/intechopen.79829

to generate real estate or any other type of development. These properties over time reproduce the deterioration associated with factors such as the fragmentation of the wall, the inability of the properties to generate facades in the corridors and to join others of greater area and to modify morphologically, and typologically the predial sections adjoining them. This phenomenon is multiplied even more after the absence of specific urban norm for such interventions or sufficient incentives so that these actions (promoted by private initiatives) are realized.

This is how urban transformations in Colombia have not been accompanied by a parallel urban action aimed at recovering and generating new public space, updating public networks and services to new densities, improving accessibility, etc. Therefore, although urban renewal has been conceived in the POT as the fundamental tool for consolidation, the lack of an integral vision of the city means that not only there are few executions but that many of the projects presented are considered as isolated urban interventions, with the dubious objective of achieving a dense and compact city.

Likewise, public interventions linked to neighborhood improvement or the implementation of urban-scale infrastructures such as the TransMilenio lead to an increase in the stratum, without improving the population's ability to pay. The effects can be expulsion of the population due to higher payments of taxes and public services, which would contribute to the elitization of space but, above all, a negative balance effect in terms of urban integration objectives, because the improvement of the spatial conditions of the environment have a cost for the inhabitants of the popular districts that is not necessarily easy to assume, especially in a conjuncture of constant increases of tariffs and reduction of the subsidies. It would be taking for granted that the quality of the environment is proportional to the income of the inhabitants of an area, denying the possibility of favorable environments for the poorest.

The conception of infrastructure and transport projects is usually promoted, from the sectoral agendas, by squandering the potential and synergy that can be obtained by coordinating integrated actions on the territory, where investment in roads and transport lines are the most important catalyst for new urban forms. As a result of this unfortunate approach, isolated actions have generated adverse consequences for urban matters, which translate into the physical appearance of stock, urban voids, and spaces of anomie. In terms of functionality, the creation of barriers for pedestrian mobility, which economically cause a reduction in value in the assets of the city, promoting insecurity and the loss of ownership of the different places.

This reflection makes it necessary to advance in the approach of instruments that allow to orient in a synergic and coordinated way, the actions on the territory, seeking to break the traditional way as the road infrastructure projects have been understood in the city, which mostly only address road technical aspects and do not generate a comprehensive strategic approach.

Revitalization, as a strategic integral approach, means generating stable socioeconomic conditions so that the inhabitants and in general the population, living in the central areas, are not displaced by new "more profitable" activities that are implemented, or by the qualification of an urban space that later cannot be paid, since in both cases the revitalization processes must provide mechanisms for the previously settled population to remain and be beneficiary of the actions.

Associated management as an instrument to participate in land rents can be used to achieve public-private partnerships and effectively involve landowners in the transformation of the city, to avoid gentrification and rejection of land renewal processes.

Bogotá needs to expand the technical, political, social, economic, and spatial vision of urban problems; this induces to debate more on the problems of the city in general and its urban transport. To avoid stagnation in discussions about mobility and the advantages and disadvantages of certain types of infrastructures or projects in progress, it is a priority to have a city project that synthesizes the type of city desired, in which the road network and public transport can be considered as one of the bases of structuring and balance. And finally, to conclude the reflection, Bogotá needs the Metro that has not been built yet.

## Acknowledgements

The text reflects on aspects of mobility in Bogotá, through the case study of the Metro, as well as analyzing phenomena such as spatial social segregation and the fragmentation of the city, taking as reference the literature produced during Gustavo Petro's government, who is currently a presidential candidate, and to whom we owe the possibility of thinking about an inclusive, integrative, and connected city development.

## Conflict of interest

I declare that I am facing a situation of conflict of interests because I belong to the institution that designs and executes the transport infrastructure plans, the Urban Development Institute (IDU).

## Author details

Juanita Corredor Tellez

Address all correspondence to: juanita.corredor@gmail.com

Urban Development Institute (IDU), Bogotá, Colombia

## References

[1] Schapira Marie-France P. Social and spatial segregation: Concepts and realities. Perfiles Latinoamericanos. December 2001

[2] Map No. 1. District Planning Secretary (SDP). Delimitation of the Extended Center of the City. http://www.sdp.gov.co/sites/default/files/documentos/01.CENTRO-AMPLIADO.pdf2015

[3] City Plan of Bogotá. Development Plan, Economic and Social and Public Works for Bogota Capital District 2012-2016. Bogotá; 2012

[4] Conceptual Design of the First Subway Line in Bogotá; 2010. http://www.metroenbogota.com/movilidad-bogota/metro-de-bogota/conozca-los-estudios-oficiales-para-el-metro-de-bogota

[5] First Subway Line in Bogotá; 2010. http://www.metroenbogota.com/movilidad-bogota/metro-de-bogota/conozca-los-estudios-oficiales-para-el-metro-de-bogota

[6] Harvey D. Seventeen Contradictions and the End of Capitalism. Quito: Editorial IAEN; 2014

[7] Castells M. Estructura de Clases y Política Urbana en América Latina. Santiago de Chile: Ed SIAP; 1974

[8] Camargo, William F. Captación de plusvalías en corredores urbanos de transporte masivo: Posibilidades para intervenciones urbanas integrales a partir de los proyectos de transporte. Master on City and Regional Planning Thesis. Pontifical Javeriana University; 2009

[9] Secretaría Distrital de Planeación. Dirección de Vías, Transporte y Servicios Públicos. Proyectos Urbanos Integrales–Documento I; 2011

[10] Secretaría Distrital de Planeación. Dirección de Vías, Transporte y Servicios Públicos. Proyectos Urbanos Integrales Asociados Al Sistema De Movilidad–Documento II; 2012

[11] Blanco J, Apaolaza R. Socio-territorial inequality and differential mobility. Three key issues in the buenos aires metropolitan region. Journal of Transport Geography. 2018; **67**(C):76-84. http://www. sciencedirect.com/science/article/pii/S0966692316303623

[12] Felipe PPJ. Project Announcement and Benchmark Valuations as a Control Mechanism for Land Prices: Case Study New Usme Strategic Operation. Bogotá, Colombi: Lincoln Institute of Land Policy; 2013

[13] www. metrodebogota.gov.co

[14] Lefebvre H. El derecho a la ciudad. Barcelona: Península; 1975

[15] Borja J. La ciudad Conquistada. Madrid: Alianza Ed; 2001

[16] Burdett R. Quito Papers Conference: Toward the Open Cities. HabitatNY@un.org; 2018

Section 2

# Spatial Planning in Urban Development and Urbanization

Chapter 4

# Models of Implementation of Spatial Plans: Theoretical Approach and Case Studies for Spatial Plans for the Special Purpose Area

Nebojša Stefanović, Boško Josimović and
Nataša Danilović Hristić

Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/intechopen.78242

**Abstract**

The implementation of spatial plans is the weakest link of planning; it is insufficiently theoretically explored, methodologically unpositioned and in practice only partially carried out. The main direction in considering improvements in the implementation of plans is that it must be viewed and focused by means of spatial plans in order to as much as possible reduce the impact of all those factors outside the planning system. The study points to the need for and offers the definition of a model of implementation for spatial plans rooted in the theory of planning. The elements and contents of the proposed model of implementation suggest a logical, functional and temporal coherence of all planning decisions covered by the plan. The process of implementing the plan depends directly on the type and method of planning. Four basic models of implementation are defined. The results of research on the application of the implementation model in spatial planning practice in the Republic of Serbia are presented. These are obtained on the basis of multicriteria comparative analysis carried out on a case study of 11 spatial plans. The chapter suggests possible directions for further study, primarily in terms of applying the model of implementation in practice.

**Keywords:** implementation, model, element, spatial plan, special purpose, planning solution

## 1. Introduction

Implementation in spatial planning can be defined in several ways. Bearing in mind the basic axiom of planning that making plans is only meaningful if they are going to be realized, it is

expected from spatial planning that plans include and consider their realization. This axiom is acceptable, provided that at the very beginning the difference is clearly made between the terms "realization" and "implementation." The term "realization" refers to actual physical functioning in the space, while the term "implementation" has a wider meaning and includes not only the realization but also the whole range of conduct in accordance with and on the basis of the plan. It is therefore more acceptable to use "realization" for the construction of individual systems and facilities, which is the planning solution, or in the design and construction of a building, like in urban planning. "Implementation" is essentially more related to the spatial plans and the set of planning solutions that may include construction, policy and the strategy of behavior in space, as well as protection of space, the possibility of applying a rule, and so on, and it is therefore justifiable and necessary to use it for the purposes of spatial planning.

In recent years, as the traditionalist (strictly expert) approach to planning has weakened, implementation has become perhaps the most important question of the theory and practice of planning. From the moment when planning began to be seen from the standpoint of the connection between the development of planning decisions (solutions) and carrying them out, planning implementation, together with planning evaluation, has become of central importance in relation to the other phases of the planning process, which is emphasized in the rational planning approach [1, 2]. The view is taken that executing planning decisions is the least developed field of planning, that is, the most complex and the weakest link in the chain of planning. It has been observed that implementation should not be just part of the plan and the mechanical completion of the plan, but that the overall logic of the planning interaction must be subordinate to the possibilities and means for the planning implementation. The progress so far is largely linked to the theoretical understanding of the problem of implementation, as well as improved access to organizational aspects, while some progress has also been made in terms of implementational methods and techniques.

This chapter focuses on the theoretical assumptions of a model of implementation for spatial plans and possible types of models, with consideration of the possibilities and dependencies of applying particular models of types and methods of planning, as well as ownership relationships.

The basic theoretical assumptions regarding the recognition and application of the implementation model for spatial plans were verified on actual examples from practice, through comparative analysis in a case study of 11 spatial plans for special purpose areas that have been prepared in recent years for priority development areas in the Republic of Serbia.

## 2. Implementation in the theory of planning

The theory of planning offers many planning concepts and ways to classify them. Each of the modalities of planning includes different views on implementation with different criteria for evaluating success:

- Control (regulative) planning is the responsibility of state institutions and it has distinct attributes of centralization. The planning authorities are usually institutionalized and have

an apparatus of legislative and administrative control and sanctions. Implementation comes down to the obligation of all participants in the planning process to comply with regulations. Institutions for planning secure mechanisms for carrying out planning solutions and those who violate the regulations are sanctioned. In the theory of planning, this kind of implementation model is characterized as "freedom of action, but on a short lead" [3].

- Initiative (project) planning is the responsibility of public and private institutions which have the means of implementation. This modality of planning relies on the creation of new projects (construction, engineering, social, etc.). Implementation is in this model most clearly understood in comparison with other modalities of planning. The institution for planning initiates the process, allocates the resources and has significant control in terms of the duration and dynamics of the realization of the project. It depends on the other institutions and plans in the process of obtaining the necessary permits for the realization, but control over implementation is less direct compared to other forms of planning. Implementation in this model is mainly shaped by organizational questions, the enterprise of the institution and the characteristics of the space for which the plan is made [4].

- Planning through policies (indicative planning in France) means planning policies that are formulated as positions on the wishes and ideas of planning institutions, with the aim of influencing their decision-making, and the policies should be a recommendation or guide to other institutions or individuals. In terms of implementation, there is a reduced level of strictness and obligation compared to control planning. Full compliance with planning policy is not expected, and noncompliance with the actions and policies from the plan is not considered to be the failure of implementation. The implementation process actually represents an attempt to formulate policies that could connect and coordinate with the different interests in the space. The role of the planner in the implementation process is based on coordination between institutions, promoting the formulated policies and engagement in obtaining political and economic support. In France, a variation of this concept has been developed known as "indicative planning" [5]. Policies are published periodically by the state, and it can be expected that private individuals, if they adhere to them, gain certain benefits.

- Transactive and advocacy planning is a process of exchange between semiautonomous groups, each of which formulates its own goals and policies. In this process, it can happen that there is no longer a body that regulates the process of exchange [6]. In the classical conception of this kind of planning, alternative plans are presented to a planning institution that plays the role of a judge [7]. The success or failure of implementation in the framework of these modalities is not easy to formulate because it depends on the viewpoint and interests of each interested party. The role of planners in this is to promote their own interests or the interests of their group, through negotiation, settlement, finding support, giving opinions, and so on.

- Radical planning is least known in the theory of planning. It is characterized by a large number of subpatterns and perceptions but they have in common the tendency toward a radical restructuring of the social and economic institutions in the system [8]. As with the previously mentioned modalities of planning, the process of implementation here can be considered to have a strong reliance on the tendency toward significant policy changes.

- Utopian planning is a traditional modality with a marked aspiration for a better quality of life. It does not imply the existence of any kind of institution for implementation. Utopian planning is by definition against all implementations or it is better to say that with this kind of planning, implementation is expressed by means of offering much needed ideas and valuable judgments to the planning [3].

McLoughlin gave a close description of implementation in planning practice by means of his cybernetic approach and viewpoint, in which he defines implementation as a process of leadership and control, that is, "error-controlled regulation" [9]. This kind of approach considers the planner to be the manager of the town or space for which the plan is being produced, whose attention is focused on the plan, or the planned pathway for the future state through which the town needs to pass, as well as observations which show its actual state. In order to focus the definition of the concept of implementation on the target area of spatial and urban planning, it is essential to give an explanation of implementation as microorganizational behavior which explains "the manner of defining and using policy, the spatial allocation of resources and revenue from operations" [4]. If we identify the way, we define policy with the way we define planning solutions (which to a certain extent are in themselves a form of policy), and identify the use of policy with instruments of implementation from planning practice (organizational, legal, financial, etc.) and if we consider the spatial allocation of resources as planning solutions that influence the space, and revenue as one of the objectives of planning, we can conclude that this definition reflects implementation in planning.

Implementation in spatial planning specifically includes planning solutions and instruments which should ensure their realization. In other words, the implementation of the plan should include answers to the questions: how should something be done?; who should do it?; when should it be completed?; with what means should it be done?; and so on. Because of this, some planners have begun to classify the instruments of implementation, for example, as legal, financial, economic, organizational and technical [10], which has found its application in practice.

The theory of planning is so complex, with a very complicated subject of study and a large number of definitions, that every attempt at systematization is a demanding and serious undertaking. One of the most practical ways of systematizing the features of planning which is of significance to implementation was given by Lewis and Flynn [11]. According to these authors, it is particularly important to point out the mixture of modalities of implementation, based on the assumption that in an actual planning situation, there will be a number of the given modalities of implementation present parallelly at the same time. However, the mechanisms of planning and mixtures of modalities of implementation in practice have not been tested. Also, Lewis and Flynn suggest that the success of the implementation will largely depend on the knowledge, experience and conscience of the planner, as well as on the extent to which the planning institution succeeds in identifying the actual spatial interests of the population, companies and other entities. Ensuring adequate public participation in the planning process should help the implementation of plans. The success of implementation at all levels of planning will largely depend on the ability of the state and planners to reconcile public and private interests in the space in an effective manner.

http://dx.doi.org/10.5772/intechopen.78242

For successful implementation, it is crucial that the planning objectives are suitably structured, from general orientation, through relatively firm target propositions, to very definite statements in terms of content, time and space [12]. This is understood to include a large number of individual requirements, which if fulfilled facilitate the implementation of planning decisions. According to Johansen, plans must have internal consistency, which includes the following: individual parts of the plan are not allowed to be contradictory toward each other, that is, evaluation of the status and objectives must be compatible with the structure of what is being planned; its parts must be consistent with each other; and the objectives must be compatible with the measures and instruments [13]. According to Barras and Broadbent, a plan must meet the following requirements: specific stipulations; avoid excessive complexity and detail; avoid fragmentation and be directed toward the whole plan; give attention to those problems that can be solved; structure the objectives within the framework of a coherent set of general, specific and detailed planning decisions; and connection with the measures and instruments from other fields [14].

When considering the problem of implementation, some authors have connected and observed it alongside the process of evaluation [1, 2, 15, 16]. At the time when the rationalist approach to planning dominated, it was observed that sometimes planning actions did not target the achievement of planning decisions, but rather something else. At the same time, growing significance in the theory and practice of planning is being given to the institutional and organizational aspects of implementing planning decisions.

The main conclusion of the majority of authors researching the implementation of plans is that the role of implementation is basically dependent on the planning approach (method) used. The implementation of planning decisions basically depends on the role, or idea of what the plan should be, and the quality of the plan directly affects the success of implementation [17]. In practice, regardless of the school (type) of planning, plans may be visionary plans; detailed plans; plans as a set of guidelines (e.g., for using land, managing development, etc.); plans as a means of solving specific problems; plans as a means of attracting investment; plans for communication and interaction; plans as policies; and so on [18]. Except for visionary plans, for the majority of other planning approaches, that is, models, it is important to achieve the objectives of the planning venture; so they most often include their own instructions and guidelines for implementation. In addition, the combination of different approaches in planning, such as planning through visions and scenarios of development and planning through definite models of land use, transport and others, can give best results, especially in terms of harmonizing the interests of different subjects of planning [19].

When it comes to the type of plan (theoretically speaking), there is an interesting proposal by Elmore on planning (mapping) backwards [20]. Instead of the conventional way of planning ahead in which the goals are determined first of all, followed by defining the steps that need to be taken in order to achieve them, this approach first assesses the possibility of achieving the goals and implementing the planning decisions on the basis of insight into the possibilities and means available from the potential actors of implementation, and only after that is the construction of goals and planning concepts approached.

Regardless of the direction in which the planning theory progresses, there is no doubt that the study of implementation will always be an integral part of it. Therefore, systematic research into implementation has become more and more common, with the goal of identifying and understanding all relevant factors that may affect the success or failure of the implementation of planning policies. At the same time, the implementation of plans will not only be a subject of interest for professional planners but also for all those who participate in the implementation of policies because the implementation of plans is not carried out by making other plans, a fact which a serious society should not forget.

A good way to finish these considerations on the mainly theoretical postulates of implementation in spatial planning is by quoting Allmendinger, who says that even when a plan is done well, its implementation is a constantly moving target [21].

## 3. The hypothetical assumptions of implementing spatial plans

The basic hypothetical position is that the link in the procedure called adoption of the plan is neither the end of planning nor the beginning of implementation. From the moment of adopting the plan, the implementation process is underway and can only be fictitiously divided into the "planning" part that preceded it and the "post-planning" that is just beginning. It is necessary to consider implementation as a unique process that begins with producing a plan (or even earlier during the preparations for developing the plan) and does not finish with the plan's adoption, but rather continuously focuses on the development of the plan [22].

From the moment when planning came to be seen from the viewpoint of the connection between the development of planning decisions (solutions) and carrying them out, Vujošević points out that the implementation of plans, together with their evaluation, has become of central importance in relation to the second phase of the planning process [1], which is emphatic in the process of rational planning [2]. The position was taken that the exercise of planning decisions is the least developed field of planning, that is, the most complex and weakest link in the chain of planning. It was noted that implementation must not only be part of the plan and the mechanical completion of the plan but rather that the overall logic of the planning interaction must be subordinate to the possibilities and means of planning implementation. In this way, the progress so far is largely linked to a theoretical understanding of the problem of implementation, as well as to improved access to organizational aspects, while certain progress has been made in terms of implementation methods and techniques.

Boisier highlights that for successful implementation, it is of key importance that planning objectives are suitably structured, starting from general decisions, through relatively firm target propositions, to very definite statements in terms of content, time and space, that is, the emphasis is placed on the mentioned "planning" elements of implementation [12].

Johansen has the striking attitude that implementation is constantly interacting with the planning conception and policies, and he emphasizes that plans must have internal consistency, which includes the following: individual parts of the plan are not allowed to contradict

each other, that is, the evaluation of the status and goals must be compatible with the structure of what is planned; the parts must be consistent with each other; and the objectives must be consistent with the measures and instruments [13]. Barras and Broadbent hold a similar position on the requirements that a plan needs to meet: to have specific stipulations; avoid excessive complexity and detail; avoid fragmentation and be directed toward the whole plan; give attention to those problems that can be solved; structure the objectives within the framework of a coherent set of general, special and detailed planning decisions; and connect with the measures and instruments from other fields [14].

These authors confirm that in the planning community, there must be a genuine determination that the objectives and policies will be carried out, which excludes "pseudo" and "quasi" plans. Funds for putting plans into practice must really be available, which should lead to a direct relationship with defining the necessary strategies and appropriate policies. In other words, the whole system must be logical, functional and time-coherent.

These positions support the claim that implementation is more than a merely detailed realization, that is, that the category in itself includes both the plan and all its elements, and everything that happens after the plan. It can even be said that in terms of time and content, implementation is "something more" than just plans and the realization of a larger or smaller set of concrete solutions. Implementation is determined by the whole planning process and in direct relationship (interaction, correlation) with the methodology and elements of the planning system. Strongholds for the attitudes mentioned earlier exist in the theory of planning and in the research of individual authors.

The concluding remarks are obtained from the authors' key standpoints that the implementation of plans is methodologically unclear and unpositioned, that implementation should be considered as a unique continuous process that begins with creating a plan and that implementation includes "planning" and "post-planning" elements as well as monitoring, evaluation and institutional and organizational aspects.

## 4. Model of implementation of spatial plan

There are different starting points for analyzing the model of implementation for spatial plans, from those that are based on the need to consider interests (state and/or private) as a priority and their mutual correlation in the planning area [23] to integral planning in which different models of planning are offered which are defined depending on the functions and attributes of the space [24].

Bearing in mind what has been presented, we can conclude at the same time that planning and implementation directly depend on the type of land ownership on the one hand, and the type, that is, the subject, of planning on the other hand. Most authors who have studied the theory of implementation have a similar conclusion, stating that the role of implementation is basically dependent on the planning approach (method) applied, that is, on the role and idea of what the plan should be. So Baer distinguishes visionary plans; detailed plans; plans as a set of guidelines (e.g., for using land, managing development, etc.); plans as a means of solving specific problems;

plans as a means of attracting investment; plans for communication and interaction; plans as policies; and so on [18]. Except for visionary plans, for the majority of other planning approaches, that is, models, it is important to achieve the objectives of the planning venture; so they most often include their own instructions and guidelines for implementation. Vujošević poses the elementary question of what implementation actually is (its role, character, object, etc.) and what it depends on in relation to the types and methods of planning [1].

The views stated so far lead to the basic conclusion of the authors of this chapter that it is necessary to define and develop a theoretical model of implementation for spatial planning and determine the basic types of models of implementation for plans.

Bearing in mind all these theoretical assumptions and arguments, the definition of a model of implementation, according to the authors of this work, should be based on:

- the definition of the model as (1) the basic pattern by which something is made or (2) an approximate description of an occurrence or construction in the real world, with the help of mathematical symbols;
- the definition of planning as a process of preparing a set of decisions on actions in the future, which is focused on the achievement of objectives using preferred means [25];
- the position that implementation is a unique continuous process that begins with creating a plan and which includes "planning" and "post-planning" elements, as well as monitoring, evaluation and institutional and organizational aspects, that is, that implementation is not a process that begins only after the adoption of a plan;
- the necessity for the whole planning system to be logical, functional and time-coherent (for successful implementation, it is crucial that the planning objectives are suitably structured, from general decisions, through relatively firm target propositions, to very definite statements in terms of content, time and space) and
- the fact that implementation directly depends on what we are planning, that is, on the types and methods of planning.

Accordingly, a model of implementation of spatial and urban plans should be defined in the following way: "A model of implementation of a spatial plan is a simplified representation of a set of related planning decisions on actions in the future, which reflects logical, functional and time-coherent planning action, depending on the type and methods of planning" [26].

As such, a model of implementation has its own elements, which are determined by a set of planning actions in the broadest possible sense, starting from general decisions, through relatively firm target propositions, to very definite statements in terms of content, time and space. The elements of the model go beyond the plan itself as a document (phase of the planning process) and in addition to the mentioned planning elements, they also include "postplanning elements" defined by the plan (carried out later) and all the necessary elements of monitoring [27] (**Table 1**).

The proposed definition and consideration of the elements of the model make up a basic theoretical model of implementation. However, in order to facilitate further research regarding

| Model of implementation of spatial plan |
|---|
| **Part I: Planning elements** |
| 1. Strategic framework (guidelines) for development |
| 2. General goals of development |
| 3. Specific goals of development |
| 4. Planning solutions (measures, rules, etc.) |
| **Part II: Post-planning elements** |
| 5. Dynamic framework of implementation |
| 5.1. Priority planning solutions (first stage of implementation—4 yrs) |
| 5.2. Medium-term and long-term stages |
| 6. Measures and instruments of implementation |
| 6.1. Planning/programming |
| 6.2. Organizational |
| 6.3. Normative and legal |
| 6.4. Financial |
| 7. The participants (subjects) of implementation |
| **Part III: Elements of monitoring** |
| 8. Monitoring system |
| 9. Evaluation (indicators) |
| 10. Institutional and organizational aspects |

**Table 1.** Elements of the implementation model.

the application of the implementation model in practice, it is necessary to define the basic types of models, depending on the type and methods of planning.

Bearing in mind the different issues and methodology of developing plans, it is necessary to separate the various types of models of implementation, which can be assumed hypothetically to be applied in practice. These are as follows:

- model of implementation for the strategies and policies of spatial development;
- model of implementation for the protection of space;
- model of implementation for technical planning solutions;
- model of implementation for the use, design and construction of space.

Since space, as the main subject of spatial and urban planning, is a complex and heterogenous category, it is a real assumption that models of implementation are not mutually exclusive, but rather are combined when producing a plan, whereby one of them dominates and determines the character of planning and the plan, and therefore later the implementation.

## 5. Case studies: comparative multicriteria analysis of the application of elements and models of implementation models in practice: a case study of 11 spatial plans for special purpose areas

In order to verify the theoretical considerations presented, the authors of this chapter have chosen to investigate the latest practice of spatial planning in the Republic of Serbia on a sample of 11 spatial plans for special purpose areas. For this type of spatial plans, it is characteristic that they are prepared for spatial units whose specialty is determined by one or more defining purposes, activities or functions in the space which are of national interest.

Research and comparative analyses were carried out on four spatial plans for protected natural areas (Kopaonik [28], Djerdap [29], Stara Planina Mountain [30] and Radan Mountain [31]), three spatial plans for highway infrastructure corridors (sections: Belgrade-Niš [32], Niš-Republic of Macedonia [33], Niš-Merdare [34]) and four spatial plans for water accumulation basins—water sources (Rzav [35], Stuborovni [36], Ćelije [37], Grlište [38]).

The comparative analysis of the application of elements and implementation models of the spatial plans is based on the following starting points:

- the implementation model elements correspond to and reflect the structure of the spatial plan;
- the assessment of the application of the implementation model is in no way an assessment of the quality of the plan but only the assessment of the object and character of the plan, that is, which models and elements within the model are recognized, which dominate and which mutually combine;
- a comparative analysis of the application of elements and implementation of models in selected plans encompasses a qualitative and quantitative assessment of numerous textual, numerical and graphic elements of the plans, whereby only the conclusions of the analysis are made (in relation to the results of the analysis presented in **Tables 2**–**6**);
- to assess the implementation model applied in the spatial plan, the criterion was used that the majority of the model's elements were recognized (50% or more);
- to assess the rules in the model of implementation, the design and construction of the space, the criterion was used that there are enough definite rules recognized in the plan, since this model of implementation is not fully coherent and does not include all foreseen elements of the model, but rather it is based exclusively on the existence of rules in the plan.

The basic conclusion of the comparative analysis (**Table 6**) is that: in one spatial plan, all four implementation models were applied; in three spatial plans, three implementation models were applied; and in seven spatial plans, two implementation models were applied. In addition, in the spatial plans for protected natural areas, the most number of implementation models were applied, while in the spatial plans for highway infrastructure corridors and protected water accumulation basins, two models of implementation were applied.

| Spatial plans for the special purpose area | I Planning elements | | | | II Post-planning elements | | | | | | III Monitoring | | | | Representation of elements in model (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Strategic framework | General goals | Specific goals | Planning solutions | Dynamic fram. | | Measures and instruments | | | | Participants (subjects) | Monitoring system | Evaluation (indicators) | Institutional and organizational | |
| | | | | | Priority planning solutions | Medium-long-term stages | Planning-programming | Organizational | Normative-legal | Financial | | | | | |
| 1. Stara planina | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | 64 |
| 2. Kopaonik | ✓ | ✓ | ✓ | | | | ✓ | | | | ✓ | | | | 36 |
| 3. Djerdap | | ✓ | ✓ | ✓ | | | ✓ | ✓ | | | ✓ | | | | 43 |
| 4. Radan planina | | ✓ | ✓ | | | | | ✓ | | | ✓ | | | | 29 |
| 5. IK Belgrade-Nis | ✓ | ✓ | ✓ | | ✓ | ✓ | | | | | ✓ | | | | 43 |
| 6. IK Nis-Maced. | | ✓ | | | | | | | | | ✓ | | | | 14 |
| 7. IK Nis-Merdare | | ✓ | | ✓ | | | | | | | ✓ | | | | 21 |
| 8. Rzav | | | ✓ | ✓ | | | ✓ | | | | ✓ | | | | 29 |
| 9. Stuborovni | | | | ✓ | | | | ✓ | | | ✓ | | | | 21 |
| 10. Celije | | | ✓ | ✓ | | | | ✓ | | | ✓ | | | | 29 |
| 11. Grliste | | | ✓ | ✓ | | | | ✓ | | | ✓ | | | | 29 |
| Representation of elem. in plan (%) | 27 | 64 | 73 | 55 | 18 | 18 | 36 | 55 | 9 | 0 | 100 | 0 | 0 | 0 | |

**Table 2.** Elements of the model of implementation for the strategies and policies of spatial development in spatial plans.

| Spatial plans for the special purpose area | I Planning elements | | | | II Post-planning elements | | | | | | | III Monitoring | | | Representation of elements in model (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Strategic framework | General goals | Specific goals | Planning solutions | Dynamic fram. | | Measures and instruments | | | | Participants (subjects) | Monitoring system | Evaluation (indicators) | Institutional and organizational | |
| | | | | | Priority planning solutions | Medium-long-term stages | Planning-programming | Organizational | Normative-legal | Financial | | | | | |
| 1. Stara planina | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | **93** |
| 2. Kopaonik | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | | | **57** |
| 3. Djerdap | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | | ✓ | **79** |
| 4. Radan planina | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | ✓ | | ✓ | **71** |
| 5. IK Belgrade-Nis | | | | ✓ | | | | | | | | | | | **7** |
| 6. IK Nis-Maced. | | | | ✓ | | | | | | | | | | | **7** |
| 7. IK Nis-Merdare | | ✓ | ✓ | ✓ | | | | | | | ✓ | | | | **29** |
| 8. Rzav | | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | ✓ | | ✓ | **64** |
| 9. Stuborovni | | ✓ | | ✓ | ✓ | | | ✓ | | | ✓ | ✓ | | ✓ | **50** |
| 10. Celije | | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | | | **50** |
| 11. Grliste | | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | | | **50** |
| Representation of elem. in plan (%) | 36 | 82 | 73 | 100 | 73 | 9 | 64 | 73 | 18 | 9 | 82 | 45 | 0 | 45 | |

**Table 3.** Elements of the model of implementation for the protection of space in spatial plans.

| Spatial Plans for the Special Purpose Area | I Planning elements | | | | II Post-planning elements | | | | | | III Monitoring | | | | Representation of elements in model (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Strategic framework | General goals | Specific goals | Planning solutions | Dynamic fram. | | Measures and instruments | | | | Participants (subjects) | Monitoring system | Evaluation (indicators) | Institutional & organizational | |
| | | | | | Priority planning solutions | Medium-long-term stages | Planning-programming | Organizational | Normative-legal | Financial | | | | | |
| 1. Stara planina | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | **79** |
| 2. Kopaonik | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | | **50** |
| 3. Djerdap | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ | | ✓ | **79** |
| 4. Radan planina | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | | | **57** |
| 5. IK Belgrade-Nis | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | | **64** |
| 6. IK Nis-Maced. | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ | | ✓ | | | | **57** |
| 7. IK Nis-Merdare | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | **71** |
| 8. Rzav | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | | | **57** |
| 9. Stuborovni | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | | **57** |
| 10. Celije | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | ✓ | | | | **50** |
| 11. Grliste | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | ✓ | | | | **50** |
| Representation of elem. in plan (%) | 91 | 91 | 82 | 100 | 100 | 73 | 100 | 64 | 18 | 9 | 100 | 9 | 0 | 18 | |

**Table 4.** Elements of the model of implementation for technical planning solutions in spatial plans.


http://dx.doi.org/10.5772/intechopen.78242

| Spatial plans for the special purpose area | I Planning elements | | | | II Post-planning elements | | | | | | | III Monitoring | | | Representation of elements in model (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Strategic framework | General goals | Specific goals | Planning solutions | Dynamic fram. | | Measures and instruments | | | | Participants (subjects) | Monitoring system | Evaluation (indicators) | Institutional and organizational | |
| | | | | | Priority planning solutions | Medium-long-term stages | Planning-programming | Organizational | Normative-legal | Financial | | | | | |
| 1. Stara planina | | | ✓ | ✓ | | | ✓ | ✓ | | | ✓ | | | | **36** |
| 2. Kopaonik | | | ✓ | ✓ | | | ✓ | | | | ✓ | | | | **29** |
| 3. Djerdap | | | | ✓ | | | ✓ | ✓ | | | ✓ | | | | **29** |
| 4. Radan planina | | | | ✓ | | | | | | | ✓ | | | | **14** |
| 5. IK Belgrade-Nis | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | | **50** |
| 6. IK Nis-Maced. | | | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | | ✓ | | | | **50** |
| 7. IK Nis-Merdare | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | **64** |
| 8. Rzav | ✓ | | | | | | | | | | | | | | **7** |
| 9. Stuborovni | ✓ | | | | | | | | | | | | | | **7** |
| 10. Celije | ✓ | | | | | | ✓ | | | | ✓ | | | | **21** |
| 11. Grliste | ✓ | | | | | | ✓ | | | | ✓ | | | | **21** |
| Representation of elem. in plan (%) | 36 | 9 | 45 | 64 | 27 | 27 | 73 | 36 | 18 | 0 | 82 | 0 | 0 | 0 | |

**Table 5.** Elements of the model of implementation for the rules of the use, design and construction of space in spatial plans.

| | Spatial plans for the special purpose area | Model of implementation | | | |
|---|---|---|---|---|---|
| | | For the strategies and policies of spatial development | For the protection of space | For technical planning solutions | For the use, design and construction of space |
| 1. | Stara planina | ✓ | ✓ | ✓ | ✓ |
| 2. | Kopaonik | | ✓ | ✓ | ✓ |
| 3. | Djerdap | | ✓ | ✓ | ✓ |
| 4. | Radan planina | | ✓ | ✓ | ✓ |
| 5. | IK Belgrade-Nis | | | ✓ | ✓ |
| 6. | IK Nis-Macedonia | | | ✓ | ✓ |
| 7. | IK Nis-Merdare | | | ✓ | ✓ |
| 8. | Rzav | | ✓ | ✓ | |
| 9. | Stuborovni | | ✓ | ✓ | |
| 10. | Celije | | ✓ | ✓ | |
| 11. | Grliste | | ✓ | ✓ | |

**Table 6.** Representation of the models of implementation in spatial plans.

The spatial plan for the area of the Nature Park and Tourist Region of Stara Planina Mountain is characteristic in that it is the only one of the plans analyzed in which all four implementation models are applied. The model of implementation for the protection of space is dominant, which in this plan has the highest percentage of elements from this model in relation to all of the spatial plans and implementation models analyzed (**Table 3**). Additionally, a high percentage of the model of implementation for technical planning solutions was applied, the elements of which mostly relate to tourist accommodation capacities. This includes tourist infrastructure such as cableways and ski tracks, communal infrastructure, and so on. Such planned contents are supported by a series of rules of use, design and construction, which are quite detailed regardless of the fact that they are indirectly implemented through the development of urban plans. It is also characteristic only in this spatial plan, in these two implementation models, that there are precisely stated financial measures and implementation instruments, which besides the sources of financing also include the estimated costs according to individual planning solutions.

