ISSN 2067-4082
e-ISSN 2068-9969
L-ISSN 2067-4082

Journal of Urban and Regional Analysis

Volume XIII - Issue 2 - August, 2021

CONTENTS

www.jurareview.ro

University of Bucharest
Professional Association of Romanian Geographers

The manuscripts and any correspondence will be sent to the Editorial Office:

University of Bucharest - Interdisciplinary Centre for Advanced Research on Territorial Dynamics (CICADIT),
030018, 4-12, Regina Elisabeta Blv., Bucharest, Romania
Tel/fax: 0040 213 138 410, e-mail: office@cicadit.ro , http://www.jurareview.ro

Journal of Urban and Regional Analysis

Volume XIII - Issue 2 - August, 2021

Journal indexed in:

CLARIVATE ANALYTICS - EMERGING SOURCES CITATION INDEX SCOPUS
EBSCO
CENTRAL & EASTERN EUROPEAN ACADEMIC SOURCE DATABASE COVERAGE LIST
PROQUEST SCITECH JOURNALS ULRICHSWEB
DIRECTORY OF OPEN ACCESS JOURNALS (DOAJ)
INDEX COPERNICUS INTERNATIONAL
KNOWLEDGE BASE SOCIAL SCIENCES EASTERN EUROPE (GESIS)

University of Bucharest
Professional Association of Romanian Geographers (APGR)

The review is issued under the aegis and the support of the
University of Bucharest - Interdisciplinary Centre for Advanced Research on Territorial Dynamics (CICADIT)
Professional Association of Romanian Geographers (APGR)

Journal of Urban and Regional Analysis,
vol. XIII, 2, 2021

www.jurareview.ro

CONTENTS

* * * * * * * * * * * * * * * * * * * *

Journal of Urban and Regional Analysis,
vol. XIII, 2, 2021, p. 199 - 214
https://doi.org/10.37043/JURA.2021.13.2.1

HOW INNOVATIVE ARE THE CITIES? A MULTI-VARIABLE APPROACH TO MEASURING INNOVATION IN TURKEY

Ebru **KERIMOGLU**, *Delal* **EKINCI**
Istanbul Technical University, Istanbul, Turkey

Abstract: There are a couple of essential indicators of an innovative city. Besides technological and economic developments, there are qualities such as institutional capacity, strong collaborative dispositions, and an excellent physical and social infrastructure which make a city genuinely innovative and they create a push for the rest of the region and, in some cases, for the entire country. This study aims to measure the innovation level of the cities in Turkey with a multi-variable approach. In total, 27 variables were used for 81 cities of Turkey, with a 0-100 scale. The results showed that 68 cities are below the average value of innovation (1.23%). Overall, most of the cities in Turkey performed poorly in the analysis, and this reveals that using innovation as a means to achieve regional development is yet not fully acknowledged by the public authorities in Turkey.

Key Words: innovative city, regional development, policy development, Turkey.

Introduction

Innovation is the new panacea of urban development and economic growth and it found audience in disciplines such as planning and economic geography. Starting in the late 2000s, innovation has been seen as the main driver of policies and interventions for urban development (Vanolo 2013, Fang et al. 2014). It is regarded as the vital factor for economic growth and it is treated as a valuable characteristic that every city should attain (OECD 2009, Rutkowska-Gurak 2010). The questions, however, of what makes a city genuinely innovative, and of how does one city attract innovative people or businesses, remain mostly unanswered. An innovative city is a place where science and technology are the main drivers of the leading sectors. It relies heavily on human capital and on a culture that highly values innovation as a developmental tool (Hall 1998, Marceau 2008, Fang et al. 2014). While cities provide an ideal environment for innovation, as they offer proximity, density and variety and they are hosts for innovation by people, firms and organizations (Athey et al. 2008), innovative cities are places where knowledge-intensive industries and skilled labor are concentrated. To be able to attract these critical components of innovative economic growth, the cities must offer suitable housing and reliable physical infrastructure and, on top of that, an open and lively social environment. The innovative cities also have a highly productive and robust private sector with a high Gross Value Added (Crowley 2011). Besides attracting new businesses from around the world, cities should work as an incubator for innovative local businesses to flourish, which is only possible when authorities see innovation as a critical factor in urban economic growth (Rutkowska-Gurak 2010). On the other hand, innovation is not a quality that is measured if either one city has it or not. The level of innovation of cities may differ in terms of their economic structuring, environment, and social fabric. The geographical and cultural context also acts as a determinant factor. Some cities set innovation as a goal; however, they are reluctant to engage in the necessary activities, which would make the real difference. There are cities where public authorities

could be miles ahead than the economic sectors, while in others, companies are on the driver seat of innovation, and the authorities are pushed to comply.

The cities that already have a strong base for sustainable development, technological investment, and skilled labor in knowledge-intensive industries have more advantages than the cities that mostly rely on traditional mechanisms for urban economic development. Whereas mainstream economics sets development at the scale of the firm, the entrepreneur and the national economy, Jacobs (1969) put cities at the center of the processes of innovation, entrepreneurship and economic growth (Florida et al. 2017). However, even if there is a lack of technological infrastructure, having young and skilled labor sometimes boost the cities' competitive potential before the services could keep up. Dynamically efficient and productive cities are essential for national economic growth and strong urban economies are essential for generating the resources needed for public and private investment in infrastructure, education and health, improved living conditions and poverty alleviation (Johnson 2008). According to Jacobs (1969), Hall (1998), Johnson (2008) and Botero (2012), the conditions for production and growth are better in cities than in less urbanized areas because the factors of production (capital and labor) are relatively available, abundant, efficient and complementary and because cities offer relatively good infrastructure for productive activities (Johnson 2008).

Cities come in all shapes and sizes. In most cases, if not all, cities do not have a physical and even visible border. Labor, goods, and economic relations flow back and forth between cities, and innovative economic activities are no exception. The economic footprint of companies is usually not confined in one city's administrative borders. They focus on wider areas that contain two or more cities, mostly one large city and its surroundings. These structures create a lively economic environment (Marceau 2008). The large city is the place where economic development, knowledge generation, skilled people, important transport nodes and good-quality housing concentrate. The additional components such as special incubator zones or science parks and many of the other supply-side elements that are generally agreed by companies and public institutions to be essential for innovation are also located here (Marceau 2008). Last but not least, cities with the potential for innovation act as a trigger and thus they play a strategic role in constructing a more innovative country, producing new forms of economic and urban development (Fang et al. 2014).

As a developing country, Turkey seems to be eager to jump on the innovation bandwagon; however, there is a lack of policies that support this and substantial studies that will measure how and why a city becomes innovative and how this affects a city's development and economic development. In recent years, with the rise of the interest on innovation and innovative cites, several studies have been conducted that focus on how to rank cities according to their competitiveness and innovation level (Crowley 2011, Baer 2014, PWC et al. 2014, ICP 2018, Kelly 2018). According to the Global Competitiveness Report published by the World Economic Forum (Schwab 2019), the countries that ranked high are the countries that are innovation-intensive (Germany and Nordic Countries), while the ones which are located at the end of the list are the countries that rely more on foreign investment rather than on technology production or on knowledge generation (Isik and Kilinc 2012, Şahinli and Kilinç 2013). Turkey is also among the countries that ranked low on this list. The quality of the scientific research organizations, university and industry collaborations for R&D and the numbers of patents show that in Turkey the level of awareness is not enough for an innovation-driven national and regional development (Isik and Kilinc 2012). After the 1980s, Turkey shifted from a closed economic model to a more globalized one. This leap from traditional to modern, i.e., open, understanding of development required a series of new tools to keep up with the global agendas. A renewed look towards regional policies is one of them. Innovative regional policies gained speed with the start of the approval of the EU candidate status (1999), and Turkey took some radical steps during the negotiations in the early 2000s (Keskin and Sungur 2010). In 2002, the concept of regional innovation gained ground and it found its way to regional development plans and policies (Akpinar

2013). Following the developments in EU countries, Turkey made similar attempts, such as extending the scope of the information and communication technologies (ICT) and taking them out of the narrow zone of technology companies and applying them to urban policies and strategies (Uçar et al. 2017). In the last couple of years, the term 'innovation' started to be mentioned in the cities' vision statements.

However, the detailed studies on what makes a city innovative and how to measure the level of innovation are still missing, leaving innovation only as a highly quoted, fancy word in the urban literature and in the one-time-only planning documents. To avoid this common pitfall, the local authorities in Turkey must commit a deeper understanding of the concept of innovation. Also, a better definition of the parameters to measure innovation is a much-needed step. By prioritizing well-rounded research on innovation parameters and local data availability, the local authorities will be able to develop long lasting strategies for urban economic growth and policies for a better future for everyone.

Thus, to measure the innovation level of the 81 cities in Turkey, the study defined a range of variables in parallel to the studies in the innovative city literature. With the selected set of variables, the study aims to determine the innovation level of cities and to find out their potentials, as well as their shortcomings, in order to pave the way for a better strategy development in the future. The following section summarizes the approaches of similar studies in the literature; it outlines the selected group of variables and the methodology, and it presents the findings of the study. In the discussion part, the existing innovation policies and the findings of this study are detailed in terms of future policy developments.

Methodology

This study uses a large group of variables, selected in parallel to similar previous studies and basic indexing to determine the innovation level of cities in Turkey. However, due to the unavailability of city-scale (NUTS 3) data in Turkey, the study faced a limitation in terms of variables. The innovative city variables are listed from cultural assets, human capital, network structures (ICP 2018) to the number of patents per capita, the number of business towers, the transport infrastructure, economic diversity, energy, smart systems, and technology (Baer 2014), creative activities and commercialization, R&D expenditures, technology transfer awards, number of small business innovation research, and venture capital per capita (Şahinli and Kilinç 2013).

There are many studies on innovative cities that determine the innovative city typologies. There are also some indexing studies that rank cities according to their innovation level and they publish the results annually (ICP 2018, Kelly 2018). On the other hand, some studies prefer to analyze countries instead of cities on a much larger scale (Isik and Kilinc 2012, Şahinli and Kilinç 2013, Ersöz et al. 2016, Yilmaz and İncekaş 2018).

Even though this study aims to reveal the innovative potential of cities in Turkey, it is easier to find data on the national scale than it is on the city scale. Due to the wider availability of large-scale data, the focus of the studies conducted in Turkey has been mostly the country-level innovation. Additionally, the policy development processes have been concerned with the national innovation level and they disregard the potential of cities in particular, which indicates a literature gap in terms of city-level innovation research. There is, however, one study that evaluated the cities of Turkey according to their potential of being a 'knowledge city' and it used a similar set of variables (Kacar and Gezici 2016).

To summarize, the variables of city-scale studies can range from economic and human capital indicators to those that show the level of social and physical infrastructures such as cultural values, institutional structures, networks and collaborations. Considering the broad range of variables of similar studies and the lack of city-specific data in Turkey, this study

suggests the following set of variables for the evaluation of the innovation level of cities in Turkey.

In total, 27 variables are used to measure the innovation level of the 81 cities of Turkey, with a 0-100 scale. The variables are categorized as (i) economy and human capital (14 variables), (ii) physical and social infrastructures (10 variables), and (iii) institutional structure and collaborations (3 variables) (Table 1).

Table 1

List of variables in the three categories

Variables	Source/year*
1. Economy and Human Capital	
Economy	
Number of patents	Turkish Patent and Trademark Office/2018
Employment rate	TurkStat/2013
High-tech export (USD)	TurkStat/2019
GDP per capita	TurkStat/2017
Number of techno-parks	Ministry of Industry and Technology/2018
Number of R&D centers	Ministry of Industry and Technology/2018
Number of foreign companies	TOBB/2019
Number of companies established	TurkStat/2019
Number of companies liquidated	TurkStat/2019
Number of entrepreneurships	TurkStat/2016
1.2. Human Capital	
Number of people with master's degrees	TurkStat/2018
Number of people with doctoral degrees	TurkStat/2017
Number of international students	TurkStat/2017-2018
Share of young population	TurkStat/2018
2. Physical and Social Infrastructure	
Number of academics/students	Council of Higher Education/2017-2018
Number of green buildings	Turkish Green Building Council/2018
Number of theaters	TurkStat/2017
Number of museums	TurkStat/2017
Number of opera houses	MCT/2018
Number of art galleries	Municipalities/2018
Number of libraries	TurkStat/2017
Number of internet subscribers	BTK/2017
Number of festivals	Ministry of Culture and Tourism/2018
Number of foreign visitors	Ministry of Culture and Tourism/2019
3. Institutional Structure and Collaborations	
Number of NGOs	Ministry of Interior/2019
Number of KUSI projects	KUSIP/2019
Number of SANTEZ projects	Ministry of Industry and Technology/2009

**The used data are the most recently available.*

Abbreviations: TurkStat – Turkish Statistical Institute; TOBB – the Union of Chambers and Commodity Exchanges of Turkey; MCT – Ministry of Culture and Tourism, Directorate General of State Opera and Ballet; BTK – Information and Communication Technologies Authority; KUSİ – projects supported by the Ministry of Science, Industry and Trade with the aim of increasing synergy between stakeholders through public-university-industry cooperation; SANTEZ – projects supported by the Scientific and Technological Research Council of Turkey, covering products and production methods based on new technologies realized with industry-university-public cooperation; KUSIP – public-university-industry cooperation portal.

The first category, economy and human capital, consists of two sub-categories, economy and human capital. The variables in the economy category are as follows: the number of companies established or liquidated, the number of entrepreneurships, the employment rate, the high-tech export, the GPD per capita, the number of R&D centers, the number of technology parks, the total number of patents obtained, and also the number of foreign companies. The first three variables are selected to measure if the current economic system is trusted or not. The last variable, the number of foreign companies, is included in the list to evaluate how well the cities' economies are integrated into the global economic flows. The second sub-category, human capital, has three variables, which are: the number of international, postgraduate, and PhD students in the city. The second category, physical and social infrastructure, has ten variables such as the number of cinemas, libraries, opera houses, museums, theatres, art galleries and festivals and also the number of internet users, foreign visitors and the number of university students per academics. Obtaining city-level institutional data was a challenging task, which makes it even harder to digitalize and measure institutional development. The third category, the institutional structure and collaborations, therefore, includes only the number of SANTEZ projects, which is an indicator of public-private project partnerships and the KUSI projects that is an indicator of university-industry-government partnerships, and the number of active NGOs.

Also, due to the strong relationship between knowledge-intensive industries and the development of cities (Koç and Mente 2007, Crowley 2011, Ozbek and Atik 2013, Şahinli and Kilinç 2013, PWC et al. 2014), if available, the number of companies established or liquidated, the number of entrepreneurships and the number of NGOs serving in knowledge-intensive industries are considered. The knowledge-intensive industries are ICT, finance, insurance, education, health and social services, other service activities and activities of international organizations, and international registrations. The relevant NGOs are categorized according to the purpose of the foundation such as education and research, urban planning and urban development, culture, art and tourism, international organizations, and partnerships.

The study used the basic indexing method to convert the different units of all variables into a percentile to make data easily comparable. After conversion, the scores of individual variables are summed up, and the total values of cities for each group of variables are determined. No variable is assigned more weight than the other, so each variable is accepted to have an equal effect on the cities' total value. The basic indexing offers a simple calculation to determine the relative value of a variable (or a set of variables) that is subject to change in time or that might differ among cities. In other words, this method measures the change, not as an absolute value but as a relative value. In this index, there are two values; the first one is the base value, and the second one is the value that is compared to the base value. In this model, the base value is always the denominator (the value that is compared), and the second value is the denominator. The aim is to observe the change of the second value in relation to the base value. Finally, to be able to easily compare the results, the end value is multiplied by 100 (Fig. 1).

$$\frac{\text{Compared Value}}{\text{Base Value}} 100 = I_{i/o} = \frac{Xi}{Xo} 100$$

Fig. 1 – **Basic indexing formula**

Based on the values that each city gets, a map was created to see the overall situation of Turkey. The cities, whose values are similar or close to each other, were grouped under the same group in the legend of the map.

Results

The innovation level of cities is analyzed with data on NUTS 3 level. However, to be able to see the place of the city among other cities in the same region, the NUTS 2 level is also utilized, if considered significant. Due to data limitations at city level, if available, either the data on NUTS 1 and NUTS 2 or the descriptive data, in particular on knowledge intensive industries etc., are also used whenever logically applicable for some cities.

Economy and Human Capital

According to the city values in the economy sub-category, Istanbul ranks as the highest valued city in Turkey, which gets above-average values in every variable. Especially the city stands out with its values in the total number of patents (45.48%), the number of companies established (46.91%), and the number of foreign companies (61.71%) variables.

On the ten groupings, there are seven cities in the first six groups (Fig. 2). Ankara, occupying the second place, also has above average values in the same categories as Istanbul, the total number of patents (12.67%) and the number of companies established (9.70%). Even though Ankara does not stand out in terms of the number of foreign businesses and investors (3.64%), it scores high in the number of technology parks. Istanbul and Ankara have similar values in the number of companies in knowledge-intensive industries, and the number of established companies is higher than the number of liquidated companies in these industries. However, the number of companies established in knowledge-intensive industries is considerably lower in the total number of companies in these cities (Table 2).

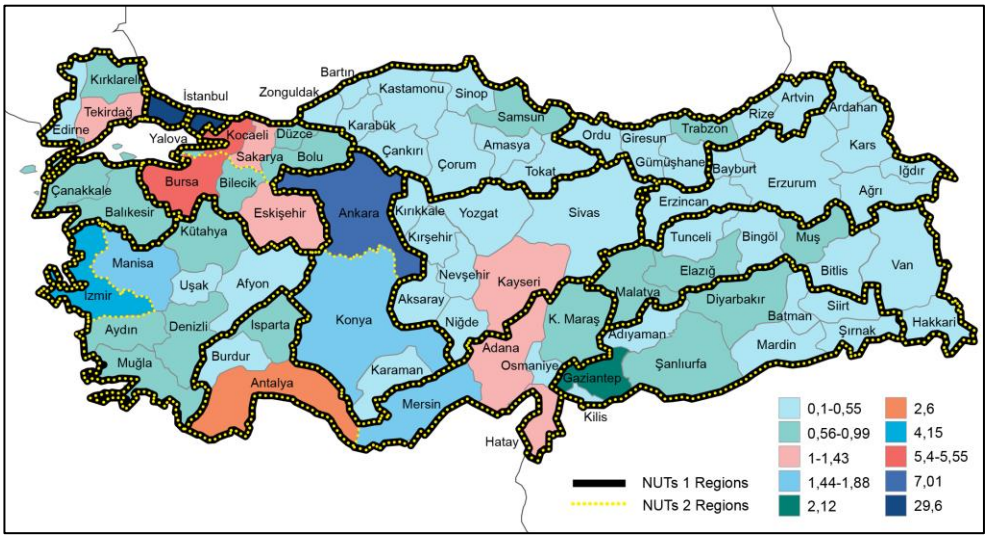


Fig. 2 – **Innovation level of cities in the economy sub-category**

According to the economy sub-category, Kocaeli and Bursa are the third and the fourth cities, respectively. In both cities, the values of the high-tech export are way above average, and also, the number of R&D centers is another variable that renders these cities economically strong. Izmir, as one of the prominent metropolitan cities of Turkey, on the other hand, could not score as high as these two cities due to its lower values in the total number of patents, the employment rate, the hi-tech export and the number of R&D centers.

Table 3 shows the R&D expenditures in GDP on the NUTS 1 regions of Turkey. The three leading cities are Istanbul, Kocaeli, and Ankara in the GDP per capita. The Marmara Region is ahead of other regions in the GDP per capita, as it is in the R&D expenditures. Ankara (in West Anatolia) and Izmir (in Aegean Region) are situated near the cities in the Marmara Region.

Table 2

The number of companies

Cities	Total number of companies established	Total number of companies established in KI*	Total number of companies liquidated	Total number of companies liquidated in KI
Ankara	1,713	84	545	20
Istanbul	8,919	529	3270	76

**Knowledge Intensive Industries*
Source: *the Union of Chambers and Commodity Exchanges of Turkey (TOBB 2019)*

In the economy category, Antalya, Gaziantep and Konya also stand out. The cities that are relatively developed and located in the west show a better performance. Tekirdag and Sakarya are on the eighth place, while Kirklareli, Balikesir, Canakkale, Bilecik, and Yalova are on the ninth, and Edirne is in the tenth group. The reason that Edirne is at the weak end of the ranking is that the city values very low on more than one variable. The low values in patent numbers (0.12%), in the number of companies established (0.01%), the number of entrepreneurships (0.60%), the number of foreign companies (0.08%) and the almost non-existent high-tech export and R&D centers, and the quite low personal investment levels are the reasons of Edirne's poor performance on this category. The cities around Ankara are not in a good condition, except Konya. Eskisehir and Kayseri are on the eighth group. In the Aegean region, Mugla, Aydin, Denizli, Isparta and Kutahya are on the ninth group. Northeast and eastern regions' values are very low, with the one exception of Gaziantep, which is on the sixth rank. With the number of patents (1.93%), the high-tech export (2.00%), the number of technology parks (2.47%), the number of companies established (3.30%), and the number of foreign companies and entrepreneurships (4.05%), the city values above the average. However, contrary to the Gaziantep's position, other cities in the same region (TRC1), Kilis and Adiyaman, are located at the end of the list. The northwest regions of Turkey (TR10-TR21-TR22- TR41-TR42) have higher innovation values on the economy category.

Table 3

R&D in GDP (NUTS 1)

Regions	R&D expenditures (1,000 TL)	R&D employment
TR1 Istanbul	7,701,448	70,251
TR2 West Marmara	728,299	8,473
TR3 Aegean	2,863,997	31,675
TR4 East Marmara	4,664,387	35,696
TR5 West Anatolia	9,751,434	57,517
TR6 Mediterranean	1,201,681	16,371
TR7 Central Anatolia	668,710	9,991
TR8 West Black Sea	557,668	9,146
TR9 East Black Sea	332,608	6,358
TRA Northeast Anatolia	394,774	5,936
TRB Central Anatolia	490,819	7,351
TRC Southeast Anatolia	499,651	7,713

Source: *Turkish Statistical Institute (TurkStat 2017)*

In the human capital sub-category, Istanbul has the leading position. Even though Ankara is on the second rank, the values of Istanbul are almost twice as much of Ankara's. Izmir is the third, and Eskisehir and Konya are the followers. It is interesting to see that the cities surrounding Istanbul have considerably lower values, and the same situation is observed for Izmir as well. Edirne, even though its economic values are quite low, as an exception, shows a better performance in human capital values (Fig. 3).

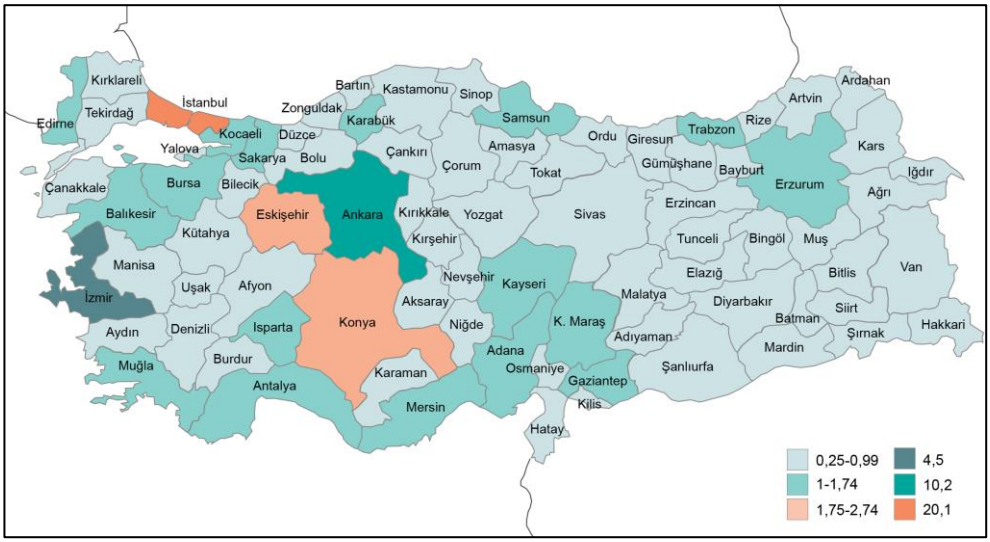


Fig. 3 – **Innovation level of cities in the human capital sub-category**

In the human capital sub-category, 76 of Turkey's cities are on the fifth and sixth groups. The Mediterranean coastal cities are mostly on the fifth group, including Sakarya, Samsun and Trabzon from the Black Sea. The cities in East and Southeast part, except Gaziantep and Erzurum, are on the last group. The reason for their differentiation is the relatively higher values of the number of international students that they have.

Physical and Social Infrastructure

In the physical and social structure category, Istanbul, again, is the highest-ranking city and Ankara takes the second place. However, the difference between the values of the cities is even higher than the previous category, Istanbul's value being 3.5 times higher than the one of Ankara. This time, instead of Izmir, Antalya takes the third place due to the high numbers of foreign visitors (29.26%), and Izmir becomes the fourth. Bursa, Mersin and Mugla have similar values and therefore similar rankings, however, again the cities that are in the surroundings of the highest-ranking cities perform quite poorly, with Bursa being an exception (Fig. 4).

In this category, 73 of Turkey's cities are accumulated at lower groups, between the seventh and the tenth. When compared to the economy sub-category, the physical and social infrastructure category varies quite a lot. In Marmara Region, the city of Bursa follows Istanbul instead of the cities in northeast Marmara. This time, the second-ranking Ankara is followed by the nearby city of Konya. However, Konya's values are dramatically lower than of Ankara. West Anatolia and Central Anatolia NUTS 1 regions are equally far from innovation as East and West Marmara NUTS 1 regions are. In East Black Sea, West Black Sea, Southeast Anatolia, Central East Anatolia, and Northeast Anatolia NUTS 1 regions, the innovation level in this category is quite low, reflecting the characteristics of the other parts of the country. There is, however, one city, Samsun, that stands out in the West Black Sea

Region with its relatively higher values. The reason for these higher values is that Samsun has an active opera house, which gives Samsun an advantage over its counterparts, as the number of opera houses in Turkey is quite low. The number of university students (1.30%), museums (1.51%), opera houses (9.09%), libraries (1.31%), festivals (2.31%) and internet subscribers (1.55%) are the other areas on which Samsun values higher than the cities in its region. There is also one more city, Yalova, which captures attention. Even though it is located very close to Istanbul, in the Marmara Region, the values of Yalova are way below the Turkey average in almost every category.

Fig. 4 – **Innovation level of cities in the physical and social infrastructure category**

Institutional Structure and Collaborations

In this category, unsurprisingly, Istanbul, again, took the first place and it is followed by Ankara, this time with a small difference in their values. Izmir takes the third place and Bursa the fourth. However, Adana, the fifth city in this category, is on the same level as the fourth ranking of Bursa (Fig. 5).

In this category, where there are 7 groups in total, most of the cities (64 cities) are on the sixth and seventh group. The three leading cities are Istanbul, Ankara and Izmir. Ankara is closer to Istanbul than it was in the other two categories. This is due to the numbers of KUSI (12.20%), and SAN-TEZ (28.65%) projects, which are high in Ankara. In the Northwest part, other cities with relatively higher values are Bursa, Kocaeli, and Sakarya. In Central Anatolia, Ankara is followed by Eskisehir and Konya. In the Aegean Region, there are no other cities that come to the fore, except İzmir. Even though most of the cities in TR81, TR82, TR83, and TR90 NUTS 2 regions are on the seventh group, in the Northern region, the cities of Trabzon and Samsun, and in the East Mus, Gaziantep and Sanliurfa, have relatively higher values. The NGOs in knowledge-intensive industries constitute only 12% of the total NGOs in Turkey. In Istanbul, Ankara, and Izmir, the number of NGOs in knowledge-intensive sectors is 10%, 7%, and 14%, respectively.

The Innovation Level of the Cities in Turkey

With the highest values in all three categories, Istanbul is the most innovative city in Turkey. Overall, it scores three times higher than the second-ranking of Ankara. Izmir is the third

city; however, in some categories, the third rank is occupied by other cities. On the final list, Antalya takes the fourth place, while Bursa takes the fifth place (Fig. 6).

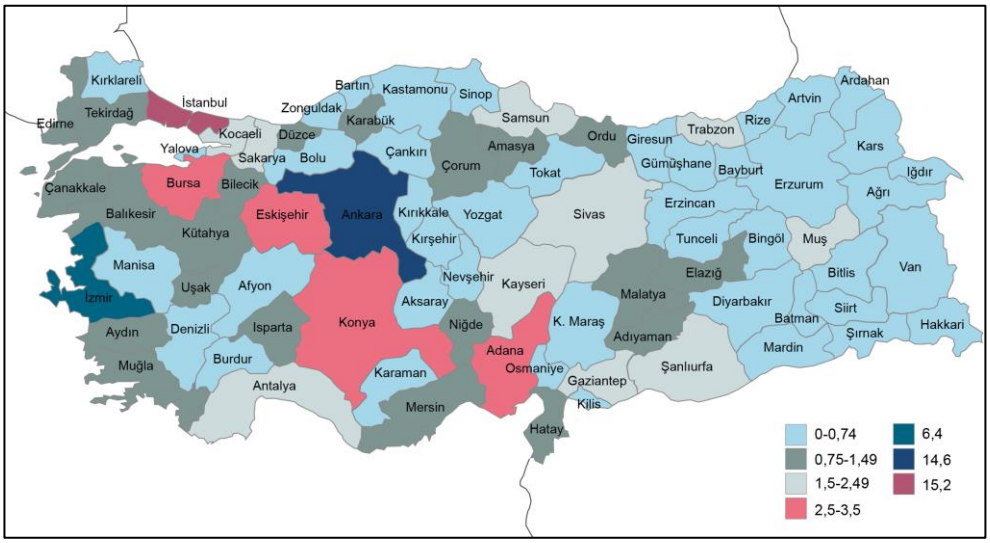


Fig. 5 – ***Innovation level of cities in the institutional structure and collaborations category***

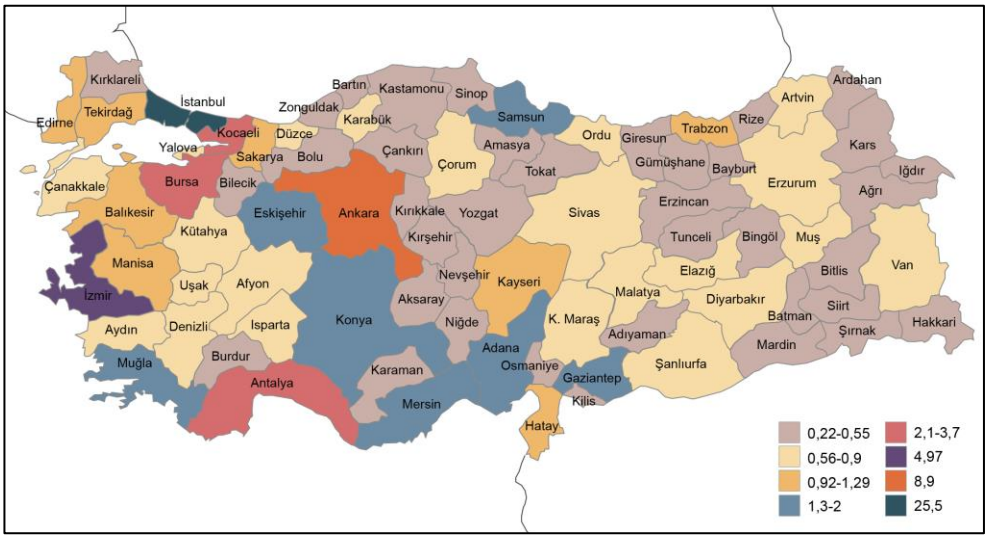


Fig. 6 – **Innovation level of cities in Turkey**

The Northwest part of Turkey is more innovative than the other regions. In this region, Bursa and Kocaeli follow Istanbul. In Central Anatolia, Ankara is followed by Konya and Eskisehir. Nevertheless, the values of Konya and Eskisehir are lower than those of Bursa and Kocaeli. These values suggest that the West and Central Anatolia NUTS 1 regions are not as innovation-driven as Istanbul and East Marmara regions. In the Aegean NUTS 1 region, where the third ranking city Izmir is located, there is one city, Mugla, that catches attention. In the overall ranking, Mugla shares the same position with Konya and Eskisehir. In the Mediterranean Region, where the fourth city Antalya is located, there is again one more city,

Adana. Furthermore, it is also on the same group as the rest of the mid-level cities such as Mugla, Konya, and Eskisehir. The cities in West Black Sea, East Black Sea, Southeast Anatolia, Central East Anatolia and Northeast Anatolia NUTS 1 regions have noticeably lower values in all categories, except Samsun in West Black Sea and Gaziantep in Southeast Anatolia. The general innovation consideration has 8 groups. However, in the first four groups, there are only 6 cities. The rest of the 75 cities in Turkey spread over the fifth and eighth groups, with 37 of the 75 cities accumulated on the eighth group.

While Istanbul, Bursa, and Kocaeli have above average values in their high-tech export, Izmir, Antalya, Mugla, Mersin, and Adana have higher values in physical and social infrastructures. Furthermore, Gaziantep has relatively higher values in the economy category (Table 4).

Table 4

The highest-ranking cities in Turkey

	Economy and Human capital		Physical and Social Infrastructure	Institutional structure and collaborations	Overall
	Economy	Human capital			
1	Istanbul 29.6%	Istanbul 20.1%	Istanbul 28.1%	Istanbul 15.2%	Istanbul 25.5%
2	Ankara 7.1%	Ankara 10.2%	Ankara 7.6%	Ankara 14.6%	Ankara 8.9%
3	Kocaeli 5.5%	Izmir 4.5%	Antalya 6%	Izmir 6.4%	Izmir 4.97%
4	Bursa 5.5%	Konya 2.3%	Izmir 5.3%	Bursa 3.2%	Antalya 3.7%
5	Izmir 4.2%	Antalya 2.1%	Mersin 2.5%	Adana 2.9%	Bursa 3.4%
6	Antalya 2.6%	Samsun 1.6%	Bursa 2.5%	Konya 2.6%	Kocaeli 3%
7	Gaziantep 2.1%	Kocaeli 1.6%	Mugla 2.3%	Eskisehir 2.6%	Konya 2%
8	Konya 1.4%	Bursa 1.6%	Samsun 1.9%	Gaziantep 2.4%	Mersin 1.9%

Antalya, even though it has the fourth place in overall, is not on the first eight cities in the institutional structure and collaborations category. Similarly, the sixth number – Kocaeli – is not located among the first eight cities in the social and physical infrastructure, and the institutional structure and collaborations categories. Also, Mersin is another city that is only in the physical and social infrastructure category on the number eight, and, however, it still values higher than the rest of the cities in Turkey, while it found its place to the most innovative eight cities in Turkey.

Even though their positions change in different categories, the cities with the eight lowest values are the same (Table 5). There are 68 cities below the average of innovation level (1.23%) in Turkey. 69 cities in the economy category, 64 cities in human capital, 67 cities in physical and social infrastructure, and 60 cities in the institutional structure and collaboration category are below the national average.

Table 5

The lowest-ranking cities in Turkey

	Economy and Human capital		Physical and Social Infrastructure	Institutional structure and collaborations	Overall
	Economy	Human capital			
1	Siirt 0.22%	Tunceli 0.4%	Siirt 0.2%	Tunceli 0.04%	Bayburt 0.25%
2	Hakkari 0.23%	Bilecik 0.4%	Yalova 0.23%	Bayburt 0.05%	Siirt 0.25%
3	Mus 0.24%	Artvin 0.42%	Bayburt 0.24%	Ardahan 0.05%	Gumushane 0.27%
4	Bitlis 0.24%	Ardahan 0.43%	Bingol 0.25%	Hakkari 0.07%	Bingol 0.27%
5	Gumushane 0.25%	Iğdir 0.43%	Bartın 0.25%	Iğdir 0.08%	Bartın 0.28%
6	Bayburt 0.26%	Mus 0.43%	Kirikkale 0.25%	Siirt 0.09%	Tunceli 0.29%
7	Agri 0.27%	Amasya 0.43%	Gumushane 0.26%	Kilis 0.09%	Kilis 0.3%
8	Sirnak 0.27%	Bartın 0.44%	Kilis 0.29%	Sirnak 0.12%	Ardahan 0.3%

Discussion

The concept of 'innovation' first appeared in the 8th Five Years Development Plan of Turkey (2001-2005); however, there were no policies that support and develop what the concept suggests (State Development Agency 2000). The 9th development plan (2007-2013) stresses the importance of new theoretical regional development tools and innovative approaches (State Development Agency 2006). In the 9th plan, R&D, university-industry partnerships, and entrepreneurship capital are seen as the drivers for innovation-based regional development (Keskin and Sungur 2010). The plan emphasizes that the most effective way to kick-start the innovation as a developmental tool is to support the key sectors that are inherently innovative, competitive, technology-driven, dynamic, and have a high added-value. Similarly, the 10th development plan of Turkey (2014-2018) focused on the innovation approach and innovative cities (Ministry of Development 2013). It drew attention to innovative production and production capacity, entrepreneurship, sectorial development, knowledge-based competition, the use of technology, R&D, skilled labor force, and education.

In policy documents, innovation was almost always concerned with sectorial development, and an innovative city or region is seen mostly through its innovative economic structure. Therefore, it can be said that, in Turkey, innovation is only seen through the lenses of economic variables. Therefore, the economy and human capital category under this research is the most covered area for the innovation policies of Turkey. However, counterintuitively, the case for an innovative development cannot be built on an economic-only approach and without the supporting role of social, physical, and institutional structures. Development and maintenance of an appropriate urban order requires both private and collective action, and administrative and institutional innovativeness, as well as technological development (Johnson 2008).

In the 10th development plan of Turkey, under the 'Livable Places, Sustainable Environment' section, there are some evaluations and propositions (Ministry of Development 2013). With this particular section, the physical and social environment found its way to the definition of innovation. The 11th development plan (2019-2023) resolved to set up a Specialization Commission; however, the terms of reference are not published yet (Directorate of Presidential Strategy and Budget 2019). But, in general, there are some strategies on productivity and innovation for developing economy in particular industries. In the last couple of years, Turkey adopted the new regionalism approach (Keskin and Sungur 2010), and it supported studies and applications in R&D, technological developments, innovation, and partnerships. The new regional policies are designed to foster the development of internal dynamics and capacities of regions. By doing so, it tries to secure a developmental model that builds upon the competitive capacity, basic infrastructure and technology, and knowledge infrastructures, the quality of physical spaces, human resources, entrepreneurship culture, sectoral clusters, internationalization, innovation, governance, institutional capacity, specialization and the social capital a region has. However, the questions of if and when the results of these positive approaches in the policy documents will manifest themselves in implementations remain unanswered (Keskin and Sungur 2010).

This study found that the country average of Turkey in innovation is 1.23%, and 68 cities are below the national average. There seems to be a positive relation between the innovation level and the socio-economic development level (SEGE 2011). When the results of this study are compared with the 2016 study of Kacar and Gezici (2016), which also used similar variables to measure the cities' knowledge capacity, it is seen that the first five cities in the economy category are precisely the same. Similarly, in another variable – the institutional structure, the first four cities are the same; however, after that, different other cities, such as Adana, Konya, Eskisehir, and Gaziantep, join the competition. When we compare the results, over the past 5-6 years, the differentiation of Antalya, Konya and Mersin is remarkable.

Although cities are simultaneously a place where skilled workers assemble and interact, there existing an organizational technology for that interaction (Florida et al. 2017), human capital is a weaker category for most cities in Turkey. Cities that usually occupy the higher ranks, such as İstanbul, Ankara, İzmir, Antalya, Mersin, Adana, Konya, Mugla, Samsun, Eskisehir, valued higher in terms of social and physical infrastructures. Bursa, Kocaeli, Gaziantep have higher values in the economy category. Most of the cities in Central East Anatolia and North East Anatolia NUTS 1 regions obtained higher values in the physical and social infrastructures. On the other hand, the cities in the Southeast NUTS 1 region stand out in the social and physical infrastructure and economy categories.

Since 2000, the number of studies on technology and innovation in Turkey is on the rise, and the technology and R&D penetrated the five-year development plans. Also, the efforts to create science and technology policies picked up speed. Between 2014 and 2023, the regions where Istanbul, Ankara, and Izmir are located seem to travel the extra mile to integrate innovation into their regional plans (Ankara Development Agency 2013). In the TR61 NUTS 2 region's plan, where the fourth city of Antalya is located, the term innovation does not stand out, however, in the regional plans of the region TR41 of the fifth city of Bursa, the term innovation and related policies were heavily emphasized (BEBKA 2014). Antalya is a tourism city, whereas Bursa is an industrial city. In Turkey, innovation is regarded as connected with industry more than with any other sector. Thus, the plans unsurprisingly reflect the sectorial differences between cities and whether or not they include innovation in their policies. Similarly, in the TR42 NUTS 2 region, another industrial city – Kocaeli – scores high, where the plans include innovation-driven policies (MARKA 2014). Likewise, in the TRC1 NUTS 2 region, the plan has aims, objectives, and policies on innovation, and Gaziantep, one of the cities in this region, got higher values in the overall innovation level in this study (Silkroad Development Agency 2014). Also, Mugla, another city located in the TR32 NUTS 2 region, has an above average value and it has innovation-related policies in its regional development plan (GEKA 2014). It is likely that if the city or the region plans to develop with a special focus on innovation and with rational strategies, it will also have higher values on innovation in the future.

Conclusions

According to Bayrac (2003), the 'new economy' is heavily connected to innovation. The technological capacity and innovation capacity often go hand in hand. As the former develops, the latter follows (Hoeckman et al. 2005). There are a couple of keywords like innovation, entrepreneurship, and university that define the common characteristics of innovative cities. Koçer and Karakayaci (2018) argue that institutional, political, and economic relationships are the main contributing factor in the process of developing an innovative environment. Most of the thriving, innovative cities have remarkably sophisticated infrastructures in terms of economy (high-tech export, the number of patents, the number of entrepreneurs), and the social and physical environment (the number of libraries, art galleries, festivals, opera houses, green buildings, foreign visitors).

Their pioneering development policies also play an important role in their success. It would not be wrong to say that innovative cities are also well-developed cities. This is also true for regions and even for countries. For innovative cities, human capital, institutional structure and partnerships, and the physical and social environment are highly valued attributes among technological and economic developments. However, the solution does not include tracing the steps of these cities/regions. On the contrary, the shortest path to innovation requires enhancing the local conditions and generating unique ways that lead to urban growth and development. A rational approach is a much-needed quality in the decision-making process.

In Turkey, the cities with higher innovation levels are located in the Marmara Region, while the coastal cities in the Aegean and Mediterranean regions are accompanying them. The

lowest-scoring cities are the cities in the Eastern part of the country. The massive difference between Istanbul and the rest of the cities' values is not an unexpected outcome. The rankings are almost carbon copies of each other in similar development scales. In Turkey, the level of innovation is way below the world average. Istanbul is on the fifth third ranking between 500 cities in a global index created by ICP (2018). But, Istanbul, even though it is the locomotive power of Turkey, does not score very high in the global indexes. And the capital city of Ankara scores way lower than Istanbul does.

The reason that this picture did not change in the long run is that there are some shortcomings in the policies and their implications. More work is needed to change the existing structure as, in almost every scale that measures development, İstanbul, Ankara and İzmir are the only cities that stand out. Innovation indicators could be seen as an opportunity to promote alternative cities. This study, therefore, has a vital role in determining the strengths and weaknesses of all cities in Turkey. This study could act as a springboard for other studies that would like to delve deep into innovation research.

The surrounding cities of Istanbul and Ankara demonstrate higher potentials than the rest of the NUTS 2 regions. Furthermore, other cities stand out on the Ankara-Konya-Antalya axis towards the Southern part of the country. In the economy category, after Istanbul and Ankara, Bursa and Kocaeli stand out, leaving Izmir behind. In the human capital category, Konya and Eskisehir follow Istanbul, Ankara, and Izmir. In the physical and social infrastructure category, Antalya comes as the third city, after Istanbul and Ankara. Finally, in the institutional structure and collaborations category, Ankara gets a higher point, closer to Istanbul for the first time, while Izmir, Kocaeli, Bursa, Eskisehir, Konya, Kayseri, Adana, and Gaziantep follow respectively. In the light of these findings, cities that have higher values above the country average, such as Ankara, Izmir, Antalya, Bursa, Kocaeli, Konya, Mersin, Eskisehir, Adana, Gaziantep, Samsun, Mugla, could be supported in order to promote a multi-centered growth model for Turkey.

Knowledge-intensive and industry-based cities always rank higher in similar indexes. Due to the prioritization of national and regional development over urban development, as policy documents and academic studies indicate, the existing strategies are not sufficient for cities to reach higher levels of innovation. The cities in NUTS 2 regions demonstrate quite different characteristics from each other. Therefore, the policies should be tailored according to the needs of each particular city rather than applying the same solution to the whole region. The current approach in this sense results in misleading policy developments that do not meet the needs of a specific region or do not support its strengths and potentials.

The driving force of innovation is represented by the increasing collaborations between the private sector, the public institutions, universities and NGOs. The main objective of innovation policies should be creating an eco-system that would enable the promotion, application, and dissemination and it would also facilitate the commercialization of new ideas. The government funds are an essential factor in this process (Ersoy and Sengul 2008). A better analysis of the production infrastructure is needed in order to develop more precise solutions. Under the current circumstances, it is evident that policies do not overlap with the dynamics of each specific city. In the last few years, competitiveness is recognized as an essential factor of innovation; however, the competitiveness of individual cities is still overlooked and understudied.

Patent and R&D expenditures, technology transfer and business development are important aspects of innovation. The potentials of larger cities in terms of institutional structure and human capital are much higher than their smaller counterparts. At this point, the allocation of public resources should be thoroughly discussed. The resources of each city, small or large, should be well analyzed and prioritized, and the innovation-driven sectors should be supported. Also, the human (labor politics, entrepreneurship) and social capital (capacity building, organizational skills) should be strengthened. Successful innovation in cities, as

elsewhere, requires specific packages of policies (Johnson 2008). However, before designing the policies and taking actions, a sustainable and detailed dataset should be produced. Due to the data limitations and the incomparability of the available data, many studies, including this one, cannot fully comprehend the issues of individual cities and they therefore fail to develop effective strategies.

References

AKPINAR R. (2013), *Changing Regional Development Policies in Turkey*, Karadeniz Sosyal Bilimler Dergisi 4 (6), 29-46.

ANKARA DEVELOPMENT AGENCY (2013), *Ankara Regional Plan 2014-2023*, Retrieved from: www.ankaraka.org.tr.

ATHEY G., NATHAN M., WEBBER C., MAHROUM S. (2008), *Innovation and the City,* Innovation: Management Policy & Practice 10 (2-3), 156-169.

BAER D. (2014), *The 18 Most Innovative Cities on Earth*, Business Insider, Retrieved from: www.businessinsider.com.

BAYRAC H. N. (2003), *Social, Economic and Technological Dimensions of New Economy*, Osmangazi Üniversitesi Sosyal Bilimler Dergisi 4 (1), 41-62.

BEBKA (2014), *Bursa Eskişehir Bilecik Regional Plan 2014-2023*, Retrieved from: www.bebka.org.tr.

BOTERO G. (2012), *On the Causes of the Greatness and Magnificence of Cities*, University of Toronto Press, Toronto.

CROWLEY L. (2011), *Streets Ahead: What Makes a City Innovative?,* The Work Foundation, Lancaster University, Retrieved from: www.reglab.dk.

DIRECTORATE OF PRESIDENTIAL STRATEGY AND BUDGET (2019), *11th Development Plan of Turkey (2019-2023)*, Retrieved from: www.sbb.gov.tr.

ERSOY B., SENGUL C. (2008), Government Applications towards Innovation and Comparison with European Union, Yonetim ve Ekonomi 15 (1), 59-74.

ERSÖZ F., BAYRAKTAR T., ERSÖZ T. (2016), *An Analysis of Innovation on World and Turkey,* Yeni Türkiye Dergisi - Bilim ve Teknoloji 2, 1-5.

FANG C., MA H., WANG Z., LI G. (2014), The Sustainable Development of Innovative Cities in China: Comprehensive Assessment and Future Configuration, Journal of Geographical Sciences 24, 1095-1114.

FLORIDA R., ADLER P., MELLANDER C. (2017), *The City as Innovation Machine*, Regional Studies 51 (1), 86-96.

GEKA (2014), *2014-2023 Mugla Regional Plan*, Retrieved from: www.geka.gov.tr.

HALL P. G. (1998), *Cities in Civilization*, Weidenfeld and Nicolson, London.

HOECKMAN B. M., MASKUS K. E., SAGGI K. (2005), Transfer of Technology to Developing countries: Unilateral and Multilateral Policy Options, World Development 33 (10), 1587-1602.

INNOVATION CITIES PROGRAM (ICP) (2018), *Innovative cities index 2018*, Retrieved from: www.innovation-cities.com.

ISIK N., KILINC E. (2012), *Innovation-Driven Development: An Examination on the European Union Countries and Turkey*, Journal of Entrepreneurship and Innovation Management 1 (1), 31-68.

JACOBS J. (1969), *The economy of cities*, Vintage, New York.

JOHNSON B. (2008), *Cities, systems of innovation and economic development,* Innovation: Management Policy & Practice 10 (2-3), 146-155.

KACAR S. M., GEZICI F. (2016), *Knowledge-based urban development potential of Turkish provinces*, International Journal of Knowledge-Based Development 7 (2), 160-183.

KELLY J. (2018), *These are the world's most innovative cities, and here's why*, World Economic Forum, Retrieved from: www.weforum.org.

KESKIN H., SUNGUR O. (2010), Transformation in Regional Policy: Changes in Regional Policies in the Development Plans in Turkey, SDÜ Fen Edebiyat Fakültesi Sosyal Bilimler Dergisi 21, 271-293.

KOÇ K., MENTE A. (2007), *Inovasyon Kavrami ve Universite-Sanayi-Devlet Isbirliginde Uclı Sarmal Modeli* (The Concept of Innovation and the Three Spiral Model in the University-Industry-State Cooperation), Hacettepe Üniversitesi Sosyolojik Araştırmalar Dergisi, 1-18.

KOÇER K., KARAKAYACI Ö. (2018), Space as Determining of Innovation Process in Small-scale Cities: The Case of Iznik City, Artium 2, 24-37.

MARCEAU J. (2008), *Introduction: Innovation in the city and innovative cities,* Innovation: Management, Policy & Practice 10 (2-3), 136-145.

MARKA (2014), *Doğu Marmara 2014-2023 Regional Plan*, Retrieved from: www.marka.org.tr.

MINISTRY OF DEVELOPMENT (2013), *10th Development Plan of Turkey (2014-2018)*, Retrieved from: www.sbb.gov.tr.

OECD (2009), 2009 Interim Report on the OECD Innovation Strategy: an agenda for policy action on innovation, Retrieved from: www.oecd.org.

OZBEK H., ATIK H. (2013), The Place of Turkey within the European Union Countries in Terms of Innovation Indicators: A Statistical Analysis, Erciyes Universitesi Iktisadi ve Idari Bilimler Fakultesi Dergisi 42,193-210.

PRICEWATERHOUSECOOPERS (PWC), EUROPEAN INSTITUTE FOR COMPARATIVE URBAN RESEARCH (EURICUR), INSTITUTE FOR HOUSING AND URBAN DEVELOPMENT STUDIES (IHS) (2014), *iUrban: Innovative City Strategies for Delivering Sustainable Competitiveness*, Retrieved from: www.pwc.com.

RUTKOWSKA-GURAK A. (2010), *The innovative city: the Impact of Innovation on City Development*, Badania Fizjograficzne R. I – Seria D – Gospodarka Przestrzenna, 77-87.

ŞAHİNLİ M. A., KILINÇ E. (2013), *Innovation and Innovation Indicators: Compare of EU Countries and Turkey*, The Journal of Social and Economic Research 25, 329-355.

SCHWAB K. (2019), *The Global Competitiveness Report 2019*, World Economic Forum, Geneva.

SEGE (2011), The Research of Socio-economic Development Rankings of Cities and Regions in Turkey-2011, Ministry of Development Publishing, Ankara.

SILKROAD DEVELOPMENT AGENCY (2014), *Gaziantep Adiyaman Kilis 2014-2023 Regional Plan*, Retrieved from: www.ika.org.tr.

STATE DEVELOPMENT AGENCY (2000), *8th Development Plan of Turkey (2001-2005)*, Retrieved from: www.sbb.gov.tr.

STATE DEVELOPMENT AGENCY (2006), *9th Development Plan of Turkey (2007-2013)*, Retrieved from: www.sbb.gov.tr.

UÇAR A., ŞEMŞIT S., NEGIZ N. (2017), *Smart City Implementations in the EU and Reflections in Turkey*, The Journal of Faculty of Economics and Administrative Sciences 22, 1785-1798.

VANOLO A. (2013), Smartmentality: The Smart City as Disciplinary Strategy, Urban Studies 51 (5), 883-898.

YILMAZ Z., İNCEKAŞ E. (2018), *Innovation and Regional Development in Turkey*, Kırklareli Üniversitesi Sosyal Bilimler Dergisi 2 (1), 154-169.

Initial submission: 01.04.2020
Revised submission: 27.11.2020
Final acceptance: 23.12.2020

Correspondence: Department of Urban and Regional Planning, Faculty of Architecture, Istanbul Technical University, Taskisla, 34437 Taksim, Istanbul, Turkey.

Email: kerimoglu@itu.edu.tr

Journal of Urban and Regional Analysis,
vol. XIII, 2, 2021, p. 215 - 232
https://doi.org/10.37043/JURA.2021.13.2.2

THE SECOND-BEST OPTION METHOD IN REGIONAL ANALYSIS: THREE APPLICATIONS

Antoni Francesc **TULLA**, *Ana* **VERA**, *Gloria Elizabeth* **VELOZ**
Universitat Autònoma de Barcelona, Bellaterra, Spain

Abstract: Inequalities between regions frequently mean that some are highly competitive while others are neglected because they do not produce socially demanded goods. Nevertheless, in the framework of sustainable local development, each territory could engage in some economic activities even if other areas are better prepared for them, when these represent the best specialization in which the territory in question can engage in. The existence of a Second-Best Option (SBO) in a territory means successfully promoting one or more economic activities that allow a comparative advantage, which means generating significant added value with the transformation of products that incorporate knowledge, technology, and innovation. The main contributions of the theory of comparative value and of the SBO method are discussed. Qualitative and quantitative methods are used instead of just the latter, as it happens in economics. In the three cases studied, activities similar to SBO have been found, favoured by the following conditions: added value, innovation, infrastructure, and better access to markets.

Key Words: *added value, comparative advantage, second-best option (SBO), sustainable local development (SLD), Kichwa people of Rukullakta, Andorra, Catalan High Pyrenees.*

Introduction

Regional inequalities caused by globalization of markets have led to the abandonment of large rural areas and concentration in regions that are more competitive in producing goods and services. This situation could be changed if it is understood that each region could offer some activity for which it is suited, when it is accepted that there are social, cultural, environmental, and even economic costs such as depopulation and neglect of the territory (Mocanu et al. 2018). In some peripheral regions like Eastern Macedonia and Thrace (Greece), a well-implemented Common Agricultural Policy (CAP) has improved the comparative advantage (Markopoulos 2019), which has allowed the introduction of innovative activities with greater added value. Moreover, the introduction of "green shoots" favours a better environmental protection and the promotion of local economic, social, and environmental development. We aim to demonstrate that regions have a second-best option (SBO) which, with the theory of comparative advantage, could lead to viable activities in every case (Tulla et al. 2009). Each area could engage in these, even if others are better equipped for them, when they represent the best specialization open to that particular territory (Tulla 2019).

The incorporation of operations that transform raw materials represents a new product of greater value. This would be the case with wood obtained from a forest, which could be converted for several uses: raw material as such, construction material, furniture making, etc. However, if a furniture factory or artisanal workshops are established in the same region, more local employment and added value are produced. The same thing happens with services like tourism. If the landscape of a region is valued, hotels, guide services, sustainable means of transport, and so on, are established, thus generating added value that will support the

sustainable local development (SLD), as a greater part of the income from the end product remains in the same territory (Vera et al. 2011).

The principle of comparative advantage, using the SBO method, is based on three assumptions: (1) space is a scarce resource that requires decisions to be made about the best location of activities; (2) each territory has a relative superiority over other territories in engaging in certain activities; and (3) there is always a second location which, although it may not be the best, can also accommodate the activities. Moreover, in many agricultural areas, there is a dual land market that rules out the free market competition and it makes land-use planning advisable (Nel·Lo 2010). Price is frequently generated from the side of demand, and, in rural areas, the supply of land involves setting the prices in keeping with the capacity of the buyer, who might have income from an urban activity. Building a hotel or second home, for example, brings higher prices than agricultural uses. This confirms the need for public regulation like that in the defence of the property of indigenous communities in Ecuador, as set in their 2016 Organic Law on Rural Lands and Ancestral territories.

A brief account of the state-of-the art is given, along with a description of the SBO methodology, and its application in the Catalan High Pyrenees (CHP) in Spain, with the Kichwa People of Rukullakta, Ecuador (KPR), and in the Principality of Andorra (PA). Activities that might be regarded as SBO and the techniques used in their application are considered.

State-of-the Art

The classical school's principle of comparative advantage affirms that each territory will specialize in the goods and services that it is best equipped to produce, rather than all those territory needs (Tulla et al. 2009). A brief account of the contributions of some authors supports our approach. Ricardo (1817) says that the costs of producing goods are defined by the natural conditions and the historical development, which generates differential income derived from the varying qualities of soil and the available natural resources. Von Thünen (Hall 1966) incorporates the localization and transport costs to this analysis by including the different incomes deriving from localization. The most intensive agricultural activities are located near the market or towns in order to reduce transport costs. A major advance is the model formulated by Heckscher (Findlay et al. 2016) and Ohlin (1933), which stresses the levels of technology and knowledge of the factors of production in each region and it considers the added value that this brings for the first time. Hence, a territory will tend to export goods and services that require intensive factors with which it is well endowed, while seeking to import those needing intensive factors which it does not have. This entails capital investment in training and acquiring machinery. Furthermore, the artisanal knowledge of the European rural population (Fuller 1990) or that regarding crops and medicinal plants of indigenous communities in Latin America could also be seen as having value (Gray et al. 2008).

Olsen (1971) suggested that a relative advantage exists for each region, which can be measured by the opportunity cost of not specializing in the production of goods and services for which it is best equipped or more skilled, although other regions could do better because, as he points out, if you do not want to close a territory, everyone should be engaged in some activity. Moreover, if these products or services do not exist in a region, then they must be imported. Opportunities for peripheral regions appear when negative effects are caused in developed areas by increasing agglomerations and consequent diseconomies, thus giving rise to development inequalities, as Myrdal (1957) described with his centre-periphery theory. Peripheral regions then have the chance to localize economic activities of comparative advantage in relation with the big production and distribution centres, with a network of innovative small- and medium-sized businesses, supported by spatial loyalty among the economic and social agents of each territory (Pallares-Barbera et al. 2004).

The dilemma posed by the balanced and unequal development suggests the possibility that some peripheral regions could have 'a comparative advantage' in certain goods and services.

For example, in the CHP, it has been shown that the transformation of certain dairy products, extensive ecological livestock farming, environmentally-friendly tourist activities, like crafts, hiking, and cross-country skiing, as well as cultural attractions based on the historical, social, and heritage wealth of the Pyrenees, can produce a comparative advantage as SBO (Tulla 2019). And also, Social Farming could create an SBO with comparative advantage (Tulla et al. 2014). In Latin America, the same is true for the cacao production on indigenous lands (De Marco Larrauri et al. 2016), while Andorra's fiscal conditions favour the commercial and finance sectors as economic drivers (Bricall et al. 1975, Bricall et al. 2001), together with the tourist sector, which is based on skiing in winter and activities in natural spaces and heritage areas in the summer, as SBO activities (Pou Serradell 2005).

The SBO method could be applied to different situations where it is necessary to combine the trends of globalisation with respect for and maintenance of traditional activities. This would be the case of transhumance in Romania (O'Brien and Creţan 2019), which has a cultural identity and historical tradition that could be protected, thus preserving the livestock activity in rural areas that are at risk of depopulation. SBO is not explained by economic factors alone. Also, important are the cultural, social and, in general, the humanist elements that strengthen the identity-defining characteristics of a territory (Tulla 2019). Furthermore, we find the resistance, with local development projects, of industrial areas in disadvantaged regions (Ianoş 2000), as happened with the Roşia Montană mining project which has involved a process of relocation and new settlements to favour foreign investment (Vesalon and Creţan 2012), although without obtaining the expected results. Small businesses and cooperatives should be encouraged and family initiatives that stimulate new, value-added tourist and craft activities should be supported. Thus, the social risks of foreign investment in Romania's disadvantaged areas have exacerbated regional inequalities rather than reducing them (Creţan et al. 2005).

Opportunities for interacting with other areas can also favour local development as would be the case of corridors penetrating regions with different levels of development. One possibility in this regard could be the anisotropic spaces that have been studied in West Romania (Creţan et al. 2016) or the airports in the medium-sized and small cities, which can open up new possibilities for the mobility of people and goods (Creţan et al. 2009) and, thus, they favour local development. Another factor that should be considered is that the strategic decisions of political powerholders, promoting investment in megaprojects, like hydroelectric power plants (Creţan and Vesalon 2017), can have a multiplier effect favouring regional development. Nevertheless, these decisions can be constrained by the levels of corruption of local, regional, or state elites with a negative result for the local population (Creţan and O'Brien 2020).

Methodology

Study areas

The SBO method has been applied in three territories, the Catalan High Pyrenees (CHP), the Principality of Andorra (PA), and the territory of the Kichwa People of Rukullakta (KPR). The CHP (Fig. 1), in the northeast of Catalonia (Spain) covers an area of 5,776 km^2 and 71,637 inhabitants (2017), distributed among six districts (Idescat 2018) to which the SBO method is applied. The PA is a sovereign state covering an area of 468 km^2 and 74,794 inhabitants (2017), distributed among seven municipalities (*parroquies*), as units of analysis. The KPR, in the Amazonian region of Ecuador, between the cantons of Archidona and Tena in the Napo Province, with 17 communities, covers an area of 424.4 km^2 and 6,735 inhabitants (2018). In the first two cases, the analysis covers all sectors, while in the KPR it focuses on agricultural, livestock and forestry A&LU, an approach which requires previous consideration on the physical limitations of the territory and its accessibility to markets.

The concept of SBO was formulated by Lipsey and Lancaster (1956), who presented it as satisfying in the conditions of Pareto optimality (Bohm 1987), when only one of the three necessary conditions is missing. Later, Boadway (1994) adapted the SBO theory to the public

economy and taxes, considering aggregate data, temporary circumstances, and exogenous factors. This method was also used in the search for a workable legal system (Markovits 1997) or a second-best legislation like the anti-trust laws (Hulen 1998) which would make it possible to promote more local initiatives. Lipsey and Lancaster (1956) believed that in order to obtain an SBO, statistics at regional level need to be collected and models must be formulated using the econometric analysis (Lipsey 2007). However, in our analysis, we take the conceptual notion to apply it — apart from the economic calculation — with a qualitative and/or quantitative methodology, to the territorial analysis. We then consider that some conditions might be missing for the development of profitable activities and services in a peripheral area. It might be that the soil is not very fertile or that some activity is absent in planning an SBO based on the complementarity of functions in a region. The qualitative methodology offers a better understanding of the area's activities from a more time-bound perspective, and it also allows the evaluation of more important activities in order to apply the SBO method. Our approach is bolstered by the comments of Smith (1977), and Lee and Smith (2004), regarding Vilfredo Pareto's contribution to welfare economics and geography. They believe that Pareto offers criteria for efficiently locating activities or equally distributing resources, thus introducing a certain ethics, but also recognizing that the contribution is limited by theoretical constraints since it is considering a non-growth economy, although they do note that, with due precautions, it could be useful for applications that include the comparative advantage.

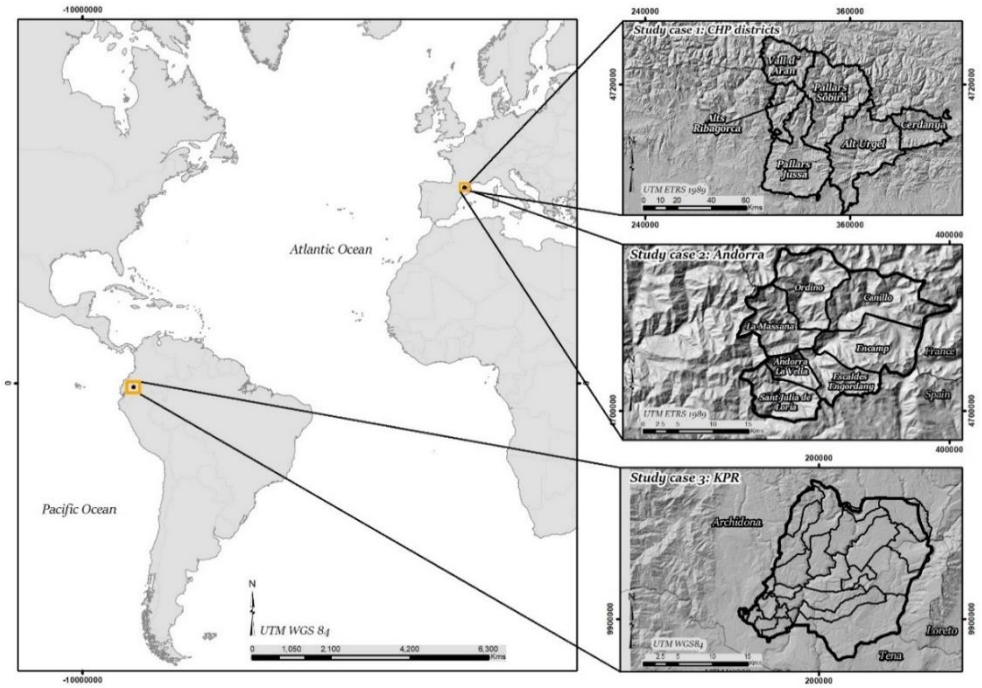


Fig. 1 **– Location of case studies**
Source: *the Authors, using atlases showing Catalonia, Andorra and Ecuador*

Application of Second-Best Option

In our methodological approach (Fig. 2), two of the three conditions for developing the SBO method are set out. The first is accepting that every territory has the right to engage in some kind of activity. The second considers that a territory specializes in what it is best equipped or prepared to do, even if other territories can offer the same product with better economic efficiency. In addition, for example, some items like dairy products, which are found in many places, need to reinforce the SBO with added value and the comparative advantage over

other territories. However, there are products like ticaso (jungle peanut) and guayasa leaves that exist in only a few places, which can also be used with a better comparative advantage. Undoubtedly, attempts have been made on many occasions to offer substitutes for these rare products with alternative, similar, more economically efficient items, as it is the case of vanilla products in Ecuador. Nevertheless, the economic value cannot be taken as the only yardstick, because social, political, and environmental values must be also considered when efficiency is gauged.

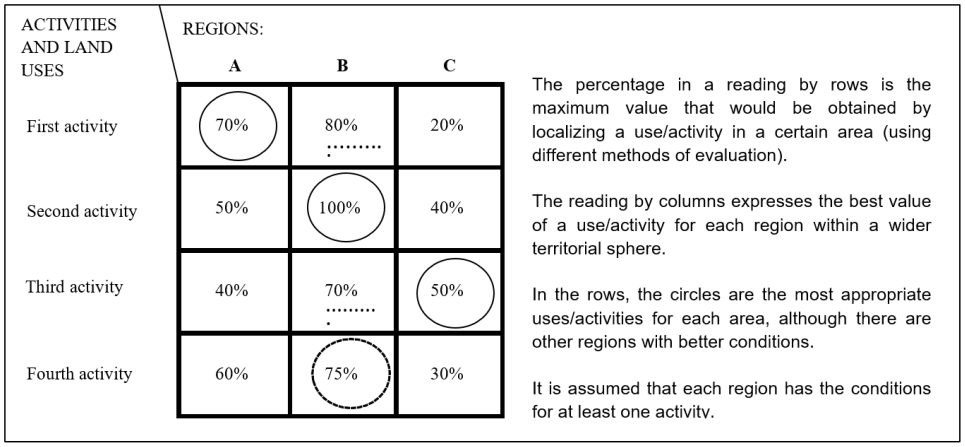


Fig. 2 **– Application of the Second-Best Option Method (SBO)**
Source: *the Authors*

We can express SBO as follows: “a territory can successfully engage in an activity, even if other territories are better equipped for them, when this is the best specialization that can be carried out in this territory”. Such activities must bear in mind several parameters: (1) they are possible to carry out in the territory because of its natural conditions and human capital, and also because each territory has the right to engage in one or more activities to sustain its population; (2) they are the best activities that can be carried out in this territory; (3) the comparative advantage can be improved in relation with other territories by incorporating the added value into the activities; (4) this means incorporating new kinds of transformation, knowledge, technology, and innovation, but also improvements in marketing and recognition by the Designation of Origin, if this is possible; and (5) achieving a minimum employment and population threshold to allow the consolidation of these activities (Tulla 2019).

In order to explain the SBO method, we choose four activities and land uses (A&LU) in the rows and three proxy regions (columns). If we assume that each region must have at least one of the activities, then it should choose that for which it is best equipped (Tulla et al. 2009). Different methods can be used to evaluate the positive and negative aspects of localization in each region, and in our case the opinion of focal groups (Morgan 1998, Barbour 2007, Stewart and Shamdasani 2014) is considered, and, also, the territory’s economic, social, and natural constraints. A list of activities, potentialities, and limitations is initially drawn up with experts, local actors, and researchers who are participating in the focal group (Krueger 1998, Krueger and Casey 2014). Next, each activity is evaluated on a scale from zero to a hundred, and this must be agreed upon or otherwise it must be the result of the arithmetic mean of the values given for each activity by the members of the focal group. The highest value is 100% and the other values of the matrix will be a percentage of each activity over the activity with the highest score (100%) in all regions. Normally, several focus groups with the local actors and outside experts are used, and separately, in order to avoid the “contaminating opinion effect”.