The spatial plan for the special purpose area of Kopaonik National Park belongs to the group of spatial plans for protected natural areas in which three implementation models are applied. The model of implementation for the protection of space is dominant, which refers to a whole series of objectives, planning solutions and other elements of the plan which have the purpose of protecting natural heritage and prescribing the regime of usage for space covering areas with a I, II or II level of protection. As is the case with other spatial plans for protected natural areas, the model of implementation for planning solutions of a technical nature refers to tourist accommodation capacities, tourist infrastructure and communal infrastructure, while the model of implementation for the use, design and construction of space includes a series of rules for the construction of tourist facilities and accompanying infrastructure.

The spatial plan for the special purpose area of Djerdap National Park and the Spatial Plan for the Special Purpose Area of Radan Mountain belong to the mentioned group of spatial plans with three models of implementation applied. The specificity of these spatial plans is that only they contain the elements of the implementation model that also refer to overseeing the general definition of the monitoring system, as well as the institutional-organizational aspect of the implementation through the dominant model of implementation for the protection of space (**Table 3**).

The Spatial Plan for the Special Purpose Area of Djerdap National Park is a special specific case in terms of the application of the implementation model in spatial plans for protected natural areas, in which the model of implementation for the protection of space and the model of implementation for technical planning solutions are equally represented, which is a consequence of the subject and special purpose in this plan being the protection of natural areas and the water management and energy aspect of the Djerdap system. In addition, only this spatial plan is characterized by a generally defined system of monitoring and the institutional-organizational aspect of implementation through the implementation model for technical planning solutions (**Table 4**).

In all three spatial plans for special purposes analyzed for the infrastructure corridors of highways, the model of implementation for technical planning solutions and the model of implementation for the rules of use, design and construction of space were applied. For these types of spatial plans, in addition to the above fact, it is characteristic that a very small percentage of elements of the other models is represented, in particular models of implementation for the protection of space (**Table 3**), which are recognized only in a part of the planning solutions, that is, in determining the regime in the belts of protection of the highway corridors.

In the Spatial Plan for the Infrastructure Corridor of the Belgrade-Niš section of the E-75 highway, elements of the implementation model for planning solutions of a technical nature and the rules of use, design and protection of space refer to the accompanying facilities for the highway corridor, their spatial distribution, content, and so on. In the spatial plan for the area of the Infrastructure Corridor Niš-Republic of Macedonia and the spatial plan for the Special Purpose Area of the Infrastructure Corridor for the Niš-Merdare section of the E-80 highway, which contain more detailed urban development at a scale of 1:1000, the elements of these two models also refer to the corridor (route) of the highway with all of its facilities. The spatial plan for the Niš-Merdare section is distinguished as specific since it has the largest number of recognized elements of both models of implementation, which is understandable considering that it was prepared more recently, thereby following the development of conceptual solutions and elements of the conceptual project, and it also contains all analytical and other technical elements necessary for resolving property relations and direct (immediate) implementation of all highway constructions and accompanying facilities. At the same time, these spatial plans are characterized by the highest number of recognized elements of the implementation model for the rules of use, design and construction of space, which, in addition to the rules themselves, relates to the stages of realization (the method and deadline for developing urban plans in the surroundings) and almost all of the measures and instruments of implementation. Also, only in these plans are the normative-legal measures and instruments defined as the basis for settling property relations (expropriation) based on the spatial plan (**Table 5**).

In all four spatial plans analyzed for water accumulation basins, the model of implementation for the protection of space and the model of implementation for planning solutions of a technical nature were equally applied. The special purpose of these spatial plans is to protect the water accumulation basins, and therefore the water supply, and to secure the conditions for the construction of technical systems for water treatment, processing and distribution. This is in connection with the fact that the implementation models are applied equally, that is, their elements relate to both the protection of water sources and planning solutions of a technical nature. In addition, the elements of the model for planning solutions of a technical nature define the framework for the development of tourism as a core activity, the development of which is planned in the water accumulation basin. In this way, these types of plans and the results of the analysis of the elements of the implementation models applied are close to the previously mentioned spatial plans for protected natural areas.

The spatial plan for the water supply source area of the Rzav regional subsystem and the spatial plan for the Stuborovni water accumulation basin were made for the planned water accumulations and systems, while the spatial plan for the special purpose area of Ćelija water accumulation basin and the spatial plan for the special purpose area of Grlište water accumulation basin were made for the existing water accumulations.

The specificity of all the mentioned spatial plans for the reservoir basins is their lack of detailed rules for the design and construction of the space, that is, the fact that none of the plans applies the implementation model for the rules of use, design and construction of space (**Table 5**). It is only in the case of these spatial plans that there is no rule that the implementation model for planning solutions of a technical nature must follow the implementation model of the rules of use, design and construction of space. However, the reason for that is that not one of the spatial plans analyzed for water accumulation was prepared for direct implementation, but rather in parallel to or immediately after the development of the plans, special urban plans were prepared with detailed rules for resolving property relations (expropriation), construction or reconstruction of the water supply systems, tourist facilities, settlements, and so on.

Regarding the application of the implementation model in spatial plans for special purpose areas and the representation of elements in the models, the comparative analysis points to the following basic conclusions:

1. The model of implementation for the strategies and policies of spatial development (**Table 2**) was applied only in one spatial plan, indicating that spatial plans for special purpose areas on the whole do not include general issues and planning aspects inherent to the integral method, that is, the general planning of particular administrative spatial units. By establishing a full hierarchy of the spatial plans in practice, the elements of this model of implementation have found their place in regional spatial plans and in the spatial plans of local government units [27], that is, in general planning which, by its character, approach and method, differs from the planning of special purpose areas;

2. The model of implementation for the protection of space (**Table 3**) was applied in eight of the spatial plans analyzed, that is, in all plans for protected natural areas and for water accumulation basins. The impression given is that this model of implementation is complemented by the model for planning solutions of a technical nature and it completes

the planning for special purpose areas, that is, the planning framework for the protection of specific natural heritage and the realization (construction) in space. Except in the case of spatial plans for the infrastructure corridors of highways in which this model is not applied, this model of implementation is always applied in combination with the abovementioned model of implementation for planning solutions of a technical nature;

3. The model of implementation for technical planning solutions (**Table 4**) is the most common implementation model and is the only one applied in all the spatial plans analyzed. Since spatial plans for special purpose areas are adopted for areas requiring special organization, design, use and protection of the space, like for projects and objects of national importance, the dominance of this model of implementation and its elements in the plans is justified. It also indicates a developed planning system at the national level, in which the institution of the spatial plan for special purpose areas is used as the basic instrument for the protection of public and national interest in the domain of spatial development. However, this model of implementation indicates an effective thematic approach to planning, which raises the issue of measures and relationships with local interests and planning levels subordinate to the planning of a specific area by the state. As the number and scope of spatial plans for special purpose areas grows, the problem of coordinating the level of planning becomes more important, and the problem of the relationship between planning special purpose areas and planning at the local level comes to the fore;

4. The implementation model for the rules of use, design and construction of space (**Table 5**) is applied in seven of the spatial plans analyzed, that is, in all plans for protected natural areas and infrastructure corridors of highways. The fact that it is not applied only in those spatial plans for which the implementation of a series of urban plans has been initiated or envisaged, and that it is applied in all recent spatial plans, points to the necessity of applying this implementation model. The need to quickly produce spatial plans that can be applied directly (necessary permission and conditions in the location, property relations, design frameworks, etc.) indicates that this model of implementation will continue to be applied in practice. However, since the elements of this implementation model are limited to detailed rules rather than a coherent set of elements, as in the case of other implementation models, the model of implementation for the rules of use, design and construction of space can only be a complementary model in the plan, which should be applied with some of the other implementation models.

## 6. Discussion and conclusions

The basic conclusion of the study is that models of implementation can be recognized in the practice of developing spatial plans, that is, that a large number of elements of the implementation model are recognized in the plans. Noting that the installation of an implementation model is grounded in the theory of planning, it can be concluded that the basic hypothetical assumptions about the application of the implementation model have been proven in practice. However, at the same time, one should not lose sight of the fact that these are the first research results on a limited scientific sample from a single planning system and, therefore, research on implementation models needs to be continued.

http://dx.doi.org/10.5772/intechopen.78242

These results of the comparative analysis for the application of elements and implementation models in the recent practice of developing spatial plans for special purpose areas clearly indicate that implementation models do not exclude each other, but rather they combine in the development of a spatial plan. Therefore, it is noticeable that the implementation models can be equally combined, and that one implementation model can dominate over another implementation model, and as such it determines the nature of the plan and its implementation.

In order to further research the implementation process, it is important to point out that these conclusions correlate with the previously stated theoretical aspects of implementation, and especially with Lewis and Flynn, who explain the mix of modalities of implementation [11]. It is precisely the results of this comparative analysis that prove the theoretical assumption that in the actual planning there will be more than one of the mentioned modalities of implementation, at the same time and in parallel, which do not have to exclude each other. In addition to the distinctive use of the term "modalities of implementation," the authors mentioned emphasize that the implementation process has not been fully theoretically studied and that the planning mechanisms and mixed modalities of implementation have not been tested.

Looking at the implementation of spatial plans through models of implementation gives an adequate idea of how implementation is guided by plans. The model elements, determined in a way to reflect the logical, functional and temporal coherence of planning actions, or the structure of the plan, are largely recognized in the plans analyzed. However, at the same time, the issue is raised as to the lack of certain elements and the fact that the implementation models do not contain all the foreseen elements, which should be corrected in future practice.

In this regard, it is of utmost importance to see the elements of monitoring implementation as an underdeveloped aspect of planning. The elements of monitoring in the implementation model are the monitoring system (in the narrow sense), evaluation (indicators) and the institutional-organizational aspect of implementation. The nature of the monitoring and evaluation process, as well as the institutional organization, go beyond plans and are connected to the continuity of the planning itself. They can be considered as the "strategic bases for managing the implementation of plans."

Monitoring the implementation of spatial plans in recent years has become more and more topical because many changes in terms of evaluation, flexibility and institutional-organizational aspects of implementation are increasingly reflected in the monitoring system. In previous approaches, tracking the achievement of goals was the basis for and the majority of the monitoring content. However, with the development of planning approaches that are based on a more elaborate structure of planning propositions, the expansion of communicative-interactive planning and establishment of the continuous evaluation of the realization of planning decisions, the understanding of monitoring as merely monitoring the degree of achieving final planning decisions has lost most of the original sense.

Significant findings on which it is necessary to base further research and suggestions for improving the monitoring (models) of implementation indicate that, in addition to determining whether planning decisions/policies are being carried out (monitoring the implementation), it is of particular importance to assess whether by establishing policies the planned objectives are being met (monitoring the impact), as well as assessing whether the planning

objectives are still current (strategic monitoring) [1]. In doing so, the key finding is that monitoring is formed from the very beginning of the planning process (preparation of decisions), that it is organized as a process that provides constant feedback for obtaining and interpreting information and that during implementation the focus is on the monitoring and evaluation of changes in the positions of basic target groups, that is, actors [39].

These theoretical considerations, definitions of models of implementation and classification of models into their basic types are an attempt to indicate directions for further research, which could and should be carried out according to different systems and levels of planning.

In addition to research on the issue of recognizing and applying models of implementation in planning practice so far, special attention should be paid to: (1) the research and definition of other types and subtypes of models of implementation within the framework of the proposed model of implementation; (2) research into the application of models of implementation depending on the national systems of planning and planning levels; (3) research into methods of combining models of implementation in individual plans and depending on the type applied, the method of planning; (4) research and review of the proposed elements of the model of implementation, in order to achieve greater logical, functional and temporal coherence of the planning actions and (5) research into the monitoring of implementation, indicators and evaluation of implementation.

In further research, it is necessary to bear in mind two basic groups of factors that affect implementation. The factors in the first group are those involved in drafting the plan, which can be affected qualitatively, such as the available data, the methodology used, different techniques, the competence of the working team, cooperation of the planning subjects, their ability to lead the synthesis of the process, the way of defining the planning solutions, and so on. In the second group of factors are all of those that are crucial after the adoption of the plan, which are difficult to perceive and even more difficult to influence, and they have a key role in the implementation of the plan. They are conditioned by the socio-political system, level of economic, social and cultural development, financial possibilities, institutional organization and others.

The use of an appropriate model of implementation and its combination with other models when developing a spatial plan, depending on the type of plan, makes it possible to largely overcome an unfavorable environment, develop the plan in a recognizable and desired style of planning and focus the process of implementation in an organized and systematic manner.

Implementation models for spatial plans can theoretically clarify and position implementation in the methodology of planning and in the practice of improving the implementation of plans, although one should not lose sight of the fact that its fate ultimately depends on the actual willingness of the community to carry out planning objectives and policies.

## Acknowledgements

This chapter is a result of research conducted as part of the scientific projects themed: (1) “Sustainable spatial development of Danubian Serbia,” TR36016, financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia in 2011–2016, and

(2) "Spatial, ecological, energy, as well as social aspects of settlement development and climate change—their mutual impacts," TR 36035 financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia in the period 2011–2016.

## Author details

Nebojša Stefanović*, Boško Josimović and Nataša Danilović Hristić

*Address all correspondence to: nebojsa@iaus.ac.rs

Institute of Architecture, Urban and Spatial Planning of Serbia, Belgrade, Serbia

## References

[1] Vujošević M. Rationality, Legitimacy and Implementation of Planning Decisions—Recent Theoretical Interpretation and Lessons for Planning in Transition. Belgrade: Institute of Architecture and Urban&Spatial Planning of Serbia; 2004. [Vujošević, M. (2004). Racionalnost, legitimitet i implementacija planskih odluka-novije teorijske interpretacije i pouke za planiranje u tranziciji. Institut za arhitekturu i urbanizam Srbije, Beograd]

[2] Sager T. Communicative Planning Theory. Aldershot: Avebury; 1994

[3] Alterman R. Implementation Analysis in Urban and Regional Planning—Toward a Research Agenda. Planning Theory: Prospects for the 1980s. Urban and Regional Planning Series. 1983;**29**:225-245

[4] Đorđević D. Introduction in to Planning Theory. Faculty of Geography, University of Belgrade; 2004. [Đorđević D. Uvod u teoriju planiranja. Geografski fakultet, Univerzitet u Beogradu; 2004]

[5] Lichfield N, Darin-Drabkin H. Land Policy in Planning. London: George Allen and Unwin; 1980

[6] Friedmann J. Retracking America: A Theory of Transactive Planning. New York: Anchor Press-Doubleday; 1973

[7] Davidoff P, Reiner TA. A choice theory of planning. Journal of the American Institute of Planners. 1962;**28**:103-115

[8] Hudson BM. Comparison of current planning theories—Counterparts and contradictions. Journal of American Planning Association. 1979;**45**(4):387-398

[9] McLoughlin B. Urban and Regional Planning—System Approach. London: Faber; 1972

[10] Stojkov B. Methods of Analysis and Synthesis in Spatial Planning. Belgrade: Institute of Architecture and Urban & Spatial Planning of Serbia; 1992. [Stojkov B. Metode analize i sinteze u prostornom planiranju. Beograd: Institut za arhitekturu i urbanizam Srbije; 1992]

[11] Lewis J, Flynn R. The Implementation of Urban and Regional Planning Policies. Policy and Politics. 1979;**7**(2):123-142

[12] Boisier S. Planning a Regional System. Santiago de Chile: ECE/UN for Latin America, ILPES; 1981

[13] Johansen L. Macroeconomic Planning. Zagreb: Cekade; 1985

[14] Barras R, Broadbent TA. The Analysis in the English Structure Plans. US (16), No.1; 1979

[15] Sillince J. A Theory of Planning. Aldershot, Hampshire: Gower; 1986

[16] Long Y, Gu Y, Han H. Spatiotemporal heterogeneity of urban planning implementation effectiveness: Evidence from five urban master plans of Beijing. Landscape and Urban Planning. 2012;**108**(2–4):103-111

[17] Brody SD, Highfield WE. Does planning work? Testing the implementation of local environmental planning in Florida. Journal of the American Planning Association. 2005;**71**:159-175

[18] Baer WC. General plan evaluation criteria, an approach to making better plans. Journal of the American Planning Association. 1997;**63**:329-344

[19] Lemp J, Zhou B, Kockelman K, Parmenter B. Visioning versus modeling: Analyzing the land-use-transportation futures of urban regions. Journal of Urban Planning and Development, ASCE. 2008;**134**(3):97-109

[20] Elmore RF. Backward mapping—Implementation research and policy decisions. Political Science Quarterly. 1980;**94**(4):601-616

[21] Allmendinger P. Planning Theory. Houndmills, Basingstoke, Hampshire: Palgrave; 2002

[22] Von Haaren C. Landscape planning facing the challenge of the development of cultural landscape. Landscape and Urban Planning. 2002;**60**(2):73-80

[23] Nunn S. Public and private built investment in the new economy: exploring regional differences, 1990–2000. Journal of Urban Planning and Development. 2004;**130**(3):125-132

[24] Maruani T, Amit-Cohen I. Open space planning models: A review of approaches and methods. Landscape and Urban Planning. 2007;**81**(1-2):1-13

[25] Perišić D. About Spatial Planning. Belgrade: Institute of Architecture and Urban & Spatial Planning of Serbia; 1985. [Perišić D. O prostornom planiranju. Beograd: Institut za arhitekturu i urbanizam Srbije; 1985]

[26] Stefanović N, Danilović Hristić N, Milijić S. The implementation model of planning rules in spatial plans. SPATIUM International Review. 2015;**33**:62-68

[27] Stefanović N, Danilović Hristić N, Krunić N. Comparative analysis of elements and models of implementation in local-level spatial plans in Serbia. SPATIUM International Review. 2017;**37**:58-65

[28] Regulation on the establishment of the Spatial Plan for the Special Purpose Area of Kopaonik National Park. Official Gazette of RS no. 95/09 [Uredba o utvrđivanju Prostornog plana područja posebne namene Nacionalnog parka Kopaonik, Službeni glasnik RS br. 95/09]

[29] Regulation on the establishment of the Spatial Plan for the Special Purpose Area of Djerdap National Park. Official Gazette of RS no. 43/13 [Uredba o utvrđivanju Prostornog plana područja posebne namene Nacionalnog parka Đerdap, Službeni glasnik RS br. 43/13]

[30] Regulation on the establishment of the Spatial Plan for the Nature Park area and tourist region of Stara planina, Official Gazette of RS no. 115/08 [Uredba o utvrđivanju Prostornog plana područja Parka prirode i turističke regije Stara planina, Službeni glasnik RS br. 115/08]

[31] Regulation on the establishment of the Spatial Plan for the Special Purpose Region of Radan Mountain, Official Gazette of RS no. 110/14 [Uredba o utvrđivanju Prostornog plana područja posebne namene Radan planine, Službeni glasnik RS br. 110/14]

[32] Regulation on the establishment of the Spatial Plan for the Infrastructure Corridor area of the E-75 highway, section Belgrade-Niš, Official Gazette of RS no. 69/03 and 102/10 [Uredba o utvrđivanju Prostornog plana područja infrastrukturnog koridora auto-puta E-75, deonica Beograd-Niš, Službeni glasnik RS br. 69/03 i 102/10]

[33] Regulation on the establishment of the Spatial Plan of the Infrastructure Corridor Area of Niš -Republic of Macedonia, Official Gazette of RS no. 77/02 and 128/14 [Uredba o utvrđivanju Prostornog plana područja infrastrukturnog koridora Niš-Republika Makedonija, Službeni glasnik RS br. 77/02 i 128/14]

[34] Regulation on the establishment of the Spatial Plan for the Special Purpose Area Infrastructure Corridor of the E-80 Highway, section Niš-Merdare, Draft, Ministry of Construction, Transport and Infrastructure, 2017 [Uredba o utvrđivanju Prostornog plana područja posebne namene infrastrukturnog koridora auto-puta E-80, deonica Niš-Merdare, Nacrt, Ministarstvo građevinarstva, saobraćaja i infrastrukture, 2017]

[35] Regulation on the establishment of the Spatial Plan for the water supply source area of the regional Rzav subsystem, Official Gazette of RS no. 131/04 [Uredba o utvrđivanju Prostornog plana područja izvorišta vodosnabdevanja regionalnog podsistema Rzav, Službeni glasnik RS br. 131/04]

[36] Regulation on the establishment of the Spatial plan for the area of the Stuborovni Reservoir Basin, Official Gazette of RS no. 20/09 [Uredba o utvrđivanju Prostornog plana područja sliva akumulacije Stuborovni, Službeni glasnik RS br. 20/09]

[37] Regulation on the establishment of the Spatial Plan of the Special Purpose Area of the Celije Reservoir Basin, Official Gazette of RS no. 95/15 [Uredba o utvrđivanju Prostornog plana područja posebne namene sliva akumulacije Ćelije, Službeni glasnik RS br. 95/15]

[38] Regulation on the establishment of the Spatial Plan for the Special Purpose Area of the Grlište Reservoir basin, Official Gazette of RS no. 95/15 [Uredba o utvrđivanju Prostornog plana područja posebne namene sliva akumulacije Grlište, Službeni glasnik RS br. 95/15]

[39] Floyd M. Structure plan monitoring, Looking to the future. Town Planning Review. 1978; **49**(4):476-485

Chapter 5

# Restructuring Gauteng City Region in South Africa: Is a Transportation Solution the Answer?

James Chakwizira, Peter Bikam and
Thompson A. Adeboyejo

Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/intechopen.80810

**Abstract**

The Gauteng city region forms the economic hub of socio-economic development and growth in South Africa. The province itself includes the Johannesburg metropolitan city, Ekurhuleni metropolitan city as well as Tshwane municipality—key urban growth regions of Gauteng province, South Africa, and by extension Southern Africa. The region exhibits the rapid urbanisation challenges typical in any developing country city. Rural–urban migration, pressure on infrastructure demand, supply and capacity constraints and mismatches in urban governance structures with respect to service delivery have remained stubborn challenges. Initiatives and strategies to resolve urban traffic congestion such as through road construction and highway expansion (physical instrument), e-tolling of roads (financial instrument), innovative housing and waste management technology deployment (technology instruments) as well as presenting advanced spatial planning and development and management systems (planning and regulatory instruments) have been employed with mixed fortunes in attempts to (re)solve the urban problems in the study area. Making use of a thematic approach and technique, the major urbanisation issues are explored and solutions proffered. Recommendations revolve around the need to implement robust and progressive rafts of projects, programmes, activities, measures and actions to reverse spatial fragmentation and spatially inefficient transport induced and perpetuated disadvantages.

**Keywords:** restructuring, fragmentation, city region, urbanisation, transportation, solutions

## 1. Introduction

Gauteng city region is defined as the economic hub of South Africa constituting Johannesburg metropolitan city, Ekurhuleni metropolitan city as well as Tshwane (formerly Pretoria) city [1–3].

This means that economic and social opportunities are spatially concentrated in the Gauteng city region, which contributes approximately 40% of the gross domestic product (GDP) for the South African economy although the geographic space occupied by the region is 2% of the total land area of South Africa [4]. Within the auspices of this current spatial structuring and subject to the processes and outcomes of successive restructuring actions and measures occurring in the Gauteng city region, various forms of spatial and transportation challenges and opportunities have emerged. As a result, the Gauteng city region is experiencing rapid urbanisation, which is a common feature for cities in the global South [4–6]. In South Africa, when one compares all the nine provinces, Gauteng attracts the largest number of migrants, with an estimated recorded net increase of 543,000 between the years 2011 and 2016 [7–10]. Given the apartheid geography and history of South Africa, Gauteng province inherited a spatially fragmented, scattered and sprawled urban set-up [11, 12]. This existing spatial structure has implications regarding long commuting times, long journey times and great distances that buses, motorists and trains travel between areas of residences with respect to areas of socio-economic opportunities [4, 7, 13–15]. This spatial formation has led to spatial inefficiency and inequity that manifests itself in terms of multiple forms of deprivation that impact on family systems, spatial disconnects, continued public transport subsidy (which is argued by others as the invisible apartheid transport tax that current generations and government has to live with) as well as a complex non-optimised governance delivery set-up and inadequate institutional and governance structure [2, 16–19].

### 1.1. Purpose

This chapter examines the impact of rapid rural–urban migration on the Gauteng space structure, economy and transportation landscape. This impact is critiqued with respect to the ensuring pressure on infrastructure created, the unravelling capacity constraints faced and mismatches in urban governance structures with respect to service delivery utilising a transportation and spatial planning approach and perspective. The objectives of this chapter include:

1. Exploring the concepts and notions of spatial fragmentation and restructuring modalities with respect to the Gauteng province of South Africa
2. Examining the key spatial and transportation challenges facing the Gauteng province of South Africa
3. Describing the impact of rapid urbanisation on the spatial arrangements and systems in Gauteng province making use of the transportation platform as a unit of analysis and intervention lever
4. Providing a rejoinder regarding how the spatial and transportation challenges in the region can be addressed with a view to closing the gaps regarding spatial and transport inefficiencies in the Gauteng city region of South Africa

In answering the four mentioned questions, the overarching question ‘is a transportation solution the answer’ was used to unpack and construct the departure point for the paper.

http://dx.doi.org/10.5772/intechopen.80810

## 2. Research methodology

A desktop survey methodology was adopted in analysing spatial and transportation documents found at both the national, provincial and municipal level in the Gauteng city region. **Table 1** presents an overview of the secondary data sources that were accessed and analysed for spatial and transportation trends and themes used in compiling this chapter.

From **Table 1**, the researcher further made use of a gap analysis to identify and codify themes for detailed discussion. The analytical framework was informed by the application of the spatial and transportation system theory within the context of a polycentrism urban spatial growth paradigm approach. The application of the above-explained methodology was instrumental in generating vital insights and establishing patterns linked to spatial and transportation landscape in the study area with respect to whether efficiencies or lack of efficiencies exist thereof.

## 3. Literature review

Understanding spatial restructuring and transportation solutions for Gauteng city region requires an appreciation of the notions and concepts that constitute spatiality as well as sustainable transportation solutions. This section, therefore, reviews the key concepts and notions of spatial fragmentation, spatial restructuring, urban systems theory as well as the urban polycentricism growth and management approach. This is critical in order to provide a common understanding of how these key notions, concepts and approaches are used in this chapter.

### 3.1. The notion and concept of spatial fragmentation

Spatial fragmentation is defined as the physical separation, division, scattering, alienation, divorce and exclusion of urban land parcels/areas/settlements/locations/uses/activities by the use of great distance and through buffering techniques such as open spaces, roads, railway lines, etc. from complementary and critical socio-economic opportunity areas [2, 4]. Urban spatial fragmentation therefore manifests itself in terms of sprawled settlements, urban settlements in which commuters travel long distances from residential areas to industrial/commercial working areas and is associated with low-density developments that promote the use of automobiles.

### 3.2. The notion and concept of spatial restructuring

Spatial restructuring is the exercise aimed at changing and transforming the spatial structure of an existing urban area from a growth and development trajectory that encourages inefficiency and fragmented development to one that encourages land densification, compaction and integration of urban land parcels/areas/settlements/locations/uses/activities through infill developments, promoting high-density developments ably supported by a transit-oriented

| Name | Status | Population census 1996-10-09 | Population census 2001-10-09 | Population census 2011-10-09 | Datasets accessed | Documents accessed |
|---|---|---|---|---|---|---|
| Gauteng | Province | 7,834,125 | 9,388,854 | 12,272,263 | 1. National Household Travel Survey (NHTS), 2003 and NHTS, 2013<br>2. Household surveys and observation surveys<br>3. Gauteng City Region Observatory datasets<br>4. Stats South Africa, 2011<br>5. Integrated Transport Plan (ITP), Johannesburg (2003–2008)<br>6. Passenger Rail Agency of South Africa (PRASA) annual reports<br>7. South African National Roads Agency Limited (SANRAL) annual reports<br>8. Gauteng Management Agency annual reports<br>9. METRO buses annual reports | 10. National Land Transport Strategic Framework 2006–2011<br>11. Public Transport Strategy, 2007<br>12. Gauteng Spatial development Framework 2011<br>13. Gauteng Land Transport Framework (2009–2014)<br>14. Comprehensive Integrated Transport Plan (CITP) (City of Tshwane) 2006–2011<br>15. Gauteng Infrastructure Renewal and Investment Plan (2008)<br>16. Integrated Transport System (ITS) Implementation Framework for Gauteng<br>17. Ekurhuleni Metropolitan Spatial Development Framework 2011<br>18. CITP (Ekurhuleni, 2014)<br>19. Johannesburg Strategic Integrated Transport Plan, 2013 |
| City of Johannesburg | Metropolitan municipality | 2,638,470 | 3,226,060 | 4,434,827 | | |
| City of Tshwane (Pretoria) | Metropolitan municipality | 1,792,360 | 2,142,320 | 2,921,488 | | |
| Ekurhuleni (East Rand) | Metropolitan municipality | 2,026,980 | 2,481,760 | 3,178,470 | | |
| Emfuleni | Local Municipality | 597,285 | 657,949 | 721,663 | | |
| Lesedi | Local municipality | 66,206 | 71,868 | 99,520 | | |
| Merafong city | Local municipality | 209,727 | 210,481 | 197,520 | | |
| Midvaal | Local municipality | 53,353 | 64,271 | 95,301 | | |
| Mogale city | Local municipality | 226,446 | 295,505 | 362,422 | | |
| Randfontein | Local municipality | 107,711 | 128,842 | 149,286 | | |
| Westonaria | Local municipality | 115,592 | 109,799 | 111,767 | | |
| South Africa | Republic | 40,583,573 | 44,819,778 | 51,770,560 | | |

Source: [20, 21].

**Table 1.** Overview of the secondary data sources consulted.

development philosophy as well as integration of activities [2, 4]. Spatial restructuring therefore manifests itself in terms of spatial development frameworks/physical plans/master plans and urban design plans aimed at redressing spatial inefficiencies and inequalities in an area, measures that promote public mass modes of transport over private motorist-based transportation approaches as well as urban development initiatives that support vertical (upward growth) rather than lateral (sprawling) urban development outcomes.

### 3.3. The notion, concept and theory of urban systems

The classical theory of urban systems recognises that urban elements that constitute the structure are in a state of equilibrium that promotes system efficiency and effectiveness [22]. If the assemblage components of an urban system are disturbed, the system will malfunction or become inefficient or operate at suboptimal performance creating repercussions that affect all system components. In this regard, the urban structure is viewed as a complex system with the following elements: size, function and scale; accessibility and movement; economic integration and pluralism of activities; ecological and environmental ecosystem services; infrastructure and services; and policy, institutions, governance and management arrangements. From the identified six (6) main elements, it is important to acknowledge that these components are interdependent, interrelated and interconnected. In any event, the functioning of these system components manifests themselves in terms of a 'territorial dynamics approach' with implications linked to centrality, specialty and peripherality of urban territories in any spatial setting.

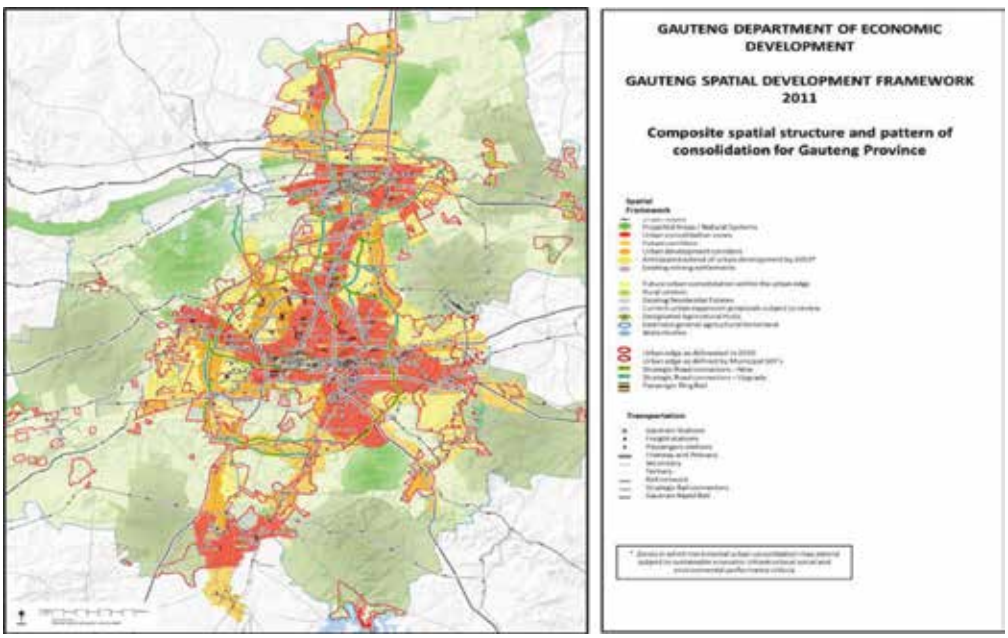
### 3.4. Urban polycentricism growth and management approach

Urban polycentrism growth and management approach draw its roots from the commuting models of polycentric and multicentric city structures [12, 23]. The polycentric commuting spatial model is predicated on the presumption that the city has an equal distribution and spread of sub-centres of employment of a similar scale that have the capacity and capability to generate trips from all over the city in all directions [7]. In this scenario, the characteristics of commuting with respect to spatial clustering and scattering are represented by a wide dispersion of scattered random origins and destinations, appearing almost everywhere. However, on the other hand the multicentric growth and management approach in acknowledging the existence of multiple sub-centres of commuting and spatial power introduces the overarching principle of primacy/dominant commuting and spatial attraction sub-centre. It is this dominant sub-centre that tends to explain the urban commuting and spatial structuring skewedness and abnormality regarding spatial inefficiencies, spatial fragmentation and transportation inadequacies in an urban setting [7, 11, 14]. The urban commuting flows would be composites of both random and radial patterns. In this regard, the poly- and multicentric urban growth and development paradigms lend themselves to spatial structuring approaches that require the need to generate solutions applicable to different multilevel systems of city scales, spatial and transportation governance, funding and partnership system. This is suggested as a way of developing and generating customised responses to rapid urbanisation in response to spatial and transportation needs.

### 3.5. Gauteng spatial development opportunity and constraint framework

Spatial planning in Gauteng province is managed through the Gauteng Spatial Development Framework among other development planning instruments as reflected on **Map 1**. The spatial plan represents a future desired spatial vision for Gauteng province. The spatial structure represented is an amalgamation of the common overarching development principles applicable to the individual local spatial development frameworks of all local authorities in the province.

From **Map 1**, we can deduce that the GSDF identifies several strategic initiatives destined for implementation between 2011 and 2030, which relate to urban structuring and priority action areas. These initiatives are regarded as the primary spatial focal points to act as catalysts in terms of significant urban transformation in Gauteng province over the next decade. The GSDF as reflected on **Map 1** is based on key spatial transformation development principles that have strong resonate in addressing the urban transportation bottlenecks in Gauteng province. The interventions are linked at the containment of urban sprawl by way of applying the urban edge principle, implementing a growth management strategy that seeks to advance compaction, residential densification and in-fill development within the existing urban fabric. At the same time, the approach is to advance social and economic integration of disadvantaged communities into the urban system, particularly those on the urban periphery. Central to all these initiatives is the promotion of the land use-public transport integration through nodal and corridor development. Evident from the above principles is the strong emphasis on public transport becoming the basis of the movement system in the province,




**Map 1.** Gauteng spatial development framework, 2011. Source: [24].

http://dx.doi.org/10.5772/intechopen.80810

with urban corridors, activity spines and public transport routes creating the 'skeleton' for future processes of densification and intensification, including transit-oriented development around road and rail-based public transport facilities. However, challenges relate to the pace of implementing the transformative and catalytic projects that are linked to inadequate investment and funding framework. At the same time, the low population densities in the Gauteng province fight against the implementation of sustainable public mass transit systems. The fragmented local transport governance systems need to graduate into a Gauteng transport authority at a faster rate than what the Gauteng Transport Commission is operating at. While good intentions and initiatives are in place, these are falling short of addressing holistically the spatial and transportation inadequacies that characterise Gauteng province.

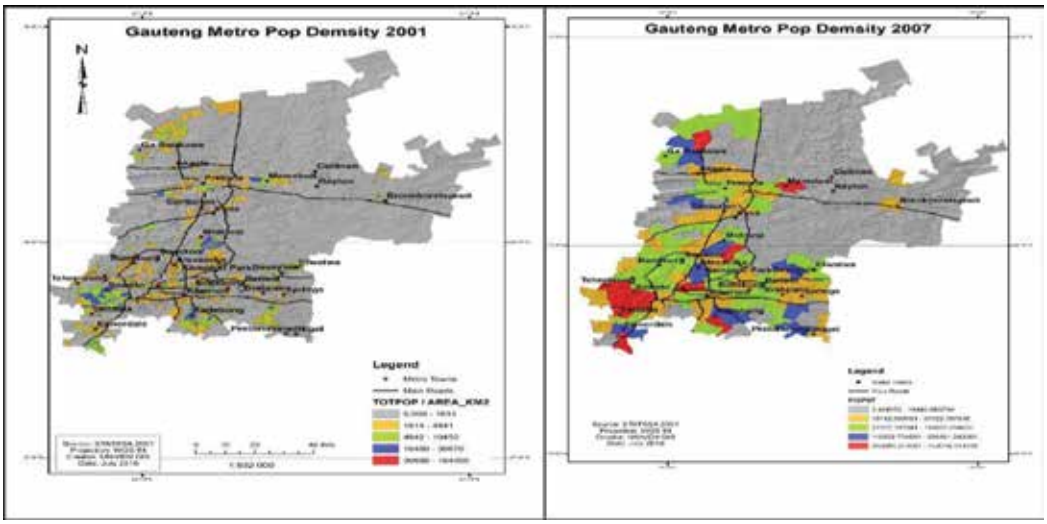
## 4. Results and discussion

In this section, the main findings of the study are discussed. These are covered in terms of the following subheadings: rapid urbanisation, high motorisation rates, spatial fragmentation and inefficiencies. The synthesis of the three above-mentioned areas is then presented in the form of a subsection that discusses the spatial and transportation complexities and challenges linked to reconciling rapid urbanisation challenges to a transportation solution. In any case, the section is then summarised through advancing recommendations and implications emanating from the study aimed at suggesting practical spatial and transportation solutions for the Gauteng city region in South Africa.

### 4.1. Rapid urbanisation

The overall growth rate of 30.7% between 2001 and 2011 (and a further 7.5% between 2011 and 2015) reflects high levels of in-migration into the Gauteng province [20]. This high growth rate is not only directed at the urban areas of the metros but also into the economic hubs of the local municipalities. Growth across the municipalities in Gauteng province has consistently varied from 9.7% in Emfuleni local municipality (LM) to over 35% in the city of Johannesburg (COJ) and city of Tshwane (COT), to 48% in Midvaal LM. The only municipalities to have experienced very low growth and negative growth rates between 2001 and 2011 census period were Westonaria LM (1.8%) and Merafong LM (−6.2%). Between 2002 and 2013, the household growth rate for the Gauteng province in total was 39%, while the next closest growth rate in South Africa was the Western Cape at 12.3% [20, 21]. Even Emfuleni LM in Gauteng, which had the lowest growth in household of all municipalities in the province (17.8%), exceeded the household growth rate of the Western Cape. **Map 2** illustrates spatially the change in total population per sub-place in Gauteng city region 1996–2011.

From **Map 2**, we can deduce that generally Gauteng city region experienced high population changes between 2001 and 2011 census periods. This high rate of growth in the number of households formation relates to the impact of in-migration, which is most pronounced in the Gauteng province, making the work of the Gauteng municipalities more than challenging. Mismatches, deficits, tensions and capacity constraints in providing for employment/




**Map 2.** Change in total population per sub-place in Gauteng city region 2001–2007. Source: [25, 26].

job creation, housing, facilities, transport infrastructures and services emerge as critical challenges as the region is underprepared for the rapid urbanisation wave occurring under its area of jurisdiction.

### 4.2. High motorisation rates

The national vehicle fleet in 2015 consisted of 10,317,262 registered vehicles, with 39% of all vehicles registered in Gauteng province. Passenger cars comprise 73% of vehicles registered in Gauteng province with heavy-duty vehicles (HDV) and buses collectively making up just 3.8% of the provincial vehicle fleet. **Table 2** presents a tabular illustration of the registered vehicles in the Gauteng province in the year 2015.

From **Table 2**, one can deduce that passenger cars are the largest vehicle category of registrations, while light delivery vehicles (LDVs) also form a significant component of the vehicle population. The total amount of diesel and petrol sold in South Africa was 13,492 and 11,470 mL, respectively. The amount of fuel sold in Gauteng in 2015 was 3160 mL of diesel and 4119 mL of petrol. The greater volume of petrol to diesel is reflective of the larger number of passenger cars in Gauteng province. The high automobile dependency on small and inefficient vehicles has negative implications in terms of urban road space utilisation, carbon footprint as well as

| | Motorcycles | Passenger cars | LDV | HDV | Buses | Total |
|---|---|---|---|---|---|---|
| Gauteng province | 147,958 | 2,975,065 | 781,714 | 136,220 | 19,112 | 4,060,069 |
| National total | 366,714 | 7,143,707 | 2,380,536 | 367,045 | 59,260 | 10,317,262 |

Source: [27].

**Table 2.** Registered vehicles in Gauteng province in 2015.

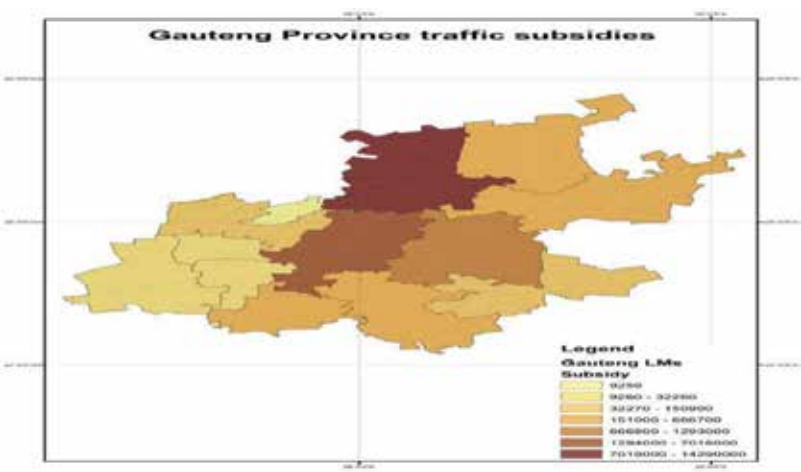
http://dx.doi.org/10.5772/intechopen.80810

congestion including road-based accident-related data. **Map 3** presents a spatial map illustrating the current public transport bus subsidy spatial portrait of subsidy allocation and distribution in South Africa. This is discovered to be strongest in the Gauteng city region around Pretoria, Johannesburg, Randfontein and Ekurhuleni.

From **Map 3**, we can deduce that the fragmented nature of spatial settlements in South Africa has huge implications for the current public transport subsidy policy by the government. The subsidies are highest in Gauteng city region as well as in Cape Town city, for example. Following on then, **Table 3** presents a comparison of the estimated annual emissions of air pollutants and $CO_2$ from registered motor vehicles in Gauteng than the national emission outputs. The CO emission of 440,22 t/a is the highest of the air pollutants and is equivalent to 35% of the national emission [28]. Emissions of non-methane volatile organic compounds (NMVOC) are relatively high and account for 35% of the national emission with the NOx emission accounting for nearly 30% [28]. Emissions of lead are very low due to the phase-out of lead in fuels. Similarly, $SO_2$ emissions are relatively low with the low sulphur content in fuels. The total $CO_2$ emission for the national vehicle fleet is estimated to be 54,258,926 with 16,213,749 t/a from vehicles registered in Gauteng province, accounting for nearly 30% of the total $CO_2$ emission [28]. The city of Johannesburg, city of Tshwane and Ekurhuleni metropolitan municipality have the highest pollutant emission rates for all pollutants.

However, **Table 4** presents the total emissions of air pollutants and $CO_2$ by vehicle category in Gauteng province. The significant contribution from passenger cars to the CO emission is noteworthy, as well as their contribution and that of HDVs and buses to the NOx emission.

From **Table 4**, we can deduce the automobile dependence cost on emissions in Gauteng province. Attempts at land and transportation solutions that move towards low-carbon economy are therefore a welcome development.




**Map 3.** 2018 public transport bus subsidy spatial representation in South African rands. Source: [25].

| | NOx | $SO_2$ | CO | $PM_{10}$ | NMVOC | Benzene | Lead | $CO_2$ |
|---|---|---|---|---|---|---|---|---|
| Gauteng province | 74,015 | 1734 | 440,222 | 3313 | 63,921 | 105 | 0.15 | 16,213,749 |
| National total | 251,390 | 6952 | 1,241,295 | 13,646 | 184,161 | 319 | 0.53 | 54,258,926 |

Source: [28].

**Table 3.** Total emission of air pollutants and $CO_2$ from motor vehicles for 2015 in Gauteng in tons per annum compared with the national emission.

| | Motorcycles | Passenger cars | LDVs | HDVs and buses | Total |
|---|---|---|---|---|---|
| NOx | 794 | 45,541 | 9861 | 17,819 | 74,015 |
| $SO_2$ | 16 | 340 | 896 | 482 | 1734 |
| CO | 40,967 | 391,189 | 4213 | 3853 | 440,222 |
| $PM_{10}$ | 226 | 985 | 1524 | 578 | 3313 |
| NMVOC | 9693 | 46,023 | 7434 | 771 | 63,921 |
| Benzene | 1.6 | 41.0 | 62.5 | 0.0 | 105.1 |
| Lead | 0.011 | 0.066 | 0.058 | 0.010 | 0.15 |
| $CO_2$ | 278,105 | 11,468,237 | 2,906,125 | 1,561,282 | 16,213,749 |

Source: [28].

**Table 4.** Total emission of air pollutants and $CO_2$ from vehicle classes in 2015 in Gauteng province in tons per annum.

### 4.3. Spatial fragmentation and inefficiencies

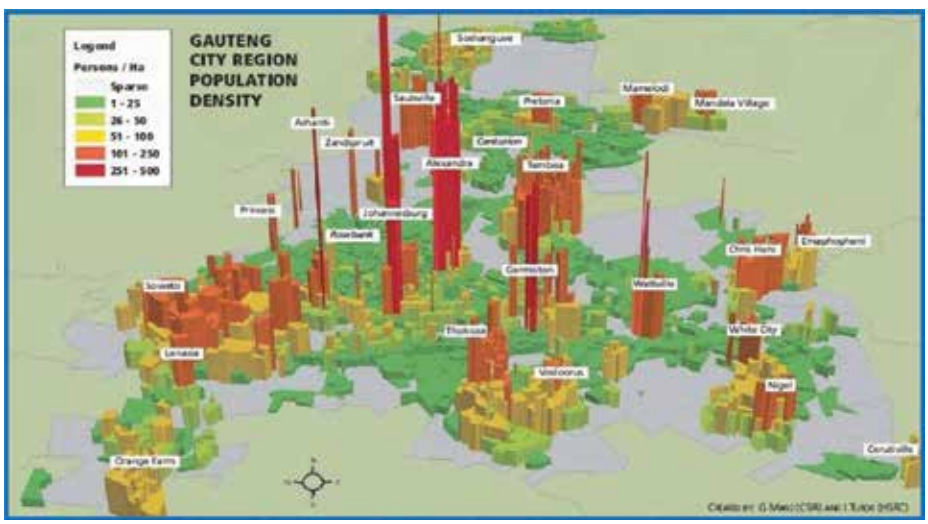
In the South African context, there are three critical concerns in relation to urban form and density. First, densities overall are very low in international terms, resulting in high costs of infrastructure provision, long and costly travel for individuals, inefficient logistic networks and low market thresholds [13, 14, 29–32]. Second, the density gradient is frequently inverted: the highest densities are found in pockets of low-income settlements along the periphery, rather than closest to the urban centre [33]. Third, spatial fragmentation of the labour market disperses available work [34]. South Africa's metropolitan areas have an average density of 2960 people/$km^2$, than 8292 people/$km^2$ for low- and middle-income countries and 3100 people/$km^2$ for high-income countries [32, 35]. Internationally, the only cities with lower average densities than South African cities, and longer travel distances to work, are the sprawling cities of North America, which rely heavily on individual passenger cars rather than public transport [22, 36, 37]. A comparative analysis of Johannesburg metropolitan area with cities in developed countries shows that there is the existence of low density in Johannesburg which becomes a critical development problem. On average most Johannesburg residents live in townships far from the city centre [14]. This development pattern contrasts with the population distribution of other large cities, since density is usually greatest towards the city centre. Transport is a major

http://dx.doi.org/10.5772/intechopen.80810

challenge in this type of urban environment [13, 29, 31]. Most people in Johannesburg live far from the city centre and their place of work. The high density in townships also presents service delivery challenges, and crowding reduces quality of life. A city cannot therefore be quickly restructured. However, the need for inner-city revitalisation, mixed-use development and densification in central urban areas is one way of resolving the issue. The need to focus development in townships in city planning and development is also vital. The Gautrain and surrounding development hubs are therefore a good step in this direction.

**Map 4** captures density variations in the Gauteng province in a graphic manner. While such variations are not uncommon internationally, what is unusual in South Africa's case is the low densities in middle-class residential areas, than high densities on the urban periphery. Particular concerns include the extreme levels of dispersal within Gauteng, South Africa's economic heartland, which makes it difficult to operate as an integrated city region, and the persistence of the profoundly constrained pattern of 'displaced urbanisation', most clearly evident in Tshwane (Winterveld) and Mangaung (Botshabelo). However, since the early 1990s, a growing concentration of people living in inner-city Johannesburg has begun to counteract the distortion of a negative density gradient. In many cases, this is happening through informal process such as increased densities in informal settlements close to work and growing numbers of backyard shacks. **Table 5** presents relative transport modal splits for nine different countries.

From **Table 5**, one can deduce that Johannesburg is a relatively energy-inefficient city in global terms. Johannesburg has furthermore high levels of unemployment and poverty (around 25%) and is home to one of the highest Gini coefficients in the world (0.75 than 0.38 for Asian cities) [12, 23]. Transport accounts for 31% of SA's energy consumption (56% in cities) and 16% of $CO_2$ emissions [38]. The big transport modal split trend in the lower-income groups of South Africa has been the shift away from using publicly owned public transport (bus




**Map 4.** Population density in Gauteng province. Source: [35].

| Urban area | Transport modal split | | | |
|---|---|---|---|---|
| | Public transport (%) | Walking (%) | Cycling (%) | Private motorists (%) |
| Istanbul | 41 | 45 | n/a | 14 |
| New York | 56 | 11 | 1 | 30 |
| Shanghai | 19 | 29 | 25 | 22 |
| London | 37 | 20 | 2 | 40 |
| Mexico | 79 | n/a | n/a | 16 |
| Johannesburg | 32 | 31 | ≤1 | 37 |
| Berlin | 27 | 25 | 10 | 37 |
| Mumbai | 36 | 56 | 1 | 5 |
| Sao Paulo | 32 | 33 | 1 | 29 |

Source: [35].

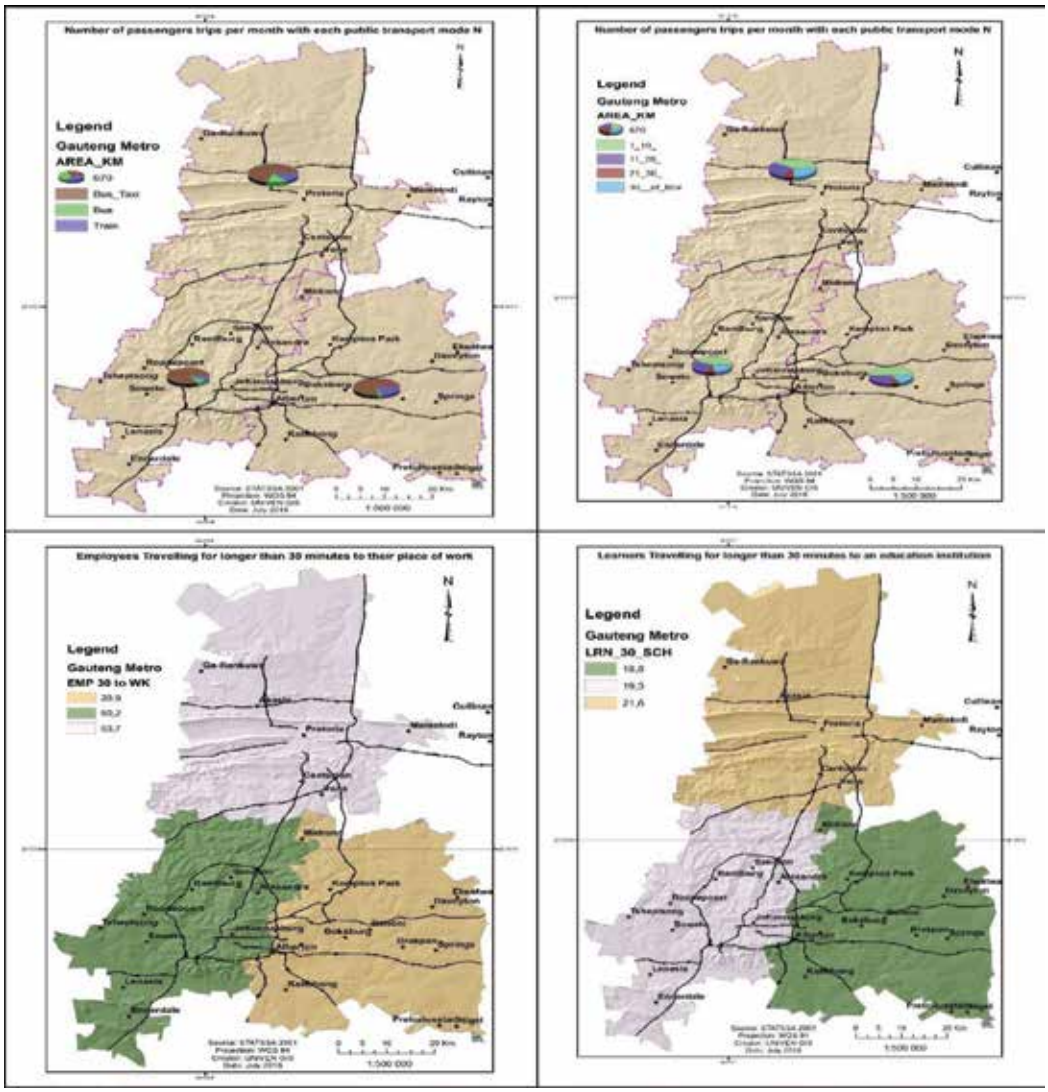
**Table 5.** Relative transport modal splits in nine different countries.

and rail) to privately owned public transport (taxis). As an example in Gauteng, changes and trends in public transport were recorded with respect to the use of minibus taxis increased from 3% in 1975 to 41% in 2009 with bus declining from 22 to 4% and train from 20 to 8%. At the same time, despite the travel flexibility associated with taxis, travel times for this group have remained static or declined in places. However, a worrying development is the fact that the middle-income group has remained resolutely car-oriented and travel times have increased dramatically since 1980 (nearly 60%) [39, 40].

From **Map 4**, we can deduce that there is a challenge of spatial distribution of population in Johannesburg. The underlying factor is that Gauteng province is not densified than other cities in the World. The spatial fragmentation manifests itself in spatial mismatches between residential areas and areas of economic opportunity. This has also strong resonates with constrained transportation and commuting challenges [41]. Given these spatial inefficiencies and misfits, transport costs and modal choice are constrained generally for passengers but in particular for employees and learners who use public transport. **Map 5** presents transport indicators by metro in South Africa which has resonates with the spatial and transport inefficiencies.

The high cost of transportation is partly due to spatial form and partly to do with modal splits and inefficiencies affecting particular types of transport (refer to **Map 5**). Internationally, spatial planning methods, such as transit-oriented development (TOD), have been developed and are touted as the antidote to address the spatial and transportation disjuncture as illustrated in Gauteng. The cities in Gauteng province are typically 'sprawling cities' that were not originally planned, designed and built to meet the needs of a large majority of the commuting population. A way of addressing this anomaly is through devising and crafting an urban development agenda that places at the centre the integration of public transport with the built environment as paramount. Steps towards building compact, inclusive, resilient,

http://dx.doi.org/10.5772/intechopen.80810




**Map 5.** Spatial representation of transport indicators by metro in Gauteng province. Source: [20, 21, 25].

integrated and connected cities are part of the solution package aimed at enhancing commuting experiences in Gauteng. In South Africa these principles have been acknowledged and the need to foster a strong and conducive environment suggested. Grant frameworks can be used to encourage densification and facilitate transition to a low-carbon economy in Gauteng province in particular and South Africa by extension. A major plank of the spatial transformation necessary in South African cities is densification—people moving from the periphery to the centre—and the formation of 'mobility corridors' [33, 42, 43], for those who remain outside the centre.

### 4.4. Reconciling rapid urbanisation challenges to a transportation solution

Rapid urbanisation further complicates the realisation of a sustainable transportation solution in Gauteng province. This is because the government has to respond to many issues including the housing backlog matters, growing informalities in the cities which also manifest themselves in expanding and expansive informal settlements. At the same time, an unemployment challenge is also created and continues to remain stubbornly high (estimated at 35%) [20]. In this set-up priority matters become housing, employment, provision of socio-economic facilities, fighting crime and increasing security, while transport features in the low rungs of priority matters. As an example, in the 1970s, it was identified and costed that an underground tube transport was solution for the transportation matters in Gauteng province. The project was however not implemented because it was seen as too costly requiring US 7 billion dollars at that time [13]. Parallel to the implementation of the Gauteng rapid rail link in the build-up to the 2010 World Cup, the idea of a light tram system to complement the Gautrain as well as existing conventional bus services and taxi transport systems was also mooted. However, the project was terminated at an advanced stage of preparing the logistics for its implementation owing to the fact that necessary government project approval and protocol compliance matters had been overlooked. While the Gautrain rapid rail link project has been implemented, the project suffers from having an inadequate and incomplete geographic coverage and spread to provide all-round transport system to all areas. In any case, the BRT systems for the three metro are at various stages of implementation with the BRT *Rea Vaya* (Johannesburg) running, while Tshwane *Areyeng* is also in operation. The BRT *Harambee* (Ekurhuleni) is yet to commence operation. While all these transformation and advanced new generation of transport systems are welcome, there is still need to improve the integration between the modes through switching and implementing the single public transport ticket system. In addition, to make public transport more sustainable from a funding perspective and growing sales, there is need to densify the public transport corridors which are currently lowly populated. The Gauteng improvement freeway programme that was implemented by the government with tolling as a principle to manage road space in Gauteng province has met with spirited resistance from the road users with toll paying defaulting rates stand at approximately 78% of the road users. Different stakeholders have continued to argue that the project though welcome was not properly structured. Its introduction to the commuters at least regarding public participation and funding and sustainable models for repaying the loans has been singled as having been inadequately structured and conveyed to stakeholders. At the same time, a sustainable steering and integration model that is acceptable to the minibus taxi industry is still yet to be developed and agreed on. Overall, rigorous efforts towards spatially transforming Gauteng city form from fragmented structure into a compact transit-oriented driven spatial structure are fundamental if the transportation and spatial inefficiencies in Gauteng are to be redressed. In this set-up in which the public system is yet to establish itself as the choice of commuters, the growth in car ownership continues unabated. The consequence is the vicious loop of an automobile-dependent society in the Gauteng province. While land densification programmes and initiatives in place are acknowledged, the downside to the arrangement is that these are inadequate in terms of the scale, size and desired impact to witness a significant change in travel patterns, driving behaviour as well as new housing and building density set-ups. At the

same time, the use of separate transport systems and institutions by the local municipalities creates cracks and lack of transportation integrated solutions in the Gauteng city region. This is because each municipality plans and implements spatial and transportation projects as if it is isolated and not linked to each other in the bigger Gauteng province transport set-up and spatial dynamics network of settlements, industry and commercial enterprise.

### 4.5. Recommendations, implications and emergent issues

From this review, it can be recommended that resolving the urban spatial and transportation solutions in Gauteng province requires a mixture of both spatial and transportation and non-spatial and transportation solutions. Optimising public transport is one way of addressing the transport commuting constraints in Gauteng province [44, 45]. The need for transforming Gauteng province into a smart city region through the smart bus rapid transport (BRT) systems should be upscaled to cover all aspects of a smart city and metropolitan region such that we have a city landscape supported by smart planning systems, smart building and construction systems, smart infrastructure maintenance and rehabilitation systems, smart recording and system management systems, smart information and communication system, et cetera [46, 47]. All these initiatives should enable increased accessibility of the Gauteng city region so that the productivity and competitiveness of the region are increased [48]. The need to consolidate governance and transport authority systems that can migrate, integrate and plan for all the transport needs of Gauteng province holistically and comprehensively in terms of a transport authority for the region rather than single areas requires further improvement and is an initiative in the right direction. Such transport authorities have been seen to assist in managing urban transport and spatial planning better in areas such as the Greater London region in the United Kingdom as an example [49–54]. The region is therefore encouraged to find the right balance in terms of implementing advanced spatial planning systems that reverse spatial fragmentation problems, making use of smart transport solutions to solve the transport problems of lack of integrated pricing system as well as fully develop and implement a transport authority that provides the overall intelligence to address todays transportation problems while having a master plan to address the future transport problems in the Gauteng region.

## 5. Conclusions

This chapter has managed to illustrate the multiple and complex spatial and transportation challenges that the Gauteng city region faces and is faced with. These challenges are partly explained by the fact that the Gauteng city region forms an extended economic hub and network of socio-economic opportunities and activities. This unique status of Gauteng city region accounts for high in-migration which creates differential pressure on all facets of socio-economic infrastructure and facilities. In response to the high urbanisation and motorisation rates experienced in Gauteng city region, the municipalities have developed a range of spatial and transportation interventions to resolve spatial fracturing, fragmentation, dislocation and urban traffic congestion problems. The interventions have met with

mixed fortunes from an implementation perspective, although generally the sum effect of these interventions is the development of strategic forward-looking urban structure and transportation solutions. While the expansion of freeways through road construction and highway expansion (physical instrument) is appreciated, the downside of this intervention is that it supports a predominantly automobile-dependent growth at the expense of development of other equally important transport dimensions such as improving the metrorail, expanding and popularising urgently the Gauteng rapid rail link as well as the development of transit-oriented development (TOD) to facilitate a compact and pedestrian urban and friendly urban structure. The introduction of e-tolling of roads (financial instrument) has met with spirited resistance, and the matter remains largely unresolved. The debate points have revolved around inadequate consultation and participation during the build-up of the project; at the same time, the economic funding model has been questioned as inappropriate. Suggestions have ranged from increasing a fuel levy nationally to having a special fuel tax for Gauteng city regions, while others have argued that the government should fund the budget from the income tax paid by individuals and companies, respectively. From this chapter's review, the need for continued research and development aimed at delivering more efficient and carbon-neutral spatial and transportation solutions beckons. It is also high time that the autonomous and electric vehicle/buses technology and implications regarding reconfiguration and spatial planning and organisation of land-use debate should be allowed to take centre stage. A sustainable spatial and transportation approach for the Gauteng city region is one that is anchored on providing innovative solutions to addressing current problems as well as balancing future intelligent innovations to create an adaptive, progressive and robust spatial structuring set-up that can be adequately supported by appropriate transportation solutions. In any case, the solution to the spatial structure mismatches, disconnects and transportation inadequacies does not lie solely in the domain of spatial and transportation planning and management per see. The need to outreach and create space for a multi-, trans- and cross-disciplinary integrative and cooperative partnerships is crucial in achieving the anticipated spatial and transportation turn linked to advanced forms of the next generation of spatial and transportation solutions. Indeed, restructuring the Gauteng city region from a spatial and transportation perspective is a daunting task, which however requires attention and can be tackled with the application of a clear spatial and transportation implementation road map plan, supported by an adequate provision of resources (financial, economic, human, political support and dedicated leadership) within the orbit of an appropriate institutional and governance delivery system and framework.

## Acknowledgements

I acknowledge the Council for Scientific and Industrial Research (CSIR), Pretoria, and the University of Venda-Directorate Research and Innovation for invaluable inputs that assisted in shaping this paper. The authors acknowledge Mr. Farai Dondofema for the GIS mapping and production.

## Conflict of interest

The authors make a no 'conflict of interest' declaration.

## Author details

James Chakwizira[1]*, Peter Bikam[1] and Thompson A. Adeboyejo[2]

*Address all correspondence to: james.chakwizira@univen.ac.za

1 University of Venda, Thohoyandou, South Africa

2 Ladoke Akintola University of Technology, Ogbomoso, Nigeria

## References

[1] Chakwizira J. The urban and regional economy directing land use and transportation planning and development. WIT Transactions on State-of-the-Art in Science and Engineering. 2015;**86**:199-225

[2] Todes A. Urban growth and strategic spatial planning in Johannesburg, South Africa. Cities. 2012;**29**(3):158-165

[3] De Villiers I. Tshwane 2055 and the (im)possibility of spatial justice. De Jure. 2014; **47**(2):202-217

[4] Coggin T, Pieterse M. A right to transport? Moving towards a rights-based approach to mobility in the city. South African Journal on Human Rights. 2015;**31**(2):294-314

[5] Bruwer M, Andersen J. Moving towards smart mobility in Stellenbosch: Transportation engineering. Civil Engineering=Siviele Ingenieurswese. 2015;**23**(8):44-47

[6] Camargo Pérez J, Carrillo M, Montoya-Torres J. Multi-criteria approaches for urban passenger transport systems: A literature review. Annals of Operations Research. 2015;**226**(1):69-87

[7] Chakwizira J, Bikam P, Adeboyejo T. The impact of rapid urbanisation on public transport systems in the Gauteng region of South Africa. World Academy of Science, Engineering and Technology. International Journal of Humanities and Social Sciences. 2014;**1**(5)

[8] Fundisi E, Musakwa W. Built-up area and land cover extraction using high resolution pleiades satellite imagery for Midrand, in Gauteng Province, South Africa. International Archives of the Photogrammetry, Remote Sensing & Spatial Information Sciences. 2017;**42**:1-6

[9] Jacobs W, Du Plessis DJ. A spatial perspective of the patterns and characteristics of main-and substream migration to the Western Cape, South Africa. In: Urban Forum. Netherlands: Springer; 2016

[10] Kok P, Collinson M. Migration and urbanisation in South Africa. Pretoria: Statistics South Africa. Report 03-04-02. 2006:1-41

[11] Chakwizira J. Transport modelling research agenda and new directions: Evidence from a developing country. In: Transportation, Land Use and Integration: Applications in Developing Countries. 2017;**100**:95

[12] Harrison P, Todes A. Spatial transformations in a "loosening state": South Africa in a comparative perspective. Geoforum. 2015;**61**:148-162

[13] Chakwizira J. Question of Road Traffic Congestion and De-Congestion in the Greater Johannesburg Area: Some Perspectives. New Forest, Ashurst Lodge, United Kingdom: Wessex Institute of Technology (WIT); 2007. Conference Planners

[14] Chakwizira J et al. Some missing dimensions of urban public transport in Africa: Insights and perspectives from South Africa. The Built and Human Environment Review. 2011;**4**(2):56-84

[15] Thomas DP. Public transportation in South Africa: Challenges and opportunities. World Journal of Social Science Research. 2016;**3**(3):352

[16] Chakwizira J, Mashiri M. Contribution of transport governance to socio-economic development in South Africa. In: Southern African Transport Conference; 2009

[17] Lwasa S. Planning innovation for better urban communities in sub-Saharan Africa: The education challenge and potential responses: Research article. Stads-en Streeksbeplanning =Town and Regional Planning. 2012;**60**:38-48

[18] Cooper AK et al. Assessment of spatial data infrastructures. Stads-en Streeksbeplanning =Town and Regional Planning. 2014;**64**:65-75

[19] Bobbins K, Culwick C. Green growth transitions through a green infrastructure approach at the local government level: Case study for the Gauteng City-region. Journal of Public Administration. 2015;**50**(1):32-49

[20] Africa S.S. General Household Survey, Pretoria, South Africa; 2016

[21] Zuberi T, Sibanda A, Udjo EO. The Demography of South Africa. Routledge; 2016

[22] Cohen MJ. The future of automobile society: A socio-technical transitions perspective. Technology Analysis & Strategic Management. 2012;**24**(4):377-390

[23] Harrison P, Moyo K, Yang Y. Strategy and tactics: Chinese immigrants and diasporic spaces in Johannesburg, South Africa. Journal of Southern African Studies. 2012;**38**(4): 899-925

[24] Gauteng Province E.D.D. Gauteng Spatial Development Framework, Johannesburg, South Africa; 2011

[25] Dondofema F. GIS Mapping–Gauteng Transport Project. University of Venda, GIS Resource Centre; 2018

[26] Maritz J. Selected Indicators for SACN SOCR2015 (SET 2). Pretoria: CSIR; 2015

[27] Transport D.o. eNATIS, Pretoria, South Africa; 2018

[28] Government G.P. Review of the 2009 Gauteng Air Quality Management Plan GT/GDARD/154/2016, Johannesburg, South Africa; 2017

[29] Lucas K. Making the connections between transport disadvantage and the social exclusion of low income populations in the Tshwane region of South Africa. Journal of Transport Geography. 2011;**19**(6):1320-1334

[30] Lucas K. Transport and social exclusion: Where are we now? Transport Policy. 2012;**20**:105-113

[31] Lucas K, Porter G. Mobilities and livelihoods in urban development contexts: Introduction. Journal of Transport Geography. 2016;**55**:129-131

[32] Joubert JW, Axhausen KW. Inferring commercial vehicle activities in Gauteng, South Africa. Journal of Transport Geography. 2011;**19**(1):115-124

[33] Commission N.P. National Development Plan Vision 2030, Pretoria, South Africa; 2013

[34] Bertaud A. The Spatial Organization of Cities: Deliberate Outcome or Unforeseen Consequence?; 2004

[35] Turok I, Network S.A.C. Towards Resilient Cities: A Reflection on the First Decade of a Democratic and Transformed Local Government in South Africa 2001-2010. Johannesburg, South-Africa; 2011

[36] Giles-Corti B et al. Discussion of "how to have sustainable transportation without making people drive less or give up suburban living" by Mark Delucchi and Kenneth S. Kurani. Journal of Urban Planning and Development. 2016;**142**(2):07016001

[37] Millard-Ball A, Schipper L. Are we reaching peak travel? Trends in passenger transport in eight industrialized countries. Transport Reviews. 2011;**31**(3):357-378

[38] Musango JK. Household electricity access and consumption behaviour in an urban environment: The case of Gauteng in South Africa. Energy for Sustainable Development. 2014;**23**:305-316

[39] Lombard M et al. Report on Trends in Passenger Transport in South Africa. Pretoria: Development Bank of South Africa (DBSA); 2007

[40] Van Zyl N, Lombard M, Lamprecht T. The success of stated preference techniques in evaluating travel options for less literate transport users in a developing country with reference to South Africa. In: International Conference on Transport Survey Quality and Innovation, How to Recognise It and How to Achieve It, Berg-en-Dal, South Africa; 2001

[41] Chakwizira J, U.V.D.U.R. Planning, Access and Constraints to Commuting in Gauteng Province, South Africa. University of Venda; 2016

[42] Van Wyk J. Can SPLUMA play a role in transforming spatial injustice to spatial justice in housing in South Africa? Southern African Public Law. 2015;**30**(1):26-41

[43] Frieslaar A, Marks T. International experience and best practices: Transportation. Civil Engineering=Siviele Ingenieurswese. 2007;**15**(9):24-26

[44] Dablanc L. Goods transport in large European cities: Difficult to organize, difficult to modernize. Transportation Research Part A: Policy and Practice. 2007;**41**(3):280-285

[45] Dirks S, Gurdgiev C, Keeling M. Smarter Cities for Smarter Growth: How Cities Can Optimize their Systems for the Talent-Based Economy; 2010

[46] Dickey JW. Metropolitan Transportation Planning. Routledge; 2017

[47] Ebrahimpour M, Majedi H, Zabihi H. "Biophilic" planning, a new approach in achieving liveable cities in Iranian new towns–Hashtgerd case study. Stads-en Streeksbeplanning=Town and Regional Planning. 2017;**70**:1-13

[48] Litman T. Evaluating Accessibility for Transport Planning. Victoria Transport Policy Institute; 2017

[49] Masson R et al. Optimization of a city logistics transportation system with mixed passengers and goods. EURO Journal on Transportation and Logistics. 2017;**6**(1):81-109

[50] Rode P et al. Accessibility in Cities: Transport and Urban Form, in Disrupting Mobility. Springer; 2017. pp. 239-273

[51] Zhuhadar L et al. The next wave of innovation—Review of smart cities intelligent operation systems. Computers in Human Behavior. 2017;**66**:273-281

[52] Black WR. Sustainable Transportation: Problems and Solutions. Guilford Press; 2010

[53] Tirachini A, Hensher DA, Rose JM. Multimodal pricing and optimal design of urban public transport: The interplay between traffic congestion and bus crowding. Transportation Research Part B: Methodological. 2014;**61**:33-54

[54] Schiller PL, Kenworthy JR. An Introduction to Sustainable Transportation: Policy, Planning and Implementation. Routledge; 2017

Chapter 6

# Development of New Sustainable Urban Areas: Horizontal or Vertical Planning Systems for Resource Efficient Cities

Ronald Wennersten

Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/intechopen.79426

**Abstract**

China's remarkable economic growth has been partly driven by a high rate of urbanization and fast reduction of poverty. This has not been achieved without a price, that of environmental pollution. The Chinese government has made great efforts to reduce coal consumption; however, adjusting the fuel mix in a country like China is not easy. An important question is, if developing countries should follow the Chinese model and reduce poverty based on the Chinese vertical planning system with a strong one-party government? or should the developing countries use a horizontal model based more on local democratic principles? The transition to more sustainable energy systems will be gradual and may take longer time than expected. Sustainable development is a process involving conflicts between different aspects of sustainability and it is a value-based concept, which means that a participatory process involving key actors including the public is crucial for the development. The Chinese vertical model is compelling for many developing countries because it produces fast results on a massive scale. A horizontal planning system is slower but more resilient and adaptive concerning complexity of the urban fabric. In a new project, based more on horizontal principles, a Swedish planning support system, CITYLAB, is now being tested in a Chinese context.