The SBO method has been applied differently in each case study, depending on the type of data available (Table 1). In the CHP, primary data were obtained using a qualitative method (in-depth interviews and focal groups), which then made it possible to concentrate basically on activities selected by the local actors and experts. However, in the PA, secondary data obtained from the official statistics covering all economic activities have been used, which conditions the results more than the use of data of qualitative origin does. The SBO method applied a quantitative method to select the sectors in each municipality. Finally, in the case of KPR, the two methodologies have been combined in order to find, first, the statistical data in the 2018 TNC (The Nature Conservancy 2018) census and then to compare them by the means of in-depth interviews with experts and focal groups in each community. This analysis combines the bottom-up local orientation with possible regional policies and decisions being taken top-down.

Table 1

Three types of SBO application method

HIGH PYRENEES AND ARAN (CHP)	**PRINCIPALITY OF ANDORRA (PA)**	**KICHWA PEOPLE OF RUKULLAKTA (KPR)**
Local level: 6 districts *Multisectoral SBO analysis*	*State level: 7 municipalities* *Multisectoral SBO analysis*	*Local level: 17 units (communities)* *Sector SBO analysis (Agrarian & forest)*
QUALITATIVE METHODOLOGY	QUANTITATIVE METHODOLOGY	QUALITATIVE AND QUANTITATIVE METHODOLOGY
PRIMARY DATA: Focus groups (11) of 3-6 persons per district. Five focus groups of experts and five other focus groups of local actors. One mixed focus group of experts and local actors.	SECONDARY DATA: Statistical information (Government of Andorra 2018). Establishments by economic sector (2016); Wage-earning by economic sector (2017).	SECONDARY AND PRIMARY DATA: Statistical data (TNC 2018). Crop surface (ha) and number of animals or farms. Mixed focal groups of experts and local actors (4-15 persons) in 17 communities. Five in-depth interviews with experts.
1) Priority of economic activities as a result of focus group discussion. 2) Analysis of each economic activity. 3) Analysis of each district. 4) SBO as an interaction of economic activities and districts. 5) A basis for producing local policies.	1) Priority of economic activities as a result of statistical analysis. 2) Analysis of each economic activity. 3) Analysis of each municipality. 4) SBO as an interaction of economic activities and municipalities. 5) Producing regional policies.	1) Priority of crops, livestock and forest as a result of statistical analysis. 2) Validation in focus group discussion. 3) Analysis of each crop, livestock and forest. 4) Analysis of each community. 5) SBO as an interaction of agricultural activities and communities. 6) Local sectoral policies in a region.

Source: *the Authors, based on the three research cases*

Results

The case of the Catalan High Pyrenees and Aran

In applying the SBO method to the CHP case (Table 2), eleven focal groups consisting of 3-6 members were constituted, two per district, one with experts and one with local actors, and each group was coordinated by a researcher. The exception was *Alta Ribagorça*, which had only one group. First, a list of possible A&LU was drawn up in the focal groups and then it was unified. Then, each group discussed which of these activities would be most appropriate for SLD in the district, considering its ability to produce added value, and making a list of A&LU showing the percentage of prioritization, with the highest value being given to the most appropriate. Finally, the participants are asked online about the weaknesses and potentialities of each one of the 12 A&LU in the focal groups of each district, modifying the scores in keeping

with these opinions. Next, for each activity, the scores received for each district were added up. The table is completed by drawing up an A&LU/district matrix with percentages showing the maximum value obtained by each activity and district which, in this study, corresponds with ski resorts and mountain housing estates.

Table 2

Application of the SBO method in the *Catalan High Pyrenees and Aran* (CHP)

ACTIVITIES AND LAND USE (A&LU)	Final score	DISTRICTS					
		Alt Urgell	Alta Ribagorça	Cerdanya	Pallars Jussà	Pallars Sobirà	Era Aran
Cultural activities of added value	**493**	83%	*88%*	**87%**	70%	80%	85%
Natural landscape and rural tourism	**487**	80%	**90%**	83%	62%	77%	*95%*
Ecological pasture-fed livestock farming	**481**	87%	64%	81%	**85%**	*89%*	75%
Value-added adventure tourism	**448**	*94%*	68%	66%	73%	**92%**	55%
Value-added milk production	**411**	***98%***	67%	83%	57%	78%	28%
Ski resorts, second residences, and hotels (development)	**404**	61%	63%	86%	18%	76%	***100%***
Industries, textile design and sports materials services	**398**	***85%***	49%	73%	51%	68%	72%
Installation. Renewable energy (hydroelectric, solar, wind)	**397**	72%	**74%**	54%	72%	62%	63%
Sawmills, transformation of wood, and construction of pallets	**372**	*76%*	58%	69%	42%	**73%**	54%
Tourist-oriented professional and university training, etc.	**362**	*83%*	36%	**81%**	64%	51%	47%
Added-value craft activities (meat, ceramics, etc.)	**361**	*83 %*	43 %	32 %	58 %	71 %	**81 %**
Ecological farms (pigs, birds, rabbits, or eggs)	**322**	***77%***	44%	52%	***88%***	33%	28%

Source: *the Authors, on the basis of focal groups*

1. The first SBO election round in the CHP

Applying the SBO methodology, it can be seen that, in the CHP, cultural activities, when carried out with added value, would have the best SBO for *La Cerdanya* (87%) in a reading by columns (places) among the first six A&LU, although Alta Ribagorça (88%) would obtain the highest value in a reading by rows. This is an activity that can be carried out in many places if it is known how to link it with restaurant and hotel initiatives (Throsby 2000), as well as others related with landscape quality (Pallares-Blanch 2012). Natural landscape connected with rural tourism (Pallarès-Blanch et al. 2014) would be the the SBO for Alta Ribagorça (90%), in the second place, although Era Aran (95%) would have a higher value for A&LU. Pasture-fed ecological livestock farming would be the SBO for *Pallars Jussà*, especially in *Vall Fosca* (Barrachina et al. 2015), where extensive organically oriented livestock farming can be carried out at low cost if there is cooperation in the butchering and marketing processes (Tulla 2019). The value obtained is the highest for this district when reading by columns (85%), although others in the region might do better, for example *Pallars Sobirà* (89%) or *Alt Urgell* (87%). Adventure tourism would be the SBO for *Pallars Sobirà* (92%), although *Alt Urgell*

(94%) shows a higher value by row. In *Alt Urgell*, milk production gives the highest percentage (98%) in the column and also in the row, making it the best place in the region for this activity, which is shown to be competitive internationally as well, thanks to the added value of production and marketing conditions (Tulla et al. 2009). Finally, there are ski resorts with the construction of second homes around them, which would be the SBO for *Era Aran* (100%), although *La Cerdanya* (86%) is also well positioned for this.

2. The following SBO elections using this methodology

If we were to start a second selection round, we would find that industries, textile design, and services related with sporting materials would be an SBO, in a reading by columns, for *Alt Urgell* (85%), which is already the best-placed for this activity (reading by rows). Renewable energy (hydroelectric, solar and wind) is the eighth A&LU and it would be the SBO for Alta Ribagorça (74%). Sawmills, the transformation of wood, and the manufacture of pallets represent the SBO for *Pallars Sobirà* (73%), although in a reading by rows *Alt Urgell* (76%) would be better positioned. In the CHP, university and professional training centres in the areas of tourism, nursing, and computing would be the SBO for *La Cerdanya* (81%), although *Alt Urgell* (83%) shows a higher value in a reading by rows. Added-value craft activities of all kinds would suit *Era Aran* (81%), although *Alt Urgell* (83%) would show a higher value by rows. Ecological pig, bird, rabbit, or egg farms would be the best SBO for *Pallars Jussà* (88%), from both the perspectives of place (column) and activity (row).

If more A&LU were considered, they could be distributed among the districts using the same methodology (Vera Martin and Tulla 2019).

The case of the Principality of Andorra (PA)

The SBO method was applied in Andorra by using statistical data on the economic activities grouped into 7 sectors (Table 3), and for each of the country's 7 municipalities (Government of Andorra 2018).

Table 3

Establishments (2016) and wage earners (2017), by economic sector in Andorra

Municipalities / Economic sector	**A** Canillo	**B** Encamp	**C** Ordino	**D** La Massana	**E** Andorra la Vella	**F** St. Julià de Lòria	**G** Escaldes Engordany	**Establishment (2016)**	**Wage earners (2017)**
Agriculture (1)	49	7	188	443	212	77	315	1,291	167
Industry (2)	12	3	37	172	139	23	190	576	1,604
Construction (3)	18	5	32	89	62	19	126	351	2,875
Transport (4)	36	7	97	260	62	53	196	711	1,228
Trade (5)	43	12	87	221	140	43	379	925	8,838
Tourism (6)	155	9	271	1164	263	126	1,070	3,058	6,301
Services (7)	62	1	118	532	144	67	521	1,445	16,698
TOTAL	**375**	**44**	**830**	**2,881**	**1,022**	**408**	**2,797**	**8,357**	**37,711**

Abbreviations: (1) Agriculture, livestock farming, and forestry; (2) Industry, energy, and mining; (3) Construction; (4) Transport and communications; (5) Vehicle repair and trade; (6) Hotels, restaurants and tourism; (7) Other services: financial, business, real estate, public administration, social security, education, health, social services, personal services, and others.
Source: *CASS, Ministry of Finance, Andorra Department of Statistics, and the Authors*

The number of establishments in the economic sector was taken by municipality, in 2016, from the Andorra Department of Statistics, on the assumption that there is one proprietor for each establishment. Wage workers in each economic sector were taken into account and they are distributed by municipalities in accordance with the percentage represented by the number of establishments in each one. Next, the proprietors of establishments are added to the wage workers in each economic sector by municipality, giving the following distribution as a result (Table 4).

Table 4

Economically active population of Andorra, by economic sector and municipality (2016-2017)

Municipalities / Economic sectors	**A** Canillo	**B** Encamp	**C** Ordino	**D** La Massana	**E** Andorra la Vella	**F** St. Julià de Lòira	**G** Escaldes - Engordany
Agriculture (1)	55	8	212	**501**	239	87	*356*
Industry (2)	45	11	140	*651*	526	87	**720**
Construction (3)	165	45	294	*819*	571	174	**1,332**
Transport (4)	98	19	265	**709**	169	144	*535*
Trade (5)	450	127	918	*2,333*	1,483	450	**4,002**
Tourism (6)	474	28	829	**3,562**	805	386	*3,275*
Services (7)	778	13	1,482	**6,677**	1,807	842	*6,540*

Abbreviations: As in Table 3. The figures in bold are the highest for the sector, and those in italics show the second highest value for each economic sector
Source*: CASS, Ministry of Finance, Andorra Department of Statistics, and the Authors*

1. Definition of the statistical framework analysis

The rows correspond to the sectors into which all of Andorra's economic activity has been grouped. The columns respond to the data by administrative unit (municipalities). In bold and underlined, there are the highest values for each sector and, in italics and underlined, there are the second most important values in each sector. In a reading by rows, it appears that all activities prioritize localization in the municipalities of *La Massana* (4 in first place and 3 in second) and of *Escaldes-Engordany* (3 in first place and 3 in second). This would suggest a tendency to the concentration of all economic activities in these two territories and the economic and human desertification of the rest of the country. The SBO method can be used in this case, in which only aggregate statistical data are available, as a guide to formulating public policies that would enable other territories to specialize in the activities for which they are best equipped. This would favour a greater diversification of the activity. If we read by columns, seeking for each municipality the sectors in which it is best situated, in both first and second place, these could be considered as an SBO.

2. The first SBO election

The value of 100% is assigned as the highest value of all boxes in the matrix of municipalities/economic sectors and to the remaining boxes is given a percentage value in relation to the highest value. The analysis was carried out based on this resulting matrix in order to identify the SBO for each municipality (Table 5). In order to avoid conflict when assigning sectors to municipalities, we assume that the highest percentage has priority when two or more municipalities coincide in a certain sector. We would start from the municipality that has the value of 100% (*La Massana*) and that would correspond to sector 7 (services) as preferential option. It has many services, including health, education, and all kinds of others that have been decentralized from the country's capital *Andorra la Vella*.

Moving on, now to *Escaldes-Engordany*, it is assigned to sector 5 (commerce) since it scores 59.94%, the highest value of the 7 sectors and, so far, it has not corresponded with another municipality. This territory, an urban continuation on the northern side of the capital, is where the greatest part of the country's commercial activities has concentrated, thanks to its good road access.

Next, we see that *Ordino* would have sector 6 (hotels, restaurants, and tourism) as preferential option since this activity has the municipality's highest percentage (12.42%), and commerce and services are excluded as they have previously been assigned to *Escaldes-Engordany* and *La Massana*. The municipality of Ordino is important for its natural protected areas (NPA), the *Ordino-Arcalis* ski resort, and other tourist resources that could be its SBO.

Table 5

Percentage of Andorra's economically active population, by economic sector and municipality (2016-2017)

Municipalities / Economic sectors	**A** Canillo	**B** Encamp	**C** Ordino	**D** La Massana	**E** Andorra la Vella	**F** St. Julià de Lòira	**G** Escaldes - Engordany
Agriculture (1)	**0.82**	*0.12*	3.18	7.50	3.58	1.30	5.33
Industry (2)	0.67	**0.16**	2.10	9.75	7.88	*1.30*	10.78
Construction (3)	2.47	0.67	*4.40*	12.27	**8.55**	2.61	19.95
Transport (4)	*1.47*	.28	3.97	10.62	2.53	**2.16**	8.01
Commerce (5)	6.74	1.90	13.75	34.94	*22.21*	6.74	**59.94**
Tourism (6)	7.10	.42	**12.42**	*53.35*	12.06	5.78	49.05
Services (7)	11.65	.19	22.20	**100.00**	27.06	12.61	*97.95*

Abbreviations: As in Table 3. Percentages in bold are the best option for each municipality and, in italics, the second best. Both could be seen as the SBO for each municipality.
Source: *CASS, Ministry of Finance, Andorra Department of Statistics, and the Authors*

The country's capital, *Andorra la Vella*, shows the highest percentage with sector 3 (construction, 8.55%), which would be its preferential option given the sectors and municipalities we have already discussed. The main construction companies are located in this municipality, and it is also where major public works (for example, the sports centre, vertical car parks, the bus station, and so on) have been carried out.

Sant Julià de Lòria, the municipality that is closest to Catalonia, presents the highest percentage in sector 4 (2.16%), transport and communications which, excluding the rows and columns that have already been used, would be its preferential option. This territory has relatively important transport and communication businesses.

In the case of *Canillo*, with 0.82% in sector 1 (agriculture) and excluding the sectors and territories we have already dealt with, we would take this as preferential option. This is a municipality with a major investment in extensive livestock farming, which can use large natural meadows and it can also work in the artisanal transformation of dairy products.
Finally, *Encamp* shows a score of 0.16% in sector 2 (industry and energy), as preferential option after which other 6 municipalities have made their choices. A good part of the country's hydroelectric energy is produced in this municipality.

3. The following SBO elections using this methodology

If we were now to look for a second sector for each municipality, we would repeat the process from which we would exclude the cells of the matrix that have already been used. Then the

second-best percentage for *Escaldes-Engordany* would be in sector 7 (services) with 97.95% and hence its second preference. This municipality has many educational, financial, and health services, including the *Hospital Nostra Senyora de Meritxell* which is the country's only public hospital, all of which situates it, together with *La Massana*, as the most economically significant territory in the country. Both municipalities adjoin *Andorra la Vella*, which was the country's first urban centre. In *La Massana*, we find sector 6 (hotels, restaurants, and tourism), with 53.35%. This sector has the *La Massana-Pal-Arinsal* ski resort, which favours tourist and hotel potential. Then, in *Andorra la Vella*, sector 5 (commerce) scores 22.21%, and it has a very well-established commercial tradition which has been adapting to new tourist needs. Next, *Ordino* shows 4.40% in sector 3 (construction), where expanding tourism has brought about a construction boom. In *Canillo*, scoring 1.47% in sector 4 (transport and communications), the proximity to the French border has favoured development here. In *Sant Julià de Lòria*, with a score of 1.30% in sector 2 (industry and energy), the tobacco industry coexists alongside other industries of agricultural transformation. Finally, for *Encamp*, with a score of 0.12%, the agricultural sector has many meadows and natural resources that favour extensive livestock farming.

A third preference could be sought for each municipality using the same method and this would make it possible to design a profile of activities in accordance with the assumption of an SBO for each territory that would be the basis for guiding SLD public policies in the country.

The case of the territory of the Kichwa People of Rukullakta (KPR)

The data used to estimate the SBO for KPR are quantitative (TNC 2018) and qualitative, based on in-depth interviews with experts and by creating focal groups in the 17 communities (Veloz Jaramillo 2019), which reinforce the research (Reichardt and Cook 1979). In each of the comunidades, considered as a territorial unit (Ecofund 2008), there are one or more predios (estates) (Bennett and Sierra 2014), with family or collective activities. Each family possesses a chakra (a productive, organic, and biodiverse space), where ancestral knowledge is applied for self-sufficiency and commercial production.

The Kichwa constitute the largest indigenous group in Ecuador and the Amazon region. They are distributed in small communities that basically live from subsistence agriculture, hunting, and fishing (Erazo 2011). Their forms of organisation enabled them to protect their lands in the face of a growing process of foreign colonisation and, in 1974, the KPR achieved legal recognition as the "San Pedro Limitada" Cooperative for Agricultural and Livestock Production by means of which land tenure was legalised and 17 KPR communities (424.4 km^2 and 6,735 inhabitants) were organised. Each community elects a president (Kuraka) and other representatives who meet in a General Assembly when the most important decisions are being made (Erazo 2003). The participation of women, although minority, has been increasing and, recently, a woman was elected as Kuraka of the whole KPR. Rukullakta (which means "the old homeland") is 180 km southeast of Quito, 2 km from the town of Archidona, and 12 km from Tena, the capital of the province of Napo, to which Rukullakta belongs. The town of Loreto, the capital of the province of Orellana, is 60 km away from the communities in the north of Rukullakta.

The aim of this study is to compare the advantages presented by the *comunidades* for creating productive activities on the basis of three marketing models: family, local community, and global community. Productive activities are evaluated on the basis of the areas of family cultivation, in accordance with the TNC census (2018), together with the physical conditions and accessibility of each territory. The participation of women has been identified as an indispensable factor for the functioning of the three models, as have been innovation and the creation of added value.

1. Conditions for the localization of productive activities and their comparative advantages

The optimal localization of productive activities in KPR is conditioned in the ways shown in Fig. 3. The access to the main markets (Archidona and Loreto) for the communities' production favours the implementation of SBO. In this case, forests, occupying 77.55% of the land and the predominance of agrology class VI (72.21%), which only permits grazing and forestry activities (MAG 2014), represent the main physical limitation. The *comunidades* have been adapted to these limitations with crops for their own consumption and trading in 4% of the territory (1,700.24 ha.). It is also necessary to consider natural wealth and the diversity of products which vary with the geographical location of the *comunidades*.

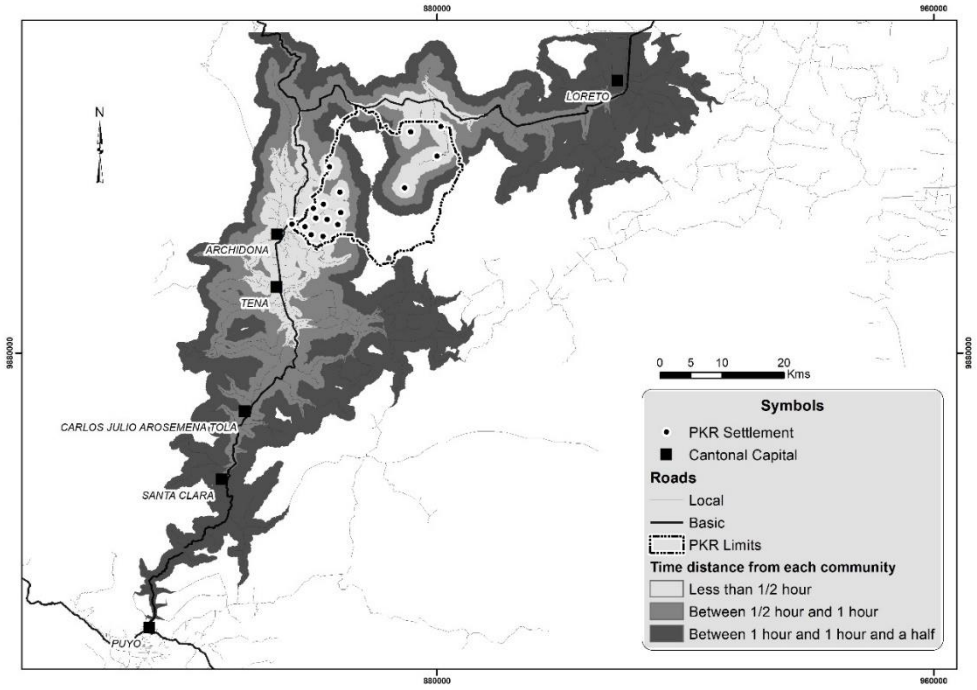


Fig. 3 **– Accessibility of KPR communities to main market towns: Archidona and Loreto**

Source*: the Authors, based on Veloz Jaramillo (2019)*

2. SBO for production in the KPR territory

In the SBO method (Table 6), three groups of activities are chosen: agricultural crops, livestock raising, and provision of services. The columns show the KPR *comunidades*, except for five of them, for which the data is unreliable. We assume that each *comunidad* has at least one of the three activities and we choose that for which it is best equipped (Tulla et al. 2009). In each *comunidad*, productive activities are evaluated in accordance with the hectares involved, the number of animals or fish farms in the census (TNC 2018), the conditioning factors of the geographic space, and the kinds of organization of Kichwa families for accessing the regional market.

In Table 6, the most advantageous options for each *comunidad* in each of the activities appear in bold and underlined. In the family model of activity, the Awayaku (column B), Lushianta (D), Porotoyaku (K), Rukullakta (L), Villano (O) and Yawari (Q) have cacao cultivation as SBO, and Yanayaku (P) has cassava. In Table 7, for a second activity, in italics and underlined, we have cassava for Villano (O). Some *comunidades*, like Papanku (I), only show activities (in a

same model) like banana crops, although their preferential SBO would be growing wayusa leaf in the global model.

It can be stated that the cultivation of cacao, cassava and wayusa leaf, together with fishing and poultry raising, is the main SBO in the KPR. In a second round, we would find that growing naranjilla and banana trees, forestry, medicinal herbs, coffee, livestock raising, the *Socio Bosque*, and tourist services would be possible SBOs in some communities.

Table 6

Comparative advantage and the method of Second-Best Option (SBO), related to crop surfaces

Community crops / Group of activities and models		***Comunidad***	**A**	**B**	**D**	**F**	**G**	**H**	**I**	**K**	**L**	**O**	**P**	**Q**
		Inhabitants	138	458	651	140	259	303	319	888	820	348	177	544
		Crop surface (ha)	20.0	70.2	295.6	46.7	46.8	58.1	227.0	178.6	67.2	94.0	19.8	12.5
		Activity	**Ha or number of animals or number of farms**											
(a)	Family Model	1 *Chakra* crops	1.8	21.7	135.1	33.5	9.0	18.6	68.3	78.7	18.9	12.0	4.5	5.5
		Chakra cro./inh.	0.01	0.05	0.21	*0.24*	0.03	0.06	0.21	0.09	0.02	0.03	0.03	0.01
		2 Cacao	10.8	**39.0**	**85.3**	5.5	12.5	20.7	16.3	**43.4**	**24.8**	**37.3**	1.0	**4.5**
		4 Naranjilla	1.0	0.5	60.1	2.5	11.8	5.4	*75.0*	39.7	15.0	18.0	3.5	1.5
		6 Banana	1.5	1.5	7.8	2.0	2.0	2.0	*32.8*	7.2	4.0	3.8	1.0	0.0
		7 Cassava	3.3	1.5	3.3	2.8	3.0	1.8	13.8	6.4	3.3	*14.5*	**4.8**	0.5
		8 Ticaso	0.5	5.0	2.4	0.3	3.0	0.5	*12.8*	0.8	0.0	8.0	1.0	0.0
		9 Forestry	1.0	0.0	0.0	0.0	3.3	*8.0*	4.0	1.5	1.0	1.8	4.0	0.5
		10 Medical herbs	0.3	1.5	1.4	0.0	2.3	1.1	*4.0*	1.0	0.3	0.8	0.0	0.0
	Global Model	3 Wayusa leaf	**11.3**	12.6	74.8	**10.3**	**22.8**	**27.8**	**84.5**	19.6	5.9	15.3	3.5	0.0
		5 Coffee	7.9	12.0	*76.6*	3.0	8.3	17.0	70.8	8.4	2.0	10.0	0.0	0.5
(b)	Community model	11 Fish farms	0.0	0.0	6.0	0.0	0.0	7.0	30.0	2.0	**3,412**	100.0	0.0	0.0
		12 Poultry raising	**91.0**	**50.0**	**743.0**	0.0	**318.0**	**413.**	**521.0**	**390.0**	252.0	**262.0**	**72.0**	**5.0**
		13 Livestock	2.0	28.0	*53.0*	0.0	11.0	0.0	34.0	0.0	5.0	35.0	30.0	0.0
(c)	Global Service Model	14 Environment (Socio Bosque)	0.0	0.0	*2,434*	0,0	*1,431*	*1,323*	*127*	*934*	0.0	*696.0*	*1.0*	0.0
		15 Tourism	0.0	*2.0*	*24.0*	0.0	*1.0*	0.0	*1.0*	*1.0*	*1.0*	0.0	*3.0*	0.0

Abbreviations: Group of activities – (a) Agricultural; (b) Fishing, poultry and livestock raising; (c) Services.
Comunidades – A, Ardilla Uku; B, Awayaku; D, Lushianta; F, Manku; G, Mushullakta; H, Nukunu; I, Papanku; K, Porotoyaku; L, Rukullakta; O, Villano; P, Yanayaku; and Q, Yawari.
Products – (1) Chakra crops; (2) Cacao; (3) Wayusa leaf; (4) Naranjilla; (5) Coffee; (6) Banana; (7) Cassava; (8) Ticaso; (9) Forestry; (10) Medicinal herbs; (11) Fish farms, fishing; (12) Poultry raising; (13) Livestock raising; (14) Environmental services; (15) Tourism.
Sources*: the Authors, based on Focal Groups and the TNC Census (2018)*

3. Main economic activities applying SBO in KPR

The commercialization of some ancestral products like wayusa, ticaso and yuquilla is the main form of SBO. This activity is based on the added value created with the type of production, Designation of Origin, cultural value, and innovation, which gives them access to a regional or even international market. These products are not very well known outside of Ecuador, but they have managed to enter the world market through social enterprises and international NGOs, as it is the case of wayusa. There are alternatives like cacao, coffee, and naranjilla, which come from the outside, with a higher market value than that of local products, although low production means that they cannot compete on a larger scale. In the cases of cacao and coffee, added value has been achieved with the Designation of Origin and organic production. In the KPR territory, we see that all the *comunidades* present at least one activity in which they can specialize.

In Table 7, the number shown in each box corresponds to an activity presented in the rows of Table 6. The columns (SBO) express the best activities (in bold in Tables 6 and 7) that each community can engage in, although they could be done better (higher values) in other *comunidades* (reading by rows) or outside the KPR territory. The secondary options are shown in italics in Table 7. The results obtained suggest that priority should be given, in the KPR, to cacao and wayusa production, since in almost all *comunidades* this appears as the largest area of cultivation in the farms, and they can be marketable products.

Table 7

The SBO method applied to the territory of the Kichwa People of Rukullakta (KPR)

Priority	Products	Community											
		A	**B**	**D**	**F**	**G**	**H**	**I**	**K**	**L**	**O**	**P**	**Q**
1	**Agricultural**	**3**	**2**	**2**	**3**	**3**	**3**	**3**	**2**	**2**	**2**	**7**	**2**
2	**Poultry, fishing**	**12**	**12**	**12**		**12**	**12**	**12**	**12**	**11**	**12**	**12**	**12**
3	*Environment*			*14*		*14*	*14*	*14*	*14*		*14*	*14*	
4	*Tourism*		*15*	*15*		*15*		*15*	*15*	*15*		*15*	
5	Secondary option			5			9	4			7		
6	Secondary option			13				6					
7	Secondary option							10					
8	Secondary option							8					

Abbreviations: as in Table 6.
Source: *the Authors, based on Focal Groups and the TNC Census (2018)*

The Napo provincial government has promoted the production of chonta (palm weevil) grubs (Chontacuros, larva of Rhynchophorus palmarum) for gastronomic use. The grub is an ingredient of a traditional dish which is served with cassava and garabato yuyo (Hypolepis Hostilis), which are grown on the *chakra*. According to the focal groups, the grubs are consumed because they have curative properties for respiratory problems and asthma. They are greatly prized in the *comunidades* to which they are exclusively limited owing to the difficulties of cultivating them, which include cutting down the chonta palms and chopping them into pieces so that the weevil will leave its larvae (which take two months before they are ready for consumption). Hence, their market price is rising because of their scarcity and because of the demand by tourists, the local population, and for export to countries like Colombia, Peru, Brazil, Thailand, and others in Africa.

Discussion

Taking three different situations — a depopulated region (CHP), a small country (PA), and an Amazonian community (PKR) — it has been possible to demonstrate that there are activities which, even if they are carried out more efficiently in other places, can be the SBO for the studied areas. In most cases, this implies innovation, local development policies, generating added value, and a comparative advantage. In the case of CHP, a mountain area at risk of depopulation, the SBO favours the development of local initiatives supported by public policies, for example tourism and craftwork in their different variants, as alternatives to the economic sector that exists inside and outside the region. In the case of KPR, the method seeks the best possible capacity building for activities in each community, although other territories might be better endowed.

It is important to note that the SBO not only depends on economic factors, but also on the social, cultural and environmental characteristics of each territory. Most local development studies do not take these characteristics into account and, therefore, they do not sufficiently assess the comparative advantages of SBOs.

In the model for the KPR, the products vary. In family units, agricultural products are prioritized for the local demand, while at community level, animal production is important and, at the global level, the supply of services and agricultural products come in response to the national and international demand. The comparative advantage sought by using the SBO method is the better preparedness of each *comunidad* for an activity, even if other *comunidades* are better equipped for it. One aim of the UN is to give support for the products that are most resilient to climate change and, also, to include entomophagy in the diet as a substitute for meat. The FAO regards cassava as a product that is resilient to climate change and one that allows Kichwa communities to eat their own production as well as to sell it. They have infrastructure to create added value through peeling, slicing, packaging, and using residues as a fodder supplement for animals. Another resilient product, the wayusa leaf, is innovative and it has added value since it has infrastructure to make energy drinks and tea with the leaves.

Conclusions

When neoclassical market principles prevail, the economic development of a region tends to concentrate most activities in a few areas. However, if the aim is not only to obtain economic benefits but also to avoid the depopulation and degradation of the territory, it is necessary to consider other criteria and other methods for the location of an economic activity. The SBO method allows the homogeneous distribution of a territory's activities in accordance with the three premises of comparative advantage in such a way that the distribution of activities is carried out in keeping with the suitability of each territory when confronted with the predominant economic tendency to locate an activity in the zone where it will be most profitable.

The strength of the SBO method resides in the complementarity of the use of qualitative and quantitative methods. However, the result obtained by the means of qualitative techniques is more reliable because they entail intense fieldwork, working with focal groups, and in-depth interviews with agents involved in developing the economic activity and who therefore have a deeper knowledge of the territory. Quantitative methods, however, require a complex database with levels of information that are not always possible to obtain for subsequent econometric calculations or multivariable analysis. When carrying out regional analysis, quantitative methodologies could be more effective, while qualitative methodologies are preferable for local analyses. The cases in this study present different methodologies. For the CHP, only qualitative methodology is used, while in the case of KPR both types of analyses are used in a complementary approach, thus favouring better targeted local development policies. Meanwhile, the PA presents quantitative methodologies with results on a more regional scale, which help the government's political decisions.

As far as we know, there are no other studies using the SBO method for analysing local development. Boadway (1998) applied the method to issues of public economics in relation with the duality of tax policy outcomes. It has also been argued that, although the best legal system is desired, when this is not possible, viable policies should be pursued in the interests of fostering a second-best legislation. Examples of this would be the anti-trust laws (Ulen 1998) and the more general legislation (Markovits 1997). All the studies are based on the premise that, when market competition is not perfect, the SBO method suggests that if some of the distorting elements can be palliated, the economy can develop efficiently (Lypsey and Lancaster 1956). In the cases studied in this paper, the idea of a local or regional reality is applied, recognising constraints like market distortion and seeking the most appropriate activities for each place, despite these limitations.

We can conclude that, in the three cases presented, it has been demonstrated that the SBO method has made it possible to identify the most appropriate economic activities for CHP and PA in relation with other territories and, in the case of KPR, to diversify the production and,

thereby, to avoid monocultures and to move beyond subsistence cultivation. This has been possible with the use of primary and secondary data.

References

BARBOUR R. (2007), *Doing Focus Groups*, SAGE, London.

BARRACHINA M., CRISTÓBAL J., TULLA A. F. (2015), *Estimating Above-Ground Biomass on Mountain Meadows and Pastures through Remote Sensing*, International Journal of Applied Earth Observation and Geoinformation 38, 184-192.

BENNETT D. E., SIERRA R. (2014), *Multi-Scale Dimensions of Indigenous Land Tenure in the Amazon*, Human Ecology 42 (4), 551-563.

BOADWAY R. (1994), *The Role of Second-Best Theory in Public Economics*, Working Papers 910, Queen's University, Kingston.

BOADWAY R. (1998), *Public Economics as Second-Best Analysis*, in: Wolf H. C. (ed.), Contemporary Economic Issues. Macroeconomics and Finance, Palgrave Macmillan, London, pp. 118-137.

BOHM P. (1987), *Second Best*, in: Eatwell J., Milgate M., Newman P. (eds.), The New Palgrave: A Dictionary of Economics, Palgrave Macmillan, London, pp. 280-283.

BRICALL J. M., BARTUMEU MARTÍNEZ I., PONS NOVELL J. (2001), *L'economia andorrana en el canvi de segle*, Fundació Julià Reig, Andorra.

BRICALL J. M., CAMPS C., CULLELL J. M., FARRÉ-ESCOFET E. P., PETITBÓ A., SOGUES J., TOMÀS R. (1975), *Estructura i perspectives de l'economia andorrana. Estudi preparatori de planificació encarregat pel M.I. Consell General de les Valls d'Andorra*, Edicions 62, Barcelona.

CREȚAN R., GURAN-NICA L., PLATON D., TURNOCK D. (2005), *Foreign Direct Investment and Social Risk in Romania: Progress in Less-Favoured Areas*, in: Turnock D. (ed.), Foreign Direct Investment in Eastern Europe, Ashgate, London, pp. 305-348.

CREȚAN R., JUCU S., ANTONI M. (2016), *Anisotropic Spaces in Romania: A Case Study of the Timiș-Cerna Corridor*, Acta geographica Slovenica 56 (1), 45-56.

CREȚAN R., TURNOCK D., WASSING M. (2009), *Romania's Airlines and Airports during Transition with Particular Reference to the West Region*, Mitteilungen der Österreichischen Geographischen Gesellschaft 151 (1-2), 241-276.

CREȚAN R., O'BRIEN T. (2020), *Corruption and Conflagration: (In)Justice and Protest in Bucharest after the Colectiv Fire*, Urban Geography 41 (3), 368-388.

CREȚAN R., VESALON L. (2017), *The Political Economy of Hydropower in the Communist Space: Iron Gates Revisited*, Tijdschrift voor Economische en Sociale Geografie 108 (5), 688-701.

DE MARCO LARRAURI O., PÉREZ NEIRA D., SOLER MONTIEL M. (2016), *Indicators for the Analysis of Peasant Women's Equity and Empowerment Situations in a Sustainability Framework: A Case Study of Cacao Production in Ecuador*, Sustainability 8 (12), 1231.

ECOFUND (2008), *Pueblo Kichwa de Rukullakta. Plan de Manejo*, Retrieved from: www.ecofund.org.

ERAZO J. S. (2003), *Constructing Autonomy: Indigenous Organizations, Governance, and Land Use in the Ecuadorian Amazon, 1964-2001*, University of Michigan, Michigan.

ERAZO J. S. (2011), *Landscape Ideologies, Indigenous Governance, and Land Use Change in the Ecuadorian Amazon, 1960-1992*, Human Ecology 39, 421-439.

FINDLAY R., HENRIKSSON R. G. H., LINDGREN H., LUNDAHL M. (2016), *Eli Heckscher, International Trade, and Economic History*, The MIT Press, London.

FULLER A. M. (1990), *From Part-Time Farming to Pluriactivity: A Decade of Change in Rural Europe*, Journal of Rural Studies 6 (4), 361-373.

GOVERNMENT OF ANDORRA (2018), *Andorra en Xifres 2018*, Departament d'Estadística, Andorra la Vella.

GRAY C. L., BILSBORROW R. E., BREMNER J. L., LU F. (2008), *Indigenous Land Use in the Ecuadorian Amazon: A Cross-Cultural and Multilevel Analysis*, Human Ecology 36, 97-109.

HALL P. (ed.) (1966), *Von Thünen's 'Isolated State'*, Pergamon Press, Oxford.

IANOȘ I. (2000), *Less-Favoured Areas and Regional Development in Romania*, in: Horváth G. (ed.), Regions and cities in the global world: Essays in honour of Gyorgy Enyedi, Centre for Regional Studies. Hungarian Academy of Sciences, Pécs, pp. 176-191.

IDESCAT (2018), *Anuari de l'Institut d'Estadística de Catalunya 2018*, Generalitat de Catalunya, Barcelona.

KRUEGER R. A. (1998), *Analyzing & Reporting Focus Groups Results*, SAGE, London.

KRUEGER R. A., CASEY M. A. (2014), *Focus Groups: A Practical Guide for Applied Research*, SAGE, London.

LEE R., SMITH D. M. (eds.) (2004), *Geographies and Moralities: International Perspectives on Development, Justice and Place*, Blackwell, Oxford.

LIPSEY R. G., LANCASTER K. (1956), *The General Theory of Second Best*, Review of Economic Studies 24 (1), 11-32.

LIPSEY R. G. (2007), *Reflections on the General Theory of Second Best at its Golden Jubilee*, International Tax and Public Finance 14, 349-364.

MAG (2014), *Mapa de uso y cubiertas del suelo*, Ministerio de Agricultura y Ganadería, Gobierno de Ecuador, Quito.

MARKOPOULOS T. (2019), *Common Agricultural Policy and Local Economy and Development in the Region of Eastern Macedonia-Thrace (Greece)*, Journal of Engineering Science and Technology Review 12 (2), 185-223.

MARKOVITS R. S. (1997), *Second-Best Theory and Law & Economics: An Introduction*, Chicago-Kent Law Review 73 (1), 3-10.

MOCANU I., GRIGORESCU I., MITRICĂ B., POPOVICI E.-A., DUMITRAȘCU M. (2018), *Regional Disparities Related to Socio-Economic Determinants of Agriculture in the Romanian Plain*, Journal of Urban and Regional Analysis 10 (1), 79-99.

MORGAN D. L. (1998), *The Focus Group Guidebook*, SAGE, London.

MYRDAL G. (1957), *Economic Theory and Under-Developed Regions*, Duckworth, London.

NEL·LO O. (2010), *The Challenges of Urban Renewal. Ten Lessons from the Catalan Experience*, Análise Social 45 (197), 685-715.

O'BRIEN T., CREŢAN R. (2019), *The Role of Identity in the 2015 Romanian Shepherd Protests*, Identities 26 (4), 470-488.

OHLIN B. (1933), *Interregional and International Trade*, Harvard University Press, London.

OLSEN E. (1971), *International Trade Theory and Regional Income Differences: United States 1880-1950 (Contributions to economic analysis)*, North-Holland, Amsterdam.

PALLARES-BARBERA M., TULLA A. F., VERA A. (2004), *Spatial Loyalty and Territorial Embeddedness in the Multi-Sector Clustering of the Berguedà Region in Catalonia (Spain)*, Geoforum 35 (5), 635-649.

PALLARES-BLANCH M. (2012), *Natural Protected Areas and Rural/Local Development: A Sustainable Strategy in Remote Areas*, Urbani izziv 23 (S2), S87-S96.

PALLARÈS-BLANCH M., PRADOS VELASCO M.-J., TULLA PUJOL A. F. (2014), *Naturbanization and Urban-Rural dynamics in Spain: Case Study of New Rural Landscapes in Andalusia and Catalonia*, European Countryside 6 (2), 118 - 160.

POU SERRADELL V. (eds.) (2005), *La balança de fets i pagaments del Principat d'Andorra*, Centre de Recerca d'Afers Exteriors. Govern d'Andorra, Andorra.

REICHARDT C. S., COOK T. D. (1979), *Beyond Qualitative versus Quantitative Methods*, in: Cook T. D., Reichardt C. S. (eds.), Qualitative and Quantitative Methods in Evaluation Research, Sage, Beverly Hills, CA, pp. 7-32.

RICARDO D. (1817), *On the Principles of Political Economy and Taxation*, Cambridge University Press, Cambridge.

SMITH D. M. (1977), *Human Geography: A Welfare Approach*, Edward Arnold, London.

STEWART D. W., SHAMDASANI P. N. (2014), *Focus Groups: Theory and Practice*, SAGE, London.

THE NATURE CONSERVANCY (TNC) (2018), *Censo*, The Nature Conservancy NGO, Quito.

THROSBY D. (2000), *Economics and Culture*, Cambridge University Press, Cambridge.

TULLA A. F. (2019), *Sustainable Rural Development Requires Value-Added Activities Linked with Comparative Advantage: The Case of the Catalan Pyrenees*, European Countryside 11 (2), 229-256.

TULLA A. F., PALLARES-BARBERA M., VERA A. (2009), *Naturbanization and Local Development in the Mountain Areas of the Catalan Pyrenees*, in: Prados M. J. (ed.), Naturbanization: New Identities and Processes for Rural-Natural Areas, Taylor & Francis, London, pp. 75-92.

TULLA A. F., VERA A., BADIA A., GUIRADO C., VALLDEPERAS N. (2014), *Rural and Regional Development Policies in Europe: Social Farming in the Common Strategic Framework (Horizon 2020)*, Journal of Urban and Regional Analysis 6 (1), 35-52.

ULEN T. S. (1998), *Courts, Legislatures, and the General Theory of Second Best in Law and Economics*, Chicago-Kent Law Review 73 (1), 189-220.

VELOZ JARAMILLO G. E. (2019), *Modelo de asociatividad para el desarrollo sostenible de territorios indígenas de la Amazonía Ecuatoriana. El caso del Pueblo Kichwa Rukullakta*, Universitat Autònoma de Barcelona, Bellaterra.

VERA A., BADIA A., TULLA A. F. (2011), *Desarrollo local en el Pirineo Catalán. Impulso económico y uso sostenible del territorio*, Finisterra 46 (92), 5-23.

VERA MARTIN A., TULLA A. F. (2019), *Innovation, Spatial loyalty, and ICTS as Locational Determinants of Rural Development in the Catalan Pyrenees*, European Countryside 11 (4), 517-540.

VESALON L., CREŢAN R. (2012), *Development-Induced Displacement in Romania: The Case of Roşia Montană Mining Project*, Journal of Urban and Regional Analysis 4 (1), 63-75.

Initial submission: 09.12.2020
Revised submission: 06.04.2021
Final acceptance: 15.04.2021

Correspondence: Department of Geography, Institut de Ciència i Tecnologia Ambiental (ICTA), Universitat Autònoma de Barcelona (UAB), Campus de la UAB, Plaça Cívica, 08193 Bellaterra, Barcelona, Spain.

Email: antoni.tulla@uab.cat

Journal of Urban and Regional Analysis,
vol. XIII, 2, 2021, p. 233 - 256
https://doi.org/10.37043/JURA.2021.13.2.3

TOWARD A CONCEPTUAL MODEL FOR PUBLIC SPACE ASSESSMENT WITH FOCUS ON THE RIGHT TO THE CITY DISCOURSE USING THE FUZZY-DELPHI AND DEMATEL METHODS

Mohammad ***AMERIAN***
Tarbiat Modares University, Tehran, Iran

Abstract: Public spaces are key elements in making a just city. These spaces are important due to the potential roles they can have in the individual and social life of the citizens, and as a result, by redefining them, we can take a big step toward more just cities. In this study, by an extensive literature review on the right to the city discourse, we designed a conceptual model that includes components and variables that affect the construction of a just city. In order to refine this model, according to 15 experts with research experience on the right to the city and public spaces, we used the Fuzzy-Delphi technique. The DEMATEL method has also been used to understand how the main components of the conceptual model interact with each other. Our findings show that the movement toward just cities through public space requires an increase in democracy, equity, participation, diversity and appropriation, and among the mentioned components, diversity has the highest impact, while appropriation is of the lowest impact.

Keywords: *the right to the city, public space, Fuzzy-Delphi, DEMATEL*.

Introduction

Conceptualizing the urban has gone through a deep change in the twentieth century. The positivistic perspective with emphasis on blueprint plans is replaced by more collaborative approaches (Purcell 2002). According to this paradigm shift, new values are emerging and reimaging in the field of planning which were previously omitted or buried (Jacobs 2016), and one of the new concepts that has entered the field of urban planning is the right to the city (RTC).

Lefebvre (1968) was the first to discuss the RTC idea. Regardless of the inherent difficulties of philosophical concepts, the qualitative nature of the concept of right made its identification difficult for urban planners (Kipfer et al. 2013). The right to the city is not merely a right of access to what it already exists, but a right to change it after our heart's desire (Harvey 2003). The right to the city is a collaborative right. Lefebvre (1968) calls it as the right to urban life. RTC is mostly used to revive lost rights of public life. According to RTC, citizens should have the right to stay, act and enjoy of being in a public space (Chiu and Giamarino 2019). Required dimensions for living a public life should be well provided since humans have a social entity. Due to the RTC discourse, citizens have the right to participate in the production of space processes regardless of gender, religion and other demographic characteristics (Fainstein 2005, Fainstein 2006). According to RTC, a good public space is a place that gathers different groups of people together and it contributes to the sense of harmony and belonging to the space (Enright et al. 2018). In such a public space, citizens can easily interact with each other, and they can experience a sense of unity through social life (Harold 2013, Mehan 2016).

Given that the RTC discourse designs a favourable vision for public spaces, consequently, one can conclude that achieving an accurate conceptual framework of this discourse can provide appropriate standards to measure the quality of modern public spaces. However, the claim that no attempt has been made so far to conceptualize this discourse is also exaggerated. But it seems that current frameworks need still more clarifications.

In this study, we will explore the concept of RTC, and the components identified by other researchers. Then, the initial conceptual model of this research, which includes the components and indicators related to the RTC, is presented. This framework is further refined within the Fuzzy-Delphi method by experts in political studies, urban planning and social studies. Finally, the effect of each of RTC components on each other is determined through the DEMATEL analysis.

Literature review

The Right to the City

The term "right" is so debated in the realm of philosophy. We could be egalitarian, utilitarian in the manner of Bentham (the greatest good of the greatest number), contractual in the manner of Rousseau (with his ideals of inalienable rights) or of Rawls, cosmopolitan in the manner of Kant (a wrong to one is a wrong to all), or just plain Hobbesian, insisting that the state imposes justice upon reckless private interests to prevent social life being violent, brutal and short (Marcuse 2009, Madden 2012, Buckley and Strauss 2016). Some even argue for local ideals of justice, being sensitive to cultural differences (Harvey 2003, Dupré 2008).

One of the problems in applying the concept of RTC in the field of urban planning is the intrinsic complexity of philosophical concepts (Fenster 2005b). There are two main conceptualizations of RTC efforts in urban planning –the first by Purcell (2002), and then, the second by Fainstein (2005, 2014). Fainstein's (2014) findings confirms that RTC on urban scale has three main dimensions: democracy, diversity, and equality, while for Purcell (2002), it encompasses the right to participation and the right to appropriation.

Democracy

In political studies, democracy refers to the freedom of expressing public opinion, the growing role of the people in decision-making and the presence of approved ways of expressing disagreement toward public decisions (Bashiriyeh 2001). According to Purcell (2006), in urban planning, democracy suggests two main ideas: (1) democracy as a right to participate in decision-making processes, and (2) democracy as a set of qualities that a space must have (Purcell 2006, Middleton 2018). Speaking about space in the RTC doesn't merely point on the concrete space (Purcell 2002).

Contrary to political studies, in urban planning, democracy is not limited to participation and place-based qualities are also taken into consideration (Nickels et al. 2020). A democratic place is usually equipped with qualities such as the freedom to pause and to move, the freedom to do different functional activities, to remember old memories and to make new memories, and the opportunity to identify and to recognize the architectural and historical values of the space (Fainstein 2005, Fainstein 2014, Misgav and Fenster 2018, Nickels et al. 2020). In recent years, urban spaces around the world have unleased their power as an arena for political and socioeconomic protests and demonstrations. As Lefebvre (1968) shows, the space has a political nature and such claim is, for example, well explained in the justice-based protests in Bucharest after the Colectiv fire in 2015 (Creţan and O'Brien 2020), and in relation to the poor and middle-class protests in Iran after the tripling of gasoline prices in 2019. In Table 1, the factors and indicators of democracy are presented.

Table 1

Indicators of democracy

Component	Indicators
Democracy (Purcell 2002, Purcell 2006, Fainstein 2014, Creţan and O'Brien 2020, Nickels et al. 2020)	1. The right to see people and of being seen in the space (D1) 2. Watching group activities in the public space (D2) 3. Getting involved in public activities such as street music or theatre (D3) 4. Lack of time bans for entrance to and exiting from the site for people (D4) 5. Identification of cultural sites in the space by people (D5) 6. Recognition of architectural value of the site by people (D6) 7. Right to functional activities in the site for all groups (D7) 8. Having appropriate connection with the historic background of a site (D8) 9. Loving the space (D9) 10. Retrieving old memories in the site by people (D10) 11. Space design in such a way that there is an opportunity to create memories (D11) 12. The right to easily move and pause in the site for all groups (D12) 13. Nightlife (D13) 14. Existence of NGO institutions to defend the rights of the people (D14)

Equity

The dominant role of religion in the public domain, along with the old traditions and customs that some societies have, made men more prominent in public spaces than women (Amirahmadi and Ali 2017). However, this trend can be adjusted or intensified through urban design and planning (Kelobonye et al. 2020). As a result, facilitating the presence of women and of other vulnerable groups in public spaces should be one of the objectives of planners (Fenster 2005a), since the unequal presence in public spaces calls the legitimacy of planning into question (Harvey 2020). It should be mentioned that the lack of diversity doesn't necessarily refer to physical diversity and multiple land-uses, but it mostly refers to access toward functions and optional activities within a place for all groups (Brenner 1999, Sugranyes and Mathivet 2010, Fainstein 2014). Moreover, the lack of access toward space for those with physical disabilities is another concern (Staeheli 2008, Kelobonye et al. 2020). Access to optional activities in a public space means that all gender and age groups can be present at different times and in different parts of the space and they can follow their favourite activities without feeling insecure or anxious (Xia et al. 2017, Yardimci and Bezmez 2018). For Kim and Nicholls (2016), the concept of equality is more about the presence of different socioeconomic groups in an urban space and the abolishment of invisible walls around the boundaries of public spaces (Tan and Samsudin 2017). In the RTC discourse, equity does not simply refer to the equal use of space, but it encompasses a wider range of issues. In the use of urban spaces, inequity arises sometimes with political propaganda slogans, as discussed by Creţan and O'Brien (2019) on the Roma stigmatization as a mobilizing tool for the far right in Romania. Pre-existing prejudices are a powerful force that not only targets

marginalized communities, but it also challenges administrative practices, and it builds organizational support. In Table 2, the main indicators of equity are presented.

Table 2

Indicators of equity

Component	Indicators
Equity (Fainstein 2005, Fainstein 2014, Kim and Nicholls 2016, Tan and Samsudin 2017, Xia et al. 2017, Yardimci and Bezmez 2018, Creţan and O'Brien 2019, Harvey 2020, Kelobonye et al. 2020)	1. Having equal physical access toward the place for all groups of people (E1) 2. Equity in the time that different genders can spend in the site (E2) 3. Equity to access the different parts of the site for all groups (E3) 4. Equity to access the site in the different hours of a day/night (E4) 5. Having equal opportunities for optional activities in the different parts of the space (E5) 6. Equal right to move and to pause for all age groups (E6) 7. Equal presence of different socioeconomic groups in the site (E7) 8. Equal presence of different age groups (E8) 9. Lack of gendered spots within the space (E9) 10. The presence of disabled groups in the site (E10) 11. The presence of elderly in the space (E11)

Diversity

We discussed that one of the most critical principles of the RTC discourse is the maximum presence of vulnerable groups in the space (Basu and Fiedler 2017). Vulnerable groups include women, the elderly, children, and economically and socially disadvantaged groups, as well as religious, sexual, and racial minorities (Thomas 2020). Urban planners and urban designers should facilitate the attraction of all sexual and socioeconomic groups to a public space (Ducre 2018). A pedestrian space, due to its high level of publicity, must provide a platform to ensure the presence of different groups in the space (Bolt 2017, Fabula and Timár 2018). In such a public space, the entry or exit must be at the sole discretion of the citizens (Sandercock 1998, Fainstein 2006).

The production of diverse public places requires a mixture of different instructions. For example, solid long walls with no markets or inactive edges that are off at night will all produce a sense of insecurity for vulnerable groups (Vacchelli and Peyrefitte 2018). Diversity in public spaces not only causes vitality but it also increases the quality of social life (Frederick et al. 2018). Consequently, a well-planned public space is where most users and a maximum of uses are witnessed (Fainstein 2006, Fiedler 2017). In Table 3, diversity indicators are presented.

Participation

In Table 4, the main indicators of participation are presented. The right to participation maintains that all citizens serve a vital role in all decisions that contribute to the production of the urban space (Mitchell 2003, Sorensen and Sagaris 2010). Harvey (2020) confirms that RTC is a demand to form the city that ultimately forms us. This implies the importance of collaborative planning which is the only legitimate planning (Mattila 2016). Communicative planning triggers a

higher level of responsiveness and transparency among the authorities (Quicke and Green 2017). As a result, participation is both a practical mechanism to increase the responsiveness and transparency of city authorities (Calderon and Westin 2021), and an opportunity to approach the ideal form of a city that pleases the needs of all citizens (Shiraz and Shokouhi 2016).

Table 3

Factors and indicators of diversity

Component	Indicators
Diversity (Sandercock 1998, Fainstein 2006, Bolt 2014, Basu and Fiedler 2017, Fabula and Timár 2018, Frederick et al. 2018, Thomas 2020)	1. Diverse architectural building forms in the site (D1) 2. Diverse transportation modes to and from the space (D2) 3. Diverse uses of the space (D3) 4. Diverse users in the site (D4) 5. Having different values such as historic, commercial, and architectural values in the site (D5) 6. Holding festivals, street music and theatre in the space (D6) 7. Having recreational sites in the space (D7) 8. The presence of restaurants and cafes (D8) 9. Diverse forms and design in the urban furniture (D9)

In the RTC discourse, participation does not simply refer to voting. Participation oversees the preservation of the identical components of the urban that foster the citizens' attachment and increase the social capital of the city (Moayedi et al. 2019). As a result, any encroachment on the citizens' social capital in the form of privatization or commodification is unacceptable. This hypothesis is well confirmed by Creţan (2019), showing how the commodification of a local football club name can cause social tensions and it can disrupt the social capital within a city.

Table 4

Indicators of participation

Component	Indicators
Participation (Purcell 2002, Creţan 2019, Harvey 2020, Calderon and Westin 2021)	1. The right to vote in urban management decisions (P1) 2. Collaboration between the urban management and the citizens (P2) 3. Direct and indirect supervision on effective decisions in place making (P3) 4. Communicative planning (P4) 5. Responsiveness of urban authorities to people (P5) 6. Transparency in urban management decision making (P6) 7. Inclusion of different groups (P7) 8. Awareness of citizens about their rights (P8) 9. Legitimacy of all groups of citizens' demands (P9) 10. Equal right of all citizens to influence urban management (P10) 11. People's sense of commitment to the space (P11) 12. People's sense of responsibility for the space (P12) 13. Existence of legal procedures approved for public opinion polls (P13)

The RTC implies an extensive rescaling of the arrangements that presently characterize democratic participation (Purcell 2002, Secor 2003). In liberal democracies, participation structures are linked tightly to formal citizenship. We witness this trend in distorted forms within religious societies too. For instance, the city administration in Iran is strongly influenced by politics and religion. This influence affects also the citizens' freedom of behaviour and their demands too. As a result, those demands that do not conform to the political-religious standards and values of the authorities are not considered and systematically, some formal citizens turn to informal residents, and they lose their participation rights.

Appropriation

Table 5 suggests the main indicators related to appropriation used in this study as emerged from reviewing the specific literature.

Table 5

Indicators of appropriation

Component	Indicator
Appropriation (Purcell 2002, Purcell 2006, Lara-Hernandez et al. 2018, Andersson et al. 2019, Málovics et al. 2019)	1. Turning individual activities to daily life in space (A1) 2. Turning urban space to a place for playing and group activities (A2) 3. Increasing the secularity of space (A3) 4. Preventing from removing special religions, genders and races from the space (A4) 5. Shared power (A5) 6. Citizens' control over the citizens instead of authorities' control over the citizens (A6) 7. Providing a platform for expressing individual values in the space (A7) 8. Space as a manifestation of political objection (A8) 9. Space as a political demonstration (A9) 10. An activity to watch (A10) 11. Sense of unity within the community (A11) 12. Sense of belonging to the space (A12) 13. Sense of attachment to the space (A13)

The concept of appropriation has a long history in philosophy and the social sciences. Appropriation is a complicated notion that has been employed to represent the processes by which people create a sense of belonging and meaningfulness in a built environment through active participation (Bouncken et al. 2018). Appropriation is conceptualized as an interactive process through which individuals purposefully transform the physical environment into a meaningful place while in turn transforming themselves. Appropriation is regarded as a process in which a meaningless space turns into a meaningful place. Another explanation of appropriation refers to the act of making a place as one's own (Rioux et al. 2017).

Purcell (2002) believes that appropriation refers to the presence, participation, and use of public spaces. He further explains that appropriation includes both the use of the already-constructed space and the production of unconstructed spaces (Pierce et al. 2016). Appropriation gives the citizens a 'full and complete usage' of the urban space during everyday life (Purcell 2006). Purcell (2006) openly speaks of the shared power in public spaces and he further explains that appropriation provides a platform for expressing individual values, as it turns daily activities into daily civic life (Lara-Hernandez et al. 2018). The expansion of personal values and using the

space in the favoured manner increase the level of secularity in the space (Andersson et al. 2019). The issue of place attachment is one of the key concepts in the RTC discourse. As Málovics et al. (2019) confirm, although the marginalization of Roma people takes place at micro-level in the everyday social relations in Eastern Europe, the world of Roma in the segregated neighbourhoods is characterized by a strong feeling of place attachment fundamentally shaped by the social relations and the features of those neighbourhoods, while, in the same time, certain centripetal forces alienate the other inhabitants from these spaces.

Methodology

In this study, we address two main objectives. The first is to identify the conceptual framework for measuring public spaces with a focus on the RTC discourse, and the second objective is to identify how the indicators of this conceptual framework affect each other. To answer the first question, the Fuzzy-Delphi method has been used, and to answer the second question, the DEMATEL technique was employed. The implementation of the Fuzzy-Delphi is a combination of the traditional Delphi method and of data analysis, by using the fuzzy theory in each step (Habibi et al. 2015). Herein, Fuzzy numbers are used to phase out expert opinions (Shahbod et al. 2020). The important point in implementing the Delphi technique is the size of the panel of experts. There is no consensus on the size of the panel required for the traditional Delphi and Fuzzy-Delphi, but the usual size is between 12 and 18 people (Shahbod et al. 2020). In this study, a total number of 15 PhD experts have been involved and they have participated in filling out the questionnaire. All these members have been university professors and researchers with publication records in the field of citizenship rights and RTC. To make the findings more comprehensive, the professional and educational field of the participants includes sociology, urban planning, geography, economics, anthropology and environmental studies. Our participants live and work in Tehran, Iran.

The steps for implementing the Fuzzy-Delphi method in this study are as follows:

Step 1: Gathering the opinions of the experts; in the first stage of Delphi, we designed a questionnaire based on the literature review and the experts were asked to determine the importance of each indicator using the very low, low, medium, high and very high verbal variables.

Step 2: Converting the verbal variables into triangular phases; in this stage, the verbal variables were defined as fuzzy triangular numbers (Table 6).

Table 6

Fuzzy numbers and verbal variables

Triangular fuzzy numbers (l, m, u)	Verbal variable
(1, 1, 0.75)	Very high
(0.5, 0.75, 1)	High
(0.25, 0.5, 0.75)	Average
(0, 0.25, 0.5)	Low
(0, 0, 0.25)	Very low

In this stage, triangular fuzzy numbers are given to the experts and the sum of fuzzy numbers for each expert is calculated according to Equation 1.

$$\tilde{A}^{(i)} = \left(a_1^{(i)}, a_2^{(i)}, a_3^{(i)}\right) \quad i = 1,2,3,\ldots,n \qquad \text{(Equation 1)}$$

Step 3: this step is calculated through Equation 2.

$$\tilde{A}_m = (a_{m1}, a_{m2}, a_{m3}) = \left(\frac{1}{n}\sum_{i=1}^{n} a_1^i, \frac{1}{n}\sum_{i=1}^{n} a_2^i, \frac{1}{n}\sum_{i=1}^{n} a_3^i\right) \qquad \text{(Equation 2)}$$

Then, for each expert, the difference of value from the average was calculated using Equation 3.

$$\left(a_{m1} - a_1^{(i)}, a_{m2} - a_2^{(i)}, a_{m3} - a_3^{(i)}\right) = \left(\frac{1}{n}\sum_{i=1}^{n} a_1^{(i)} - a_1^{(i)}, \frac{1}{n}\sum_{i=1}^{n} a_2^{(i)} - a_2^{(i)}, \frac{1}{n}\sum_{i=1}^{n} a_3^{(i)} - a_3^{(i)}\right) \qquad \text{(Equation 3)}$$

Step 4: when the initial feedback was given to the experts and the second stage of Delphi was done, the corrected comments of the experts in the form of fuzzy triangular numbers were extracted according to Equation 4.

$$\tilde{B}^{(i)} = \left(b_1^{(i)}, b_2^{(i)}, b_3^{(i)}\right) \qquad i = 1,2,3,\ldots,n \qquad \text{(Equation 4)}$$

Thus, the triangular fuzzy numbers were given to each expert, and the set of triangular fuzzy numbers for each expert was obtained using Equation 5.

$$S\left(\tilde{B}_m, \tilde{A}_m\right) = \left|\frac{1}{3}\left[(b_{m1}, b_{m2}, b_{m3}) - (a_{m1}, a_{m2}, a_{m3})\right]\right| \qquad \text{(Equation 5)}$$

Step 5: There are several ways to the defuzzification of the final values of each indicator. In this study, the simple method of the centre of gravity basis is used.

Step 6: In this stage, we calculate the experts' difference in opinion in two phases. The repetition of Delphi's steps went until the difference of opinion between the two polling stages reached less than the very low threshold of 0.2 (Habibi et al. 2015).

According to Fainstein (2014), there is contradiction between democracy, equity, and diversity. Accordingly, finding a way to solve this contradiction is useful to prioritize any action strategies to enhance RTC in public spaces. To address this challenge, an appropriate strategy is to identify the extent to which these five components interact, affect each other and get affected by each other. The DEMATEL method is a strong technique to find the answer to this question. The DEMATEL technique is one of the multi-criteria decision-making methods that identifies the pattern of causal relationships between the variables in a study (Rad et al. 2018). DEMATEL

stands for Decision Making Trial and Evaluation. The aim of DEMATEL technique is to identify the pattern of causal relationships between a set of criteria. This technique examines the intensity of communication in terms of scoring, scrutinizes important reviews, and it accepts non-transferable relationships. The values of D in this technique indicate the effect of a factor on other factors. The values of R indicate how much the factor is affected by other factors. The values of R+D indicate the amount of interaction by that factor with other factors and finally R-D indicates the level of being effective (positive values) or of being affected (negative values) of any of the variables (Addae et al. 2019).

Results

Fuzzy-Delphi

In this part, the initial questionniare was given to all experts. After compiling the first round of questionnaires, the difference of opinion of the experts was sent to them with the average opinion of the other experts. They were then asked to comment again. In the following, the new opinions of the experts and the extent of their differences of opinion for the first and second stages can be seen. Table 7 shows the difference of opinion of experts for the first and second rounds for democracy indicators.

Table 7

Results of the difference between the average of the first and the second rounds of experts' opinion for democracy indicators

I	Expert number								
	Fuzzy average of the first round			Definite value of the first round	Fuzzy average of the second round			Definite value of the second round	Difference
D1	0.3571	0.6071	0.8571	0.6071	0.4107	0.6607	0.9107	0.6607	-0.0536
D2	0.1786	0.4286	0.6786	0.4286	0.1964	0.4107	0.6607	0.4196	0.0089
D3	0.5714	0.8214	1.0000	0.8036	0.4107	0.5893	0.7857	0.5938	0.2098
D4	0.4643	0.7143	0.9286	0.7054	0.4107	0.6607	0.8929	0.6563	0.0491
D5	0.3571	0.6071	0.8393	0.6027	0.3929	0.6429	0.8750	0.6384	-0.0357
D6	0.3393	0.5893	0.8393	0.5893	0.3571	0.6071	0.8393	0.6027	-0.0134
D7	*0.0714*	*0.1607*	*0.4107*	*0.2009*	*0.1071*	*0.2143*	*0.4643*	*0.2500*	*-0.0491*
D8	0.4286	0.6786	0.9286	0.6786	0.4286	0.6786	0.9107	0.6741	0.0045
D9	0.5179	0.7679	0.9286	0.7455	0.5357	0.7857	0.9643	0.7679	-0.0223
D10	0.3750	0.6250	0.8571	0.6205	0.4643	0.7143	0.9107	0.7009	-0.0804
D11	0.4464	0.6964	0.9286	0.6920	0.4821	0.7321	0.9464	0.7232	-0.0313
D12	0.3036	0.5536	0.8036	0.5536	0.3571	0.6071	0.8393	0.6027	-0.0491
D13	0.5357	0.7857	0.9286	0.7589	0.5536	0.8036	0.9643	0.7813	-0.0223
D14	0.6071	0.8571	1.0000	0.8304	0.4107	0.6071	0.7857	0.6027	0.2277
D15	0.4464	0.6964	0.9464	0.6964	0.4821	0.7321	0.9286	0.7188	-0.0223

As it can be seen, two of the criteria still have a difference above 0.2. So, one more questionnaire needs to be filled out. At this stage, one of the criteria scored less than 0.3 and it was eliminated (Right to functional activities in the place for all groups – D7). According to a group of experts' opinions, three more indicators related to democracy were added to the table.

These three new indicators are: a) public art such as street arts; b) public space as a place for group discussion; and c) lack of control on group activity

Thus, after sending the difference of opinion of the experts with the average of the comments of the previous stage, they were asked to complete the questionnaire again. As it can be seen, all criteria have a difference of less than 0.2. So, there is no need to fill in the questionnaires again. This is a sign of consensus among the experts. Table 8 shows the results of the difference between the mean opinions of the third and fourth rounds of experts' consultation for democracy indicators.

Table 8

Results of the difference between the average of the third and the fourth rounds of experts' opinion for democracy indicators

I	Expert number								
	Fuzzy average of the third round			Definite value of the third round	Fuzzy average of the fourth round			Definite value of the fourth round	Difference
D1	0.3571	0.6071	0.8571	0.6071	0.3571	0.6071	0.8214	0.5982	0.0089
D2	0.1786	0.4286	0.6786	0.4286	0.2500	0.4821	0.7143	0.4821	-0.0536
D3	0.5714	0.8214	1.0000	0.8036	0.5179	0.7679	0.9643	0.7545	0.0491
D4	0.4643	0.7143	0.9286	0.7054	0.4107	0.6607	0.8750	0.6518	0.0536
D5	0.3571	0.6071	0.8393	0.6027	0.3929	0.6429	0.8571	0.6339	-0.0313
D6	0.3393	0.5893	0.8393	0.5893	0.3214	0.5714	0.8036	0.5670	0.0223
D8	0.4286	0.6786	0.9286	0.6786	0.4286	0.6786	0.8750	0.6652	0.0134
D9	0.5179	0.7679	0.9286	0.7455	0.5357	0.7857	0.9643	0.7679	-0.0223
D10	0.3750	0.6250	0.8571	0.6205	0.3393	0.5893	0.8393	0.5893	0.0313
D11	0.4464	0.6964	0.9286	0.6920	0.5179	0.7679	0.9643	0.7545	-0.0625
D12	0.3036	0.5536	0.8036	0.5536	0.3750	0.6250	0.8214	0.6116	-0.0580
D13	0.5357	0.7857	0.9286	0.7589	0.5179	0.7679	0.9286	0.7455	0.0134
D14	0.6071	0.8571	1.0000	0.8304	0.5893	0.8393	0.9821	0.8125	0.0179
D15	0.4464	0.6964	0.9464	0.6964	0.4286	0.6786	0.8929	0.6696	0.0268
D16	0.3214	0.5714	0.8214	0.5714	0.3929	0.6429	0.8750	0.6384	-0.0670
D17	0.3393	0.5714	0.8036	0.5714	0.3929	0.6429	0.8571	0.6339	-0.0625
D18	0.2857	0.5357	0.7857	0.5357	0.3036	0.5536	0.7857	0.5491	-0.0134

Our second pillar of the RTC model is equity. In this stage, the experts were asked to fill the first round of the questionnaire for equity indicators. In Table 9, the fuzzy average of the first and the second round of expert answers to equity indicators is shown. Two of the criteria still have a difference above 0.2. So, one more questionnaire needs to be filled out. At this stage, two of the criteria scored less than 0.3 and they were eliminated (Equity to access the different parts of the site for all groups – E3, and Equal presence of different age groups – E8). After four rounds of filling the questionnaire by the experts, all criteria have a difference of less than 0.2. So, there is no need to fill in the questionnaires again. This is a sign of consensus among the experts. Table 10 shows the results of the difference between the mean opinions of the third and fourth rounds of experts' consultation.