**Keywords:** urban planning models, energy systems, China, Sweden, CITYLAB

# 1. Introduction

## 1.1. Global challenges for urban development

Our world is currently facing serious challenges. Human impacts affect basic ecosystem services as biodiversity and climate in a negative way with unknown long-term consequences. Large amounts of resources are needed for creating a decent life for a growing population in developing countries. It is important to reveal the built-in conflicts in future trajectories towards sustainable development on a global level. As stated by the Brundtland Commission, we have to take care of people today as well as of future generations [1]. This challenge cannot be met without more intelligent solutions for use of resources, solutions that will have less environmental impacts and save resources for future generations, and at the same time reduce poverty among people living today. When discussing resources in this chapter, we mainly refer to energy, materials, and water. Of these, energy is the central resource which makes it possible to utilize the other resources for human needs like building infrastructures, supplying food and water. Energy is the engine driving urban development. For this reason, the focus is on sustainable energy systems in this chapter.

Important global trends are now, especially pronounced in the developing countries, a growing population, migration to urban areas, and a growing middle-class population having increased demand for comfortable lives. This trend is particularly obvious in Asian countries like China and India, but in the near future, also Africa will go this way. Acute deprivation persists in the global energy sector, with 1.2 billion people without electricity and 2.7 billion reliant on the traditional use of solid biomass for cooking [2]. Achieving universal access to affordable, reliable and modern energy services by 2030 is now one of the UN Sustainable Development Goals, but projections show today's efforts falling short of reaching this goal. Embedded in the strategies to achieve the UN goals are high urbanization rates and high annual economic growth (7%) in developing countries which is an important criterium for reaching the goals. Urbanization and economic growth are in many ways seen as key factors for sustainable development and poverty reduction. This is because of an anticipated higher and more effective utilization of common services as building and transport infrastructure, hospitals, schools, etc. Other researchers however point to that urbanization will drive consumption and thus increasing use of resources. This is because consumption choices or lifestyles are not just a product of the values of individuals but actually tied to the form of the surrounding urbanization: that is, lifestyles are situated [3]. Urban areas can be on one side regarded as centers for innovation, but they are also part of modernization resulting in higher consumption patterns. However, the strong urbanization is probably more or less out of control globally, so the focus must be to see how resource consumption can be minimized under that boundary condition for urban development. If the goals of the UN SDGs are to be achieved this will inevitable be linked to increased use of resources globally [4]. To escape from this trap, there seems to be only one way out, to be more effective in the use of resources

http://dx.doi.org/10.5772/intechopen.79426

in urban areas. Increasing supply cannot counteract the increasing demand in a sustainable way. New ways of urban planning play a central role in this development.

### 1.2. Central issues in this chapter

The fast global urbanization rate is a driver for increasing resource consumption which in turn is connected to an increasing energy consumption mainly from fossil fuels. This development will cause more of environmental impacts and international conflicts around resources. Many of these problems and conflicting goals are described in the UN 2030 Sustainable Development Goals which primary aim is to decrease poverty in the world. It is more and more obvious that renewable energy sources cannot till 2030 in a significant way change this situation to replace fossil fuels with clean energy. The increasing demand cannot be met by increasing supply. This leads to a central question, how we plan our cities? Are there ways which new strategies for urban planning can change the negative development? China has shown that its central model for planning, a vertical model, have had a huge effect on reducing poverty. This has been to a price of increasing resource consumption and environmental degradation. Sweden, a small developed country with very high environmental ambitions has chosen another way. Here participatory or horizontal planning models are used with early involvement of actors on local level. A central question is then, which model other developing countries should choose?

## 2. General trends affecting resource consumption

The general trends for resource consumption are important to keep in mind when discussing future pathways for sustainable urban development. Are we on a positive trajectory on the global level or are we going in the wrong way using more resources?

There are three important trends for the future development of global needs for resources:

- High urbanization rates
- Higher affluence stimulating consumption of goods
- Growing population on the global scale

These trends all points towards higher needs for resources on the global scale. To handle this there are international agreements formulated. One is the Paris agreement [5] with focus on reducing emissions of Green House Gases (GHG) till 2030, and the other one is the UN 2030 Sustainable Development Goals [6] with a set of more complex and partly conflicting goals. There are obvious conflicts between the goals as poverty reduction is linked to economic growth and availability of energy at reasonable prices. To be successful, these agreements should be implemented with more detailed goals on national and local levels. An important indicator of the progress is the energy consumption.

## 3. Energy is the core of the problem for increasing resource consumption

### 3.1. Energy is driving development

All living systems keep alive because they use energy of high quality and leave energy of low quality. It is the general principle of entropy increase. This applies also for human urban systems. The processes can be different when it comes to effectivity. We do not build cities in order to minimize carbon dioxide emissions.

Energy is thus the fuel that keeps urban areas as well as the whole society running. Much energy is spent on production of material goods which at the end creates waste and environmental impacts. A new trend which creates hope is to reuse and recycle materials expressed in ideas around circular economies. However, one should bear in mind that recycling of materials requires energy and it also involves degradation of quality of materials. The concept consumption is sometimes criticized because mass and energy are constant, but is merely used to describe the decreasing quality both for energy and materials. This means that the idea of circular economy does not in itself solve the problem of the increasing use of energy. Except from consumption of different goods, also sectors like urban transports and buildings are important parts in the energy demand in urban areas. In several ways, the different sectors are connected in a way which should be handled in more cross-sectoral ways to get optimal, not suboptimal, solutions [7].

### 3.2. Trends for global energy consumption

In World Energy Outlook 2016 [2], different scenarios for the future development of energy consumption are developed. The New Policies Scenario is based on a detailed review of policy announcements and plans, and reflects the way that governments, individually or collectively, see their energy sectors developing over the coming decades. Its starting point is the policies and measures that are already in place, but it also considers, in full or in part, the aims, targets and intentions that have been announced, even if these have yet to be enshrined in legislation or the means for their implementation are still taking shape. The result of this scenario is given in **Table 1**.

Predicting the future is inherently difficult and there are many unknowns and unknown unknowns on the way. However, according to the WEO16 New Policy scenario, fossil fuels will continue to dominate the world energy mix, at least till 2040. This is also important to have in mind when discussing specific countries like Sweden and China later on in this chapter. The global energy development is thus characterized by growing energy consumption especially in the developing countries. This has been shown also in other reports like BP Statistical Review of World Energy [8]. China is the world's largest emitter of carbon dioxide and a new study has forecast China's carbon emissions to accelerate further in 2018, despite Beijing's efforts to switch to greener energy sources and policies [9]. The conclusion from the figures in **Table 1** is, although renewable energy production is increasing, fossil fuels will remain as main primary resources for a predictable future. It is better to face facts early and

| New policy scenario | 2000 | 2014 | 2025 | 2040 |
|---|---|---|---|---|
| Coal | 2316 | 3926 | 3955 | 4140 |
| Oil | 3669 | 4266 | 4577 | 4775 |
| Gas | 2071 | 2893 | 3390 | 4313 |
| Nuclear | 676 | 662 | 888 | 1181 |
| Hydro | 225 | 335 | 420 | 536 |
| Bioenergy* | 1026 | 1421 | 1633 | 1883 |
| Other renewables | 60 | 181 | 478 | 1037 |
| Total | 10,042 | 13,684 | 15,340 | 17,866 |
| Fossil-fuel share (%) | 80 | 81 | 78 | 74 |
| $CO_2$ emissions (Gt) | 23.0 | 32.2 | 33.6 | 36.3 |

*Includes the traditional use of solid biomass and modern use of bioenergy. Source: IEA [2].

**Table 1.** World primary energy demand by fuel and scenario (Mtoe).

plan for that than wishful thinking which later turns out to be just wishful thinking. If the Paris agreement and the UN 2030 SDGs fail, what hope and trust could there be in new goals then? What is then a sustainable energy system? Often the argument is that it is a system that only uses renewable energy. This is of course true in the very long run, when we have exhausted fossil fuels, but what about the transition period?

## 4. General principles for a sustainable urban resource use

The concepts of sustainable development suggest that development should be in some way towards higher states of sustainability. The problem related to sustainability is that it contains conflicting goals. Does it imply economic growth and if so, where should the balance lie between economic growth, poverty reduction and environmental protection for example, minimizing emissions of GHG which is just one effect among many? All these conflicting goals can easily be found in the UN 2030 SDGs. Maybe an even more important question is who should decide how to make priorities among the goals? For companies and most organizations, growth is desirable and when it comes to several frameworks for sustainability, the central idea is to decouple economic growth and environmental degradation often expressed as emissions of GHGs. This usually implies a target of continuing economic growth with less consumption of energy and materials. Some researchers argue that this kind of "sustainable development" cannot be achieved with existing economic growth models. The latter argument is in line with a doubt if ecological modernization is possible [10]. Can we handle the problems of rising population and consumption by technology development? We can only reflect over the fact that if the rich economies grow at 3% until 2070, and by that stage the emerging economies have attained similarly high living standards—which seems to be the aim of the global development agenda, the total world economic output and impact could

be 60 times larger than it is today. It is also important to consider that it is more difficult to change an urban development which is socially and economically declining. Cities and regions which are in a phase of growth always have more choices than those declining.

The discussion around growth models is an active and important on-going discourse beyond the scope of this chapter. Changing life styles and consumption patterns can only grow out from a bottom-up perspective in democratic countries and these changes will occur at different times in different cultures and developing states and cannot easily be controlled or predicted. The complexity around defining a long-term sustainable energy system depends mainly on the conflicts between different goals. These conflicts cannot be resolved with scientific methods although such methods should reveal transparent facts which could be used in decision processes involving different stakeholders. In many urban projects, the emissions of GHG have become a central criterion for the overall development. However, one must accept that it is one criterion among many others in a broad decision process in an urban context.

It is necessary to consider which basic criteria we should use to characterize more sustainable energy systems before we can start planning for these and compare different alternatives. We can use these criteria in decision processes to formulate targets for short, medium, and long-term planning. The specific choices should be taken in a broad democratic process on local level.

In many cases, the definitions of sustainability or sustainable development are too general and too vague to serve as guidelines for the practical implementation of more sustainable energy systems, and we will not review all these kinds of definitions here.

What is needed are more hands-on criteria which can be used by planners in formulating goals for a sustainable urban energy system. The criteria proposed here at two levels are by no means derived from scientific facts but more from practical experiences from urban development cases.

## 5. Planning for long-term sustainable urban energy systems

Energy is thus the fundamental resource for urbanism and social development. Today, the main primary energy sources are fossil fuels. To meet global challenges in the long run, there should be a transition to a 100% renewable energy, but it is more and more obvious that the transition will take longer time than anticipated today, and that we have to find alternative pathways for transitions based on local conditions. It might very well be that the developing countries first will have a phase of using more energy before they can enter as state of decreasing use of energy. In the UN SDGs, the "hope" is that the transition to renewable and clean energy can go faster than might be realistic. If so, there is a risk for a backlash for the goals which will be serious when realizing the failure with the earlier millennium goals. According to a new report, world hunger is on the rise: the estimated number of undernourished people increased from 777 million in 2015 to 815 million in 2016 [11]. The report also noted that slowdown in global growth has had a negative impact on people's ability to get enough to eat. The cause for increasing number of starving people is related to conflicts and droughts

which could be partly connected to climate change. Increasing conflicts are often caused by increasing competition for resources for example, fossil fuels.

We should accept the fact that all primary energy sources are connected to social and ecological problems but are needed to improve social conditions for people. Today's one-sided focus on one environmental aspect, climate change and GHG emissions, draws attention from this fact. Most of the negative environmental effects of energy transformation are long-term and highly uncertain, making long-term planning and communication of risks. One problem here is that there is no red line for environmental effects as it also is for social development. We cannot foresee the long-term consequences of environmental impacts as well as social changes. There are thus no scientific solutions for sustainable development. Sustainable development involves many conflicting goals where different actors have different values concerning the priorities. To solve the conflicts local actors have to be involved. The urban transformation will be crucial for solving the problems related to resource use on a global scale. An important question is if the transition should start more as a bottom-up process than top-down processes on global and national levels and which role models could be used for the transition process? The top-down or *vertical process* can be more effective in the short-run but embedded risk is this fast development creates new problems because of too much focus on one side namely economic development. The local participatory, or *horizontal* process, might be slower but maybe safer in the long run. One major obstacle is the short-sighted vision where results on short-term are asked for.

## 6. Planning models

To solve the problems related to increased resource use, especially energy, on a global level it will be important to find principles for planning that can be adapted to local conditions in different countries and urban areas. This will be of central importance in relation to the UN 2030 SDGs. This chapter is comparing the development of more sustainable urban resource use looking at two very different countries, Sweden and China in order to evaluate which role model and principles for sustainable urban development could lead forward in relation to the UN 2030 SDGs. These examples are used to point out some critical factors underlying the development of more sustainable urban systems on short- and long-term. Sweden is a developed country with a small population depending very much on export of high-tech products. It is also renowned for high environmental standards and for several examples of urban development claimed to be sustainable. Swedish representatives have even argued that Sweden is the only country that has decoupled economic growth and emissions of GHG. This statement is under discussion and related to the problem if GHG emissions should be production or consumption based. In the Swedish calculations emission from our consumption of goods manufactured in China is not included. The Swedish Government is supporting an effort to export Swedish environmental technology and examples of sustainable urban development mainly to emerging economies [12, 13]. One of the most well-known cases is the "Hammarby-Sjöstad" area in Stockholm [14]. This case is clearly showing that the success of the Swedish planning system is based on the participation of all relevant actors in an early stage. We call this here horizontal planning.

On the other hand, China is an example of more vertical top-down planning system where strong actors play important roles. Chinese examples of urban development ranges from large-scale housing areas without any obvious focus on sustainability other than creating housing for the huge population migrating to cities in the effort to reduce social problems. The drivers for the developers of these areas are clearly short-term profits without more of longer term sustainability thinking. Also, China is now trying to export these kind of urban models, mainly to Africa and the question is how this fits into models of sustainable development [15]. Can any of these models be a role model for the transition of developing countries towards more long-term sustainability?

This chapter discuss how processes for gradual energy transitions can be developed mainly on the urban level, to find pathways towards more sustainable energy systems. The chapter analyses several key concepts in more detail: sustainability principles, sustainable energy systems, urban planning, and energy integration in urban planning. The overall goal is to give a more comprehensive view of problems and possibilities of implementing sustainable energy technologies, including policy implications on the urban level. These considerations are important also for researchers working in the field of applied energy as well as urban planning. It is necessary for the researchers to understand how technologies can be accepted and fit into emerging more sustainable energy systems. It is about widening ones' perspectives and looking at problems at different system levels.

## 7. Planning for a global shift in energy

Much hope is put into that there is an on-going global shift to renewable energy sources, which is also a precondition in the UN 2030 SDGs. Poverty reduction will be dependent on huge amount of energy, and this energy should come from clean energy sources, in order not to conflict with other SDGs. If this problem cannot be solved environmental goals will be difficult to achieve. Also, the peace aspect will be endangered because with the fast-growing need for energy and other resources international conflicts will certainly increase.

To evaluate sustainable pathways and planning principles concerning energy systems, there should be some general and also more specific criteria for the planning process. Basically, these can be derived from scientific analysis but at the end, choices should be made, choices which are value based. Which future do we want? As will be discussed these choices can be made from central governments or from participatory processes on the local level.

Sweden and China are used as cases for discussion of role models for development of sustainable energy systems. The reason for this is that they are extremes when it comes to vertical and horizontal planning systems. Sweden is a highly developed country which is regarded as being very advanced when it comes to sustainable development and environmental protection. The Swedish government have decided that Sweden will have sustainable and resource-efficient resource supply in 2050 and there should be no net greenhouse gas emissions to the atmosphere. Sweden has a very flat planning system at the local level to a high degree independent on influence from the national government.

http://dx.doi.org/10.5772/intechopen.79426

China, on the other hand, is the world's biggest emitter of GHG gases and the development does not seem to go in the right direction. China has also a very hierarchical planning system leaving local planners with fewer options. On the other hand, China has had a remarkable development when it comes to poverty reduction, a central goal in the UN SDGs. Using two case studies and analyzing the energy situation concerning sustainability leads to a discussion on how urban planning principles can be developed to be in harmony with all the UN SDGs.

## 8. Urban planning in China

Since initiating market reforms in 1978, China has shifted from a centrally-planned to more of a market-based economy and has experienced rapid economic and social development. GDP growth has averaged nearly 10% a year—the fastest sustained expansion by a major economy in history—and has lifted more than 700 million people out of poverty. It thus seems that China is a successful story when it comes to social development and reducing poverty but is less successful when it comes to decoupling economic growth from increasing resource use and environmental degradation. Much of the environmental problems are related to China's energy system. The success of the Chinese development has also been an attractive way for development for other developing countries, and China want to benefit from this. Examples are bilateral development with countries in Africa and the One Belt One Road (OBOR) project. In 2010, China overtook the US as the world's largest $CO_2$ emitter, mainly because its massive use of coal in the energy sector. Over the last three decades, China's energy transition has marginally moved towards a somewhat lower carbon structure: less coal and oil, more gas and more renewables. However, at the same time, the total amount of fossil fuels has increased. Many foreign scenarios are however predicting a fast increase in renewables. In one scenario, "The Energy [R]evolution scenario," it is argued that renewable energy can provide more than 80% of the world's energy needs by 2050 [16]. In a report published by Greenpeace [17], it is written "China leads the world in investment in solar and wind power, prompting many to say the country has reached a green tipping point [17]. The growth of renewable energy in China has thus been much commented on in positive terms, but what is the real situation? If we look at Chinese statistics, the change in the mix of primary energy sources is not revolutionary in any sense. During the period 2010–2014, the share of coal in percentage went from 69.87 to 66.03. Hydropower is dominant among renewable energy sources. The share of other renewables is still less than 2% in 2014. These figures show the relationship between primary energy sources which sometimes hide reality. The absolute amount of fossils fuels increased from 946.9 million tonnes of oil equivalent (Mtoe) in 2000 to 2649.6 Mtoe in 2014, and it will most likely continue to increase in the future [2, 18].

China is struggling with the transition of its economy from an old Soviet style to a modern market economy, but the central 5-year plans still dominate the planning system. According to the 18th Chinese Communist Party Congress, China will be a moderately prosperous society by 2021 and a fully developed country by 2049, 100 years after the country's foundation [19]. In practice, the planning system in China is still operating in a traditional way by predicting rising demand and establishing a supply for the growing demands for resources. If not new

ways for more radical shift of the societal metabolism can be found, fossil fuels will continue to be the main energy source in Chinese urban development.

The Chinese Government is trying to balance economic growth, social development, and environmental protection but up till now the focus has been on economic and social development. This top-down, vertical planning system has played an important role in the very fast infrastructure development and the reduction of poverty. This makes this model attractive for many developing countries and the question is if this one party, centrally controlled model can be a role model for sustainable development in other developing countries concerning the fulfillment of the SDGs. As mentioned before, Chinese attempts to export its urban development model and is investing in huge infrastructure projects in developing countries.

## 9. Urban planning in Sweden

The Planning and Building Act of 1987 established the basis for decentralized, autonomous municipal planning and limited possibilities for state intervention. The new Planning and Building Act of 2011 simplifies planning and building processes, while strengthening control of building construction. The new Act puts greater emphasis on the Comprehensive Plans as strategic and developmental documents. Independent municipal planning is a key aspect of local self-governance in Sweden, with each municipality deciding how land is used and developed. Before the 1987 Planning and Building Act, a central government agency approved local plans. Now, municipal plans approved by local assemblies have legal status, and central government can only interfere to protect national interests, natural resources or state security, or to ensure proper stakeholder participation.

The Law on Energy Planning (1977) requires that each municipality has a plan for the supply, distribution and use of energy. An amendment in 1999 requires that the plan include an analysis of how municipal energy operations affect the environment, public health, land management, water and other resources. Swedish municipalities mostly supply energy through municipal-owned or private contracted energy companies that in several cases operate district heating systems, often powered by waste incineration plants.

One important aspect for this discussion is the policy of municipal monopoly in Sweden. Plan monopoly means that the municipality decides how land in the municipality should be used without influence from the national government. Another important aspect is that the principal revenue source for Swedish local government is income tax, and tax rates are decided by municipal and county/regional councils. The average is about 30% of income, with 20% collected by municipalities and 10% by county/regions. Tax revenues finance approximately 68% of municipal of public services and development operating costs and 72% of county council costs, with the balances funded by service fees and other sources. Compared to China, the city is not so much depending on exploiting land values, but can use money from land allocation to invest in infrastructure, social services, etc. The municipality in this case also has a possibility to put up restriction for developers concerning sustainability aspects.

Many municipalities and county/regional councils have over time developed more inclusive and integrated planning processes, and wider coordination and cooperation in the planning and

implementation phases, involving different departments, regional authorities, the private sector and other stakeholders. As a result, many visions, comprehensive plans, strategies and policies have the long-term and holistic perspective required for sustainable development. Several other cases for sustainable development in residential have been described elsewhere [20].

To sum up, there are at least three characteristics of the Swedish planning system which are important for the case study and in the comparison with the Chinese system. These are:

1. The Plan Monopoly for Municipalities: the municipalities can develop their plans without interference from the national level.
2. The municipality tax: most of the tax people pay in Sweden goes to the Municipalities not to the state. This means that municipalities have a possibility to develop strict conditions for developers which can receive land allocations at lower costs if they follow the conditions.
3. The practice to involve many stakeholders early in the planning process.

Recently, the collected experiences of horizontal planning in Sweden have been put into action by Sweden Green Building Council through the development of CITYLAB [21].

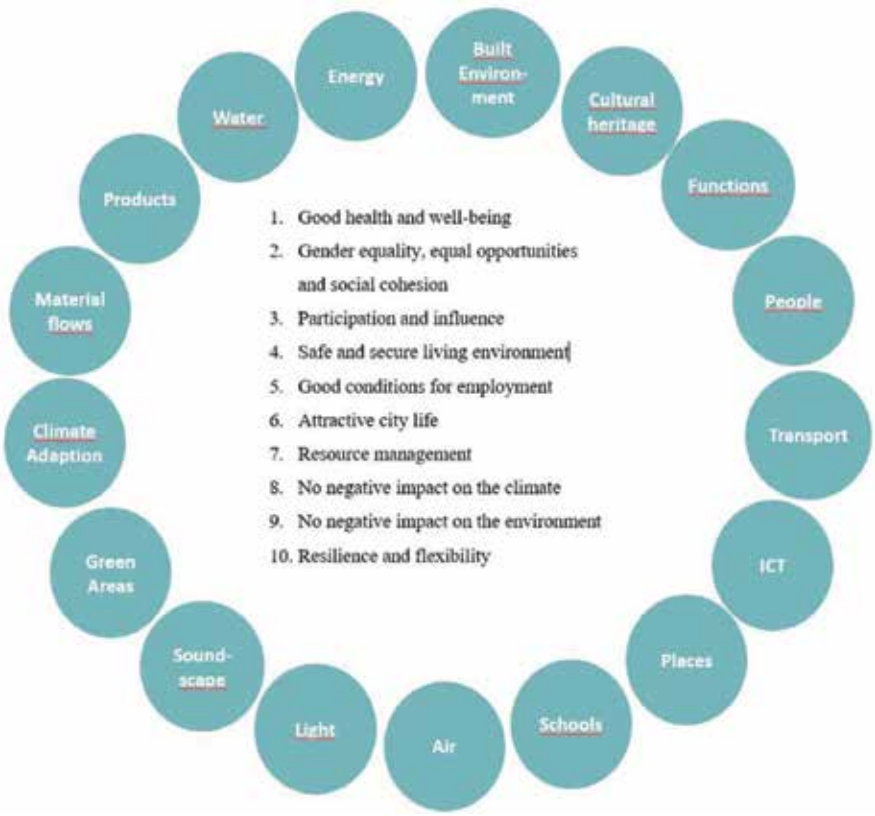



**Figure 1.** The 10 sustainability goals and 17 focus areas in CITYLAB GUIDE.

CITYLAB does not replace existing planning systems in municipalities but rather supports the cooperation and experience exchange between different actors and projects. For this purpose, a guideline has been developed. CITYLAB primarily supports urban development projects in formulating sustainability targets and ensuring that those targets are achieved within the urban planning process.

Thousands of people have been involved in this work, including representatives of state agencies, municipalities, and building companies; as well as property owners, consultants, architects, and researchers.

CITYLAB has specified 10 overall sustainability goals for sustainable urban development. These goals have been developed based on the UN's Global Goals for Sustainable Development, the Delegation for Sustainable Cities' document "Fifteen obstacles to sustainable urban development," Sweden's national environmental quality objectives, public health policy objectives, and Vision for Sweden 2025.

The 10 overall sustainability goals for sustainable urban development are given in **Figure 1**. To achieve these goals, 17 focus areas (in blue) have to be handled in an integrated way described in CITYLAB GUIDE.

## 10. Role model for emerging economies

The UN 2030 Sustainable Development Goals have in its 17 goals an agenda for how developing countries can develop towards sustainability. It also seeks to strengthen universal and recognize that eradicating poverty in all its forms is the greatest global challenge and an indispensable requirement for sustainable development. However, there are obvious conflicting goals. To reach the development outlined in the SDGs requires huge amounts of resources, economic and concerning material and energy. As have been the case for China, the transformation will heavily depend on affordable energy sources [22]. The Chinese development has shown that eradicating poverty has been coupled with serious environmental impacts. There is a hope in the SDGs of that the development of the developing countries can find other ways thus minimizing the use of fossil fuels and using clean energy sources. Is this wishful thinking which can lead to disappointments when it comes to fulfillment of the SDGs as was the case with the millennium goals?

The development of developing countries is linked to high urbanization rates and resilient energy supplies. Thus, a key problem is to find solutions for planning sustainable energy systems for urban areas. This brings us to the question which planning models could support these solutions? Should it be a more centralized planning vertical model as in China or a more decentralized horizontal model as in Sweden for example, CITYLAB?

The question is highly relevant since both China and Sweden are trying to export their planning models to emerging economies.

China's influence in Africa is growing quickly on many levels. All across the continent, Chinese companies are creating new highways, light rail systems, Special Economic Zones, and mass housing developments. Cities have received brand new skylines made in

China, designed by Chinese architecture firms, financed by Chinese banks, and built by Chinese contractors. From foundational elements such as concrete, window frames, and fire extinguishers, to decorative ones such as carpets and curtains, many of the basic items used to construct these skylines have been sourced directly from China.

Chinas initiative One Belt One Road (OBOR) is a network of roads, railways, oil pipelines, power grids, ports and other infrastructural projects meant to connect China to the world. OBOR is an ambitious project and it encompasses almost 65 countries. China has planned around $1 trillion of investment in various infrastructure projects by providing loans to the countries involved at a low cost.

Many developing countries find the Chinese offers attractive. It is a fast way to fulfill social development for the large number of people. However, the model for development is the same as in China, with huge need for energy and other resources. It also leads to a dependency of China in the future development because the economic debts to China.

Sweden has been widely praised for their efforts to develop and promote models of sustainability for the rest of the world. In this sense, "the sustainable city" has become a Swedish service to export. In order to strengthen a coherent image of Swedish sustainable urban development, the Swedish Trade Council initiated a marketing platform for eco-profiled companies under the name of "Symbio-City" [23, 24]. This concept has been applied in several urban development projects in China. An example of this knowledge transfer is the Caofeidian eco-city, which was marketed become a world-renowned, modern, people-focused, prosperous, climate-neutral and environmentally sustainable society [25]. The project was supported by both the Swedish and the Chinese government. However, it is obvious that the projects have run into several problems during the implementation phase which is common for many eco-city projects in China involving international cooperation. Several authors also have pointed out the Caofeidian eco-city exhibits several features of twentieth-century techno-cities and that on eco-city projects needs to consider not only the high-tech, new urban environments materialized as eco-cities, but also complex social factors. This is especially true in China with its situation with huge migration of people into urban areas. De Jong et al. developed this further and argued that problems to implement European cases for urban sustainable development in China is very much due to differences in the traditions and attitudes to what "good governance" is [26]. In another study, the problems with transferring urban development experiences from West to China was analyzed using the concept of "experimentation under hierarchy" to show important success criteria [27]. The study only investigated two cases but here the key factors for success were strong international inputs of expertise and funds. However, it is clear that importing whole city concepts to developing countries like China is difficult because these concepts are planned in another context.

In contrast, the Chinese administrative context is one of "power concentration among a limited number of people in the executive branch and obedient attitudes at the receiving end of all other branches of power." In China, it is often not easy to find out who these "limited number of people" really are. Urban policy has become more important yet also more challenging. Urban systems are becoming more and more complex with growing bureaucracies. It is inherently difficult to control this system in a vertical way.

The role of local governments in catalyzing effective transitions to more sustainable urban development is of central importance. Despite strong local political will and commitment to promote environmental integration, obstacles still exist to a considerable degree in China, including political instability, lack of understanding, knowledge and experience, and insufficient cross-sector coordination [28]. This is probably a situation which is similar in many developing countries. Current administrative organization of sector specific responsibility appears to impede cross-sector coordination for integrating environmental concerns in urban development.

The competition between the two role models is thus unbalanced. On one side, the Chinese massive investments requiring huge amounts of resources but rather fast result for raising welfare among poor people.

On the other side, the Swedish slow step-by-step processes built on participation of many actors including inhabitants.

In another case study, there has been a trial to implement the planning strategy used in the Swedish case. Important conclusions from this case are that it is difficult to break the traditional planning routines at the city level and that there should be an initial phase where the ideas behind the new planning strategy should be carefully explained. It is important to state that it is a project-based demonstration case and that external funding can be used to compensate for extra resources needed. A new project is now initiated in China as a cooperation between Sweden Green Building Standard, School of Architecture, Southeast University in Nanjing, Planning research institutes in Jiangsu province, and local governments. The purpose of the cooperation is to find mechanisms to develop a strong partnership that can lead to benefits for all partners in the work for more sustainable urban development. The project will use a pilot urban development case in Nanjing, based on the CITYLAB concept, and is running in 2018–2019.

## 11. Concluding discussions

Despite international agreement to reduce the use of fossil fuels and to reduce GHG emissions, the existing trends show something else. EIA (the U.S. Energy Information Administration) has projected that the worldwide energy consumption will grow by 53% between 2008 and 2035. The Chinese government is struggling to promote sustainable development with focus on economic development end poverty reduction. Millions of people have been lifted out of poverty because of economic growth and urbanization. At the same time, resource consumption, for example, fossil fuels and materials, is steadily increasing and this has raised huge environmental problems affecting eco-systems and people's health. China is trying to tackle the problems by developing strategies for example, low carbon eco-cities. However, it is doubtful if such strategies could eventually improve energy and resource efficiency. There is no sign that the consumption of fossil fuels will decrease soon or that the reliance on fossil fuels will be replaced by renewable energy. In practice, the planning system in China is still operating in a traditional way by predicting demand and establishing a supply for the growing demands for resources for example, energy. If not new ways for more radical shift of the societal metabolism can be found, fossil fuels will continue to be the main energy

source in Chinese urban development for a long time. The UN released in 2015 its Sustainable Development 2030 Goals aiming primarily to reduce poverty on a global level. Embedded in the strategies to achieve the goals are high urbanization rates and high annual economic growth (7%) in emerging economies. Urbanization is in many ways seen as a key factor for sustainable development. China has been regarded by many emerging economies as a role model for their development. However, following China's example will increase the use of energy drastically on a global scale creating international conflicts and threatening other SDGs like peace and a healthy environment. Sustainability of energy systems should also be built on some principles taking many criteria into account, not only emissions of GHG.

This chapter demonstrates the difference between two planning systems, the Swedish and the Chinese. The Swedish system is more horizontal than the Chinese and more based on actor participation and local urban conditions. The central question around role models for sustainable energy systems for developing countries is of course complicated. One would be to follow the energy intensive Chinese model to create fast development and decreasing poverty. An argument for this is what the Western world did. However, the situation is different now when several billion people are going this way in a short time. It will surely create international conflicts around resources and increased environmental degradation. The other model would be to follow the Swedish system and use criteria developed on local level with participation from many actors including ordinary urban inhabitants. This is a slower process but involving all affected actors in democratic processes might be the only stable model for development in the long run. Urban development on the local level based on democratic processes is the only guarantee that many aspects are taken into account.

It seems more and more obvious that the transition to more energy- and resource-efficient cities will be gradual and take longer time than expected. We will have the correct answer when the UN 2030 SDGs are presenting the results, but then it might be too late. It is also clear that transitions have to be anchored in a local context at the urban level where all key actors take part in the planning process. Urban systems are examples of very complex systems and the study of complex systems is about understanding indirect, sometimes unwanted effects. Problems that are difficult to solve are often hard to understand because causes and effects are not always obviously related. Pushing on a complex system "here" often has effects "over there." This has become more and more apparent in our efforts to solve societal problems or avoid ecological disasters caused by our own actions. We tend to solve complex problems by breaking them down into understandable units in a reductionist way. This is true for planning departments as well as in many academic disciplines.

Urban planning is also a process where many aspects and interests have to be taken into account. There are conflicts of interests between key actors in the planning for future cities. The central planning system in China does not really accommodate the situation at the local level especially when it comes to the complex concepts like sustainability.

It is clear that there is a lack of integrated multidisciplinary planning for sustainable energy systems in China. This is partly due to the lack of knowledge about energy systems among planners and the difficulty in adopting the participatory planning approach to involve key actors from various areas. To solve this, the transparency between the planning levels has to

be enhanced and key actors from various urban sectors should be involved in the participatory planning at an early stage creating more of evolutionary processes than fully planned. The only way to overcome the complexity of urban planning is probably to use more horizontal planning at a local level with a high degree of transparency between the planning levels. The transparency can help resolve conflicts and avoid corruption. In China, this is difficult but in the long run, it is inevitable. Sustainable urban development, which is a buzzword in today's urban development, is not just about building energy-efficient homes. It is also about planning and building in a way that gives people a sense of participation, which in the long run can increase the confidence of both politicians and society at large. It is certainly no easy task. But it is good if people feel that there is a serious ambition to strive for this.

There is a new form of cooperation growing in Europe where many urban projects cooperate to exchange experiences and creating innovative environments. Cooperation on international level cannot be in a sustainable way through copying of city areas or of national planning models. This is because development is a step-by-step evolution anchored in a framework of experiences, culture, etc. Copying means that one looses the context and the copy has lost its content compared to the original.

The Chinese vertical model is compelling for many developing countries because it produces fast results on a massive scale. A horizontal planning system is slower but more resilient and adaptive concerning complexity.

Vertical planning is effective for moving fast in one direction. The question is what happens if we move in the wrong direction? The discussion around planning models must be central for the further discussions around how to reach the UN 2030 Sustainable Development Goals.

## Author details

Ronald Wennersten

Address all correspondence to: rw@kth.se

School of Architecture, Southeast University, Nanjing, China

## References

[1] Brundtland GE. Report of the world commission on environment and development: our common future. In: Our common future: The World Commission on Environment and Development. U. Nations, editor. Oslo; 20 March 1987

[2] IEA. World Energy Outlook 2016. Paris, France: International Energy Agency; 2016

[3] Heinonen J et al. Situated lifestyles: II. The impacts of urban density, housing type and motorization on the greenhouse gas emissions of the middle-income consumers in Finland. Environmental Research Letters. 2013;**8**(3):1-10

[4] Wennersten R, Sun Q. United Nations sustainable development goals for 2030 and resource use. In: World Symposium on Sustainability Science: Implementing the UN Sustainable Development Goals; Manchester, United Kingdom; 2017

[5] United Nation, Paris Agreement, Draft decision-/CP.21, December 15 2015

[6] UNDP. Sustainable Development Goals 2030. 2015. https://www.un.org/sustainable|development/sustainable-development-goals/

[7] BP Energy Outlook 2018. https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/energy-outlook/bp-energy-outlook-2018.pdf

[8] BP Statistical Review of World Energy 2018. https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review/bp-stats-review-2018-full-report.pdf

[9] China's carbon emissions on track for fastest growth in 7 years. China Economic Review, May 30, 2018. https://chinaeconomicreview.com/73045-2/

[10] Weskamp AS. Ecological modernization in China's settlement development, Master Thesis, Student No. 1236970, College of Architecture and Urban Planning, Tongji University; June 2013

[11] Food and Agriculture Organization of the United Nations, The state of food security and nutrition in the World. 2017. ISBN 9789251098882

[12] Government Office of Sweden. SymbioCity—Sustainability by Sweden. 2017 [cited 2017 September 30]. Available from: http://www.symbiocity.se/

[13] Government Office of Sweden. Environmental Technology—13 Swedish Solutions. 2013 [cited 2017 September 30]. Available from: http://www.regeringen.se/contentassets/724f78d9290f4ea7974341bbac04a1f8/environmental-technology---13-swedish-solutions

[14] Wennersten R, Liu H. HAMMARBY SJÖSTAD—A unique sustainability project in Stockholm, ISOCARP· Review 10—Water and Cities—Managing A Vital Relationship. 2014. ISBN 978-94-90354-29-9

[15] Zhuang J. How Chinese urbanism is transforming African cities, Metropolis, 2014. https://www.metropolismag.com/cities/how-chinese-urbanism-is-transforming-african-cities/

[16] Teske S et al. Energy [R]evolution 2010—A sustainable world energy outlook. Energy Efficiency. 2010;**4**(3):409-433

[17] Greenpeace. Coal's terminal decline. 2015. http://www.greenpeace.org/international/Global/international/publications/climate/2015/Coals-Terminal-Decline.pdf

[18] BP. BP Statistical Review 2015 China's energy market in 2014. 2014

[19] Xi J. The Chinese Dream of the Great Rejuvenation of the Chinese Nation. Beijing, China: Foreign Languages Press; 2014

[20] Developing Sustainable Cities in Sweden. http://www.symbiocity.se/

[21] Sweden Green Building Council, CITYLAB Guide Version 2.0. 2018. https://www.sgbc.se/in-english

[22] Wennersten R, Qie S. United Nations Sustainable Development Goals for 2030 and Resource Use. Springer Nature; 2017

[23] SIDA. The Sustainable City Approach. 2015

[24] Cleantech S. Exporting Sustainable Cities. 2017. Available from: http://www.swedish-cleantech.se/english/cleantechsectors/sustainableconstruction/exportingsustainablecities.4.5fc5e021144967050481899.html

[25] Liu H et al. Analysis of sustainable urban development approaches in China. Habitat International. 2014;**41**:24-32

[26] de Jong M, Stout H, Sun L. Seeing the People's Republic of China through the eyes of Montesquieu: Why Sino-European collaboration on Eco City development suffers from European misinterpretations of "good governance". Sustainability. 2017;**9**(2):151

[27] Miao B, Lang G. A tale of two eco-cities: Experimentation under hierarchy in Shanghai and Tianjin. Urban Policy and Research. 2014;**33**(2):247-263

[28] Yin Y. Environmental Integration in Sustainable Urban Planning from an Institutional Perspective - A Study of Swedish and Chinese Eco-City Development, PhD thesis, Royal Institute of Technology, 2014. ISBN 978-9-7595-251-2

Section 3

# Urban Renovation in the Urbanization Process

Chapter 7

# Urban Planning and Mega-Event Projects: Lessons from Expo 2010, Shanghai

Lingyue Li

Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/intechopen.78662

**Abstract**

With the capitalist transformation from Fordist-Keynesianism to neoliberalism, mega-events such as Olympic Games and World Exposition have increasingly been incorporated into urban development plan to boost urban renewal. Seeking the role of mega-event in urban transformation and its related effects have practical significance as mega-event movements have become a worldwide phenomenon. Although the profile of world fairs is reduced and does not have the international impacts that they used to have, Shanghai Expo 2010, the first Expo ever held in a developing country is pinned hope on as the "Turn to Save the World Expo" and is unusually ambitious to bring opportunities in urban transformation. While much attention has been paid to how mega-events can be used in tourism development in previous literature, this research links mega-event to urban development. Specifically, it reviews planning history before Expo 2010, addresses how a mega-event is integrated into city's overall transformation strategy and what possible challenges a mega-event strategy may encounter related to the ultimate goal of urban transformation. It finds that political added value of mega-events empowers Shanghai to advance its urban agenda and the role of urban planner is vital to deliver a sustainable mega-event.

**Keywords:** mega-events, urban planning, urban renewal, Expo 2010, Shanghai

## 1. Mega-event projects, urban renewal, and urban planning

> *"The 'urban' has a specific meaning under the capitalist mode of production which cannot be carried over without a radical transformation of meaning (and of reality) into other social contexts"* [1].

Mega-event projects have evolved different in the turn of the 1970s economic recession in capitalist society to build place competitiveness for economic growth [2–4]. Mega-events such

as Olympic Games and World Exposition have increasingly been incorporated into urban development plan to help urban transformation [5, 6]. Browsing the past events, their nature as sport events diminished, whereas their relation to cities is much fortified. This is largely attributed to the transition of Fordist-Keynesian policy to neoliberal economic strategy that entails a flexible way of capital accumulation [7]. A new urban spatial order is required to adapt to the changes such as the restructuring of urban form from monocentric city to polycentric mega-city region, the economic transition to service industry and leisure consumption, and the resulted decentralization of population from central (or inner) city to suburb. This is in line with the transition of urban renewal from slum-clearance and infrastructure-based strategy in the 1950s to place competitiveness building in the 1980s [8]. In neoliberal urbanism, megaprojects with symbolic and substantial power in economic growth are unmissable to catalyze urban agenda. The 2002 Manchester Commonwealth Games was vigorously linked with urban regeneration strategy [9]; the 1998 Lisbon Expo was designed to revitalize a rundown industrial harbourside and create a new urban center [10]; and the 2012 London Olympic Games reshaped east London to revive the dilapidated area [11]. Indeed, more and more cities launched mega-events. Under such circumstances, seeking the role of mega-event in urban transformation of those cities and its related effects will then have practical significance. The efforts made by Shanghai municipal government in the planning practice of the World Exposition 2010 provides an important lesson, not only because the effective delivery of the event realizes city vision but also because the issues it confronted are universe and thus noteworthy. Although the profile of world fairs is reduced and does not have the international impacts that they used to have [12], Shanghai Expo 2010, the first Expo ever held in a developing country, is pinned hope on as the "Turn to Save the World Expo" and is unusually ambitious to bring opportunities in urban transformation. The event was strategically integrated into the overall urban development agenda and facilitated the implementation of Shanghai master plan. By and large, Expo 2010 propelled Shanghai's overall urban development almost 10 years ahead of schedule. While much attention has been paid to how mega-events can be used in tourism development in previous literature [13, 14], this paper, using Shanghai Expo as a case, focuses on the role of mega-events as strategic planning tools in urban transformation. Specifically, it reviews planning history before Expo 2010, addresses how a mega-event is integrated into city's overall transformation strategy and what possible challenges a mega-event strategy may encounter related to the ultimate goal of urban transformation.

## 2. The evolving Shanghai master plans: planning history before Expo 2010

Master plan exemplifies the orientation of central government and the intervention of municipal government on urban spatial development. Regulated by political power, flagship projects or important events promote urban development in varied stage. This section reviews previous master plans of Shanghai before the launch of Expo 2010, unfolding a planning history to contextualize the event. Significance of a stable political environment for hosting mega-events is highlighted in evolution of plans. **Table 1** summarizes all the previous master plans of Shanghai and significant projects it launched.

| Name of the plan | Year | Planning ideology and city positioning | Important urban projects |
|---|---|---|---|
| The Greater Shanghai Plan | 1929–1937 | "Locate World Port in Shanghai" Sun Yat-Sen proposed in 1922 | Municipal buildings, libraries, museums and the first phase of Qiujiang Dock project |
| Metropolitan Plan of Great Shanghai | The first draft, 1946<br>The second draft, 1948<br>The third draft, 1949 | Organic decentralization, express ways and regional planning; Shanghai is a port city, one of the largest industrial, commercial and financial centers in China—The third edition modified the first two draft | |
| Overall planning of Shanghai | 1953 | By using the method of socialist city transformation, reasonably distribute housing, factories, railways, transport and storage, so as to lower population density of central area; Socialist city | Taopu Industrial Zone, Pudong Park, Sino-Soviet Friendship Building |
| Shanghai Master Plan in "Second Five Year Plan" | 1956–1967 | Start suburban industrial areas and outer suburban satellite towns, to form a relatively independent but organic correlated city groups; to make Shanghai become one of the world's most beautiful cities in production, culture, science and art | Industrial parks, 10 suburban industrial zones, and satellite towns |
| Master plan of Shanghai | 1982–1995 | One of economic, technological, cultural centers in China, an international port city | Pudong New Area, Nanpu, Yangpu Bridge, the Oriental Pearl, People's Square |
| Master Plan of Shanghai Metro-Region | 1999–2020 | An international world city, economic, financial, trade and shipping | CBD, traffic hubs, historic and cultural cities, the 2010 Shanghai World Expo, Shanghai Disneyland Park |

Source: Compiled by author.

**Table 1.** Previous master plans of Shanghai and important projects.

The 1929 Great Shanghai Plan (1929–1937) formulated by Kuomintang (KMT) officially turned Shanghai into an independent urban administrative division and incorporated the city into central-policy-making agenda. However, unstable political ambience because of the 1937 incident of August 13 aborted the plan. Reaching its historical peak, Shanghai stood on the threshold of an international metropolis in Far East countries of Eastern Hemisphere and became a foreign trade, economic, financial and cultural center in China. Thereafter, Shanghai fell with the outbreak of Sino-Japanese War in 1937, when it embargoed and deviated from the track of "international metropolis." After the victory of Sino-Japanese War, Shanghai municipal government set out to the Metropolitan Plan of Great Shanghai (1946–1949), and explicitly claimed it a port city, a national industrial and commercial center. The three drafts for the Metropolitan Plan reveal Shanghai ambition but were not implemented. It introduced advanced ideas in urban planning from the West, such as "organic decentralization," "express way" and "regional planning," yet the development potential of Pudong is overlooked.

From 1949 to 1980, Shanghai experienced low ebb in urban development under the planned economy. Planned as a socialist city in overall plan (1953) and an endogenous industrial city in master plan during the "Second Five Year Plan" (1956–1967), Shanghai was the most important economic and industrial city, financially buttressing central state. Series of suburban industrial zones were approved under the guideline of "industrial hub" in China, with iconic projects such as the Sino-Soviet Friendship Building built under the ideology of socialist city. Most urban projects were promoted for industrial development. The 1959 plan even proposed to reduce new investment, maximize the use of city's primitive accumulation, and achieve maximal output of the cities. In stark contrast is that other Asian cities such as Hong Kong, Tokyo and Singapore actively engaged in globalization, shaped entrepreneurial urban landscape and attracted foreign investment. Shanghai fell far behind in a planned economy.

The 1978 reform was remarkable to revive Shanghai master plan and spatial development. In the 1982 version of Shanghai master plan (1982–1995), entrepreneurial city strategy was advised: Shanghai was not only a national economic center, but also an international port city. Numerous flagship projects were launched and produced far-reaching impacts. The opening and development of Pudong was dazzling, with Lu Jiazui financial and trade zone justifiable as large-scale flagship development in Shanghai. An entrepreneurial urban image came into being through series of landmarks: the Oriental Pearl TV Tower, Jin Mao Building, and Shanghai World Financial Center are world known and became urban tourist attractions years later. Shanghai Bund, Nanjing Road Business Center, People's Square, Shiliupu and other urban renewal programs were carried out to reshape central area. The city is catching up with world metropolis with varied significant urban events and flagship programs. Meanwhile, tax sharing preferential policy further enhanced the financial autonomy of Shanghai and enriched local developmental funds.

In Master Plan of Shanghai Metro-Region (1999–2020), world city and "Four Centers," strategies were proposed under the central committee of the communist party. The plan aims to build Shanghai an international economic center, an aviation and shipping center, to enhance its role as a two-fan hub that opens to the world and connects the domestic. Shanghai has ascended to the fierce inter-city competition worldwide. Expo 2010 initiated by central state as a national project has transited to and integrated into Shanghai's entrepreneurial strategies for local competitive edge. At the municipal level, Expo 2010 is not only part of a general promotion of central city to create a new urban center, but also designed to regenerate a declined industrial dockland along Huangpu riverside. Therefore, the interlinked-strategic components justify the 2010 World Fair not only a mega-event but also a large-scale flagship renewal development in Shanghai. The latest Shanghai Master Plan (2017–2035) envisaged a functional core area connecting Expo-Qiantan-Xuhui waterfront, serving its target to build Shanghai a cultural metropolis.

## 3. Transforming Shanghai via Expo 2010: planning context for mega-event led urban renewal

As a mega-event flagship project, Shanghai Expo is a dual strategy not only concretizing event function but also propelling urban transformation [15, 16]. For Shanghai municipal government, Expo's urban-related impacts are far reaching to shape Shanghai's track towards global

http://dx.doi.org/10.5772/intechopen.78662

metropolis. This mega-event project is strategically incorporated into Shanghai's discourse of urban renewal which underscores the transition of manufacturing to service industries and dilapidated residence to luxury gated communities, so as to accumulate urban wealth at a faster rate. Manufacture industry plays an important role in Shanghai's economic growth and has occupied a great proportion of land in central city. The proportion of added value of secondary industry has accounted for more than 50% for a long time and had stabilized at 50% from 1999 to 2003. The concern is that in metropolises at apex of urban hierarchy such as New York, London, and Tokyo, ratio of secondary industry is much lower with a high proportion of tertiary industry.[1] Similar comparison of population density in central area also suggests that Shanghai has a higher density than Tokyo, and much higher than New York and London.[2] As policy makers in aspiring cities, particularly in Asian cities, are enthusiastically addicting to the race to the summit of "world-class" cities by intercity referencing and rivalry [17], they habitually juxtapose Shanghai and top global cities according to the quantitative index.

In the narrative of Shanghai master plan (1999–2020), the site of Expo 2010 is considered a catalyst to optimize the structure of metropolis where socio-demography and industries are unevenly distributed. The change of site selection from Chuansha (now the Disneyland location) to Huangpu Riverside well captures the intention of Shanghai municipal government

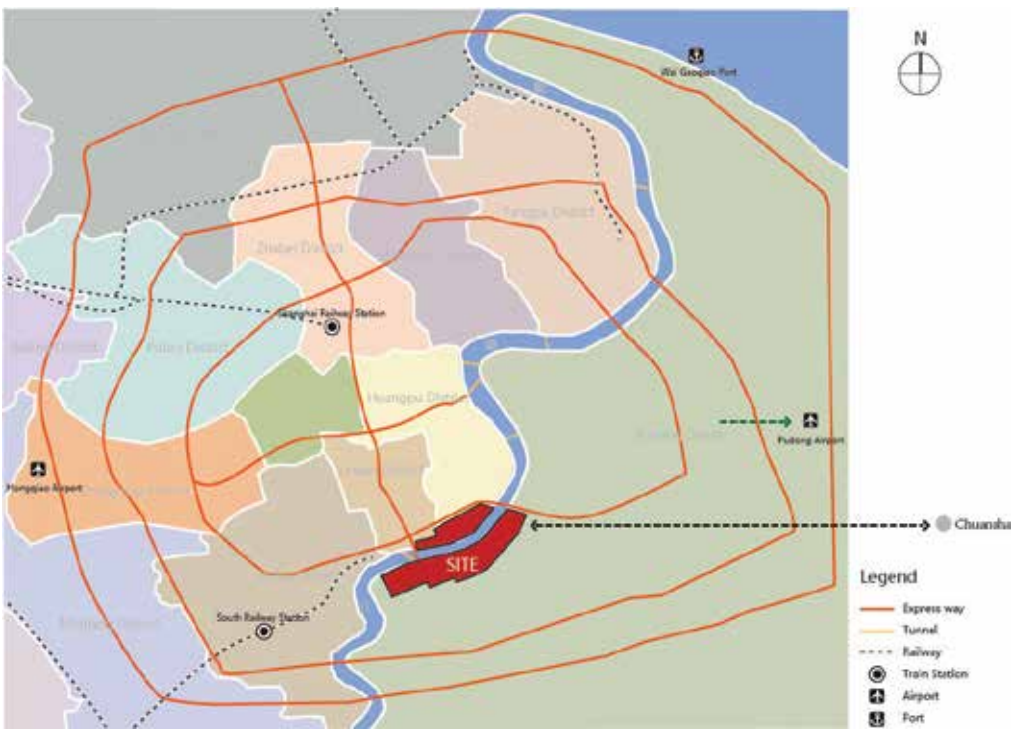



**Figure 1.** Site selection of shanghai Expo 2010: from Chuansha to Nanpu and Lupu. Source: Author.

[1]Tertiary industrial proportion in New York is 86.7%, London 85%, and Tokyo 72.7%.
[2]Shanghai's population density in central area is 15,100 people/km, while in Tokyo, New York, and London, the number is 13,500, 10,300, and 9100.

(**Figure 1**). In the initial, Chuansha located in the suburb of Pudong was proposed to facilitate urban expansion. But the site on the edge of central area along the Huangpu Riverside was finally chosen because of its particular significance for urban renewal. Shanghai as the birthplace of China's modern industry has left fertile traditional industrial resources. The industrial dock with dense area of factories along the southern extension of Huangpu River was once intractable for local bureau, not only because it undermines entrepreneurial image hindering investment but also because it inlaid involute interests that postpone the relocation and demolition. The site of Expo 2010 was selected in between Nanpu and Lupu Bridge on the Huangpu riverside, which aimed to promote urban renewal in central area by event-led relocation. Apparently, the municipal government determined to strategize Expo site to unravel Shanghai's development dilemmas (**Figure 2**). A tiny part of the site is in Puxi, whereas the major part is in Pudong. The entire planned area is 6.68 $km^2$, with 5.28 $km^2$ construction area and 1.4 $km^2$ preserved residential areas. As informed by an interviewee,[3] 26.2% of all the land use was residential housing, and 62% were industries and warehouses. The old industrial base not only represents the epitome of China's footprints to modernization, but also tracks the labyrinthian post-industrial trajectory of Shanghai.

## 4. Shanghai Expo 2010: a mega-event project in action

### 4.1. Transforming landscape and assisting shaping polycentric urban form

After Shanghai successfully won the bid for Expo in Monte Carlo, Monaco, the municipal government endowed the event with political merits and spared no effort to use Expo 2010 as an opportunity to beautify city image and build city competitiveness. In this case, the rundown industrial site with great potential because of its advantageous location in central city would largely boost Shanghai's world city pathway. Thus, we have grounds to believe that the Expo project is representative as an urban planning tool for urban transformation. Iconography of Expo site displays a transition of landscape from a messy waterfront industrial area to a modern well-designed urban space (**Figures 2** and **3**). It creates a distinctive urban fabric that an entrepreneurial landscape apt to capital accumulation takes shape in central Shanghai. Despite on the edge of inner expressway, the southern extension area of Huangpu River is hard to capture attention before the Expo project. The remarkable group of landmarks, carefully designed with distinctive architectural style and public spaces, are eye-catching and significant legacies assimilating World Fair cultural into the local context.

At the city level, the Expo project helps shape the polycentric urban form. Master plan of Shanghai (1999–2020) proposed a "multi-axis, multi-layer and multi-core" overall urban layout. However, this strategy was yet to be effectively delivered, not only because the downtown area remains immature but also because infrastructure and transportation system connecting new towns and the central city are hysteretic. A mature and dynamic urban core is a solid base for a polycentric urban form and a sound transportation system connecting new towns and central city is a prerequisite guaranteeing polycentricity strategy delivery. In this regard,

[3]Interview with a senior urban planner involved in master plan of Expo Park, June, 2010, Shanghai.

http://dx.doi.org/10.5772/intechopen.78662

**Figure 2.** The panorama of Expo site in 2004 and 2010. Source: photo taken in 2004, 2010.

**Figure 3.** Changing urban landscape in Expo site, April 2004, and April 2010. Source: Google Earth, 2004, 2010; edited by author.

Expo 2010 plays a large role in consolidating urban core and propelling rapid transit system construction in Shanghai (**Figure 4**). In the 1990s, Pudong New Area was a leaping development across Huangpu River. The Expo site further expands southward along the Huangpu River to squeeze out low value-added land in downtown edge, facilitating the formation of a multi-functional city center as part of Shanghai's polycentricity strategy. To this end, Expo 2010 is not only a short-term event but also a long-term urban vision.

**Figure 4.** Shanghai Metro Network (2002, 2010); source: www.shmetro.com; edited by author.

Shanghai's metro system forms the initial "cross + ring" ("申") structure by three metro lines (lines 1, 2 and 3) in 1993 and a maglev line in 2002. Almost in the same period, Shanghai successfully won the bid for Expo 2010, accelerating the metro network construction in the subsequent 8 years. A metro network for an international metropolis formed before Expo 2010 with total length of 410 km (at the end of June 30, 2010). Four lines and three extension lines operated beforehand. The shadows in **Table 2** indicate that more than half of the completed construction of metro lines was facilitated by Expo 2010. The rapid transit system promoted by Expo 2010 facilitates suburban new town development. Shanghai's new town was firstly proposed in 1959 to decentralize population and upgrade industries in central city. The "one city, nine towns" urban system in 1999 was designed to attract people to settle down in cultural-themed new towns. In the "Eleventh Five Year Plan," Songjiang, Lingang and Jiading-Anting are three strategically superior new towns. Nevertheless, these new towns were unattractive as infrastructures and public transportations remained in shortage. The Expo 2010 catalyzes new town development through TOD model: metro line 9 operated to benefit Songjiang and line 11 promoted Jiading and Lingang. Line 11 (No. 21) extended southward in 2012, when the two stations in Lingang New Town opened to improve accessibility to central Shanghai.

### 4.2. Upgrading industries and decentralizing population

Expo 2010 greatly facilitates economic transition from manufacturing to service and leisure consumption in Shanghai. There are three layers of Shanghai's industrial space. The first layer, urban area within the inner expressway, aims at developing tertiary industry; the second layer, area between inner and outer expressway, is planned to develop high-tech, high value-added and nonpolluted industry and to improve existing industrial park; the third layer, area outside outer expressway, is planned to develop the primary and secondary industry. This "tertiary – secondary – primary" structure spans from central city to out suburb. The central city is entrusted the important task to "suppress the second industry and develop the third industry." A major obstacle in the industrial adjustment is the large number of traditional manufacture industries that occupied large amount of land. The proportion of tertiary industry in the primary, secondary and tertiary industries in GDP has accounted for 50% since 1999 and almost unchanged until 2003 before Expo project was officially launched.

| No. | Operation records |
|---|---|
| 1 | 1995.04.10: Jinjiang Park to Shanghai Railway Station; 1997.07.01/2004.12.28/2007.12.29: Fujin Rd. to Xinzhuang |
| 2 | 1999.10.20–2006.12.30: Zhangjiang Hi-tech Park to Song Hong Rd.; 2010.02.24/2010.03.16/2010.04.08: Xujing Dong to Pudong International Airport |
| 3 | 2000.12.26/2006.12.18: Shanghai South Rail to North Jiangyang Rd. |
| 4 | 2003.11.25: Xinzhuang to Minhang Development Zone |
| 5 | 2005.12.31: "C" trial operation; 2007.12.29: link operations |
| 6 | 2007.12.29: Gangcheng Rd. to South Lingyan Rd. |
| 7 | 2007.12.29/2009.07.05: Shiguang Rd. to Pujiang Expo Home |
| 8 | 2007.12.29/2009.12.31: Songjiang New Town to Middle Yanggao Rd. |
| 9 | 2009.12.05: Shanghai University to Huamu Rd. |
| 10 | 2009.12.31/2010.03.29: North Jiading to Jiangsu Rd. / Anting to Jiading New Town (branch) |
| 11 | 2010.04.10: Xin Jiangwan Cheng to Hangzhong Rd. |
| 12 | 2010.05.01–2010.10.31: Temporary open three stations |

Shadow for Expo facilitated ones. Source: www.shmetro.com; edited by author.

**Table 2.** Operation records for Shanghai Metro until June 30, 2010.

Industrial relocation preparing Expo is crucial for economic and industrial upgrade in the southern extension of Huangpu River, a valuable piece of land. The Expo site is composed of Pudong and Puxi along the Huangpu River. The Puxi area mainly consisted of mix-use of residential housing and industries. Industrial units such as Jiangnan Shipyard, Qiuxin Shipyard, Nanshi Waterworks, Nanshi Power Station and Jianshe Machine Factory were located in the south of Gaoxiong-Bansongyuan Road, and housing-industrial mix land in the north. The Pudong area mainly consisted of industries and warehouse, including Shanghai Solvent Factory, the Third Shanghai Steel Factory, Shanghai Zhenghua Port Machinery Manufacturing Factory, Nanpu Ports Corporation, and Zhoujiadu Shipyard. Around 62% of the land were industries and warehouse, not only presenting an epitome of China's footprints to modernization but also tracking record on a tough post-industrial trajectory of Shanghai. Transiting to a service economy, manufactures imprinting China's modernization and rejuvenation shall be off the stage. In this regard, Expo 2010 did a favor to Shanghai municipal government, which resumed most of the land by the "effective mega-event weapon" in the negotiation of industrial relocation, and thus promoted the policy of "suppressing the second industry and developing the third industry."

Industrial planning for post-Expo contributes furthermore to the economic transition. Expo site area on the Pudong side integrated three adjacent neighborhoods to build a "world-class civic center." Headquarters economy, commerce and trade, creative industries and advanced services are prioritized industries in post-Expo development. By and large, spatial structure of five functional zones plus an outparcel was made in the legacy plan of Expo. Zones A and B are start-up areas merged to develop convention, exhibition and business. Zone C is Houtan expansion district reserved for retail, trade and office uses. Zone D and E, located in Puxi, are redeveloped to shape Shanghai into a cultural and eco-living metropolis [8]. Catalyzed

by Expo 2010, Shanghai has accomplished its economic transition. The contribution rate of economic growth by tertiary industry increased year by year after 2003 when Shanghai starts Expo preparation. Until 2009, the contribution rate and the proportion of economic growth by secondary industry decreased significantly, with remarkable increase in tertiary industries (**Figures 5** and **6**).

Expo 2010 also propelled population decentralization from over-densed central area to newly planned new towns. Before Expo, as infrastructures, transportations, industries and public facilities in suburb fell behind, central Shanghai was overly populated. Mega-events lead to massive social relocation as the Expo site locates in a population dense area. The effects are

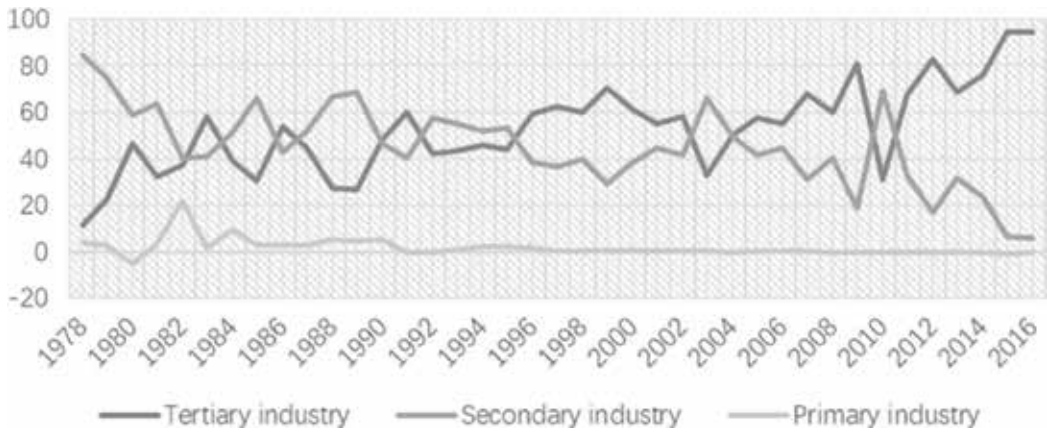



**Figure 5.** Contribution rate of economic growth by primary, secondary and tertiary industries in Shanghai, 1978–2016. Source: Shanghai Statistical Yearbook, edited by author.

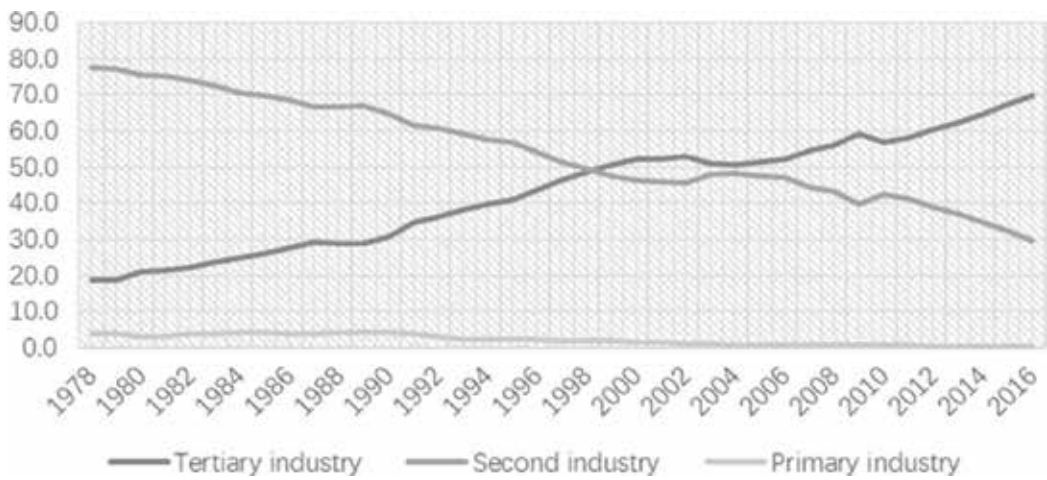



**Figure 6.** Proportion of primary, secondary and tertiary industries in GDP of Shanghai, 1978–2016. Source: Shanghai Statistical Yearbook, edited by author.

a double-edged sword. On the one hand, it assists population decentralization that sustains new town development and props up the polycentricity strategy of the metropolis. On the other hand, it was criticized to cause large-scale social displacements. More than 18,000 households (about 47,900 people) need to relocate, most of which are low-income groups. The direct impacts were slow growth rates in Jing'an (−28.87), Luwan (−22.21) and Huangpu (−18.05) from 2003 to 2010. However, population did not evenly decentralize. Minhang (168.07%), Songjiang (138.98%) and Jiading (122.06) with better accessibility than other new towns have experienced the highest growth rate.

Leading to such a massive social relocation, urban planners attempt to minimize the potential negative impacts. They made effort to maintain the high-quality residential districts and to create better community environment for those who reside in poor living condition. The original land use for Expo Park is 6.68 $km^2$, in which 1.4 $km^2$ are residential districts[4] built from the 1970s to the 2000s. "After field survey from 2003 to 2004, we decided to preserve the existing residential areas and got approval from the municipal government for the 'Construction Coordination Area of Expo' with total area of 1.4$km^2$," Expo's chief planner said. Preservation is merely the first step for the theme "Better City, Better Life," following which the "add, subtract, multiply and divide (+ – × ÷)" planning and design methods are applied to community rehabilitation. The "Construction Coordination Area of Expo" is moderately demolished, reconstructed, and maintained (functional replacement), to achieve renewal targets of safety, employment for low income, entertainment, equality, justice and fraternity. Preserving those residential districts, 15,000 households and the involved social networks were maintained. This gained support from neighborhoods and established a good image of local government.