Table 9

Results of the difference between the average of the first and the second rounds of experts' opinion for equity indicators

I	Expert number								
	Fuzzy average of the first round			Definite value of the first round	Fuzzy average of the second round			Definite value of the second round	Difference
E1	0.4286	0.6786	0.9107	0.6741	0.5000	0.7500	0.9464	0.7366	-0.0625
E2	0.4107	0.6607	0.8929	0.6563	0.4821	0.7321	0.9286	0.7188	-0.0625
E3	*0.1071*	*0.2679*	*0.5179*	*0.2902*	*0.0714*	*0.2321*	*0.4821*	*0.2545*	*0.0357*
E4	0.3571	0.6071	0.8571	0.6071	0.3750	0.6250	0.8571	0.6205	-0.0134
E5	0.5893	0.8393	0.9643	0.8080	0.3929	0.5893	0.7321	0.5759	0.2321
E6	0.6250	0.8750	1.0000	0.8438	0.6071	0.8571	1.0000	0.8304	0.0134
E7	0.4643	0.7143	0.9286	0.7054	0.5179	0.7679	0.9464	0.7500	-0.0446
E8	0.0536	0.1964	0.4464	0.2232	0.0893	0.2321	0.4821	0.2589	-0.0357
E9	0.6071	0.8571	1.0000	0.8304	0.3750	0.6250	0.8036	0.6071	0.2232
E10	0.1607	0.3750	0.6250	0.3839	0.1786	0.3929	0.6429	0.4018	-0.0179
E11	0.1607	0.4107	0.6607	0.4107	0.2321	0.4821	0.7321	0.4821	-0.0714

Table 10

Results of the difference between the average of the third and the fourth rounds of experts' opinion for equity indicators

I	Expert number								
	Fuzzy average of the third round			Definite value of the third round	Fuzzy average of the fourth round			Definite value of the fourth round	Difference
E1	0.4286	0.6786	0.9107	0.6741	0.4286	0.6786	0.8571	0.6607	0.0134
E2	0.4107	0.6607	0.8929	0.6563	0.4107	0.6607	0.9107	0.6607	-0.0045
E4	0.3571	0.6071	0.8571	0.6071	0.3929	0.6429	0.8929	0.6429	-0.0357
E5	0.5893	0.8393	0.9643	0.8080	0.5357	0.7857	0.9643	0.7679	0.0402
E6	0.6250	0.8750	1.0000	0.8438	0.5179	0.7679	0.9464	0.7500	0.0938
E7	0.4643	0.7143	0.9286	0.7054	0.4107	0.6607	0.8929	0.6563	0.0491
E9	0.6071	0.8571	1.0000	0.8304	0.5000	0.7500	0.9464	0.7366	0.0938
E10	0.1250	0.3393	0.5893	0.3482	0.1964	0.4107	0.6607	0.4196	-0.0714
E11	0.1607	0.4107	0.6607	0.4107	0.1607	0.4107	0.6429	0.4063	0.0045

The third pillar of our model encompasses the indicators related to diversity. In this stage, experts were asked to report their opinions on the importance of following the indicators through fuzzy numbers. Table 11 shows the fuzzy average of the first and second rounds of opinion. Again, one of the criteria has a difference above 0.2. So, one more questionnaire needs to be filled out. At this stage, according to a group of experts' perspectives, two more items were added to diversity: a) determining the legitimacy of public activities by the people; and, no prevention for public celebrations.

Table 11

Results of the difference between the average of the first and the second rounds of experts' opinion for diversity indicators

I	Expert number								
	Fuzzy average of the first round			Definite value of the first round	Fuzzy average of the second round			Definite value of the second round	Difference
DI1	0.3750	0.6250	0.8750	0.6250	0.4286	0.6786	0.9107	0.6741	-0.0491
DI2	0.2857	0.5357	0.7857	0.5357	0.3571	0.6071	0.8393	0.6027	-0.0670
DI3	0.5357	0.7857	0.9286	0.7589	0.3393	0.5000	0.6607	0.5000	0.2589
DI4	0.6429	0.8929	1.0000	0.8571	0.6071	0.8571	1.0000	0.8304	0.0268
DI5	0.5714	0.8214	1.0000	0.8036	0.5893	0.8393	1.0000	0.8170	-0.0134
DI6	0.4107	0.6429	0.8393	0.6339	0.4643	0.6964	0.8929	0.6875	-0.0536
DI7	0.1786	0.4286	0.6786	0.4286	0.2143	0.4643	0.7143	0.4643	-0.0357
DI8	0.3393	0.5893	0.7857	0.5759	0.3750	0.6250	0.8393	0.6161	-0.0402
DI9	0.1964	0.4464	0.6964	0.4464	0.2500	0.5000	0.7500	0.5000	-0.0536
DI10	0.5536	0.8036	0.9821	0.7857	0.5357	0.7857	0.9643	0.7679	0.0179
DI11	0.1429	0.3929	0.6429	0.3929	0.2500	0.5000	0.7500	0.5000	-0.1071

After the third and the fourth rounds of receiving the experts' opinion for diversity indicators, all criteria have a difference of less than 0.2, so there is no need to fill in the questionnaires again (Table 12).

Our fourth component is participation. The result of the first and the second round of opinions on the indicators of participation is presented in Table 13.

Table 12

Results of the difference between the average of the third and the fourth rounds of experts' opinion for diversity indicators

I	Expert number								
	Fuzzy average of the third round			Definite value of the third round	Fuzzy average of the fourth round			Definite value of the fourth round	Difference
DI1	0.3750	0.6250	0.8750	0.6250	0.4464	0.6964	0.9286	0.6920	-0.0670
DI2	0.2857	0.5357	0.7857	0.5357	0.2321	0.4821	0.7143	0.4777	0.0580
DI3	0.5357	0.7857	0.9286	0.7589	0.4107	0.6607	0.8571	0.6473	0.1116
DI4	0.6429	0.8929	1.0000	0.8571	0.5536	0.8036	0.9464	0.7768	0.0804
DI5	0.5714	0.8214	1.0000	0.8036	0.4643	0.7143	0.9464	0.7098	0.0938
DI6	0.4107	0.6429	0.8393	0.6339	0.3571	0.6071	0.8214	0.5982	0.0357
DI7	0.1786	0.4286	0.6786	0.4286	0.2321	0.4821	0.7321	0.4821	-0.0536
DI8	0.3393	0.5893	0.7857	0.5759	0.3571	0.6071	0.8214	0.5982	-0.0223
DI9	0.1964	0.4464	0.6964	0.4464	0.3214	0.5714	0.8036	0.5670	-0.1205
DI10	0.5536	0.8036	0.9821	0.7857	0.5536	0.8036	0.9643	0.7813	0.0045
DI11	0.1429	0.3929	0.6429	0.3929	0.2500	0.5000	0.7500	0.5000	-0.1071
DI12	0.3214	0.5714	0.7857	0.5625	0.3036	0.5536	0.8036	0.5536	0.0089
DI13	0.3214	0.5714	0.8214	0.5714	0.3571	0.6071	0.7857	0.5893	-0.0179

Table 13

Results of the difference between the average of the first and the second rounds of experts' opinion for participation indicators

I	Expert number								
	Fuzzy average of the first round			Definite value of the first round	Fuzzy average of the second round			Definite value of the second round	Difference
P1	0.6250	0.8750	1.0000	0.8438	0.6607	0.9107	1.0000	0.8705	-0.0268
P2	0.5536	0.8036	0.9821	0.7857	0.5714	0.8214	1.0000	0.8036	-0.0179
P3	0.6250	0.8750	0.9821	0.8393	0.3393	0.5179	0.7143	0.5223	0.3170
P4	0.1071	0.2500	0.5000	0.2768	0.1071	0.2500	0.4821	0.2723	0.0045
P5	0.4107	0.6607	0.8929	0.6563	0.4464	0.6964	0.9107	0.6875	-0.0313
P6	0.4821	0.7321	0.9464	0.7232	0.5179	0.7679	0.9464	0.7500	-0.0268
P7	0.5714	0.8214	0.9643	0.7946	0.3571	0.5536	0.7143	0.5446	0.2500
P8	0.5893	0.8393	1.0000	0.8170	0.3214	0.5536	0.7679	0.5491	0.2679
P9	0.6250	0.8750	1.0000	0.8438	0.6071	0.8571	1.0000	0.8304	0.0134
P10	0.5179	0.7679	1.0000	0.7634	0.5179	0.7679	0.9643	0.7545	0.0089
P11	0.2321	0.4643	0.6964	0.4643	0.2500	0.5000	0.7321	0.4955	-0.0313
P12	0.1607	0.4107	0.6607	0.4107	0.2143	0.4643	0.7143	0.4643	-0.0536
P13	0.5357	0.7857	0.9464	0.7634	0.5536	0.8036	0.9643	0.7813	-0.0179

After two rounds, three of the criteria still have a difference above 0.2. So, one more questionnaire needs to be filled out. At this stage, one of the criteria scored less than 0.3 and it was eliminated (Communicative planning – P4). The final refining of participation indicators is presented in Table 14.

Table 14

Results of the difference between the average of the third and the fourth rounds of experts' opinion for participation indicators

I	Expert number								
	Fuzzy average of the third round			Definite value of the third round	Fuzzy average of the fourth round			Definite value of the fourth round	Difference
P1	0.6250	0.8750	1.0000	0.8438	0.6071	0.8571	1.0000	0.8304	0.0134
P2	0.5536	0.8036	0.9821	0.7857	0.4821	0.7321	0.9643	0.7277	0.0580
P3	0.6250	0.8750	0.9821	0.8393	0.6071	0.8571	0.9821	0.8259	0.0134
P5	0.4107	0.6607	0.8929	0.6563	0.3214	0.5714	0.8214	0.5714	0.0848
P6	0.4821	0.7321	0.9464	0.7232	0.4821	0.7321	0.8929	0.7098	0.0134
P7	0.5714	0.8214	0.9643	0.7946	0.5357	0.7857	0.9464	0.7634	0.0313
P8	0.5893	0.8393	1.0000	0.8170	0.5714	0.8214	0.9821	0.7991	0.0179
P9	0.6250	0.8750	1.0000	0.8438	0.6071	0.8571	1.0000	0.8304	0.0134
P10	0.5179	0.7679	1.0000	0.7634	0.5179	0.7679	0.9464	0.7500	0.0134
P11	0.2321	0.4643	0.6964	0.4643	0.2321	0.4821	0.7321	0.4821	-0.0179
P12	0.1607	0.4107	0.6607	0.4107	0.2143	0.4643	0.7143	0.4643	-0.0536
P13	0.5357	0.7857	0.9464	0.7634	0.5357	0.7857	0.9643	0.7679	-0.0045

The last component of the RTC model encompasses the indicators for appropriation. The results of the first and the second round of experts' opinions (Table 15) show that two of the criteria still have a difference above 0.2. So, one more questionnaire needs to be filled out. At this stage, according to a group of experts' opinions, three more items were added to these components. These three new indicators are: a) spending time in the place, b) knowing different routes in the place, c) knowing the location of different restaurants, parks, and shopping centres in the place.

Table 15

Results of the difference between the average of the first and the second rounds of experts' opinion for appropriation indicators

I	Expert number								
	Fuzzy average of the first round			Definite value of the first round	Fuzzy average of the second round			Definite value of the second round	Difference
A1	0.3750	0.6250	0.8393	0.6161	0.4464	0.6964	0.9107	0.6875	-0.0714
A2	0.3393	0.5893	0.8393	0.5893	0.4286	0.6786	0.8929	0.6696	-0.0804
A3	0.3571	0.6071	0.8393	0.6027	0.3929	0.6429	0.8571	0.6339	-0.0313
A4	0.5893	0.8393	1.0000	0.8170	0.6429	0.8929	1.0000	0.8571	-0.0402
A5	0.6607	0.9107	1.0000	0.8705	0.3929	0.5536	0.7321	0.5580	0.3125
A6	0.6071	0.8571	1.0000	0.8304	0.6071	0.8571	0.9821	0.8259	0.0045
A7	0.5714	0.8214	1.0000	0.8036	0.3750	0.5536	0.7500	0.5580	0.2455
A8	0.5000	0.7500	1.0000	0.7500	0.5536	0.8036	1.0000	0.7902	-0.0402
A9	0.4464	0.6964	0.9286	0.6920	0.4643	0.7143	0.9464	0.7098	-0.0179
A10	0.3571	0.6071	0.8571	0.6071	0.4107	0.6607	0.9107	0.6607	-0.0536
A11	0.4643	0.7143	0.9464	0.7098	0.4643	0.7143	0.9286	0.7054	0.0045
A12	0.2857	0.5357	0.7857	0.5357	0.3393	0.5893	0.8393	0.5893	-0.0536
A13	0.1250	0.3214	0.5714	0.3348	0.1607	0.3929	0.6429	0.3973	-0.0625

The result of the third and the fourth round of experts' opinion on appropriation is presented in Table 16.

DEMATEL

In this study, after refining the model, we examined the effect of all indicators on each other. Our analysis matrix includes all variables of democracy, diversity, equity, participation, and appropriation together. To ease the understanding of tables, the score for each component is presented separately. Table 17 shows the way in which the different indicators of democracy affect other variables (all 5 components and indicators together) and they get affected by them.

The components of the Democracy Index are not highly effective, and they mostly get affected by other indicators. This issue has been shown in Fainstein's (2014) research, as well as in Xiao et al. (2017). In fact, the main reason for this is that democracy at street level is the product of the emergence of other qualities at social level (Mirzaei and Mohammadzaki 2016). In other words, when we witness the expansion of participation and the recognition of minorities groups in a society, then that society becomes a democratic one. Democracy in urban spaces, both in terms of designing a democratic space and in terms of participation between the state and the people in the decision-making, requires the expansion of diversity and equity at community level. An equal society in which all groups are recognized and respected gives all groups the opportunity to participate. Also, in a society where diversity and pluralism are accepted and the

rights of men and women are equal, we will see the formation of democratic spaces, and, as a result, the level of publicity in public spaces will increase while gendered spaces are eliminated.

Table 16

Results of the difference between the average of the third and the fourth rounds of experts' opinion for appropriation indicators

I	Expert number								
	Fuzzy average of the third round			Definite value of the third round	Fuzzy average of the fourth round			Definite value of the fourth round	Difference
A1	0.3750	0.6250	0.8393	0.6161	0.4464	0.6964	0.8929	0.6830	-0.0670
A2	0.3393	0.5893	0.8393	0.5893	0.2679	0.5179	0.7679	0.5179	0.0714
A3	0.3571	0.6071	0.8393	0.6027	0.2500	0.5000	0.7321	0.4955	0.1071
A4	0.5893	0.8393	1.0000	0.8170	0.4286	0.6786	0.8750	0.6652	0.1518
A5	0.6607	0.9107	1.0000	0.8705	0.5714	0.8214	0.9821	0.7991	0.0714
A6	0.6071	0.8571	1.0000	0.8304	0.5893	0.8393	0.9821	0.8125	0.0179
A7	0.5714	0.8214	1.0000	0.8036	0.5536	0.8036	1.0000	0.7902	0.0134
A8	0.5000	0.7500	1.0000	0.7500	0.5714	0.8214	0.9821	0.7991	-0.0491
A9	0.4464	0.6964	0.9286	0.6920	0.4464	0.6964	0.9107	0.6875	0.0045
A10	0.3571	0.6071	0.8571	0.6071	0.4286	0.6786	0.8929	0.6696	-0.0625
A11	0.4643	0.7143	0.9464	0.7098	0.4464	0.6964	0.9286	0.6920	0.0179
A12	0.2857	0.5357	0.7857	0.5357	0.3393	0.5893	0.8393	0.5893	-0.0536
A13	0.1250	0.3214	0.5714	0.3348	0.1429	0.3571	0.6071	0.3661	-0.0313
A14	0.2500	0.4821	0.7321	0.4866	0.1607	0.3750	0.6250	0.3839	0.1027
A15	0.2679	0.5179	0.7679	0.5179	0.2857	0.5357	0.7857	0.5357	-0.0179
A16	0.2857	0.5357	0.7857	0.5357	0.3036	0.5536	0.8036	0.5536	-0.0179

Table 17

Output of DEMATEL analysis for democracy indicators

Indicator	D	R	D+R	D-R
D1	0.988805	1.348056	2.336861	-0.35925
D2	0.872516	1.543114	2.41563	-0.6706
D3	0.934893	1.467893	2.402786	-0.533
D4	0.904501	1.559529	2.46403	-0.65503
D5	0.941278	1.550251	2.491528	-0.60897
D6	0.939389	1.530431	2.46982	-0.59104
D8	1.014381	1.497795	2.512176	-0.48341
D9	1.088945	1.566481	2.655426	-0.47754
D10	0.959102	1.511992	2.471094	-0.55289
D11	1.043291	1.642895	2.686186	-0.5996
D12	0.905076	1.519548	2.424624	-0.61447
D13	0.972976	1.626601	2.599577	-0.65362
D14	0.95107	1.485305	2.436375	-0.53424
D15	0.914316	1.554345	2.468661	-0.64003
D16	1.004055	1.456663	2.460718	-0.45261
D17	1.027285	1.530379	2.557664	-0.50309
D18	1.052827	1.462897	2.515724	-0.41007
Average	0.971453	1.520834	2.492287	-0.54938

Democratic spaces are recognized arenas for group discussions and group activities, and the less we witness external control over these optional activities, the more democracy is expected in that space. As a result, our analysis shows that the increase in public activities and group gatherings in a public space has a higher effect on other indicators. Moreover, the role of urban design as a facilitator is important. The effect of urban design on increasing democracy is shown in the table (D11) while other democratic standards, such as the lack of time ban or having the opportunity to see people activities and being seen by others, are also among the effective indicators of democracy. It should be stated that when the urban design provides a platform for group gathering and group activity, an increase in seeing people and being seen is expected as a result that this indicator is more affected by others, and it has less effect on the other indicators. Democracy is also the most affected component in our RTC model, because democracy is more a result of diverse and equitable society. Our next component is equity, which is shown in Table 18.

Table 18

Output of DEMATEL analysis for equity indicators

Indicator	D	R	D+R	D-R
E1	1.449847	1.259923	2.709771	0.189924
E2	1.449688	1.226243	2.675931	0.223445
E4	1.488913	1.243335	2.732248	0.245578
E5	1.49947	1.172517	2.671987	0.326953
E6	1.45778	1.258488	2.716269	0.199292
E7	1.526816	1.107938	2.634754	0.418878
E9	1.453617	1.192833	2.646449	0.260784
E10	1.576982	1.170235	2.747217	0.406747
E11	1.519699	1.119492	2.639191	0.400207
Average	1.4914236	1.194556	2.6859797	0.2968676

Equity is the second most effective component in our model with higher effect than democracy and less than diversity. The presence of disabled groups in the place along with the equal presence of different socioeconomic groups in the place are of highest effectiveness among the equity indicators. Then, the presence of the elderly in the space and having equal opportunities for optional activities in the different parts of the space leave more inspiring effect on the indicators, while having equal physical access toward the place for all groups of people is of lowest effectiveness. One explanation for the overall effectiveness of equity in our model is that achieving a democratic citizenship is rooted into social values, and social values are largely influenced by the economic structures that govern that society. Equity in a society confirms that there are organized and planned economic structures for the maximum inclusion of vulnerable groups. As a result, the component of equality is more self-generating than the product of the realization of other components and it has a more active role than a passive role. The existence of a high level of equity guarantees a secure foundation for the citizens' collaborative rights. This is also reflected in our findings, as we see that equity is the second most influential element in the conceptual model, and that the occurrences of participation, appropriation, and democracy require equity. The third pillar of our model encompasses diversity, which is the most influential component. The level of effectiveness of diversity indicators is shown in Table 19.

Diversity has the highest level of impact among all variables. One reason for the high impact of diversity on our conceptual model is that diversity in a society means cultural and social progress. A high level of diversity of users in a society means a high level of physical and mental security in the society. In fact, the acceptance of the presence of women in the society and the existence of security for them, along with the existence of physical security for the presence of

families and the elderly, pave the way for the formation of diversity in the society. As a result, the concept of diversity is a deep-rooted concept that itself is the producer of the other components mentioned in our conceptual model. The most effective indicators of diversity are the diverse transportation modes, the diverse uses of the space, multidimensional places, recreational sites and the people power on a place.

Table 19

Output of DEMATEL analysis for diversity indicators

Indicator	D	R	D+R	D-R
DI1	1.731115	1.155586	2.886701	0.575529
DI2	2.030224	1.079881	3.110104	0.950343
DI3	1.88036	1.048206	2.928566	0.832154
DI4	1.725002	1.092275	2.817277	0.632727
DI5	1.865131	1.058305	2.923436	0.806825
DI6	1.653637	1.023203	2.67684	0.630434
DI7	1.770332	1.014873	2.785205	0.755458
DI8	1.643212	1.02345	2.666662	0.619762
DI9	1.543303	0.946645	2.489948	0.596658
DI10	1.742571	1.022487	2.765057	0.720084
DI11	1.662541	0.991945	2.654486	0.670597
DI12	1.760036	1.004885	2.76492	0.755151
DI13	1.731667	0.965951	2.697617	0.765716
Average	1.7491639	1.0328994	2.782063	0.7162645

The fourth pillar of our model includes participation and its indicators. Regarding participation, it should be noted that the effectiveness of participation is in the third place, and as a result, this component is almost equally affected by other components and it affects them. Table 20 shows the effectiveness of the various participation indicators.

Table 20

Output of DEMATEL analysis for participation indicators

Indicator	D	R	D+R	D-R
P1	1.342801	1.128276	2.471078	0.214525
P2	1.260233	1.141035	2.401268	0.119197
P3	1.466935	1.164186	2.631121	0.302749
P5	1.383213	1.221124	2.604337	0.162089
P6	1.321295	1.185125	2.506419	0.13617
P7	1.313723	1.141307	2.45503	0.172416
P8	1.253119	1.182893	2.436012	0.070226
P9	1.298356	1.107774	2.40613	0.190582
P10	1.383411	1.148839	2.53225	0.234572
P11	1.296297	1.202969	2.499266	0.093328
P12	1.240909	1.23529	2.476199	0.00562
P13	1.221557	1.198871	2.420427	0.022686
Average	1.3151541	1.1714741	2.4866281	0.14368

The effectiveness of the participation debate is due to the role that this component plays in maximizing the inclusion of vulnerable and forgotten groups in the decision-making. For this reason, we see that the most effective indicators of participation in our analysis are the components related to urban management and its approach to attracting people participation. The direct and indirect supervision of effective decisions on place making is the most effective

indicator, while the equal right of all citizens to influence urban management, the responsiveness of urban authorities to people, the right to vote in urban management decisions and, finally, transparency in the urban management decision making are, respectively, other effective indicators of this component.

Generally, participation in the decision making is not acceptable in every society where women do not have democratic rights, or vulnerable economic and social groups are not considered to be part of the community. As a result, participation requires equity and diversity as presumptions. Now, if participation in the urban management system takes place, we can expect the appropriation process to be more just and to see a higher level of urban democracy. Because the maximum participation of sexual and socio-economic groups provides a better opportunity for the realization of the democratic rights of the citizens. As a result, participation is both a result of diversity and equity and it produces democracy and appropriation. Our last component is appropriation, which includes 16 indicators. The effectiveness level of all appropriation indicators is presented in Table 21.

Table 21

Output of DEMATEL analysis for appropriation indicators

Indicator	D	R	D+R	D-R
A1	1.031263	1.226358	2.257621	-0.19509
A2	0.951084	1.302668	2.253752	-0.35158
A3	1.05722	1.293041	2.350262	-0.23582
A4	1.13187	1.334553	2.466423	-0.20268
A5	1.012346	1.300238	2.312585	-0.28789
A6	1.025587	1.334733	2.360321	-0.30915
A7	0.952773	1.275268	2.228041	-0.32249
A8	1.135828	1.383002	2.518831	-0.24717
A9	0.990947	1.319426	2.310373	-0.32848
A10	1.103764	1.355009	2.458773	-0.25125
A11	0.984927	1.327948	2.312875	-0.34302
A12	1.067035	1.330964	2.398	-0.26393
A13	1.040058	1.289267	2.329325	-0.24921
A14	1.07131	1.362379	2.433689	-0.29107
A15	0.936528	1.264432	2.20096	-0.3279
A16	1.058447	1.219639	2.278086	-0.16119
Average	1.0344367	1.3074328	2.3418698	-0.272995

In terms of effectiveness, the appropriation of space is the least effective component in our conceptual model. The reason for this can be seen in the fact that the fair appropriation of space occurs essentially when more basic values such as diversity and equity are respected in each society. More communicative approaches of decision making provide the more just appropriation of space. The political nature of space and then the importance of space in the citizens' time spending are, respectively, the two areas with the highest level of effectiveness. The shared power and space as a manifestation of political objection, along with the presence of an activity to watch and with spending time in the place are among the most effective indicators of appropriation in this study.

Discussion

The extent of urban poverty, the social demonstrations and protests, the widening of the gap between the rich and the poor, the commodification of space and, in general, the neoliberal approach toward urban development in recent years have shown us how much the issue of the rights of marginalized urban groups in the process of urban development matters. As previously

shown, the negative effects of ignoring the voiceless are a major threat to the sustainability of our cities. As a result, due to the importance of this issue, on one hand, and moreover, given the breadth of issues that can be discussed under the title of the RTC discourse, on the other hand, we tried to provide a conceptual framework for measuring urban development projects with a focus on the RTC, allowing professionals and researchers to evaluate different urban policies.

While reviewing all related articles and studies in the recent years, we tried to extract the related indicators that can be explained under the title of the RTC in order to form our initial framework. These indicators cover a wide range of components, from the physical dimensions of space to decision-making processes at national level. In the next stage, using the opinions of the experts and researchers in various urban areas, such as urban planners and designers, as well as sociologists and economists, we tried to refine our indicators. Since the compilation of the initial indicators was the product of the researcher's opinion, by using the Delphi method, by removing the irrelevant indicators and by adding those indicators that were neglected, we tried to increase the level of credibility of the analysis and to ensure its validity and reliability. At this stage, the unrelated indicators were removed, and several new indicators were introduced to our conceptual framework. In the next step, the DEMATEL technique was used to discover how the components interact and it was determined which component has the highest impact on the others and which component is affected the most.

The main significance of this study, however, lies in the breadth of claims that have been explained under the heading of the term 'right'. It is generally a vague and qualitative word. This term, like many other qualitative interpretations, suffers from a lack of quantifiable capability. As a result, even though the use of rights as a valuable indicator in measuring urban development projects is necessary, the urban literature in the field of RTC needs further exploration for materialization and clarification. This study is an attempt to categorize the concept of 'right' on an urban scale. This research determines a clear and precise framework of the RTC to measure the distance from the status quo to the desired one. As a result, we claim that any future effort for urban development, without considering the rights of marginalized groups and disregarding the symbolic and non-commodity values of the city, is unsustainable.

In recent decades, the answer to the question of what a good city is has enriched the urban literature. Different urban practices are formed in response to the question. But it seems that given the multidimensional nature of the city and the extent of urban issues, we need a more inclusive theory that can embrace both the physical and the non-physical aspects of the city and that can have an optimal answer to it. We believe that the RTC, with its broad framework, which is investigated in this study, can be an answer to this question. In fact, we think that a good city is a city whose status quo is as close as possible to the principles and standards of the RTC discourse. However, it is important to note that much of the research on urban rights has focused on the intra-city and regional scale, while the occurrence of the COVID19 pandemic during this past year has shown how much urban issues are affected by the international sphere. So that, the RTC too can be greatly influenced by the international geopolitical elements (Creţan and Light 2020). As a result, our suggestion to other researchers is to investigate the impact of the COVID19 pandemic on the disenfranchised groups and to reread the conflict of interest between the workforce and the employers in the current context of the pandemic.

Conclusions

The importance of public spaces in people's daily lives is obvious to anyone. Today, due to population growth and the flood of migration to cities, the importance of public spaces as a critical component in the social life of citizens is undeniable. The shrinking size of residential lots

and the disappearance of the traditional way of life have made it possible for public spaces to meet many of the social and mental needs of the citizens. As a result, the public space is not a space that simply does not have an entrance and exit door with lots of green space and playing grounds. Indeed, such an arena requires the provision of democratic qualities that give the citizens the opportunity to experience a sense of citizenship and shared action. The publicity of spaces depends on their power to create memories and collective experiences that give the citizens the opportunity to create new groups beyond socioeconomic boundaries. Achieving such objectives also depends on moving towards democracy, equity, diversity, participation and space appropriation. Another point addressed in this study is the emphasis on the internal contradiction among the main components that make up our conceptual model, as if, for example, the expansion of diversity can reduce the fair appropriation of space, or it can lead to a reduction in equity. As a result, we have shown how the different components affect each other, and through this, planners and city managers can redefine public spaces and they can take a big step towards just cities by prioritizing the more effective components as more essential components in city plans and designs.

In this study, the most important and effective component in our conceptual model is diversity, the expansion of which has the greatest impact on increasing democracy and participation. In the next rank, equity has the highest level of influence, followed by participation, democracy and appropriation. Both equity and diversity are two conceptual elements rooted in the cultural beliefs and the socioeconomic structure of a society that play important roles in promoting the democratic rights of the citizens. This impact clearly shows that it is impossible to make a just space and to build a just city without interfering in the structure of the production and the social system, and as a result, the process of transforming the existing cities into promised cities requires a change in social and individual structures.

Our findings suggest that local development patterns are more sustainable prescriptions for developing cities, and that the application of imported global models at the local level generally provokes negative reactions from the local community, leading to the residents' alienation (Vesalon and Creţan 2019). Our findings on the importance of social capital and social ties among the inhabitants are also confirmed in the study of Méreiné Berki et al. (2017) according to which the bonding ties and related specific norms as tools for everyday survival easily overwrite the system's integration efforts for poverty alleviation and social mobility with long-term and uncertain benefits for the segregated urban underclass.

Our findings also confirm the emphasis of Sandercock (1998), Fainstein (2005, 2006) and Purcell (2006) on the importance of diversity in urban spaces. Diversity is the axial component of the RTC scholarship to the point that Sandercock (1998) labels her dream city as a cosmopolis. The reason behind such importance is that diversity intensifies democracy by accepting the pluralism of the society, and by creating equal opportunities for all socioeconomic groups, while it guarantees equal access and usage of space for all (Tayebi 2013).

In this study, we identified the conceptual components and we explored how they interact, so that, now our suggestion to other researchers is to understand the possible contradictions and conflicts between the components of this conceptual model and the way such contradictions might change our understanding of the RTC.

References

ADDAE B. A., ZHANG L., ZHOU P., WANG F. (2019), *Analyzing barriers of Smart Energy City in Accra with two-step fuzzy DEMATEL*, Cities 89, 218-227.

AMIRAHMADI H., ALI K. (2017), *The transformation of Tehran from a Garrison Town to a Primate City: A tale of rapid growth and uneven development*, in: Amirahmadi H., El-Shakhs S. S. (eds.), Urban development in the Muslim world, Routledge, London, pp. 109-136.

ANDERSSON B., REUTLINGER C., ROTH P., ZIMMERMANN D. (2020), *Young people's appropriation of public space: Participation through voice, sociability and activity*, in: Walther A., Batsleer J., Loncle P., Pohl A. (eds.), Young People and the Struggle for Participation: Contested Practices, Power and Pedagogies in Public Spaces, Routledge, London, pp. 82-96.

BASHIRIYEH H. (2001), *Civil Society and Democratization during Khatami's First Term*, Global Dialogue 3 (2/3), 19.

BASU R., FIEDLER R. S. (2017), *Integrative multiplicity through suburban realities: exploring diversity through public spaces in Scarborough*, Urban Geography 38 (1), 25-46.

BOLT G. (2017), *DIVERCITIES. Governing Urban Diversity: Creating Social Cohesion, Social Mobility and Economic Performance in Today's Hyper-diversified Cities*, Impact 3, 26-28.

BOUNCKEN R. B., LAUDIEN S. M., FREDRICH V., GÖRMAR L. (2018), *Coopetition in coworking-spaces: value creation and appropriation tensions in an entrepreneurial space*, Review of Managerial Science 12, 385-410.

BRENNER N. (1999), *Beyond state-centrism? Space, territoriality, and geographical scale in globalization studies*, Theory and Society 28 (1), 39-78.

BUCKLEY M., STRAUSS K. (2016), *With, against and beyond Lefebvre: Planetary urbanization and epistemic plurality*, Environment and Planning D: Society and Space 34 (4), 617-636.

CALDERON C., WESTIN M. (2021), *Understanding context and its influence on collaborative planning processes: a contribution to communicative planning theory*, International Planning Studies 26 (1), 14-27.

CHIU C., GIAMARINO G. (2019), *Creativity, Conviviality, and Civil Society in Neoliberalizing Public Space: Changing Politics and Discourses in Skateboarder Activism From New York City to Los Angeles*, Journal of Sport and Social Issues 43 (6), 462-492.

CREŢAN R. (2019), *Who owns the name? Fandom, social inequalities and the contested renaming of a football club in Timişoara, Romania*, Urban Geography 40 (6), 805-825.

CREŢAN R., LIGHT D. (2020), *COVID-19 in Romania: transnational labour, geopolitics, and the Roma 'outsiders'*, Eurasian Geography and Economics 61 (4-5), 559-572.

CREŢAN R., O'BRIEN T. (2019), *'Get out of Traian Square!': Roma Stigmatization as a Mobilizing Tool for the Far Right in Timişoara, Romania*, International Journal of Urban and Regional Research 43 (5), 833-847.

CREŢAN R., O'BRIEN T. (2020), *Corruption and conflagration: (in)justice and protest in Bucharest after the Colectiv fire*, Urban Geography 41 (3), 368-388.

DUCRE K. A. (2018), *The Black feminist spatial imagination and an intersectional environmental justice*, Environmental Sociology 4 (1), 22-35.

DUPRÉ L. (2008), *The enlightenment and the intellectual foundations of modern culture*, Yale University Press, London.

ENRIGHT T., BJÖRKMAN L., MCGUIRK P., PECK J., PURCELL M., SCOTT A. J., ROSSI U. (2018), *Cities in Global Capitalism*, The AAG Review of Books 6 (1), 59-75.

FABULA S., TIMÁR J. (2018), *Violations of the right to the city for women with disabilities in peripheral rural communities in Hungary*, Cities 76, 52-57.

FAINSTEIN S. S. (2005), *Cities and diversity: should we want it? Can we plan for it?*, Urban Affairs Review 41 (1), 3-19.

FAINSTEIN S. S. (2006), *Planning and the Just City*, Conference on Searching for the Just City. GSAPP, Columbia University, New York.

FAINSTEIN S. S. (2014), *The just city*, International Journal of Urban Sciences 18 (1), 1-18.

FENSTER T. (2005a), *Identity issues and local governance: Women's everyday life in the city*, Social Identities 11 (1), 21-36.

FENSTER T. (2005b), *The right to the gendered city: Different formations of belonging in everyday life*, Journal of Gender Studies 14 (3), 217-231.

FREDERICK C., RIGGS W., GILDERBLOOM J. H. (2018), *Commute mode diversity and public health: A multivariate analysis of 148 US cities*, International Journal of Sustainable Transportation 12 (1), 1-11.

HABIBI A., JAHANTIGH F. F., SARAFRAZI A. (2015), *Fuzzy Delphi technique for forecasting and screening items*, Asian Journal of Research in Business Economics and Management 5 (2), 130-143.

HAROLD G. (2013), *Reconsidering sound and the city: asserting the right to the Deaf-friendly city*, Environment and Planning D: Society and Space 31 (5), 846-862.

HARVEY D. (2003), *The right to the city*, International Journal of Urban and Regional Research 27 (4), 939-941.

HARVEY D. (2020), *The right to the city*, in: LeGates R. T., Stout F., The City Reader, Routledge, London, pp. 281-289.

JACOBS J. (2016), *The economy of cities*, Vintage Books, New York.

KELOBONYE K., ZHOU H., MCCARNEY G., XIA J. C. (2020), *Measuring the accessibility and spatial equity of urban services under competition using the cumulative opportunities measure*, Journal of Transport Geography 85, 102706.

KIM J., NICHOLLS S. (2016), *Using geographically weighted regression to explore the equity of public open space distributions*, Journal of Leisure Research 48 (2), 105-133.

KIPFER S., SABERI P., WIEDITZ T. (2013), *Henri Lefebvre: Debates and controversies*, Progress in Human Geography 37 (1), 115-134.

LARA-HERNANDEZ J. A., MELIS A., COULTER C. M. (2018), *Using the street in Mexico City centre: temporary appropriation of public space vs legislation governing street use*, The Journal of Public Space 3 (3), 25-48.

LEFEBVRE H. (1968), *Le droit à la ville*, Anthropos, Paris.

LEFEBVRE H., KOFMAN E., LEBAS E. (1996), *Writings on cities*, Wiley-Blackwell, Oxford.

MADDEN D. J. (2012), *City becoming world: Nancy, Lefebvre, and the global—urban imagination*, Environment and Planning D: Society and Space 30 (5), 772-787.

MÁLOVICS G., CREȚAN R., MÉREINÉ BERKI B., TÓTH J. (2019), *Urban Roma, segregation and place attachment in Szeged, Hungary*, Area 51 (1), 72-83.

MARCUSE P. (2009), *From critical urban theory to the right to the city*, City 13 (2-3), 185-197.

MATTILA H. (2016), *Can collaborative planning go beyond locally focused notions of the "public interest"? The potential of Habermas' concept of "generalizable interest" in pluralist and trans-scalar planning discourses*, Planning Theory 15 (4), 344-365.

MEHAN A. (2016), *Public squares and their potential for social interactions: a case study of historical public squares in Tehran*, International Journal of Humanities and Social Sciences 10 (2), 544-549.

MÉREINÉ BERKI B., MÁLOVICS G., TÓTH J., CREŢAN R. (2017), *The role of social capital and interpersonal relations in the alleviation of extreme poverty and spatial segregation of Romani people in Szeged*, Journal of Urban and Regional Analysis 9 (1), 33-50.

MIDDLETON J. (2018), *The socialities of everyday urban walking and the 'right to the city'*, Urban Studies 55 (2), 296-315.

MIRZAEI K., MOHAMMADZAKI A. (2016), *Social Impact Assessment walk the streets of Tehran 15 Khordad located in the region of 12 municipalities (Phase II)*, Research and Urban Planning 7 (24), 121-142.

MISGAV C., FENSTER T. (2018), *Day by day - protest by protest: Temporal activism and the feminist Mizrahi right to the city*, Cities 76, 29-35.

MITCHELL D. (2003), *The right to the city: Social justice and the fight for public space*, Guilford Press, New York.

MOAYEDI M., KHEYRODDIN R., SHIEH I. (2019), *Determining the Role of Pedestrian-Orientation, Concerning the Public Places: Improvement of Urban Social Capital Quality*, Civil Engineering Journal 5 (4), 901-912.

NICKELS A. E., CLARK A. D., WOOD Z. D. (2020), *How municipal takeovers reshape urban democracy: Comparing the experiences of Camden, New Jersey and Flint, Michigan*, Urban Affairs Review 56 (3), 790-822.

PIERCE J., WILLIAMS O. R., MARTIN D. G. (2016), *Rights in places: An analytical extension of the right to the city*, Geoforum 70, 79-88.

PURCELL M. (2002), *Excavating Lefebvre: The right to the city and its urban politics of the inhabitant*, GeoJournal 58, 99-108.

PURCELL M. (2006), *Urban democracy and the local trap*, Urban Studies 43 (11), 1921-1941.

QUICKE S. P., GREEN C. (2017), *Precarious residence: Indigenous housing and the right to the city*, Geoforum 85, 167-177.

RAD T. G., SADEGHI-NIARAKI A., ABBASI A., CHOI S.-M. (2018), *A methodological framework for assessment of ubiquitous cities using ANP and DEMATEL methods*, Sustainable Cities and Society 37, 608-618.

RIOUX L., SCRIMA F., WERNER C. M. (2017), *Space appropriation and place attachment: University students create places*, Journal of Environmental Psychology 50, 60-68.

SANDERCOCK L. (1998), *Towards cosmopolis: Planning for multicultural cities*, John Wiley & Sons, New York.

SECOR A. J. (2003), *Citizenship in the city: Identity, community, and rights among women migrants to Istanbul*, Urban Geography 24 (2), 147-168.

SHAHBOD N., BAYAT M., MANSOURI N., NOURI J., GHODOUSI J. (2020), *Application of Delphi Method and Fuzzy Analytic Hierarchy Process in Modeling Environmental Performance Assessment in Urban Medical Centers*, Environmental Energy and Economic Research 4 (1), 43-56.

SHIRAZ M. S., SHOKOUHI M. A. (2016), *Measuring the level of citizen participation in urban management based on urban good governance pattern. Case study: Mashhad*, International Journal of Humanities and Cultural Studies, August 2016 Special Issue, 759-774.

SORENSEN A., SAGARIS L. (2010), *From participation to the right to the city: Democratic place management at the neighborhood scale in comparative perspective*, Planning Practice and Research 25 (3), 297-316.

STAEHELI L. A. (2008), *Citizenship and the problem of community*, Political Geography 27 (1), 5-21.

SUGRANYES A., MATHIVET C. (eds.) (2010), *Cities for All: Proposals and Experiences towards the Right to the City*, Habitat International Coalition, Santiago de Chile.

TAN P. Y., SAMSUDIN R. (2017), *Effects of spatial scale on assessment of spatial equity of urban park provision*, Landscape and Urban Planning 158, 139-154.

TAYEBI A. (2013), *Planning activism: using social media to claim marginalized citizens' right to the city*, Cities 32, 88-93.

THOMAS R. (2020), *Accessibility of urban public space: considering the diversity of ordinary pedestrian practices*, in: Dissart J.-C., Seigneuret N., Local Resources, Territorial Development and Well-Being, Edward Elgar Publishing, Cheltenham, pp. 162-179.

VACCHELLI E., PEYREFITTE M. (2018), *From a/topia to topia: towards a gendered right to the city for migrant volunteers in London*, Cities 76, 12-17.

XIAO Y., WANG Z., LI Z., TANG Z. (2017), *An assessment of urban park access in Shanghai – Implications for the social equity in urban China*, Landscape and Urban Planning 157, 383-393.

VESALON L., CREȚAN R. (2019), *"Little Vienna" or "European Avant-Garde City"? Branding narratives in a Romanian city*, Journal of Urban and Regional Analysis 11 (1), 19-34.

YARDIMCI S., BEZMEZ D. (2018), *Disabled Istanbulites' everyday life experiences as 'urban citizens': accessibility and participation in decision-making*, Citizenship Studies 22 (5), 475-490.

Initial submission: 02.09.2020
Revised submission: 18.01.2021
Final acceptance: 01.02.2021

Correspondence: Tarbiat Modares University, Jalal AleAhmad, Nasr, P.O.Box: 14115-111, Tehran, Iran.

Email: mohammad.amerian89@gmail.com

Journal of Urban and Regional Analysis,
vol. XIII, 1, 2020, p. 257 - 280
https://doi.org/10.37043/JURA.2021.13.2.4

"OUTDATED HOUSING STOCK" AS AN OBJECT OF COMPLEX RECONSTRUCTION PROGRAMS AND PROJECTS: CHALLENGES FOR UKRAINE

Alla **PLESHKANOVSKA**, *Svitlana* **BIRIUK**
Institute of Urban Planning, Kiev, Ukraine

Abstract: European countries have accumulated quite a wide experience in the reconstruction of the multiapartment housing stock of the first period of mass industrial construction. But, in Ukraine, where such a stock is about 18%, the solution to this problem has not been properly implemented. The reasons for the lag of Ukraine compared to other European countries in the reconstruction of outdated buildings are analysed. The paper describes the features of identified outdated residential buildings by typological groups, which are typical for Ukrainian cities – historical type buildings, barrack type buildings, "stalinka" type buildings, buildings of the first period of industrial housing construction ("khrushchevka" type panel and brick buildings). The features of their cluster spatial localization on a large city plan are also considered. Based on the European countries' wide experience, the authors analysed the features of solving such a problem for Ukrainian cities. In particular, the indicators of physical deterioration are too high (from 50% up to 70%), and there are a high privatized housing percentage (up to 92%) and a low population income, which does not allow to attract the residents' own funds for the complex preconstruction programs and projects realization. The study was carried out on the example of the city of Kyiv statistical data. The conclusions of the study can be useful mainly for post-Soviet countries and for other countries with similar socio-economic conditions.

Key Words: *outdated housing stock, objects of reconstruction, program for the reconstruction, methods of reconstruction.*

Introduction

Mass housing construction after the end of the World War II became the characteristic feature of the destroyed European cities' restoration. The best example of solving such a problem is the German Economic Miracle of 1949-1963, as part of a recovery plan for post-war Europe – the specially developed "European Recovery Program", also known as the "Marshall Plan" (Hogan 1987, Berger and Ritschl 1995, Bobrova 2011). There was a similar analogue in the former Soviet Union – the restoration of the national economy after the Second World War and the solution of the housing problem based on the development of industrial housing construction in the '50-'60s of the last century, or the "Housing Development Program in the USSR", approved by the decree of the Central Committee of the CPSU and the Council of Ministers of the USSR of July 31, 1957 (Iankovska and Bachynskyj 2013). In this context, the last three decades have been marked by a new challenge – the need for mass reconstruction of post-war housing construction buildings. The mission has been successfully solved in many countries of Western and Eastern Europe. Unfortunately, Ukraine lags significantly behind other countries on this issue. One of the important lessons of such an experience for Ukraine is "having a reliable program of economic reforms" (Sharov 2014).

On March 1, 2020, the Government of Ukraine presented the Infrastructure Development Program: "Big Construction" (Government Portal 2020). According to this program, it is

planned to build: 6.5 thousand km of roads by the end of 2021, 236 schools, 155 kindergartens, 212 multidisciplinary hospitals, and many other facilities, which will contribute to the creation of 150,000 new jobs. But, in addition to the construction and reconstruction of infrastructure facilities in Ukraine, there is another problem area that requires immediate government intervention – the reconstruction of the housing stock, which was mainly built after the war, and it has already exhausted its operational resource.

According to the State Statistics Service of Ukraine (2020), as of 01.01.2019, the total area of the country's housing stock, excluding the area of buildings within the temporarily occupied territories of Ukraine, amounted to 993.3 million m^2. At the same time, the housing stock of urban settlements represents 60.9% (599.4 million m^2) of the total amount (State Statistics Service of Ukraine 2020). Most of this housing stock – 62.4% or 374.0 million m^2 – was built before 1980 or more than 40 years ago: before the 1920s – 6.2%; in the 1950s – 8.9%; in the 1960s – 19.6%; in the 1970s – 27.7% (State Statistics Service of Ukraine 2018a). In fact, every fourth residential building – 28.5% or 105.6 million m^2 of the housing stock of urban settlements – was built in the period of the '50-'60s of the 20th century, known as the period of the first industrial housing construction, with a maximum service life up to 70 years. Unfortunately, over the past forty years, this housing stock has not undergone any massive reconstruction or even major repairs, which has led to its extremely poor technical condition, with high rates of physical deterioration and the moral aging of houses. The construction of a quarter of the country's housing stock in a rather short period of 15-20 years and the failure to carry out planned repairs have led to an extremely acute situation with the technical condition of these buildings, and the threat of their avalanche-like collapsing.

After the Second World War, in many European countries, blocks and neighbourhoods appeared, in which four and five-storey large-panel and brick residential buildings dominated. At the same time, large-panel construction prevailed in most countries (Hess et al. 2018). Already in the late 1960s, its share in new housing construction was as follows: 50% in France, 64% in Germany, 65% in Sweden, 70% in Finland (Kostetsky and Gurko 2003). In Ukraine and Russia, the share of large-panel housing construction in the total construction of that period was also up to 60% (Sunak et al. 2014). In the twentieth century, experiments with mass mid-rise panel buildings in the social sector of housing were carried out in many countries of the world. The reconstruction of the buildings of these blocks (neighbourhoods) in Western Europe began to be carried out in the '70s of the 20th century. During that period, considerable experience had been gained in the practice of the outdated housing stock reconstruction in Europe.

The development of settlements and the formation of their material infrastructure usually takes place at an uneven pace, experiencing either the rapid growth of construction activity, in other words, "building booms", or a long slowdown under the influence of economic, political, religious and social factors (Pleshkanovska and Savchenko 2019, Pleshkanovska and Savchenko 2020). The mass short-term increase in the residential buildings amount required, mainly, large free urban territories and, in turn, a wave-like city area increase. That led to the formation of a concentric urban spatial structure model, especially in former socialist countries (Hirt and Stanilov 2007).

The foreign experience of reconstruction

Each European country, while solving the problem of the need for major repairs, modernization or reconstruction of residential buildings, is faced with a number of features due to the socio-economic conditions of a particular historical period, the specifics of the legislative regulation of property issues, the regulatory and methodological framework for design, etc. However, in the experience of various countries, there are also common features of solving such an important issue as the reconstruction of the outdated housing stock and of residential buildings of the mass series of the first period of industrial housing construction.

In post-Soviet countries, the main discussions regarding the direction of such buildings' reconstruction are concentrated around two main dominants: to demolish or to reconstruct? The answer to this request was given by the calculations of specialists from Estonia, Poland, East Germany and Russia, according to which the reconstruction was cheaper than the construction of new houses. In East Germany, the cost of reconstruction of panel buildings, according to average estimates, was up to 30% of new construction costs (Tzonev 2013). Similar figures were obtained in Estonia: 29-33% (Tzonev 2013). At one time, the Polish Housing Institute developed a program according to which 22% of the country's housing stock should have been reconstructed (Regulska 1987). Under that program, the "limit of expediency" of the reconstruction works was determined by the works cost at 70% of new constructions. In the case when the cost of reconstruction works exceeded the threshold of 70%, those works were advisable only for architectural monuments buildings (Grabovoi and Kharitonov 2006). Those figures were confirmed by the practice of reconstruction of 5-storey buildings in Moscow. So, according to the Center for Housing and Communal Services of the Institute of Industrial Management of the Russian Academy of National Economy and Public Administration under the President of the Russian Federation, the cost of overhauling a building is 30% of the cost of constructing a similar building in terms of area and comfort level, and the reconstruction is not more than 80% (Volynskov 2016).

A combination of various methods of reconstruction of housing estates built after the World War II –maintenance and repair, demolition and partial demolition, combined with various mixed changes – is common in countries of Central and Eastern Europe (Marin and Chelcea 2018). The ambiguity of the attitude towards the future of mentioned areas is due to the significant volumes of this kind of housing, the socio-economic status of its inhabitants, and the relatively low cost of such a housing stock (Kovács et al. 2018).

The most wide-scale experience of demolition of shabby five-storey houses was gained in Russia and in Moscow, where a program for the complex reconstruction of the five-storey buildings of the first period of industrial housing construction areas was adopted and implemented until 2010. According to this program, it was planned to demolish 6 million m^2 of the total area of housing stock by 2010, including at least 700 thousand m^2 annually, to accomplish the new housing construction of at least 1 million m^2 per year for the purpose of relocating the residents of houses subject to demolition. Also, since 2001, it was envisaged to modernize the buildings not subject to demolition in the amount of at least 200 thousand m^2 of total area annually (Government of Moscow 1999). As of mid-2017, 1,675 houses with an area of 6.1 million m^2 had been demolished since the beginning of this program (Kostrikin 2017).

That experience introduced a new term into practice – *renovation of the housing stock*, which meant the partial or complete demolition of the housing stock (houses) with the subsequent preparation of the territory (site) for new construction on the freed territory (Mogzoev and Kuzmicheva 2017). In 2017, the Government of Moscow adopted the new "Program for the Housing Renovation in the City of Moscow", which provided for a new wave of demolition of 5175 houses or about 350 thousand apartments with about 1,6 million population (Government of Moscow 2017). It is expected to be the largest residents' resettlement (Luhn 2017). European countries – France, Germany, Denmark and Sweden, which solve the problem of reconstruction, at the present stage, of the urban environment formation according to the criteria of the sustainable development of settlements, pay primary attention to considering the social aspects, namely: the improvement of physical performance, correspondence to the needs of the elderly, improvement of energy efficiency, and social cohesion and area revitalization (Baek and Park 2012). Such an approach leads to the decision of demolition for the entire blocks of houses that have already undergone reconstruction (Bernt 2017, Charan 2018, Marin and Chelcea 2018).

In Ukraine, the mass construction of the post-war period was carried out in Kyiv (9.2 million m^2) and in the cities with highly developed industrial production, or in certain regions, as follows: Donetsk (15.7 million m^2), Lugansk (10.06 million m^2), Odessa (6.22 million m^2), Kharkiv (5.19 million m^2), and the Autonomous Republic of Crimea (3.03 million m^2). The total number of houses was about 25,000 units (State Statistics Service of Ukraine 2018b). Nowadays, when the technical condition of buildings is catastrophically worsening every year (Barashykov et al. 2000), houses are beginning to collapse, resulting in property damage and, worst of all, in human casualties. So that, a clear awareness of the urgent need to develop a system of immediate measures for the reconstruction of the buildings of the first industrial series and of the outdated housing stock, in general, has emerged in the country.

The issue of the reconstruction of mass housing of the first period of industrial housing construction in Ukraine has not arisen for the first time. Even during the period of development of mass housing construction projects and their implementation, it was clear to designers and builders that this was not the final solution to the housing problem. It was understood that the validity period of those projects, developed according to the minimum social standards, as well as housing construction based on low cost technology was not optimal. The real life of both projects and buildings according to the most optimistic expectations could not exceed 50-70 years. First of all, that period was determined on the basis of the “vitality” of the building structures, as well as the obvious low quality of the construction as a whole. Now, these residential buildings have already exhausted their moral and technical resources and they have come into conflict with the general practice of housing construction in the recent years. Also, inequality in the conditions of comfort between the different types of buildings by their date of construction was formed.

The first steps in the reconstruction of buildings can be dated to the beginning of the 80s of the 20th century. Architects and engineers proposed a number of projects aimed at improving the constructional qualities of houses, the facade architecture, and, to some extent, the layout of apartments. Attempts to reconstruct separate buildings began to be carried out as to implement those projects. The legislative consolidation of this approach to reconstruction was embodied in the State Program of Ukraine: “Reconstruction of residential buildings of the first mass series”, adopted in 1997 and designed for the period 1997-2010 (Cabinet of Ministers of Ukraine 1999). Its purpose was to maintain and update the existing housing stock built on the projects of the first mass series. A complex reconstruction of those buildings was to significantly increase the density of the housing stock, the level of improvement and arrangement of the built-up territories and consequently, the efficiency of their use. It was assumed that the average cost of reconstruction and modernization of residential buildings should be 53-77% of the cost of new construction (Bolshakov et al. 2005).

In the development of this program, a study on the possibility of reconstruction of five-storey residential buildings constructed in the ‘60s of the 20th century was carried out in 8 districts of the city of Kyiv (“KYIVPROEKTREKONSTRUKTSIIA” Design Institute 1996). According to the analysis, the report noted that by the time of its development, the normative deadlines for major repairs with a complete or partial reconstruction of the five-storey residential buildings of the first mass series had come. 879 residential buildings in 8 administrative districts of the city were examined. The city reconstruction program included residential buildings that allowed the superstructure of the attic floor, the attachment of parts (bay windows along the entire height of the building or only along the 1st floor), the extension of the ends, and the internal layout change. In addition, the examination identified the buildings that required major repairs, the buildings which did not need reconstruction, the buildings with a room height of more than 2.5 m, and with a good layout, separate toilets and bathrooms, as well as the buildings that were recommended for demolition (those that had irreversible deformations, transverse load-bearing walls, with showers combined with kitchens of 3-4 m^2, as a rule, etc.), and the layout of which could not be improved. The results of the examination indicated that,

as of 1996, 4% of the five-storey residential buildings of the first mass series were classified as subjects to demolition ("KYIVPROEKTREKONSTRUKTSIIA" Design Institute 1996).

In 2006, Ukraine adopted the law "On the complex reconstruction of the blocks (neighbourhoods) of outdated housing stock" (Law of Ukraine 2006). Ideologically, it was mainly based on the implementation model of the Moscow program (Government of Moscow 1999), and other Russian cities, using the so-called "wave" method. In order to test the validity of this regulation (Law of Ukraine 2006), a pilot project was implemented in 2007 – "Urban planning concept for the renovation of buildings of the territory along Marshal Grechko street in the Podilsky district of the city of Kyiv (from No. 2 to No. 26-a)", developed by the Institute of Urban Planning, Kyiv. The project demonstrated the organizational capability, the cost-effectiveness and the advisability of using such a method of reconstruction for the outdated residential stock areas in the conditions of the city of Kyiv. Based on the results of the development of the pilot project, proposals of amendments to the current Law of Ukraine (2006) were made. The next step was the development of the draft program for the complex reconstruction of the blocks (neighbourhoods) of outdated housing stock in the city of Kyiv. The development of such a program was started in 2008. However, the economic crisis of 2008-2009 prevented the completion of its development and the start of its implementation.

The active transformation of the residents' idea on the necessary level of comfort and efficiency of maintenance of residential buildings, both new and already reconstructed, requires constant attention to this issue. In 2019, the development of a new program for the complex reconstruction of outdated housing stock began preceded by an analytical and research stage.

The purpose of the present study included:

- The clarification of the criteria for classifying residential buildings as outdated and for forming an outdated buildings' typology for the conditions of Ukraine, considering the stages of urban development;
- The determining of spatial localization patterns of outdated buildings typological groups as potential objects of complex reconstruction – blocks (neighbourhoods), groups of residential buildings or separate residential buildings;
- Determining the specific features and reasons for the delay in the implementation of programs and projects for the complex reconstruction of outdated housing stock in Ukraine, based on the analysis of the experience of reconstruction in the countries of Western and Eastern Europe.

Methodology

This article presents the results of a study of the outdated housing stock reconstruction problem considering the specifics of modern socio-economic conditions in Ukraine. The study was carried out as a part of the research and analytical stage of the development of the draft Program for the Complex Reconstruction of Blocks (Neighbourhoods) of Outdated Housing Stock in the City of Kyiv. The Program was commissioned by the Department of Construction and Housing of the executive body of the Kyiv City Council to the Institute of Urban Planning (Kyiv), as contractor. The development of the draft Program included three stages: the preparatory stage, the research and analytical stage, and the design stage. The *preparatory* stage included an inventory of property, an inventory of land, and the technical examination of buildings. During the *research and analytical* stage, the following was carried out: analysis of the current legislative framework; analysis of the regulatory framework; systematization of possible reconstruction methods based on the analysis of foreign and domestic experience in the reconstruction of such a stock; analysis of the available urban planning documentation for the city of Kyiv; forming of a typology of outdated housing stock; conducting a sociological

survey regarding the consideration of public opinion on the reconstruction of outdated housing stock; development of financial mechanisms for the implementation of reconstruction projects. Based on the results of the research and analytical stage, recommendations were made on amendments to the legislative framework for the development and implementation of programs and projects for the reconstruction of outdated housing stock in Ukraine. The *design* stage included the development of project documentation for the separate reconstruction objects determined during the second stage of the Program development.

One of the main tasks of the research and analytical part of the Program development was to clarify the concept and to determine the territorial boundaries of the reconstruction object – the blocks of outdated housing stock. The term "outdated housing stock" is widely used both in research publications and in the publicist sources of Ukraine. However, its formalized, legislatively fixed definition is given only in one legislative document – the 2006 Law of Ukraine. The incorrectness of the mentioned definition necessitated the use of methods for formalizing the criteria for the concept of an outdated stock on the basis of a comparative analysis of the legislative framework, the methodological base and the terminological apparatus for implementing the reconstruction processes.

The authors analysed the materials of the address list of residential buildings built before 1980 and intended for the complex reconstruction, formed in the context of administrative districts of Kyiv. The list contained information on 5068 houses. Considering the construction period of residential buildings, their basic design schemes, their technical condition and the minimum necessary engineering equipment supply, the entire analysed housing stock was divided into four typological groups: *historical type buildings; "Stalinka" type buildings; barrack type buildings; and houses of the first mass series of the period of industrial housing construction ("khrushchevka" type)*. Comparative and generalized characteristics of the various types of outdated buildings are given in Table 1.

The study analyses the results of a comparative research of the implemented foreign and domestic programs for the complex reconstruction (renovation, rehabilitation) of the buildings of neighbourhoods formed by the houses of mass series of the first period of industrial housing construction, and of the modernization projects, and the projects of reconstruction of separate buildings of this type. A retrospective analysis of the urban planning documentation at local level, developed for the city of Kyiv over the past 30 years, was also performed. The analysed documents are:

1. Report on the possibility of reconstruction of five-storey residential buildings constructed in the 1960s in 8 districts of the city of Kiev ("KYIVPROEKTREKONSTRUKTSIIA" Design Institute 1996);
2. The current Master Plan of the City of Kyiv and the draft planning of its suburban zone until 2020, PJSC "Kyivproekt", 2002;
3. The Concept of Strategic Development of the City of Kyiv for the period up to 2025 (The first stage of the Master Plan of the City of Kyiv and its suburban area until 2025), Municipal organization "Institute of the Master Plan of the City of Kyiv", 2010;
4. The draft Master Plan of the City of Kyiv, which is at the approval stage now, Municipal organization "Institute of the Master Plan of the City of Kyiv", 2019;
5. Urban planning concept for the renovation of buildings of the territory along Marshal Grechko street in the Podilsky district of the city of Kyiv, Institute of Urban Planning, Kyiv, 2007;
6. Detailed plans of the territory of separate parts of the city of Kyiv (approved and under development);
7. Other projects and predesign proposals.

Using grapho-analytical methods, a list of the reconstruction objects was formed with an indication of their spatial boundaries. At the next stage of the program development, those

objects, namely: whole planning formations – blocks, neighbourhoods; or separate buildings, groups of buildings, will act as objects for the development of project documentation.

Table 1

Main characteristics of various types of outdated residential buildings

Parameter	Historical type buildings	Barrack type buildings	"Stalinka" type buildings	
			ordinary	"nomenklatura"-intended
Series			I-201 – I-405	II-01 – II-07
Construction period	before 1914	1950s	1950s	1950s
Load-bearing wall material	brick, wood	brick (of destroyed (demolished) buildings)	brick	brick
Load-bearing wall thickness	0.51-0.80 m		0.51 m	0.51 m
Bridging	wooden	wooden	wooden	reinforced concrete floor slabs
Roof	sloped, with an attic	sloped, with an attic	sloped, with an attic	sloped, with an attic
Number of storeys	1-8	1-2	3	5-10
Room height	2.5-4.5 m	2.8 m	2.8-3.0 m	3.3-3.6 m
Kitchen area	4.5 - 12 m^2	6-15 m^2 (shared)	7.0-7.8 m^2	7-12 m^2
Elevator	absent / present	absent	absent	present

Parameter	"Khrushchevka" type 5-storey buildings			"Khrushchevka" type 9-storey panel buildings
	panel	brick	brick / panel	
Series	1-464	1-438	1-480	1-464A
Construction period	1960s	1950s-1960s	1960s-1970s	1960s-1970s
Load-bearing wall material	reinforced concrete panels	brick, brick large-block	brick, reinforced concrete panels	reinforced concrete panels
Load-bearing wall thickness	0.35 m	0.51 m	0.35-0.45 m	0.35 m
Bridging	flat-slab, reinforced concrete	flat-slab or hipped, reinforced concrete	hipped, reinforced concrete	hipped, reinforced concrete
Roof	flat-slab, combined	flat-slab, combined	flat-slab, combined or separate	flat-slab
Number of storeys	5	5	5	9
Room height	2.5 m	2.5 m	2.5 m	2.55 m
Kitchen area	5.6-6.3 m^2	5-6 m^2	5-6.5 m^2	6.4-7.6 m^2
Elevator	absent	absent	absent	present

Source: *own research, especially designed for this paper*

Solving a number of important economic, technical and urban development problems, the Program for the reconstruction of outdated housing stock should provide another, the most important, component – the social one, in order to create comfortable and safe living conditions for the inhabitants and for guaranteeing the property rights of the residents. To ensure maximum public support for the implementation of the reconstruction program, a sociological survey was conducted as part of the study – an online questionnaire with

distribution on social media networks and in social groups of Kyiv. In the social survey, the results of an online questionnaire of 733 respondents were analysed with a confidence interval of 3.6% (Filvarova and Pleshkanovska 2020). The study was conducted also by using the analysis of the statistical reporting materials of structural units of the Kyiv City State Administration in terms of the amount and the condition of the existing housing stock in the city of Kyiv. Altogether, 5,068 houses were analysed, with a total area of 11,296.4 thousand m^2, in which 524 thousand residents lived in 257,235 apartments.

Results and Discussion

The reconstruction of the outdated buildings is a multidimensional subject, and it is widely covered in the scientific literature. But, even for countries that have accumulated a large theoretical and practical experience in solving this issue, the problem of maintaining the proper technical condition of residential buildings, their compliance with energy efficiency requirements and an appropriate level of the living environment comfort are constantly relevant. A significant lag behind European countries in the practical implementation of projects for the reconstruction of the outdated stock has presented Ukraine with challenges of rethinking the experience of other countries and its adaptation to the economic and social conditions of the country.

The concept of "outdated housing stock"

According to the 2006 Law of Ukraine, the term *outdated housing stock* is defined as "a set of housing units under five storeys, except for individual estate, which, in technical conditions, do not meet the current standards for safe and comfortable living, the maximum service life of which has expired or the physical deterioration of the main structural elements of which is at least 60%" (Law of Ukraine 2006). Any other quantitative and qualitative characteristic of this term is absent in the legislative and regulatory framework of Ukraine. At the same time, the term *outdated housing stock* is used quite widely in the scientific literature (Shcherbyna and Valiashchuk 2013, Serdiuk 2016, Kalentieva 2018). In general, it is applied to residential buildings of the first period of industrial housing construction, while residential buildings that have almost exhausted their operational resource and they are physically and morally outdated while they require immediate reconstruction are much more diverse.

The list of criteria for classifying residential buildings as "outdated" was clarified as part of the study and recommendations were given on the parametrization (quantitative indicators) of these criteria. In the legislative definition of the term *"outdated housing stock"* or *"outdated residential buildings"*, four criteria of such a stock can be determined (Law of Ukraine 2006):

- *Number of storeys.* The analysis of residential buildings built in the city of Kyiv more than forty years ago and of the ones that potentially require immediate reconstruction indicates that the above mentioned attribute cannot be a criterion for classifying them as an outdated housing stock. The number of storeys can only act as a characteristic feature, especially for residential multi-apartment buildings of mass industrial series, both previously built and modern.
- *Technical condition of houses.* The category of technical condition is characterized by the degree of physical deterioration of structural elements and of the object as a whole. However, the deterioration of "not less than 60%", determined by the law as a criterion for classifying the building as outdated, defines the technical condition of the building as "dilapidated" or "unserviceable", and the condition of structural elements as "emergency" (State Building Standards of Ukraine 2009). The indicator of physical deterioration should be reduced to at least 50% and it should cover buildings that at the time of the analysis belong to the "unsatisfactory technical condition" group with a physical deterioration from 41% to 60%.

- *Comfort of living conditions*. According to the results of a sociological survey, only 8.9% of the participants expressed satisfaction with the conditions of their residence. Most of all, the residents are dissatisfied with the state of the engineering networks (57.7% of respondents) and the technical condition of the structural elements of the building (38.1%). Almost half of the respondents – 47.8% – expressed dissatisfaction with the inconvenient layout of the apartments (walk-through rooms, small areas of kitchens and bathrooms, etc.), as well as with the absence of elevators – 17.1% (Filvarova and Pleshkanovska 2020).
- Separate signs of comfort, which have become extremely relevant in recent years, are the *energy saving and energy efficiency* of the building indicators (Grabovyy and Kiseleva 2015, Oliynyk and Murgul 2016). Energy efficiency is an indicator that is characterized by the ratio of energy use effect to energy consumption. We are talking about electricity, heat, water, gas consumption, etc. Furthermore, indicators of the thermal characteristics of the building envelope are important (Marique and Rossi 2018). The compliance with this criterion is extremely difficult in terms of historical buildings' renovation (La Fleur 2019).

Outdated buildings typology

Despite the significant amount of housing stock lost during the Second World War, the existing buildings in Kyiv are very diverse in terms of architectural and planning characteristics, as well as by the construction period. The typology of residential and non-residential buildings was considered by numerous authors in the context of various criteria. From the point of view of the subject of research, the following typologies can be mentioned: by the construction period (Kornieva 2013), according to the historical and architectural value, by design schemes (Zakharov et al. 2019), by the number of storeys, by the wall material (Oliynyk and Murgul 2016), and by many others.

The scientific literature, while considering issues of outdated buildings reconstruction, mostly talks about the mass blocks development of the period after the World War II (Hess et al. 2018). Other authors (Marin and Chelcea 2018) also include the buildings constructed after the 1990s, as a separate type. In this research, the authors analysed the materials of the address list of residential buildings built before 1980 and intended for complex reconstruction, as formed in the context of administrative districts of Kyiv. The list contained information on 5068 houses. In terms of outdated housing stock reconstruction for the conditions of Ukraine, considering the construction period of residential buildings, their basic design schemes, technical condition and minimum necessary engineering equipment supply, the entire analysed housing stock can be divided into four typological groups:

1. ***Historical type buildings.*** There are a large number (2.58 million m^2 of total area) of historical buildings, built before 1914 (of the First World War and the Civil War period), which can be divided into two subtypes:
   - *Cultural heritage monuments* listed in the State Register of Cultural Heritage Sites. Most of these memorial objects are used as public buildings, they are under state protection, and they have quite a good technical condition (for example, the House with Chimaeras of the architect Horodecky). However, even despite the status of the monument, sometimes they have a too shabby technical condition, and they are on the edge of collapsing (e.g. I. Sikorsky's house).
   - *Objects that do not have the status of a cultural heritage monument*, but those that belong to the so-called "background historical buildings" of the city.
2. ***Barrack type buildings.*** The construction of such housing took place mainly after the Second World War of improvised materials (usually of brick of destroyed houses) as temporary housing, but even now, there are up to 0.27 million m^2 of total area of such houses in Kyiv. Their main disadvantages are: cracking of the external brick of the load-

bearing walls, the emergency condition of the internal wooden walls, the unsatisfactory condition of the internal electrical networks and sanitary equipment, the internal layout providing for communal apartments.

3. ***"Stalinka" type buildings.*** Buildings of this type were built in the '30s and '50s of the twentieth century (the period of I. Stalin's governance) and they total about 0.73 million m^2 in Kiev. Houses are divided into two subtypes – ordinary and "nomenklatura"-intended.
   - *Ordinary houses* – three-storey buildings, they have brick walls, bridging – wooden; roof – sloped, with an attic.
   - *"Nomenklatura"-intended houses* have 5-10 storeys and elevators. The internal layout of apartments, common areas, stairwells, entrance halls and service rooms, balconies, loggias, bay windows are quite spacious.

   In the "stalinka" type buildings, signs of series housing appeared: external resemblance, similar layout and building materials. During this period, the production of unified parts (reinforced concrete floor slabs, foundation parts, prefabricated columns, etc.) was established, that laid the groundwork for the transition to mass construction.
4. ***Houses of the first mass series of the period of industrial housing construction ("khrushchevka" type).*** These are the houses built according to the program for the restoration of the housing stock destroyed during the Second World War, which was begun by the head of the USSR of that time, Nikita Khrushchev (the '50-'70s of the 20th century). The total area of these houses in Kyiv is almost 9.23 million m^2. Of these, 47% are panel houses, 50% are brick houses, 3% are large-block ones. The most widely used series were 5-storey ones, such as: 1-438, 1-464, 1-480 (8.73 million m^2 of total area).
   - *"Khrushchevka" type 5-storey brick buildings* (series 1-438). Design scheme – frameless with longitudinal load-bearing walls.
   - *"Khrushchevka" type 5-storey and 9-storey panel buildings* (series 1-464) were not widely used in the city of Kyiv. Design scheme – frameless with transverse load-bearing walls.
   - *"Khrushchevka" type 5-storey brick or panel buildings* (series 1-480) were the most widely used in the city of Kyiv. Design scheme – crosswall. Foundations – concrete, walls – brick covered with ceramic tiles or reinforced concrete panels.

Distribution of the total amount of the outdated stock by its main characteristics (population, total area of apartments, number of apartments, number of houses) is shown in Table 2.

Table 2

Distribution of the outdated housing stock in the city of Kyiv, by type

Type of buildings	Number of houses	Number of apartments	Total area of apartments (thousand m^2)	Population (thousand people)
Historical type buildings	918	15 182	1 054.1	35.7
Barrack type buildings	393	6 038	276.9	13.9
"Stalinka" type buildings	369	14 121	731.8	32.6
"Khrushchevka" type buildings (total)	3 509	222 530	9 233.6	439.8
including:				
brick buildings	2 001	121 189	4 869.3	233.6
panel buildings	1 387	100 705	4 364.3	208.2
Total within the city	**5 068**	**257 235**	**11 296.4**	**524.0**

Source: *own research (2019); archival materials are kept at the Institute of Urban Planning*

An analysis of the spatial distribution of outdated residential buildings was carried out in the context of the administrative districts of the city of Kyiv (Fig. 1). The present administrative-territorial structure of the city was formed in 2001, and it now includes ten administrative districts, each of which differs in area, population, and the number and type of outdated houses (Fig. 2). These are:

1. Holosiivsky district
2. Darnytsky district
3. Desniansky district
4. Dniprovsky district
5. Obolonsky district
6. Pechersky district
7. Podilsky district
8. Sviatoshynsky district
9. Solomiansky district
10. Shevchenkivsky district

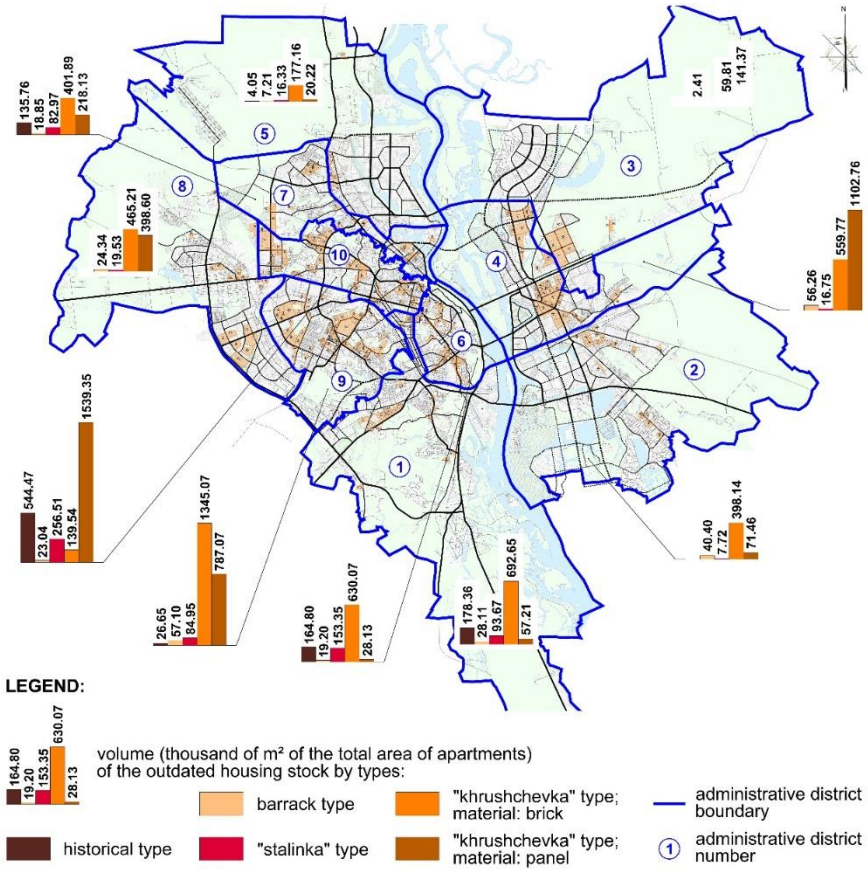


Fig. 1 **– Scheme of distribution of outdated housing stock, by the type according to the city administrative-territorial structure**

Source: *own research (2019); archival materials are kept at the Institute of Urban Planning*

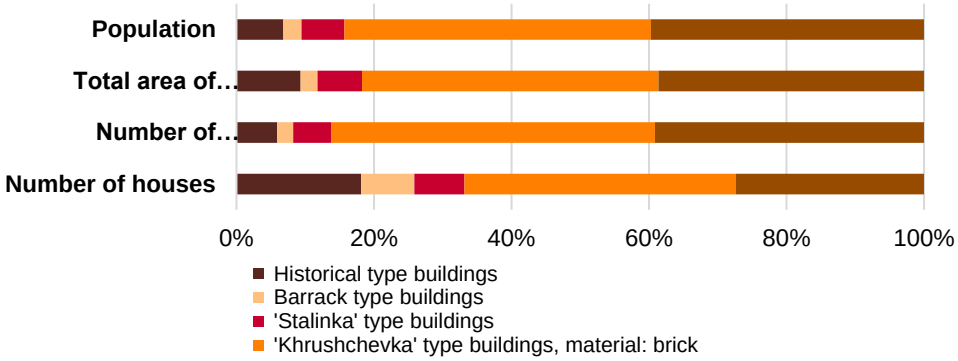


Fig. 2 **– Distribution of outdated housing stock, by types, in Kyiv**
Source: *own research, especially designed for this paper*

General characteristics of outdated stock

The inclusion of buildings of an earlier construction period (before the World War II) is due to the long period of not carrying out this stock reconstruction measures, since the part of the stock (barrack type buildings) was considered as temporary housing of extremely poor quality and low level of engineering equipment. As noted above, according to the Main Department of Statistics in Kyiv (2020), as of 2018, there are 63.5 million m^2 of the total area of housing (including individual estate) in the city of Kyiv, which amounts to 1,081.7 thousand apartments. Therewith, 1.9% of the total number of apartments (20,539 units) are not provided with cold water supply, and 3.3% (35,691 apartments) are not provided with hot water supply. There is no sewage system in 4.3% of units (46,513 apartments) and 3.9% of them (42,185 apartments) are not provided with heating (Main Department of Statistics in Kyiv 2020). This indicates a significant amount of the housing stock in Kyiv that does not fully comply with the general understanding of comfortable living conditions.

Another characteristic of comfort may be the average housing sufficiency, that is the total area of the apartment provided for 1 resident. By this indicator, Kyiv has one of the last places in Europe. In Ukraine, as of 2008, the housing sufficiency is 22.8 m^2 per person (State Statistics Service of Ukraine 2020). For comparison with other data, in Kyiv, as of 2008, the housing sufficiency was 20.6 m^2 per person, and as of 2018 – 21.8 m^2 per person (Main Department of Statistics in Kyiv 2020). At the same time, the highest average housing sufficiency is in Norway – 74.0 m^2 per person, and in Denmark – 65.0 m^2 per person. In Eastern European countries this indicator is: Czech Republic – 28.7 m^2 per person, Hungary – 28.0 m^2 per person. A lower level of housing sufficiency is only in Poland – 22.2 m^2 per person, and in Russia – 21.1 m^2 per person (Kyrychuk 2009).

One of the important characteristics that influences the choice of financial support options and possible outdated stock reconstruction methods is a form of housing ownership. This indicator differs significantly in Western Europe and in post-socialist countries. Before 1990, the number of privately-owned apartments was: approx. 25% in Poland and in Bulgaria, approx. 37% in Hungary, and approx. 50% in Slovenia; in the USSR, the part of which Ukraine was, it reached only 8% (Mandič 2010). Then, in 1994, in Hungary, Slovenia, Bulgaria and Romania, for instance, the rate of home ownership reached close to 90%.

In Western Europe, the share of people living in rented housing reaches: for people with a low income – from 40-45% in France, Germany, and the Netherlands; to 50-62% in Sweden, Belgium and Great Britain; for people with an average income – from about 34% in Great

Britain and Belgium; to 40-45% in France, Germany, Sweden and the Netherlands (Van der Heijden 2002).

As part of the study, the features of the legal status of the outdated housing stock of Kyiv were analysed. According to official data (State Statistics Service of Ukraine 2018b), as of 2018, in big cities, including Kyiv, 92.4% of apartments are in private ownership (privatized, purchased); the state and departmental property is 0.7% of total apartments, and 6.9% of families rent the housing from private owners. According to the results of our own sociological survey conducted as part of this study, in the city of Kyiv, among the respondents living in housing which may be considered outdated, 84.3% own their apartments, 10.4% rent the housing, and the rest of 5.3% live in non-privatized apartments (Filvarova and Pleshkanovska 2020). The high percentage of people living in their own housing and who have no other (rented) one creates additional complications for the outdated stock reconstruction option with the total demolition. Such an option requires the need for additional compensatory measures to solve the property issues.

The formation of a system of complex reconstruction objects

The program is aimed at ensuring the further sustainable development of the city of Kyiv and it sets goals of:

- counteracting housing stock degradation;
- forming of comfortable living conditions for the inhabitants;
- ensuring the further development of social infrastructure and updating the existing engineering and transport infrastructure;
- helping to improve the efficiency of the urban territory use and increasing tax revenues to the local budget;
- attracting additional investment in the development of the city.

As noted above, the following typological groups can act as objects of reconstruction of outdated housing stock: 1) *separate residential buildings or groups of residential buildings* within the set boundaries of house plots or without them; 2) *whole planning formations* – blocks, neighbourhoods with clearly determined boundaries (red lines of the adjacent streets or other artificial or natural bounds). In determining the boundaries of potential reconstruction objects, the authors based on the following principles: 1) the territories of the individual estate and the territories built up over the past four decades were not included in the territories under consideration; 2) buildings should correspond to the category "outdated housing stock". The layout of areas of complex reconstruction of the blocks of outdated housing stock in Kyiv is shown in Fig. 3.

The first typological group includes buildings or small groups of buildings located dispersed within the existing built-up territories and the ones that do not form the whole blocks and neighbourhoods. These are:

- buildings or groups of buildings, which belong to the historical type of outdated housing stock (cultural heritage monuments, background historical buildings);
- "stalinka" type buildings; groups of the barrack type buildings;
- separate buildings or groups of buildings of other types of outdated housing stock.

The second typological group consists of blocks and neighbourhoods that form residential areas of the mass post-war housing construction period – "khrushchevka" type outdated buildings. This group can be divided into several subgroups:

- neighbourhoods as whole planning formations, within which five-storey brick buildings prevail. A typical example is the Voskresenka residential area. On the territory of 245 hectares, 11 neighbourhoods were formed with a total area of housing stock of about 680 thousand m^2; neighbourhoods as whole planning formations, within which five-storey panel buildings prevail. A typical example is the northern part of Nyvky residential area with the territory of 46.9 hectares and a total area of housing stock of about 204 thousand m^2. It was this type of neighbourhoods that the first "pilot" project in Ukraine was developed for in 2007.
- neighbourhoods as whole planning formations, within which mixed five- and nine-storey brick or panel buildings prevail. A typical example is Lisovy residential area, which consists of 9 neighbourhoods with a total area of houses of about 360 thousand m^2. The territory is of 96 hectares.

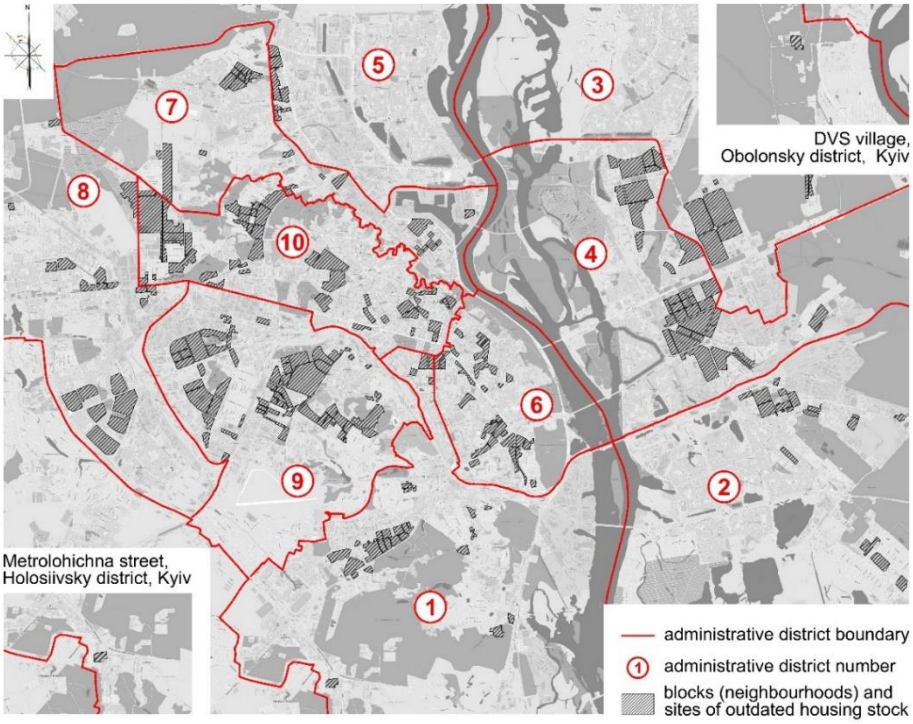


Fig. 3 **– Layout of the objects of potential reconstruction of outdated housing stock in Kyiv**

Source: *own research (2019); archival materials are kept at the Institute of Urban Planning*

Also, this subgroup contains blocks of small area formed by:

- residential buildings of barrack type or ordinary "stalinka" type. Typical examples are blocks within Nova Darnytsia residential area, formed by two-storey houses built by German prisoners of war. These blocks are also called "German blocks".
- blocks in the historical part of the city, mainly formed by the historical type of residential buildings interspersed with separate modern buildings.

According to the results of the analysis, in the city of Kyiv, in general, 274 blocks and neighbourhoods were allocated, of which 31 blocks with prevailing historical type and "stalinka" type buildings, 6 blocks of barrack type buildings and 22 neighbourhoods formed mainly by five-storey panel buildings of the first period of industrial housing construction. The

rest of the blocks and neighbourhoods contain a combination of different types of outdated buildings.

Analysis of the spatial localization of obsolete buildings' typological groups

The spatial organization of the city's territory develops during the period of its existence, experiencing wave-like changes under the influence of socio-demographic, economic and political factors (Pleshkanovska and Savchenko 2019, Pleshkanovska and Savchenko 2020). After the World War II, in most European countries, in order to restore the destroyed housing stock, mass construction took place over large areas. The following factors facilitated that process:

- large volumes of the destroyed stock within previously developed territories to be cleared after the total destruction of houses;
- state ownership of land in socialist countries of that time that made it possible to allocate large free territories, mainly in suburbs;
- attempts to minimize the cost of construction through mass industrial housing construction.

Most often, the spatial allocation of such areas in the planning structure of cities was concentric (Hirt and Stanilov 2007, Marin and Chelcea 2018). However, in Kyiv, such a model is not clearly defined. For a more reliable assessment of the spatial localization of areas of mass residential development during the post-war revival, their placement on the Kyiv map, based on cartographic materials such as the Stadtplan Kiew of 1943, was considered.

The first Soviet Master Plan of Kyiv was carried out under the leadership of Haustov and it was approved in 1938. Kyiv's development along the west-east latitudinal direction (along the historic Via Regia) with the city's exit on the left bank of the Dnieper was to be a major novelty of the city's spatial planning. More than 20 suburban settlements were planned to be added. On the other hand, the cardinal transformations should have led to a significant increase in the spatial compactness of the city with the creation of powerful industrial and residential areas, and the formation of a large-scale governmental centre (Pleshkanovska 2019). But the beginning of the Great Patriotic War of 1941-1945 did not allow the completion of this ambitious plan. As a result, the spatial organization of Kyiv remained quite dispersed (Fig. 4).

The need to place significant volumes of new housing construction during the period of Kyiv restoration after the war led to the predominant localization of residential blocks in the peripheral part of the post-war city. However, some of that blocks were built on the central areas of the city, freed from the remains of destroyed houses. So, most of the "khrushchevka" type residential buildings are located in the Solomiansky district (2,132.2 thousand m^2 of which 1,345.1 thousand m^2 are built of brick and 787.1 thousand m^2 are of panel ones), the Shevchenkivsky district (1,678.9 thousand m^2, of which 139.5 thousand m^2 are brick ones and 1,539.4 thousand m^2 are panel ones), and in the Dniprovsky district (1,662.6 thousand m^2, of which 559.8 thousand m^2 are built of brick and 1,102.8 thousand m^2 are panel ones).

The entire blocks of groups of houses, formed by the historical type of residential buildings are located mainly in the central areas of the city (Fig. 5), namely: in the Shevchenkivsky district (544.5 thousand m^2), the Pechersky district (164.8 thousand m^2), the Golosiivsky district (178.4 thousand m^2), and the Podilsky district (135.8 thousand m^2). It should be noted that we are talking only about residential buildings. A significant number of historical type buildings are used as public ones. The amount of the barrack type of buildings is quite little – 276.9 thousand m^2. These buildings are located mainly in the Darnytsky district (40.4 thousand m^2), the Dniprovsky district (56.3 thousand m^2), and the Solomiansky district (57.1 thousand m^2), of the city of Kyiv. The "stalinka" type buildings are also located mainly in the

central areas of the city – in the Shevchenkivsky district (256.5 thousand m^2), and the Pechersky district (153.4 thousand m^2).

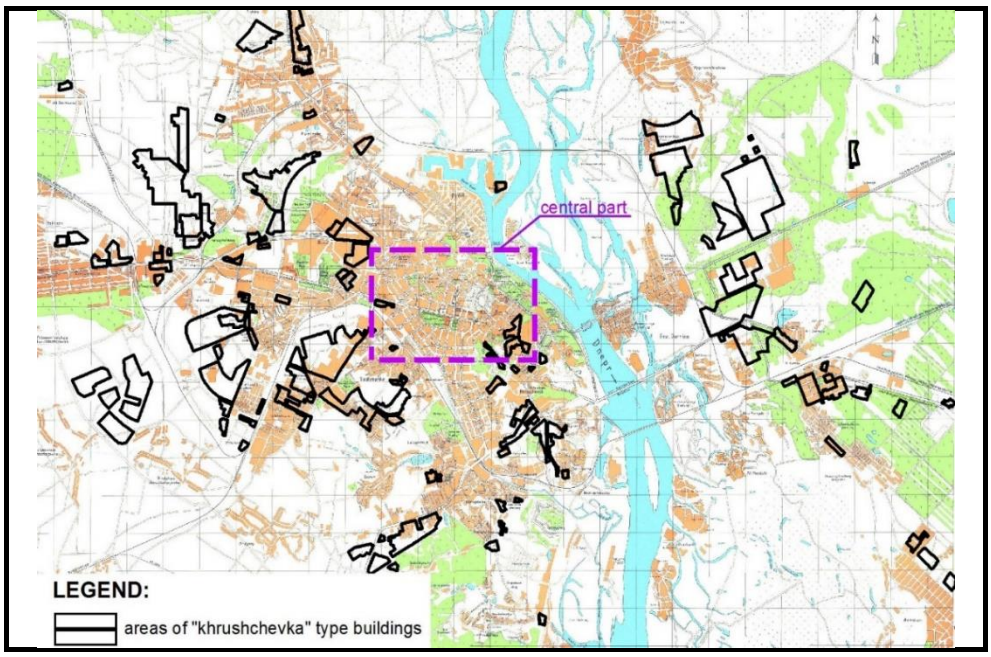


Fig. 4 **– Spatial localization of blocks of barrack type and of "khrushchevka" type of outdated buildings in Kyiv**
Source: *own research based on the Stadtplan Kiew (1943), especially designed for this paper*

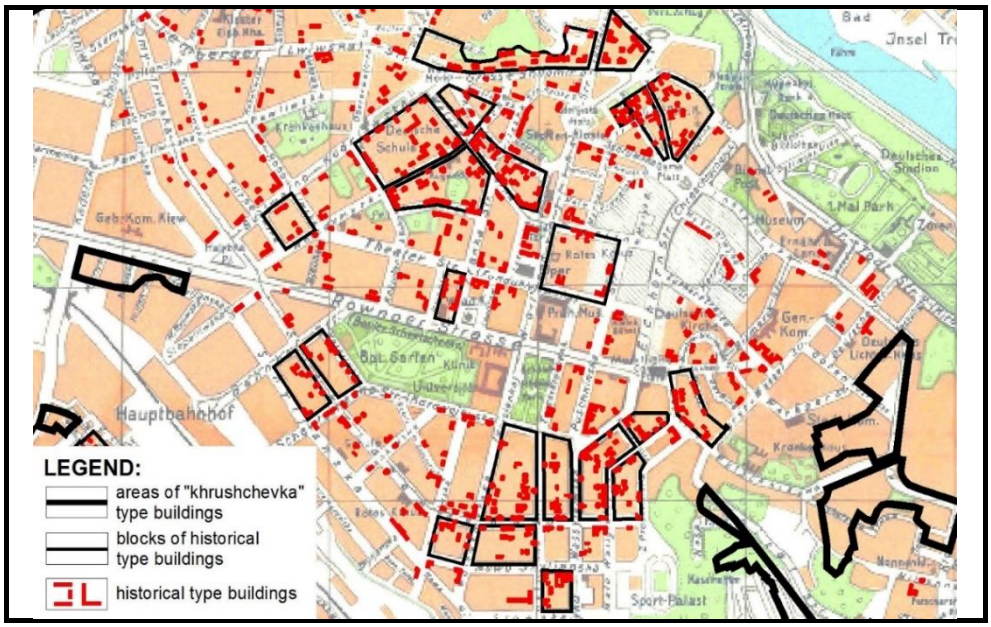


Fig. 5 **– Spatial localization of outdated buildings' blocks in the central part of Kyiv**
Source: *own research based on the Stadtplan Kiew (1943), especially designed for this paper*

Thus, the spatial localization of potential objects of complex reconstruction – blocks of outdated residential buildings, groups or separate residential buildings – has a mixed pattern with the domination of:

- a circular arrangement of significant areas formed by the "khrushchevka" type of residential buildings of the first mass series of industrial housing construction and by the barrack type buildings moderately concentrated in peripheral (at the time of construction) districts of the city;
- concentrated allocation of blocks and groups of historical and "stalinka" type of residential buildings in the central zone;
- dispersed in the planning structure of the entire city localization of complex reconstruction objects, formed by representatives of different typological groups of outdated housing stock.

The legal status of land plots as a factor influencing the choice of the reconstruction method

The evolution of the spatial planning organization of the territory of the city is quite clearly seen in the change of the localization of residential formations (residential areas, districts) of outdated housing stock. The blocks and neighbourhoods formed during the first period of industrial housing construction (1950s-1960s), were located mainly in the peripheral zone of the city at the time of construction. Now, in the process of spatial growth, these areas are in the middle, and sometimes even in the central parts of the cities, with a rather high cost of land. So, almost all the areas formed by the first mass series of residential buildings (the "khrushchevka" type) in Kyiv are now located within the middle zone and only Lisovy residential area (in the eastern part of the city) and Mykilska Borshchahivka residential area (in the western part of the city) remain in the peripheral zone of the city (Fig. 6).

Unlike the countries of Western Europe, the formation of cities in Ukraine, as well as in other post-Soviet countries, took place for a long period under the conditions of state ownership of land and planned economic development. At that period, the decision to allocate large territories for areas of mass construction did not consider the factor of the cost of land, but only the town planning value and the need for solving a social task of providing the population with housing and of developing the necessary material infrastructure of the city. This led to the fact that the technical and economic parameters of the territory use and development had provided rather low indicators of building density (15-18% of the total area of the neighborhood) and population density (230-270 people per hectare).

The comparison of the land valuation at the present stage of the city's development and the cost-effectiveness assessment of the technical, architectural and planning reconstruction of these outdated houses became possible as a result of the inclusion of land in the system of market relations, where land acts as a high-value product. Regarding the barrack type buildings, an unambiguous decision has been made on its complete demolition followed by a new construction on the freed territories. As for the "khrushchevka" type buildings, two basic options are possible: complete demolition followed by new construction, for the panel residential buildings of the first mass series; and modernization with a set of measures to modernize the engineering equipment and to insulate the facades of brick buildings; or the complex reconstruction of buildings of this period with additional new construction on separate vacant land plots and modernization of existing buildings.

A particular aspect of the analysis of the territory of blocks and neighbourhoods as objects of the potential reconstruction of outdated housing stock was the consideration of land management issues and property rights of owners / users of both individual land plots and individual residential and non-residential premises. The territory of outdated housing stock was formed during the Soviet era, when there was only one type of land ownership – the state.

It means that the entire territory of blocks and neighbourhoods belonged to the residential territory of state property without dividing it into separate land plots for each building or object within them. To understand the heterogeneity of the legal status of land plots of blocks of outdated multi-storey residential buildings, an example of such a block can be considered. The block is located in the Obolonsky district of the city of Kyiv, in the Priorka residential area. On the area of 7.36 hectares, there are 6 barrack type residential buildings and 6 residential buildings of the first period of industrial housing construction (Fig. 7.A). The fragment of the Public Cadastral Map of Ukraine (Fig. 7.B) clearly shows that:

- the majority of land plots within the block are not formed as objects of law;
- the land category is not determined;
- the purpose of land use is not determined;
- the land management materials are not available.

In Fig. 7.B, the boundaries of the reconstruction objects (blocks) are shown in yellow; the land plots with set boundaries are in blue.

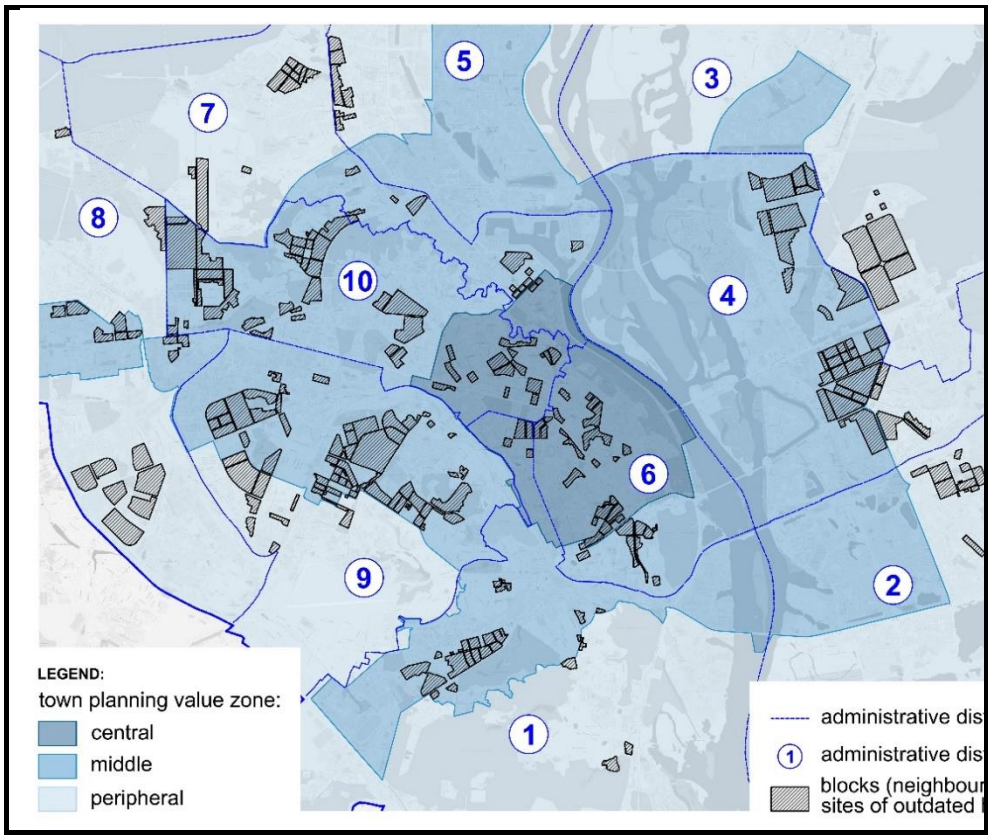


Fig. 6 **– Layout of the objects of potential reconstruction of outdated housing stock on the zoning scheme of the territory of Kyiv, according to the town planning value**
Source: *own research (2019); archival materials are kept at the Institute of Urban Planning*

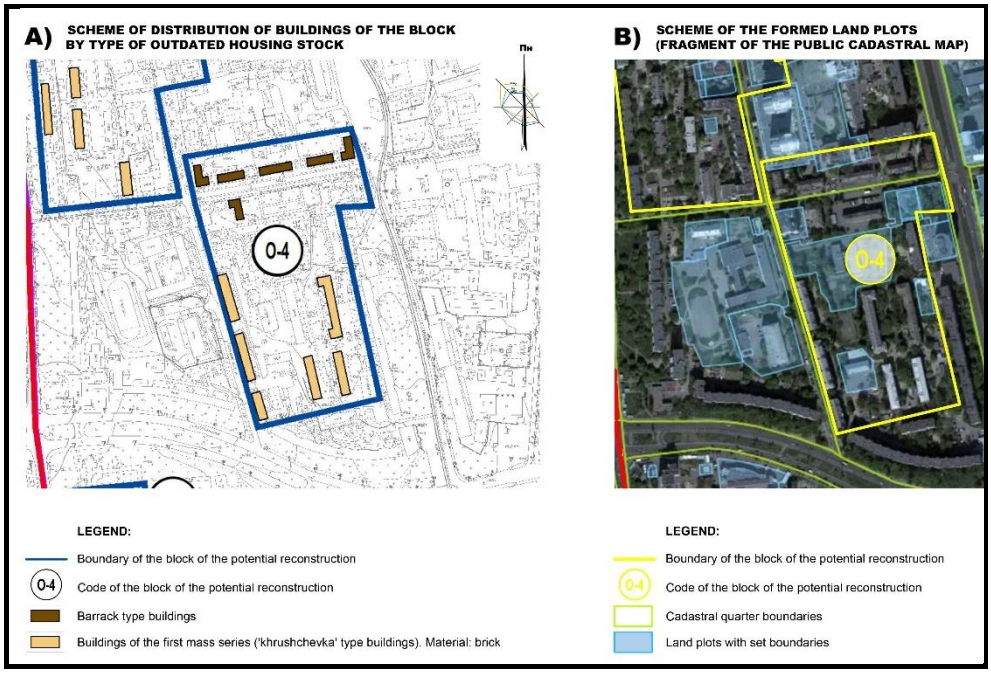


Fig. 7 **– Structure of the block of outdated housing stock in Kyiv**
A) Scheme of distribution of buildings of the block, by the type of outdated housing stock
B) Scheme of the formed land plots (fragment of the Public Cadastral Map of Ukraine)
Source: own research (2019); archival materials are kept at the Institute of Urban Planning

There are separate formed land plots of other land users with certain boundaries and purpose interspersed within the block territory. In addition to the outdated residential buildings, there are also other buildings and structures in the block owned by third persons with not set land plots for them. Land plots formed and provided to third persons for ownership or use mostly belong to the category of "land for residential and public buildings". The buildings of educational institutions or public health institutions of municipal property are located on them, which is a positive point. The uncertainty of the legal status of the territory of potential complex reconstruction objects in terms of setting the land plots boundaries and determining their area significantly complicates the procedure for holding investment tenders to choose an investor for the implementation of complex reconstruction projects.

Conclusions

The awareness of the need to permanently maintain the proper technical condition of the housing stock of settlements was widely considered by a large number of foreign and Ukrainian scientists and practitioners in the field of urban planning. However, unfortunately, Ukraine came to a practical solution to this problem much later than other countries in Western and Eastern Europe. The operational resource of residential buildings is almost exhausted. In the absence of planned repair measures, the technical condition of the housing stock has approached an emergency level or it has even crossed this line. There are cases of spontaneous collapsing of residential buildings.

The minimum necessary legislative and regulatory framework on the complex reconstruction of the outdated housing stock has been developed in Ukraine through the 2006 Law of Ukraine, based on the Russian model for the implementation of reconstruction projects, using

the “wave” method (Law of Ukraine 2006). But, the lack of domestic practice in implementing such programs has led to the loss of relevance of this Law and its inconsistency with the current socio-economic conditions and with the legislative framework developed over the past decade on land management and property rights consideration.

In our opinion, final recommendations on amendments to the 2006 Law should be made only after the development of programs and pilot projects for the complex reconstruction of blocks. The main principles for the development of such programs and projects should be:

- *The principle of social necessity and the principle of social justice* – creating a safe living environment, reducing social tension in the society, increasing energy efficiency and the architectural attractiveness of buildings;
- *The principle of guarantee of property rights* – compliance with the constitutional requirements regarding the equality of all subjects of property rights, the guarantees of property rights and the obligations of owners;
- *The principle of complexity* – the implementation of programs and projects as a system of comprehensive measures for the reconstruction, renovation and modernization of outdated housing stock with the updating of engineering and transport infrastructure, and the creation of new social infrastructure facilities;
- *The principle of public-private partnership* – ensuring a balanced respect of private, public and state interests at all stages of the implementation of the reconstruction programs and projects;
- *The principle of expanding the role of the public in the reconstruction processes* – supporting public initiatives, holding public dialogue (“public hearings”), clarifying future benefits and legal guarantees;
- *The principle of consistency* – carrying out the complex reconstruction of the existing residential buildings as part of a single socio-economic and urban development policy of the capital.

Developing programs and projects for complex reconstruction should be based on the type of outdated housing stock. Using the example of the city of Kyiv, four such types were identified: 1) *historical type buildings*, 2) *barrack type buildings*, 3) *“stalinka” type buildings*, and 4) *buildings of the first period of industrial housing construction (“khrushchevka” type buildings)*. The totality of outdated houses can be divided into two typological groups: 1) *separate residential buildings or groups of residential buildings* within the set boundaries of house plots or without them; 2) *whole planning formations* – blocks, neighbourhoods with clearly determined boundaries.

A comparative analysis of the experience in the reconstruction of separate buildings and blocks (neighbourhoods) of the outdated housing stock in various countries revealed that this process reflects the constant progress in creating and maintaining a comfortable living environment for people in cities. During the entire “life cycle” of the house and depending on its service life, various methods and models of reconstruction are used in the European practice, such as:

- Complete demolition;
- Partial demolition;
- Technical improvement of buildings: repairs, modernization, rehabilitation;
- Protection of the housing estate structure including cultural activities;
- Restoration of the area of the housing estate;
- Extending the range of services on the estate (Tofiluk et al. 2019).

The formed types of outdated housing stock determine the preferred method of reconstruction. So, the historical type of building requires, first of all, restoration measures, the modernization of the engineering equipment with a possible internal layout change and the preservation of the exterior view. Buildings of the "stalinka" type and the 5-storey brick buildings of the "khrushchevka" type require reconstructive measures with the attic floor superstructure, modernization and measures to increase the energy efficiency indicators, and with additional construction of new buildings. The barrack type buildings should be completely demolished, followed by the new construction on the freed territory. The exception is a separate predefined group of blocks that should be fully restored to preserve such a type of buildings for tourism purposes.

The preferred method for the complex reconstruction of neighbourhoods formed by 5-storey panel houses of industrial housing construction should be the renovation method. Four typical situations can be determined, depending on the features of the architectural and planning design of the territory and buildings of the blocks of potential renovation:

1. the availability of free territory for the construction of the start house within the block or the neighbourhood;
2. the availability of free territory for the construction of the start house within the neighbouring blocks or neighbourhoods. In this case, it is advisable to carry out the mass reconstruction in a comprehensive manner, starting with a planning formation, where it is possible to place a start house, and only after that moving to a neighbouring planning formation;
3. construction of the start house due to the demolition of a low-value non-residential building with the appropriate compensation to the owners;
4. construction of the start house with a temporary violation of insolation and a number of other regulated distances during the construction period.

The use of the renovation method is complicated by the presence of the almost complete private ownership of the apartments in these houses, unlike the common European practice of rental housing. Accordingly, the property rights of the owners of both residential and non-residential premises must be fully respected, and all the proposed projects must be agreed with the owners.

Acknowledgements

This study is a part of a researchers group project on the development of the research and analytical phase of the draft Program for the Complex Reconstruction of Blocks (Neighbourhoods) of Outdated Housing Stock in the City of Kyiv. The draft Program was carried out on the basis of the Institute of Urban Planning in Kyiv, with the support and funding of the Department of Construction and Housing of the executive body of the Kyiv City Council (Kyiv City State Administration) – the development contract No. 78 dated October 9, 2019, according to CPV code DC 021:2015 - 71410000-5 "Services in the field of urban planning". The authors are grateful to the whole team of the Institute of Urban Planning for their support and assistance in this study.

References

BAEK C.-H., PARK S.-H. (2012), *Changes in renovation policies in the era of sustainability*, Energy and Buildings 47, 485-496.

BARASHYKOV A. Y., HOMILKO V. O., MALYSHEV O. M. (2000), *Technical exploitation of buildings and urban territories*, Vyshcha shkola, Kyiv.

BERGER H., RITSCHL A. (1995), *Germany and the Political Economy of the Marshall Plan, 1947-52: A re-revisionist view*, in: Eichengreen B. (ed.), Europe's Postwar Recovery, Cambridge University Press, Cambridge, pp. 199-245.

BERNT M. (2017), *Phased Out, Demolished and Privatized: Social Housing in an East German 'Shrinking City'*, in: Watt P., Smets P. (ed.), Social Housing and Urban Renewal, Emerald Publishing Limited, Bingley, pp. 253-275.

BOBROVA V. D. (2011), *The program of economic assistance in restoring the economies of post-war Europe (Marshall Plan)*, Vestnik MGUP 12, 71-79.

BOLSHAKOV V. I., MOTORNY N. A., RAZUMOVA O. V., SHCHEGLOVA O. Y. (2005), *Basics of assessing the economic efficiency of the reconstruction of residential buildings,* Dnipropetrovsk: Bulletin of Prydniprovska State Academy of Civil Engineering and Architecture 10, 4-10.

CABINET OF MINISTERS OF UKRAINE (1999), *On measures for the reconstruction of residential buildings of the first mass series*, Resolution of the Cabinet of Ministers of Ukraine dated 05.14.1999 No. 829, Retrieved from: www.zakon.rada.gov.ua.

CHARAN S. P. (2018), *Study on Urban Sustainable Restructuring of Leinefelde, Germany and Revealing the Important Strategies for Environmental Well-Being for Shrinking Cities*, European Journal of Engineering and Formal Sciences 2 (3), 76-86.

FILVAROVA N. G., PLESHKANOVSKA A. M. (2020), *Attitudes towards outdated housing stock reconstruction: a sociological study*, Institute of Urban Planning, Kiev.

GOVERNMENT OF MOSCOW (1999), *Decree on the missions of the complex reconstruction of the five-storey building of the first period of industrial housing construction areas until 2010*, Dated 06.07.1999 No. 608, Retrieved from: www.docs.cntd.ru.

GOVERNMENT OF MOSCOW (2017), *Program for the housing renovation in the city of Moscow*, Retrieved from: www.mos.ru.

GOVERNMENT PORTAL (2020), *Construction work has begun at 300 sites – the "Big Construction" has started in Ukraine*, Retrieved from: www.kmu.gov.ua.

GRABOVOI P. G., KHARITONOV V. A. (2006), *Reconstruction and renewal of the existing buildings of the city*, Izd-va "ASB" i "Realproekt", Moscow.

GRABOVYY K. P., KISELEVA E. A. (2015), *Energy Efficiency of Housing Stock as an Economic Incentive to Increase the Performance of Real Estate Objects*, Vestnik MGSU 3, 79-91.

HESS D. B., TAMMARU T., VAN HAM M. (eds.) (2018), *Housing Estates in Europe: Poverty, Ethnic Segregation and Policy Challenges*, Springer, Dordrecht.

HIRT S., STANILOV K. (2007), *The perils of post-socialist transformation: Residential development in Sofia*, in: Stanilov K. (ed.), The post-socialist city: urban form and space transformations in Central and Eastern Europe after socialism, Springer, Dordrecht, pp. 215-244.

HOGAN M. J. (1987), *The Marshall Plan: America, Britain, and the Reconstruction of Western Europe, 1947-1952*, Cambridge University Press, New York.

IANKOVSKA O., BACHYNSKYJ D. (2013), *UkrSSR reforms in the social sector (1950–1960s): Housing provision*, Ukraine in the 20th century: Culture, Ideology, Politics 18, 132-149.

KALENTIEVA N. A. (2018), *Structural-logical model description the recovery management of obsolete housing*, Economy, business innovation. Penza. 5th int. science and practical conf. digest. part 2, 175-178.

KOSTETSKY N. F., GURKO A. I. (2003), *Foreign experience of state regulation of the housing stock reproduction, its conservation and modernization*, Ekonomika stroitelstva (Construction economics) 1, 13-30.

KOSTRIKIN P. N. (2017), *Problems of Efficiency of Realization of State (Municipal) Housing Renovation Programs*, Vestnik MGSU 12 (11), 1221-1228.

KOVÁCS Z., EGEDY T., SZABÓ B. (2018), *Persistence or Change: Divergent Trajectories of Large Housing Estates in Budapest, Hungary*, in: Hess D. B., Tammaru T., van Ham M. (eds.), Housing Estates in Europe, Springer, Cham, pp. 191-214.

"KYIVPROEKTREKONSTRUKTSIIA" DESIGN INSTITUTE (1996), *Report on the possibility of reconstruction of five-storey residential buildings constructed in the 1960s in 8 districts of the city of Kiev,* Kyivproektrekonstruktsiia, Kiev.

KYRYCHUK Y. L. (2009), *Foreign experience of state influence on housing affordability*, Theory and Practice of Public Administration 4 (27), 380-387.

LA FLEUR L. (2019), *Energy renovation of multi-family buildings in Sweden: An evaluation of life cycle costs, indoor environment and primary energy use, and a comparison with constructing a new building*, Linköping University, Linköping.

LAW OF UKRAINE (2006), *On the Complex Reconstruction of Blocks (Neighbourhoods) of Outdated Housing Stock*, dated 22.12.2006 No. 525-V, Retrieved from: www.zakon.rada.gov.ua.

LUHN A. (2017), *Moscow's big move: is this the biggest urban demolition project ever?*, The Guardian, Retrieved from: www.theguardian.com.

MAIN DEPARTMENT OF STATISTICS IN KYIV (2020), *Housing stock (1995-2018)*, Retrieved from: www.kiev.ukrstat.gov.ua

MANDIČ S. (2010), *The changing role of housing assets in post-socialist countries*, Journal of Housing and the Built Environment 25, 213-226.

MARIQUE A.-F., ROSSI B. (2018), *Cradle-to-grave life-cycle assessment within the built environment: Comparison between the refurbishment and the complete reconstruction of an office building in Belgium*, Journal of Environmental Management 224, 396-405.

MARIN V., CHELCEA L. (2018), *The Many (Still) Functional Housing Estates of Bucharest, Romania: A Viable Housing Provider in Europe's Densest Capital City*, in: Hess D. B., Tammaru T., van Ham M. (eds.), Housing Estates in Europe, Springer, Cham, pp. 167-190.

MOGZOEV A. M., KUZMICHEVA K. I. (2017), *Renovation of Housing Fund of Moscow City*, Moscow Witte University Bulletin. Series 1: Economics and Management 4 (23), 70-74.

OLIYNYK O., MURGUL V. A. (2016), *Strategy for energy efficient reconstruction of residential low-rise buildings*, Construction of Unique Buildings and Structures 1 (40), 112-124.

PLESHKANOVSKA A. M. (2019), *City Master Plan: Forecasting Methodology Problems (on the example of the Master Plans of Kyiv)*, Transfer of Innovative Technologies 2 (1), 39-50.

PLESHKANOVSKA A., SAVCHENKO O. (2019), *Epochs and Cities*, 2-nd ed., Logos, Kyiv.

PLESHKANOVSKA A. M., SAVCHENKO E. D. (2020), *«Building booms»: an urban planning phenomenon of large city development*, Colloquium-journal 4, 10-13.

REGULSKA J. (1987), *Urban development under socialism: the Polish experience*, Urban Geography 8 (4), 321-339

SERDIUK T. V. (2016), *Organization and economic activities financing thermal modernization obsolete housing*, Modern Technology, Materials and Design in Construction 2 (21), 80-87.

SHAROV O. M. (2014), *Out of the Crisis: the "Marshall Plan" - Lessons and Prospects for Ukraine*, Economy of Ukraine 12 (637), 20-28.

SHCHERBYNA L. V., VALIASHCHUK V. V. (2013), *Reconstruction and redevelopment of morally outdated residential buildings*, Mistobuduvannia ta terytorialne planuvannia 48, 509-513.

STATE BUILDING STANDARDS OF UKRAINE (2009), *Rules for determining the physical deterioration of residential buildings*, SOU ZKH 75.11-35077234.0015:2009, Retrieved from: www.dbn.co.ua.

STATE STATISTICS SERVICE OF UKRAINE (2018a), *Children, women and family in Ukraine*, Retrived from: www.ukrstat.org.

STATE STATISTICS SERVICE OF UKRAINE (2018b), *Social and demographic characteristics of households of Ukraine*, Retrived from: www.ukrstat.org.

STATE STATISTICS SERVICE OF UKRAINE (2020), *Housing stock (1990-2018)*, Retrieved from: Retrived from: www.ukrstat.org.

SUNAK P. O., MELNYK Y. A., MELNYK O. V., SYNII S. V., SUNAK O. P., LYNNYK I. E. (2014), *Analysis of measures for reconstruction of housing stock abroad*, Mistobuduvannia ta terytorialne planuvannia 54, 397-410.

TOFILUK A., KNYZIAK P., KRENTOWSKI J. (2019), *Revitalization of Twentieth-Century Prefabricated Housing Estates as Interdisciplinary Issue*, IOP Conference Series: Materials Science and Engineering 471 (11), 112096.

TZONEV T. (2013), *Seismic Retrofit of Precast Panel Buildings in Eastern Europe*, Massachusetts Institute of Technology, Cambridge.

VAN DER HEIJDEN H. (2002), *Social rented housing in Western Europe: Developments and expectations*, Urban Studies 39 (2), 327-340.

VOLYNSKOV V. E. (2016), *On the Need for Modernization of the Five-Storey Typical Residential Fund of the Russian Federation*, Academia. Architecture and Construction 4, 71-75.

ZAKHAROV Y., SANKOV P., TRIFONOV I., TKACH N., TOSHYNA L. (2019), *The content and specific features of reconstructing the residential houses of various configurations*, Science and Innovation 15 (3), 79-90.

Initial submission: 01.05.2020
Revised submission: 29.10.2020
Final acceptance: 28.12.2020

Correspondence: Institute of Urban Planning, 8 Kazymyra Malevycha str., 03038, Kiev, Ukraine.

Email: biriuk.svitlana@gmail.com

Journal of Urban and Regional Analysis,
vol. XIII, 2, 2021, p. 281 - 299
https://doi.org/10.37043/JURA.2021.13.2.5

CITIES OF CULTURAL HERITAGE: MEANING, REAPPROPRIATION AND CULTURAL SUSTAINABILITY IN EASTERN LISBON RIVERSIDE

Joao **MARTINS**
Universidade de Lisboa, Lisbon, Portugal

Abstract: Contemporary post-industrial riverside areas like *Marvila* and *Beato*, in Lisbon, are being addressed by public and private bodies towards their urban regeneration. The aim of this paper is to present the ROCK project analysis of cultural heritage meaning, reappropriation and urban sustainability. Methodologically, we developed an inquiry to the local population around the residents' perceptions on cultural heritage, the ongoing changes and existing retail, a cultural heritage mapping, and a conceptual analysis on urban sustainability. The results show the residents' vision on cultural heritage and its relationship with the social and spatial changes, and the resilience process strengthening urban decayed areas, as a crucial element for urban life and socioeconomic development. Our conclusions present the relevance of cultural heritage as a public and private investment against the urban crisis, as well as the diversity in the process of cultural heritage reappropriation, including the residents' participation to cultural led commodification processes developed by private companies.

Key Words: *ROCK project, urban regeneration, socio-spatial renewal.*

Introduction

The continuous creation of post-industrial sites worldwide has brought a specific background of social, economic, and cultural deprivation to several port areas from western societies, namely in Europe and North America (Loures 2015, Marcuse 2015, Lees 2018). Simultaneously, these spaces were marked by the permanence of socially excluded populations, and by the vacancy or informal uses of the building environment and landscape that has led to the development of public and private funded processes of urban regeneration (Evans 2005, Miles and Paddison 2005, Evans 2009, Couch et al. 2011).

These new perspectives on deprived urban areas require a new vision on urban planning, the scale of intervention, and governance, promoting a "mix between top-down and bottom-up governance processes" (Ferilli et al. 2017: 246). In the processes of urban change related to former industrial areas, there is a multiplicity of aspects to be changed, where the cultural aspects of a specific city are used to overtake a context of deprivation, entering in a context of worldwide competition: "Revitalization is a long-term process aimed at rescuing an urban area out of a crisis. This change concerns both the material tissue—buildings, public spaces, green areas—and intangible elements in economic, social, or cultural spheres. The latter includes the use of heritage. Among the different benefits of revitalization, experts mention the improvement of a city or area image, the help in developing a sense of community, the support in reusing existing buildings and preventing their further dilapidation, the increase in employment and business activation, the fostering of the unique character of a community and its history" (Konior and Pokojska 2020: 1).

Concordantly, we must mention several international cases of revitalization of post-industrial cities, where cultural promotion is seen as a driver of regeneration. One of the first and significant cases is from Glasgow in the United Kingdom, where culture was used as

Bourdieu's cultural capital to overcome a context of economic and social deprivation (Lever 1987, Barta 2017), creating a series of events, which was developed in all Europe with the initiative of the Cultural Capital of Europe, including several events in postindustrial port cities like Liverpool (Liu 2014), or even in our case study, Lisbon (Balsas 2007, Costa and Lopes 2018).

In this case, not only the public dynamization of culture is determinant, but also the input from the artists, particularly the so-called hipsters (Pratt 2018), which start to use these deprived areas and, consequently, to gentrify them (Lees 2012). In the case of the United States, we must refer to one of the most significant urban regeneration practices, occurred in one of the most traditional industrial cities – Detroit. The city has overcome a bankruptcy process, where the re-use of traditional industrial heritage is significant, creating forms of urban change based on industrial, physical and symbolic inherence: "urban heritage is to be considered as comparable to other infrastructures within cities (…). A systems approach to urban heritage would focus not on conserving or preserving the urban tissue/fabric of a city for the sake of attracting tourism or locking that section of a city into a certain time-era, but to act as a regenerative layer upon which to develop the contemporary city (…). It is, rather, an urban framework, a system on which other sub-systems will evolve and adapt" (Locke et al. 2018: 12).

Barcelona, which has become a role model for urban change in Lisbon, with a series of cultural events like the International World Fair in 1992 (and in 1998 in Lisbon), has regenerated its former industrial port with "a unique governance style ensured that culture was integrated as a vernacular expression into the physical landscape of a re-emerging city, actively linking the design of public space with new democratic culture and social citizenship programs" (Degen and García 2012), developed by public-private partnerships, as part of an integrated economic growth process (Nofre i Mateo 2010).

To go further in this proclaimed process of urban regeneration, it is determinant to acknowledge the reasons behind this declared urban dysfunctionality, how this fragmentation started and to know in deep how these urban voids were created (Heckert and Mennis 2012, Huang et al. 2015, Lee et al. 2015). These spaces are characterized as vacant, informal, and abandoned, resulting from a failure to create new urban uses after deindustrialization. Most times, these spaces are not totally empty or without social interactions. Several areas considered as urban voids have informal uses (as the informal agricultural plots in *Marvila* and *Beato)*, and they are not controlled by property owners, private companies, or the public administration. In fact, these spaces can be analyzed as a symptom of decadence, expectancy, urban fragmentation, and crisis, for their non-planned nature. But at the same time, they can be seen as spaces of future experimentation of an idea of city, and of prototyping projects to experiment new urban uses in these territories, while expecting a formal planning perspective.

More than an artistic or aesthetic change in these deprived territories, these profound processes of urban voids change, as vacant, informal, and deprived territories, highlighted the importance of cultural heritage, of placeness, of the existing historical artifacts and a specific local sociability. Here, cultural heritage is seen as beneficial to the mental health of deindustrialized communities, "rooted in historical life-modes that are created and recreated over time" (Birkeland 2008: 288), connected to a local authenticity, intending on highlighting certain values and traditions, as "a meaningful concept for both tourist and living culture" (Swanson and DeVereaux 2017: 71). These attributes, under a global context of travel and consumption, of enlargement of access to exotic cultures, can be culturally commodified under tourism appropriations or high social classes consume, and they can be materialized in a product that can be sold and simplified, without the real characteristics of the community who created them.

Cultural heritage is seen as a reflection of the value of a specific territory, and of the attributes which symbolize the significance of each society. So here heritage is a pathway for the interpretation of social representations, and a way to express the identity of a person or social group (Graham et al. 2000), as a concept which "encompasses all the ways we use to remind ourselves, and show others, who we are" (Hawkes 2001: 19). Simultaneously, heritage is a state-led process, the result of a national or regional state recognition, and a political acknowledgment of cultural practices as determinants of local social life, as elements of a national identity and a component of collective representations (Vecco 2010, Papadam 2017).

Simultaneously, cultural heritage preservation can be seen as a catalyst of sustainable development (Couch et al. 2011, Soini and Birkeland 2014, Soini and Dessein 2016, Swason and DeVereaux 2017, Pop et al. 2019). At the center of these processes of social and spatial change, it is the idea that contemporary development has human and natural limits, asking for a rational exploration of natural and human resources. Until then, and strongly inflected by a positivist idea of progress, the maximization of all resources towards an infinitive economic growth was a global aspiration (Hawkes 2001, Birkeland 2008, Budd et al. 2008). This vision defended that a better quality of life for all citizens was possible, resulting from the improvements in the productive techniques, rationality, and democracy. But in fact, the expected global improvement did not occur, and even some societies have lowered their quality of life. The exploration of natural resources, the economic liberalization, and the new forms of political dominance have shown that this expected development was promoting new forms of conflict, inequality, and social exclusion, even inside the most productive and developed nations (Brundtland and World Commission on Environment and Development 1987).

This strong emphasis on the economic factor of development, and particularly in urban spaces, has showed the necessity for a more global vision on the social and spatial change. In this case, cultural heritage reappropriation (George 2010, Van de Kamp 2019, Martins 2020) should be made in a sustainable way, not only in the economic field, but also towards the social dimensions, namely as forms of cultural capital, being at the core of all transformations, throughout the idea of the fourth pillar of sustainability (Hawkes 2001). For this matter, it was crucial to accept the international regulations, the support of trained and specialized specialists, artists, cultural advisors, and cultural workers, involving all elements of cultural heritage, namely of tangible, intangible, and digital inherence. In this case, public powers have the responsibility of ensuring a more livable environment, interconnected with more subjective senses of quality of life. A new vision of development was required, not only centered on state officials, political, economic, or artistic elites, but mainly on participative and engaged local communities in interaction, as being the first ones that should receive the economic, social, and political gains of development processes.

Methodology

This paper results from a research-action methodology developed within the ROCK project: "Regeneration and Optimization of Cultural Heritage in Creative and Knowledge Cities". It was developed in ten European cities: Bologna, Lisbon, Skopje, Athens, Cluj-Napoca, Eindhoven, Liverpool, Lyon, Turin, and Vilnius. Despite local differences and particularities, all cities promoted the best practices of research-action, expecting to achieve common results in the cultural heritage optimization, seen as a driver of urban regeneration for disadvantaged communities and their spaces, most of them being inflected by the effects of deindustrialization, the urban crisis, and economic degradation. The project was developed under the European Commission program "H2020-EU.3.5.6. – Cultural heritage", having the "aim is to research into the strategies, methodologies and tools needed to enable a dynamic and sustainable cultural heritage in Europe" (European Commission 2020).

In Lisbon, the project detailed the socio-spatial transformations occurring in a specific urban continuum, as deindustrialization has led to the creation of an urban enclave (Nevado 2015, Reis e Silva 2016, Borghi et al. 2018, Gennari 2018, Martins and Mourato 2018, Camara Municipal de Lisboa 2019, Martins 2020, Verheij and Corrêa Nunes 2021). The research area is located between two vibrant urban areas: *Parque das Nacoes* (also a former industrial area), and the touristified historical city center. At the same time, the continuous exclusive use of the port area by a commercial harbor prevents the connection of this territory to the Tagus River. With few forms of public transportation, it presents problematic connections to the rest of the city.

Study areas

Formally, the ROCK project area is located between three main heritage sites: the Tile Museum, near the *Xabregas* area, the ruins of the old *Alfinetes* Palace, and the remains of the Guns and Munitions factory (*Fabrica Braço de Prata*), where a cultural organization has been working since 2006, being a pioneer on the cultural and artistic practices in the area. Internally, resulting from the existence of two train lines (*Cintura* and *Norte*) and their tunnels, old narrow pathways, morphologic slopes and cliffs, this is an area with little urban connectivity, creating a closed territory to the rest of the city. These train lines, divide the ROCK project area into three main areas (Fig. 1), with a strong diversity on the kind of urban users: social and cooperative rehoused populations on 4 Crescente; old industrial workers accommodations in the area classified as Island; and the Riverside, where we can find a strong presence of visitors, with higher social backgrounds, reappropriating the tangible cultural heritage (mostly old industrial and commercial warehouses and factories). Resulting from the deindustrialization process, several urban voids remain, particularly in the area classified as Island.

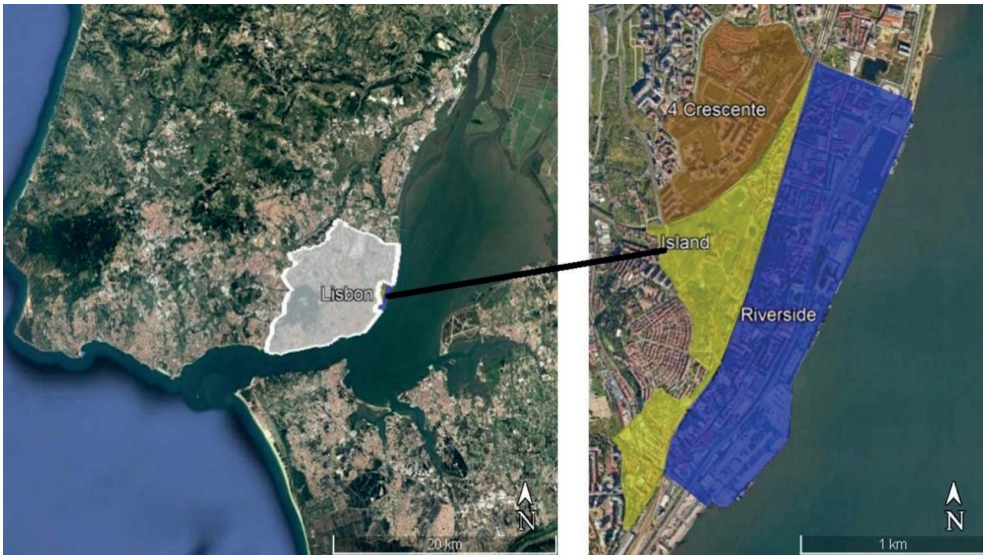


Fig. 1 **– The ROCK project in Lisbon with the 3 areas: 4 Crescente, Island and Riverside**
Source: *the author on Open Access Google Earth*

Crescente
An important part of the territory is occupied by a social housing area around the recently created *Marvila* Library, located on the remains of the reconverted *Chines* Shantytown, created in the 1960's by the rural migrants from northern Portugal – the former L Zone of the

1965 *Chelas* Masterplan (Camara Municipal de Lisboa 1965, Rodrigues et. al. 2015). Today, it is informally called *4 Crescente* (Fig. 2), where most of the ROCK area population is concentrated, perceived by the media and by the other Lisbon residents as a territory strongly inflected by criminality (Tulumello 2015). Several rehousing processes occurred, as a cooperative movement in *PRODAC-SUL*, in 1973; the first steps on democratic social housing in *Quinta do Chale* in 1979, and the European funded *Marques de Abrantes* and *Alfinetes* neighborhoods in the late 1990's (Da Mata Pequeno Baptista Soares 2011, Rodrigues et. al. 2015, Gebalis 2020).

Fig. 2 **– *Chines* Shantytown and the present *4 Crescente***
Source: *Da Mata Pequeno Baptista Soares (2011), and map created by the author on Open Access Google Earth*

Island
This space is in *Marvila* Street where several *Patios* are located, composed of buildings with an interior open space, and in *Toucinheiros* Alley, in *Beato*, with several villas, small streets with small working-class accommodations. Being a space between *Cintura* and *Norte* train lines, composed of several formal and informal allotment gardens and other urban voids, as the remains of the Soap factory (Fig. 3), we classified them as "Island", being the most a very interesting area for future real estate promotion. Its creation is prior to *Chines* Shantytown, resulting from the first phases of the industrialization at the end of the ninetieth century, created by industrial entrepreneurs and by real estate promotors, reappropriating the former Nobility Palaces (Reis e Silva, 2016, Camara Municipal de Lisboa 2019).

Riverside
Thirdly, the Riverside is the place where most of the socio-spatial change is occurring with the presence of new users, under a strong media radar, particularly on gourmet gastronomy, craft beer tasting, art galleries and luxury real estate. This area presents major changes on cultural heritage reappropriation, as well as an increase on land prices, promoting the interest of entrepreneurs to locate their businesses: "When I came here, I came to pay less. Today, the warehouses are around 2000 euros (for renting). Two years ago (the price) was around 1000 euros, two and half years ago was around 800 or 900 euros. For housing, there are places with the cost of 5000 euros per square meter. There is a reconstructed building nearby, and I do not know how they sold that, but in true it was sold, where a 30 square meter house was sold for 150 000 euros" (Local company responsible). An example of significant change in *Marvila* and *Beato* riverside is the transformation of the former Guns and Munitions Factory towards a luxury real estate project, under the name *Prata Living Village* (Fig. 4).

In result, a social and spatial urban enclave in contemporary Lisbon has been created, resulting from both internal and external factors, which has been changed recently. Presently, entrepreneurial, cultural and artistic institutions, municipal and other public bodies, local social movements, as well as academics, some of them integrated in EU-funded research projects, are discussing the relevance of cultural heritage as a driver of urban regeneration. The reappropriation of cultural heritage is seen as a resilience process against the urban crisis, strengthening the urban decayed areas, seen as crucial elements for the urban life and the socioeconomic development, as happened in *Marvila* and *Beato*, two post-industrial riverside areas located in eastern riverside Lisbon.

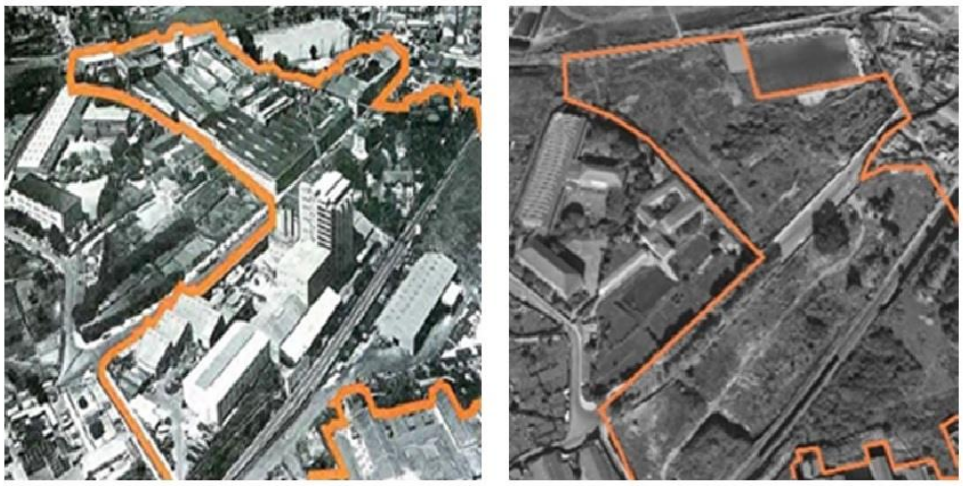


Fig. 3 **– The former soap factory and the present urban void**
Source: *Folgado and Custódio (1999), and author creation on Open Access Google Earth*

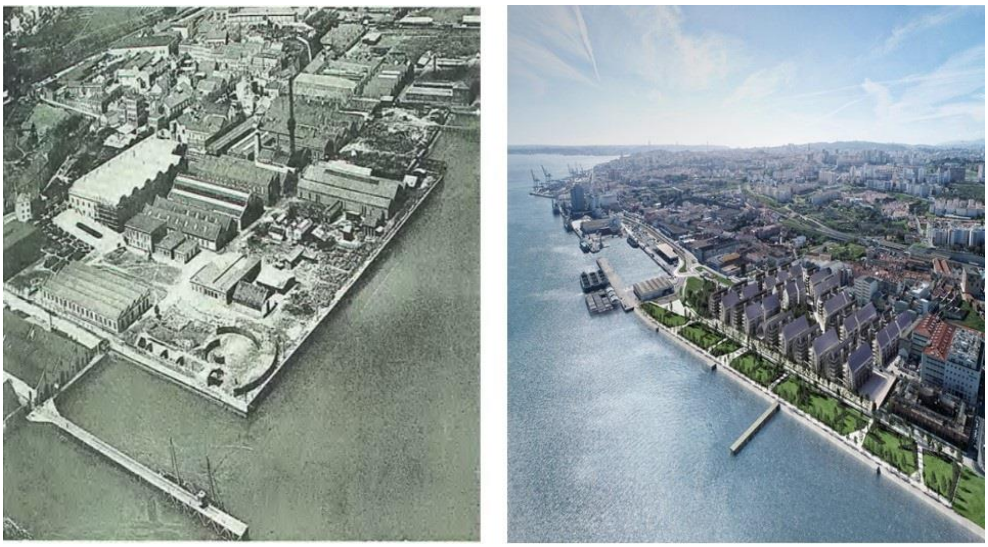


Fig. 4 **– Former Gun and Munitions Factory and future Prata Living Village Real Estate**
Source: *Folgado and Custódio (1999), Vic Properties (2019)*

Resulting from an inquiry to the local population and a tangible cultural heritage mapping on the reappropriation of these historical assets, we discussed if cultural sustainability was being accomplished. So, this paper wants to answer to a specific research question: Is the reappropriation of tangible cultural heritage in *Marvila* and *Beato* being developed under the theoretical framework of cultural sustainability, integrating the residents' participation and engagement? In fact, we want to know if the residents and the local associations participated in this process, or if the public and private investment have led to the commodification of cultural heritage, orienting them to high social backgrounds.

Cultural sustainability assessment

To analyze the cultural sustainability effects resulting from the cultural heritage reappropriation in the ROCK areal, we developed several tasks. The first task was to ask the local population about their understanding on cultural heritage and its importance. To do so, we developed an inquiry by addressing a questionnaire to 368 residents, based on a Quota probabilistic sample (De Rada and Martín 2014), covering at least 5% of the population. The sample was based on several conditions: neighborhood of residence, gender, group age and academic qualifications. The results were previously presented in an open access report of the ROCK project (Correia et al. 2020).