### 4.3. A project under an omnipotent government

The main coordinator, Shanghai Expo Coordination Bureau (SECB), was set up in 30th Oct, 2003 under the leadership of Shanghai Expo Organization Committee and Executive Committee. As a platform, SECB coordinates various stakeholders including all levels of the government, developers that are led by or cooperating with the government, enterprises required disclaiming the lands, and communities affected by the Expo project. This set up resembles those *ad hoc* administrative committees, which are on behalf of the public government but are more entrepreneurial in terms of management, in development zones or national new areas [18]. The developer, Shanghai Expo Land Holding Co. Ltd. (SELHC), was set up with 9.4 billion RMB registered capital, respectively from the Shanghai Municipal Land Reserve Center with 3 billion RMB and the Shanghai Expo Land Reserve Center (SELRC) with 6.4 billion RMB under the guidelines of the Shanghai Municipal Government. It is responsible for land development financing, industrial and residential relocation, and infrastructure construction in Expo area. In 2009, SELHC and SELRC were incorporated into SECB, addressing post-Expo development issues.

Land banking is the key mechanism operated by SELHC, a government-affiliated agent invested by Shanghai Real Estate Group and Shanghai Chengtou. Municipal government used land banking to resume the scattered land, benefit the preparation of Shanghai Expo

[4]The term "residential district" is used as the pre-transformed, fragmental and unorganized "communities" built in different period are lacking of social characteristics and hardly called as communities.

and help recover the relocation cost via redevelopment. Land banking for Expo 2010 generally includes three stages: land requisition by purchase, land reservation, and land provision. Apart from the Expo site of 5.28 km$^2$, land banking area also includes the three relocation sites in Changxing, Luojing and Pujiang. The major work at the first stage is relocation of residents and enterprise. In the stage of land reservation, the initial infrastructural construction was accomplished by SELHC. The purpose is to take the advantage of land banking system to integrate infrastructural plan of Expo site into post-Expo redevelopment. The project was implemented by one construction company to avoid "one affair managed by different departments or superiors." Land reservation also relieves fiscal burden of government by transferring the cost to the enterprise that relies on land value to make profit; the investment of infrastructure is bundled together with land value increment contributed by the improvement of infrastructures. In the whole process, SECB and Shanghai Municipal Bureau of Planning and Land Resources took charge of planning and management (including planning, approval and adjustment). In the third stage, land provision in the secondary land market would probably last for more than 20 years. The use right of land for World Fair is "borrowing" rather than "renting" by SECB. Then, SECB "lent" the land to the exhibitors from 2007 to 2010. After the event, the SELRC resumed and leased the land for future development.

The government-affiliated agents played important yet special role in development the Expo site area. On one hand, the SELRC and SELHC, operating as enterprises, were independently responsible for land banking and development to integrate land resources and make profit. SECB was the sole investor in land development and should earn profits to recover the pre-event cost. In the industrial relocation, all the relocation agreements were signed by the SELRC and relocated units or their higher-level authorities. The highest-level enterprises—units under the central ministry, religious units, and military—were directly relocated by SELRC. To settle the Jiangnan Shipyard and Pudong Steel Factory, the two largest SOEs, SELRC specially reserved two relocation sites in Changxing Island and Luojing, Baoshan District to facilitate the restructuring. In residential resettlement, SELRC set the relocation of two sites in Pujiang Town of Minhang and Sanlin Town of Pudong (**Figures 7** and **8**) to accommodate the moved residents. In line with the new "One City, Nine Towns" urban system plan, SELRC also authorized relevant agency to assess the value of each household to make monetary compensation. SELHC also accomplished the initial infrastructural construction so that the land could be leased in a much higher price in the secondary land market in post-event redevelopment. On the other

**Figure 7.** Pujiang Expo Home. Source: www.expo2010.cn/; edited by author.

http://dx.doi.org/10.5772/intechopen.78662

**Figure 8.** Sanlin Expo Home. Source: shanghai.gov.cn; edited by author.

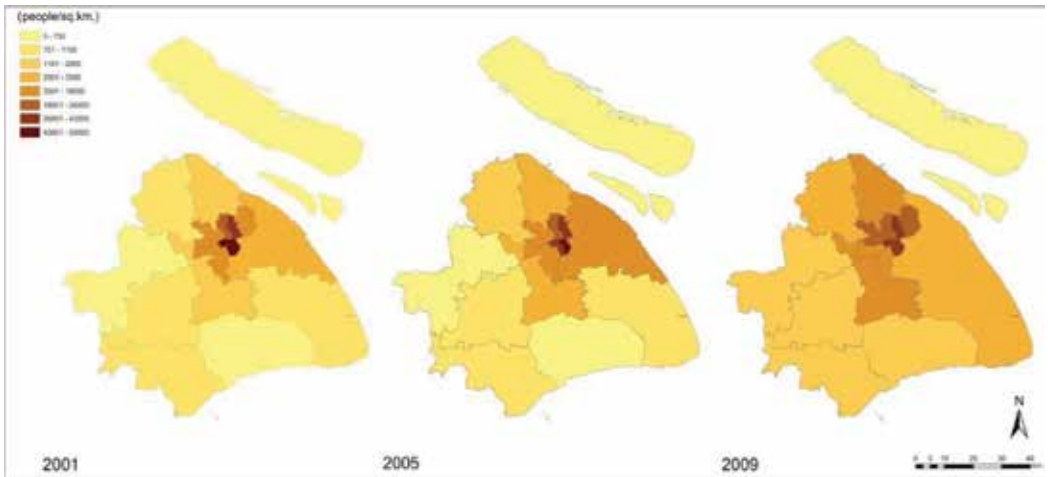



**Figure 9.** Population density in Shanghai Municipality (2001, 2005, 2009). Source: Shanghai Yearbook, analyzed by author.

hand, SECB was on behalf of the governments to coordinate various stakeholders. It actively sought and attracted private and international capital to sponsor Expo 2010, cooperated with the major planning and design consultant—Shanghai Urban Planning and Design Research Institute—to organize bids and designs in the Expo site area, and managed the negotiation with the original occupants to relocate. Any amendment of the plan or relocation rules should be reviewed and approved by SECB. SECB also provided the nonprofit public infrastructures and facilities to optimize the resumed land and supervised the whole construction process in accordance with the detailed regulatory plan (**Figure 9**).

## 5. Conclusions

Globalization and neoliberalization co-contribute to the transformation of urban order from traditional manufacture to financial and service economy, from labor intensive activity to cultural and leisure consumption, and from monocentric city to polycentric mega-city

region. Such transformation of urban space enables city to better adapt to capital accumulation in post-Fordism era. However, implementation of the urban transformation strategy is not easy as it is a huge project which requires policy packages, fund resources, manpower, and may involve a series of interest issues and power struggles. Thus, though mega-events seem attractive, strategy integration is a challenge and has to overcome difficulties. For how to integrate mega-events into urban transformation, Shanghai Expo at least has following implications for urban planning. Site selection for the event is the primary and key step to determine in what way and to what extent the event can contribute to the urban transformation. In the case of Shanghai, site selection of the Expo 2010 aims to revitalize the rundown riverside area to strengthen a polycentric urban form. The subsequent industrial and residential relocations would never accomplish without the opportunity of Expo 2010. The Shanghai case shows that the Expo 2010 promoted urban transformation by assisting polycentricity strategy by facilitating the transition to a leisure consumption and service economy and by fostering population decentralization from central city. Expo 2010 accelerated government's objectives in a number of ways: the mature of rapid transit system in central city, the retreat of manufactures and the decentralization of low-income population, all enable the municipal government to build a polycentric urban system supported by new towns.

To implement such a large-scale project, Shanghai encountered numerous challenges. Problems are observed in Expo 2010 as market economy in Shanghai is immature and decentralization is asymmetric [19]. In the Expo 2010, the legacy of central-planned economy and land ownership impact on the mega-event strategy. On the one hand, government managed to force most of the enterprises and residents to move without much negotiation since the land is ultimately owned by government. On the other hand, state-owned enterprises with political capital hinder negotiation for them to surrender land ownership. Thus, political added value of mega-events did Shanghai municipal government a great favor to accomplish all the relocation. In all, mega-event project is effective to transform cities. While mega-events are often criticized to be unsustainable as they lead to massive social relocation and redundant infrastructure construction, these issues are not unsolvable. What urban planners need to concern is how to best utilize the advantages of mega-event strategy and to make it in consistent with the city's overall development objective.

## Acknowledgements

The author would like to thank Dr. Roger C.K. Chan whose valuable insights inspired this research. This work was presented at the Annual Conference of American Association of Geography in Seattle, WA, the 43rd Urban Affairs Association Conference in San Francisco, CA, US, and the International Geographical Union (IGU) Regional Conference in Moscow, Russia. The author would like to thank Professor Tingwei Zhang, Dr. Shi Xian, and Dr. Xiaohu Zhang for their valuable comments. Special thanks go to Mr. Ying Luo for his love and those who offer great help in the field trip in Shanghai. This research is funded by the Shanghai Pujiang Program [Grant No. 17PJC084], the National Natural Science Foundation of China [Grant No. 41601445] and the National Natural Science Foundation of China [Grant No.41701189].

## Author details

Lingyue Li

Address all correspondence to: lilingyue929@gmail.com

College of Architecture and Urban Planning, Tongji University, Shanghai, PR China

## References

[1] Harvey D. The urban process under capitalism: a framework for analysis. In: MJ Dear, AJ Scott, editors. Urbanization and Urban Planning in Capitalist Society. London: Methuen, 1981

[2] Essex S, Chalkley B. Mega-sporting events in urban and regional policy: A history of the Winter Olympics. Planning Perspectives. 2004;**19**(2):201-204

[3] Hubbard P, Hall T. The entrepreneurial city and the new urban politics. In: Hall T, Hubbard P, editors. The Entrepreneurial City: Geographies of Politics, Regime and Representation. Chichester, UK: John Wiley & Sons; 1998

[4] Swyngedouw E, Moulaert F, Rodriguez A. Neoliberal urbanization in Europe: Large–scale urban development projects and the new urban policy. Antipode. 2002;**34**(3):542-577

[5] Essex S, Chalkley B. Urban development through hosting international events: A history of the Olympic games. Planning Perspectives. 1999;**14**:369-394

[6] Essex S, Chalkley B. Olympic games: Catalyst of urban change. Leisure Studies. 1998;**17**(3):187-206

[7] Harvey D. From managerialism to entrepreneurialism—The transformation in urban governance in late capitalism. Geografiska Annaler Series B-Human Geography. 1989;**71**(1):3-17

[8] Deng Y, Poon SW, Chan EHW. Planning mega-event built legacies—A case of Expo 2010. Habitat International. 2016;**53**:163-177

[9] Carlsen J, Millan A. The links between mega events and urban renewal: The case of the Manchester 2002 commonwealth games. Journal of Sport Tourism. 2002;**7**(3):4-5

[10] Carriere J-P, Demaziere C. Urban planning and flagship development projects: Lessons from EXPO 98, Lisbon. Planning Practice & Research. 2002;**17**(1):69-79

[11] Imrie R, Lees L, Raco M. Regenerating London : Governance, Sustainability and Community in a Global City. Vol. xiii. Milton Park, Abingdon, Oxon; New York, NY: Routledge; 2009. 353 p

[12] Hall CM. Urban entrepreneurship, corporate interests and sports mega-events: The thin policies of competitiveness within the hard outcomes of neoliberalism [J]. The Sociological Review. 2006;**54**(s2):59-70

[13] Hall CM. Hallmark Tourist Events : Impacts, Management, and Planning. London: Belhaven Press; 1992

[14] Syme GJ, Shaw BJ, Fenton DM, Mueller WS. The Planning and Evaluation of Hallmark Events. England: Avebury; Brookfield, Vt.; 1989

[15] Deng Y. Conceptualizing mega-event flagships—A case study of China pavilion of Expo 2010 shanghai China [J]. Frontiers of Architectural Research. 2013;**2**(1):107-115

[16] Chan RCK, Li L. Entrepreneurial city and the restructuring of urban space in Shanghai Expo. Urban Geography. 2017;**38**(5):666-686

[17] Ong A. Worlding cities: Or the art of being global. In: Roy A, Ong A, editors. Worlding Cities: Asian Experiments and the Art of Being Global. Oxford: Wiley-Blackwell; 2011. pp. 1-26

[18] Li L. State rescaling and national new area development in China: The case of Chongqing Liangjiang. Habitat International. 2015;**50**:80-89

[19] Wu F, Xu J, Yeh AG-O. Urban Development in Post-Reform China: State, Market, and Space. London; New York: Routledge; 2007

Chapter 8

# The Impact of Organizational Collective Efficacy on Residents' Choice of Urban Renewal Mode and Urban Planning

Chan Kin-sun, Zheng Zhongxing and Zou Yifan

Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/intechopen.79340

**Abstract**

With "One Center, One Platform" as the strategic goal, Macau's development has been an essential part of the 12th and the 13th Five-Year Plan. Even though Macau has achieved a great success in development, it encountered bottlenecks, especially urban renewal. This study made a literature review on relevant theories on urban renewal, the development of Macau's urban renewal policy, and collective efficacy to construct the research questions. The study will base on a household survey in an old region of Macau and make use of quantitative research to examine Macanese choice on urban renewal option. From the results, organizational collective efficacy can be divided into two subscales, namely neighbor-to-neighbor mutually assistance collective efficacy and commercial collective efficacy. For Macanese, the latter has a significant impact on their options on urban renewal, which can explain why downtown areas of Hong Kong succeeded at the beginning of Urban Renewal Authority. It is reasonable for Macau SAR government to actively set up Macau Urban Renewal Company Limited. However, urban renewal stresses more on participation of its residents and cities worldwide, all promoting diversified consultation and development patterns in the hope that different public values can coexist upon urban renewal.

**Keywords:** urban renewal, organizational collective efficacy, multi-subject participation

## 1. Introduction

With "One Center, One Platform" as the strategic goal, Macau's development has been an essential part of the 12th Five-Year Plan and the 13th Five-Year Plan. By taking full advantage of national policies like Guangdong-Hong Kong-Macau Greater Bay Area Program and the Belt and Road Initiative [1], it aims to get a more rapid development. However, its

development also encountered plenty of problems, particularly in turning itself into the world tourism and leisure center, where its carrying capacity of tourism is insufficient [2]. How the living quality of residents and tourism quality of tourists in old towns [3], namely the urban renewal, can be balanced has become an important topic of Macau SAR government. In the past, Macau prioritized most of its urban renewal research on urban planning and top-down design, and thus, there were few studies conducted from the perspective of residents. In the light of Macau's household surveys, this study investigates into Macanese options in urban renewal through the quantitative study of questionnaire results and also proposes an effective way to participation for its residents on urban renewal.

## 2. Literature review

The study starts by reviewing the research development of urban renewal in Mainland China. It summarizes Macau's urban renewal development and relevant studies briefly and examines the relevant research direction of collective efficacy. Finally, it sums up some research questions.

### 2.1. Urban renewal and urban planning

Researches on urban renewal of Chinese mainland are mainly divided into two parts. One is policy design/public management, while the other one is public participation. In terms of system design, America's experiences recommends to enrich relevant policy toolbox [4], while on the part of residents' demand, it recommends to develop the Old Town Management Mode, the Internet Plus Mode [5]. Furthermore, these researches have done reviews in relation to urban renewal development experiences of western countries [6] and Taiwan [7], pointing out that urban renewal mechanism was gradually shifted from public management to multi-subject participation, which is characterized by public-private partnership [8] and public participation [9]. Shifts like these also conform to the development of public administration theories. For instance, the theory firstly turned itself from traditional public administration or bureaucracy to new public management, which lay more stress on the promotion of economy, efficiency, and performance on policies [10]. After that, it changed from new public administration to new public governance, which emphasize on absorbing diversified pubic values in policy-making [11]. It is found that this shift generated a positive external effect on social development. Moreover, the improvement of social participation and community involvement is conducive to lifting the security sense of residents [12], where collective efficacy bears a strongly significant relationship with organizational commitment. The abovementioned collective efficacy can be classified into group collective efficacy and organizational collective efficacy. When the goal of the concerned group is consistent with their organizational objective, the group's collective efficacy can strengthen the consequences of the group's organizational commitment [13]. Also, residents can improve living environment and neighborhood through organizational collective efficacy [14]. Thus, the role of government in urban renewal features the shift of the decision making from government to residents by empowerment,

where they are well informed to choose urban renewal modes appropriately in accordance with their own interests. Similar to urban renewal policy, during urban planning, government faces various challenges, including urban NIMBY (Not in my backyard) [15] and built-heritage conservation [16]. There are some studies to investigate into public participation in urban planning [17], as well as to propose some models for public participation in urban planning, like structuralized inter-network collaboration [18]. Konsti-Laakso and Rantala show that public participation can bring new insights into urban planning and facilitate an open innovation-based strategy in collaboration among stakeholders in urban planning [19]. However, it is lack of empirical study to justify the appropriateness of those models for public participation in urban planning.

### 2.2. Macau's urban renewal

Macau boasts of a longer history in opening commercial ports than Hong Kong, and it also owns its historic urban areas, which have been enlisted in the World Culture Heritage List [20]. It can be seen that Macau also encountered the problem of urban renewal. For the sake of balancing its industrial development and the living quality of its residents, Macau SAR government set up the Consultative Committee on the Renewal of Macao's Old Districts in 2006. According to pertinent documents released at that time, there were four modes of old town restoration plan, namely Redevelopment, Rehabilitation, Conservation, and Street Beautification [21]. These four modes are similar to the 4R theory, which was developed in other parts of the country in this regard, namely Redevelopment, Rehabilitation, pReservation, and Revitalization [22]. In order to facilitate the process of urban renewal and urban planning, Macau SAR Government reviews Land Law, Urban Planning Law and Cultural Heritage Protection Law in 2013 and 2014 [23]. Since then, Macau has set up Urban Renewal Committee to replace the Consultative Committee on the Renewal of Macao's Old Districts [24] in a bid to enhance the living quality of its residents and the management of its community with a more flexible and effective way.

Now, there are numerous policies and researches in this respect, such as findings on mediating the effect of sense of community on Macanese options of urban renewal [25]. This can be attributed to the fairly strong traditional organizational culture in Macau. Afterwards, there are studies further exploring the influence of the sense of community in depth, among which Exploratory Factor Analysis (EFA) is used as the fundamental analysis. It is found that the sense of community can be subdivided into two sub-variates, namely identity and mutual support, where the sub-variate identity will generate a more significant impact on the Macanese choice of urban renewal option [26]. Also, there are studies exploring the impact of the sense of community and political efficacy on traditional organizations' decision making in Macau. However, those traditional organizations in Macau fail to practice professional management; thus, it is necessary to put forward the third-party evaluation [27]. While in terms of urban renewal policy, Macau still lags behind Hong Kong. This may be ascribed to relevant lagging administrative laws and regulations, as well as no-dominated organizations regarding urban renewal [28]. Due to the strong traditional organizational culture in Macau, its residents enjoy achieving goals by means of collective actions, accounting to the appearance of a number of

directly elected members from the Legislative Assembly of Macau with the background of traditional organizations [29]. Therefore, this study aims to achieve further understanding of the development factors of Macau's urban renewal from another perspective.

### 2.3. Collective efficacy

Generally speaking, organizational collective efficacy can be regarded as an evaluation toward the power of an organization or an institution, while the concept of the collective, which means a group with common beliefs, is not a rigorous one. In this way, if the collective efficacy in one place is fairly strong, then its residents can achieve their common interest by means of its regional power [30]. According to studies and findings from other places, both social capital and public participation will have a strong impact on the community collective efficacy [31]. Meanwhile, it is found that collective efficacy can strengthen organizational commitment [32], and organizational collective efficacy will exert a relatively positive effect [14] on city dwellers and community organizations. Consequently, Macau SAR government has been encouraging the community to set up owners' organization in the past few years in the hope that owners can more properly manage their properties [33]. Chan Yingdi, who concluded studies on collective efficacy conducted in recent years, found that collective efficacy was composed of the single-factor and three-factor structure [34]. Moreover, studies on collective efficacy conducted in Mainland China mainly focus on education [35] and human resources [36]. Before that, traditional organizations were found in Macau always making a great difference, and old town restoration and its environment were always concerns for its residents. Therefore, this study aims to explore the role of organizational collective efficacy on Macau's choice on urban renewal options.

### 2.4. Research questions

Although the past decades witnessed a rapid economic development in Macau, this region falls short of land resources, and thus urban renewal acts as an important way to deal with houses and living problem. Based on that, this study is to identify the factor structure of organizational collective efficacy, to assess the impact of socio-economic status of residents living in old region on the options of Macanese in urban renewal with different social backgrounds (i.e., redevelopment, rehabilitation, preservation, and beautification), and to examine the impact of factors of organizational collective efficacy on the options of Macanese in urban renewal.

## 3. Study methods

### 3.1. Questionnaire collection

With all residents from Praça de Ponte e Horta (a region in the southeast of Macau) as the object, it collects data from the authorized research project supported by Macau Old Town Restoration Commission. Because the range of questions in the questionnaire is quite wide,

http://dx.doi.org/10.5772/intechopen.79340

this study chose the household survey as the main study method. In order to get an ideal response rate, not only Macau SAR government launched public promotion but also traditional organizations assisted with the survey, which can naturally account for the response rate close to 70%.

The questionnaire is mainly divided into four parts, namely the choice of urban renewal options, organizational collective efficacy, living environment satisfaction, and social background of interviewees. On the part of organizational collective efficacy is designed by Ohmer, and the study group translates it into Chinese with repeated discussions and revision with working group dominated by the Consultative Committee on the Renewal of Macao's Old Districts. All these efforts are made by the study group and the working group. The study group will give scores for eight problems with the standard of evaluation ranging from one to five points, among which one point means strongly disagree and five points strongly agree. Main questions in the questionnaire will include public service advice put forward by community organizations, the prevention of illegal and criminal acts by community organizations, the enhancement of regional commercial values by community organizations, and so on [14]. The higher the index of organizational collective efficacy can get, the stronger performance of their organizational collective efficacy is. At last, the study group designs a scale made of six problems based on the environmental topics concerned by Macanese also with the same standard evaluation mentioned earlier. Its problems include the population mobility, fire prevention, environmental protection and greening work, and so on. The higher the environmental satisfaction index is, the greater satisfaction they have on the environment quality.

### 3.2. Statistical analyses

The analyses of descriptive statistics are mainly used to describe the sample structure and conduct bivariate analysis. It aims to examine the relation between Macanese socioeconomic background and living environment satisfaction, and their choice of urban renewal options, whose analytical method is Analysis of Variance (ANOVA). It can be seen from Exploratory Factor Analysis (EFA) that the number of sample of this study is adequate (more than 100), which meets the relevant requirement of the five-grade marking system [37]. There are eight questions measuring organizational collective efficacy (see **Table 2**). It utilizes KMO and Barlett's Test to examine whether the samples are appropriate for factor analysis. Finally, it will use Cronbach's alpha to examine the internal reliability of scales used in this study. And the regression analysis used in this study is a multinomial logistic regression model. Furthermore, the dependent variable is urban renewal options and "remain unchanged" serves as the reference value, while the independent variables are divided into three parts, namely the respondents' socioeconomic background (including gender, age, and status of residence), living environment satisfaction, and organizational collective efficacy. By the results of multinomial logistic regression model, the relationship between organizational collective efficacy and residents' choice of urban renewal mode can be examined, especially controlling for the respondents' socioeconomic background and living environment satisfaction; besides, the examined relationship could inspire the process of public participation in urban renewal or urban planning.

# 4. Study results

## 4.1. Sample analysis

It can be seen in **Table 1** that there are 785 questionnaires with complete answers. The male accounted for 47.8% of samples. With 16.8% whose age is over 65 years old, there

| | Redevelopment | Rehabilitation | Conservation | Beautification | Remain unchanged | Total | p-value |
|---|---|---|---|---|---|---|---|
| **Number** | **202** | **351** | **23** | **133** | **76** | **785** | |
| Male | 0.495 | 0.464 | 0.565 | 0.511 | 0.408 | 0.478 | 0.513 |
| Age | | | | | | | |
| 35–64 | 0.649 | 0.570 | 0.652 | 0.579 | 0.421 | 0.580 | 0.014 |
| ≧65 | 0.094 | 0.154 | 0.087 | 0.180 | 0.434 | 0.168 | <0.001 |
| Status of residence | | | | | | | |
| Permanent residents | 0.916 | 0.860 | 0.696 | 0.872 | 0.776 | 0.864 | 0.004 |
| Non-permanent Residents | 0.050 | 0.085 | 0.087 | 0.053 | 0.066 | 0.069 | 0.500 |
| Race | | | | | | | |
| Chinese | 0.906 | 0.855 | 0.870 | 0.880 | 0.882 | 0.875 | 0.534 |
| Portuguese | 0.079 | 0.071 | 0.043 | 0.075 | 0.000 | 0.066 | 0.169 |
| Length of residence over 10 years | 0.891 | 0.858 | 0.696 | 0.880 | 0.763 | 0.856 | 0.012 |
| Income (patacas) | | | | | | | |
| ≤8000 | 0.574 | 0.556 | 0.739 | 0.609 | 0.816 | 0.600 | <0.001 |
| >20,000 | 0.094 | 0.057 | 0.087 | 0.053 | 0.013 | 0.062 | 0.124 |
| Living alone | 0.079 | 0.103 | 0.174 | 0.105 | 0.224 | 0.111 | 0.011 |
| Type of house | | | | | | | |
| Rent | 0.144 | 0.174 | 0.130 | 0.113 | 0.355 | 0.172 | <0.001 |
| Lodge | 0.079 | 0.103 | 0.130 | 0.075 | 0.092 | 0.092 | 0.787 |
| Ownership of house ≥10 years | 0.554 | 0.530 | 0.391 | 0.632 | 0.382 | 0.535 | 0.006 |
| Living environment satisfaction | 3.017 | 3.220 | 3.029 | 3.198 | 3.504 | 3.186 | <0.001 |

**Table 1.** ANOVA of social and economic background and living environment satisfaction toward options in urban renewal.

are, respectively, 86.4 and 6.9% of samples permanent residents and non-permanent ones in Macau. And the Chinese and Portuguese groups account for 87.5 and 6.6%, respectively. There are 85.6% surveyors living in the present communities over 10 years while 60% with income less than 8000 patacas. It also shows that 73.8% surveyors living in their own houses, among whom 53.5% have owned their houses for more than 10 years.

With regard to variates against social and economic background, the outcome of ANOVA shows that age, permanent residents, length of residence over 10 years, income less than 8000 patacas, living alone, rent, and ownership of houses over 10 years have an appreciable impact on the options of urban renewal. Those over 65 years old with income less than 8000 patacas who like to live alone, pay rent, or relatively satisfy with the living environment are inclined to remain unchanged.

### 4.2. Factor analysis

The study has conducted analyses on the scale of organizational collective efficacy's factor structure and internal reliability. It can be seen from **Table 2** that the corrected item-total

| | | Average | Standard deviation | Corrected item-total correlation | Factor loading | |
|---|---|---|---|---|---|---|
| | | | | | Factor 1 | Factor 2 |
| 1 | Neighbors will take the initiative to enhance living environment quality, such as perform some cleaning | 2.517 | 0.841 | 0.468 | **0.661** | 0.091 |
| 2 | Neighbors take the initiative to care and support others | 2.578 | 0.769 | 0.581 | **0.826** | 0.036 |
| 3 | Neighbors take the initiative to give the advice of offering better public service | 2.821 | 0.805 | 0.533 | **0.604** | 0.301 |
| 4 | Neighbors do their best to prevent crimes | 2.343 | 0.734 | 0.465 | **0.572** | 0.223 |
| 5 | Neighbors take the initiative to make friends with others | 2.579 | 0.772 | 0.534 | **0.755** | 0.075 |
| 6 | Neighbors will fight for building houses at a reasonable price in the old areas | 2.700 | 0.818 | 0.467 | 0.190 | **0.823** |
| 7 | Neighbors will actively promote the commercial values of this area | 2.861 | 0.798 | 0.407 | 0.090 | **0.871** |
| 8 | Neighbors will actively discuss and deal with problems of others | 2.720 | 0.802 | 0.567 | **0.575** | 0.410 |
| Cronbach's alpha | | | | 0.794 | 0.783 | 0.702 |
| KMO measure | | | | | 0.815 | |
| Barlett's Test (p-value) | | | | | <0.0001 | |

Factor 1: Neighbor-to-neighbor mutually One; Factor 2: Commercial One.

**Table 2.** Internal reliability and factor analysis of organizational collective efficacy.

| | Redevelopment | Rehabilitation | Conservation | Beautification | Remain unchanged | Total | p-value |
|---|---|---|---|---|---|---|---|
| No. | 202 | 351 | 23 | 133 | 76 | 785 | |
| Organizational Collective efficacy | 2.656 | 2.621 | 2.696 | 2.581 | 2.740 | 2.637 | 0.223 |
| Neighbor-to-neighbor mutually assistance | 2.643 | 2.561 | 2.725 | 2.538 | 2.631 | 2.589 | 0.204 |
| Commercial nature | 2.699 | 2.803 | 2.609 | 2.705 | 3.080 | 2.780 | 0.001 |

**Table 3.** Analyses of organizational collective efficacy on the options of urban renewal.

correlation coefficient of all items of organizational collective efficacy is higher than 0.30, which means that the overall scale and individual items are strongly related to each other. According to Cronbach's alpha ($\alpha$), it shows that the internal reliability of organizational collective efficacy, neighbor-to-neighbor mutually assistance (subscale of organizational collective efficacy), and commercial objective (subscale of organizational collective efficacy) are, respectively, 0.794, 0.783, and 0.702, whose internal reliabilities reach a satisfactory level (the threshold is 0.700). All of their KMO are, respectively, 0.815 (>0.60) and p-value of Barlett's Test is less than 0.001 (<0.05), which means that it is appropriate for factor analysis. In accordance with factor loading, "neighbors will actively fight for building houses with reasonable price in the old areas" and "neighbors will actively promote commercial values of their community" can be attributed to commercial collective efficacy while other items can be attributed to neighbor-to-neighbor mutually assistance collective efficacy.

From **Table 3**, it can be concluded that ANOVA finds that only commercial collective efficacy has a significant impact on the options of urban renewal, among which the higher commercial collective efficacy is, the more likely it will remain unchanged.

### 4.3. Multiple logistic regression model regression analysis

**Table 4** shows that the appreciable factors of multinomial logistic regression model regression analysis are less than that in ANOVA, which can be seen that each and every independent variate may possibly exert an intermediate effect mutually. Factors like age over 65 years, higher living environment satisfaction, and commercial collective efficacy may be contributed to the respondents' choice to remain unchanged. Non-permanent residents are likely to choose redevelopment while those with a house over 10 years probably choose rehabilitation and beautification of streets, where respondents paying for rent resist conservation and beautification.

| | Redevelopment | Rehabilitation | Conservation | Beautification |
|---|---|---|---|---|
| | B | B | B | B |
| Male | 0.395 | 0.253 | 0.907 | 0.506 |
| Age | | | | |
| 35–64 | −0.430 | −0.676 | −0.149 | −0.632 |
| ≧65 | −2.382** | −1.965** | −2.337* | −1.942** |
| Status of residence | | | | |
| Permanent resident | 1.263 | 0.671 | −1.614 | −0.714 |
| Non-permanent resident | 0.992 | 1.394* | −0.549 | 0.230 |
| Race | | | | |
| Chinese | −0.604 | −0.959 | −0.781 | −0.833 |
| Length of residence over 10 years | 0.460 | 0.855 | 0.759 | 1.341 |
| Income (patacas) | | | | |
| ≦8000 | −0.070 | −0.514 | 0.870 | −0.227 |
| >20,000 | 1.546 | 0.827 | 1.921 | 0.867 |
| Living alone | −0.103 | −0.186 | 0.355 | −0.021 |
| Type of house | | | | |
| Rent | −0.617 | −0.478 | −2.432** | −1.146* |
| Lodge | 0.360 | 0.599 | −0.411 | 0.184 |
| Ownership of house over 10 years | 0.801 | 0.883* | 0.079 | 1.067* |
| Living environment Satisfaction | −1.524** | −0.897** | −1.593** | −1.022** |
| Organizational collective efficacy | | | | |
| Neighbor-to-neighbor mutually assistance | 0.075 | −0.277 | 0.765 | −0.249 |
| Commercial collective efficacy | −0.934** | −0.576* | −1.483** | −0.788** |
| Nagelkerke R square | 0.232 | | | |

*p-value <0.05
**p-value <0.01

**Table 4.** Multiple logistic regression model regression analysis on the options of urban renewal ("remain unchanged"as the reference value).

## 5. Conclusion

The results of this study coincide with the previous ones. For instance, since the elderly (over 65 years old), to some extent, depend upon the living environment, most of them are likely not to change their original living environment [38]. The quality of living environment also has a direct impact on the residents' options in urban renewal mode [39]. The higher the commercial collective efficiency is, the more likely they will not change their status quo. This may contribute to the full embodiment of commercial values of the communities where residents are now living. Actually, this is also what is happening now. On the part of tenants, they show little interest in urban renewal because it does not bring any direct tangible benefits to them. So are the Conservation and Beautification. This study found that organizational collective efficacy can be divided into two sub-variates, which are, respectively, neighbor-to-neighbor mutually assistance and commercial efficacy. Such a result is consistent with the one done in the west, which means collective efficacy can be divided into group collective efficacy and organizational collective efficacy. The former is a bottom-to-up concept while the latter is an up-to-bottom one; thus, the former one can be regarded as a relatively common integration of concrete interests and the latter can be something considered in the long run. In this way, group collective efficacy has a greater impact on organizational commitment [32]. Furthermore, it is found that commercial collective efficacy can be regarded as group collective efficacy, focusing on commercial interests while neighbor-to-neighbor mutually one will be more likely to focus on the long-term development of a region. With this in mind, commercial collective efficacy will be more influential in choosing the urban renewal mode.

It can be seen from the above that the urban renewal mode will be easier to achieve its efficacy by stressing on its commercial nature and efficiency. A typical case can be seen in Hong Kong's Urban Renewal Authority. At the beginning of its establishment, it made a remarkable achievement [40]. However, with the further development of the society, the number of redevelopment projects with high economic returns has been reducing year by year. Besides, there were more demands on Urban Renewal Authority from residents. In order to respond to the growing demands, it had to offer extensive community consultation [28]. With regard to community consultation on urban renewal, it had no longer been pushed by a single channel but diversified ones. With different channels dominated by administrative organs, experts, and residents, it hopes that the urban renewal mode will be chosen by residents not only considering their private interest [41]; thus, they could select a relatively appropriate one. Apart from the channel of consultation, Hong Kong's urban renewal mode is surging toward a more diversified direction, and the government will seek cooperation and development together with private developers, non-private organizations and social entities, and so forth in a bid to strike a balance on its commercial nature, originality, and economic vitality [42].

Macau SAR government has always set store by the urban renewal mode to improve the living environment of old regions [43]. Since Macau quite depends upon private developers in this regard, it leads to no official or semi-official organizations with unified authority to push

http://dx.doi.org/10.5772/intechopen.79340

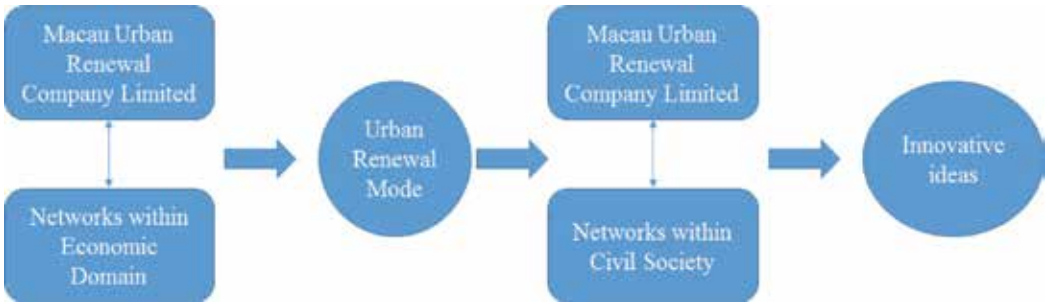



**Figure 1.** Revised structuralized inter-network collaboration in Macau.

relevant tasks, which made all these tasks too fragmented [28]. In recent years, Macau has learnt lessons from its past and considered setting up organizations like Hong Kong Urban Renewal Authority. That is why Macau Urban Renewal Company Limited was established. It aims to unify relevant work on urban renewal through this measure [44]. Besides, Macau SAR government carried out a new round of economic guidance measures including A Research on the Proportion of Housing Reconstruction Ownership, Reinforcement of Housing Maintenance Fund Sponsorship, and other schemes, aiming to encourage private developers, civil entities, and residents to participate in urban renewal and speed up the urban renewal [44].

By combining Hong Kong's related experience [28], structuralized inter-network collaboration [18], and innovation-based strategy [19], Macau SAR Government can make use of Macau Urban Renewal Company Limited to mobilize stakeholders' commercial interests (Networks within Economic Domain in Structuralized Inter-Network Collaboration) to reach consensus on urban renewal mode, because commercial organizational collective efficacy has higher impacts on residents' choice on urban renewal mode than neighbor-to-neighbor mutually assistance. After reaching stakeholders' consensus on urban renewal mode, Macau Urban Renewal Company Limited can mobilize stakeholders' social interests (networks within civil society in structuralized inter-network collaboration) to recruit innovative ideas in agreed urban renewal mode or urban planning, because Macau has a lot of folk organizations serving residents in old districts for a long time, and it is much easier for the company to mobilize folk organizations to provide inspiring ideas for an agreed urban mode. The revised structuralized inter-network collaboration shown in **Figure 1** could be used for urban planning consultation process.

## Author details

Chan Kin-sun[1,2], Zheng Zhongxing[1,2] and Zou Yifan[1,2]*

*Address all correspondence to: 449488339@qq.com

1 University of Macau, Macau, China

2 Macau Social Security Society, Macau, China

## References

[1] Macau Development Strategy Research Center. Guangdong-Hong Kong-Macau Greater Bay Area: Macau's Role, Challenge and Strategy (a Study Report). Macau: Macau Development Strategy Research Center; 2017

[2] Tourism Adminstration of Macau SAR Government. The Overall Development Planning of Macau's Tourism [Internet]. 2017. Available from: https://masterplan.macaotourism.gov.mo/Summary_Report_cn.pdf [Accessed: September 01, 2017]

[3] Macau SAR Government Office. Flexible Adjustment to Long-term Planning and Promotion of Smooth Development of Tourism [Internet]; 2015. Available from: http://www.gcs.gov.mo/showNews.php?DataUcn=92238&PageLang=C [Accessed: September 09, 2015]

[4] Yao ZH, Zeng HY. The Evolution and Laws of Urban Renewal Political Tools of the US Since 1950s. International Urban Planning; 2018. Available from: file:///C:/Users/kschan/Downloads/1950%E7%88%9B%E6%B8%AC%E7%9C%95%E6%87%82%E8%97%9D%E5%BC%8A%E5%82%91%E5%BA%88%E8%BC%89%E9%99%94%E6%B7%89%E7%BF%92%E9%A6%B1%E6%92%BF%E8%85%94%E6%A0%B3%E8%B6%99%E8%BF%B5%E5%AF%9E%E8%96%BA%E6%9D%BB%E6%B6%BD_%E7%8B%BE%E7%9C%B3%E7%98%8B.pdf

[5] Wong YC, Lee DY, Wong H. Residential demands and suggestions in old town renewal-taking urban renewal in Dadong District of Shenyang in Liaoning Province as an example. China Land. 2017;**5**:41-42

[6] Wong LJ. The enlightenment from implement mechanism of urban renewal in foreign countries. Housing and Real Estate. 2017;**217**

[7] Ren HT, Huang XS. The review of urban Governmence system in Taiwan and its enlightenment. Urban Planning Review. 2015;**3**:65-73

[8] Jia X. Urban renewal driven by public-private cooperation mechanism-taking reward Systems of Urban Renewal Regulations in Taiwan as an example. Journal of China National School of Administration. 2015;**6**:56-60

[9] Liu YX. The improvement of public participation mechanism of old towns in shanghai. Journal of Shanghai Institute of Political Science and Law. 2014;**29**(3):69-73

[10] Bryson JM, Crosby BC, Bloomberg L. Public value governance: Moving beyond traditional public administration and the new public management. Public Administration Review. 2014;**74**(4):445-456

[11] Osborne SP. The new public governance? Public Management Review. 2006;**8**(3):377-387

[12] Okunola S, Amole D. Perception of safety, social participation and vulnerability in an urban neighbourhood, Lagos, Nigeria. Procedia – Social and Behavioral Sciences. 2015;**35**:505-513

[13] Borgogni L, Russo SD, Petitta L, Latham GP. Collective efficacy and organizational commitment in an Italian City hall. European Psychologist. 2009;**14**(4):363-371

[14] Ohmer M, Beck E. Citizen participation in Neighborhood organizations in poor communities and its relationship to Neighborhood and organizational collective efficacy. Journal of Sociology and Social Welfare. 2006;**33**(1):179-202

[15] Sun L, Zhu D, Chan EHW. Public participation impact on environment NIMBY conflict and environmental conflict management: Comparative analysis in shanghai and Hong Kong. Land Use Policy. 2016;**58**:208-217

[16] Yung EHK, Chan EHW. Problem issues of public participation in built-heritage conservation: Two controversial cases in Hong Kong. Habitat International. 2011;**35**:457-466

[17] Aoki N. Sequencing and combining participation in urban planning: The case of tsunami-ravaged Onagawa Town, Japan. Cities. 2018;**72**:226-236

[18] Lin D, Simmons D. Structured inter-network collaboration: Public participation in tourism planning in southern China. Tourism Management. 2017;**63**:315-328

[19] Konsti-Laakso S, Rantala T. Managing community engagement: A process model for urban planning. European Journal of Operational Research. 2018;**268**:1040-1049

[20] Tourism Administration of Macau SAR Government. The World Heritages in Macau [Internet]; 2018. Available from: http://zh.macaotourism.gov.mo/sightseeing/sightseeing.php?c=10 [Accessed: 2018-02-08]

[21] The Consultative Committee on the Renewal of Macao's Old Districts. A Survey on the Status Quo of Residents in Praça de Ponte e Horta of Macau. Macau: the Consultative Committee on the Renewal of Macao's Old Districts; 2010

[22] Lord GF, Price AC. Growth ideology in a period of decline: Deindustrialization and restructuring, Flint style. Social Problems. 1992;**39**(2):155-169

[23] Government Information Bureau of Macau SAR Government. Public consultation on Five-Year Development Plan starts on Tuesday [Internet]; 2016. Available from: http://www.gcs.gov.mo/showNews.php?DataUcn=99003&PageLang=E

[24] Urban Renewal Committee. The Brief Introduction of Urban Renewal Committee of Macau [Internet]; 2018. Available from: https://www.cru.gov.mo/main/index.php [Accessed: 2018-03-06]

[25] Chan KS, Lin YF, Lin CL. An analysis of Intererence effect of community awareness and organizational collective efficacy on Macau's old town restoration. Administration. 2014;**94**:935-955

[26] Chan KS, Wu ZL, Li N. Macau Residents' Sense of Community in Choosing a New Urban Renewal Method. Urban Planning and Renewal. New York: Nova Science Publishers; 2017

[27] Chan KS, Wu ZL. From the perspectives of sense of community and political efficacy to comment the importance of third party evaluation in Macau. In: Wong SF, editor. Small

Government, Big Communities: Macao's Post-Postmodernity and Post-Traditional Life. Guangdong: Guangdong People's Publishing House; 2014

[28] Chan KS, Siu YFP. Urban Governance and Social Sustainability. Asian Education and Development Studies. 2015;**4**(3):330-342

[29] Cai YJ, Chan KS, Li N. An analysis of election voter turnout in Hong Kong and Macau SAR regions, a perspective on regional social and economic background. Hong Kong and Macau Journal. 2016;**3**:11-20

[30] Lee LF. Collective Efficacy, Support for democratization, and political participation in Hong Kong. International Journal of Public Opinion Research. 2005;**18**(2):297-317

[31] Collins CR, Neal JW, Neal ZP. Transforming individual civic engagement into community collective efficacy: The role of bonding social capital. American Journal of Community Psychology. 2014;**54**(3-4):328-336

[32] Borgogni L, Russo SD, Latham GP. The relationship of employee perceptions of the immediate supervisor and top management with collective efficacy. Journal of Leadership and Organizational Studies. 2011;**18**(1):5-13

[33] Macau SAR Government Housing Bureau. Shoulder Responsibilities and Work Together to Build A Beautiful Home [Internet]; 2018. Available from: http://www.ihm.gov.mo/uploads/archive/image/fckupload/file/PDF/%E5%B1%95%E8%A6%BD%E6%AB%83.pdf [Accessed: February 16, 2018]

[34] Chan Y, Zhou XH, Wong G, Bao JN. An analysis of the new development of the theory of organizational collective efficacy. Soft Science. 2016;**30**(2):98-116

[35] Liu SM. A study on the relations among sense of collective efficacy, academic self-efficacy and academic performance. Journal of Huzhou Teachers College. 2014;**36**:84-87

[36] Lee YP, Wong ZC. A study on the construction of the mode of collective efficacy mechanism and its human resource management strategy. Research on Economics and Management. 2014;**7**:107-114

[37] Mundfrom DJ, Shaw DG, Ke TL. Minimum sample size recommendations for conducting factor analyses. International Journal of Testing. 2005;**5**(2):159-168

[38] Chui E. Doomed elderly people in a booming City: Urban redevelopment and housing problems of elderly people in Hong Kong. Housing, Theory and Society. 2001;**18**(3-4): 158-166

[39] Lee GKL, Chan EHW. Factors affecting urban renewal in high-density city: Case study of Hong Kong. Journal of Urban Planning and Development. 2008;**134**(3):140-148

[40] La Grange A, Pretorius F. State-led gentrification in Hong Kong. Urban Studies. 2016; **53**(3):506-523

[41] Hong Y. Resident participation in urban renewal: Focused on Sewoon Renewal Promotion Project and Kwun Tong Town Centre Project (in press. In: Frontiers of Architectural Research

[42] Rong YJ, Sun Y, Wong AQ, Chan HY. An exploration on commercial mode to revitalize and renew historic heritages in Hong Kong. Urban Planning International. 2017;**32**(3):42-49

[43] Information Bureau of Macau. To Speed up Urban Renewal and Improve the Environment of Old Town [Internet]; 2017. Available from: https://www.gov.mo/zh-hans/news/184815/ [Accessed: November 15, 2017]

[44] Urban Renewal Committee. News after the 10th Meeting Held by Urban Renewal Committee in 2017 [Internet]; 2017. Available from: https://www.cru.gov.mo/news/shownews.php?lang=cn&id=192&language= [Accessed: November 28, 2017]

Chapter 9

# Urban Renewal and Sustainable Development in Jamaica: Progress, Challenges and New Directions

Jasneth Mullings, Leith Dunn, Mona Sue Ho, Rainford Wilks and Carol Archer

Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/intechopen.79075

**Abstract**

The chapter discusses the history and context of urban renewal in Jamaica and shares the country's integrated model for urban renewal, as well as the lessons learned from over two decades of implementation. As the urban planning landscape evolves there is a call to move in new directions, incorporating concepts which embody the development of human capital. One call is to re-position urban renewal as a public health tool to reduce crime and violence, communicable and non-communicable diseases, especially for the urban poor and urban youth who share a greater burden of Jamaica's status as a Low/Middle Income Country (LMIC) and Small Island Developing State (SIDS). The call for the paradigm shift from gender-blind to gender-sensitive urban planning is expected to promote policy coherence between commitments to gender mainstreaming and gender equality and urban development modalities. There is also the need for a new governance framework to support the active participation of the average resident in the decision making process for land use management and other aspects of urban renewal to meet the goals of the New Urban Agenda and to realize Vision 2030 Jamaica, making "Jamaica, the place of choice to live, work, raise families and do business".

**Keywords:** urban renewal, Jamaica, sustainable development, gender, health, urban planning

## 1. Introduction

### 1.1. Urbanization and sustainable development

Urbanization is defined as the movement of populations from rural areas to cities and towns. It could also mean that population centres shift their character from rural to city. The United

Nations [UN] definition is "the built-up or densely populated area containing the city proper, suburbs and continuously settled commuter areas. It may be smaller or larger than a metropolitan area; it may also comprise the city proper and its suburban fringe or thickly settled adjoining territory" [1]. The concept of sustainable development has been most often defined using the Brundtland Commission Report as "a development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" [2]. The concept underscores economic, social and environmental development as core pillars and value systems for sustainability [3, 4]. The 17 sustainable development goals [SDGs] enunciated by the United Nations for the 2015–2030 agenda are the platform on which environmental, economic and social progress is predicated globally [5]. Goal 11: *Make cities inclusive, safe, resilient and sustainable* directly addresses problems such as inadequate basic services, housing and poor quality infrastructures which pose a challenge to urban development and the well-being of urban dwellers. There is widespread acknowledgement that the attainment of each of the SGDs is co-dependent on advancement in other goals (e.g. Goals 1, 3, 4, 5, 8, 10 and 16). This issue becomes more pertinent with the estimated 60% of the world's population expected to reside in urban areas by 2030 and the vast majority (95%) of urban expansion projected to occur in the developing world [5]. The impact of urban problems can reasonably be expected to be intensified in Lower and Middle Income Countries [LMICs] which face rapid urbanization, unmatched by the requisite resources to attend to the needs of their growing urban populations. Escalation in informal settlements is also expected to be a natural consequence of these developments, with the current >880 million slum dwellers globally [6], projected to rise to 2 billion persons by 2050 [7].

### 1.2. Urbanization in Latin America and the Caribbean and attendant challenges

The Latin America and Caribbean region is characterized by a high level of urbanization which began earlier than in other regions. Among the reasons proffered for the 36% increase in the LAC urban growth (1925–1975) are the effects of industrialization and economic restructuring, particularly in rural areas [8]. Outpacing Europe and Asia, urbanization in LAC is projected to be just under 90% by 2050 (**Table 1**), with rates varying within the region. In Jamaica, over 55% of the population resides in urban areas [9] and over the next few decades this growth trajectory is expected to continue, also throughout the Caribbean and Latin America.

With a trend towards the concentration of urban populations in mega cities [>10 million inhabitants], the LAC represents 20% or four of the world's 19 megacities. Alongside this trend is a rapid increase in medium size cities (50,000–1,000,000), experiencing the twin burdens of declining infrastructure and services. Rural–urban migration remains a factor to contend with. However, intra-metropolitan migration has emerged as a key feature of migratory flows. Two key trends of note in the regions are (a) the movement of higher income groups into closed residential/gated communities to protect themselves from the social and environmental effects of urban decay and (b) increased concentration of low-income groups in deteriorated areas of the city. These developments have disrupted traditional integration mechanisms in education, health and culture, fuelling social and economic inequities [8]. Among the anticipated benefits of urbanization are economies of scale, economic transformation and diversification, increased productivity and higher

| | Percentage urban | | | | | Rate of urbanization (percentage) | | | |
|---|---|---|---|---|---|---|---|---|---|
| Major area | 1950 | 1975 | 2007 | 2025 | 2050 | 1950–1975 | 1975–2007 | 2007–2025 | 2025–2050 |
| Africa | 14.5 | 25.7 | 38.7 | 47.2 | 61.8 | 2.28 | 1.28 | 1.10 | 1.08 |
| Asia | 16.8 | 24.0 | 40.8 | 51.1 | 66.2 | 1.42 | 1.66 | 1.24 | 1.04 |
| Europe | 51.2 | 65.7 | 72.2 | 76.2 | 83.8 | 1.00 | 0.29 | 0.30 | 0.38 |
| **LAC*** | **41.4** | **61.1** | **78.3** | **83.5** | **88.7** | **1.56** | **0.78** | **0.36** | **0.24** |
| Northern America | 63.9 | 73.8 | 81.3 | 85.7 | 90.2 | 0.58 | 0.30 | 0.29 | 0.20 |
| Oceania | 62.0 | 71.5 | 70.5 | 71.9 | 76.4 | 0.57 | −0.05 | 0.11 | 0.24 |

*Latin America and the Caribbean.

Source: UN Department of Economic and Social Affairs, Population Division, —World Urbanization Prospects: The 2007 Revision, p. 5.

**Table 1.** Percentage urban by major area, selected periods, 1950–2050.

standards of living. This expectation has not materialized in many instances as the attendant economic and social problems have dogged many cities. These include pollution, traffic congestion, higher costs of living, urban unemployment, proliferation of slums and urban poverty [10, 11], as well as other ill effects such as "…inappropriate and haphazard development, inadequate basic services, poor physical infrastructure, urban congestion, inadequate waste management, environmental degradation and susceptibility to natural hazards" [12].

Many cities, including those in high-growth mode operate in absentia of critical development resources – technical, financial and human and are perennially challenged by shrinking fiscal capacity to support appropriate investments in infrastructure; limited technical and managerial capacity to support urban growth; uncoordinated efforts and lack of clarity in roles and responsibilities of state agencies; weak policy and enforcement environment to provide an enabling environment for macroeconomic stability and investments [8]. The urban poor are challenged to navigate their environment as they face a number of hurdles including "limited access to income and employment; inadequate and insecure living conditions; poor infrastructure and services; vulnerability to risks such as natural disasters, environmental hazards and health risks; particularly associated with living in slums; spatial issues which inhibit mobility and transport; inequality closely linked to problems of exclusion" [13]. Youth, who form a relatively high proportion of the population, are particularly vulnerable. Limited access to basic services, employment and housing stymies their potential for development and contribution to society, while fostering increasing perceptions of social exclusion [8]. The Jamaica Habitat III report also discusses risk for youth development which is severely impacted in Jamaican urban spaces.

> *"The urban space affords a unique fuelling of youth disenfranchisement and equally presents numerous challenges and plausible solutions in a tandem reality. The urban habitats are rigged with overpopulation, environmental pollution, gang nucleus, poverty, fluent cases of youth parenting, disenfranchised homes and high unemployment rates among other ills"* [14].

### 1.3. Urban decay in Jamaica

With the United Kingdom relinquishing political authority over Jamaica in 1962, the nation became an independent state. In the 1960s, fresh into the throes of early independence, industry and trade thrived in urban centres, attracting hordes of rural migrants in search of better opportunities and quality of life. Mass migration quickly resulted in over-populated towns and urban centres throughout Jamaica. The poorly designed and maintained infrastructure and basic urban services strained under the increased pressure. The mass migration also led to a burgeoning of unplanned growth in squatter communities islandwide. Inadequate physical planning and oversight has contributed to growing urban sprawl, dilapidated housing and environmental degradation, particularly worse in urban slums. Up to a decade ago (2008), approximately 20% of Jamaica's population was estimated to reside in slum conditions [15]. It is expected that this proportion would have shown a marked increase since then. As Tindigarukayo [16] outlined, this has had significant impacts in four major areas: environment, social conditions, economic and health status, noting that the practice has negative effects for both squatters and the wider community. A National Squatter Management Policy and Implementation Plan [NSMP] has been developed as a response to this growing problem [14].

### 1.4. Urban renewal in the context of the local urban planning framework

Vision 2030 Jamaica [17] is a national plan for development which encapsulates national goals, outcomes and strategies. Goal 4 addresses the target of having a healthy environment, with outcomes being sustainable management of natural resources, hazard risk reduction, climate change adaptation, as well as sustainable urban and rural development. The plan recognizes urban sprawl and dilapidated housing as problems emerging from the lack of spatial planning. The objective in part is to develop and action a national spatial plan which will support the necessary social and economic development to take the country forward to fulfilling the vision of 'Jamaica, the place of choice to live, work, raise families and do business'. In Jamaica, Local Government, through the Parish Councils, serves as the central driver of the urban planning process (**Figure 1**). Local Government is supported by National Environment and Planning Agency (NEPA), the national agency with oversight for land use management and planning which was established out of a merger of the Town and Country Planning Authority (TCPA) and the National Resources Conservation Authority (NRCA). Additionally, public agencies have legislative authority in the planning process. Land use planning is guided by the National Land Policy; legislative provisions (e.g. Town Country Planning Act, 1958; Parish Council Act, 1901; Local Improvement Act, 1914; Urban Development Act, 1968; Housing Act, 1968) and Development Orders which provide the standards and guidelines for physical planning. It is important to note that all the Acts mention above have been in varying stages of revision for over 10 years. With over 100 pieces of land and land-related legislation and overlapping functions across public agencies, the case has been made for legislative and administrative reform to improve efficiencies in the planning environment [18].

Notably, the planning process for land use management demonstrates a limited role for the average citizen to participate in the decision making process as an individual or through community-based organizations or institutions.

http://dx.doi.org/10.5772/intechopen.79075

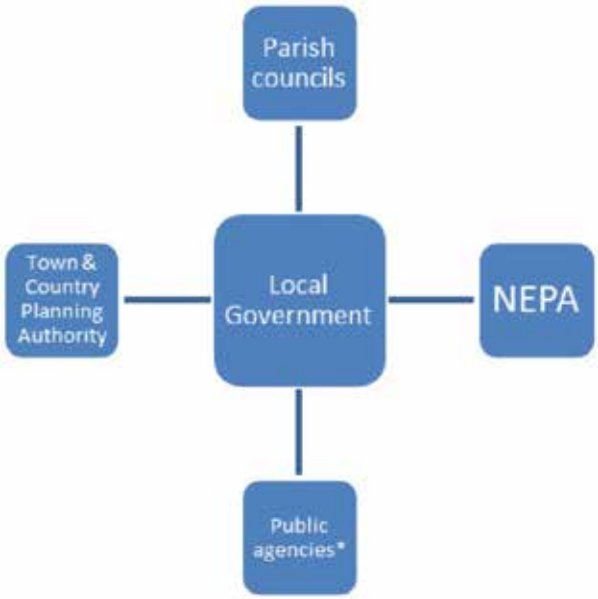



**Figure 1.** Urban planning architecture, Jamaica. Source: Jasneth Mullings. The asterisk (*) denotes public agencies involved in planning: Urban Development Corporation [Office of the Prime Minister]; Ministries with portfolio responsibility for Local Government and Environment, Water, Housing, Transport and Works; Land Development and Utilization Commission; Natural Resources Conservation; Authority and subcommittees; Line agencies [e.g. National Works Agencies, Jamaica Bauxite Institute, Water Resources Authority, Mines and Geology Division]; Office of Disaster Preparedness and Emergency Management; Negril Green Island Local Planning Authority [NGILPA]; Portmore Planning Authority.

### 1.5. Sustainable urban renewal

The global concept of urban sustainability is receiving more attention given the rapid physical, economic and social transformations occurring in cities. Facing the influx of growing urban dwellers and a mismatch of resources, urban decay is a common phenomenon in many cities. Urban renewal is among the planning responses which can be used to address this challenge. Urban renewal aims to improve the quality of life of the affected community by improving environmental, social, and economic conditions.

It is recognized that improving the built environment is insufficient [19] as successful renewal involves improving the life opportunities, promoting social cohesion and a sense of belonging [20]. The concept of sustainability has been applied to urban renewal as an attempt to mitigate the deficiencies in the urban renewal process. The sustainable urban renewal approach requires a strategic multi-sector and multi-agency partnership at national and local levels and many cities have begun to incorporate this approach into their planning mechanism [21]. Nicola Dempsey et al. [22] argue that while physical and economic development are critical for urban sustainability, there should be an increased focus on urban social sustainability, defined by Yiftachel and Hedgcock [23] as: "the continuing ability of a city to function as a long-term viable setting for human interaction, communication and cultural development."

The important role played by social capital in sustainable development [24] allows planners an appreciation of social issues which can inform a sustainable strategy for urban renewal [25–29], taking into account the close linkages between environment and society. Hence the case is made for active community engagement as a critical component of reshaping the urban space [30, 31].

## 2. Urban renewal: the Jamaica Programme

### 2.1. Brief history of urban renewal programmes in Jamaica

Facing significant pressure from the burgeoning population explosions in urban spaces, Government identified the need for a central entity, acting in the public interest, to be charged with responsibility for ensuring planned and orderly development in urban areas, in accordance with national priorities. Thus in 1968, a Special Act of Parliament gave birth to the Urban Development Corporation (UDC) [32]. The UDC bears direct responsibility for urban renewal and urban development in designated areas, as well as rural modernization through collaboration with government entities and private interests. The Government of Jamaica has had a long history of urban renewal and slum upgrading initiatives within the last three decades. **Table 2** captures the major urban renewal programmes undertaken by the Government of Jamaica since 1994.

As the representatives of the Government of Jamaica, the Planning Institute of Jamaica has played a critical coordinating role with international development partners, while the Jamaica Social Investment Fund (JSIF) has been largely responsible for the implementation of many of the projects outlined in **Table 2** [in tandem with government ministries and agencies]. Over the last few decades the UDC has also played a vital role in revitalizing urban centres, developing new townships and urban settlements, while improving the coverage and quality of public infrastructure. Outside of funding from international development partners, urban renewal programmes are funded via a tax incentive scheme with four options: urban renewal bond; investment tax credit; tax relief on rental income; and exemption from transfer tax and stamp duty [33]. The Urban Renewal (Tax Relief) Act is the legislative act which provides funding support for urban renewal projects in areas of Downtown Kingston managed by UDC. It was amended in 2015, providing the relevant Minister of Government discretional powers to amend specific sections of the Act.

### 2.2. Building an integrated model for the development of volatile urban communities

In Jamaica, the development of urban spaces has been assigned priority status given their potential contribution to economic development and public safety and security. Just over half (55%) of the population resides in urban areas, with a projection to 58% by 2030 [34]. Inadequate urban planning has resulted in a range of consequences that is well documented, including environmental degradation, unsafe and dilapidated housing and limited access to basic services [17]. In addition to the deficits in the physical environment, the profile of

| Programme | Year | Funder | Objectives |
|---|---|---|---|
| Programme for Resettlement and Integrated Development Enterprise [Operation PRIDE] | 1994 | Government of Jamaica | Reduce squatting and improve shelter provisions while empowering persons to relocate legally into organized communities |
| Jamaica Urban Poverty Project | 1997–2000 | World Habitat, UK | Poverty alleviation through training, infrastructure improvement and maintenance, housing restoration and construction |
| Inner-City Renewal Programme | 2000–2005 | GOJ | Improvements in physical and social infrastructure; reduction in crime and violence and stimulation of economic and employment opportunities |
| Inner City Housing Project [ICHP] | 2004–2008 | National Housing Trust | Construction of 5000 new housing units in 15 inner city communities. Project included related physical and social infrastructure, as well as social development programme to address psychosocial needs of residents |
| Inner City Basic Services for the Poor Project [ICBSP] | 2006–2013 | International Bank for Reconstruction and Development [IBRD]/The World Bank/GOJ | Improve quality of life in 12 Jamaican inner-city areas and poor urban informal settlements through improved access to basic urban infrastructure, financial services, land tenure regularization, enhanced community capacity and improvements in public safety |
| United Nations Habitat Participatory Slum Upgrading Programme [PSUP] | 2008 | European Commission | Improve living conditions of the urban poor; strengthen capacity of local, central and regional institutions and key stakeholders' in settlement and slum improvement |
| Kingston Urban Renewal Programme [KURP] | 2009–2010 | GOJ/Inter-American Development Bank [IDB] | Infrastructural and social intervention initiative, including income-generating activities |
| Community Renewal Programme [CRP] | 2013–2014 | GOJ/International Development Partners | Project aimed at improving community empowerment, housing, sanitation and waste disposal, economic opportunity, recreation, dispute resolution and crime |
| Integrated Community Development Project [ICDP] | 2014–2020 | The World Bank | Provision of basic infrastructure and social services in 18 communities islandwide |
| Poverty Reduction Programme [PRP]* | 2014–2018 | European Union/ GOJ | Support the governance, physical transformation, socio-economic development, and youth development components of the CRP |
| Expansion of the downtown Kingston Urban Renewal project | 2016 | People's Republic of China/GOJ | Expansion of development area and rejuvenation of Downtown Kingston to promote investments in the capital city |

*Several international development partners have contributed to the Government of Jamaica's poverty reduction programme and are listed on the website of the Jamaica Social Investment Fund [JSIF]. See also the UDC website for ongoing projects.

**Table 2.** Snapshot of urban renewal programmes, Jamaica 1994 to present.

many urban communities have seen marred by high rates of crime and violence which have impacted negatively on social capital and trust. Crime persists as a national concern. The Global Study on Homicide (2013) of the United Nations Office on Drugs and Crime [35], ranked Jamaica as sixth in the world with a homicide rate of 39/100,000. Data provided by the Jamaica Constabulary Force in 2017 ranked St. James, St. Andrew, St. Catherine and Kingston as the parishes accounting for the highest reported number of murders in 2017. The far reaching negative impact of crime on economic and human development cannot be overlooked, diminished or silenced. How can crime be prevented in Jamaican communities? The straightforwardness of this question belies the complexity of issues that gives rise to and perpetuate crime. Solutions proffered for the transformation of volatile communities have included a menu of elements geared at improving the physical environment, broadening access to basic services as well as social programming. The justification for these activities draws on theories including "Broken Windows" which prioritize addressing elements in the physical environment that signal neighbourhood disorder [littering, loitering, overgrown vacant lots, abandoned buildings] [36]; Crime Prevention Through Environmental Design (CPTED) [37] promotes alterations to the physical design of the built environment in order to enhance opportunities for detection and apprehension. Social risks factors are prioritized in Crime Prevention through Social Development (CPSD) [38] which draws attention to the plethora of social risks factors which when present does not cause violence but can contribute to the likelihood of violence occurring. Though debatable, an integrated model that builds on the strengths of both situational and social prevention is a recommended way forward.

### 2.3. Towards an integrated model for urban renewal

Among the first major initiatives of the Government of Jamaica, the Inner-city Renewal Programme (ICRP) was launched in 2000 for the purpose of redeveloping areas in the Kingston Metropolitan Area which denoted characteristics of urban blight and social decay [39]. The programme's main goal was "…to facilitate sustainable improvements in the quality of life of persons in these areas through the improvement of physical and social infrastructure, reducing the levels of crime and violence and stimulating economic and employment opportunities" [39].

The ICRP was faced with many administrative challenges in implementation, especially related to inter-agency coordination and community engagement and was subsequently followed by the next major national initiative, the Inner City Basic Services Project [ICBSP]. The ICBSP was funded by the World Bank with counterpart funding from the Government of Jamaica and implemented by the Jamaica Social Investment Fund [JSIF] from 2006 to 2014. The ICBSP project was implemented in 12 pre-selected inner city communities in Kingston, St. Andrew, St. Catherine, St. James and Clarendon [12]. The epicentre of project design was inner city renewal; with a focus on crime and violence prevention as a key priority. The project was built on a general framework that integrated situational prevention with social interventions to enhance the human, social, economic and environmental development of 12 inner city communities in a holistic model with the objectives of expanding access to basic services and improving safety and perception of safety. The selection of project communities

http://dx.doi.org/10.5772/intechopen.79075

was led by the Planning Institute of Jamaica (PIOJ)] and involved the Ministry of National Security, the Social Development Commission (SDC) and the Jamaica Social Investment Fund (JSIF) [40]. Hence, the project design was aligned to national priorities and reflected a multi-faceted understanding of the needs of the targeted communities. The project was also built on an innovative framework that integrated situational prevention with social interventions to enhance the human, social, economic and environmental development of the 12 pre-selected inner city communities in a holistic model. This project was the first in the country to take an integrated approach to crime- and violence-prevention. Instead of crime suppression utilizing strictly hard policing and paramilitary force only the ICBSP used infrastructure and public safety methodologies to address crime and violence in the target areas.

The ICBSP integrated situation prevention focused on investments in the physical environment to reduce opportunities for crime such as the provision of mobile mediation posts, zinc fence removal and substitution, conversion of open lots in parks and green spaces, rehabilitation of road networks to facilitate more effective policing and delivery of services, solid waste management. Social activities were focused on addressing a range of social risks factors including premature exit from the school system building human capacity building and included skills training and job placement, school based activities and the strengthening of community based organizations. The implementation of an integrated package of technical and social sub-projects under the ICBSP was underpinned by attention to four social dimensions: participation, gender, management of social risks and social safeguards. Development efforts can be lopsided and result in the exclusion of individuals and groups who are in most need of benefits as well as generate adverse impacts; attention to these social dimensions were therefore necessary to safeguard outcomes including inclusive and equitable access to services, resources and opportunities; empowerment of groups and individuals to participate in and benefit from development activities and mitigation of chronic or unforeseen risks. The integration of both technical and social components was evident in the Project Development Objective (PDO) which had a multiplicity of both technical and social indicators. The design and delivery of sub projects also reflected integration of both technical and social elements as teams of multi-disciplinary specialists were involved in the design, appraisal, review, implementation, monitoring and evaluation activities. This integrated approach resulted in:

- A balanced approach to transformation that demonstrated visible improvements in infrastructure, service delivery and community aesthetics as well as well as interventions to build the capacity of individuals, groups, and institutions.
- Leveraging social outputs as inputs into infrastructure subprojects - e.g. skills development and certification of persons in areas including construction and electrical installation provided a pool of skilled labour to undertake technical works.
- Building community capacity for sustaining benefits beyond the life of the project by strengthening community capacity to utilize, manage and, maintain assets acquired under the project, including roads networks, water systems, recreational spaces, parks and green spaces.

The project was given an overall rating of Satisfactory by the World Bank having met Project Development Objectives. The communities were generally satisfied with both project outcomes and project implementation. In the 2013 Citizens' Report Card, 98% of respondents reported that they would welcome the JSIF back into their communities, while 84% said the best projects were chosen for the communities [41]. The success of the ICBSP model has provided the impetus for both the Government of Jamaica and the World Bank to embark on a new project, namely the Integrated Community Development Project (ICDP) which is currently being implemented by the Jamaica Social Investment Fund from 2014 to 2020.

More recently, crime prevention strategies in volatile communities have included the deployment of the security forces operating out of strategically operated posts in a "clear, hold and build" strategy within Zones of Special Operations (ZOSO) [42]. In addition to security measures, the Act also provides for the social and economic development of any area designated as a zone. The social intervention strategy of the ZOSO promotes an integration of social and technical intervention within an integrated framework of multiple agencies. Current models utilize a lead/coordinating agency, multi-agency collaboration and implementation; community engagement; transformation of built and social environments; legislative action; public/private partnerships; diversified funding sources and partners and a monitoring and evaluation mechanism (**Figure 2**).