The second task was to map the present uses of local tangible cultural heritage, creating an analysis typology in the ROCK area: old housing (*Patios* and *Villas*); former industrial and commercial warehouses; and old palaces, convents and farms. This evaluation will take as temporary framework the late 1990's when the deindustrialization occurred until present times. To do so, it was determinant to access some literature on the local post-industrial tangible cultural heritage (Folgado and Custódio 1999, Camara Municipal de Lisboa 2019).

Throughout the research, using an ethnographic and ground-level approach, we participated in several community gatherings and assemblies, where the reappropriation of tangible cultural heritage and of interstitial urban voids were discussed, and different solutions were presented by the residents and the local associations. Several focus groups were developed with the local elders, and the former industrial workers through municipal initiatives such as "*Vidas e Memorias*" (lives and memories) and the *Marvila* and *Beato* Interpretative center. This last one was integrated in the research-action strategy developed by the ROCK project in Lisbon. At the same time, 18 semi-structured interviews were held with residents and ground-field organizations in the fields of social and economic exclusion, cultural heritage reappropriation, community engagement and participation. The interviews started with general questions around the contextual framework of the interviewed people (when they came to the territory and their symbolic relation with it), their opinion around the present and future uses of the existing cultural heritage assets and the relation between *Marvila* and *Beato* and the remaining city of Lisbon. At the end, it was asked if interviewees look at *Marvila* and *Beato* as urban enclaves or as integrated territories in the touristified city of Lisbon, questioning the present visibility of these territories in national and local media.

During our research, the residents were aware of our presence as urban researchers, in a fast-changing territory, promoting the best practices in gathering information in the social sciences, while detailing the ROCK project research objectives and aims by using a modest language and objectivity, and by promoting the full autonomy of research participants, namely, their privacy and anonymity.

Finally, the evaluation of cultural heritage reappropriation in the framework of cultural sustainability is marked by fluidity, controversies, and a strong connection with the Portuguese and Lisbon's urbanization processes, planning structures and its local practices, while discussing the role of public and private organizations in these processes.

Results

We present the results of the reappropriation of cultural heritage under the theoretical framework of cultural sustainability in the ROCK project area by using two main procedures. The first one, in order to understand how the local population represented the concept of cultural heritage in their neighborhoods, the ongoing changes and the existing retail, was resulting from an inquiry made to the local population. The second task was a mapping process in the territory, while creating a tangible cultural heritage typology that was complemented with the vision expressed by the residents, the local associations and the private entities developing new businesses in the area.

Inquiry results: what is heritage, and which are the ongoing changes and the existing retail in the Rock Project area?

Firstly, we asked the local residents: "If we say the word heritage, what comes to your mind?", as an open question. From the 368 residents inquired, we received 473 responses, because the residents had the chance to say how many expressions they wanted. We wanted to know the statistic importance of each relevant expression and we presented only the most significant ones, with more than 1% of the distribution (Fig. 5).

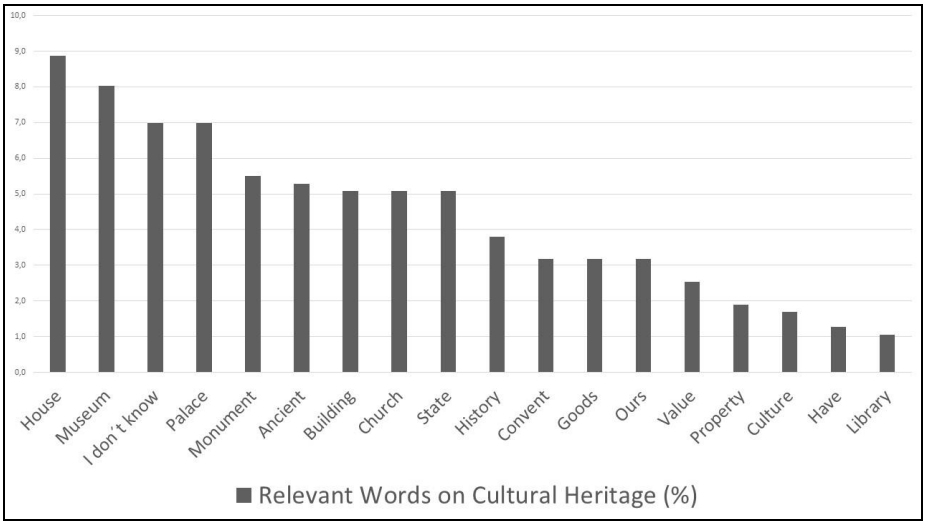


Fig. 5 **– Relevant Words to the question: "If we say the word heritage, what comes to your mind?"**

An important part of the respondents has traditional views on heritage, referring mainly to tangible cultural heritage, concentrating 28.8% of the distribution (museum, palace, monument, church, convent), but relating also to industrial times. Simultaneously, we see the prevalence of words related with the idea of property: house (8.7%), building (5.1%), goods (3.2%), property (1.9%), have (1.3%) or ours (3.2%). By this way, we understood that the expression heritage without the "cultural" element is strongly connected with the idea of physical goods that can be passed throughout generations, not relating it, at least at first sight, with the idea of cultural heritage. With a lower presence, it is also possible to find words related to the intangible cultural heritage, such as: ancient (5.3%), state (5.1%), history (3.8%), value (2.5%) or culture (1.7%). It is also significant to state that 7% of the residents inquired do not know what heritage means.

The inquiry had another section which provides more information about the vision of the residents on new uses for local cultural heritage, and its relationship with the ongoing changes. We provided a list of 14 ongoing changes in this territory, and the residents could choose as many changes as they wanted, to illustrate their understanding. From the 368 residents, we had 854 answers (Fig. 6).

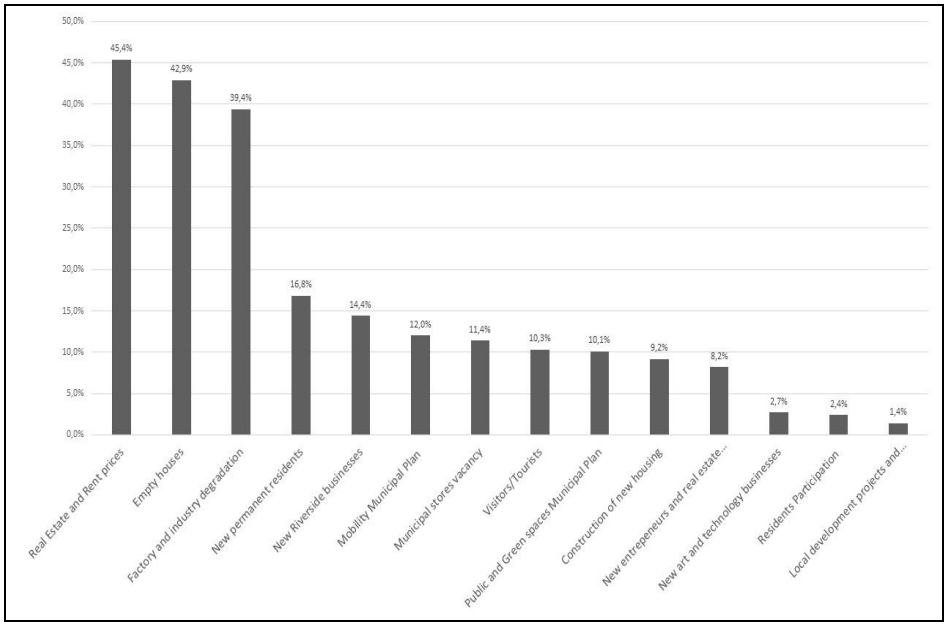


Fig. 6 **– Ongoing changes in the Rock project area**

The results of this question show some interesting aspects to discuss the importance and reappropriation of cultural heritage. The most significant answer is referring to the real estate and rent prices increase (45.4%), which is strongly related to the existence of new permanent residents (16.8%) and businesses (14.4%), as well as visitors/tourists (10%). These answers show the new visibility of these territories, as well as it is occurring in the remaining Lisbon. In the same direction, it is particularly interesting that the residents do not recognize so much the importance of new art and technology businesses, as being one of the most present reappropriations on local cultural heritage, particularly for the Riverside former industrial and commercial warehouses.

The third question is related to local retail. We provided a list of classified commercial structures, and we asked the residents which ones were oriented to them or to the visitors/tourists. Once again, the residents could choose as many variants as they wanted. In the case of local businesses oriented to the residents, we gathered 790 answers and in the case of local businesses oriented to visitors/tourists, we gathered 625 answers (Fig. 7).

It is particularly interesting to see that the most significant cultural heritage reappropriations in the ROCK project area are seen by the residents as being oriented towards the visitors/tourists. In this case, we must highlight the museums/art galleries/theatres (22%), the restaurants/taverns (18%), the breweries and nightclubs (17%), and the local accommodation (9%), showing that the respondents are aware that the present social and spatial changes are not oriented towards them, but to the outsiders.

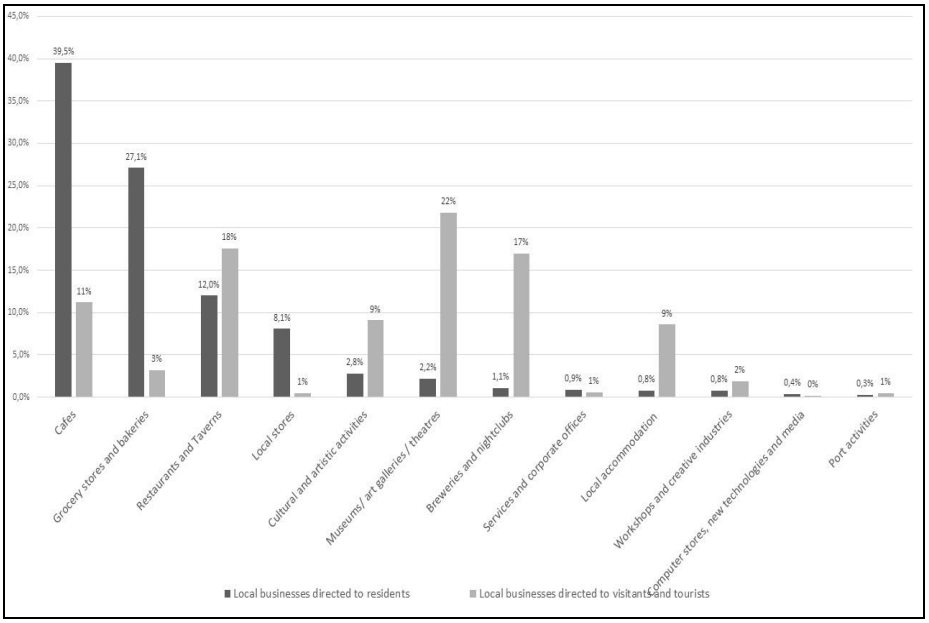


Fig. 7 **– Local businesses existing in the Rock project area (oriented to the residents or to the visitors/tourists)**

Tangible cultural heritage mapping in the ROCK project area

To create this paper, we mapped 130 organizations reappropriating tangible cultural heritage (95 assets) in ROCK project area, considering the use of these assets in June 2020. We created a typology of former uses namely: Old Housing, *Patios* and *Villas* corresponding to 22.3% of the distribution; Former Industrial and Commercial Warehouses, corresponding to 61.5%, and Old Palaces, Convents and Farms corresponding to 16.2%. Just 5.4% were managed by public bodies, so we can see the major interest of private investors on this kind of urban assets. Around 76.9% of these institutions were in the Riverside of *Marvila* and *Beato*, the area under major spotlight in this territory.

Old housing, patios and villas

Patios and *Villas* represent a strong inheritance resource of this territory. An important part of these tangible cultural heritage assets is mainly residential, most of them being degraded, empty, or occupied by elderly populations, with a precarious economic and social condition. According to the 2011 National Census Data, 56.1% of these houses were built before 1919, and 21.9% until 1945, corresponding to the first and the second industrialization waves occurred in the ROCK project area. Only 20.9% of the houses were occupied by their owners as permanent accommodation, when that percentage stands for 51.7% in Lisbon, and for 73.1% in Portugal, highlighting the precarious condition towards housing property. We mapped 29 *Patios* and *Villas*, located on *Marvila* Street (48.3%), *Toucinheiros* alley (20.1%) and the remaining located in the riverside (31.6%), while just one is having public ownership – *Vila Dias.* We would like to highlight the new uses of the former *Patio do Colegio* (Fig. 8)*,* which has not changed its physical form, but it has changed its urban use, from a residential towards a cultural functionality. This asset has public ownership since 1970, when it was part of the *Chines* Shantytown, renamed as *Marques de Abrantes* Palace. In 1885, *Sociedade Musical 3 de Agosto* was created, which has become an important cultural and sports organization in the territory, being namely the organiser of *Marchas Populares*, a dancing competition between Lisbon traditional neighbourhoods, and taking place during the annual Lisbon festivities in June.

Fig. 8 – **Former *Patio do Colegio* in a fieldwork visit to university students on urban studies, under the ROCK project**

Former industrial and commercial warehouses

The most determinant strategy in the ROCK project area towards the reuse of tangible cultural heritage happened in former industrial sites, namely warehouses and old factories, as being today reconverted with new economic uses, and representing 61.5% of all distribution. We mapped 80 organizations in the ROCK project area, almost all of them being under private management and they are located in the Riverside. Only one of them is under public supervision – the future social assistance project *Lisboa Social*, developed in the former cork factory located on *Acucar* street (Fig. 9).

Fig. 9 **– *Lisboa* Social**
Source: *the author*

We present next the typology created to aggregate the different tangible cultural heritage reappropriations in these former factories and commercial warehouses, using the same categories used in our inquiry (Fig. 10).

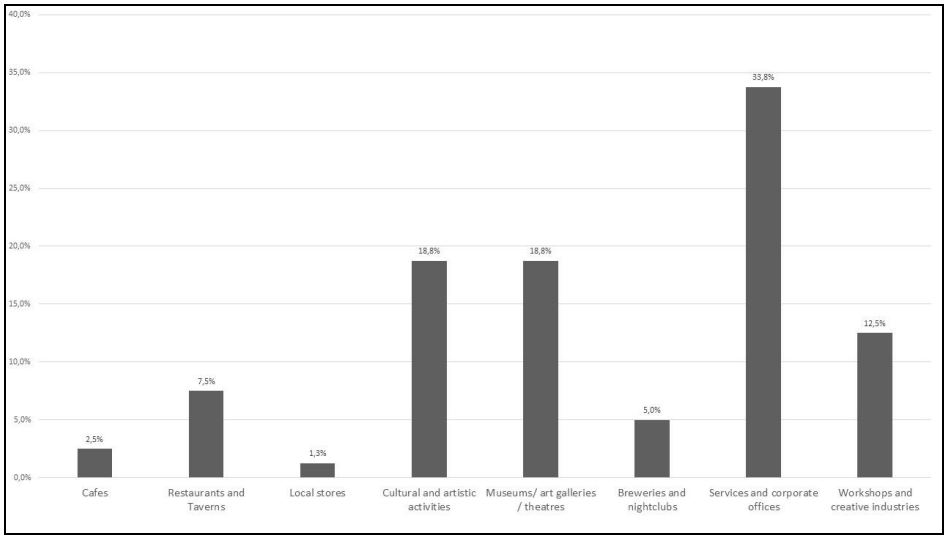


Fig. 10 **– New uses of former industrial and commercial warehouses**

In terms of occupations, firstly, we must highlight the services and corporate offices (33.8%), with a multiplicity of activities, from accounting, real estate and architecture, to design, new technologies, and communication. Secondly, it is particularly important to highlight the cultural and artistic activities (18.8%) and the museums/art galleries/theatres (18.8%), promoting new urban events and festivals, as a clear cultural led regeneration process. Thirdly, it is important to highlight the presence of workshops and creative industries (12.5%), by organizations dedicated to innovations and to creative professional profiles. Fourthly, an element that is determinant for the access of this area from nonresidential profiles, there are the restaurants and taverns (7.5%), and the breweries and nightclubs (5%), promoting an economic development strategy related to forms of leisure consumption.

Another determinant element in the analysis of the reappropriation of former industrial and commercial warehouses, it is the year of their opening, while 57.5% of them were created since 2015, and only 16.3% between 2011 and 2014. This information consubstantiates the contemporary interest in *Marvila* and *Beato* riverside in the fields of consumption, artistic performance and culture, as well as innovation and creativity. Not surprisingly and resulting from the major increase on soil prices and rents, some of the companies located in *Acucar* street, as *Musa*, *O Lugar que nao existe*, *Revivigi,* and *Asian Home Concept*, have received the intention from their landlords to leave the territory due to the end of their rental contracts without renovation.

But the most significant change for the former industrial and commercial warehouses is the creation of the Beato Creative Hub (Fig. 11), which will receive several companies dedicated to innovation, creativity, and leisure, being still under construction, and maintaining most of its original form. The reappropriation of the former Military Maintenance factory, from public ownership, resulted in the reuse of a former warehouse composed of more than 10.000 square meters. All activities will be developed and managed by the private sector, with a company called Startup Lisbon. It is expected an agglomeration of start-up companies, gathering thousands of skilled, innovation and creativity entrepreneurs and workers. Simultaneously, in the same project, several leisure activities will be developed, as a micro-

brewery, urban street art, music concerts and artistic performances, a dining area and an industrial museum with some of the machinery of the initial factory, developed in cooperation with the municipal agency for culture (EGEAC).

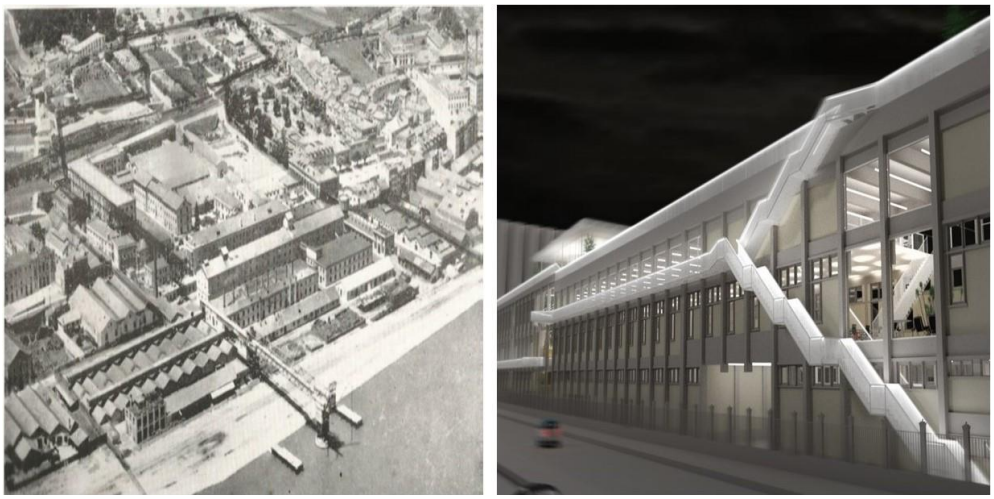


Fig.11 **– Beato Creative Hub**
Source: *Pinto (1966), Orientre (2017)*

Old palaces, convents and farms
These are the most traditional tangible cultural heritage assets in *Marvila* and *Beato*, which were not transformed in the era of industrialization and still today they have a cultural use, as the Tile Museum created in 1980 – a determinant point of the tourism and visitors offer in the area, as well as some palaces in *Xabregas* area, as the former *Marques de Olhao* palace. We mapped 21 old palaces, convents and farms, only three of them being under public management. There are still two churches, as the *Igreja Paroquial de Santo Agostinho a Marvila* or *Igreja Paroquial de São Bartolomeu do Beato*. Despite their low presence in the territory, in the inquiry made to the residents, around 60% of the respondents indicated these heritage sites as the most significant in *Marvila* and *Beato*.

In this case, the most significant culture led regeneration process resulting from the tangible cultural heritage reappropriation from nobility times is the *Fontes* farm reuse towards the present *Marvila Library* (Fig. 12). This municipal structure is determinant for the local cultural promotion, the resident's participation, community engagement, being a space for urban regeneration by using arts and cultural practices. Simultaneously, it is the headquarters of several social assistance projects, as well as two European funded pilot projects in the field of cultural amusement and green spaces, funded by the ROCK project. Nearby, it was created a street art gallery in 2017, highlighting these two points as two important strategies on the *Marvila* and *Beato* cultural visibility in the city of Lisbon.

Discussion

Despite its differences, we can find a process of spatial and social urban crisis in the ROCK project area, marked by the ruins and the remains of its nobility and industrial past, which created major urban voids, youngsters' unemployment, and the concentration of elderly populations. Globally, this territory is experiencing processes of social mix, seen by the entrepreneurs and the municipal officials as a major improvement for the area, and as an urban regeneration process, for until now, being a homogeneous urban area. But others, namely the Lisbon's social movements, local associations, and some of the residents, see it

as a process of liberalization of the urban space, creating urban exclusivity, as being orientated to the higher social classes.

Fig.12 **– The former *Fontes* farm and the present Marvila Library**
Source: *provided by a resident and the author*

After presenting the results of the inquiry to the population and the tangible cultural heritage mapping, we will discuss how these processes occurred. In fact, we underline if the reappropriation of these three tangible cultural heritage typologies is close or not to the concept of cultural sustainability, using the theoretical framework of Soini and Birkeland (2014), and of Soini and Dessein (2016). We reproduce, in a reduced vision in Table 1, the understandings which are more connected with our case study.

Table 1

Representations and dimensions of cultural sustainability

	Culture in sustainability	**Culture for sustainability**	**Culture as sustainability**
Definition	As a social capital	As a way of life	As a semiosis
Development	As an achievement	As a resource	As a process
Value	Intrinsic	Instrumental	Embedded
Policy sectors	Cultural policies	All policies	New policies
Governance	Hierarchical	Co-governance	Self-governance

Source: *Soini and Dessein (2016)*

The theoretical framework is based on three main representations: (1) *culture in sustainability* – culture has an independent role in sustainability, close to the idea of Hawkes (2001), as the fourth pillar of sustainability, in horizontal relation with ecology, social and economic elements of sustainability; (2) *culture for sustainability* – culture is a driver to achieve higher grounds of economic development at regional and local level, having a regulating role; and (3) *culture as sustainability* – culture is a "necessary foundation for meeting the overall aims of sustainability" (Soini and Dessein 2016: 3).

In the case of old housing, patios and villas, with the case of Marques de Abrantes Palace or *Patio do Colegio*, we find a process of culture in sustainability. It presents a conservative context based on the importance of cultural Heritage, as an element of inheritance, distinctiveness of specific landscapes and its communities, strongly inflected by a desire to

preserve these physical and subjective elements in the future; as well as to support culture-led development processes which promoted the vitality of these historical assets and their communities. Here, culture has an independent role in sustainability, not connected to other spheres of sustainability, namely, economic, ecological, or social. This is an example where the use of culture is seen as social capital, representing an important symbolic moment for a local group. In terms of the value of the use of culture, it is intrinsic, constituting a form of representational boundary between the different communities, and of separation between the different placed social groups. Simultaneously, the convoked policy sector is cultural policies, as a municipal policy to highlight the different symbolic contents of each community, within a symbolic competition between them. In terms of governance, it is clearly hierarchical, because it is the municipality that funds this competition, while providing rules and regulations that all dancing groups must obey.

In the case of former industrial and commercial warehouses, with the case of *Beato* Creative Hub, we assist to a case of the use of culture for sustainability, culture being a driver to achieve higher grounds of economic development at regional and local level and having a regulating role. Culture is seen as a way of life, and in terms of development it is regarded as a resource and condition for economic improvement, its use being instrumental, and integrating all urban policies, from innovation, cultural heritage preservation or leisure consumption, while using a co-governance model of management, and by promoting public-private partnerships. It is clearly a neoliberalist context, strongly related to cultural consumption and tourism, while the access of outsiders to the commercial and commodified versions of historical assets is emphasizing its economic importance for the global urban regeneration of the enlarged area.

Finally, we discuss the urban changes on old palaces, convents and farms, with the example of *Marvila* library. Recalling the theoretical framework of Soini and Dessein (2016), we assist to a process of cultural heritage reappropriation classified as culture as sustainability, where culture is the foundation of the improvement of a socially, economic, and politically disadvantaged community. In fact, culture is contributing to a more participative and engaged development, centered on local organizations and the residents. It is clearly a communitarian context, where diversity, locality, identity, creativity, and cultural vitality are central processes of sustainable development, promoting social inclusion, cohesion, local engagement, and participation, particularly towards the rights of minorities and of specific ethnic groups. Here, the definition of culture is seen as a semiosis of social capital and a way of life, in order to reach a territory and community with a strong lack of cultural and artistic practices. Development is seen as a process resulting from the residents' engagement, participation and decision, and the value of culture is embedded towards urban change, as a driver of all achievements in this process of urban regeneration, while promoting new policies and ensuring a self-governance form of management.

Conclusions

In order to make sense of the existing cultural heritage in the ROCK project area, and to know how the population is relating to the existing inheritance of assets and memories, and to the potential of heritage as an optimizer of urban regeneration, especially in response to the urban crisis, we asked the residents about the meanings that they can associate to cultural heritage. We saw that the word "heritage" provides different meanings for the respondents, where the idea of monuments and property is especially important. In an intentional way, we did not use the expression "cultural" in association to "heritage", in order to see how the respondents react to the word. As it is in English with the word "patrimony", and in Portuguese with the word "*patrimonio*", it is common to associate heritage with the idea of property, and of material goods coming from the ancestors, but as well, with the idea of accumulated earnings, associated with economic wealth. The results of the inquiry showed a low frequency in the local use of the existing tangible cultural heritage, as it is

seen by the residents as an asset mostly destined to the outsiders, to the visitors, and not directly to them. Once again, we see a clear lack of participation and engagement from the local population towards the existing cultural heritage in the area.

In this case, we confirmed that for the local population, cultural heritage is not so central and determinant on their daily lives, or at least, not directly expressed as a central part of their present. It is regarded as something important, to be highlighted and to be preserved, mainly by the public powers, as a community value, but not as a daily concern of the residents. They have lower scholar capitals than the other Lisbon residents, and a high rate of social benefits and unemployment dependency, while an important part of the population is aged, having a lower economic status. The residents recognize their industrial and migrant past as an element to forget, as they are living primarily in social housing units. For them, and we discussed these issues with the occasion of formal and informal contacts, it is more important to debate the future, particularly after the current COVID-19 context, than the past. On the opposite side, resulting from funding initiatives and their own prepositive nature and relation to the cultural sector, we observed on the local public agencies and associations a strong effort on discussing cultural heritage, as the past times, that was regarded and participated by the more aged population. But these themes had a low interest among the youngsters and the middle-aged residents. Most of them have lived all their existence in the existing housing units, while they perceive the industrial and migrant past as something that is exclusively oriented to their ancestors.

According to private organizations, we observed, from most of the new uses of tangible cultural heritage, that culture was being used as an instrumental factor to motivate the visits of the outsiders, leading towards the creation of a new residential, cultural and leisure consumption space in the eastern Lisbon riverside. Also, cultural heritage is being used as a commodity and as a nostalgic ambiance for the creation of new businesses and artistic practices. At the same time, the long-term expectancy resulting from deindustrialization, the existence of several urban voids, the empty warehouses and vacant factories waiting for rehabilitation, as well as the economic crisis occurred between 2008 and 2013, have brought a new urban paradigm to this area of the city, with the interest of major real estate companies, which have rehabilitated some of the existing urban voids towards cultural consumption. In result, an important part of its resident population has left the territory in the last three decades. It is the effect of a neo-liberal vision, based on the importance of land values, promoting a significant difference between the exchange and the use value. This new visibility is based on the reappropriation of tangible heritage from industrial times, being recently reconverted with commercial, cultural, and creative uses, but it is lacking the residents' engagement and participation.

References

BALSAS C. J. L. (2007), *City centre revitalization in Portugal: a study of Lisbon and Porto*, Journal of Urban Design 12 (2), 231-259.

BARTA A. (2017), *Habitus in alternative food practice: Exploring the role of cultural capital in two contrasting case studies in Glasgow*, Future of Food: Journal on Food, Agriculture and Society 5 (2), 27-41.

BIRKELAND I. (2008), *Cultural Sustainability: Industrialism, Placelessness and the Re-animation of Place*, Ethics, Place & Environment 11 (3), 283-297.

BRUNDTLAND AND WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT (1987), *Report of the World Commission on Environment and Development: Our Common Future*, Retrieved from: www.sustainabledevelopment.un.org.

BUDD W., LOVRICH JR. N., PIERCE J. C., CHAMBERLAIN B. (2008), *Cultural sources of variations in US urban sustainability attributes*, Cities 25 (5), 257-267.

BORGHI V., FALANGA R., OLORI D., PUSSETTI C. (2018), *Practices of Citizenship and Real Estate Dynamics: Roberto Falanga and Chiara Pussetti in conversation with*

Vando Borghi and Davide Olori, European Journal of Creative Practices in Cities and Landscapes 1 (1), 103-114.

CAMARA MUNICIPAL DE LISBOA (1965), *Plano de Urbanização de Chelas* (Urbanization Plan of Chelas), Departamento de Habitaçao da Camara Municipal de Lisboa, Lisbon, Portugal.

CAMARA MUNICIPAL DE LISBOA (2019), *Lisboa a Oriente, Roteiro Cultural* (Lisbon towards East, Cultural Script), Direção Municipal de Cultura, Lisbon, Portugal.

CORREIA R., FALANGA R., NUNES M., MARTINS J. (2020), *ROCK Lisbon Survey: Statistical Report*, Retrieved from: www.lisboa.rockproject.eu.

COSTA P., LOPES R. (2018), *Dos dois lados do espelho: diálogos com um bairro cultural através da intervenção urbana* (On both sides of the mirror: dialogues with a cultural quarter through urban intervention), Etnográfica 22 (2), 395-425.

COUCH C., SYKES O., BÖRSTINGHAUS W. (2011), *Thirty years of urban regeneration in Britain, Germany and France: The importance of context and path dependency*, Progress in Planning 75 (1), 1-52.

DA MATA PEQUENO BAPTISTA SOARES A. M. (2011), *Identidade Territorial de um Bairro Social: O Caso da Quinta Marquês de Abrantes* (Territorial Identity of a Social Housing neighborhood: The case of Marques de Abrantes Farm), Universidade Nova de Lisboa, Lisbon.

DEGEN M., GARCÍA M. (2012), *The transformation of the 'Barcelona Model': an analysis of culture, urban regeneration and governance*, International Journal of Urban and Regional Research 36 (5), 1022-1038.

DE RADA V. D., MARTÍN V. M. (2014), *Random route and quota sampling: Do they offer any advantage over probably sampling methods?*, Open Journal of Statistics 4 (5), 391-401.

EUROPEAN COMMISSION (2020), *CORDIS: EU research results*, Retrieved from: www.cordis.europa.eu.

EVANS G. (2005), *Measure for Measure: Evaluating the Evidence of Culture's Contribution to Regeneration*, Urban Studies 42 (5-6), 959-983.

EVANS G. (2009), *Creative Cities, Creative Spaces and Urban Policy*, Urban Studies 46 (5-6), 1003-1040.

FERILLI G., SACCO P. L., TAVANO BLESSI G., FORBICI S. (2017), *Power to the people: when culture works as a social catalyst in urban regeneration processes (and when it does not)*, European Planning Studies 25 (2), 241-258.

FOLGADO D., CUSTÓDIO J. (1999), *Caminho do Oriente – Guia do Património Industrial,* (Pathway towards East – Guide for industrial heritage), Livros Horizonte, Lisbon.

GEBALIS (2020), *Quinta do Chale*, Retrieved from: www.gebalis.pt.

GENNARI C. (2018), *Regeneração urbana, cidade criativa e gentrificação: Estudo do caso de Marvila em Lisboa* (Urban Regeneration, creative city and gentrification: Case study of Marvila in Lisbon), Sociabilidades Urbanas – Revista de Antropologia e Sociologia 2 (6), 113-123.

GEORGE E. W. (2010), *Intangible cultural heritage, ownership, copyrights, and tourism*, International Journal of Culture, Tourism and Hospitality Research 4 (4), 376-388.

GRAHAM B., ASWORTH G., TUNBRIDGE J. (2000), *A Geography of Heritage: Power, Culture and Economy*, Routledge, London.

HAWKES J. (2001), *The fourth pillar of sustainability: Culture's essential role in public planning*, Common Ground, Melbourne.

HECKERT M., MENNIS J. (2012), *The economic impact of greening urban vacant land: a spatial difference-in-differences analysis*, Environment and Planning A: Economy and Space 44 (12), 3010-3027.

HUANG L., WU J., YAN L. (2015), *Defining and measuring urban sustainability: a review of indicators*, Landscape Ecology 30, 1175-1193.

KONIOR A., POKOJSKA W. (2020), *Management of Postindustrial Heritage in Urban Revitalization Processes*, Sustainability 12 (12), 5034.

LEE S. J., HWANG S., LEE D. (2015), *Urban Voids: As a Chance for Sustainable Urban Design*, Proceedings of the 8th Conference of the International Forum on Urbanism, D007.

LEES L. (2012), *The Geography of Gentrification: Thinking Through Comparative Urbanism*, Progress in Human Geography 36 (2), 155-171.

LEES L. (2018), *Introduction: towards a C21st global gentrification studies*, in: Lees L., Phillips M. (eds.), Handbook of Gentrification Studies, Edward Elgar, Cheltenham, pp. 1-10.

LEVER W. F. (1987), *Glasgow: Policy for the Post-industrial City*, in: Robson B. (ed.), Managing the City: The Aims and Impacts of Urban Policy, Croom Helm, London, pp. 40-59.

LIU Y.-D. (2014), *Socio-cultural impacts of major event: evidence from the 2008 European Capital of Culture, Liverpool*, Social Indicators Research 115 (3), 983-998.

LOCKE R., MEHAFFY M., HAAS T., OLSSON K. (2018), *Urban Heritage as a Generator of Landscapes: Building New Geographies from Post-Urban Decline in Detroit*, Urban Science 2 (3), 92.

LOURES L. (2015), *Post-industrial landscapes as drivers for urban redevelopment: Public versus expert perspectives towards the benefits and barriers of the reuse of post-industrial sites in urban areas*, Habitat International 45 (Part 2), 72-81.

MARCUSE P. (2015), *Gentrification, Social Justice and Personal Ethics*, International Journal of Urban and Regional Research 39 (6), 1263-1269.

MARTINS J. C. (2020), *Tangible Cultural Heritage Re-Appropriation Towards A New Urban Centrality. A Critical Crossroad in Semi-Peripheral Eastern Riverside Lisbon*, Geography, Environment, Sustainability 13 (3), 139-146.

MARTINS J. C., MOURATO J. (2018), *Marvila/Beato: Research Report*, Retrieved from: www.lisboa.rockproject.eu.

MILES S., PADDISON R. (2005), *Introduction: The Rise and Rise of Culture-led Urban Regeneration*, Urban Studies 42 (5-6), 833-839.

NEVADO A. (2015), *The Eastern waterfront area of Lisbon: progress, decline and regeneration*, Joelho 6, 146-152.

NOFRE I MATEO J. (2010), *Políticas culturales, transformaciones urbanas y higienización social en la Barcelona contemporánea* (Cultural Policies, urban transformtions and social hygienization in contemporary Barcelona), Anales de Geografía de la Universidad Complutense 30 (2), 133-161.

ORIENTRE (2017), *Bem-vindos ao Hub Criativo do Beato* (Welcome to Beato Creative Hub), Retrieved from: www.orientre.pt.

PAPADAM M. (2017), *The Heritage of the Ordinary: an alternative view. Strategies for using cultural heritage sites as a driver of sustainable urban [re]development in Piraeus*, Delft University of Technology, Delft.

PINTO A. (1966), *Histórica da Manutenção Militar* (Military Maintenance History), SPEME, Lisbon.

POP I. L., BORZA A., BUIGA A., IGHIAN D., TOADER R. (2019), *Achieving cultural sustainability in museums: A step toward sustainable development*, Sustainability 11 (4), 970.

PRATT A. (2018), *Gentrification, artists and the cultural economy*, in: Lees L., Phillips M. (eds.), Handbook of Gentrification Studies, Edward Elgar, Cheltenham, pp. 346-362.

REIS E SILVA M. (2016), *Pátios e vilas de Marvila e Beato: modos de vida de um movimento antigo* (Pátios and Villas of Marvila e Beato: ways of life from an old motion), Cadernos do Arquivo Municipal 6, 143-170.

RODRIGUES A., GOMES A., FERREIRA S., COSTA A. (2015), *PRODAC: Comunidade em construção* (PRODAC: Comunity in construction), Santa Casa da Misericórdia de Lisboa, Lisbon.

SOINI K., BIRKELAND I. (2014), *Exploring the scientific discourse on cultural sustainability*, Geoforum 51, 213-223.

SOINI K., DESSEIN J. (2016), *Culture-Sustainability Relation: Towards a Conceptual Framework*, Sustainability 8 (2), 167.

SWANSON K. K., DEVEREAUX C. (2017), *A theoretical framework for sustaining culture: Culturally sustainable entrepreneurship*, Annals of Tourism Research 62, 78-88.

TULUMELLO S. (2015), *Fear and Urban Planning in Ordinary Cities: From Theory to Practice*, Planning Practice & Research 30 (5), 477-496.

VAN DE KAMP L. (2019), *The heritagization of post-industrial re-development and social inclusion in Amsterdam*, Journal of Urban Cultural Studies 6 (2-3), 199-218.

VECCO M. (2010), *A definition of cultural heritage: From the tangible to the intangible*, Journal of Cultural Heritage 11 (3), 321-324.

VERHEIJ J., CORRÊA NUNES M. (2021), *Justice and power relations in urban greening: can Lisbon's urban greening strategies lead to more environmental justice?*, Local Environment 26 (3), 329-346.

VIC PROPERTIES (2019), *Breathe a new way of living*, Retrieved from: www.pratariversidevillage.com.

Initial submission: 02.06.2020
Revised submission: 30.11.2020
Final acceptance: 23.12.2020

Correspondence: Institute of Social Sciences, University of Lisbon, Av. Professor Aníbal de Bettencourt, 1600-189, Lisbon, Portugal.

Email: joaomartins.cf@gmail.com

Journal of Urban and Regional Analysis,
vol. XIII, 2, 2021, p. 301 - 322
https://doi.org/10.37043/JURA.2021.13.2.6

INCLUSIVE URBANISATION? A STUDY OF INDIAN SLUMS

Somenath **GHOSH**[1], *Pallabi* **SETH**[2], *Saumya* **CHAKRABARTI**[1]
[1]Visva-Bharati University, Bolpur, India
[2]Fondazione L'Albero Della Vita, Kolkata, India

Abstract: The proliferation of slums always questions the process of inclusive urbanisation in developing countries. Given this perspective, the study aims to see the changing pattern of urbanisation in India comparing the level, concentration and growth of slum and urban populations over time. Furthermore, it intends to see the relationships of different economic indicators with the level and concentration of urban and slum population in order to determine the inclusiveness of Indian cities. The study incorporated descriptive and inferential statistical analysis using Indian state-level data on urban and slum population and different economic indicators for 2001 and 2011. The study finds an increasing level of slum population compared to the urban population in most Indian states, while shifting the concentration of slum population from high-income to newly growing states. We also evidence the positive impact of economic inequality on the expansion of slum population. The study concludes that the process of economic growth with exclusionary urbanisation generates urban inequality, which helps to persist the slums.

Key Words: *inclusive urbanization, slum dwellers, economic inequality, logarithmic regression.*

Introduction

The whole world is now mesmerized with the concept of "inclusive city". It talks about the cities that must have the capacity to generate spatial, social and economic inclusion of the marginal or poor people with its growth and development (Armendaris 2015). However, despite the efforts for inclusive urbanization, exclusion in cities is seen as growing at a high rate in many developing countries, as influxes of poor migrants to the cities are widely noticed (Tacoli et al. 2015). It is already evident across the globe that the slum population of urban areas, specifically in developing countries, has increased tremendously and it has firstly been estimated to rise to 2 billion by 2020 (UN-HABITAT 2003). However, the latest official data is of 863 million people for the global urban slum population (UN-HABITAT 2013). So, these facts persuasively restrain us to nullify the perception of the 'urbanization of poverty' (Piel 1997), and they also prevent us from accepting the notion of the inclusiveness of cities. Thus, the basic argument in this paper affirms the concept that the expansion of slums is one of the symptoms of exclusionary urbanisation. Our study attempts to explore the extent of increase in slum dwellers and to find the possible determinants of their existence and spread.

In recent times, India is experiencing a high urban-centric economic growth[1] with rapid urbanisation. The country's urban population has been increasing speedily[2] and it is projected to reach 590 million people by 2030 (Sankhe et al. 2010). But, beside the rise in urban population, the population of the slums has also increased rapidly from 42.5 million in 2001 to 65.5 million in 2011 and, even worse, 0.9 million urban people are counted as houseless (Government of India 2001, Government of India 2011). Therefore, a widespread view has emerged among many researchers, development practitioners and policy analysts that poverty is urbanising in this country, and it is moving far away from attaining inclusive urban growth. Moreover, the recent trends of high economic growth without a significant

formal sector employment generation in India also do not endorse inclusive growth (Chakrabarti 2016).

According to modernisation theorists, poverty and slums are temporary phenomena in cities. They have argued that the process of urbanisation has a natural ability to eradicate the problems of poverty and slums, with the help of economic growth and modernisation methods (Frankenhoff 1967, Turner 1969, World Bank 2009, Glaeser 2011). Accordingly, inclusive urbanisation is considered to take place without any push of development policies and programmes. And, following this view, planners of many developing countries, including India, had reserved little provision for urban development in their earlier development plans. However, later, it was noted that urban poverty and slums were on the rise, mainly due to the lack of a formal sector employment and the inability of the poor to work in the formal sector (Stokes 1963, Harris and Todaro 1970). Therefore, from 1980s, to address this problem, the Government of India had emphasised on the alleviation of poverty from urban areas through development programs for achieving inclusive and comprehensive urbanisation[3] (UN-HABITAT 2009, Mishra and Dasgupta 2014).

But, despite such policies and programs, discrimination and exclusion continue to prevail in urban India, as the increase in consumption inequality in urban areas depicts the unequal urban process (Sarkar and Mehta 2010). Concurrently, the uneven distribution of the economic growth process in urban areas encourages socio-spatial inequality (Ahmed et al. 2011), and socio-economic disparities are visible between the tier-I and tier-II[4] cities in India (Kundu and Samanta 2011). However, approaching the issue from a different perspective, Harvey (2008) has blamed the urban transformation behind such disparity, and he criticised this new trend, claiming it as an exclusionary process by which many slums and squatter settlements have not only been generated but they also get displaced or evicted[5] through the process. The recent idea of creating world-class cities in India follows a certain spatial change – the elites have acquired peri-urban areas and a special economic zone is created to attract global capital; this also does not ensure the process of inclusion of the poor (Roy 2014). The creation of World-class cities rather results in the dispossession and displacement of the poor.

On one hand, a study (Marx et al. 2013) analysed the predominance of slums from a different perspective. It argued that the persistence of slums is a result of the existing policy gaps and poverty traps. On the other hand, the lack of human capital formation and the investment inertia have been proposed as factors that are confining slum dwellers into a poverty trap (Duflo et al. 2012). And there is a conflict of action between the formal policy proposal and the involvement of local private actors, causing failure to ensure an effective policy action for the improvement of slum dwellers (Fox 2014). The process of rapid urbanisation in the less developed countries is posturing challenges in their governance. The growing cities of many developing countries lack a proper institutional mechanism to keep the things in order so that the inclusiveness of cities to be enhanced (Henderson and Turner 2020).

The regional diversity of urbanisation processes around the world occurs due to a variety of factors. The causes of urbanisation in South Asia are quite different from those in Sub-Saharan Africa (Lall et al. 2017, Akbar et al. 2018). Several studies observed that, unlike many other countries, India's process of urbanisation follows the classic Roback model of rural to urban migration due to regional inequality (Chauvin et al. 2017). So far, many studies have been conducted to examine the trends of urbanisation in India. One among them (Sankhe et al. 2010) uncovered the realities of Indian cities and it discussed their prospects while it emphasised on the policies which may lead India to achieve inclusive urbanisation. But it hardly discussed the present condition of urbanisation concerning the growth of slum dwellers (Sankhe et al. 2010). Besides, the report of the Indian Institute for Human Settlements (2014) on 'cities as engine of inclusive development' has demonstrated the relations between urbanisation, employment generation, economic growth and human

development, in order to understand how cities in India are getting inclusive. However, the report has left further the scope of analysing the relationships between urbanisation and other economic indicators in order to assess inclusive urban growth (Institute for Human Settlements 2014). Moreover, until now, few studies have been conducted to explore the possibilities regarding the expansion of slum population due to the influence of different economic indicators at macro level, specifically from the Indian perspective. Hence, the above arguments and gaps induce us to raise questions on the current process of urbanisation and they encourage us to re-examine the present changing trend and pattern of urbanisation that India is undergoing. The relation between urbanisation and the essential economic indicators has also been worth noting. Besides, we specifically felt the need of studying the changing trends of the slum population with urbanisation and to find out which probable factors are influencing it, in order to address our primary issues.

Thus, the article aims to understand the process of urbanisation (whether it is inclusive) by comparing the proportion of urban and slum population in the total of the population and the urban population respectively along with their growth rates. And the study intends to explore the share of urban and slum population of the regions out of the total urban and slum population of the country. Next, as a digression, the study further purposes to enquire into the inclusiveness of cities through finding the relationships between urbanisation and the relevant economic indicators. Finally, the paper focuses to look at the influence or impact of economic indicators on the expansion of slum population.

Methodology

The study employs Indian state-level data for two rounds: 2001 and 2011 (Government of India 2001, Government of India 2011). We consider 15 major states[6] that constitute more than 85% and 90% of the total urban and slum population of India respectively, for both rounds (Fig. 1).

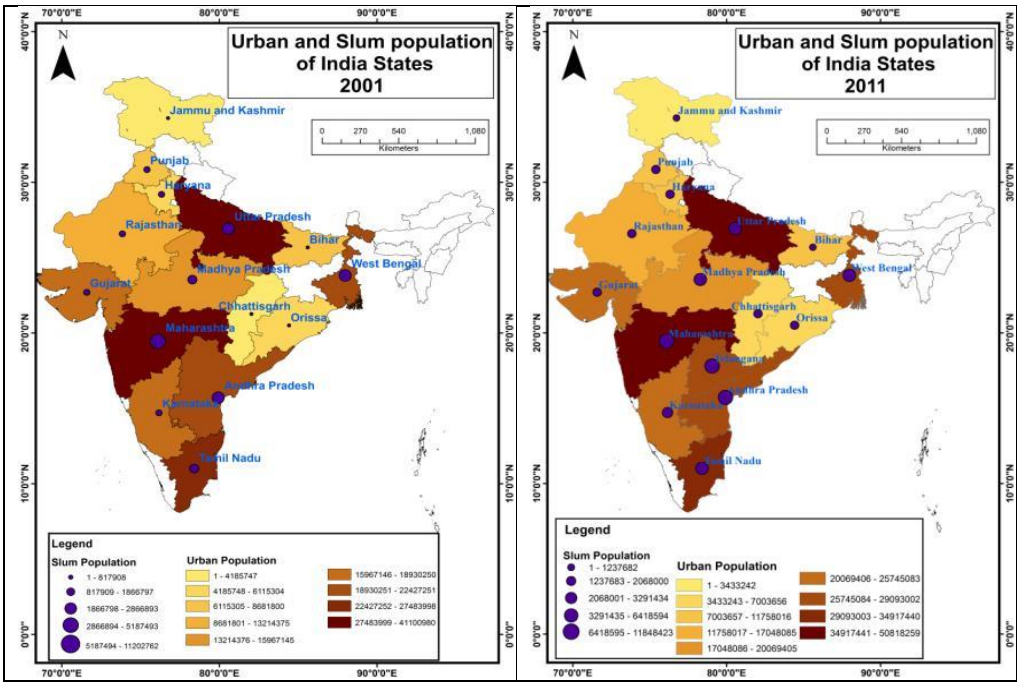


Fig. 1 **– The Indian States' urban and slum population**
Source[9]: *the authors' estimation*

The data for the analysis (Table 1) was collected from the census (Government of India 2001, Government of India 2011), from the reports of the Reserve Bank of India (2021), the National Sample Survey Office (2011, 2014), the National Sample Survey Organisation (2001a, 2001b, 2003, 2012) and the databook of the Planning Commission of India (2014). We used the statistical software Stata 8 for the analysis.

Table 1

List of variables with data source

Variables	Indicators	Abbreviation	Data Source
Slum Population		***SlumPop***	Census
Urban Population		***UrbanPop***	Census
Share of Urban Population to Total Population	Level of Urbanisation	***Urban-Level***	Census
Share of Urban population of the states out of the total urban population of India	Concentration of Urbanisation	***Urban-Concentration***	Census
Share of slum population out of urban population	Level of Slum dwellers/population	***Slum-Level***	Census
Share of slum population of the states out of the total slum population of India	Concentration of slum dwellers/population	***Slum-Concentration***	Census
Urban consumption inequality (Gini coefficient)	Urban Economic Inequality	***Urban-Economic-Inequality***	Planning Commission databook
Monthly Per capita Consumption Expenditure in the Urban	Cost of Living in the Urban	***Cost-of-Living-Urban***	National Sample Survey Organisation, National Sample Survey Office
Workforce Participation Rate in the Urban	Employment Opportunities in the Urban	***Urban-Employability***	Census
Casual worker's Wage Rate in Urban areas	Wage rate in Urban areas	***Wage-Rate-Urban***	National Sample Survey Organisation
Urban-rural casual worker's Wage rate Gap	Urban-rural Wage Rate Gap	***Urban-rural-Wage-Rate-Gap***	National Sample Survey Organisation, National Sample Survey Office
Per capita Urban Net State Domestic Product (Urban-NSDP)	Urban Economic Growth	***Urban-NSDP***	Reserve Bank of India
Urban informal workers out of the total workers of the urban	Share of urban informal employment	***Urban-Informality***	National Sample Survey Organisation

For the analysis, we took the variables as described below:

a) In the first part of the study, we measured the level, concentration and growth of the urban as well as slum dwellers. We have considered the variables: share of urban population to total, share of urban population of the states out of total urban population in India and the decadal growth of urban population, which are applied for measuring the level, the concentration and growth of the urban population respectively. Similarly, the level, concentration and pace of increase of the slum population have been measured by the variables: share of slum population to urban population, share of slum population of the states out of the total slum population of India and the decadal growth of slum population respectively. This has been illustrated with the help of a table and thereafter, paired t-tests have been done to articulate whether the difference of mean

between the periods is significant for the levels of slum and urban population. And an independent sample t-test has been done to find the significant mean difference between the growth rate of slum and urban population.

b) In the second part, we examine the relationships between the level of the urban population and a few selected economic indicators, like the urban consumption inequality, the urban cost of living, employment opportunities in urban areas, urban wage rates[7] and the share of slum population out of the urban population. We also show the relationships between the concentration of urban population and the same economic indicators. We take the Gini-Coefficient and the Monthly Per Capita Expenditure (MPCE) as proxies for measuring the urban consumption inequality and the cost of living respectively. We also select the workforce participation rate as a proxy for the employment opportunity. In this part, the relationships have been shown with the help of line diagrams and fitted lines where we placed the variables indicating the urbanisation along the X-axis and we put other indicators along the Y-axis to obtain the visual representation of the influence of urbanisation on the economic indicators for 2001 and 2011 separately (Table 2).

c) The relationships between the level and concentration of the slum population and of the same economic indicators, except the urban wage rates, have been observed. Instead of the variable of urban wage rate, we have considered the urban-rural[8] wage rate gap to see the relationships with the level and concentration of the slum population. Similar to the previous exercise, the relationships have been also shown with the help of line diagrams. But here the influence has been predicted by the economic indicators (along X-axis) on the variables indicating the level and concentration of slum dwellers (Y-axis) for the same years separately. Apart from the relationships of the main economic indicators in the study, as mentioned above, we have also considered the Net State Domestic Product (NSDP) as a representative of economic expansion, in order to get some connecting relationships between economic growth and some of the previously stated indicators.

d) Along with these relationships, the paper looks at correlations to generate a more meaningful understanding of the changing relationships between the variables, over time. Here, we have noted the difference in the correlation value (r) for the years to identify the changing direction (either positive or negative) of the relationships of the variables. Lastly, two regression models have been developed to find out the impacts of the economic indicators on the slum population and its concentration.

Table 2

Methodology of charts

<table>
<tr><th>Variables at X-axis</th><th>Variables at Y-axis</th><th>Methods</th></tr>
<tr><td colspan="3">1. Relationships between economic indicators and urbanisation</td></tr>
<tr><td rowspan="5">(a) Urban-Level
(b) Urban-Concentration</td><td>Urban-Economic-Inequality</td><td rowspan="5">Line diagrams, regression fit and correlation results</td></tr>
<tr><td>Cost-of-Living-Urban</td></tr>
<tr><td>Urban-Employability</td></tr>
<tr><td>Wage-Rate-Urban</td></tr>
<tr><td>Slum-Level</td></tr>
<tr><td colspan="3">2. Relationships between slum population and economic indicators</td></tr>
<tr><td>Urban-Economic-Inequality</td><td rowspan="4">(a) Slum-Level
(b) Slum-Concentration</td><td rowspan="4">Line diagrams, regression fit and correlation results</td></tr>
<tr><td>Cost-of-Living-Urban</td></tr>
<tr><td>Urban-Employability</td></tr>
<tr><td>Urban-rural-Wage-Rate-Gap</td></tr>
<tr><td colspan="3">3. Relationship between urban economic growth and the level of urbanisation (Appendix 1)</td></tr>
<tr><td>Urban-NSDP</td><td>Urban-Level</td><td>Line diagrams and correlations</td></tr>
</table>

Results

Level, concentration and growth of urban and slum population: a state-level analysis

Urbanisation is a multi-aspect and changing process (Davis 1965). Among the multiple contributing factors, economic ones are important. Historically, urban centres were found to be originated mostly around factories or industries, whereas, at present, the urban has no specific centre; several factors induce cities to expand to big urban centres. Apart from the natural growth of population in the cities, rural to urban migration for better employment or living has prompted congestions at urban areas and the expansion of slum population, in contrast. The maps below show the slum and urban population of the analysed states. And there is a significant increase in the level of the urban and slum population over time for India (and also for many states) – from 27.86% and 14.88% in 2001, to 31.14% and 17.37% in 2011 respectively (Table 3). The result of the paired t-test shows, in both cases, that the increase of their level is significant; it is similar for the growth of both populations, but the growth of slum population (53.82%) is almost twice than that of the urban population (31.8%), while the average difference between the two growth rates is significant.

Table 3

Level, concentration and growth of urban and slum populations (2001 and 2011)

State[6]	Urban-Level		Slum-Level		Urban-Concentration		Slum-Concentration		Growth of urban population (Decadal growth)	Growth of slum population (Decadal growth)
	2001	2011	2001	2011	2001	2011	2001	2011		
India	**27.86**	**31.14**	**14.88**	**17.37**					**31.8**	53.82
J&K	24.99	27.38	10.67	19.28	0.9	0.9	0.6	1	36.42	146.57
Punjab	34.02	37.48	14.03	14.04	2.9	2.8	2.7	2.2	25.86	25.95
Haryana	29.01	34.88	23.23	18.8	2.1	2.3	3.3	2.5	44.59	17.03
Rajasthan	23.4	24.87	9.79	12.13	4.6	4.5	3	3.2	29.01	59.8
UP	20.8	22.27	12.73	14.02	12.1	11.8	10.3	9.5	28.82	41.97
Bihar	10.48	11.29	6.12	10.53	3	3.1	1.2	1.9	35.43	132.87
WB	27.96	31.87	18.35	22.06	7.8	7.7	9.7	9.8	29.72	55.94
Orissa	15.03	16.69	11.42	22.28	1.9	1.9	1.5	2.4	26.94	147.67
Chhattisgarh	20.13	23.24	19.54	31.98	1.5	1.6	1.9	2.9	41.84	132.17
MP	26.44	27.63	15.14	28.35	5.6	5.3	5.7	8.7	25.69	135.37
Gujarat	37.41	42.6	9.86	6.53	6.6	6.8	4.4	2.6	36	-10
Maharashtra	42.48	45.22	27.26	23.32	14.4	13.5	26.3	18.1	23.64	5.76
AP	27.48	33.36	24.93	36.1	7.3	7.5	12.2	15.6	35.61	96.37
Karnataka	34.06	38.67	7.81	13.93	6.3	6.3	3.3	5	31.54	134.6
TN	44.25	48.4	10.43	16.61	9.6	9.3	6.7	8.9	27.05	102.26
Mean	***27.9***	***31.1***	***14.8***	***19.2***	***5.8***	***5.7***	***6.2***	***6.3***	***31.9***	***79.9***
SD	***9.2***	***10.2***	***6.3***	***7.9***	***4***	***3.8***	***6.6***	***5.3***	***6***	***54.7***
t-test (sig)	***7.766 (0.00)***		***3.08 (0.003)***						***3.48 (0.001)***	

Source: *the authors' estimation, using the census data (Government of India 2001, Government of India 2011)*

The level of the urban or slum population has been widely used as a measure for urbanisation; however, it there are limitations for measuring the regional/state-level thickening of the urban and slum population. So, we introduced another important measure, i.e., the concentration of the urban and slum population for measuring the extent of concentration of those populations across the Indian states. Unlike the urban population, the state-wise concentration of the slum population differs over time. For instance, the concentration of slum population in Maharashtra and Gujarat has reduced, whereas it increased in AP, TN and Karnataka.

The level of urban population has increased significantly in Punjab and Haryana over time, whereas in J&K, Rajasthan and UP, the level of slum population has increased. The concentration of urban and slum population has changed marginally over time. The growth of slum population is higher than that of the urban population for J&K, Punjab, UP and Rajasthan. Since the late '90s, the tertiary and secondary sectors started contributing more than the primary sector in Punjab and Haryana, leading to a steady growth in the level of urban population. However, their pattern of urbanisation was different. Most of the rural pockets of Haryana experiencing urbanism[10] (Singh and Singh 2013) might have induced the formation of small towns (Government of India 2001, Government of India 2011) since 2000, with less slum population compared to the urban population. Moreover, the rising out-migration of slum dwellers to the State Capital and the National Capital from different districts of Haryana may contribute to decreasing the level/concentration of slum population in the state. Urbanisation in Punjab is spatially dispersed with the growth of small towns around rural hinterlands and few metro cities (Singh and Singh 2014) attracting a huge influx of rural agricultural labours from different parts of Punjab and India. Besides, the infrastructure development increased the daily commute between villages and small towns and between small towns and big cities. Probably, it has resulted in a slow-paced change in the level and concentration of slum population.

The laggard state Bihar witnessed a huge increment in the level of slum population between 2001 and 2011, despite having the lowest level of urban population among all states. With the initiation of a new political regime since 2005, Bihar's economy experienced an unprecedented growth driven by the secondary (construction, manufacturing) and tertiary (communication, tourism, banking and insurance) sectors. Along with that, there was an improper urban planning attributed to the growth of existing cities and the conversion of big villages into new towns. Concurrently, the neglecting attitude of the state in urban policymaking and the poor rural-urban transportation triggered in an overwhelming growth of slums (132.87%) in the cities.

Orissa, MP and Chhattisgarh experienced a similar trend like Bihar. The level, concentration and growth of slum population are higher than that of the urban population in 2011. The tribal populations of these states have been caught in the crossfire between acute poverty and inherent political instability; thus, they have often migrated for alternative livelihood opportunities. However, the migration has become increasingly intra-state (Government of India 2001, Government of India 2011), which is one of the reasons pushing the slum population up within these states despite the low level, concentration and growth of the urban population. On the contrary, instead of a higher level of urban population in both periods, WB witnessed a low level of slum population in 2011. The lack of job opportunities because of withering industries (Lahiri 2016) aggravated outbound migration in WB, contributing to a sluggish increase in the level, concentration and growth of slum population.

The rich states of Maharashtra and Gujarat have a very high level of urban population in both periods. Though Maharashtra retained a very high level and concentration of both populations in 2011, it observed a fall in all the above-mentioned aspects since 2001, probably because of the low expansion[11] of slum population in the newly formed urban areas. Does reverse migration to the suburbs (the gathering of slums around the urban-core), because of the industrialisation of the suburbs and peripheries and of the de-

industrialisation of the metropolitan core (World Bank 2013), reduce the slum population in cities too? – this requires further attention. Much research (Housing and Land Rights Network 2014) has also referred to the eviction of slum dwellers from cities to the suburbs/peripheries. Furthermore, the ever-increasing out-migration from Maharashtra (Edwin 2019) may have inculpated the lowering of the slum population in urban areas. The level and concentration of both populations are significantly lower in Gujarat than that of Maharashtra in 2011 and all these aspects witnessed deterioration since 2001. Strikingly, the Gujarat's growth of urban population is significantly higher than that of Maharashtra, but it has a negative growth of the slum population. Gujarat encounters decentralised urbanisation with numerous small and medium-sized units receiving huge inter-state migrants (John 2019). Alike Maharashtra, the high out-migration has become pivotal, reducing the level and concentration of the slum population here (Edwin 2019). Whether the in-situ slum development projects (Bhatkal et al. 2015), undertaken by different urban bodies, have contributed the same, it requires further exploration.

AP, Karnataka and TN witnessed a very high level and moderate concentration of urban population in 2001, with a significant increase in 2011. On the contrary, the level and concentration of the slum population are very high in AP compared to Karnataka and TN, but the growth of slum population in AP is less than that of Karnataka and TN. Industrial development can be considered as one of the drivers of decentralised urbanisation in TN (Kolappan 2016), whereas the urban is centred around a few regions of AP. The very high level and concentration of slum population in AP may attribute to ineffective urban planning in cities for accommodating the rural-urban migration (Rohit 2013).

The above sub-national/regional analysis points out increasing footsteps for the slums in Indian cities[12], despite the government initiatives for its prevention. Therefore, the urbanisation of India seems increasingly exclusionary. Economic inequality has increased (Planning Commission of India 2014) with a structural change in urbanisation which may forbid cities to become inclusive. So, in the following section, we try to explore some relations in order to interrogate more on the inclusive urbanisation of India.

Relationship between economic indicators and urbanisation: a digression

We assume that the ongoing process of urbanisation in India has been amplifying the urban-inequality and the urban cost of living along with an enhanced employability; it could have possibly increased the inequality between the wage rates too. So, before exploring how these economic indicators are affecting the expansion of the slum population, we seek to explore the influence of urbanisation on these indicators as a separate issue of discussion.

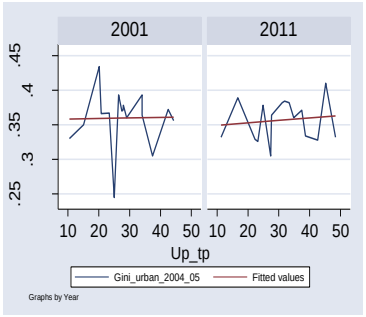
As an outcome of the recent urbanisation process in India, wealth has been accumulating only in a few hands, mainly due to the improper distribution of the economic growth benefit (Sengupta et al. 2008, Sarkar and Mehta 2010). Modern technology-led economic growth in the urban areas only demands skilled workers creating a distinction between the skilled and the unskilled workers in terms of wages or remunerations (Mukherjee 2007). The skilled workers and sophisticated managers are paid high salaries and so, they possess the capacity to spend more compared to the low-salaried or the informal workers. This has differentiated them in terms of living standards, and it therefore generated a stark inequality in a single urban space. Furthermore, in the process of urbanisation, the rich are getting the opportunity to invest their wealth for a better return whereas a poor cannot, which has created a significant gap between the wealthy and the poor. So, there is a high possibility of an increase in urban inequality with the current urbanisation in India.

We see that the cost of living in urban areas is high compared to the rural areas and the process of urbanisation has been continuously raising this cost of living further. Perhaps the rich in urban areas can demand and buy goods at a higher price, thereby the cost of living in

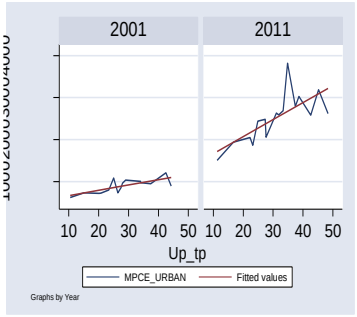
the city increases. To meet the diversified needs of the rich, various high-value commodities are being produced, which is a prominent characteristic of urbanisation.

The trends show that the scope for employment got boosted in urban areas but mostly in the informal sector, as the expansionary process of urbanisation has attracted many informal constructions and casual workers, petty businessmen, hawkers, and also people involved in petty services (Harris and Todaro 1970, Mazumdar 1976). The wage rates in urban areas are relatively higher than the rural counterparts but the wage rates are still highly unequal. Hence, it would be worth exploring the relationships between urbanisation and employability and between urbanisation and the casual worker's wage rate.

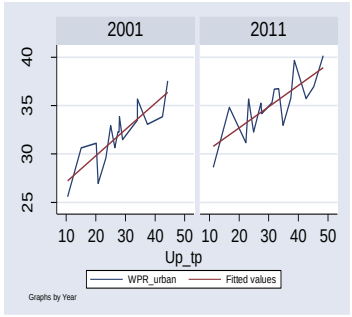
We have considered both the level and concentration of the urban population to see their relationships separately with the economic indicators, by the help of the line diagram, regression fit and correlations for two periods (2001 and 2011). We find no such relationships between the Urban Economic Inequality and the Level of Urban Population in both periods (Fig. 2), whereas the relationship between Urban Economic Inequality and Concentration of Urban Population is weakly positive in both periods (Fig. 3). However, in both cases, we find that the relationships are becoming positive over time (Table 4). Besides, we find indirect relationships between the Level of Urban Population and the Urban Economic Inequality using the Per capita urban Net State Domestic Product as a proxy of urban economic growth. This entails that the growth process taking place in urban areas may deepen economic inequality.



2.1 *Association between* ***Urban-Economic-Inequality and Urban-Level***

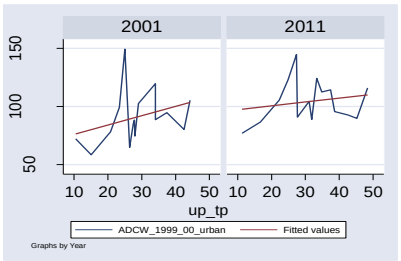


2.2. Association between ***Cost-of-Living-Urban and Urban-Level***

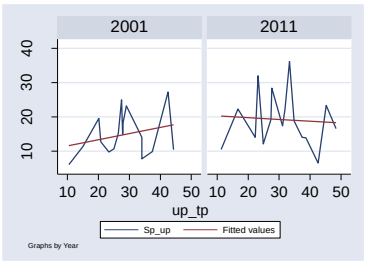


2.3. ***Association between*** *Urban-Employability and Urban-Level*

*For all charts, X-axis**:** Urban-Level*



2.4. Association between ***Wage-Rate-Urban and Urban-Level***

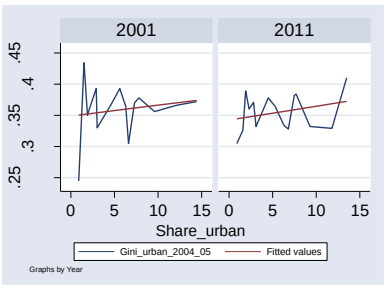


2.5. Association between ***Slum-Level and Urban-Level***

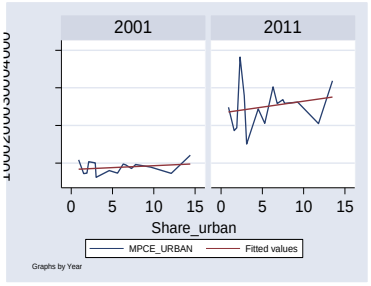
Fig. 2 **– The relationships between the economic indicators and the level of urban population**

Source: *the authors' estimation*[13]

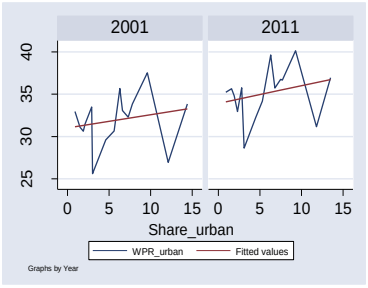
The line diagram shows positive relationships between the Cost of living in urban and the Urban-Level in 2001 and no correlation is found between the Cost of living in urban and the Urban-Concentration in that year. However, positive relationships have been noticed and the relationships got starkly positive with both level and concentration of urban population in 2011. It denotes that the recent process of urbanisation inflates the cost of living.



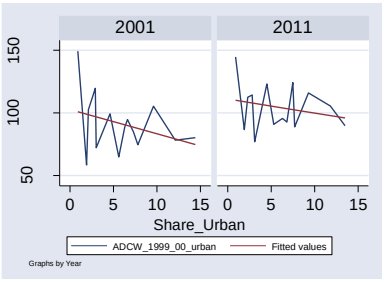
***3.1. Association between** Urban-Economic-Inequality and Urban-Concentration*



***3.2. Association between** Cost-of-Living-Urban and Urban-Concentration*

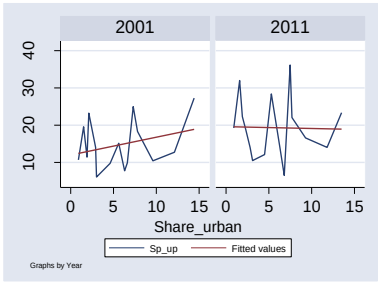


***3.3. Association between** Urban-Employability and Urban-Concentration*



***3.4. Association between** Wage-Rate-Urban and Urban-Concentration*

*For all charts, X-axis**:** Urban-Concentration*



***3.5. Association between** Slum-Level and Urban-Concentration*

Fig. 3 **– The relationships between economic indicators and the concentration of urban population**

Source: *the authors' estimation*

The line diagram shows that employability in urban areas has increased with an increase in the level and concentration of the urban population. Moreover, those relationships in both years are sharply positive.