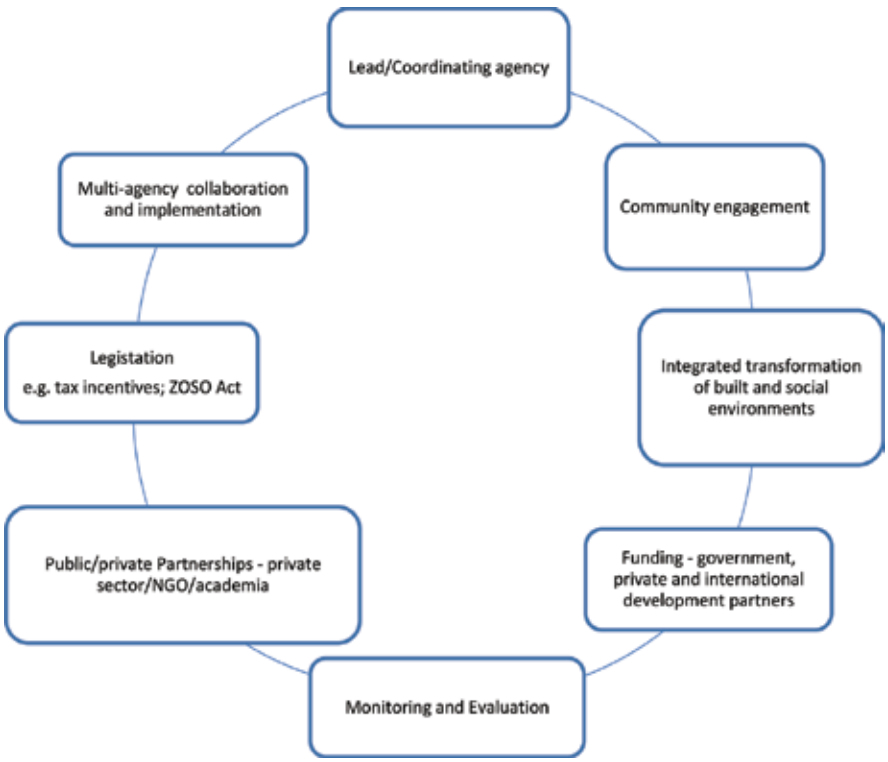



**Figure 2.** Integrated model for urban renewal – Jamaica.

http://dx.doi.org/10.5772/intechopen.79075

## 3. Lessons learned and new directions

### 3.1. Lessons learned

An assessment of the ICRP showed gaps in agency coordination and accountability, community preparation for intervention (i.e. buy-in), inadequate funding and lack of a sustainability plan. Best practices noted are the community engagement and consultations through the Community Development Committees, and multi-agency participation. While this model has not worked to perfection, some key lessons learned from the past 20 years include the need for a holistic approach with emphasis on community readiness, engagement and ownership, improved coordination and monitoring of multi-agency activities, as well as sustained resource mobilization and programme maintenance and management [39]. Lessons learned have been integrated into subsequent models such as the ICBSP and the ICPD. What is clear is that infrastructure investments must be balanced with and complemented by social services as this approach is essential to improving and maintaining access to the infrastructural works and intervention sustainability.

### 3.2. New directions

#### *3.2.1. Urban renewal as a public health tool*

In its purest and most ideal form urbanization is a mark of development, associated with increased wealth, more readily available amenities and generally a higher quality of life for the inhabitants. Whatever the path to urban living, we now recognize that it is a two-edged sword, on the one hand associated with better access to nutrition, physical activity and health care but on the other, it may be associated with poverty, crowding and ill-health [43]. The essential characteristics that emerge from the UN definition of an urban agglomeration are density of population and the concept of a 'city'. At its most simplistic, the contrast with a rural setting would include greater space per individual and this may be extended to the concept of fresh air which for many decades was a premise for a healing environment (tuberculosis etc.) [44]. While the space and physical environment are no doubt important, it cannot be far-fetched that the physical characteristics must influence and affect how inhabitants behave in the one, rural, versus the other, urban, setting. Presumably these behaviours influence the health differences that are seen in the one versus the other setting. What may be more proximate however is an examination of the physical and other environmental characteristics and the behaviours that they influence and how the appropriate behaviours can be encouraged within the changing environment, for example the increasing density of the population. There is good evidence that certain behaviours account for large proportions of prevalent disease. In past circumstances the role of poor sanitation, unsafe water supply, under-nutrition, disease vectors, environmental pollution and other factors accounted for the vast majority of diseases seen and the improvement in these factors was accompanied by significantly improved health [45, 46]. In the present dispensation while many countries still grapple with the previous scenario, the epidemiological profile has shifted worldwide to a dominance of non-communicable diseases and the factors that explain the current pattern

have also been identified. There is strong evidence that poor dietary practices, reduced physical activity, tobacco smoking and the harmful use of alcohol will explain the majority of the non-communicable diseases that plague us today [47]. These are all behavioural factors which are influenced by social circumstances, individual choice and a combination of the two. This picture is epidemiologically consistent with the concept of rural living being healthier as it is likely to be more associated with diets of lower energy density and lifestyles which involve greater physical activity. Smoking and alcohol consumption may be less easy to explain.

Rates of communicable and non-communicable diseases are higher in urban informal settlements as they lack the basic infrastructure and services necessary for good health and quality of life. Poor sanitation hikes rates of diarrhoeal diseases. Overcrowding inflates communicable diseases such as tuberculosis, and other respiratory infections while inadequate draining, exacerbated during periods of flooding provides prime breeding sites for vectors such as mosquitoes. Malnutrition among urban slum dwellers decreases their natural immunity, thereby escalating their risk of morbidity and mortality from these diseases [48]. Non-communicable diseases such as cardiovascular disease, asthma, violence and mental illnesses are major public health concerns in poor urban areas [49]. Informal settlements are also plagued by intentional injuries arising from high levels of exposure to violence and crime and inter-partner violence, as well as non-intentional injuries from accidents in the home [50–52]. Stress and depression are marked features among the urban poor and slum dwellers, especially in developing countries [50].

Tindigarukayo [16] outlined the Jamaican experience of significant negative implications of informal settlements [i.e. squatting] – environmental, social, economic and health, noting that the practice impacts both squatters and the wider community. Importantly, there is a distinctive interplay among these risk factors, possibly synergistic which compounds the threat to public health and safety. Squatting harms the physical environment as it encourages deforestation for fuel, increases exposure to fire hazards, and vulnerability to the forces of nature and results in poor environmental health practices such as the inadequate disposal of sewage and solid waste. Socially, squatter communities are impacted by the absence of reliable access to amenities [e.g. electricity and water] and social services [e.g. roads, playgrounds], resulting in illegal access to these critical resources. These communities often become hotbeds for crime and illegal activities. The non-existence of educational institutions in close reach of many squatter communities results in low school attendance and high rates of drop-out, which is further compounded by the lack of priority on education. Lack of tenure also affects them by way of unstable occupancy/tenancy.

Unplanned settlements negatively impact on the economic landscape by increasing demand on limited urban services, destroying ecological sites for marine industries and occupying productive lands for agriculture, tourism, etc. Squatters face economic exclusion as they are often denied employment opportunities, arising from the fear and rejection of the communities in which they reside. They are also disabled economically, as in the absence of legal rights to the lands they occupy, their productivity and contribution to society is impaired. Women with young children are particularly vulnerable as they are forced to choose between child neglect [i.e. leaving children unattended to pursue economic opportunities] and starvation.

Also in Jamaica, Mullings et al. [53] reported results from a national survey, the Jamaica Health and Lifestyle Survey 2007–2008 which demonstrated that women in urban informal/squatter communities and men in poor urban communities faced a doubling of their risk of depressive symptoms. Of great concern is the preponderance of health problems in these social-environmental clusters which are less recognized by the formal health care sector, which often treats with the costly late complications of these diseases. Neglect of urban slum health carries a high economic, social and developmental cost for urban populations and public health and must be tackled at all levels. The call for studies of urban slum populations to better understand the magnitude and characteristics of the problem and a new approach to health assessment to improve the public health response mechanism for this vulnerable group is justified [49].

What is required is the enabling of healthy behaviours and environments in the urban setting where they may not occur 'naturally'. The fact is that the offending behaviours which account for a disproportionate amount of disease are influenced by almost all aspects of society including urban planning, community structure and governance, transportation, security, food availability, import policy, agricultural practices, education. Urbanization and urban settings which discourage healthy behaviours must be targeted using a combination of bottom-up and top-down approaches to influence environment [physical and social] and behaviours [e.g. diet, physical activity, tobacco use, alcohol consumption and violence]. An adequate response will require the buy-in of all the stakeholders to a vision that will harness all these components into a coordinated system of multi-sectoral programming to address urban living conditions and the underlying social, economic and psychological drivers of poor quality of life. This governance must supersede the narrow interest of any sector and will require innovative ways of harnessing all assets in society, especially those at the community level including faith-based organizations.

### *3.2.2. Urban renewal through the gender lens*

Historically, urban planning has been a male-dominated field. This patriarchal tradition has implications for commitments to gender equality and the empowerment of women and vulnerable groups [54]. It also challenges goals to achieve the UN's Sustainable Development Goals, especially Goal 5 on gender equality, Goal 10 reduced inequalities and Goal 11 sustainable cities and communities. Most importantly, differences in gender roles and responsibilities have major implications for how social groups have access to and use planned public spaces in urban areas. UN Habitat 2012 [55] supports the use of sex-disaggregation of data based on the collection of data on men and women separately in relation to all aspects of urban planning, including employment and livelihood, housing, ethnicity, class, caste, age and location.

A gender and development theoretical framework uses gender as a social concept and tool of analysis. Gender and gender identities create clearly defined social roles and expectations for both males and females associated with masculinity and femininity, as well as hierarchies and unequal access to power and decision making (including financial and other resources for development). These realities must be considered in urban planning–essentially planning cities based on the gender roles ascribed to different groups. Gender mainstreaming is a

process and a strategy introduced by the United Nations in 1987, to assess the likely impact of planned legislation, policies and programmes on males and females, given their ascribed gender roles and responsibilities. Gender mainstreaming in urban planning for renewal would therefore require the collection of data disaggregated by sex and other socioeconomic and demographic variables. It involves asking basic questions such as: Who needs what? Who has access to what resources? Where? When? Gender analysis of the data can be used to identify the specific needs of each demographic group and this information can be used as evidence to guide urban planning and to make it more effective and efficient. This approach stands in sharp contrast to traditional approaches to urban planning. Using this methodology is essential in Caribbean countries which have many single female headed households which tend to be larger in size, have a larger number of family members and to have less income than male headed households because of the gender wage gap which is reflected in women earning less than men. In single-female headed households, women are the primary breadwinners, as well as primary caregivers and community organizers, representing a 'triple shift'. These lived realities mean that women will need efficient physical infrastructure and services to fulfil their three gender roles efficiently.

*3.2.2.1. Paradigm shift: gender blind to gender-sensitive urban renewal*

Urban renewal plans will need to consider the trend of increasing urbanization which has resulted in Jamaica having a population that is 55% urban [9]. Planners will also need to consider the country's demographic profile and the reality of a demographic transition, moving from a largely young population to an increasingly larger population of older persons. Urban planners will also need to make provisions for this older population that is living 20 years longer on average and where the life expectancy for women is 5 years longer than for men. In this context traditional urban planning which is 'gender blind 'would need a paradigm shift to become 'gender-sensitive'. Gender blind means that planners assume that there are no differences in how the physical urban environment will be used by all stakeholders. This incorrect assumption results in *gender biases* which create problems for specific demographic groups including women, persons with disabilities and children. Traditional approaches can also reinforce gender and other inequalities which will impact access to education, jobs and enjoying an independent fulfilling life. UN Habitat 2012 [55], therefore argues the case for gender sensitive urban planning, which includes several components. Among them is appropriate *legislation* which is required to support the allocation of human and financial resources to support physical planning. This has implications for the design and use of roads, walkways, ramps for wheelchair users and prams, building codes, creation of 'green spaces' and parks as well as road infrastructure and traffic flows. Urban renewal will require rethinking gender needs – e.g. designing bathroom facilities and use of equipment to facilitate the creation of safe spaces for women and girls who are more at risk of gender based violence. It also offers scope for independence of persons with disabilities, children, older women and men and other vulnerable population groups. This approach to re-thinking and redesigning spaces to address the needs of users supports the concept of an inclusive society.

*3.2.2.2. Legislation, good governance and gender inequality*

Power to influence legislation requires a minimum of 30% of women in Parliament to successfully lobby for gender sensitive legislation and here there are two challenges. In a system reflective of a culture of patriarchy, women are significantly under represented at the highest levels of decision making which is in Parliament. Also women in Parliament are not organized into women's caucuses that would advocate and pass laws that facilitate and empower women to fulfil their socially ascribed gender roles. In Jamaica for example women are 51% of the population but only 17% of Parliamentarians. A major barrier to good governance is the lack of awareness of gender as a tool of analysis and global commitments to gender equality which may result in a diminished understanding of the value of such legislation to achieve national development goals. 'Tribal 'and adversarial political culture undermine the possibility of progressive legislation to support gender sensitive urban planning and sustainable development. Increased gender equality in political participation and in Parliament should significantly increase the number of women in positions of leadership, power and decision making, including at the local government level.

*3.2.2.3. Safety, security and safety audits*

Statistics on crime and violence reported by the Jamaica Constabulary Force [56] reflect high levels of crime, including murder and gender based violence. The fear of crime and the perception of the government's ability to manage crime are problematic. Gender analysis of the crime problem can help to improve interventions to promote safety and security. Use of gender-sensitive gender audits can also help to increase understanding of the causes, characteristics consequences and solutions, serving as a guide to urban planning to ensure that basic needs are addressed and housing solutions create an environment for well-being.

*3.2.2.4. Commitments to gender equality and sustainable development*

Jamaica has ratified and signed several international conventions that provide a strong governance framework for gender sensitive urban renewal. Among these are the UN Convention on the Elimination of all forms of Discrimination against Women (CEDAW) [57]; the National Policy for Gender Equality (NPGE) [58]; Vision 2030 Jamaica [17] which includes a Gender Sector Plan and the Sustainable Development Goals [5]. SDG 5 promotes the principle and practice of gender equality as a basic human right and gender is also regarded as a cross cutting issue for the achievement of all 17 SDGs.

*3.2.3. Urban planning: a new governance framework for sustainable development*

Missing from the various integrated approaches to urban renewal in Jamaica is the sustained development and assimilation of community-based organizations or institutions in the decision making process. Projects implemented (**Table 2**) have recognized the importance of building community capacity for sustaining benefits beyond the life of the project by strengthening community capacity to utilize, manage and, maintain assets acquired

under the project, including roads networks, water systems, recreational spaces, parks and green spaces. However, no mention is made of the role of these entities in the decision making process. Put another way, the active participation of these institutions in the governance process does not reside outside of the scope of the projects. Most of the projects listed (**Table 2**) used a top-down approach to urban renewal, led primarily by government agencies rather than an approach where issues to be resolved and strategic interventions were defined and executed by all stakeholders and a multi-disciplinary professional team, including persons trained in aspects of land use management and urban planning. Drnevich [59] noted that the involvement of critical stakeholders in any urban renewal initiative must be community driven and the application of community driven development must follow some fundamental principles in order to yield success. This diversity of participation in problem definition, alternative solutions and strategy development increases the success of the solution. The partners "buy in" to the final strategy bring resources and expertise and become part of the solution. Sara and Katz [60] studied urban renewal in six countries and concluded that sustainable initiatives were those in which the communities "controlled key investment decisions and part of the investment cost." Similarly, in a study of community-based organization's (CBO) involvement in the development process in South Africa, Adato, et al. [61] pointed out that CBO's involvement in all aspects of project development [design, management and monitoring] helped to reduce cost per beneficiary by approximately 50% [62]. The preponderance of scholarly research on current approaches to urban renewal calls for a new governance framework which directly involved the residents in all aspects of the decision making process. For example, see [63] where the author argued that the defining feature of urban governance is that the management of cities is not the sole domain of government or the private sector, but is the jurisdiction of a wide variety of actors that interact with one another to govern cities. It is also important to recognize that the actors/stakeholders in the governance and management of cities are not likely to always have equal power because urban governance is a concept that brings together the political, economic, and social systems and processes in a contemporary capitalism system that is itself an intrinsically unequal system [64].

The Local Governance Act developed in 2014 and enacted in 2016 [65] was an attempt to include the variety of actors in the urban governance process. The introduction to the 2016 Act asserts that it allows for a governance process which is more autonomous and responsive to the citizenry. The Act also attempt to reconcile several anomalies and repair the deficiencies of existing Acts such as the Parish Councils Act (1887) [66], the Kingston and St. Andrew Corporation Act (1923), the Municipalities Act (2003), and the Parochial Elections [Modifications] Act (1979) [67]. Unfortunately, the Act speaks to without defining a clear approach to land use planning and the role of professionals trained in the field of land use planning and urban management. It is safe to assume that decision-making process on land use management has not changed materially. It is therefore necessary to propose a new governance framework to ensure the active participant of community residents in the decision making process. Below is the proposed structure for a new governance framework to drive sustainable land management and urban planning in Jamaica (**Figure 3**). **Figure 4** proposes a mechanism for the operationalization of the new governance structure.

http://dx.doi.org/10.5772/intechopen.79075

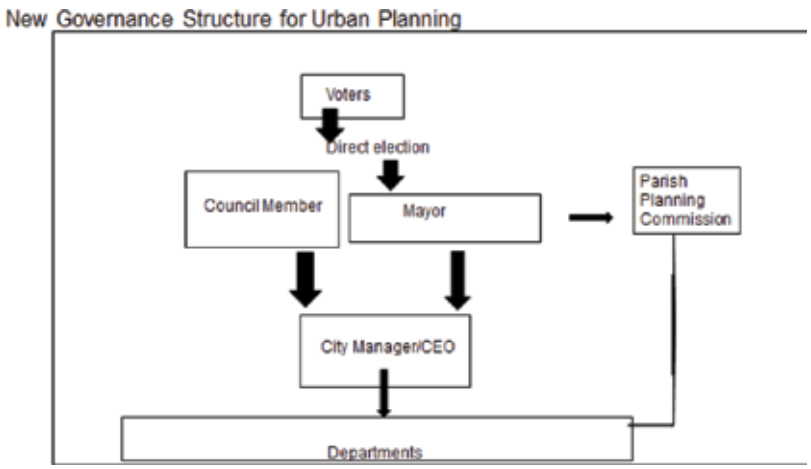



**Figure 3.** New governance framework for urban planning in Jamaica. Source: Carol Archer.

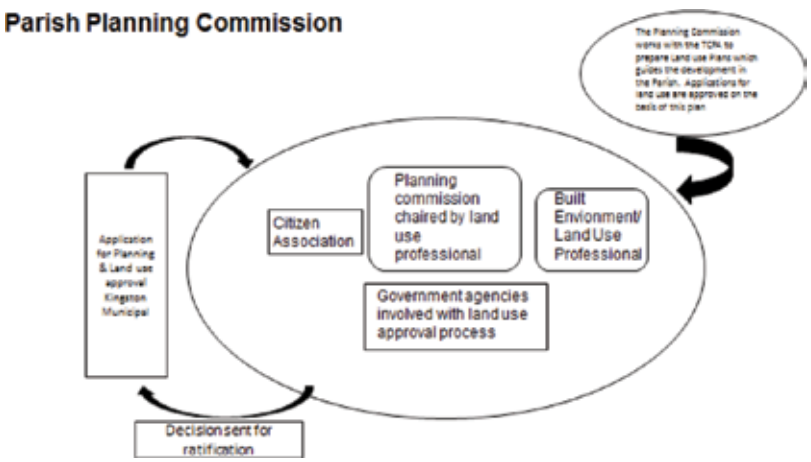



**Figure 4.** Mechanism to operationalize the new governance structure. Source: Carol Archer.

This structure calls for direct election of Mayors by the residents of a parish. Currently, the Mayor of the parish capital and the chief decision maker for land use management in the parish is selected from among the caucus of councillors from the ruling party. An individual can win his or her electoral division by one vote and be selected by the caucus as Mayor. Direct election of Mayors from a wide cross-section of the population of the parish will give greater legitimacy to the office of the Mayor. The proposed structure also calls for the creation of a Planning Commission. Listed below are the major features of the proposed Commission:

- Independent, semi-autonomous and insulated from the mainstream of political and administrative affairs.
- Includes representatives of the urban planning profession and others from the Built Environment Professionals approved/vetted by the council or services commission

- Include representatives from neighbourhood organizations [community councils]
- Serve for a period of 10 years [typical time period for the redevelopment of an urban area]
- The commission should be given the power to veto or override the city council by the requirement of a greater-than-majority vote of the Commission.
- Recognize that the Municipal Council is, and should, be the principal legislative and policy-making authority of the municipal government.
- Recognize that when a specialized organization is relatively independent of the Municipal Council, its professionals and technicians can exert their professional training and practice
- Provide opportunities for citizens to actively participate in policy-making by expressing their wishes and opinions to the legislators through the Commission.

## 4. Challenges and opportunities for sustainable development

To realize opportunities and overcome challenges, there is need for urban planners in the Caribbean to scale up the mainstreaming of gender and community engagement and participation in all facets of professional training, policies, programmes and practices. This will help to promote policy coherence between commitments to gender mainstreaming and gender equality as well as future practices. This new approach implies the use of community driven approaches that focus on gender-sensitive needs assessments, audits, and budgets. This approach will help to prioritize the allocation of resources to address gender inequalities which affect both sexes from various backgrounds. The analysis points to the need for increased national training programmes on gender and commitment to gender re-socialization to promote more equitable gender roles and responsibilities as well as access to financial and other resources. This has implications for the delivery of programmes in education and religious institutions, as well as public education and media awareness programmes to promote behaviour change.

Urban planners will need to value and use multidisciplinary research that combines quantitative, qualitative and participatory methodologies to better understand underlying behaviours that are linked to gender roles and design urban spaces with these considerations. Jamaica's 2014 report to Habitat notes gender and women's issues must be central when planning designs in urban spaces for infrastructure, housing, employment and livelihoods. As a Small Island Developing State (SIDS) facing significant environmental threats, practical needs of community members must be considered, taking account of the gender profile resulting from analysis of sex disaggregated data [68]. Policy coherence is important given several commitments to gender mainstreaming to promote gender equality, equity [fairness] and sustainable development for all.

## 5. Conclusion

Urban planning has evolved from the Garden City movement initiated by Sir Ebenezer Howard at the turn of the 20th century [69], to modern urban planning approaches such as

the healthy city concept which aims to improve quality of life and maximize citizens' potential by improving the city environs through inter-connections in the political, economic, and social spheres [70]. The model of urban renewal in Jamaica aims to improve quality of life and well-being of community and residents, through infrastructure, social and economic development programmes. The integrated model is intended to serve the Government of Jamaica as a tailored blueprint for community development and is a model that can and should be further replicated to have a more scaled and sustained impact. The model can be further enhanced by refocusing on three areas: public health, gender and a new governance structure for urban planning. In the re-positioning of urban renewal as a public health tool, a succinct examination of urban health, inclusive of social determinants of health and the socio-ecological model of health would be a useful exercise. Innovative public health care delivery which targets 'at risk' and off-the-grid communities with services such as mobile clinics can propel us towards practical and sustainable development outcomes. Additionally, a compelling case has been made for the urban renewal agenda to focus on well-needed gender-sensitive approaches to assessment, planning and policy development to ensure effective responses to changing needs. Sensitizing male and female legislators and agents of central and local government and mainstreaming gender in the policies and programmes of central and local government can also have a positive impact on urban planning, resulting in infrastructure and services being more equitable for all stakeholders. Thirdly, the New Urban Agenda calls for a new governance structure, one that integrates sustainable urban management through a Planning Commission and provides for an expanded role for citizens in the decision making process.

## Author details

Jasneth Mullings[1]*, Leith Dunn[1], Mona Sue Ho[2], Rainford Wilks[1] and Carol Archer[3]

*Address all correspondence to: jasneth.mullings@uwimona.edu.jm

1 The University of the West Indies, Jamaica

2 Jamaica Social Investment Fund, Kingston, Jamaica

3 University of Technology, Kingston, Jamaica

## References

[1] United Nations. United Nations World Urbanization Prospects. The 2011 Revision. Population Division. New York: United Nations; 2011

[2] United Nations General Assembly. Report of the World Commission on Environment and Development: Our Common Future. Oslo, Norway: United Nations General Assembly, Development and International Co-operation: Environment; 1987

[3] Zheng H, Shen G, Wang H. A review of recent studies on sustainable urban renewal. Habitat International. Jan. 2014;**41**:272-279

[4] Emas R. The Concept of Sustainable Development: Definition and Defining Principles. Brief for Global Sustainable Development Report 2015; 2015. Accessed at https://www.academia.edu/31158981/The_Concept_of_Sustainable_Development_Definition_and_Defining_Principles

[5] United Nations. Sustainable development goals. Accessed at: http://www.un.org/sustainabledevelopment/cities/ [Access date: April 17, 2018]

[6] United Nations. Millennium Development Goals Report 2015. New York: United Nations; July 1 2015 Available from: http://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG

[7] State of the World's Cities 2012/2013: Prosperity of Cities. New York: United Nations Human Settlements Programme; 2013

[8] USAID. Urbanization in Latin America and the Caribbean: Trends and Challenges. Washington DC: USAID Contract No. AFP-I-00-04-00002-00, Task Order No. 9. 2010

[9] Central Intelligence Agency. World Factbook. Available from: https://www.cia.gov/library/publications/the-world-factbook/geos/print_jm.html [Access date: April 17, 2018]

[10] Indrawati S. Urbanization and Urban-Rural Integrated Development. Beijing, China: The World Bank; 2014. Available from: http://www.worldbank.org/en/news/speech/2014/03/23/urbani-zation-and-urban-rural-integrated-development

[11] Annamalai T, Devkar G, Mahalingam A, Benjamin S, Rajan A, Deep A. What is the evidence on what makes an effective urban planning framework for improved access to water, sanitation, and electricity services in low income or informal settlements?. EPPI-Centre, Social Science Research Unit, Institute of Education, University of London; 2014

[12] Government of Jamaica. Jamaica report to HABITAT 2014; 2014. Available at: http://habitat3.org/wp-content/uploads/Habitat-III-Jamaica-Report.pdf

[13] Baker JL. Urban Poverty: A Global View (English). Urban Papers; No. UP-5. Washington, DC: World Bank; 2008. Available from: http://documents.worldbank.org/curated/en/954511468315832363/Urban-poverty-a-global-view

[14] Government of Jamaica: National Report for Third United Nations Conference of Housing and Sustainable Urban Development (HABITAT III). Kingston, Jamaica: Ministry of Transport, Works and Housing; 2014

[15] Government of Jamaica. Rapid Assessment of the Problem of Squatting in Jamaica. Kingston, Jamaica: Ministry of Housing; 2008

[16] Tindigarukayo JK. The impact of rural-urban influx on Jamaican society. International Journal of Humanities and Social Science. 2014;**4**(9; 1):35-40

[17] Planning Institute of Jamaica. Vision 2030: National Development Plan. Kingston, Jamaica: Planning Institute of Jamaica; 2009. Available from: http://www.vision2030.gov.jm/portals/0/ndp/executive%20summary.pdf

[18] Planning Institute of Jamaica. Urban planning and regional development sector plan 2009 – 30. Vision 2030 Jamaica-National Development Plan. Government of Jamaica; 2009

[19] Planning and Lands Bureau. Urban Renewal Strategy. Hong Kong: Hong Kong Special Administrative Region government; 2001

[20] Arthurson K. Redevelopment of public housing estates: The Australian experience. Urban Policy and Research. 1998;**16**(1):35-46

[21] Yi Z, Liu G, Lang W, Shrestha A, Martek I. Strategic approaches to sustainable urban renewal in developing countries: A case study of Shenzhen, China. Sustainability. 2017; **9**(8):1460. DOI: 10.3390/su9081460

[22] Dempsey N, Bramley G, Power, Brown C. The social dimension of sustainable development: Defining urban social sustainability. Sustainable Development. 2009;**19**(5):289-300

[23] Yiftachel O, Hedgcock D. Urban social sustainability: The planning of an Australian city. Cities. 1993;**10**(2):139-157

[24] Danchev A. Social capital influence on sustainability of development (case study of Bulgaria). Sustainable Development. 2005;**13**(1):25-37

[25] Price Waterhouse. Evaluation of Urban Development Grant, Urban Regeneration Grant and City Grant. London: HMSO; 1993

[26] Edwards J. Urban policy: The victory of form over substance? Urban Studies. 1997; **34**(56):825-843

[27] Roberts P. Evolution, definition and purpose of urban regeneration. In: Roberts P, Sykes H, editors. Urban Regeneration: A Handbook. London: Sage; 2000

[28] Stubbs M. Heritage-sustainability: Developing a methodology for the sustainable appraisal of the historic environment. Planning, Practice & Research. 2004;**19**(3):285-305

[29] Friedman A. Sustainable Residential Development: Planning and Design for Green Neighborhoods. New York: McGraw-Hill; 2007

[30] Fordham G. Made to Last. York: Joseph Rowntree Foundation; 1995

[31] Edgar B, Taylor J. Housing. In: Roberts P, Sykes H, editors. Urban Regeneration: A Handbook. London: Sage; 2000

[32] Government of Jamaica. Urban Development Corporation Act 1968. Kingston: GOJ; 1968

[33] Urban Development Corporation. Tax Incentive. Available from: http://www.udcja.com/tax-incentive [Access date: April 17, 2018]

[34] Planning Institute of Jamaica. Vision 2030 Jamaica national development plan–Population sector plan. Government of Jamaica Population Task Force; 2007. Available from: http://www.vision2030.gov.jm/portals/0/sector_plan/microsoft%20word%20-%20population2.pdf

[35] United Nations Office on Drugs and Crime. The Global Study on Homicide. Vienna, Austria: UNODC; 2013 Available from: https://www.unodc.org/documents/gsh/pdfs/2014_GLOBAL_HOMICIDE_BOOK_web.pdf

[36] Kelling GL, Wilson JQ. Broken windows: The police and neighborhood safety. Atlantic Monthly. 1982;**249**(3):29-38

[37] Crowe T. Crime Prevention through Environmental Design: Applications of Architectural Design and Space Management Concepts. 2nd ed. Oxford: Butterworth-Heinemann; 2000

[38] The John Howard Society of Alberta. Crime Prevention through Social Development: A Resource Guide; 1995. Available from: http://www.johnhoward.ab.ca/pub/pdf/C7.pdf

[39] Planning Institute of Jamaica. Social Assessment of the Inner-City Renewal Programme. Rae Town Pilot Project. Kingston, Jamaica: PIOJ; 2004

[40] Jamaica Social Investment Fund. Inner City Basic Services for the Poor Project (ICBSP). Available from: http://www.jsif.org/content/inner-city-basic-services-poor-project-icbsp [Access date: April 17, 2018]

[41] Jamaica Social Investment Fund. Implementation and Completion Results Report: Inner City Basic Services for the Poor Project JSIF; May 2014

[42] Government of Jamaica. The Law Reform (Zones of Special Operations) (Special Security and Community Development Measures) Act. Kingston: GOJ; 2017

[43] Dye C. Health and urban living. Science. 2008;**319**(5864):766-769

[44] Demaitre L. Air, miasma and contagion–Epidemics in antiquity and the middle ages. Bulletin of the History of Medicine. 2004;**78**(2):466-468

[45] Esrey SA, Potash JB, Roberts L, Shiff C. Effects of improved water supply and sanitation on ascariasis, diarrhoea, dracunculiasis, hookworm infection, schistosomiasis, and trachoma. Bulletin of the World Health Organization. 1991;**69**:609-621

[46] Pelletier DL, Frongillo EA Jr. Changes in child survival are strongly associated with changes in malnutrition in developing countries. Journal of Nutrition. 2003;**133**:107-119

[47] Nabel EG, Stevens S, Smith R. Combating chronic disease in developing countries. Lancet. 2009;**373**(9680):2004-2006

[48] Sclar E, Garau P, Carolini G. The 21st century health challenge of slums and cities. The Lancet. 2005;**365**:901-903

[49] Riley LW, Ko AI, Unger A, Reis MG. Slum health: Diseases of neglected populations. BMC International Health and Human Rights. 2007;**7**(2):1-6

[50] National Academy of Sciences. Cities Transformed: Demographic Change and its Implications for the Developing World. New York: National Academies Press; 2003

[51] Bartlett SN. The problem of children's injuries in low-income countries: A review. Health Policy and Planning. 2002;**17**:1-13

[52] Winton A. Urban violence: A guide to literature. Environment and Urbanization. 2004;**16**: 165-184

[53] Mullings JA, McCaw-Binns AM, Archer C, Wilks R. Gender differences in the effects of urban neighborhood on depressive symptoms in Jamaica. Revista Panamericana de Salud Pública. 2013;**34**(6):385-392

[54] Reinecke S. The Intersection of Urban Planning and Gender [Internet]. 2016. Available from: https://aboutdci.com/2016/05/intersection-urban-planning-gender/

[55] UN Habitat. Gender and Urban Planning: Issues and Trends. Nairobi: UN Habitat; 2012

[56] Government of Jamaica. Jamaica constabulary force periodic serious and violent crimes review January 01, 2017 to July 15, 2017. Jamaica Constabulary Force Statistics and Information Management Unit, Planning, Research and Development Branch; 2017. Available from: https://www.jcf.gov.jm/sites/default/files/JCF%20Periodic%20Serious%20Crimes%20Review%20Weekly%20Jan%2001%20to%20July%2015%2C%202017.pdf

[57] United Nations. UN Convention on the Elimination of all Forms of Discrimination against Women. Geneva: United Nations; 1980

[58] Government of Jamaica. National Policy for Gender Equality. Kingston, Jamaica: The Bureau of Women's Affairs (Gender Affairs); 2011

[59] Drnevich R. Partnerships for community development and housing. Journal of Housing & Community Development. 1995;**52**(2):9-14

[60] Sara J, Katz T. Making Rural Water Sustainable: Report on the Impact of Project Rules. United Nations Development Programme (UNDP) and World Bank Water and Sanitation Program. Washington, DC; 1997

[61] Adato M, Besley T, Haddad L, Hoddinott J. Participation and Poverty Reduction: Issues, Theory and New Evidence from South Africa. Background Paper for World Development Report 2000/2001. Washington, DC: International Food Policy Research Institute and World Bank; 1999

[62] Dongier P, Domelen J, Ostrom E, Rizvi A. Community-Driven Development; 2004. Available from: http://siteresources.worldbank.org/INTPRS1/Resources/383606-120533-4112622/5805_chap9.pdf

[63] Mouolutas T. The glass menagerie of urban governance and social cohesion: Concepts and stakes/concepts as stakes. International Journal of Urban and Regional Research. 2004;**28**(2):449-465

[64] Brenner N. Globalization and Reterritorialization: Re-scaling of urban governance in the European Union. Urban Studies Journal. 1999;**36**:3431-3451

[65] Government of Jamaica. Local Governance Act (2016); 2016. Available from: http://www.japarliament.gov.jm/attachments/article/341/The%20Local%20Governance%20Act,%202016%20No.%208.pdf

[66] Government of Jamaica. The Parish Councils Act 1901; 1901. Available from: http://moj.gov.jm/sites/default/files/laws/Parish%20Councils%20Act_1.pdf

[67] Commonwealth Local Government Forum. The Local Government System in Jamaica. Available from: http://www.clgf.org.uk/default/assets/File/Country_profiles/Jamaica.pdf [Access date: April 17, 2018]

[68] Dunn L, Wedderburn J, editors. Gender, Climate Change and Disaster Risk Management. Kingston, Jamaica: Institute for Gender and Development Studies Mona Unit UWI and Friedrich Ebert Stiftung; 2013

[69] Howard E. Garden Cities of Tomorrow. London, UK: Swan Sonnenschein & Co., Ltd.; 1902

[70] World Health Organization. Healthy Cities Approach. Available from: http://www.euro.who.int/en/health-topics/environment-and-health/urban-health/who-european-healthy-cities-network/what-is-a-healthy-city [Access date: April 17, 2018]

*Edited by Yasar Bahri Ergen*

Urban and regional planning is a spatial design practice that brings limitations to the intervention in natural areas to ensure a balance between population growth, housing, and employment in residential areas. It includes spatial design that enables living creatures to live while planning the interventions to ensure suitability to ecology, geology, climate, and land structure since intervention in nature should be balanced. In this context, the profession generally includes regional, spatial and urban planning, urban transformation that involves the urban decline areas in the city, urban renewal and protection, urban transportation, and urban management. Therefore, it is believed that this book will be useful for those who work in this area on a practical or academic basis and follow the innovations in the profession.

Published in London, UK


IntechOpen

ISBN 978-1-83881-826-5