Table 4

Correlation results of urban population

Correlation results	Urban-Level		Difference in correlation	Urban-Concentration		Difference in correlation
	2001	2011		2001	2011	
Urban-Economic-Inequality	0.0172	0.1198	0.102	0.1636	0.2766	0.113
Cost-of-Living-Urban	0.7310*	0.7305*	-0.000	0.2496	0.2030	-0.046
Urban-Employability	0.8354*	0.7638*	-0.071	0.2040	0.2640	0.060
Wage-Rate-Urban	0.3242	0.1868	-.1374	-0.3223	-0.2261	.0962
Slum-Level	0.2639	-0.0674	-.3313	0.2931	-0.0241	-.3172

Source: *the authors' estimation*

The wage rate in the urban is declining with the increase in the Urban-Concentration in both periods. However, the relationship between the Wage rate and the Urban-Level was positive in 2001, but no relation is observed between them in 2011.

In 2011, no relationship is found between the level of slum and urban population, as well as with the concentration of urban population, and the relationships have deteriorated over time which indicates that the expansion of the slum is not strongly dependent on the Urban-Concentration. There could be other factors influencing the expansion of slums (discussed in the next section). Moreover, one reason could be the high convertibility of land from rural to urban, which generates more urban population at once. Such newly formed urban hamlets do not draw the poor in those areas so quickly as those newly formed hamlets that are very much connected to the rural hinterlands, which are easy to commute. According to the Government of India (2011), the growth rate of town population is higher compared to that of slum population.

For knowing the process of urbanisation more deeply, we also looked into some other relations (Appendix 2). We found increasing positive relationships between the Cost-of-Living-Urban and the Urban-Economic-Inequality, which possibly identifies inequality as a factor behind the rise in the cost of living. There is also an increasing positive relation between the Cost-of-Living-Urban and the Urban Economic Growth.

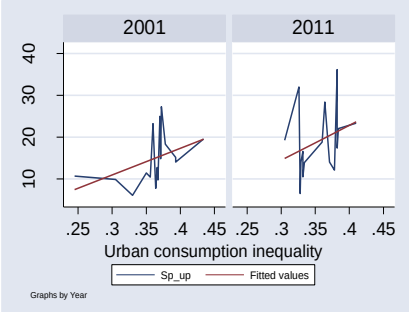
Relationship between the level and concentration of slum population and the economic indicators

The above-mentioned economic indicators might induce the increase in the concentration and level of slum population in urban areas. The increasing economic inequality has exacerbated a few people's wealth and income, making large sections of the population poor, property-less and incapable to get out of the slum. In contrast, the rise in the price level of goods, including the housing price and the price of services due to the growing demand of the rich, may inflate the cost of living for the poor. This may compel people to stay in slums/slum-like settlements; and this might be increasing the slum population.

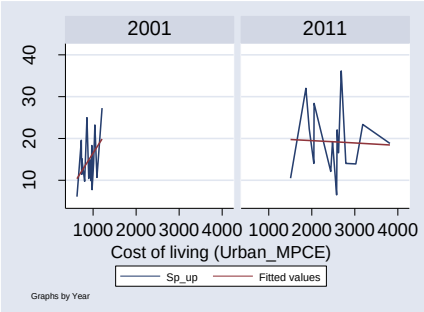
Most of the workers in the urban areas are informal and low paid, while they mostly reside in slums. So, the rising informal employment in urban areas may lead to an increase in the slum population. Moreover, due to the rural-urban wage rate difference, a large chunk of the rural population migrates to urban areas every year (Lewis 1954) and it gets absorbed in informal works, thereby impacting the expansion of the slum. Therefore, we hypothesise positive relations with the economic indicators.

Here also, we consider both the level and concentration of the slum population to see the relationships with the economic indicators separately. Both the level and concentration of the slum population has a positive relationship with urban economic inequality. As described above, there is a tendency of increasing economic inequality with urbanisation, which depresses the capacity of the slum dwellers to come out of the slum (Fig. 4, Fig. 5, Table 5). Apart from this result, a positive relationship between urban economic growth and the concentration of slum population (Appendix 3) ratifies the fact of exclusionary urbanisation.

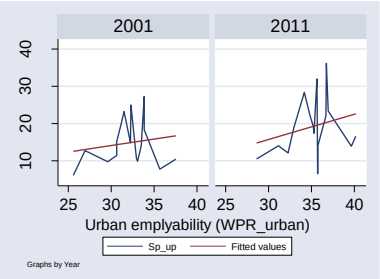
Furthermore, the level and concentration of slum population have positive relationships with the cost of living in urban in 2001. However, we find no relationship between the cost of living and the level of slum population in 2011. Although the cost of living has a positive relationship with the concentration of the slum, that is reduced over time. This indicates that living costs do not influence the generation of slum population.



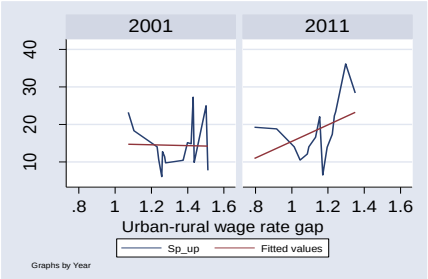
4.1. Association between ***Slum-Level and Urban-Economic-Inequality***



4.2. Association between ***Slum-Level and Cost-of-Living-Urban***



4.3. Association between ***Slum-Level and Urban-Employability***



4.4. Association between ***Slum-Level and Urban-rural-Wage-Rate-Gap***

Fig. 4 **– The relationships between the level of slum population and economic indicators**

Source: *the authors' estimation*

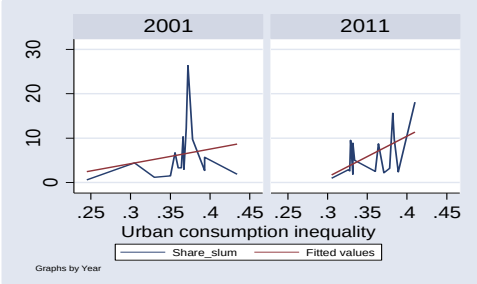
Table 5

Correlation results of slum population

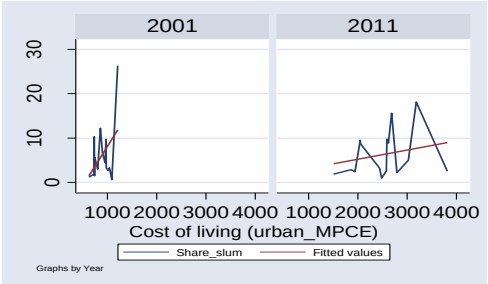
Correlation results	Slum-Level		Difference in Correlation	Slum-Concentration		Difference in Correlation
	2001	2011		2001	2011	
Urban-Economic-Inequality	0.2135	0.5272*	0.313	0.4197*	0.3150	-0.104
Cost-of-Living-Urban	0.4401*	0.2267	-0.213	0.4098*	-0.0399	-0.449
Urban-Employability	0.1991	0.3321*	0.133	0.1650	0.2494	0.165
Urban-rural-Wage-Rate-Gap	0.3153	0.6060*	0.290	-0.0265	0.4329*	0.406

Source: *the authors' estimation*

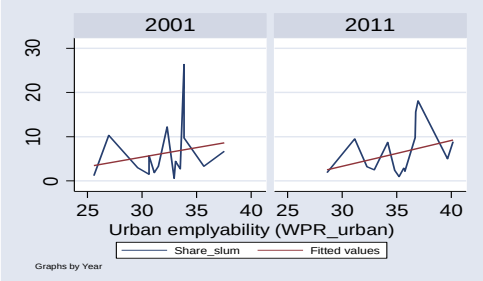
The level and concentration of slum population have positive relationships with urban employability in both years. The Urban-rural wage rate gap is positively related with the level and concentration of the slum population in both periods as well. This explicates that the growth in size of the slum population is due to the expansion of informal employment and because of wage rate differences. The Urban-rural wage-rate gap pulls the poor workers to the urban areas and these migrants get involved mainly in informal work and they reside in slums.



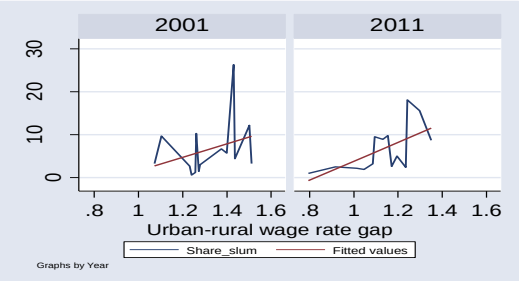
5.1. Association between Slum-Concentration and **Urban-Consumption-Inequality**



5.2. Association between ***Slum-Concentration and*** **Cost-of-Living-Urban**



5.3. Association between ***Slum-Concentration and Urban-Employability***



5.4. Association of ***Slum-Concentration with Urban-rural-Wage-Rate-Gap***

Fig. 5 **– The relationships between the concentration of the slum population and economic indicators**
Source: *the authors' estimation*

Regression analysis: the effect of economic factors on the level and concentration of slum population

One of the fundamental issues of this paper is to verify the probable impact of urban economic inequality on the expansion of the size of slum population. We have considered two regression models to validate such a claim. Here, for the regression analysis, we assume that the level and concentration of the slum population are the desired dependent variables (Table 6). But the variable 'level of slum population' is a ratio between the slum and the urban population which are highly correlated to each other. Such correlations between the numerator and the denominator dampen the variability of the variable 'level of slum population'. So, instead of considering the level of slum population, we considered the slum population as the dependent variable in the first model. In the second model, we assume the concentration of slum population as the dependent variable. We take 'logs' on both sides of the equations to eliminate the non-normality of the dependent variables (Appendix 4) and the problem of heteroscedasticity in the models. The independent variables are the urban economic inequality, the share of informal workers out of the total urban workers (as a control factor), the workforce participation rate in the urban, the share of total state population out of the total population of India, and the urban-rural wage rate gaps. We eliminate the Cost of Living from the equations as we found no such relation with both the level and the concentration of the slum population in the previous section. So, the regression equations are as follows:

$Y = a + b_1X_1 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + D_1 + U_i$------- (1)
$Z = a + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + D_1 + U_i$------- (2)

Where Y = Log(slum population) and Z = Log(concentration of slum population)
X_1 = Log(urban population)
X_2 = Log(share of total population of the state out of total population of India)
X_3 = Log(urban economic inequality)
X_4= Log(share of urban informal workers out of total urban workers)
X_5= Log(employment opportunity in urban)
X_6= Log(urban-rural wage rate gaps)
D_1= Time dummy (year 2001 = 0; year 2011 =1)

Table 6

Regression Results

Regression results	**Dependent Variables**	
Independent variables	Y	Z
X_1	.99132***	
X_2		1.0185***
X_3	2.0319**	2.1865**
X_4	-.36400	-.00159
X_5	1.0039	4.6545***
X_6	-.20255	-.48590
D_1	.08106	-.43996
Adjusted R – square	0.8942	0.7264
Nos. of observation	30	28
F-ratio (prob>F)	41.86***	12.95***
Mean VIF	1.67	1.93
Heteroscedasticity test (Chi-square sig)	0.9155	0.6310

*Note: ** and *** are the 5% and 1% level of significance*
Source: *the authors' estimation*

The above regression shows that both models are robust as the R-square in the models are high and both of them are significant at 1% level. We found that urban economic inequality has a significant and positive impact on the growth of slum population and the growth of the concentration of slum population respectively, at 5% level of significance. These findings tentatively reveal that, economic inequality is a vital cause for expanding the size of the slum population in the city. The mean Variable Inflating Factors (VIF) in both results are low, indicating the absence of a serious multicollinearity problem. Besides, the Breusch-Pagan tests have been performed for verifying the heteroscedasticity problem in the models and they reveal insignificant chi-square results that denote that the assumption of homoscedasticity has prevailed.

Discussion

By summarising the above results, we could arrive to some propositions. First, we arrive at the proposition that the overall slum population is expanding at a higher rate compared to that of the urban population. Apart from Maharashtra, Gujarat and Haryana, the level of the slum population has increased in other better off and poor states. And a shift in the concentration of the slum population has been observed from the states of Gujarat and Maharashtra towards other highly growing states like Karnataka, TN and AP, pointing out an ongoing exclusionary urbanisation in most of the states. For the few states with a reduced level and concentration of the slum population, it is mostly due to inter-state migration and wage rate gaps, urbanism, eviction, growth of small-sized towns and extensive infrastructural development. On the contrary, for the states witnessing an increasing level

and concentration of slum population, these are largely attributed to the unprecedented secondary and tertiary sectors-led growth in thriving urban centres accompanied by the poor urban planning and the intra-state migration.

Next, we find a positive association (correlation) of economic inequality with the concentration of urban population, whereas the former has indirect (positive) relation with the level of urban population through economic growth. It signifies that economic growth in urban areas has been playing a dual role. On one hand, it enhances the process of urbanisation through more investment or by creating more demand, and it generates inequality through improper distribution, on the other hand. The level of the urban population is positively related (line diagram) with the cost of living and the employment opportunity, but it is showing no relation with the urban wage rate. This signifies that the process of urbanisation has only created the option of a costlier living. A study (Kundu and Saraswati 2012) discusses the determinant of high urban cost of living: limited skilled jobs at urban centres generate high income for a small section who can spend exorbitantly. Along with this, a huge percentage of workers (64.1%) are found to be crowded into informal enterprises with substandard income (National Statistical Office 2019). The wages in the informal sector have witnessed a very slow-paced rise over time (International Labour Organization 2018). This widening wage rate gap within urban areas is instrumental in not only raising but also in persisting urban economic inequality. Simultaneously, the concentration of the urban population is positively related (correlation) with employability, and it has an inverse relationship with the wage rate. This indicates a similar situation about the current urbanisation process as discussed above.

Then, we observe that the level and concentration of slum population are found to be positively associated (line diagram) with urban economic inequality, employability and urban-rural wage rate gaps. The significant positive impact (regression) of economic inequality on both slum population and its concentration is one of the reasons that helps slums to persist and exclusionary urbanisation to continue. Economic inequality helps to stretch the rich-poor gap, specifically in terms of the capacity of spending. So, the rising urban cost of living with little or no change in the earnings force the slum dwellers in India to live in slums for generation after generation (Marx et al. 2013). Moreover, another study shows (Krishna et al. 2014) that the prevailing inequality and the rising cost of living have deteriorated the situation of the new migrants into the cities. Besides, the growing urban-rural wage rate gap are still drawing the migrants from rural to the urban areas for a better wage, while they take shelter at slums. Supporting this fact, a study (International Labour Organization 2018) finds that the urban casual wage rate remains more than double than that of the rural over time.

The relationship between the different indicators as discussed above is encapsulated in the following flow chart below (Fig. 6).

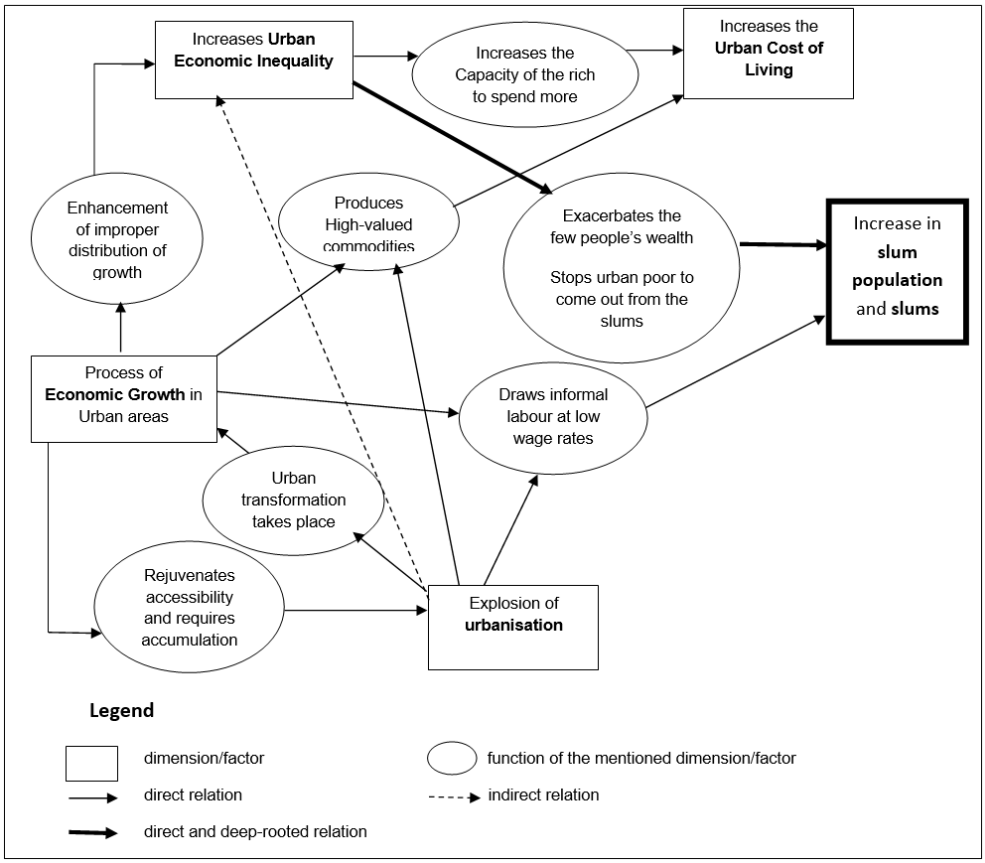


Fig. 6 **– Schematic flow chart of relationships of the proposed indicators**

Conclusions

Throughout this paper, the analysis identifies an ongoing exclusionary process of urbanisation in India in terms of level, concentration and growth of slum population and its relationship with the economic indicators, which is shown in contrast to that of the urban population. Therefore, from the above discussion, it can be deduced that the crux of the problem is perhaps the exclusionary process of urbanisation which enhances the improper distribution of growth benefits. The sector-specific economic growth channelizes the fund, and it increases the demand for specific employment only. Besides, the new era of urban transformation makes a stark distinction in the wages between the skilled and the unskilled workers which leads to inequality, raising the burden of the cost of living on the urban poor. However, the process of urban transformation employs a large number of informal workers, who mostly migrate from the rural areas due to urban-rural wage differences, for restructuring the cities; but it pays diminishing wages to them because of huge unskilled labour supply, consequently widening inequality. Moreover, establishing world-class cities, along with world-class amenities at high prices, is perpetuated as per the requirement of the rich, which, again, increases the burden of the cost of living for the poor which resist them to shift in the better places of the city.

The Government's vision of attaining inclusive urbanisation through the creation of housing programs for the slum dwellers, like the 'Slum Free Cities' and 'Housing for All', is no doubt

essential for providing free housing or housing at a subsidised rate to the urban poor. But it can contribute only a little in establishing inclusive urbanisation because the improper distribution of growth benefits and the sector-specific employment generation may offset such initiatives and they can enhance exclusionary urbanisation.

Notes

1. More than 60% of the total economic growth is contributed by urban areas (Buckley et al. 2007).
2. According to the Government of India (2011), the urban population has increased from 290 million in 2001 to 360 million in 2011.
3. During the 1990s and early 2000s, following the recommendation of United Nations for the up-gradation and up-scale of urban slums for effective slum and urban development, the Government had taken up policies like: National Slum Development Programs, SJSRY, VAMBAY, etc. Later, the Government introduced policies like: Rajiv Awas Yojna, IBHUB, etc., for a comprehensive and inclusive urban development.
4. According to their population (Government of India 2011), Indian cities are classified tier-wise. Tier-I cities: 0.1 million or above population, Tier-II cities: 50,000-99,999 population.
5. In India, a policy, namely VISION 2020, was introduced by the State Government of Maharashtra to restructure and redevelop Mumbai for making it an international city. This inflicts the eviction of many slum residents from the inner-city space to the fringes, at precarious conditions.
6. India is administratively divided into 28 states and 8 union territories. We use the acronyms of states as described: Jammu & Kashmir – J&K, Uttar Pradesh – UP, West Bengal – WB, Andhra Pradesh – AP, Tamil Nadu – TN, Madhya Pradesh – MP.
7. and 8. Urban Wage/Urban-Rural Wage-Rate Gap represents the average wage/salary earnings per day received by the casual labour mostly engaged in informal works.
9. The authors have estimated the data from the census (Government of India 2001, Government of India 2011).
10. Urbanism: adopting urban ways of living within the villages or the suburbs.
11. Class Tier-III towns are increasing at a rate of 31.3% compared to 8.2% for Tier-I and 10% for Tier-II towns in Maharashtra (Government of India 2011).
12. One in every six urban Indian lives in the slums and 65% towns in India have slums (DownToEarth 2019).
13. The authors used the sources given in Table 1 for collecting the data. It is the same for all the other figures and tables.

References

AKBAR P. A., COUTURE V., DURANTON G., STOREYGARD A. (2018), *Mobility and Congestion in Urban India*, National Bureau of Economic Research, Retrieved from: www.nber.org.

AHMED W., KUNDU A., PEET R. (2011), *India's New Economic Policy: A Critical Analysis*, Routledge, New York.

ARMENDARIS F. (2015), *World - Inclusive cities approach paper,* World Bank Group, Retrieved from: www.documents.worldbank.org.

BHATKAL T., AVIS W., NICOLAI S. (2015), *Towards a Better Life? A cautionary tale of progress in Ahmedabad*, Overseas Development Institute, Retrieved from: www.gwp.org.

BUCKLEY R. M., SINGH M., KALARICKAL J. (2007), *Strategizing Slum Improvement in India: A Method to Monitor and Refocus Slum Development Programs*, Global Urban Development Magazine 3 (1), 1-24.

CHAUVIN J. P., GLAESER E., MA Y., TOBIO K. (2017), *What is different about urbanization in rich and poor countries? Cities in Brazil, China, India and the United States*, Journal of Urban Economics 98, 17-49.

CHAKRABARTI S. (2016), *Inclusive Growth and Social Change: Formal-Informal-Agrarian Relations in India*, Oxford University Press, Oxford.

DAVIS K. (1965), *The Urbanization of the Human Population*, Scientific American 213 (3), 40-53.

DOWNTOEARTH (2019), *Slumming it out*, Retrieved from: www.downtoearth.org.in.

DUFLO E., GALIANI S., MOBARAK M. (2012), *Improving Access to Urban Services for the Poor: Open Issues and a Framework for a Future Research Agenda*, J-PAL, Retrieved from: www.povertyactionlab.org.

EDWIN T. (2019), *Migrants seem to prefer neighbouring States for livelihood*, The Hindu Business line, Retrieved from: www.thehindubusinessline.com.

FOX S. (2014), *The Political Economy of Slums: Theory and Evidence from Sub-Saharan Africa*, World Development 54, 191-203.

FRANKENHOFF C. A. (1967), *Elements of an Economic Model for Slums in a Developing Economy*, Economic Development and Cultural Change 16 (1), 27-36.

GLAESER E. (2011), *Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier*, Penguin Press, New York.

GOVERNMENT OF INDIA (2001), *Primary Census Abstract, Urban and Slum Population*, Retrieved from: www.censusindia.gov.in.

GOVERNMENT OF INDIA (2011), *Primary Census Abstract, Urban and Slum Population*, Retrieved from: www.censusindia.gov.in.

HARRIS J. R., TODARO M. P. (1970), *Migration, Unemployment and Development: A Two-Sector Analysis*, The American Economic Review 60 (1), 126-142.

HARVEY D. (2008), *The Right to the City*, New Left Review 53, 23-40.

HENDERSON J. V., TURNER M. A. (2020), *Urbanization in the Developing World: Too Early or Too Slow?*, Journal of Economic Perspectives 34 (3), 150-173.

HOUSING AND LAND RIGHTS NETWORK (2014), *Forced to the Fringes: Disasters of 'Resettlement' in India. Report Three. Vashi Naka, Mumbai*, Housing and Land Rights Network, New Delhi.

INDIAN INSTITUTE FOR HUMAN SETTLEMENTS (2014), *Cities as Engines of Inclusive Development: IIHS-RF paper on Indian Urban Economy*, Retrieved from: www.iihs.co.in.

INTERNATIONAL LABOUR ORGANIZATION (2018), *India Wage Report: Wage policies for decent work and inclusive growth*, International Labour Organisation, Geneva.

JOHN P. (2019), *In 10 years, 79% rise in migration to Gujarat's urban areas*, The Times of India, Retrieved from: www.timesofindia.indiatimes.com.

KOLAPPAN B. (2016), *What drives urbanisation in Tamil Nadu*, The Hindu, Retrieved from: www.thehindu.com.

KRISHNA A., SRIRAM M. S., PRAKASH P. (2014), *Slum types and adaptation strategies: identifying policy-relevant differences in Bangalore*, Environment and Urbanization 26 (2), 568-585.

KUNDU D., SAMANTA D. (2011), *Redefining the Inclusive Urban Agenda in India*, Economic & Political Weekly 46 (5), 55-63.

KUNDU A., SARASWATI L. R. (2012), *Migration and Exclusionary Urbanisation in India*, Economic & Political Weekly 47 (26/27), 219-227.

LAHIRI A. (2016), *West Bengal from an external perspective*, Ideas for India, Retrieved from: www.ideasforindia.in.

LALL S. V., HENDERSON J. V., VENABLES A. J. (2017), *Africa's Cities: Opening Doors to the World*, The World Bank, Washington, D.C.

LEWIS W. A. (1954), *Economic Development with Unlimited Supplies of Labor*, The Manchester School 22 (2), 139-191.

MARX B., STOKER T., SURI T. (2013), *The Economics of Slums in the Developing World*, Journal of Economic Perspectives 27 (4), 187-210.

MAZUMDAR D. (1976), *The urban informal sector*, World Development 4 (8), 655-679.

MISHRA A. K., DASGUPTA S. (2014), *Evolution of National Policies for Affordable Housing and Basic Services for the Urban Poor*, in: Ministry of Housing and Urban Poverty Alleviation, Government of India (ed.), Inclusive Urban Planning: State of the Urban Poor Report 2013, Oxford University Press, New Delhi, pp. 3-23.

MUKHERJEE D. (2007), *Post-Reform Trends in Wage Differentials: A Decomposition Analysis for India*, Indian Journal of Labor Economics 50 (4), 955-965.

NATIONAL SAMPLE SURVEY OFFICE (2011), *Employment and Unemployment Situation in India (2009-10)*, National Sample Survey Office, National Statistical Organisation, Ministry of Statistics and Programme Implementation, Government of India, Retrieved from: www.mospi.nic.in.

NATIONAL SAMPLE SURVEY OFFICE (2014), *Household Consumption of Various Goods and Services in India (2011-12)*, National Sample Survey Office, Ministry of Statistics and Programme Implementation, Government of India, Retrieved from: www.mospi.nic.in.

NATIONAL SAMPLE SURVEY ORGANISATION (2001a), *Employment and Unemployment Situation in India (1999-2000)*, National Sample Survey Organisation, Ministry of Statistics and Programme Implementation, Government of India, Retrieved from: www.mospi.nic.in.

NATIONAL SAMPLE SURVEY ORGANISATION (2001b), *Non-agricultural workers in informal sector based on Employment - Unemployment survey (1999-2000)*, National Sample Survey Organisation, Ministry of Statistics and Programme Implementation, Government of India, Retrieved from: www.mospi.nic.in.

NATIONAL SAMPLE SURVEY ORGANISATION (2003), *Household Consumer Expenditure and Employment - Unemployment Situation in India (2001-2002)*, National Sample Survey Organisation, Ministry of Statistics and Programme Implementation, Government of India, Retrieved from: www.mospi.nic.in.

NATIONAL SAMPLE SURVEY ORGANISATION (2012), *Informal Sector and Conditions of Employment in India (2009-2010)*, National Sample Survey Office, National Statistical Organisation, Ministry of Statistics and Programme Implementation, Government of India, Retrieved from: www.mospi.nic.in.

NATIONAL STATISTICAL OFFICE (2019), *Annual Report: Periodic Labour Force Survey (2017-2018)*, National Statistical Office, Ministry of Statistics and Programme Implementation, Government of India, Retrieved from: www.mospi.nic.in.

PIEL G. (1997), *The Urbanization of Poverty Worldwide*, Challenge 40 (1), 58-68.

PLANNING COMMISSION OF INDIA (2014), *Gini Coefficient of Distribution of Consumption: 1973-74 to 2009-10*, Planning Commission of India, Government of India, Retrieved from: www.niti.gov.in.

RESERVE BANK OF INDIA (2021), *Handbook of Statistics on Indian States*, Government of India, Reserve Bank of India, Retrieved from: www.rbi.org.in.

ROHIT P. S. (2013), *Steep rise in Hyderabad's slum population*, The Times of India, Retrieved from: www.timesofindia.indiatimes.com.

ROY A. (2014), *The Inclusive City: A New Paradigm of Urban Planning in India*, in: Ministry of Housing and Urban Poverty Alleviation, Government of India (ed.), Inclusive Urban Planning: State of the Urban Poor Report 2013, Oxford University Press, New Delhi, pp. 134-148.

SANKHE S., VITTAL I., DOBBS R., MOHAN A., GULATI A., ABLETT J., GUPTA S., KIM A., PAUL S., SANGHVI A., SETHY G. (2010), *India's urban awakening: Building inclusive cities, sustaining economic growth*, McKinsey Global Institute, Retrieved from: www.mckinsey.com.

SARKAR S., MEHTA B. S. (2010), *Income Inequality in India: Pre- and Post-Reform Periods*, Economic and Political Weekly 45 (37), 45-55.

SENGUPTA A., KANNAN K. P., RAVEENDRAN G. (2008), *India's Common People: Who Are They, How Many Are They and How Do They Live?*, Economic and Political Weekly 43 (11), 49-63.

SINGH P., SINGH B. (2014), *Structure and Pattern of Urbanisation in Punjab: A Macro Level Analysis*, Journal of Punjab Studies 21 (1), 69-89.

SINGH S., SINGH D. (2013), *Urbanism vs Urbanization in Haryana: A Regional Analysis*, International Journal of Environment, Ecology, Family and Urban Studies 3 (5), 11-22.

STOKES C. J. (1963), *A Theory of Slums*, Ekistics 15 (88), 121-124.

TACOLI C., MCGRANAHAN G., SATTERTHWAITE D. (2015), *Urbanisation, rural–urban migration and urban poverty*, International Institute for Environment and Development, London.

TURNER J. F. C. (1969), *Uncontrolled Urban Settlement: Problems and Policies*, in: Breese G. (ed.), The City in Newly Developing Countries: Readings on Urbanism and Urbanization, Prentice Hall, Engelwood Cliffs, pp. 507-534.

UN-HABITAT (2003), *The Challenges of Slums: Global Report on Human Settlements 2003*, Earthscan, London.

UN-HABITAT (2009), *Planning Sustainable Cities: Global Report on Human Settlements 2009,* Earthscan, London.

UN-HABITAT (2013), *State of the World's Cities 2012/2013: Prosperity of Cities*, Routledge, London.

WORLD BANK (2009), *World Development Report 2009: Reshaping Economic Geography*, The World Bank, Washington, D.C.

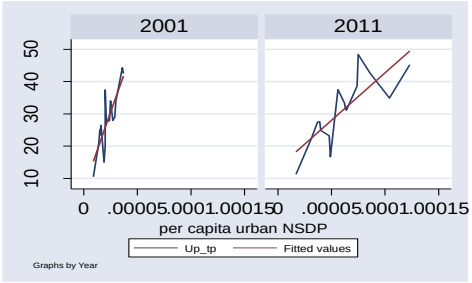
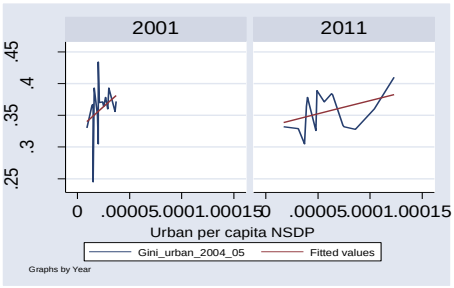
WORLD BANK (2013), *Urbanization beyond municipal boundaries: nurturing metropolitan economies and connecting peri-urban areas in India*, The World Bank, Washington, D.C.

Initial submission: 28.05.2020
Revised submission: 29.09.2020
Final acceptance: 19.10.2020

Correspondence: Fondazione L'Albero Della Vita, India Country Office - 1241, Hossainpur Road, Madurdaha Kolkata-700107, West Bengal, India.

Email: pallabi.seth@gmail.com

Appendix 1

5.a. Relationship between Urban-Level and Urban Economic Growth	*5.b. Relationship between Urban-Economic-Inequality and Urban Economic Growth*
 **X-axis:** Urban Economic Growth (Urban-NSDP)	 **X-axis:** Urban Economic Growth

Source: *the authors' estimation*

Table 7

Correlation results: Urban Economic Growth, Urban-Level and Urban-Economic-Inequality

Correlation results	Urban-Level		Urban-Economic-Inequality	
	2001	2011	2001	2011
Urban Economic Growth	0.8234	0.7962	0.2817	0.3811

Source: *the authors' estimation*

Here, Urban Economic Growth has been estimated by multiplying the per capita NSDP with the ratio of the urban-rural consumption expenditure. The above result shows that Urban-NSDP is positively related to both Urban-Level and Urban-Economic-Inequality. This may imply that the expanding urbanisation is a result of urban-centric economic growth, and the process of urbanisation has helped the economy to grow. But the benefits of growth have been skewed to few hands and they may result in increased inequality in the urban areas. So, the circuitously urban inequality is highly related to the process of urbanisation.

Appendix 2

Table 8

Correlation Results: Urban-Economic Inequality, Urban-NSDP and Cost-of-Living-Urban

Correlation results	Cost-of-Living-Urban	
	2001	2011
Urban-Economic-Inequality	-0.2654	0.2879
Urban-NSDP	0.6955	0.8297

Source: *the authors' estimation*

Appendix 3

Table 9

Urban-NSDP and Slum-Concentration

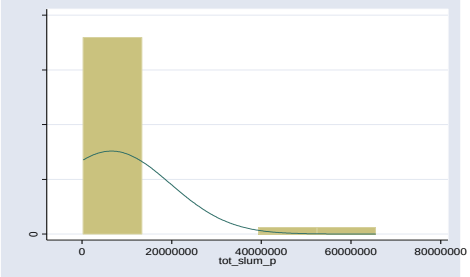
Correlation results	Slum-Concentration	
	2001	2011
Urban-NSDP	0.5070	0.4080

Source: *the authors' estimation*

Appendix 4

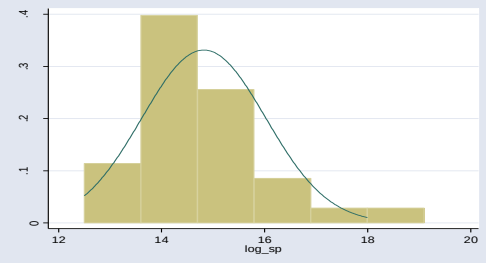
The distribution of the level and concentration of the slum population with the help of the histogram and the normal curve below shows the distributions are not normal and they are skewed leftward. So, to make the distributions normal, we have taken log of dependent variables.

6.a. Distribution of Slum Population



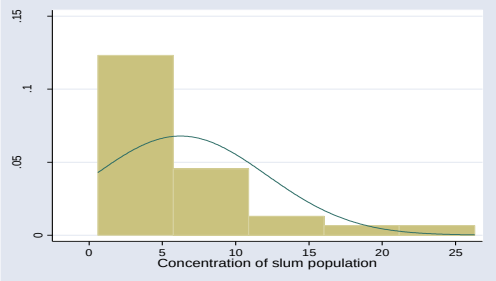
Slum Population

6.b. Distribution of Log Slum Population

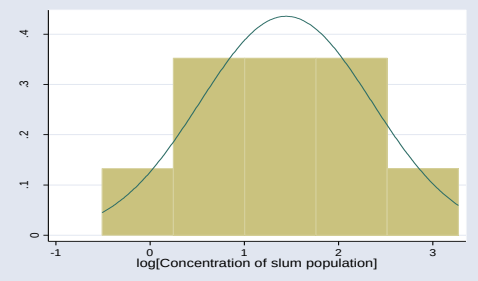


Log Slum Population

6.c. Distribution of Concentration of slum population



6.d. Distribution of Log Concentration of slum population



Source: *the authors' estimation*

Journal of Urban and Regional Analysis,
vol. XIII, 2, 2021, p. 323 - 342
https://doi.org/10.37043/JURA.2021.13.2.7

COLLABORATIVE LAND USE PLANNING IN URBAN RENEWAL

Aslı **BOZDAĞ**[1], *Şaban* **İNAM**[2],
[1]Niğde Ömer Halisdemir University, Nigde, Turkey
[2]Konya Technical University, Konya, Turkey

Abstract: Conflicting expectations of stakeholders in urban renewal applications may lead to spatial and functionally unsustainable applications. Therefore, urban renewal applications require collaborative planning with their multi-stakeholder and multi-dimensional structure (political, social, and economic). This study aims to create a collaborative land-use planning (CLUP) approach that minimizes the factors arising from the expectations of the stakeholders and that has an adverse effect on the success of the project. The study consists of two stages. In the first stage, the literature is reviewed to create a framework for the CLUP approach. Within this framework, spatial and functional goals are identified for an urban renewal site within the borders of Meram Municipality in the Konya province of Turkey. In the second stage, a survey is conducted with the participation of stakeholders to identify their spatial and functional demands (vision, land-use and building design). Finally, the fitting between the spatial and functional demands of the stakeholders and the spatial and functional goals identified within the framework of the CLUP approach is discussed. As a result of the survey, it was determined that the expectations of the stakeholders regarding the vision, land-use and building design participate and governance processes are incompatible with each other. The expectations of the stakeholders were evaluated within the framework of the CLUP approach, and recommendations were made for a sustainable vision and a pluralistic decision-making, while raising awareness for participation.

Key Words: *urban renewal, collaborative land use planning (CLUP), governance, participation.*

Introduction

With their multi-stakeholder and complex structure, urban renewal projects involve uncertainties during implementation, and they require the taking of a series of actions to make economic, physical, social, and environmental arrangements (Yu and Kwon 2011). Arrangements such as ownership changes and building design may result in the failure of the project if they ignore this structure. A collaborative land-use planning (CLUP) is needed to comprehend this complex multi-stakeholder process and to take its implications into account in project implementation. Sustainable practices can be achieved by formulating goals to ensure spatial and functional justice in urban environments and to ensure planning that takes the stakeholder groups' spatial expectations into account within the framework of these goals.

To implement the CLUP in Turkey, first, a framework for sustainable land-use planning needs to be developed. This framework should balance spatial functionality, redevelopment of land, regulation of property and use rights, paying attention to the common good and the identification of spatial demands and potentials (Üstün 2009, Islam and Enlil 2010, Özden 2010, Buitelaar and Segeren 2011). The relevant literature includes studies on the creation of social, environmental, economic, and political frameworks in renewal projects (Yung et al. 2014), the development of a framework that includes the factors that affect the decision-making process in sustainable land-use planning (Wang et al. 2014), and the creation of a

practical framework to design a land-use scenario that features participatory processes (Pearson et al. 2010).

For land-use planning to be sustainable, practitioners should avoid decisions that contradict one another (Akten and Akten 2010). In this context, participatory practices should be adopted to prevent the uncertainties concerning the process of partnerships and to achieve coordination between the stakeholder groups. Therefore, a framework needs to be created in the CLUP approach regarding the ways to achieve and to sustain participation, the extent of participation, and the choice of a participation model that fits the ethnic, commercial and cultural characteristics of the project site. The relevant literature includes studies on the identification of factors that affect participation and the creation of a specific framework (Parés et al. 2012), together with the employment of participatory models with the purpose of examining social movements in sites with multiple ethnic groups and undergoing cultural transformation (Uysal 2012, Jung et al. 2015). In addition (Feuvre et al. 2016), examined the creation of dynamic structures and linkages for the stakeholders to facilitate partnerships in the process of participation.

A governance structure must be in place to find the common ground between the expectations voiced in the participatory process, in order to prevent conflict between the stakeholder groups and to achieve meaningful participation. In project implementations in Turkey, the concept and networks of governance are plagued by uncertainties with regard to horizontal coordination, power-sharing and the creation of pluralist decision-making processes (Tekeli 2006, Tallon 2010, Özden 2010, Tekeli 2012, Van Bortel 2012). Preventing these uncertainties and creating a conceptual framework for development are important in the context of governance. The relevant literature includes studies on the creation of a framework regarding governance models in project sites (Carvallo and Fidélis 2013, Faehnle and Tyrväinen 2013), conceptual and process aspects of governance in redevelopment and renewal sites (Roy 2015, Somoza Medina 2016), reviewing the literature on participatory approaches to innovation and city governance (Bifulco et al. 2017), and the role of governance in the urban, institutional and economic development of expanding and shrinking cities and metropolises (Großmann et al. 2013, Carpenter and Verhage 2014, Meegan 2015). As these studies show, sustainable land-use planning, functional governance and participation are subtitles of the CLUP approach in urban renewal projects. This study aims to formulate spatial and functional goals for a project site within the framework of the CLUP approach and to make planning recommendations concerning the stakeholder groups' spatial and functional expectations.

Methodology

This study adopts a methodology that combines theoretical and empirical approaches (Laurian and Shaw 2009, Faehlne and Tyrvainen 2013). In the theoretical part (Fig. 1), a literature review is conducted to create the approach and the framework of CLUP. The CLUP approach was designed to cover inner city areas in general and all urban renewal sites. To implement the CLUP approach in a specific project site, an urban renewal project within the boundaries of Meram Municipality in Konya province was selected. In the empirical part of the study, the physical and social structure of the project site was examined using the spatial analysis. After conducting these analyses and evaluating the problems within the framework of the CLUP approach, spatial and functional goals were created with subtitles of sustainable land-use, governance, and participation.

In the result of the study, the expectations of the stakeholder groups in the project site concerning the vision, land-use and the building design were identified using a survey. Civil society organizations (NGOs), the local administration and the residents were determined as stakeholder groups. Köse and Erkan (2014) argue that qualitative studies feature non-random samples and, as such, they do not require sampling a certain proportion of the population. Hence, for the purposes of this study, a limited number of participants who meet

the pre-defined criteria and who have the required characteristics is sufficient (Neuman 2000, Köse and Erkan 2014). Therefore, the survey for this study was conducted with 30 NGO members, 30 local administrators, and 30 prominent residents, such as shopkeepers and neighborhood heads. The survey contained questions on the participants' opinions concerning the vision, land-use planning and the building design in the project site, and the processes of governance and participation. These expectations were then evaluated considering the spatial and functional goals formulated using the CLUP framework, while planning recommendations were made.

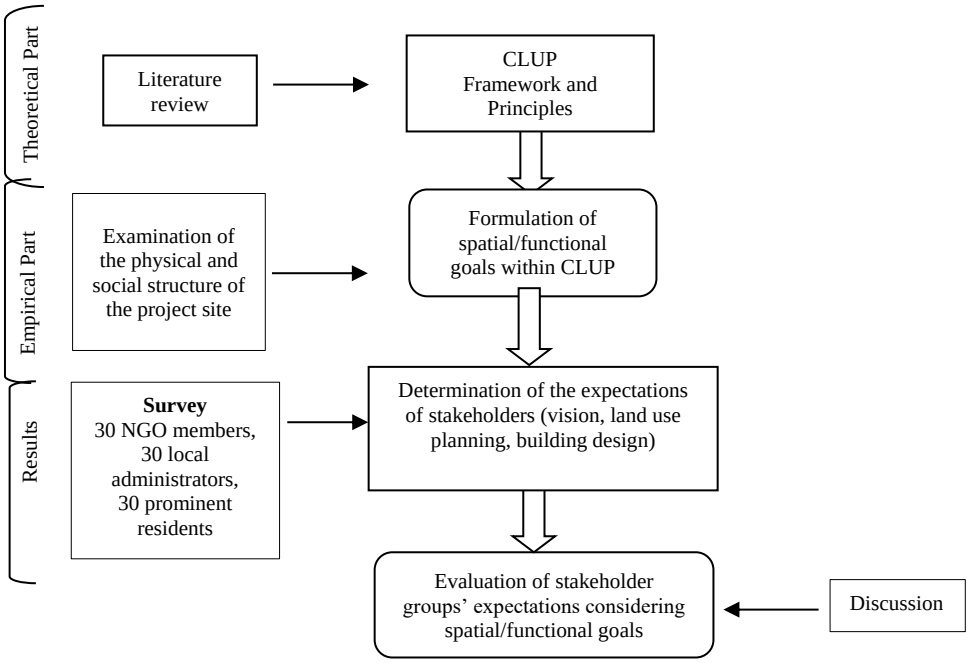


Fig. 1 **– The methodology of the study within the CLUP framework**

Theoretical part: the CLUP approach in urban renewal

Collaborative planning is a political process that allows the participants in multi-stakeholder planning to make common decisions (Innes and Booher 2000, Wondolleck and Yaffee 2000). Collaborative planning requires power-sharing, such as actors to share activities and to act together within a shared structure (Henning and Yein Ng 2009). Urban renewal projects also require collaborative planning with their multi-stakeholder and multi-dimensional structure (political, social, and economic). The CLUP approach to urban renewal means land use planning that results from meaningful participation practices within the framework of governance regarding specific sustainable land-use criteria (Fig. 2).

Within this framework, first, the principles and criteria of sustainable land use that would ensure spatial and functional quality and justice were identified. These include the conservation and redevelopment of land, spatial knots, spatial functionality, regulation of property and the use rights, the consideration of common good, and the spatial demands and potentials (Table 1). This framework prevents the dominant groups from shaping land-use planning in line with their particular interests.

Next, the concepts of governance and governance networks were used to express the optimum way in which stakeholder groups should be involved in the planning process.

These were discussed with reference to the principles and criteria of pluralism and integration. The concept of governance refers to the regulation and organization of administrative institutions (Muñoz-Gielen 2012). Governance networks, on the other hand, describe the way in which new combinations of stakeholders and power holders are formed (Muñoz-Gielen 2012). Governance networks are of crucial importance in striking a balance between the various actors in multi-actor projects such as urban renewal projects. Public administration in Turkey, typically, has a hierarchical structure with vertical coordination. In urban renewal projects, which involve social, environmental, and economic structure problems, as well as property and land use problems, the solution to these problems requires limiting the role of the administration and giving a bigger say to the other actors. This, in turn, can be achieved by creating a network structure that involves all stakeholders in a horizontal coordination (Fig. 3).

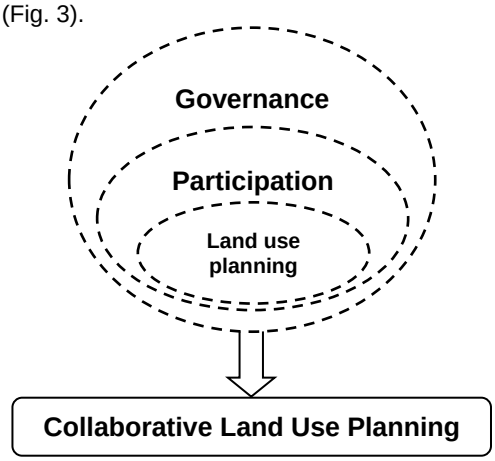


Fig. 2 **– The framework of the CLUP approach**

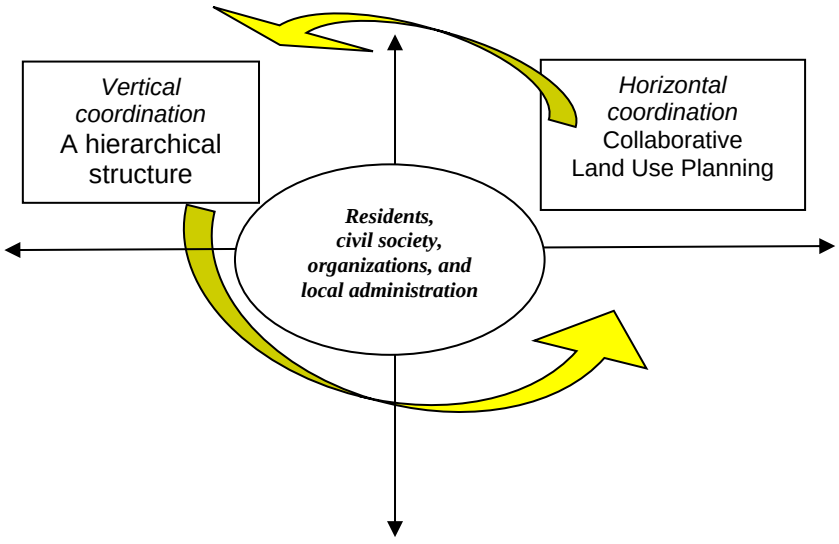


Fig. 3 **– Transition from vertical coordination to horizontal coordination**

The stakeholder participation is necessary and important in order to promote governance (Almirall and Wareham 2008). The public should be involved at all levels of the decision-

making process for a transparent, responsible, accountable, and sustainable governance (Almăşan and Reinhardt 2009). For that reason, participation principles and evaluation criteria of CLUP for the assessment of stakeholders' expectations were identified. Participation-related issues were identified as collaboration, participation, and adaptation.

Table 1

Principles of the CLUP approach

	Subtitle	**Principles of CLUP approach**	**Evaluation Criteria in the CLUP approach**	
CLUP APPROACH		Conservation and redevelopment of land	Avoiding practices that limit the production of public spaces (such as the maximization of building volumes and high-density buildings) (Buitelaar and Segeren 2011, Muñoz-Gielen 2012). Prevention of illegal occupancy and provision of a strategy for dilapidation assessment (Wing Ho et al. 2012). Creation of active policies regarding urban land, transportation, and open public space reserves (Needham 1997, Cysek-Pawlak 2019). Identifying the basic principles (historical, cultural, rural, etc.) for national, regional, and local land policies and management (Zimmermann 2008, Clemente et al. 2016, Kożuch and Sienkiewicz-Małyjurek 2016). Redevelopment of unused and idle construction areas (Barker 2006, Ferretti and Grosso 2019). Creation of scenarios to deal with potential risks and uncertainties.	Spatial and Functional Goals on the Basis of the CLUP Approach Regarding Project Site Characteristics and Encountered Problems
		Spatial knots	Adopting a holistic approach to the project, taking all its dimensions into consideration (Özdemir 2010). Preventing spatial and functional inequalities in the vicinity of the project site (Oatley 2000, Kuyucu 2013). Identifying obstructions in the physical environment (Bassett 2013). Identifying historical marks and authentic social values for tourist and social communities (Clemente et al. 2016, Ginting et al. 2019). Identifying elements of harmony and differentiation in the project site. Developing modern characteristics that fit the project site.	
		Spatial functionality	Making production-oriented investments with an eye to balanced sectoral growth (Göksu and Bal 2010; Islam and Enlil 2010), Classifying land and creating a land inventory (Zimmermann 2008), ensuring that land-use planning is compatible with urban development.	
		Regulation of property and use rights	Allocating property and use rights by taking the beneficiaries' preferences into consideration (Healey and Barrett 1990, Adams and May 1991, Buitelaar and Segeren 2011). Ensuring that the allocation of property and the usage rights contributes to positive urban design outcomes (Buitelaar and Segeren 2011).	
		Consideration of common good	Lowering costs via private-public partnerships and aiming to prioritize social housing (Van der Krabben and Needham 2008, Webster 2008, Muñoz-Gielen 2012). Giving priority to the problematic regions of the city in the use of public resources in order to alleviate spatial and social inequalities between regions (Göksu and Bal 2010).	
		Spatial demands and potentials	Preventing processes of displacement and of social exclusion (Özden 2010). Taking demands concerning the building density and the land-use into consideration (Bassett 2013). Examining the actual users of the site and the way it is used (Bassett 2013). Prioritizing the projects that reflect the increasingly diverse cultural profile of the city.	

	Subtitle	**Principles of CLUP approach**	**Evaluation Criteria in the CLUP approach**	
	GOVERNANCE	Pluralism and integration	Including stakeholder and neighborhood groups (residents, civil society organizations and local administration) in the decision-making process (Atkinson 2009, Boyle et al. 2018). Achieving integration between the different levels of institutional governance (national, regional and local) (Raitio 2012, Carvalho and Fidélis 2013). Achieving integration with various sectors (industry, services, etc.) that interact with the urban renewal project (Göksu and Bal 2010, Carvalho and Fidélis 2013). Integrating technical and local knowledge (Carvalho and Fidélis 2013, Faehnle and Tyrväinen 2013). Ensuring coordination between the agencies and organizations involved in the local administration (Turgut and Ceylan 2010, Muñoz-Gielen 2012). Creating decision-making processes that are pluralist and not majoritarian (Tekeli 2012). Creating strategic plans based on urban planning standards (Somoza Medina 2016). Consisting of the concept of smart governance with a digital platform for bridge communications between the public and the government (Sejati et al. 2020).	
	PARTICIPATION	Collaboration and participation	Perception of participation as an instrument to legitimize planning programs (Parés et al. 2012, Van Bortel 2012, Carvalho and Fidélis 2013). Institutionalizing participation in local administration (Raitio 2012). Making all kinds of effort to ensure participation actions (survey, deep engagement, etc.) (Innes and Booher 2000, Parés et al. 2012, Glackin and Dionisio 2016, Boyle et al. 2018). Conducting social training activities on the content and significance of participation (Faehnle and Tyrväinen 2013). Conducting workshop activities on the content of stakeholders' interests and the equal allocation of resources (Li et al. 2020). Providing organizational training on the functionality of participation and cooperation (Faehnle and Tyrväinen 2013). Setting up decision-making mechanisms guided by cooperation and participation (Carvalho and Fidélis 2013, Faehnle and Tyrväinen 2013). Ensuring that the process and costs associated with the participation and cooperation are worth the effort made (Parés 2012, Faehnle and Tyrväinen 2013). Creating adaptation processes to improve the local communities' fluency in the language of politics within public agencies (Atkinson 2009). Establishing the trust between key stakeholders (Boyle and Michell 2020). Including digital domains (GIS), Web GIS, and Multicriteria Decision Analysis (MCDA) in the spatial planning process for further strengthening the role of participation (Alam et al. 2018, Jelokhani-Niaraki 2019, Omidipoor et al. 2019).	

Source: *Bozdağ (2015)*

Empirical part: the CLUP approach in urban renewal – the case of Konya

In line with the purposes of the study, a project site at the pre-implementation stage, within the borders of Meram Municipality in Konya province, was selected (Fig. 4). The project site was examined in terms of existing plans, characteristics of its physical and social structure, and the problems encountered.

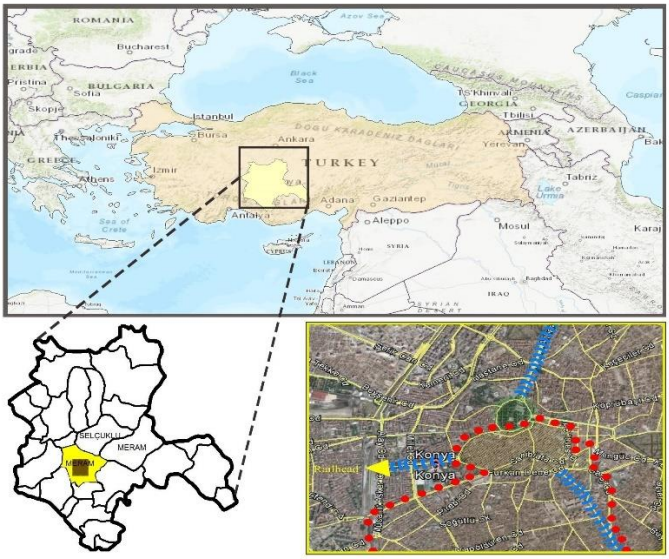


Fig. 4 **– General view of Konya and the application area**
Source: *Landsat (2015)*

Examination of the plans of the project site (1923-2015)

All plans for the project site from 1923 to present were examined (Fig. 5). The 1923 Konya city plan shows an urban fabric that is not dispersed. No significant changes are detectable in the 1933 and 1945 city plans, whereas the 1954 city plan shows the emergence of new residential areas. This can be attributed to the acceleration of urban development and the population increase. The 1967 city plan marks the beginning of urban sprawl. The Environmental Plan approved in 1983 and the Master Development Plan approved in 1999 show an extension of the city northward, with the effect of the rail system. In the 2000s, a Master Development Plan for Conservation was drawn up. This was the first holistic plan covering all inner-city areas. Konya had suffered from a lack of holistic planning from 1967 to the 2000s.

The study area is located in the oldest settlement in the city centre, remaining in the 1923 plan area. For this reason, the study area is highly in need of urban renewal.

Examination of the physical structure

Current maps and data obtained from the local administration were updated in the field (Fig. 6). There are registered different monumental buildings in the project area, as well as historical city walls. Some of these buildings have undergone restoration and they have been made functional again. However, there are still buildings that are not functional and historical structures that need to be unearthed. An examination of building uses showed that derelict buildings and buildings that lost their functionality are located to the south of the project site. In the project site, most buildings are moderately sound because the average age of the buildings is 30 years. In addition, the site was designated as a “Disaster Risk Area” by the Ministry of Environment and Urban Planning because of its buildings’ characteristics.

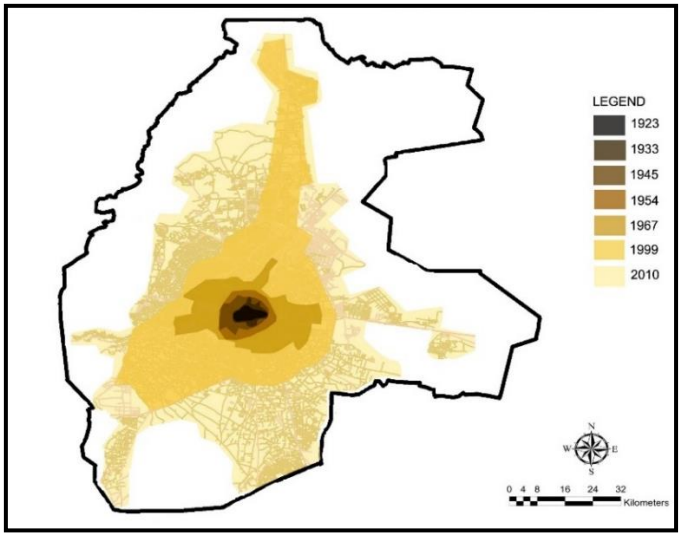


Fig. 5 **– The project site spatial development according to all plans from 1923 to the present**
Source: *Bozdağ (2015)*

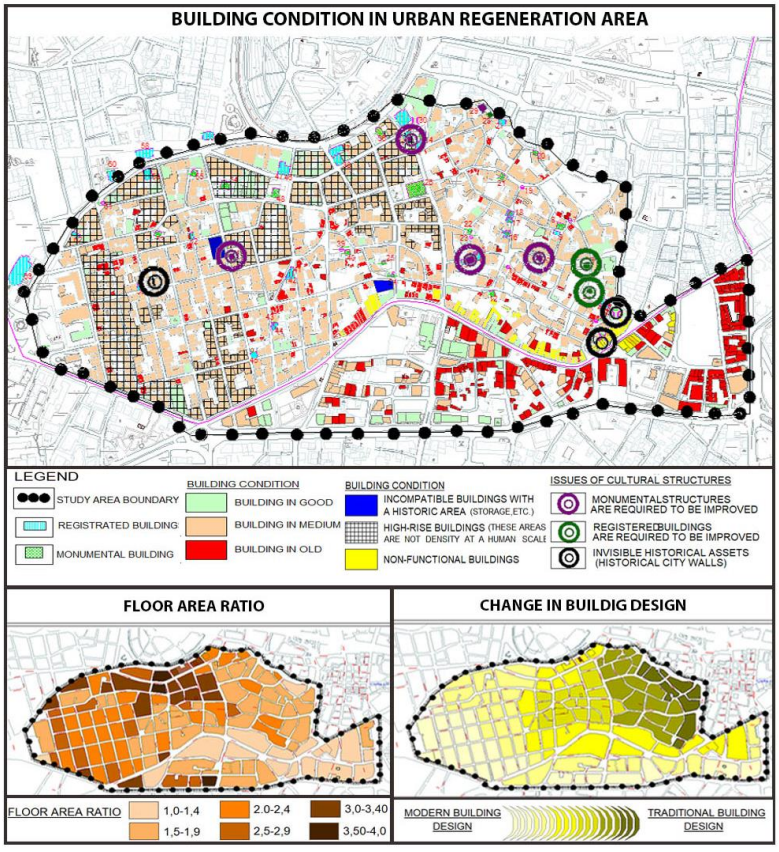


Fig. 6 **– Examination of the physical structure**

The northern and western parts of the project site have higher floor area ratios and buildings that are not at a human scale. An examination of variation in the building design shows that the buildings with a traditional design, in harmony with the historical structure, are more numerous in the eastern part of the site. The project site is located in a 4th degree earthquake zone, and the geotechnical analysis shows that the bearing capacity of the ground is very low. Most buildings in the site are tall, and the building loads are not uniformly distributed across the ground. Heavy and static buildings and mass housing projects should therefore be avoided in the favor of a moderate density development.

Examination of land-use patterns and of property structure

The project area is located in the oldest central business district of the city. Commercial areas in the northern parts of the project site have a modern character, whereas commercial areas in the eastern and southern parts of the site are more traditional. The project site also features landmarks such as a historical mosque, tombs, archaeological museums, theaters, and churches (Fig. 7).

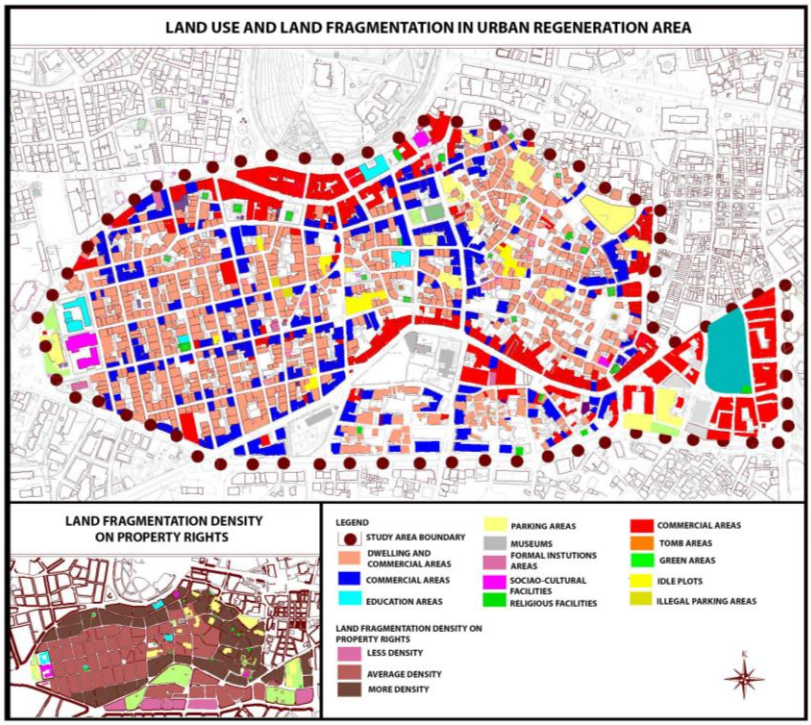


Fig. 7 **– Examination of land-use patterns and of property structure**

It was found that most of the properties in the project area were owned privately or by foundations. To analyze the fragmented ownerships, samples were taken from a few blocks. A map was created by generalizing from these findings. Fragmented ownership was found to be more common in axes where commercial activities, traditional commerce and residential buildings are concentrated. Fragmented ownership in this area is mainly a result of ongoing conflicts over estates, as this is one of the oldest residential areas of the city. Urban renewal is imperative for a solution to the problems in the project site and for the renewal of property rights.

Examination of visual-environmental assets

The following internationally prominent landmarks are located in the vicinity of the project site: Mevlana Museum, devoted to Rumi, one of the biggest symbols of sufi Islam; Alaeddin Hill, a natural and historical conservation site featuring the relics of the Seljuk Emperor Alaeddin; St. Paulus Church, with French Gothic architectural characteristics; and the Ince Minaret Museum, an archaeological museum dating from the Seljuk era with the distinction of being the second oldest archeological museum in Turkey. The linkage-corridors between these elements and the effects of proximity were noted (Fig. 8).

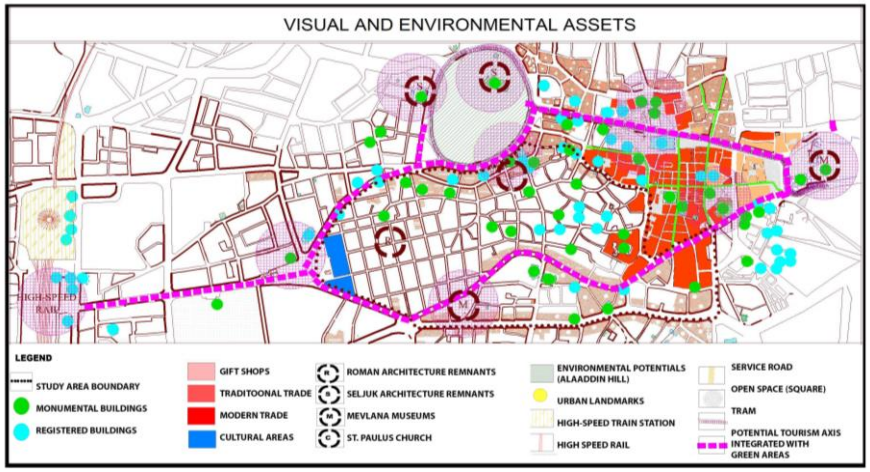


Fig. 8 **– Examination of visual-environmental assets**

Examination of the social structure

The deteriorating urban fabric of the project site led the former residents to leave the area and to rent their buildings out for low prices. With its low rents, the area has drawn the interest of recent migrants to the city, who were searching for jobs and for dwelling places. Most tenants are migrants from other provinces or from other districts of Konya, as well as Tatars. In recent years, Syrian migrants have also taken their place among the tenants in this area (Fig. 9). With a tenant ratio of 94%, this area is dominated by tenants and occupiers. With security problems, high crime rates, and difficult living conditions, the project site is an area of decay with a sharp social stratification.

From the perspective of property owners, renewal would prevent illegal use by the occupiers. In addition, the owners would benefit from the physical renovation and increase in value that the urban renewal project would bring (Bozdağ et al. 2018). On the other hand, the current residents in the project site would lose their dwelling places and access to jobs. Social housing and employment opportunities should be offered to current residents to prevent them from being victims of social exclusion. One of the motivations for the inclusion of a large number of residents among the stakeholders interviewed for this study was to learn about their spatial and functional expectations.

Formulation of spatial and functional goals using the CLUP approach

The current plans and the physical and social structure of the project site were examined in the previous sections. This section formulates the spatial and functional goals based on these examinations and within the framework of the CLUP approach (subtitles, principles and criteria) (Table 2). This was done to demonstrate the implementation of the approach –

which is of a general nature and applicable to all urban renewal projects – by using the specific project site selected.

Fig. 9 **– The social structure view of the project area**
Source: *Bozdağ (July 2017)*

Table 2

Formulation of spatial and functional goals regarding the project site using the CLUP framework

	Subtitles	**Principles of CLUP approach**	**Goals based on the CLUP approach regarding the project site characteristics and the encountered problems**
(CLUP) Approach	SUSTAINABLE LAND-USE PLANNING	Conservation and redevelopment of land	Renewal of the physical structure by preserving the historical and cultural buildings, keeping harmony with these buildings. Using substitute land from equivalent areas to compensate the right holders in the city centers. Developing land use policies that would conserve and develop historical and cultural buildings. Putting back in use the plots in the city centers that remain idle because of fragmented ownership. Planning the project site based on its designation as a disaster risk area.
		Spatial knots	Achieving physical and property renewal in a holistic manner, simultaneously with social renewal. Development of the project site, which has a strategic location on the route of Mevlana Museum, Alaeddin Hill and the high-speed train, in such a way as to preserve this spatial and functional continuity and to prevent inequalities. Setting floor area ratios based on geological studies and the bearing capacity of the ground. Integrating the historical traces in the project site with those on the route of Mevlana Museum, Alaeddin Hill and the high-speed train. Taking social values into consideration in planning. Differentiating the site using traditional buildings. Ensuring that the building designs successfully combine modern and traditional elements.
		Spatial functionality	Planning sectoral development to ensure that the project site – which is located on the route of modern, bazaar, and daily commerce – neatly achieves this transition.

(CLUP) Approach	**Subtitles**	**Principles of CLUP approach**	**Goals based on the CLUP approach regarding the project site characteristics and the encountered problems**
		Regulation of property and use rights	Meeting the right holders' and the residents' expectations concerning ownership, within the framework of the Revised Development Plan that covers the project site. Preventing the right holders' and the residents' expectations in the process of ownership renewal from having a negative effect on urban design.
		Consideration of common good	Directing the revenues from renewal to the production of social housing for the current residents of the project site (tenants and occupiers) and for the creation of other housing and employment opportunities.
		Spatial demands and potentials	Taking demands for housing and employment opportunities into consideration to prevent social exclusion following the implementation of the renewal project. Analyzing local knowledge concerning the cultural profile of the residents and of property owners in the project site, as well as their land use patterns.
	GOVERNANCE	Pluralism and integration	Creating pluralist decision-making processes.
	PARTİCİPATION	Collaboration and participation	Raising awareness on the concept of urban renewal and its implementation.

Source: *Bozdağ (2015)*

Results

Evaluation of stakeholder groups' expectations considering the spatial and functional goals

As it was previously explained, a survey was conducted with stakeholder groups and data were collected about their opinions on the vision, land-use, and building design in the project site, as well as their expectations concerning participation and governance (Fig. 10).

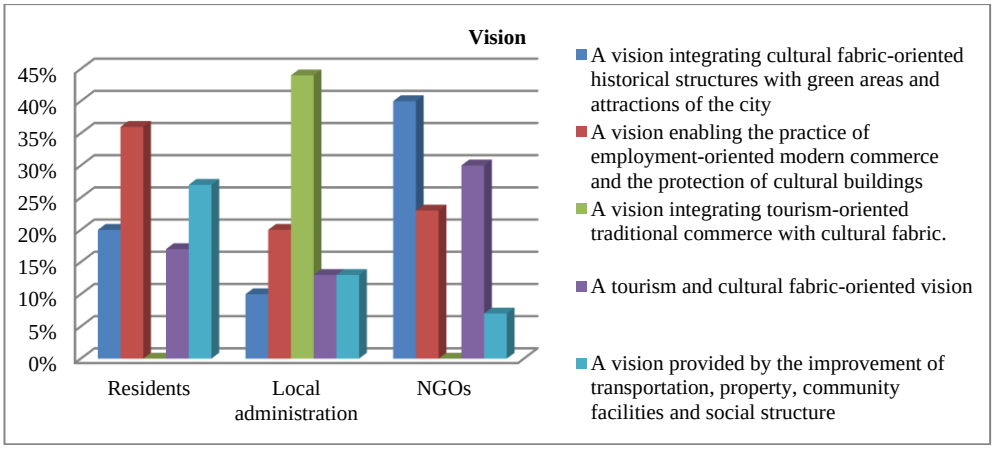


Fig. 10 **– Expectations of stakeholder groups concerning with the vision**

Concerning the vision for the project site, the residents' expectations focused on the creation of employment opportunities, the local administration's expectations focused on the holistic development of tourism and traditional commerce together with the cultural fabric, and the NGOs' expectations focused on the integration with cultural and historical riches and green spaces.

Each stakeholder group thus voiced different expectations. However, these expectations are compatible with the principles of spatial functionality and spatial knots, which are part of the spatial and functional goals formulated using the CLUP approach. A vision statement that takes the stakeholder groups' expectations into account within the framework of the CLUP approach could be the following:

> *"A history, tourism, commerce and urban services-oriented* renewal *that conserves and develops visible and invisible historical, cultural and environmental assets on the Mevlana Museum-Project site-Alaeddin Hill-high-speed train route, it creates employment opportunities, and it improves the physical and social structure and the urban fabric of the city in a holistic manner together with the rest of the city".*

The stakeholders' expectations concerning land-use, building density, and building design in the project site were also examined (Fig. 11).

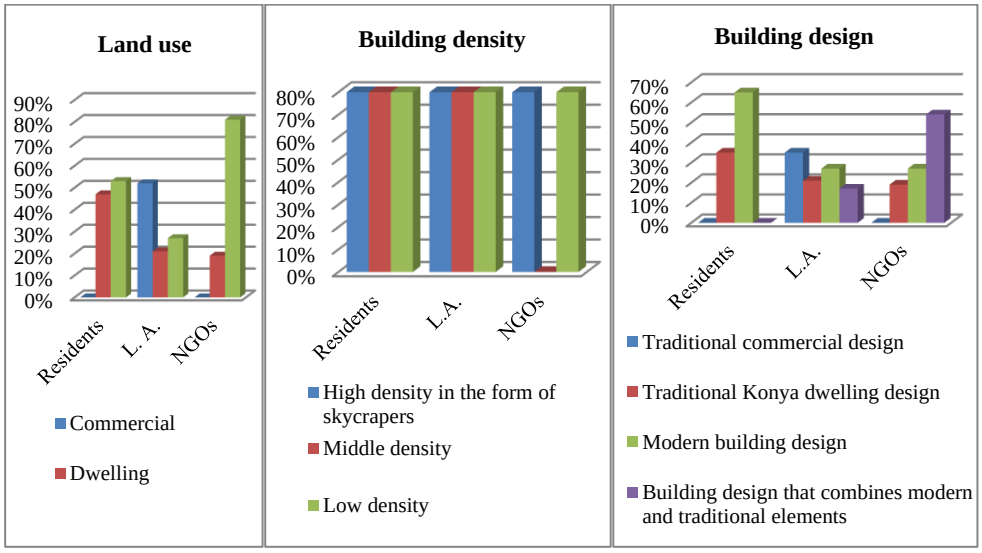


Fig. 11 **– Expectations of stakeholder groups concerning with land-use, building density and building design**

Most of the residents expect a residential and commercial land use with a high density in the form of skyscrapers and of modern building design. The local administration expects a commercial land use with a low density in the form of traditional building design. NGOs expect a commercial and residential land use with a low-density building design that combines modern and traditional elements.

Evaluation of stakeholder groups' expectations on the participation and governance process

Stakeholder groups' opinions about the processes of participation and governance were collected. The problems encountered in the relationships between the stakeholder groups and the problems that would need to be resolved if this process is to be created are shown

in Table 3. Each stakeholder group encounters different problems in its relations with the other groups concerning participation and governance processes.

Table 3

Relationships between stakeholder groups

	Residents	**NGOs**
Local administration	Lack of a common language (political language) Lack of desire for compromise Conflict of interests Expectations from bureaucratic processes Financial and time-related costs associated with acting together Speculations Lack of local knowledge	Ideologies influencing opinions Utopian ideas Negative attitudes Conflict of interests Lack of incentives to compromise
Residents	Hearsay Lack of unity, failure to present a united front Conflict of interests	Conflict of interests Lack of a common language (academic language, institutional language)

Discussion

According to the results obtained in the empirical part of the study, the land-use and building design together with the participation and governance processes were discussed and suggestions were developed.

Creating to a sustainable land-use and building design process

Each group voiced different expectations concerning land-use and building design. In addition, some of these expectations conflict with the spatial goals formulated using the CLUP approach. Some of the expectations feature high-density building designs in the form of skyscrapers. However, geological studies and the bearing capacity of the ground show that low floor area ratios are required. If the goal is to create differentiation within the project site by making use of the contrast between skyscrapers and traditional buildings, the static strength of the buildings should be improved. This, in turn, would increase the building cost.

Expectations concerning land-use exclusively focus on commercial uses. Land-use should allow a balanced sectoral development. The exclusive commercial use might have a negative effect on the success of the project in terms of security and usage during both day and night.

Modern and traditional elements should be combined in building design. The project site is located on the route of a modern, bazaar and daily commerce, so sectoral development should be planned to allow a neat transition. Both modern and traditional building designs should reflect the different potentials of the site in line with the cultural profile and land-use patterns of the residents.

A land-use and building design principle that takes the stakeholder groups' expectations into account within the framework of the CLUP approach could be as follows:

> *"A low-density building design that combines the traditional residential use and the commercial use in the form of bazaars with modern residential and commercial uses, and it features both modern and traditional buildings in harmony with each another".*

Creating pluralist decision-making processes

Stakeholder relationships are not compatible with the framework of spatial-functionality goals (pluralism, integration, collaboration, and participation) formulated using the CLUP approach. Within the framework of goals formulated using the CLUP approach, the following recommendations are made to solve these problems.
Pluralist decision-making processes may result in lots of red-tape, high financial and labor costs, together with speculation. Dialogue between groups may create difficulties in the process because of the lack of understanding and the confusion that results. Therefore, representatives should be elected to create a pluralist approach and to help solving these problems. The members of professional chambers, neighborhood heads or well-known shopkeepers could serve as representatives. These representatives can help prevent the conflicts inside their groups, achieve coordination between stakeholders, use a common language to find common ground, and prevent the waste of financial resources and time.

Public administration in Turkey has a hierarchical structure. This structure results in the exclusion of the actors providing horizontal coordination. This situation, in turn, results in the prioritization of bureaucratic agencies' expectations within the projects and the adoption of ideological positions by other actors towards the project. To deal with this problem, a governance system that manages and supervises, but it avoids interfering in horizontal coordination, should be established for the project.

Raising awareness about the concept of urban renewal and its implementation

The local administration can help prevent speculation and hearsay and alleviate the lack of knowledge by holding events and meetings with their counterparts (representatives of other groups) or by visiting them. Using participatory methods (survey, interview, etc.) to identify the problems, expectations, and local characteristics of the project site can help achieve a non-utopian, sustainable, and problem-solving oriented project.

The local administration can prevent the conflicts of interests and negative attitudes by ensuring the active participation of other actors in one part or stage of the project process. The legislation that would make it mandatory to participate in the process could prevent the lack of desire to compromise.

The scientific importance of the research and the contribution of the results to the theoretical development of the field

Studies on obtaining a collaborative approach in urban renewal are increasing in the international literature. There are studies in rural, urban, and historical areas within the framework of collaborative approach. Clemente et al. (2016), in order to develop the social, economic, environmental and cultural structure of Naples historic city center, defined a collaborative urban renewal approach with the citizens, stakeholders and decision-makers. Glackin and Dionisio (2016) examined with two applications that the deep engagement in urban renewal will increase the success of the urban renewal process in revealing the local knowledge and socio-cultural diversity and in integrating it into urban design and planning. Allam (2019) developed suggestions to re-create the urban fabric by providing focus group studies with public, private and foreign institutions to become a smart city of Port Louis. Ferretti and Grosso (2019) developed a collaborative approach among the stakeholders with the help of decision-making tools to create alternative strategies by determining the local needs in the process of creating a new function in an abandoned urban area. Jiang et al. (2020) examined the sharing of interests among the key stakeholders and the mechanisms behind the process in the urban transformation process in a village in China. Yung and Sun (2020) examined the roles, coalitions, interests of different actors and the use of power in the urban transformation implementation process in historic urban centers and they analyzed the complex and unbalanced power relations. Li et al. (2020) put forward a model

of collaborative workshops, aiming to ensure the equal distribution of resources by addressing the interests of the stakeholders in the town of Shenjing in Guangzhou, China. Unlike the application studies, in Boyle et al. (2018), neighborhood sustainability was evaluated in urban renewal and it was temphasized that a sustainable urban renewal process should be based on urban governance principles, participatory actions and market dynamics.

In all these studies, there is a search to obtain common spatial strategies by taking the opinions of the participants who play a role in urban renewal. The CLUP analysis is presented in this study as a model that accepts the sustainable land use, governance, and participation topics as basic components in the urban renewal process, similar to the literature.

The CLUP approach provides that the contrary expectations of the stakeholders in renewal applications are evaluated and limited within the framework of sustainable land use principles. Thus, this approach is important in increasing the success of the application results.

The contribution of the empirical part results in the theoretical development of the field while it examines the expectations of the stakeholders for a specific field. In addition, these expectations were evaluated within the framework of goals determined by the theoretical approach. Accordingly, when the implementation results are examined, it is seen that the expectations of the inhabitants (vision, land use, building design) are against the topics of sustainable land use planning.

This study makes an important contribution in terms of the evaluation of stakeholder groups' spatial and functional expectations, which affects the spatial and functional sustainability within the framework of the CLUP. This study can also serve as a guide for conducting the holistic examination of a project site by using the CLUP approach while formulating spatial and functional goals.

Conclusions

This study developed the CLUP approach, which provides a framework for formulating spatial and functional goals that help achieve spatial and functional justice and quality. Stakeholder groups' demands were evaluated within the framework of this approach. The CLUP approach, as its application to the selected project site demonstrates and it introduces several novelties in urban design that could serve as a guide for other urban renewal projects. CLUP is a pioneering approach because it considers all aspects of the project process. It allows practitioners to take all aspects of the project site into consideration, including, but not limited to, the social, economic, and environmental aspects. It provides a framework for formulating spatial and functional goals concerning the problems and potentials of the project site. The CLUP approach also provides a framework for constraining the shifting expectations of stakeholder groups concerning the land-use within the boundaries of pre-defined criteria. In the sample project examined, stakeholder groups demanded high-density buildings. However, the CLUP approach showed that in this case low-density buildings should be preferred. The CLUP approach thus limits the expectations that conflict with the principle of sustainable land-use.

Urban renewal projects in Turkey are usually seen as processes of ownership renewal, so that spatial and functional goals are formulated with this aspect in mind. The CLUP approach, however, allows for the spatial demands and principles of urban design to be taken into consideration, as well as ownership renewal. In the sample project examined, some of the stakeholder groups demanded only modern building designs. However, the CLUP approach showed that building designs that combine traditional and modern elements should be preferred. Therefore, expectations regarding this aspect of the project were

limited because they conflicted with the principle of sustainable land-use. Another pioneering quality of this approach is that it allows horizontal coordination for monitoring and tracking the project while achieving harmony between the local administration and the other stakeholders. This approach also facilitates participatory practices that improve cooperation and access to empirical knowledge. The next step for the CLUP approach should be the development of national, regional and local frameworks, and its adaptation to the conditions of different urban renewal sites.

References

ADAMS C. D., MAY H. G. (1991), *Active and passive behaviour in land ownership*, Urban Studies 28 (5), 687-705.

AKTEN M., AKTEN S. (2010), *A Model Approach: An Agricultural Sector Case Study for Sustainable Land Use Planning*, Research Journal of Biology Sciences 3 (2), 83-90.

ALAM K., ERDIAW-KWASIE M. O., SHAHIDUZZAMAN M., RYAN B. (2018), *Assessing regional digital competence: Digital futures and strategic planning implications*, Journal of Rural Studies 60, 60-69.

ALLAM Z. (2019), *Identified priorities for smart urban regeneration: Focus group findings from the city of Port Louis, Mauritius*, Journal of Urban Regeneration and Renewal 12 (4), 376-389.

ALMĂŞAN O., REINHARDT Z. (2009), *The Negative Impact of Legislation Pitfalls on Meaningful Public Participation, Efficient Policy-Making and Effective Governance*, Transylvanian Review of Administrative Sciences 25 E, 5-12.

ALMIRALL E., WAREHAM J. (2008), *Living Labs and Open Innovation: Roles and Applicability*, The Electronic Journal for Virtual Organizations and Networks 10 (3), 21-46.

ATKINSON R. (2009), *Kentsel Dönüşüm, Yerel Halk Katılımı ve Değişimi* (Urban Regenerations, Local Public Participation and Change), Kentsel Dönüşümde Politika, Mevzuat ve Uygulama, Avrupa Deneyimi (Policy, Legislation and Implementation in Urban Regeneration, European Experience, Istanbul Practices), Nobel Press, Istanbul.

BARKER K. (2006), *Barker Review of Land Use Planning: Final Report - Recommendations*, The Stationery Office, London.

BASSETT S. M. (2013), *The role of spatial justice in the regeneration of urban spaces*, University of Illinois at Urbana-Champaign, Champaign.

BIFULCO F., TREGUA M., AMITRANO C. C. (2017), *Co-Governing Smart Cities Through Living Labs. Top evidences from EU*, Transylvanian Review of Administrative Sciences 50 E, 21-37.

BOYLE L., MICHELL K. (2020), *Key ingredients for a collaborative urban regeneration strategy in the Global South*, Construction Economics and Building 20 (2), 150-164.

BOYLE L., MICHELL K., VIRULY F. (2018), *A Critique of the Application of Neighborhood Sustainability Assessment Tools in Urban Regeneration*, Sustainability 10 (4), 1005.

BOZDAĞ A. (2015), *Analysis of Urban Regeneration Applications in Consensus Land Use Planning Approach*, Selçuk University, Konya.

BOZDAĞ A., İNAM Ş., DURDURAN S. S. (2018), *Urban Regeneration Projects to Achieve Sustainable Urban Land Development, Konya Case Study*, Afyon Kocatepe Üniversitesi Fen Ve Mühendislik Bilimleri Dergisi 18 (3), 1000-1018.

BUITELAAR E., SEGEREN A. (2011), *Urban Structures and Land. The Morphological Effects of Dealing with Property Rights*, Housing Studies 26 (5), 661-679.

CARPENTER J., VERHAGE R. (2014), *Lyon City Profile*, Cities 38, 57-68.

CARVALHO T. M., FIDÉLIS T. (2013), *The relevance of governance models for estuary management plans*, Land Use Policy 34, 134-145.

CLEMENTE M., OPPIDO S., DALDANISE G., SPOSİTO S. (2016), *Cultural heritage for collaborative urban regeneration: community and stakeholders activation for the historical centre of Naples*, in: Santos Cruz S., Brandão Alves F., Pinho P. (eds.), Book of Proceedings – Joint Conference: CITTA 8th Annual Conference on Planning Research and

AESOP TG / Public Spaces & Urban Cultures Meeting, Universidade do Porto, Porto, pp. 719-741.

CYSEK-PAWLAK M. M. (2019), *Testing the new urbanism principle of sustainable transport in the contemporary redevelopment projects. Lessons from Clichy-Batignolles in Paris and the station area in Lodz*, Journal of Urban and Regional Analysis 11 (1), 35-52.

FAEHNLE M., TYRVÄINEN L. (2013), *A framework for evaluating and designing collaborative planning*, Land Use Policy 34, 332-341.

FERRETTI V., GROSSO R. (2019), *Designing successful urban regeneration strategies through a behavioral decision aiding approach*, Cities 95, 102386.

FEUVRE M. L., MEDWAY D., WARNABY G., WARD K., GOATMAN A. (2016), *Understanding stakeholder interactions in urban partnerships*, Cities 52, 55-65.

GINTING N., RAHMAN N. V., NASUTION A. D. (2019), *Aspects of Self-Esteem in The Tourism Development in Karo Regency, North Sumatera, Indonesia*, Journal of Urban and Regional Analysis 11 (2), 173-183.

GLACKIN, S., DIONISIO M. R. (2016), '*Deep engagement' and urban regeneration: tea, trust, and the quest for co-design at precinct scale*, Land Use Policy 52, 363-373.

GÖKSU E., BAL E. (2010), *Türkiye'de Neoliberal Mekânsal Gelişim Stratejisi olarak Kentsel Dönüşüm Projeleri* (Neoliberal Spatial Development Strategy as Urban Regeneration Projects in Turkey), Kentsel Dönüşümde Politika, Mevzuat ve Uygulama, Avrupa Deneyimi, (Policy, Legislation and Implementation in Urban Regeneration, European Experience, Istanbul Practices), Nobel Press, İstanbul.

GROßMANN K., BONTJE M., HAASE A., MYKHNENKO V. (2013), *Shrinking cities: Notes for the further research agenda*, Cities 35, 221-225.

HEALEY P., BARRETT S. M. (1990), *Structure and agency in land and property development processes: some ideas for research*, Urban Studies 27 (1), 89-103.

HENNING F., YEIN NG G. (2009), *The Challenge of Collaboration – ICT Implementation Networks in Courts in The Netherlands*, Transylvanian Review of Administrative Sciences 28 E SI, 27-44.

INNES J. E., BOOHER D. E. (2000), *Public participation in planning: New strategies for the 21st century,* in: Annual conference of the association of collegiate schools of planning, November 2–5, University of California at Berkeley, Retrieved from: www.escholarship.org.

ISLAM T., ENLIL Z. (2010), *5366 Sayılı Yasa Merkezli Dönüşüm ve Sulukule Örneği: Belediye'nin Hedefleri ve Yaşanan Gerçeklik* (Law-Centered Regeneration No. 5366 and Sulukule Example: The Goals of the Municipality and the Reality Experienced), Kentsel Dönüşümde Politika, Mevzuat ve Uygulama, Avrupa Deneyimi (Policy, Legislation and Implementation in Urban Regeneration, European Experience, Istanbul Practices), Nobel Press, İstanbul.

JELOKHANI-NIARAKI M. (2019), *Exploring the effect of group decision on information search behaviour in web-based collaborative GIS-MCDA*, Journal of Decision Systems 28 (4), 261-285.

JIANG Y., MOHABIR N., MA R., WU L., CHEN M. (2020), *Whose village? Stakeholder interests in the urban renewal of Hubei old village in Shenzhen*, Land Use Policy 91, 104411.

JUNG T. H., LEE J., YAP M. H. T., INESON E. M. (2015), *The role of stakeholder collaboration in culture-led urban regeneration: A case study of the Gwangju project, Korea*, Cities 44, 29-39.

KOŻUCH B., SIENKIEWICZ-MAŁYJUREK (2016), *Factors of Effectıve Inter-Organizational Collaboration: A Framework for Public Management*, Transylvanian Review of Administrative Sciences 47 E, 97-115.

KÖSE N., ERKAN N. Ç. (2014), *Kentsel Mekân Örgütlenmesinin Yaşlıların Kentsel Etkinlikleri Üzerindeki Etkisi, İstanbul Ve Viyana Örneği* (The Impact of Urban Space Organisation on the Urban Activity of the Elderly, Istanbul and Vienna Example), METUJFA 31 (1), 39-66.

KUYUCU T. (2013), *Bir Paradoks Olarak Türkiye'de Kentsel Dönüşüm ve Toplu Konut Politikaları* (As a paradox in Turkey Mass Housing and Urban Renewal Policies),

Kentleri Savunmak, Mekân, Toplum ve Siyaset Üzerine (On Defending Cities, Space, Society and Politics), Notabene Press, Ankara.

LAURIAN L., SHAW M. M. (2009), *Evaluation of public participation: the practices of certified planners*, Journal of Planning Education and Research 28 (3), 293-309.

LI X., ZHANG F., HUI E. C.-M., LANG W. (2020), *Collaborative workshop and community participation: A new approach to urban regeneration in China*, Cities 102, 102743.

MEEGAN R. (2015), *City profile – Leeds*, Cities 42 (Part A), 42-53.

MUÑOZ-GIELEN D. (2012), *Urban governance, property rights, land readjustment and public value capturing*, European Urban and Regional Studies 21 (1), 60-78.

NEEDHAM B. (1997), *Land policy in the Netherlands*, Tijdschrift voor Economische en Sociale Geografie 88 (3), 291-296.

NEUMAN W. L. (2000), *Social Research Methods: Qualitative and Quantitative Approaches,* Allyn and Bacon, Boston.

OATLEY N. (2000), *New Labour's Approach to Age-old Problems: Renewing and revitalising poor neighbourhoods - the national strategy for neighbourhood renewal*, Local Economy 15 (2), 86-97.

OMIDIPOOR M., JELOKHANI-NIARAKI M., MOEINMEHR A., SADEGHI-NIARAKI A., CHOI S.-M. (2019), *A GIS-based decision support system for facilitating participatory urban renewal process*, Land Use Policy 88, 104150.

ÖZDEMIR D. (2010), *Batı Avrupa'da Kentsel Dönüşüm Olgusunun Süreç İçinde Değişen Anlamları ve Türkiye Yansımaları* (Changing Meanings of Urban Transformation in Western Europe and Turkey Reflections), Kentsel Dönüşümde Politika, Mevzuat ve Uygulama, Avrupa Deneyimi (On Defending Cities, Space, Society and Politics), İstanbul Press, Istanbul.

ÖZDEN P. (2010), *Türkiye'deki Kentsel Dönüşüm Politikaları ve Uygulamalarına Eleştirel Bir Bakış* (A Critical Approach to Urban Renewal Policies and Practices in Turkey), Kentsel Dönüşümde Politika, Mevzuat ve Uygulama, Avrupa Deneyimi. İstanbul Uygulamaları (Policy, Legislation and Implementation in Urban Regeneration, European Experience, Istanbul Practices), Nobel Press, İstanbul.

PARÉS M., BONET-MARTÍ J., MARTÍ-COSTA M. (2012), *Does Participation Really Matter in Urban Regeneration Policies? Exploring Governance Networks in Catalonia (Spain)*, Urban Affairs Review 48 (2), 238-271.

PEARSON L. J., PARK S., HARMAN B., HEYENGA S. (2010), *Sustainable land use scenario framework: Framework and outcomes from peri-urban South-East Queensland, Australia*, Landscape and Urban Planning 96 (2), 88-97.

RAITIO K. (2012), *New institutional approach to collaborative forest planning on public land: Methods for analysis and lessons for policy*, Land Use Policy 29 (2), 309-316.

ROY P. (2015), *Collaborative planning – A neoliberal strategy? A study of the Atlanta BeltLine*, Cities 43, 59-68.

SEJATI A. W., BUCHORI I., RUDIARTO I., SILVER C., SULISTYO K. (2020), *Open-Source Web GIS Framework in Monitoring Urban Land Use Planning: Participatory Solutions for Developing Countries*, Journal of Urban and Regional Analysis 12 (1), 19-33.

SOMOZA MEDINA X. (2016), *Governance, Urban Competitiveness and Crisis in Spain*, Journal of Urban and Regional Analysis 8 (1), 47-60.

TALLON A. (2010), *İngiltere'de Kentsel Rönesans: Kentlerdeki Yansımaları ve Eleştirel Değerlendirmeler* (Urban Renaissance in England: Reflections on Cities and Critical Reviews), Kentsel Dönüşümde Politika, Mevzuat ve Uygulama, Avrupa Deneyimi İstanbul Uygulamaları (Policy, Legislation and Implementation in Urban Regeneration, European Experience, Istanbul Practices), Nobel Press, İstanbul.

TEKELI I. (2006), *Kentleri Dönüşüm Mekânı Olarak Düşünmek* (Thinking Cities as Spaces of Regeneration), Kentsel Dönüşüm Sempozyumu'na Sunulan Bildiri (The Declaration Presented to the Urban Transformation Symposium), TMMOB Şehir Plancıları Odası Yayını (City Planners Chamber Publication).

TEKELI I. (2012), *Türkiye İçin STK'lar ve Katılımcı Demokrasi Yazıları* (NGOs and Participatory Democracy Writing for Turkey), Tarih Vakfı Yurt Press, Istanbul.

TURGUT S., CEYLAN E. Ç. (2010), *Bir Kentsel Dönüşüm Uygulaması Deneyimi: Küçükçekmece Ayazma-Tepeüstü* (An Urban Regeneration Application Experience: Küçükçekmece Ayazma-Tepeüstü), Kentsel Dönüşümde Politika, Mevzuat ve Uygulama, Avrupa Deneyimi, İstanbul Uygulamaları (Policy, Legislation and Implementation in Urban Regeneration, European Experience, Istanbul Practices), Nobel Press, Istanbul.

UYSAL Ü. E. (2012), *An urban social movement challenging urban regeneration: The case of Sulukule, Istanbul*, Cities 29 (1), 12-22.

ÜSTÜN G. (2009), *Kentsel Dönüşümün Hukuki Boyutu* (Legal Dimension of Urban Regeneration), XII Levha, Istanbul.

VAN BORTEL G. (2012), *Institutions and Governance Networks in Housing and Urban Regeneration*, International Encyclopedia of Housing and Home, 93-98.

VAN DER KRABBEN E., NEEDHAM B. (2008), *Land readjustment for value capturing: a new planning tool for urban redevelopment*, The Town Planning Review 79 (6), 651-672.

WANG H., SHEN Q., TANG B.-S., LU C., PENG Y., TANG L. (2014), *A framework of decision-making factors and supporting information for facilitating sustainable site planning in urban renewal projects*, Cities 40 (Part A), 44-55.

WEBSTER C. (2008), *Property rights, public space and urban design*, The Town Planning Review 78 (1), 81-101.

WING HO D. C., YAU Y., POON S. W., LIUSMAN E. (2012), *Achieving Sustainable Urban Renewal in Hong Kong: Strategy for Dilapidation Assessment of High Rises*, Journal of Urban Planning and Development 138 (2), 153-165.

WONDOLLECK J. M., YAFFEE S. L. (2000), *Making Collaboration Work: Lessons from Innovation in Natural Resource Management*, Island Press, Washington.

YU J.-H., KWON H.-R. (2011), *Critical success factors for urban regeneration projects*, International Journal of Project Management 29 (7), 889-899.

YUNG E. H. K., LANGSTON C., CHAN E. H. W. (2014), *Adaptive reuse of traditional Chinese shophouses in government-led urban renewal projects in Hong Kong*, Cities 39, 87-98.

YUNG E. H. K., SUN Y. (2020), *Power relationships and coalitions in urban renewal and heritage conservation: The Nga Tsin Wai Village in Hong Kong*, Land Use Policy 99, 104811.

ZIMMERMANN W. (2008), *Effective and Transparent Management of Public Land Experiences, Guiding Principles and Tools for Implementation*, FIG/FAO/CNG International Seminar on State and Public Land Management, Verona, Italy, Retrieved from: www.fig.net.

Initial submission: 29.02.2020
Revised submission: 18.09.2020
Final acceptance: 21.10.2020

Correspondence: Geomatic Engineering, Niğde Ömer Halisdemir University, Central Campus, 51240, Nigde, Turkey.

Email: aslibozdag@ohu.edu.tr

Journal of Urban and Regional Analysis,
vol. XIII, 2, 2021, p. 343 - 358
https://doi.org/10.37043/JURA.2021.13.2.8

ENTREPRENEURSHIP AND COMPETITIVENESS IN THE TERMS OF ENDOGENIZATION OF REGIONAL ECONOMY PROCESSES ON THE EXAMPLE OF EASTERN POLAND POVIATS IN 2007-2018

Paweł **DZIEKAŃSKI**
Jan Kochanowski University of Kielce, Kielce, Poland

Abstract: Enterprises become organizations that affect the competitiveness of poviats. The development of entrepreneurship and the competitiveness of regions are influenced by natural, social, financial, economic, and infrastructural factors. The aim of the article is to assess the diversity of the level of entrepreneurship in Eastern Poland poviats using a synthetic measure. The data from the Central Statistical Office for 2007-2018 were used as empirical material. In 2018, the entrepreneurship measure ranged from 0.22 to 0.51, while in 2007 from 0.11 to 0.33. The measure of competitiveness in 2018 took values from 0.28 to 0.51, while in 2007 from 0.24 to 0.40. The appropriate entrepreneurship potential and competitiveness of poviats affect the standard of living, the social situation, and the public safety, while they determine their future possibilities and development directions. Demographics, the sold production of industry, the gross value of fixed assets, the investment outlays and the natural persons conducting business activity have an impact on the analysed processes.

Key Words: *entrepreneurship, competitiveness, synthetic measure, poviat, Eastern Poland.*

Introduction

Entrepreneurship development delays in Eastern voivodships are significant. Therefore, it is necessary to identify the factors and to identify the trends of changes in the entrepreneurship and competitiveness of poviats. The level of diversity is determined, among others, by the natural conditions, the transport accessibility, the location of large settlement centers and enterprises, the access to capital, the equipment in infrastructure, the current level of economic activity, the access to knowledge and capital, the policy of local government units conducive to the growth of entrepreneurship and, thus, by competitiveness (Miłek and Kantarek 2017). Skawińska (2012) writes that entrepreneurship plays an important role in the efficient allocation of existing resources. It involves people working in the search of innovation and detecting new relationships in the existing economic and social system. The development of entrepreneurship is influenced by natural, social, financial, economic, and infrastructural (technical) factors. These factors used in market and social relations are interdependent and they occur at the same time. They should therefore be considered together. There is a correlation between the basic activities of territorial units and the level and living conditions of the residents, or the activities of enterprises. The essence of these activities is to ensure cohesion in its three dimensions: economic, social, and territorial cohesion.

Regional competitiveness attracts the attention of various circles (including entrepreneurs, politicians, scientists) due to the growing importance of regions as key elements of economic growth (Annoni and Kozovska 2010). Regional differences and imbalances are a serious obstacle to sustainable development. The assessment of the competitiveness of regions is important for an effective and efficient regional policy, and for both private and state, local and foreign investors (Ivanov 2017). Increasing the competitiveness of regions

should be treated as an instrument to achieve the ultimate goal – social and economic development.

The aim of the article is to assess the diversity of the level of entrepreneurship in Eastern Poland poviats using a synthetic measure. The hypothesis according to which entrepreneurship is the key factor determining the development of poviats was verified. The following questions were assessed: how to measure the entrepreneurial potential of the region? Does the level of entrepreneurship in counties depend on the level of endogenous socio-economic variables in counties? What is the spatial distribution of the level of development?

Literature review

The region is a system that is set up to implement specific economic and social goals, functions, and decision-making competences. To maintain their competitive position, they must constantly seek new sources of development (OECD 2013). The competitiveness of the regional economy and its ability to develop sustainably depend not only on the location of traditional factors: land, capital and labour, but also on the knowledge and skills of its practical use. Contemporary endogenous factors play a significant role in the development of regions, including the level of qualifications of regional and local communities (OECD 1992).

The factors that may affect the development of the region or its competitiveness are very diverse, but the number of those that significantly affect this development (aspect of the multidimensionality of the process) is not only limited, but it also varies depending on the stage of development of the region. This means that one ideal development pattern is missing that leads to strengthening the competitive position of a given region (Gurria 2011). Models often emphasize that all these factors make up a hierarchical system where the significance of individual factors determining the process depends on the current level of competitiveness or development (the pyramid of competitiveness, the competitiveness tree, the hat of competitiveness) (Martin 2003).

Regional competitiveness is the ability of a given economy to optimize local assets in order to compete on the domestic and international market, as well as the ability to adapt to changes occurring in these markets (Hildebrandt and Silgoner 2007) and to achieve success in the economic competition on a global and local scale (Hatzichronoglou 1996), and by integrating these relationships in the socio-economic model (Garelli 2003). Competitiveness is a multidimensional feature of the socio-economic quality of the region's space. It determines the efficiency of using regional resources and it is reflected in the improvement of the quality of life in the region. Competitiveness is characterized by the significant diversification and asymmetry of natural, historical, cultural, social, and economic determinants. The existing factor differences make uniform rules inadequate to solve the problems of a given region, thus weakening the resources and further strengthening interregional asymmetries (Polyakova et al. 2019).

Meyer-Stamer (2016) defines the competitiveness of the territory as the ability of the regional level to generate growing income and to increase the livelihood of its inhabitants. Regional competitiveness is the region's ability to offer companies and the residents an attractive and sustainable environment for living and working. The definition of competitiveness considers not only economic but also social and environmental factors (Dijkstra et al. 2011). Dijkstra et al. (2011) built a Regional Competitiveness Index based on NUTS 2 regions, which consists of variables divided into three groups: basic (e.g. institutions, macroeconomic stability, infrastructure, health, basic education), efficiency (higher education and lifelong learning, labour market efficiency, market size), and innovation (technological readiness, business sophistication, innovation). The EU Regional Competitiveness Index (RCI) is the first composite indicator that provides a synthetic picture

of territorial competitiveness for EU regions. The authors of the RCI index proposed to include entrepreneurship in it. They assumed that competitiveness means the ability to provide an attractive and sustainable environment for the companies and the residents of the region where they work and live. RCI provides a comparable and multi-faceted picture of the level of competitiveness of all EU regions. RCI should be treated as an instrument supporting the design of better policies and monitoring their effectiveness (Annoni and Dijkstra 2019).

In the case of measures describing the level of competitiveness in the dimension of regional economies, researchers refer to its direct conditions. An example of different approaches in this respect may include studies prepared by Martin (2003) and Gardiner et al. (2006). Some competitiveness factors remain outside the influence of local authorities (spatial location of the commune, natural resources). Others may be more or less shaped by the local authorities (development areas, access to housing, infrastructure, social capital, workforce and entrepreneurs).

An enterprise, as an element of economic space, is one of the factors of economic development. It influences the development of regions through the efficient use of the available resources, innovative activities, or a more complete and comprehensive use of regional resources (Glinka and Gudkova 2011). The proponents of endogenous development recognize that entrepreneurship allows for sustainable, independent, and long-term development (Lipa and Karpińska 2019). In addition, endogenous development is an opportunity for peripheries to avoid growth dependent on growth centers, based, for example, on investment inflows and knowledge transfer (Endovitskaya et al. 2019). The level of entrepreneurial activity varies regionally. The owned structural features of regions and situational factors occurring in their area cause that regions differ in the scale of entrepreneurial activity. The most important benefits for the economy related to the development of entrepreneurship include a more complete satisfaction of the needs of the local community, the creation of new jobs, the liberation and strengthening of economy's innovativeness, contributing to the uniform development of regions. The existing differences between regions incline to consider the possibility of reducing them in the context of doing business (Valliere and Peterson 2009).

Entrepreneurship efficiency and an economy based on innovation enable the reduction of unemployment, the creation of jobs, they increase the propensity to undertake innovative activities, and they accelerate structural changes in the economy, and the introduction of products and services to the market that contribute to the improvement of the quality of life (Porter et al. 2002). The factors generating a kind of field of forces generating or blocking the entrepreneurship of the region include the demographic characteristics of the region, the situation on the regional labour market, the vitality of the economic structure of the region, the quality of human capital, the prestige of entrepreneurs in the region, the housing resources and their standard, and the infrastructure equipment.

Methodology

Study area

Eastern Poland (research area) covers the following voivodships: Lubelskie, Podlaskie, Podkarpackie, Świętokrzyskie and Warmińsko-Mazurskie (Fig. 1). A characteristic feature of Eastern Poland and its socio-economic space is the presence of disproportions in the development of regions. There is unequal access to basic production factors, such as capital, labour, and natural resources. Another problem for the region is the low level of economic, social, and territorial cohesion, which also results from historical conditions. The region is also characterized by a low effectiveness of the structure of the economy and the labor market, the outflow of inhabitants to other regions, and a low level of innovation

(Ministry of Infrastructure and Development 2014). This region is characterized by a territorial and developmental peripheral character. Thanks to this, it is an interesting example for the analysis of development processes (Strojny and Kościółek 2015).

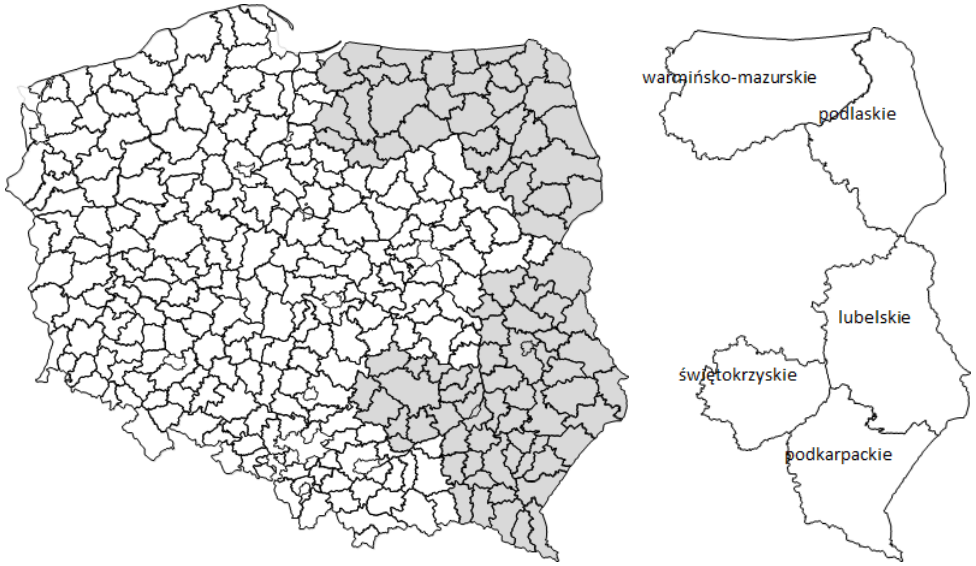


Fig. 1 – **Poviats in Poland and voivodships of eastern Poland (as of August 25, 2020)**
Source: *own study*

Since January 1, 1999, a three-tier structure of local self-government has been in force in the Republic of Poland, consisting of commune, poviat and voivodeship self-government. The commune is an organization of the inhabitants of the region, and it performs public tasks not reserved by the Constitution or statutes for the organs of other public authorities (Article 163 of the Polish Constitution). The poviat is responsible, inter alia, for health care and education above the lower secondary school. The system of poviat self-government is regulated by the Act of June 5, 1998, on regional development and it allocates funds for this purpose. Jendostki have legal personality and their independence is subject to judicial protection.

Entrepreneurship assessment

In order to build synthetic measures, the Technique for Order Preference by Similarity to an Ideal Solution (TOPSIS) method was used. The aggregate value of a synthetic variable makes it easier to compare objects in multidimensional spaces. The analyses were carried out in the system of 87 poviats of Eastern Poland (20 Lubelskie Voivodship, 21 Podkarpackie Voivodship, 14 Podlaskie Voivodship, 13 Świętokrzyskie Voivodship, and 19 Warmińsko-Mazurskie Voivodship). Data from the Local Data Bank of the Central Statistical Office from 2007-2018 were used as the source material.

Several stages are distinguished in the indicated process of evaluation and classification of objects (Hellwig 1968), i.e:

I. A set of simple variables describing the studied phenomenon has been determined. The selected set of simple variables should optimally characterize the phenomenon under study. Diagnostic variables should also be of great importance in the characteristics of the analysed phenomenon, the availability of information on the variables, the weak correlation between the variables and the high degree of variability, and the relative information value

(Kukuła and Bogocz 2014). The selected set of variables is presented in the form of an observation matrix x_{ij}:

$$x_{ij} = \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1m} \\ x_{21} & x_{22} & \dots & x_{2m} \\ \dots & \dots & \dots & \dots \\ x_{n1} & x_{n2} & \dots & x_{nm} \end{bmatrix} \quad (1),$$

where x_{ij} denotes the values of the j-th feature for the i-th object (i = 1, 2, ..., n; j = 1, 2, ..., m).

The development process is created by both economic, legal, financial, and demographic factors. They form a network of interrelated elements, and they should be considered together. The synthetic measures were determined separately for the indicated areas, using the variables listed in Table 1.

The process of verification of variables is aimed at extracting from the extracted variables such that, from the point of view of the complex phenomenon under consideration, bring the largest information and differentiating values in relation to the considered objects. From the set of variables, those characterized by a low variability (according to the coefficient of variation, the limit value was adopted at the level of 0.10) (Młodak 2006), and by a high correlation of variables (according to the inverse correlation matrix method) were removed (Malina and Zeliaś 1997).

II. In the next stage of the variable analysis, the nature of each of them was assessed, i.e. it was determined whether the variable was a stimulant or a destimulant. Destimulant variables were replaced with a stimulant, counting its inverse by the formula:

$$x_{ij} = \frac{1}{x_{ij}} \quad (2).$$

III. The next stage of building a synthetic feature is the normalization of features to introduce additivity in the sets of feature values with different titles. This is achieved by transforming their values in such a way as to obtain values without titles and harmonized as to numerical ranges (Wysocki 2010). The selected variables were subjected to the procedure of zero unitarization using the following formulas:

$$z_{ij} = \frac{x_{ij} - \min_i x_{ij}}{\max_i x_{ij} - \min_i x_{ij}} \text{ when } x_i \in S \quad (3),$$

where: S – stimulant, i = 1, 2... n, j = 1, 2... n, x_{ij} – means the value of the j-th feature for the examined unit, max – the maximum value of the j-th feature, min – the minimum value of the j-th feature (Kukuła and Bogocz 2014). As a result of the unitarization process, the matrix of property values was obtained z_{ij} :

$$z_{ij} = \begin{bmatrix} z_{11} & z_{12} & \dots & z_{1m} \\ z_{21} & z_{22} & \dots & z_{2m} \\ \dots & \dots & \dots & \dots \\ z_{n1} & z_{n2} & \dots & z_{nm} \end{bmatrix} (4),$$

where z_{ij} ($\in [0; 1]$) is the unified x_{ij} value.

Table 1

List of variables describing the situation of the economic development of municipalities

Variables	S / D*
Entrepreneurial potential of the region:	
Entities entered in the register per 1000 population	S
Natural persons conducting economic activity per 1000 population	S
Foundations, associations, and social organizations per 1000 inhabitants	S
Newly registered units in the REGON register per 1000 population	S
Units removed from the REGON register per 1000 Population	D
Average monthly gross salary (total)	S
Employed persons by section groups in total poviats (person) per 1000 inhabitants	S
Total registered unemployment rate (%)	D
Total sold production of industry and per 1000 inhabitants (entities employing>9) (PLN)	S
Gross value of fixed assets in enterprises per 1000 inhabitants (PLN)	S
Investment outlays in enterprises per 1000 inhabitants (PLN)	S
Competitive potential of the region:	
Total migration balance per 1000 population (persons)	S
Population Growth per 1000 inhabitants	S
Total registered unemployment rate (%)	D
Post-working age population per 100 people of working age (demographic dependency ratios)	D
Employed persons by section groups in total poviats (persons)	S
Entities entered in the register per 1000 population	S
Foundations, associations, and social organizations per 1000 population	S
Total sold production of industry and per 1 inhabitant (entities employing>9) (PLN)	S
Gross value of fixed assets in enterprises per 1 inhabitant (PLN)	S
Investment outlays in enterprises per 1 inhabitant (PLN)	S
Population using the water supply network (person)	S
Population for a public pharmacy (person)	S
Population per 1 library institution (including library points included in accordance with the head office of the parent unit) (person)	S
Total forest area [ha]	S
Own income per capita (PLN)	S
Investment expenditures per capita (PLN)	S

*S – stimulant; D – destimulant.

Source: *own study*

IV. Then, synthetic measures of competitiveness and entrepreneurship based on the TOPSIS method were calculated. As part of the method, the Euclidean distances of communes from the pattern (=1) and anti-pattern (=0) were determined (which may indicate a segment of optimal decisions), according to the following formulas:

$$d_i^+ = \sqrt{\frac{1}{n}\sum_{j=1}^{m}\left(z_{ij} - z_j^+\right)^2} \quad (5),$$

$$d_i^- = \sqrt{\frac{1}{n}\sum_{j=1}^{m}\left(z_{ij} - z_j^-\right)^2} \quad (6),$$

where n – stands for the number of variables making up the synthetic measure, z_{ij} stands for the unified value of the j-th feature for the tested unit, z_j^+, z_j^- – stands for the pattern or anti-pattern object (Wójcik-Leń et al. 2019).

The synthetic measure according to the TOPSIS (*Technique for Order Preference by Similarity to an Ideal Solution*) method was determined based on the formula (Behzadian et al. 2012):

$$q_i = \frac{d_i^-}{d_i^- + d_i^+}, gdzie\ 0 \leq q_i \leq 1, i = 1, 2, \ldots, n \quad (7)$$

where: $q_i \in [0; 1]$; d_i^- means the distance of the object from the anti-pattern (from 0), d_i^+ means the distance of the object from the pattern (from 1). A higher value of the measure indicates a better situation of the individual in the studied area (Yilmaz and Konyar 2013).

V. In the last stage of the research, the studied area was divided into 4 quartile groups. The first, the second and third quartiles were used as threshold values. The size of the synthetic measure in the first group means a better unit, and in the last one is the weakest. The mutual compliance of the obtained results was also verified based on the correlation coefficient. A scatter graph with a fit line for synthetic measures and the regression analysis is also presented (Zeliaś and Malina 1997, Dziekański 2017, Dziekański 2020, Dziekański and Prus 2020).

Results and Discussion

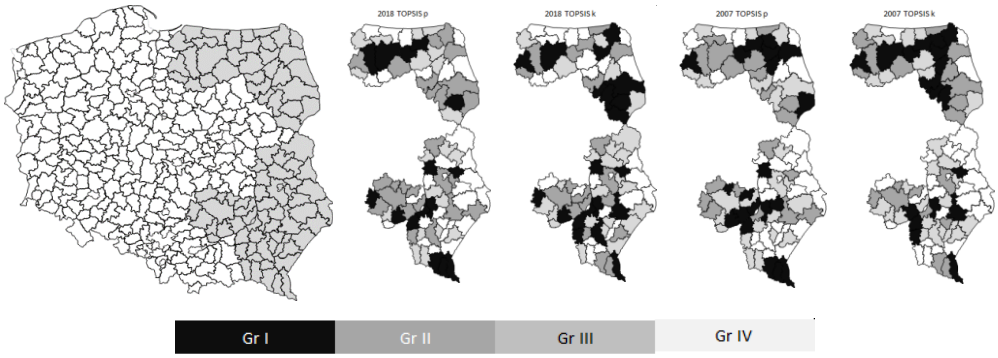
In 2018, the TOPSIS's entrepreneurship measure ranged from 0.22 (Chełm, Lubelskie poviat; the weakest units) to 0.51 (Mielec poviat, Podkarpackie, the best unit), and in 2007 from 0.11 (Strzyżów, Podkarpackie) to 0.33 (Ostrowiec, Świętokrzyskie). The value of myri synthetic competitiveness in 2018 ranged from 0.28 (Hrubieszów, Lubelskie; Brzozowski, Podkarpackie) to 0.51 (Mielecki, Podkarpackie), and in 2007 from 0.24 (Chełm, Hrubieszów, Lublin) to 0.40 (Mielec poviat, Podkarpackie).

The range of values adopted by the entrepreneurship measure was higher in 2018 (range 0.29) than in 2007 (range 0.22), while in the case of the competitiveness measure it was 0.23 in 2018, and 0.16 in 2009. This indicates a similar range of unit diversity in both areas under study, and a similar response of the units to changes in the economy. The units with an industrial character or a developed tourist function were in a better position, as well as those undergoing the impact of the local development centre (e.g. cities: Rzeszów, Kielce, Lublin, Białystok). A spatial picture of the distribution of measures is presented in Fig. 2.

The competitiveness potential of poviats is built, among others, by the financial resources of units, the occupational activity of the inhabitants, the local labour market, the entrepreneurship, infrastructure, and the condition of the natural environment. The endogenous potential resulting from the combination of local conditions determines its possibilities and directions of competitiveness development (Przybytniowski 2012).

The best and the weakest poviat of Eastern Poland differed significantly in terms of competitiveness and entrepreneurship. These are the areas shaped by location rent, local

development centers (Rzeszów, Kielce, Lublin, Białystok, Olsztyn) and the developing labour market and growth in the SME sector. Regions located peripherally (poviats of Eastern Poland in the context of the EU area) relative to the centre are characterized by, among others, the effect of leaching social potential (sucking the potential from the periphery to the centre), which is manifested in the balance of migration. This means that often a centre develops at the expense of small units. According to Rosner (2012), there is a close relationship between the processes regarding the population (population, age and occupational structure, birth rate, migration balance) and the level of socio-economic development or competitiveness.



TOPSIS p – entrepreneurship; TOPIS k – competitiveness;
Black – the best units; Brighter – the weaker units.

Fig. 2 – **Spatial diversity of entrepreneurship and competitiveness of Eastern Poland poviats in 2007 and 2018**

Source: *own development based on the data from the Local Data Bank of the Central Statistical Office*

The histogram (Fig. 3) indicates the distribution model for the measure of synthetic entrepreneurship (2018 – left-sided, 2007 – right-sided) and competitiveness (2018 – left-sided, 2007 – right-sided). The synthetic measure was 0.22-0.51 and 0.11-0.33, and it had a range of 0.22-0.29 (2007-2018) in the case of the entrepreneurship measure. In the case of the competitiveness measure, respectively: 0.28-0.51; 0.16-0.24 and 0.16-0.23. The most numerous range in 2018 was 0.30-0.35 (25/87, measure of entrepreneurship), followed by 0.34-0.36 (19/87, measure of competitiveness), which means that there is a dominant in this range.

For the measures of spatial diversity in the case of entrepreneurship in 2018 compared to 2007, the results show an increase in diversity according to the standard deviation (0.05-0.06), the quarter deviation (0.20-0.33), and the range value (0.22-0.29). Also, for the competitiveness measure – the standard deviation (0.03-0.05), the quarter deviation (0.33-0.38), the classic coefficient of variation (0.11-0.12) and the range (0.16-0.23), respectively (Table 2).

The Pearson correlation coefficient between the value of the synthetic entrepreneurship measure in 2018 compared to 2007 was 0.694, and in the case of the competitiveness measure – 0.751. In the case of the relation measure of entrepreneurship to the measure of competitiveness in 2007 – 0.585, in 2018 – 0.780 (Fig. 4). The spatial diversity of the studied area was quite stable. The units reacted similarly to the changes in the economy. Two groups of outliers can be identified, i.e. the first is characterized by a developed industrial function, good situation in both studied areas, and location in the area of influence of a strong urban unit (e.g. the group consists of units with low entrepreneurship and competitiveness potential – Chełm, Hrubieszów, Brzozowski, and Kolno poviats).

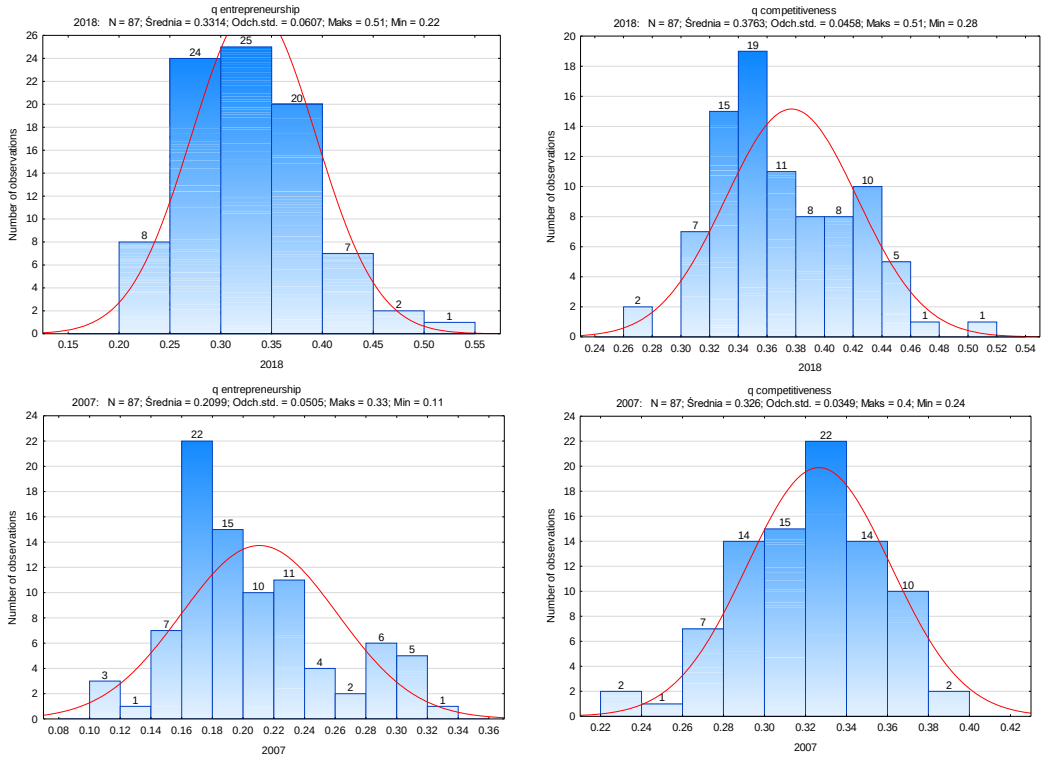


Fig. 3 **– The measure of synthetic entrepreneurship and competitiveness of Eastern Poland poviats in 2007 and 2018**

Source: *own development based on the data from the Local Data Bank of the Central Statistical Office*

Table 2

The diversity of entrepreneurship and competitiveness measures of Eastern Poland poviats in 2007 and 2018

	q entrepreneurship		**q competitiveness**	
	2007	**2018**	**2007**	**2018**
Average	0.21	0.33	0.33	0.38
Standard Deviation	0.05	0.06	0.03	0.05
Quarter (Quartile) Deviation	0.20	0.33	0.33	0.38
Classic Coefficient of Variation	0.24	0.18	0.11	0.12
Positional Coefficient of Variation	1.00	1.04	0.98	1.01
Min.	0.11	0.22	0.24	0.28
Max.	0.33	0.51	0.40	0.51
Range	0.22	0.29	0.16	0.23
Quartile Range	0.06	0.10	0.05	0.07

Source: *own study based on the data from the Local Data Bank of the Central Statistical Office*

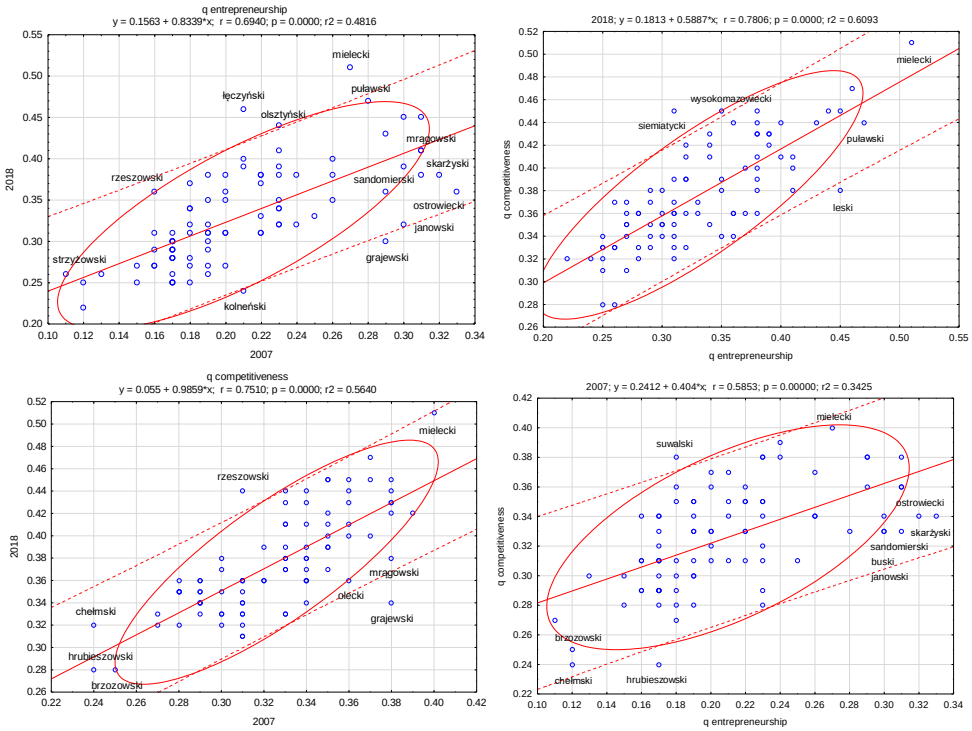


Fig. 4 **– The adjustment line of synthetic measures of entrepreneurship and competitiveness of Eastern Poland Poviats in 2007 and 2018**

Source: *own development based on the data from the Local Data Bank of the Central Statistical Office*

The correlation coefficient between the values of the measures of endogenous potential of the region indicates positive correlations with the exception of the demographic area (in the case of peripheral areas, the process of social capital is leaching). The highest correlation value of the entrepreneurship measure was with competitiveness (0.729) and with the financial situation (0.475) and infrastructure (0.464, Table 3). The results obtained may indicate the stability of spatial diversity in the examined aspect and a similar reaction of individuals to the changes in the economy.

Competitiveness of the local government is perceived in the context of its ability to adapt to positive trends appearing in the environment (e.g., development of entrepreneurship, creation of local development). Competitiveness potential is the total of tangible and intangible resources of an organization, necessary for it to function. Myrdal, in the theory of cumulative causation referring to the analysis of the interdependence of social, economic, and institutional phenomena, has proved that every element interacting with another element affects its behaviour, and, at the same time, it is modified by the reaction of that element (Stanny and Strzelczyk 2018).

The financial situation of the poviat is closely correlated with the level of competitiveness, the standard of living of the inhabitants and the functioning of business entities. It translates into disproportions in the scope of the ability to meet the local needs or the manner and quality of public tasks' implementation. Financial resources are the basis for the operation of the unit and a condition for the implementation of its statutory tasks (related to, among others, solving social problems, taking actions related to the needs of the residents). A high correlation value with PIT and CIT revenues may indicate that poviats are dependent on the revenues from the state budget. The costs incurred by the poviats for the development of

technical and social infrastructure lead to the development of entrepreneurship. These investments, combined with the activity of the inhabitants, should favour the creation of new and the development of existing enterprises.

Table 3

Correlation between the basic endogenous potentials of Eastern Poland poviats

q entrepreneurship	q financial situation	q competitiveness	q demographics	q infrastructure	q natural environment	
1	0.4753	0.7298	-0.1778	0.4644	0.364	q entrepreneurship
	1	0.5232	-0.0443	0.1673	0.1637	q financial situation
		1	0.1647	0.3819	0.3512	q competitiveness
			1	-0.2039	0.0104	q demographics
				1	0.5277	q infrastructure
					1	q natural environment

Linear correlation coefficients for observations from sample 1-1044; Critical value (at a 5% bilateral critical area) = 0.0607 for n = 1044.

Source: *own study based on the data from the Local Data Bank of the Central Statistical Office*

Infrastructure is one of the main conditions shaping the competitiveness (development) possibilities of regions, both on the economic, social, and ecological level. It influences the processes taking place in the regions by creating conditions for improving the attractiveness of a given area for the current and potential residents, enterprises, and investors. The poviats (including communes within the poviat), by investing in road infrastructure and utilities, better meet the needs of the local community, while making it easier for entrepreneurs to run their business. The competitiveness of regions is also increasing, which attracts the attention of potential investors.

The synthetic measure of entrepreneurship in relation to the socio-economic elements presents positive and negative correlation values. The most correlated measure was the share in income from PIT and CIT, the sold production of industry, the gross value of fixed assets, the investment outlays, the employed in industry, as well as trade and repair, entities and natural persons conducting an economic activity (Table 4).

The economy cannot develop without an adequate human potential. Its migrations cause changes in the area of population structure or spatial distribution. The change in the number of economic entities is a positive impulse to support entrepreneurship. Local authorities should also improve the condition of infrastructure. Its quality and condition affect the attractiveness of the area, the increase in the number of companies, jobs, and the quality of life of the inhabitants.

Table 4

Correlation between the entrepreneurship measure and the simple features shaping it in Eastern Poland poviats

	q entrepreneurship
Own income	0.3065
Investment expenditure	-0.0351
Share in PIT and CIT revenues	0.4316
Industrial output sold	0.5005
Gross value of fixed assets	0.6265
Investment outlays	0.5076
Number of employed persons	0.1072
Employed in agriculture	-0.2608
Employed in industry	0.4909
Working in trade and repair	0.5286
Registered unemployed persons	-0.3471
Economic operators	0.7692
Self-employed persons	0.7438
Net migration rate	0.0634
Housing stock	0.2484
Forest areas	-0.114

Linear correlation coefficients for observations from sample 1-1044;
Critical value (at a 5% bilateral critical area) = 0.0607 for n = 1044.

Source: *own study based on the data from the Local Data Bank of the Central Statistical Office*

The regression analysis of the measure of synthetic entrepreneurship and the endogenous potentials of Eastern Poland poviats allows explaining the R = 0.645 variable variations. The model indicates the important role of the basic endogenous potentials of poviats (financial situation, competitiveness, demography, infrastructure, natural environment) in the development of entrepreneurship in the economy. The statistics values F (5, 1038) 378.5477 and the corresponding probability level p mean that all parameters are statistically significant. The further increasing of the multidimensionality of the model would cause a small increase in R2 0.644 (Table 5)[1].

The regression analysis of the measure of synthetic entrepreneurship and the simple variables pouring on it (according to the correlation values) allows to explain the R = 0.786 variable variations. The model indicates the important role of participation in PIT and CIT revenues, of investment expenditure, of persons employed in agriculture and industry, of the unemployed, of the entities and natural persons conducting an economic activity, as well as of migration balances in the process of entrepreneurship development in the local economy. The statistics values F (8, 1035) 476.4623 and the corresponding probability level p mean that all parameters are statistically significant. The further increasing of the multidimensionality of the model would cause a small increase in the R2 (0.784, Table 6).

[1]The adjusted determination ratio did not reach 60%. The optimal value is considered exceeding the 95% determination threshold.

Table 5

KMNK regression model of the synthetic measure entrepreneurship in relation to the variable synthetic endogenous potentials of Eastern Poland poviats

	Coefficient	Standard error	t-Student's	p-value
Constant	-0.198820	0.0177308	-11.21	< 0.0001
q financial situation	0.211795	0.0527102	4.018	< 0.0001
q competitiveness	1.07450	0.0399117	26.92	< 0.0001
q demographics	-0.148000	0.0113345	-13.06	< 0.0001
q infrastructure	0.147166	0.0312805	4.705	< 0.0001
q natural environment	0.0910867	0.0333182	2.734	0.0064

Arithmetic mean of the dependent variable	*0.256418*	*Logarithm of credibility*	*1924.948*	*Corrected R-square*	*0.644117*
Residual sum of squares	*1.530045*	*Bayesian information criterion Schwarza*	*-3808.192*	*P-value for the F test*	*5,2e-231*
Determining the coefficient R-square	*0.645823*	*Standard deviation of dependent variable*	*0.064358*	*Information criteria Akaike'a*	*-3837.897*
F (5, 1038)	*378.5477*	*Residual standard error*	*0.038393*	*Crit. Hannana-Quinna*	*-3826.630*

The observations used 1-1044; Dependent variable: q entrepreneurship.
Source: *own study based on the data from the Local Data Bank of the Central Statistical Office*

Table 6

KMNK regression model – a synthetic measure of entrepreneurship in relation to the socio-economic elements of Eastern Poland poviats

	Coefficient	Standard error	t-Student's	p-value
Constant	-0.0993187	0.0124266	-7.992	< 0.0001
Share in PIT and CIT revenues	0.221785	0.0364791	6.080	< 0.0001
Investment expenditure	0.0523233	0.0110198	4.748	< 0.0001
Employed in agriculture	0.000240042	2.23294×10^{-5}	10.75	< 0.0001
Employed in industry	0.000619950	4.21355×10^{-5}	14.71	< 0.0001
Registered unemployed persons	-0.000534047	6.14068×10^{-5}	-8.697	< 0.0001
Economic operators	0.00545828	0.000316408	17.25	< 0.0001
Self-employed persons	-0.00170910	0.000380477	-4.492	< 0.0001
Net migration rate	-0.000845172	0.000397601	-2.126	0.0338

Arithmetic mean of the dependent variable	*0.256418*	*Logarithm of credibility*	*2189.048*	*Corrected R-square*	*0.784802*
Residual sum of squares	*0.922525*	*Bayesian information criterion Schwarza*	*-4315.538*	*P-value for the F test*	*0.000000*
Determining coefficient R- square	*0.786453*	*Standard deviation of dependent variable*	*0.064358*	*Information criteria Akaike'a*	*-4360.096*
F (5, 1038)	*476.4623*	*Residual standard error*	*0.029855*	*Crit. Hannana-Quinna*	*-4343.196*

The observations used 1-1044; Dependent variable: q entrepreneurship.
Source: *own study based on the data from the Local Data Bank of the Central Statistical Office*

Conclusions

Poviats have individual natural, social, and economic features that can constitute resources determining the possibilities of their functioning. Competitiveness contributes to the growth of economic potential (development) and to the increase in the quality of life of the residents. A high level of competitiveness creates good conditions for ensuring a higher standard of living for the residents, and the further development of entrepreneurship.

In 2018, the TOPSIS entrepreneurship measure ranged from 0.22 to 0.51, while in 2007 from 0.11 to 0.33. The measure of competitiveness in 2018 took values from 0.28 to 0.51, while in 2007 from 0.24 to 0.40. This indicates a similar range of unit diversity in both areas under study, and a similar response of the units to the changes in the economy.

The poviats with the highest level of competitiveness are located in the vicinity of urban centres, industrial centres, and in the vicinity of transport routes – which positively stimulates the processes of the local economy, while the weakest units are often characterized by a traditional agricultural function.

The appropriate entrepreneurship potential and the competitiveness of poviats affect the standard of living, the social situation, public safety, and they determine the regional possibilities and development directions. Human resources and endo-ethnic capitals in the region are shrinking due to leaching effects. They seem to be strongly dependent on the transfer revenues from the state budget.

The correlation coefficient between the values of the measures of the endogenous potential of the region indicates positive correlations with entrepreneurship except for the area of demography (in the case of peripheral areas, the process of social capital is leaching). The highest correlation value of the measure of entrepreneurship was with competitiveness, as well as with the financial situation and the infrastructure. The results obtained may indicate the stability of spatial diversity in the examined aspect and a similar reaction of the individuals to the changes in the economy. The measure of entrepreneurship was to the greatest extent correlated with the share in income from the PIT and CIT, the industrial production sold, the gross value of fixed assets, the investment outlays, the number of employed in industry, as well as trade and repair, the entities and natural persons conducting a business activity.

The results of the study give the local governments the opportunity to compare their own situation with the situation of neighbouring municipalities. The conclusions drawn on this basis may allow the local authorities to set out potential directions for optimizing the structure of the local finances or the competitiveness process. When assessing the changes over time, it should be remembered that small changes in the results should not be considered as information (they may result from the slight differences between regions).

References

ANNONI P., DIJKSTRA L. (2019), *The EU Regional Competitiveness Index 2019*, Publications Office of the European Union, Luxembourg.

ANNONI P., KOZOVSKA K. (2010), *EU regional competitiveness index 2010*, Publications Office of the European Union, Luxembourg.

BEHZADIAN M., OTAGHSARA S. K., YAZDANI M., IGNATIUS J. (2012), *A state-of the-art survey of TOPSIS applications*, Expert Systems with Applications 39 (17), 13051-13069.

DIJKSTRA L., ANNONI P., KOZOVSKA K. (2011), *A New Regional Competitiveness Index: Theory, Methods and Findings*, European Commission. Regional Policy, Retrieved from: www.ec.europa.eu.

DZIEKAŃSKI P. (2017), *Diversification Synthetic Indicator for Evaluating the Financial Capacity of Local Government. The Case of Polish Voivodeships*, Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis 65 (2), 611-619.

DZIEKAŃSKI P. (2020), *Differentiation of the financial standing of the municipalities of Świętokrzyskie voivodeship in the aspect of their financial independence*, Optimum. Economic Studies 3 (101), 41-55.

DZIEKAŃSKI P., PRUS P. (2020), *Financial Diversity and the Development Process: Case study of Rural Communes of Eastern Poland in 2009–2018*, Sustainability 12 (16), 6446.

ENDOVITSKAYA E. V., RISIN I. E., TRESHCHEVSKY Y. I. (2019), *Strategic Goals of Socio-Economic Development of Regions in the Conditions of Economic and Financial Limitations*, in: Popkova E. (ed.), The Future of the Global Financial System: Downfall or Harmony. ISC 2018. Lecture Notes in Networks and Systems 57, Springer, Cham, pp. 229-235.

GARDINER B., MARTIN R., TYLER P. (2006), *Competitiveness, Productivity and Economic Growth across the European Regions*, in: Martin R., Kitson M., Tyler P. (eds.), Regional Competitiveness, Routledge, London, pp. 55-78.

GARELLI S. (2003), *Competitiveness of nations: the fundamentals*, IMD World Competitiveness Yearbook, Lausanne.

GLINKA B., GUDKOVA S. (2011), *Przedsiębiorczość* (Entrepreneurship), Wolters Kluwer, Warsaw.

GURRIA A. (2011), *Stability and Growth: What Role for EU Cohesion Policy?*, OECD, Retrieved from: www.oecd.org.

HATZICHRONOGLOU T. (1996), *Globalisation and competitiveness: relevant indicators*, OECD Publishing, Paris.

HELLWIG Z. (1968), *Zastosowanie metody taksonomicznej do typologicznego podziału krajów ze względu na poziom rozwoju oraz zasoby i strukturę wykwalifikowanych kadr* (Application of the taxonomic method to the typological division of countries according to the level of development as well as resources and structure of qualified personnel), Przegląd Statystyczny 4, 307-326.

HILDEBRANDT A., SILGONER M. A. (2007), *The Competitiveness Challenge: EU Member States in International Trade*, Monetary Policy & the Economy Q4 (7), 67-88.

IVANOV I. (2017), *Dynamics of competitiveness of the regions in Bulgaria*, Trakia Journal of Sciences 15 (S1), 42-50.

KUKUŁA K., BOGOCZ D. (2014), *Zero unitarization method and its application in ranking research in agriculture*, Economic and Regional Studies 7 (3), 5-13.

LIPA A., KARPIŃSKA U. (2019), *Entrepreneurship as endogenous development potential of communes in the Świętokrzyskie province*, Regional Journal 19, 100-114.

MALINA A., ZELIAŚ A. (1997), *Taksonomiczna analiza przestrzennego zróżnicowania jakości życia ludności w Polsce w 1994 r.* (Taxonomic analysis of spatial differentiation in the quality of life of the population in Poland in 1994), Przegląd Statystyczny 44 (1), 11-27.

MARTIN R. L. (2003), *A Study of the Factors of Regional Competitiveness*, Cambridge Econometrics, ECORYS-NEI, Retrieved from: www.ec.europa.eu.

MEYER-STAMER J. (2016), *Systemic Competitiveness and Local Economic Development*, in: Bodhanya S. (ed.), Large Scale Systemic Change: Theories, Modelling and Practices, Nova, New York.

MIŁEK D., KANTAREK I. (2017), *Przedsiębiorczość w rozwoju polskich regionów* (Entrepreneurship in the development of Polish regions), Nierówności Społeczne a Wzrost Gospodarczy 50 (2), 315-328.

MINISTRY OF INFRASTRUCTURE AND DEVELOPMENT (2014), *Program Operacyjny: Polska Wschodnia 2014–2020* (Operational Program: Eastern Poland 2014–2020), Ministerstwo Infrastruktury i Rozwoju, Warsaw.

MŁODAK A. (2006), *Analiza taksonomiczna w statystyce regionalnej* (Taxonomic analysis in regional statistics), Difin, Warsaw.

OECD (1992), *Technology and the economy: the key relationships*, OECD Publications, Paris.

OECD (2013), *Innovation-driven growth in regions: the role of smart specialisation*, OECD Publications, Paris.

POLYAKOVA A., KOLMAKOV V., YAMOVA O. (2019), *Regional Competitiveness Response to Innovation Changes: Issues of Evaluation*, Journal of Urban and Regional Analysis 11 (2), 159-172.

PORTER M. E., SACHS J. D., MCARTHUR J. W. (2002), *Executive Summary: Competitiveness and Stages of Economic Development*, in: Schwab K., Porter M. E., Sachs J. D. (eds.), The Global Competitiveness Report 2001-2002, Oxford University Press, Oxford, pp. 16-25.

PRZYBYTNIOWSKI J. W. (2012), *The Importance of Environmental insurance as an Economic and Financial Instrument*, Political Sciences 15 (2), 174-184.

ROSNER A. (2012), *Zmiany rozkładu przestrzennego zaludnienia obszarów wiejskich. Wiejskie obszary zmniejszające zaludnienie i koncentrujące ludność wiejską* (Changes in the spatial distribution of population in rural areas. Rural areas that diminish the population and concentrate the rural population), IRWiR PAN, Warsaw.

SKAWIŃSKA E. (2012), *Kapitał społeczny w rozwoju region* (Social capital in the development of the region), PWN, Warsaw.

STANNY M., STRZELCZYK W. (2018), *Kondycja finansowa samorządów lokalnych a rozwój społeczno-gospodarczy obszarów wiejskich: Ujęcie przestrzenne* (Financial condition of local self-governments and the socio-economic development of rural areas: Spatial shot), IRWiR PAN, Wyd. Naukowe Scholar Spółka z o.o., Warsaw.

STROJNY J., KOŚCIÓŁEK M. (2015), *Entrepreneurship in Eastern Poland – the evaluation of development potential using comparative analysis*, Entrepreneurship – Education 11, 64-81.

VALLIERE D., PETERSON R. (2009), *Entrepreneurship and Economic Growth: Evidence from Emerging and Developed Countries*, Entrepreneurship & Regional Development 21 (5-6), 459-480.

WÓJCIK-LEŃ J., LEŃ P., MIKA M., KRYSZK H., KOTLARZ P. (2019), *Studies regarding correct selection of statistical methods for the needs of increasing the efficiency of identification of land for consolidation—A case study in Poland*, Land Use Policy 87, 104064.

WYSOCKI F. (2010), *Metody taksonomiczne w rozpoznawaniu typów ekonomicznych rolnictwa i obszarów wiejskich* (Taxonomic methods in recognizing economic types of agriculture and rural areas), Uniwersytetu Przyrodniczego w Poznaniu, Poznan.

YILMAZ B. B., KONYAR A. M. (2013), *Financial Performance Evaluation of Publicly held Lodging Companies Listed in Istanbul Stock Exchange with TOPSIS Method*, European Journal of Scientific Research 95 (1), 143-151.

ZELIAŚ A., MALINA A. (1997), *O budowie taksonomicznej miary jakości życia. Syntetyczna miara rozwoju jest narzędziem statystycznej analizy porównawczej* (On the construction of a taxonomic measure of the quality of life. The synthetic measure of development is a tool for statistical comparative analysis), Taksonomia 4, 238-262.

Initial submission: 22.04.2020
Revised submission: 21.10.2020
Final acceptance: 01.12.2020

Correspondence: Department of Economics and Finance, Jan Kochanowski University of Kielce, Uniwersytecka 15 str., 25-406 Kielce, Poland.

Email: pawel.dziekanski@ujk.edu.pl

Journal of Urban and Regional Analysis,
vol. XIII, 1, 2021, p. 359 - 375
https://doi.org/10.37043/JURA.2021.13.2.9

ANALYSIS OF ROAD INTERVENTION BASED ON GEOGRAPHICAL ACCESSIBILITY AS A DEVELOPMENT TOOL IN REGIONAL COMPETITIVENESS

Jorge **MONTOYA**, *Diego* **ESCOBAR**, *Jorge* **GALINDO**
Universidad Nacional de Colombia, Manizales, Columbia

Abstract: Regional transport connectivity plays an important role in economic and productive development; hence, a good transport infrastructure fosters profit-making competitiveness, and it improves the quality of life of the population. In this research, the objective is to analyze the impact on road transport costs and the number of possible trips from road infrastructure interventions to improve the connectivity and competitiveness of the municipality of Tumaco (Colombia) in the region. The study methodology is based on the concept of geographical accessibility, supported by using GIS-type applications, which allows evaluating the access conditions of the study area, based on the characteristics offered by the road network. From the analysis, our results show that it is possible to achieve a reduction in the costs per ton of up to 7.53% and an up to 10.23% increase in the number of possible trips. The main conclusion is that geographical accessibility models give a much broader vision on the impact generated by road interventions. Therefore, they could be included in the constructive evaluation of development projects.

Key Words: *road infrastructure, transport, accessibility, regional studies, connectivity*.

Introduction

Transport infrastructure is currently part of the backbone of economic and social development (Li and Qi, 2016, Skorobogatova and Kuzmina-Merlino 2017), allowing the communication and development of activities in the context of globalization (Pike et al. 2017), which guarantee a higher quality of life. However, this development influenced by transportation is directly linked to the costs, generating strong questions as a factor of location and competition at local and interregional level (Fujita et al. 1999, Fujita and Thisse 2002). In this sense, if adequate infrastructure interventions are carried out, it is possible to obtain reductions in the input costs and therefore improvements in productivity and competition. Considering the above, transport connectivity and evaluation processes facilitate decision-making by the government entities, characterizing which intervention would be the most efficient, as well as the benefits obtained from the intervention. Therefore, in the present research, the authors proposed to carry out a regional analysis of road transport connectivity, based on the costs and possible trips, with a focus on the municipality of San Andrés de Tumaco, Columbia, formulating two possible interventions as an active measure to improve the competitiveness of the municipality in the region. It is important to clarify that the study area is selected based on the general research project associated with the Colciencias 812 call for proposals as a measure to support peacebuilding.

Regarding the evaluation dynamics to be used, an analysis of costs and the number of possible trips is proposed based on a geographical accessibility approach; one that visualizes the impacts from the different interventions carried out (geometric correction, repaving surface, increase speed) (Cui and Levinson 2018), which should result in greater ease for decision-making by the local or regional leaders. Accessibility, from a general point of view, has a wide range of definitions, in which the ability of people to access certain distributed activities is considered as an inherent advantage of one place over another (Ingram 1971), or the capacity of activities to attract people (Curl et al. 2011, Rubulotta et al.

2013). However, any technical definition is based on the definition established by Hansen (1959), which considers accessibility as the potential of opportunities for interaction. However, giving a more consistent view of the research, we will define accessibility as a measure of the spatial or temporal separation of human activities, from a transport system (Morris et al. 1979), subject to limitations for them to be achieved given the existence of barriers (Geurs and Van Wee 2004, Vega 2011). This definition extends the terminology a little more, in which only the places are considered and not how people travel. Some applications of accessibility in various fields pose it in residential terms (Elldér 2014), social exclusion (Grengs 2015, Vitale Brovarone and Cotella 2020), transportation costs (Cui and Levinson 2018), transportation planning (Handy and Niemeier 1997), demographic analysis (Kotavaara et al. 2011), and sustainability (Vega 2011), among others.

Methodology

Study area

San Andrés de Tumaco is located in the southwestern strip of Columbia, on the Pacific Ocean shore (Fig. 1), over 1°48′24″ North latitude and 78°45′53″ West longitude. It belongs to the Nariño Department and it has a total extension of 3591.16 km^2 (Tumaco District Mayor's Office 2017), in which 212 692 inhabitants reside (DANE 2018). Tumaco has an average elevation of 1 m.a.s.l. and a temperature of 26°C on average, which facilitates productivity concerning the African palm, cocoa, coconut, and fishing on the seashore (Tumaco District Mayor's Office 2017). These agricultural activities make up the main economic contribution of the municipality (83%), which generates an added annual value of 371 706 947.61 USD (DANE 2019), which gives it a national importance rating of 3 units, 1 being the best rating and 7 the most unfavourable condition (DANE 2019).

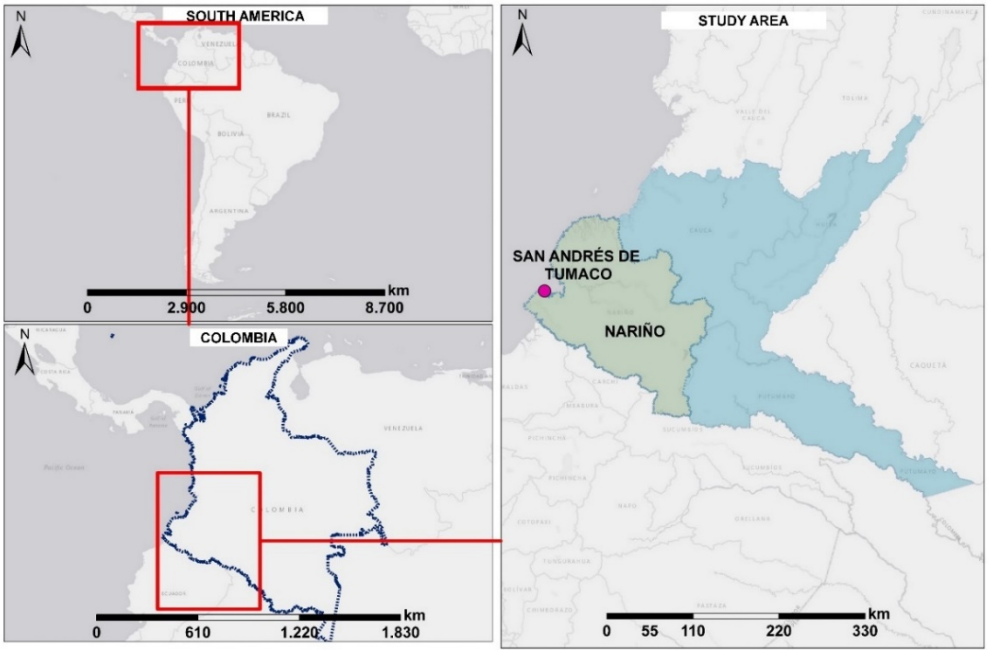


Fig. 1 **– Location of the municipality of San Andrés de Tumaco**
Source: *the authors*

Collection of basic information and digital structures

The approached research methodology is made up of a total of seven fractions, being a fundamental part of the process (Fig. 2).

As the first methodological fraction, we proceed to exhaustively investigate the existing digital databases to obtain the shape-type digital structures of each municipality, department, and region. Thus, it is possible to obtain the road infrastructure network based on the study, extracted from the DANE geoportal (DANE 2020), as well as the distribution by municipalities. Additionally, we proceed to inquire about the participation of each municipality within the economy of the country to select the most important municipalities in the area. Next, the existing information regarding transportation costs is located (Colombian Ministry of Transport 2019a).

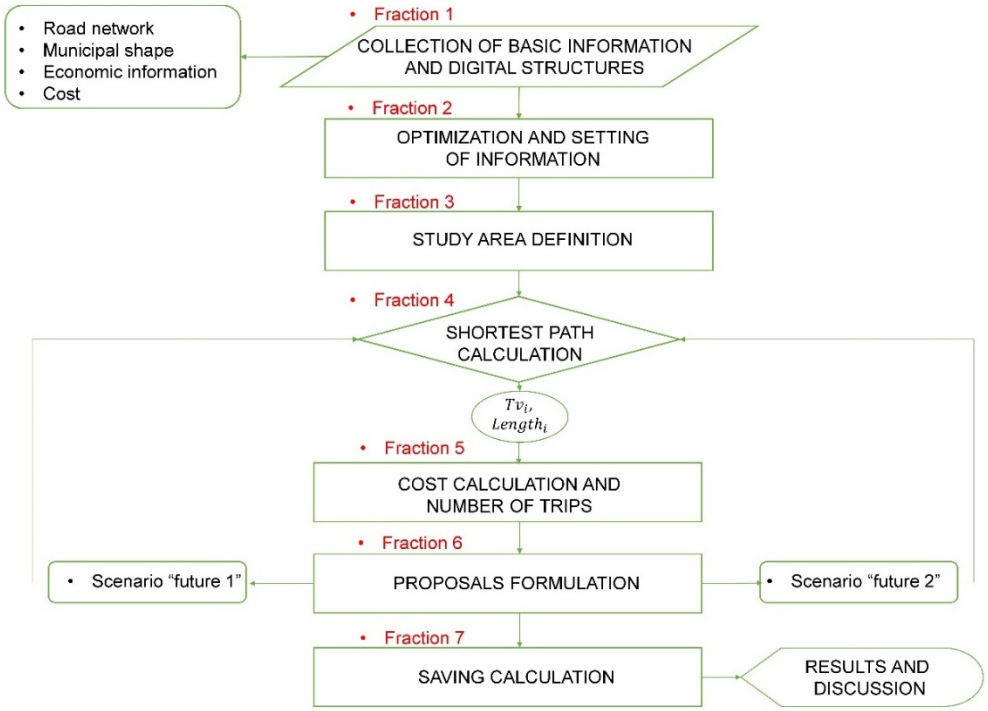


Fig. 1 **– Research methodology**
Source: *the authors*

Optimization and the setting of information

Once the base information has been obtained from the existing sources, the optimization of each of the acquired elements is carried out. In the first instance, an audit of the road infrastructure network is made to observe the possible disconnections and the absence of fragments. This process is carried out by using the topology tool in the ArcMap program. This audit contemplates the evaluation of the disconnected links, the directionality of the roads, the corroboration of the speed, and the location of the municipalities (Fig. 3). Subsequently, the information associated with the municipal estates is reviewed, as well as the data referring to basic transportation costs. Fig. 4 shows the digital base information to be used (road network, municipalities).

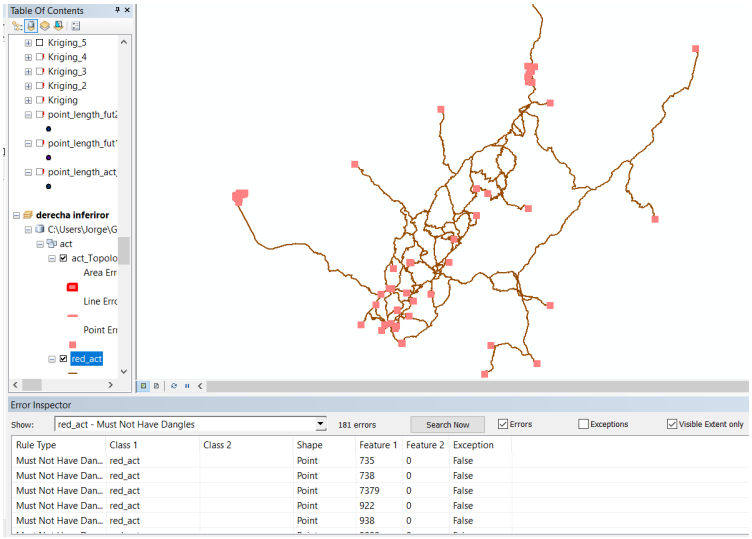


Fig. 3 **– Topology intervention**
Source: *the authors*

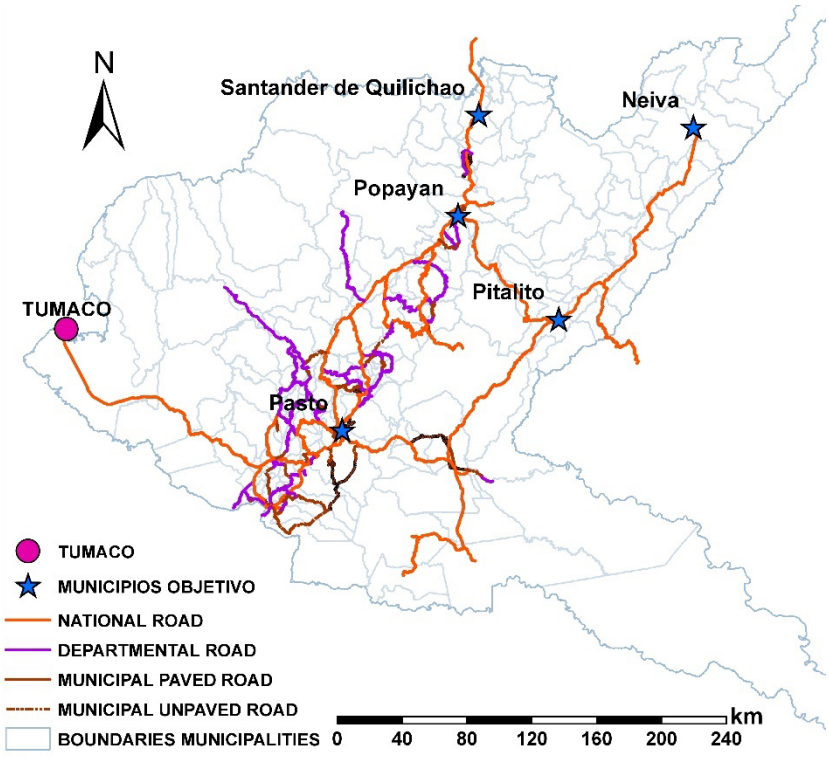


Fig. 4 **– Information calculation base**
Source: *the authors, using the DANE base information*

Study area definition

Taking into account that the research process presented is part of the results of a larger project, it is decided to define the study area based on the macro-region formed by the neighbouring departments of the Nariño department, which contains the municipality of San Andrés de Tumaco, the centre of development of this research. Likewise, the area is subdivided by municipalities, limiting to those municipalities that have a direct relationship with the road infrastructure to be used.

Shortest path calculation

As a previous requirement, we proceed to select the target municipalities of greater regional importance. The process consists of filtering and ordering the information regarding the added value and the importance index obtained from the official bases of DANE (2019). From the defined study area, the municipalities with the best ranking, concerning the departmental and national contribution, are selected as areas of higher productivity, with 1 being the best rating and 7 being the least favourable condition (DANE 2019). Considering the above, it is obtained that in the study area the best rating is referred by 5 municipalities with an importance rating of 2. These are: San Juan de Pasto, Santander de Quilichao, Popayán, Neiva, and Pitalito. In Table 1, the assessment of the selected municipalities is appreciated, as well as the rating of the municipality of San Andrés de Tumaco, the central focus of this research.

Table 1

Municipalities with the highest importance rating

Department	Municipality code	Municipality	Added value (Billions of Dollars)	Degree of economic importance
Cauca	19001	Popayán	204.96	2
Cauca	19698	Santander de Quilichao	75.40	2
Huila	41001	Neiva	263.49	2
Huila	41551	Pitalito	76.27	2
Nariño	52001	Pasto	258.05	2
Nariño	52835	San Andrés de Tumaco	6577	3

Source: *the authors*

After selecting the target municipalities and optimizing the road network, the time and distance vectors are calculated considering the use of travel time (Eq. 1) of each road section as an impedance variable. The procedure is based on Dijkstra's shortest path algorithm, which was developed in 1959 (Dijkstra 1959) contemplating the use of the graph theory (Biggs et al. 1986), where the shortest path is obtained from the traffic conditions defined in the network (Makariye 2017). Thus, the shortest path from each node of the network to the target municipalities is selected (Eq. 2). Once the shortest path concerning the travel time has been obtained, the final length of the route to be taken is determined (Eq. 3).

$$Tv_k = \frac{length_k\ (km)}{speed_k(\frac{km}{h})} \quad \text{Eq. (1)}$$

Where Tv_k is the travel time of arc k, obtained from the division between the length and speed of each arc.

$$Tv_i = min(Tv_{ij}),$$
$$j = 1{:}n,\ \ Tv_{ij} = min\{Tv_{ij_1}, Tv_{ij_2}, \dots, Tv_{ij_m}\}, m = Roads \qquad \text{Eq. (2)}$$

Where Tv_i is the travel time from node i to the nearest target municipality; Tv_{ij} is the shortest of the travel times from node i to municipality j, within the set of values Tv_{ij_m} obtained from the Dijkstra's algorithm. In order to give greater clarity to the calculation of the minimum time of each node, Fig. 5 is presented.

$$Tv_i = min(Tv_{i1}, Tv_{i2}, Tv_{i3}, Tv_{i4})$$

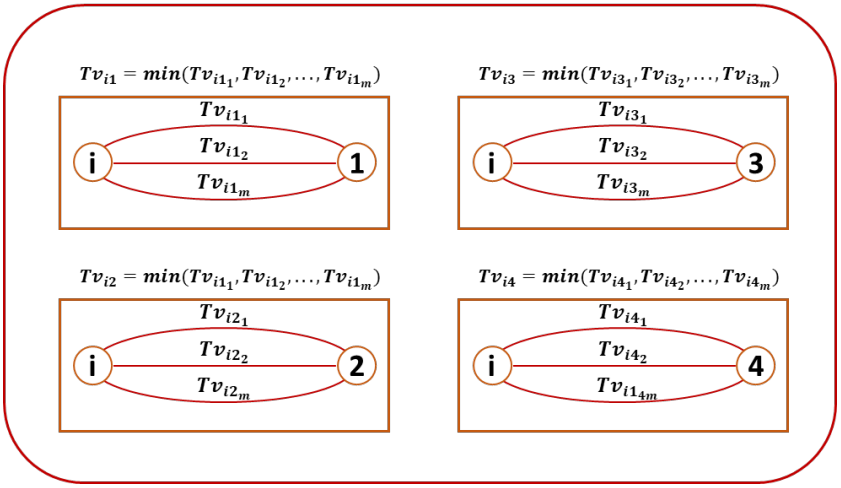


Fig. 5 **– Minimum travel time to the nearest main city**
Source: *the authors*

$$Length_i = \sum_{k=1}^{n} length_k\,, \qquad k \in \{arcs\ on\ the\ road\ Tv_i\} \qquad \text{Eq. (3)}$$

Where $Length_i$ is the sum of the lengths of arcs k, from node i to the nearest target municipality, from the time Tv_i obtained.

From the same structure, the average time and length of each node in the network, for the set of target municipalities, is obtained through Eq. 4 and 5, where $\overline{Tv_i}$ is the average of the minimum travel times from node i to each municipality j; $\overline{Length_i}$ is the average length of node i, obtained from the minimum lengths for each Tv_{ij}.

$$Tv_{prom\,i} = prom(T\ Tv_{ij})$$
$$j = 1{:}n,\ \ Tv_{ij} = min\{Tv_{ij_1}, Tv_{ij_2}, \dots, Tv_{ij_m}\}, m = Roads \qquad \text{Eq. (4)}$$

$$Length_{prom\,i} = prom(Length_{ij}) \rightarrow Length_{ij} = \sum_{k=1}^{n} length_k, \qquad \text{Eq. (5)}$$
$$k \in \{arcs\ on\ the\ road\ Tv_{ij}\}$$

Cost calculation and the number of trips

Carrying on with the methodological development, we proceed to determine the cost per ton and the number of possible trips. In this sense, we begin to determine the base cost per kilometre to be used, which is obtained from the division between the cost of transportation between cities for a 2-axle truck-type vehicle (Colombian Ministry of Transport 2019a) and the distance to travel, obtained from the SICE-TAC platform (Colombian Ministry of Transport 2020). In this way, an average transportation cost per ton-kilometre of 311.43 Colombian pesos is obtained, with a variation of ± 34.11 pesos. Next, the value obtained from the minimum and average lengths is multiplied for each scenario by the base cost of transportation.

On the other hand, the calculation of the number of trips takes its base value, based on the number of working hours of operation in the month (288 hours) obtained from the SICE-TAC platform (Colombian Ministry of Transport 2020). It is important to highlight that the value presented does not include the times of loading and unloading. Therefore, the number of final trips may be affected depending on the items to be transported. Hence, the number of possible trips to the nearest municipality and the set of municipalities is obtained by dividing the calculated travel time in each scenario by 288 business hours in a month.

Proposals' formulation

Once the procedure to calculate the costs and the number of trips in the study area have been defined, pertinent interventions are made, establishing two scenarios; scenario Future 1, which studies the geometric correction of the corridor and the repaving of the surface in 184.13 kilometres to increase the operational speed to 51 km/h; and scenario Future 2, which considers the construction of a new 83.57-kilometer road corridor between El Pailón and La Llanada. Additionally, the fact that scenario Future 2 links the carried-out interventions in scenario 1 is highlighted, in order to link the interventions as a phased intervention plan. This considers an operational speed of 51 km/h, while in Fig. 6, the intervention bands for the scenarios are shown.

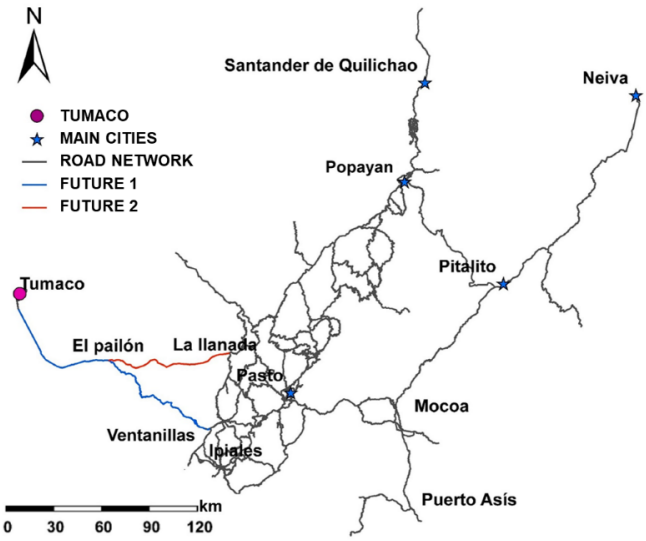


Fig. 6 **– Intervention scenarios**
Source: *the authors*

Saving calculation

Once the different scenarios have been evaluated, it is necessary to calculate the saving percentage generated by the interventions which is made from equation 6, where $Savings_i$ will be the ones perceived in node i, obtained from the difference between the future value $V.Fut_i$ in each scenario and the current value $V.Act_i$.

$$Savings_i = \left(1 - \frac{(V.Fut_i)}{V.Act_i}\right) * 100\% \quad \text{Eq. (6)}$$

Results and Discussion

As a result of the cost analysis and the number of trips to the municipalities of greatest national importance in the region, we further highlight the behaviour associated with each of the analyzed scenarios.

The cost of transport behaviour per ton to the nearest municipality, within the group of most important municipalities, is clear in the 3 scenarios discussed (Fig. 7). The highest transport costs within the region are presented in the municipality of San Andrés de Tumaco, taking into account that it has only one access road (the current situation), which must support all traffic entering and leaving the municipality. Likewise, there is no variation between the different scenarios, since, despite the interventions in the speed and the construction of the road, the travelled distance to the nearest main municipality does not vary, so that the maximum cost ranges observed reach 90 000 to 95 000 Colombian pesos (23.32 to 24.62 USD). On the other hand, it is understood that the lower transport costs, which are less than 10,000 Cop (2.59 USD), refer to the urban transport or to very close areas to the main municipalities, so they would not have a direct impact on the mobilization of cargo in the region.

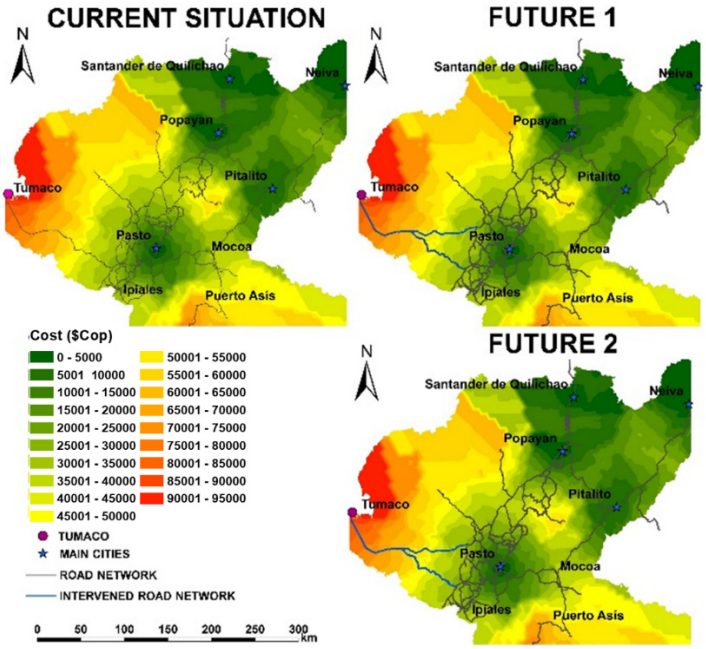


Fig. 7 **– Transportation cost per ton to the nearest major municipality in each scenario**
Source: *the authors*

The average cost obtained for the group of municipalities of greatest national importance in the region (Fig. 8) considers the average joint displacement to the 5 municipalities, from which a maximum average value of between 1650,000 and 175,000 Cop (42.75 and 45.34 USD) per ton is obtained. It is possible to show that in each of the proposed scenarios, the highest cost is presented in the area of the municipality of San Andrés de Tumaco. However, there is a decrease in the cost for future scenario 2, in which the maximum cost ranges between 150 000 and 155 000 (38.86 to 40.16 USD).

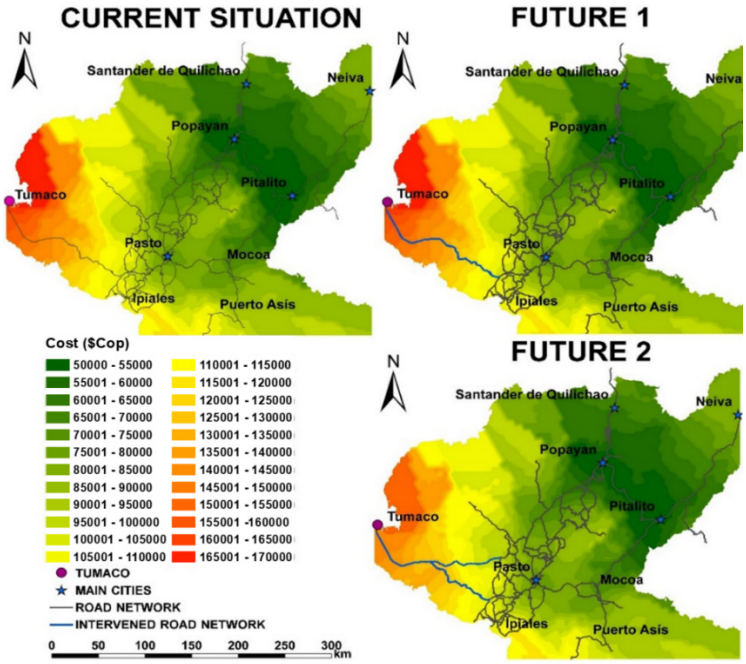


Fig. 8 **– Average cost of transport per ton to the most important municipalities in the region**
Source: *the authors*

Carrying on with the presentation of results, the numbers of possible trips within the 288-hour monthly working range obtained from the SICE-TAC platform are presented (Colombian Ministry of Transport 2020). On the number of simple trips (one-way) to the nearest main municipality (Fig. 9), it is observed that the south-western part of the region has the least possibility of trips concerning the monthly working hours, reaching its lowest value between 40 to 50 trips per month. On the other hand, the north-eastern area presents the greatest ease of travel due to the higher concentration of municipalities of greater importance. Likewise, it is considered that more than 290 trips per month are classified as urban, so the incidence in the region is not significant. Similarly, the variation between scenarios is not quite observable. However, there is a reduction in the area of action of the curves between 40 to 70 trips per month on the road under intervention.

Referring to the variation in the average monthly trips to all the most important municipalities in the region (Fig. 10), the highest number of possible trips is presented for the northeast sector (75-77.5 trips), and the lowest for the southwest sector, with values between 22.5 and 25 trips per month. The variation observed between the scenarios is subtle, minimizing the area of action of the curves from 25 to 30 trips per month, between the future scenarios 1 and 2, both cases being in the vicinity of the municipality of San Andrés de Tumaco.

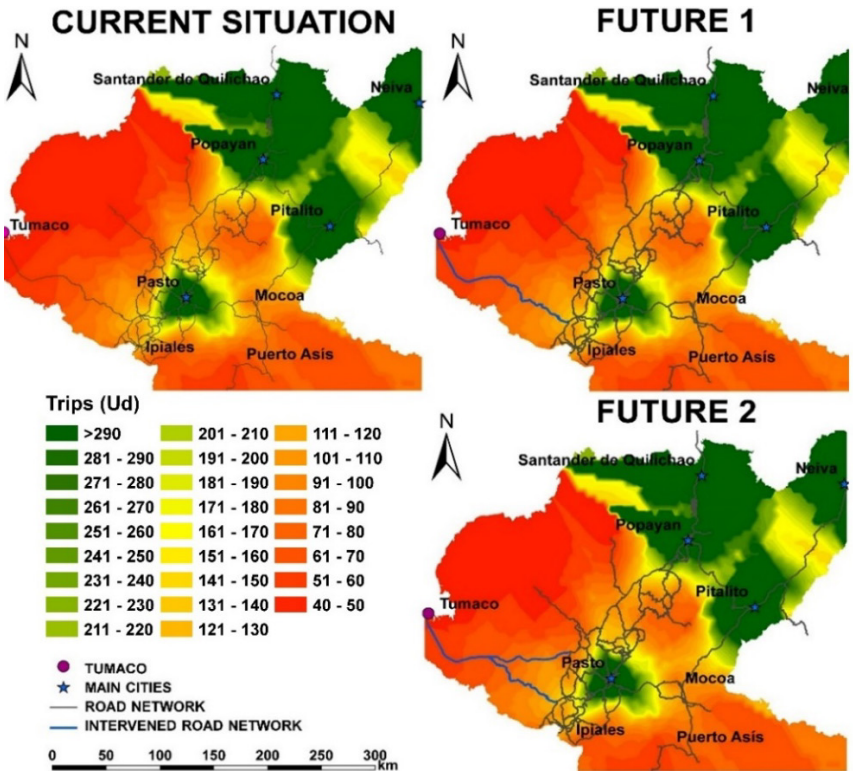


Fig. 9 **– Number of possible trips per month to the nearest major municipality**
Source: *the authors*

Table 2 shows a summary of the cost behaviour and the number of trips for each proposed scenario in the municipality of San Andrés de Tumaco, taking into account that the purpose of the research is to evaluate an alternative for connectivity, such as improving the development of the municipality. Thus, the first column shows that the cost per ton transported to the nearest major city, in this case, San Juan de Paso, does not vary. This is due to the improvement in the speed of the network, as well as the fact that the construction of the new road does not affect the distance between the municipality of San Andrés de Tumaco and San Juan de Pasto. However, it leaves open a new possibility of connection in the event of possible closures on the main road. On the other hand, the average cost of transport per ton to all the main cities does not vary in the future in comparison with the current scenario 1. This is because although the speed of operation of the road increases, the travelled distance is the same. Despite this, there is a reduction in the cost of transport per ton – 12,400 COP (3.23 USD), including the new road – because this new corridor allows more efficient connectivity within the cities in the northern sector, as well as it is facilitating the movement towards the interior of the country.

By continuing with column 3, referring to the number of trips to the nearest major city and starting from the base of the 288-working-hour per month (Colombian Ministry of Transport 2020), the result is that the number of trips, currently possible between the municipality of San Andrés de Tumaco and San Juan de Pasto, is approximately of 42 trips or 21 complete cycles. After the intervention, a total of 46 trips were made, i.e. 23 complete cycles, which gives an increase of 4 trips per vehicle to the nearest city. This could result in a net gain for the transport of around 360 000 Cop (93.27 USD) per vehicle, equivalent to 36.33% of the current legal minimum wage.

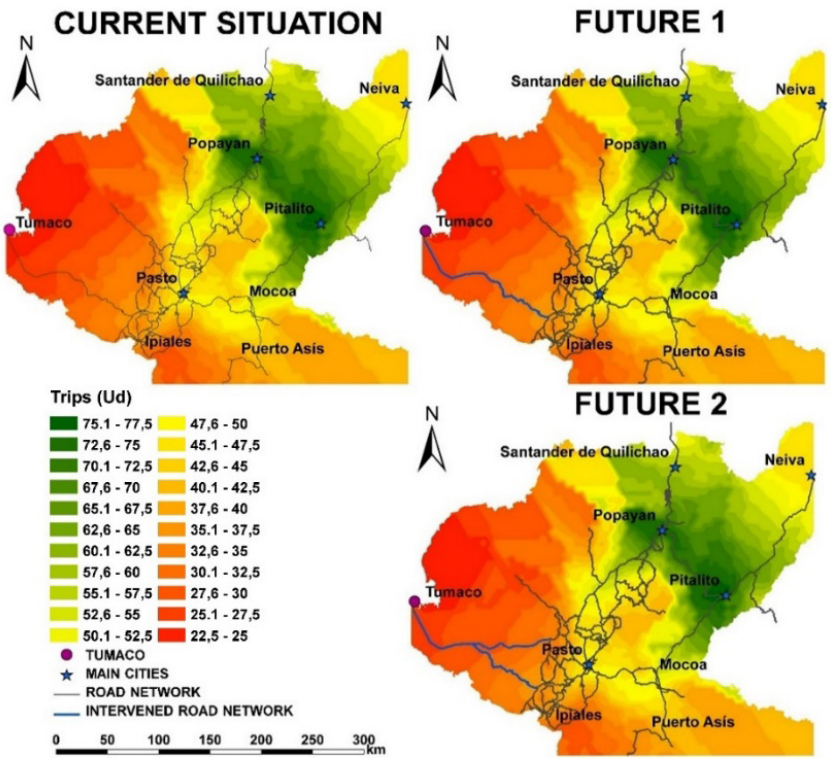


Fig. 10 **– Average number of possible trips per month to the set of municipalities of greatest national importance within the region**
Source: *the authors*

Finally, column 4 shows the variation of average trips to the main cities in the region. For the current situation, there is an average of 23.16 trips, starting from Tumaco, going to a total of 24.42 trips in intervention 1 and 24.55 trips in intervention 2. Thus, when comparing the average cost and the increase in trips, a benefit of 206 302 USD and 245 794 USD (53.45 and 63.68 USD) per vehicle is achieved in each scenario, respectively.

Table 1

Variation of costs and trips for each scenario in the municipality of San Andrés de Tumaco

Scenario	Cost per ton to the nearest main city Cop (USD)	Average cost per ton to the set of main cities Cop (USD)	Number of trips to the nearest main city (trip)	Average number of trips to the set of main cities (trip)
Current	89 072 (23.08)	164 655 (42.66)	41.88	23.16
Future 1	89 072 (23.08)	164 655 (42.66)	46.17	24.42
Future 2	89 072 (23.08)	52 249 (39.45)	46.17	24.55

Source: *the authors*

On the percentage of cost savings for the nearest municipality (Fig. 11), the road intervention proposed for future scenario 1 and future scenario 2 has no impact on the costs. Likewise, on the average cost saving behaviour towards all municipalities (Fig. 12), the road intervention in future scenario 1 does not generate a reduction in transportation costs, but the road intervention in future scenario 2 does achieve reductions of up to 8%.

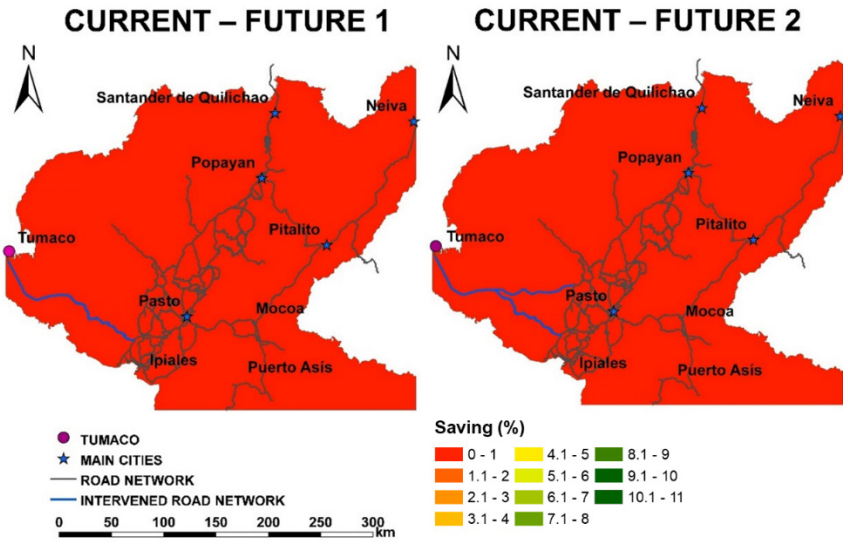


Fig. 11 **– Cost savings per ton to the nearest major municipality**
Source: *the authors*

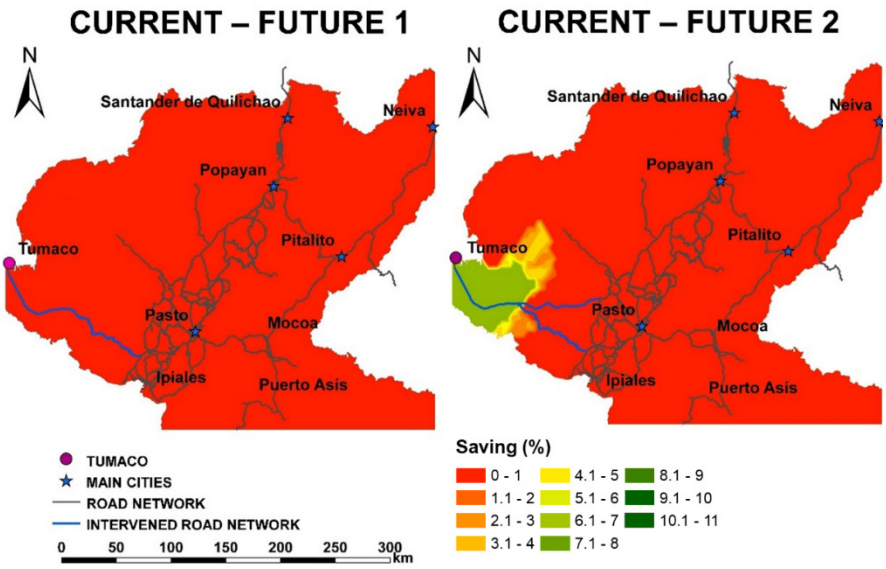


Fig. 12 **– Average cost savings per ton for the most important set of municipalities in the region**
Source: *the authors*

Given the savings behaviour in the number of trips for the region in each evaluation scenario (Fig. 13), the intervention of future scenario 1 generates savings of up to 11% in the Southwest area. Likewise, the construction of the new road in future scenario 2 has no impact on the number of journeys to the nearest town because the recovery and improvement of the road in future scenario 1 mean a reduction in time and number of journeys. In the case of the average number of journeys, the road intervention in future scenario 1 has a significant impact of up to 5% on the average number of journeys (Fig. 14). However, when road intervention is carried out in future scenario 2, this percentage of savings increases to 6%, generating a joint improvement if the savings in costs and the number of journeys are considered.

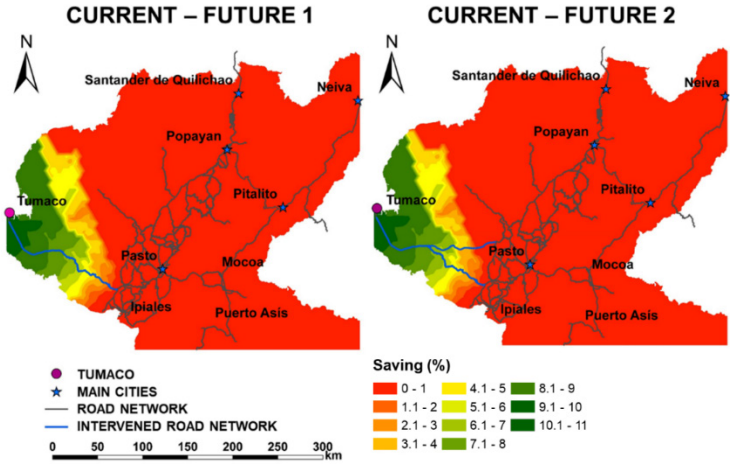


Fig. 13 **– Savings in the number of trips to the nearest main municipality**
Source: *the authors*

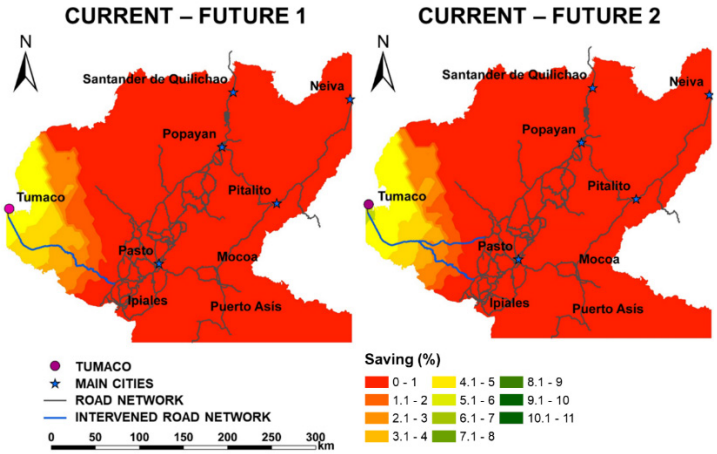


Fig. 14 **– Savings in the average number of trips to the set of most important municipalities in the region**
Source: *the authors*

Table 3 shows the percentage of savings for the proposed scenarios. In the first column, it is observed that there is no variation in the costs per ton transported to the nearest city for each intervention scenario. However, the perceived savings in the average cost for the main cities is up to 7.53 %. On the other hand, the variation in the number of trips shows a saving of up to 10.23% to the nearest city and 5.99% to the set of main cities; there are significant percentages if it is considered that the assessment is made per vehicle and per ton.

Table 3

Savings in costs and trips for each scenario in the municipality of San Andrés de Tumaco

Scenario	Saving cost per ton to the nearest main city (%)	Savings in the average cost per ton to the set of main cities (%)	Increase in the number of trips to the nearest main city (%)	Average number of travels to the set of main cities (%)
Current vs future 1	0.00%	0.00%	10.23%	5.41%
Current vs future 2	0.00%	7.53%	10.23%	5.99%

Source: *the authors*

Taking into account the impact generated by the intervention proposals, it is possible to demonstrate that the model of evaluation of accessibility allows giving greater clarity as far as the zones with greater benefit, giving an additional perspective to the traditional models of evaluation (De Dios Ortúzar and Willumsen 2011). On the other hand, the observed savings can be significant concerning the scale of work, bearing in mind some evaluations carried out in other cities and regions of the country, in which the impact evaluation is similar, in a smaller study area (Sarmiento Ordosgoitia et al. 2000, Escobar et al. 2018a, Escobar et al. 2018b).

As a final discussion, it is possible to express that the road intervention proposed in scenario number 1 only creates an impact on the number of possible trips. Taking that into consideration, since the length of the trip does not vary, the cost per ton does not have a reduction or increase concerning the current situation. Despite this, the increase in the number of trips makes it possible for the municipality to be more active within the region, as it allows for the mobilization of more products and inputs needed for the economic development of the municipality. On the other hand, scenario 2 generates significant impacts on the cost and number of trips. This impact makes it possible to speed up the municipality's marketing dynamics by guaranteeing a new connection corridor with the other members of the region.

Impact assessments should therefore be carried out at national level in order to establish the final impact on road construction (Table 4). On the other hand, an analysis of construction and intervention costs should be carried out to quantify the amount needed for the project development. However, they have an approximate average value per kilometre built of 19,033 million Colombian pesos, obtained from the projects already implemented in the nation (Colombian Ministry of Transport 2019b). It is important to consider that the percentage of impact is associated with the transport of 1 ton per kilometre, but the traffic in the area includes the operation of trucks of around 10 tons per vehicle and the latest flow of cargo vehicles recorded by INVIAS (2011) is 436 vehicles per day. With these values, as well as the difference in the cost of the intervention, a monthly value of 442,582.85 USD can be estimated, which is an important value to be considered in regional competitiveness.

Table 4

Impact assessment at national level to establish the final impact on road construction

Scenario	Ton per vehicle	Cargo vehicle flow	Savings in average cost per ton to the set of main cities (7.53 %)	Average number of travels to the set of main cities (%)	Monthly days	Monthly cost saving
Saving cost	10	436	3.21 USD	5.41%	30	442 582.85 USD

Source: *the authors*

Conclusions

It can be concluded, from the obtained results and observations, that the geographical accessibility models give a much broader vision of the impact generated by a road intervention, thus facilitating decision-making by the local administrations to focalize resources. Therefore, it is possible to argue that these types of analyses could be included in the constructive assessment of the projects to be executed.

In this sense, it would be prudent to make a more exhaustive analysis in terms of construction costs, as well as the addition of other variables in terms of calculating the global impact. This would allow for a more accurate assessment of the benefits of the intervention versus the construction costs.

Likewise, it can be seen that road intervention, whether in future scenario 1 or in future scenario 2, creates a significant impact on the transport dynamics only in the municipality of San Andrés de Tumaco, which allows to improve the conditions of competitiveness and to improve the connectivity of the municipality.

Despite this, some areas of the region with similar deficiencies to those of San Andrés de Tumaco are observed. In some cases, the sectors surrounding Tumaco, such as near Puerto Asís. Therefore, it would be prudent to carry out an individual analysis of these sectors to propose interventions that increase the equity connectivity in the region.

Finally, it can be clearly concluded that the current connectivity of the municipality of San Andrés de Tumaco shows great needs for a new connection route, which guarantees that, in a possible closure, the municipality would not be isolated because there is only one access route.

References

BIGGS N. L., LLOYD E. K., WILSON R. J. (1986), *Graph Theory: 1736-1936*, Oxford University Press, Oxford.

COLOMBIAN MINISTRY OF TRANSPORT (2019a), *Costos de referencia por tonelada para un tractocamión* (Reference costs per ton for a tractor unit), Retrieved from: www.mintransporte.gov.co.

COLOMBIAN MINISTRY OF TRANSPORT (2019b), *Reporte proyectos ejecutados* (Report of executed projects), Retrieved from: www.mintransporte.gov.co.

COLOMBIAN MINISTRY OF TRANSPORT (2020), *Sistema de Información de Costos Eficientes para el Transporte Automotor de Carga SICE-TAC* (Efficient Cost Information System for Automotive Freight Transportation SICE-TAC), Retrieved from: www.mintransporte.gov.co.

CUI M., LEVINSON D. (2018), *Full Cost Accessibility*, Journal of Transport and Land Use 11 (1), 661-679.

CURL A., NELSON J. D., ANABLE J. (2011), *Does accessibility planning address what matters? A review of current practice and practitioner perspectives*, Research in Transportation Business & Management 2, 3-11.

DANE (2018), *Censo Nacional de Población y Vivienda* (National Population and Housing Census), National Administrative Department of Statistics, Retrieved from: www.dane.gov.co.

DANE (2019), *Indicador de importancia económica municipal* (Municipal economic importance indicator), National Administrative Department of Statistics, Retrieved from: www.dane.gov.co.

DANE (2020), *Marco geoestadistico nacional* (National geostatistical framework), National Administrative Department of Statistics, Retrieved from: www.dane.gov.co.

DE DIOS ORTÚZAR J., WILLUMSEN L. G. (2011), *Modelling transport*, Wiley, Chichester.

DIJKSTRA E. W. (1959), *A note on two problems in connexion with graphs*, Numerische Mathematik 1, 269-271.

ELLDÉR E. (2014), *Residential location and daily travel distances: the influence of trip purpose*, Journal of Transport Geography 34, 121-130.

ESCOBAR D. A., MONTOYA GÓMEZ J. A., MONCADA C. A. (2018a), *Evolution of Urban Accessibility in Manizales, Colombia, 2010 – 2017*, Indian Journal of Science and Technology 11 (18), 1-11.

ESCOBAR D. A., MONTOYA J. A., MONCADA C. A. (2018b), *Impact Assessment through Territorial Accessibility of the Set of Road Intervention Projects for the 2030 Skyline in the Municipality of Quibdo, Colombia*, Indian Journal of Science and Technology 11 (29), 1-10.

FUJITA M., KRUGMAN P., VENABLES A. J. (1999), *The Spatial Economy: Cities, Regions, and International Trade*, The MIT Press, Cambridge.

FUJITA M., THISSE J.-F. (2002), *Economics of Agglomeration: Cities, Industrial Location, and Regional Growth*, Cambridge University Press, Cambridge.

GEURS K. T., VAN WEE B. (2004), *Accessibility evaluation of land-use and transport strategies: review and research directions*, Journal of Transport Geography 12 (2), 127-140.

GRENGS J. (2015), *Nonwork accessibility as a social equity indicator*, International Journal of Sustainable Transportation 9 (1), 1-14.

HANDY S. L., NIEMEIER D. A. (1997), *Measuring accessibility: an exploration of issues and alternatives*, Environment and Planning A: Economy and Space 29 (7), 1175-1194.

HANSEN W. G. (1959), *How Accessibility Shapes Land Use*, Journal of the American Institute of Planners 25 (2), 73-76.

INGRAM D. R. (1971), *The concept of accessibility: a search for an operational form*, Regional Studies 5 (2), 101-107.

INVIAS (2011), *Flujo de vehículos de carga* (Flow of cargo vehicles), National Roads Institute, Retrieved from: www.invias.gov.co.

KOTAVAARA O., ANTIKAINEN H., RUSANEN J. (2011), *Population change and accessibility by road and rail networks: GIS and statistical approach to Finland 1970—2007*, Journal of Transport Geography 19 (4), 926-935.

LI K. X., QI G. (2016), *Transport connectivity and regional development in China*, Journal of International Logistics and Trade 14 (2), 142-155.

MAKARIYE N. (2017), *Towards Shortest Path Computation using Dijkstra Algorithm*, International Conference on IoT and Application (ICIOT), 1-3.

MORRIS J. M., DUMBLE P. L., WIGAN M. R. (1979), *Accessibility indicators for transport* planning, Transportation Research Part A: General 13 (2), 91-109.

PIKE A., RODRÍGUEZ-POSE A., TOMANEY J. (2017), *Local and regional development*, Routledge, London.

RUBULOTTA E., IGNACCOLO M., INTURRI G., ROFÈ Y. (2013), *Accessibility and centrality for sustainable mobility: Regional planning case study*, Journal of Urban Planning and Development 139 (2), 115-132.

SARMIENTO ORDOSGOITIA I., MUÑOZ RÍOS J. D., ÁNGEL SOTO C. A. (2000), *Análisis de la Accesibilidad Vial en la Región del Occidente Colombiano*, in: Colomer J. V., García A. (eds.), IV Congreso de Ingeniería del Transporte, Valencia, pp. 5-12.

SKOROBOGATOVA O., KUZMINA-MERLINO I. (2017), *Transport Infrastructure Development Performance*, Procedia Engineering 178, 319-329.

TUMACO DISTRICT MAYOR'S OFFICE (2017), *Nuestro municipio*, Retrieved from: www.tumaco-narino.gov.co.

VEGA A. (2011), *A multi-modal approach to sustainable accessibility in Galway*, Regional Insights 2 (2), 15-17.

VITALE BROVARONE E., COTELLA G. (2020), *Improving Rural Accessibility: A Multilayer Approach*, Sustainability 12 (7), 2876.

Initial submission: 09.06.2020
Revised submission: 19.10.2020
Final acceptance: 23.12.2020

Correspondence: Facultad de Ingeniería y Arquitectura, Departamento de Ingeniería Civil, Grupo de investigación en Movilidad Sostenible, Universidad Nacional de Colombia, Campus La Nubia, Bloque S2-208, Carrera 37 con Calle 94, Manizales, 170003, Columbia.

Email: joamontoyago@unal.edu.co

Journal of Urban and Regional Analysis,
vol. XIII, 1, 2021, p. 377 - 399
https://doi.org/10.37043/JURA.2021.13.2.10

APPLICATION OF FUTURE STUDIES AND SCENARIO PLANNING MODELS IN EARTHQUAKE CRISIS RESPONSE PLANNING

Hossein **HOSSEINIKHAH**, *Asghar* **ZARRABI**
University of Isfahan, Isfahan, Iran

Abstract: Future studies and scenario planning models have been applied in this investigation to formulate a useful planning for earthquake crisis response in Boyer Ahmad County, Iran, located on active faults. The objective of this study is to evaluate the vulnerable areas of urban and rural settlements, to identify the factors of casualties and losses, and to formulate the most desirable scenario in order to increase the resilience of the settlements in earthquake crisis. In this research, the vulnerable areas were detected by using the spatial analysis in ArcGIS. Cross-impact analysis and MICMAC were employed to identify the effective thrusters to reduce the financial losses of the citizens. The most desirable scenario was formulated by the Morphol scenario planning. The results indicated that about 27% of the city and 261 villages out of 977 are vulnerable to the risk. To reduce earthquake losses, a preventive scenario was outlined in order to enhance the resilience of the settlements against the earthquake crisis.
Key Words: earthquake, future studies, scenario planning, Boyer-Ahmad County.

Introduction

The World Bank has reported that the number of natural disasters worldwide has been rapidly raising from 1975 to 2005, while the amount of disasters has increased by about 400% and the annual number of affected people has nearly quadrupled, also depending on the rise in the population and urbanization (Parisi and Augenti 2013). ICRC (2011) showed that more than half of the world's population lives in high-risk areas. Meanwhile, earthquake has long been considered one of the most catastrophic and destructive natural phenomena, especially in developing countries (Dong and Shan 2013).

Iran is one of the earthquake-vulnerable countries in the world, suffering a lot of casualties and financial losses due to earthquakes over the past century (Yari et al. 2019). Regarding its geographical location, Iran, as a developing country, is one of the most vulnerable countries to hazards such as earthquakes, floods, and droughts. Meanwhile, the earthquake is considered to be the most common and destructive natural hazard in Iran, as a corollary to the fact that Iran's geographic zone, stretching from the Alpine-Himalayan seismic belt and extending to Zagros, Alborz, and Khorasan regions, is a highly seismic one. Iran, due to its location on the Alps-Himalayas seismic belt, ranks first in the number of earthquakes above 5.5 Richter and it ranks as one of the highest in terms of earthquake vulnerability and the number of people killed in such an event (UNDP 2004). In the last century, 18 earthquakes measuring greater than 7 on the Richter scale occurred in Iran, causing financial, physical, economic, and social losses in a large part of the country (Einali et al. 2020). Most of the physical and economic damage to such events is due to the lack of planning and weakness in the building standards, as well as in the infrastructures. Therefore, the readiness to face the future is one of the essential requirements of any nation; so, mankind should be prepared for the future to encounter its uncertainties (Bell 2003). Thus, ignoring these forecasts and changes in the external environment and being unprepared for such changes may lead to disastrous consequences.

On the other hand, the speed of natural disasters today, such as earthquakes and changes in the natural environment, is so fast that they can no longer be dealt with in the traditional way, and they must be resolved using a new perspective and solution which in turn reflects the management of such disasters. In the meantime, one of the new approaches that can lead to financial vulnerability and the loss of causality during earthquake and humanitarian crises is represented by the future studies and scenario planning. Therefore, what underlines the significance of future studies in promoting safety and preventing disasters caused by earthquake natural disasters and future disaster management is the fact that, by imagining future disasters and events, there are provided appropriate solutions for disaster preparedness, prevention, and the mitigation of disasters while they are scientifically manageable (Treuer et al. 2018). Indeed, the main application of future studies in crisis management, such as earthquakes, is to identify the situation of future crises and to avoid being surprised by future events and phenomena such as natural disasters. It should be noted that the purpose of future studies and scenario planning in earthquake disaster management is to identify the influential indicators and to assess their severity, to identify the most critical factors in reducing or increasing the severity of damage, to examine the most important organizations and institutions in earthquake management before and after the crisis, and to tailor the most optimal earthquake management in the future to reduce the rate and severity of damages.

Since Boyer Ahmad is located in the Zagros seismic zone and the majority of cities and villages are located on the fault lines and close to three major faults known as: Dena fault, within a radius of less than 20 km; Zagros fault, within a radius of 70 to 80 km; and Qatar-Kazerun fault, within 20 km of Yasuj (Zarrabi et al. 2015), it is one of the high-risk areas for earthquakes. Accordingly, the present study strived to identify the seismic zones of Boyer Ahmad as well as the potential earthquake-prone population centres by applying the spatial zoning and future studies and scenario planning approach while taking advantage of future studies and scenario planning. Attempts were made to determine the casualties and financial losses caused by the earthquake crisis in the county. In summary, the objectives of this study are as follows: (1) the identification and assessment of vulnerability of urban and rural settlements of Boyer Ahmad against the earthquake crisis (preparing the earthquake prone points of Boyer Ahmad); (2) the extraction of key proponents effective in reducing the causality and financial vulnerability of the earthquake crisis based on a cross-impact analysis approach; (3) the provision of possible scenarios for earthquake and the financial loss reduction in Boyer Ahmad assuming the scenario-based approach.

According to the studies conducted in Boyer Ahmad, earthquakes within the magnitude of 4-5.5 Richter are the most frequent, followed by a large average of 4-Richter earthquakes. The dominant focal points of the earthquakes are 10 to 30 km from the surface, and the seismic layer is 10 to 30 km deep. The largest earthquake had a magnitude of 6.3 MS magnitude, 100 km far from Yasuj and 60 km from the earth surface (Zarrabi et al. 2015). There are a bulk of faults in the vicinity of Boyer Ahmad, the most important of which include (Fig. 1):

- Zagros Main Fault: the most important fault within the studied area which is 70 to 80 km from Yasuj (center of Boyer Ahmad).
- Qatar-Kazeroun Fault: the nearest piece is about 45 km from Yasuj.
- Dena Fault: this fault is the closest fault to Yasuj, less than 10 km to Yasuj.
- Michigan Fault: this fault is farther away than other faults in Yasuj, which is 85 km from Yasuj.
- Arjan Plain Fault: this fault is the farthest which is 100 km from Yasuj (Zarrabi et al. 2015).

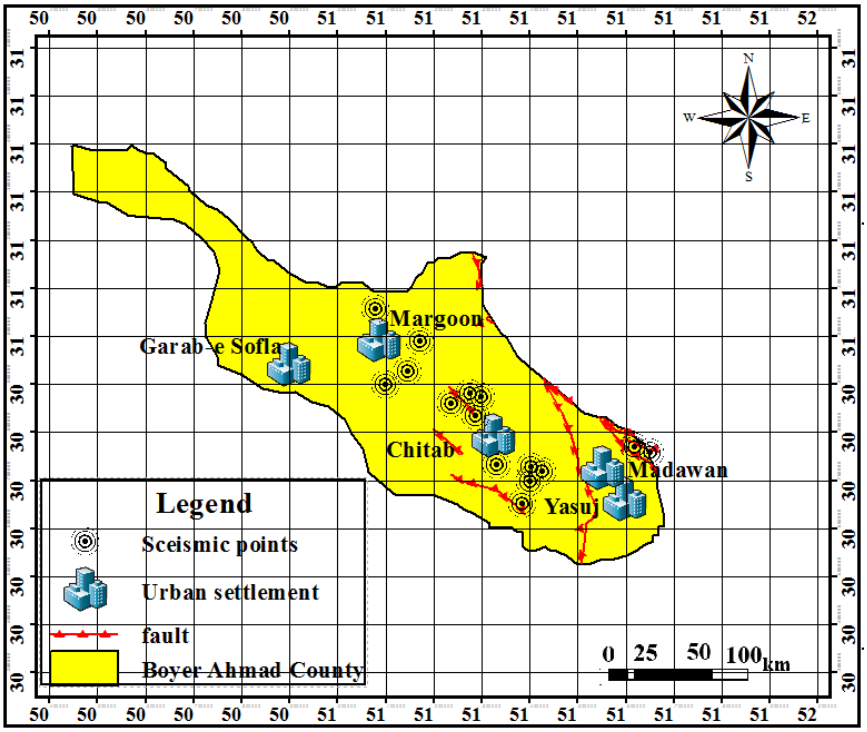


Fig. 1 **– Active and passive faults and seismic points of Boyer Ahmad**

The futures studies method can be one of the best optimal management techniques in the future when at any moment a crisis such as an earthquake may occur.

Earthquakes

Earthquakes are among the most catastrophic natural disasters to affect mankind (Dong and Shan 2013). Cascading natural hazards are urgent global issues that may cause catastrophic losses, affecting urban communities from the economic, social, and environmental point of view. Earthquakes and tsunamis can be concurrent threats to cities (De Risi et al. 2018). Natural processes that modulate the spatial and temporal occurrence of earthquakes include tectonic stress changes, migration of fluids in the crust, Earth tides, surface ice and snow loading, heavy precipitation, atmospheric pressure changes, sediment unloading and groundwater loss. Such processes perturb the stress on faults by only small amounts but, since rock failure in earthquakes is a critical process, nucleation of each event is ultimately brought about by a final, incremental change in stress (Foulger et al. 2017). An earthquake is a sudden, rapid shaking of the earth's crust caused by the breaking and shifting of tectonic plates beneath the earth's surface. This shaking can cause the collapse of buildings and bridges; and disruptions in gas, electric, and phone services; and it can trigger landslides, avalanches, flash floods, fires, and huge, destructive ocean waves (tsunamis). Structures constructed on unconsolidated landfill, old waterways, or other unstable soils are generally at greatest risk unless seismic mitigation has been utilized. Seismicity is not seasonal or climate-dependent and it can therefore occur at any time of the day or year (Haddow et al. 2017).

The threat of earthquakes will probably increase because of global urbanization, and thus millions of people are exposed to earthquakes. Although humans cannot prevent earthquakes, we can change the way we respond to them (Dong and Shan 2013).

Earthquakes can cause different types of structural and non-structural damage in buildings (Vitorino et al. 2020). Earthquakes are among the most unpredictable and devastating natural disasters. Since 1900, earthquakes have caused 2.3 million deaths and they resulted in economic costs of an estimated $3.41 trillion. The earthquake phenomenon as a natural hazard is causing high levels of vulnerability and damages to the structures around the world (Kassem et al. 2019). A recent review of significant earthquakes found that injuries were reported in only 56% of earthquakes with mortality that occurred between 1960 and 2009 and that 2 million earthquake injuries were reported worldwide in this period. Building design, geography and development indicators are important factors in earthquake vulnerability. There is substantial variation in the human impacts of earthquakes, and low levels of economic development have been associated with a higher earthquake morbidity and mortality suggesting that poorer countries face an increased risk due to a variety of characteristics of the built environment (Doocy et al. 2013).

The earthquake is an unpredictable natural phenomenon and a series of vibrations at the surface caused by the production of elastic (seismic) waves, and it is generally the sudden collapse of plates due to accumulated energy release (Kahandawa et al. 2018). The most important cause of the earthquake is the pressure between two or more adjacent geological structures as well as the increase in overburden within the rocks and the inner layers of the earth (Sołtysik et al. 2017). In fact, high-grade earthquakes cause enormous physical losses, destruction, casualties, and psychological costs such as fear, anxiety, and distress (Liu et al. 2017).

Futures studies

The future is an uncharted territory. The future is often a scary place for organizational executives (Hines 2002). Bell (2002) defines future studies as an independent discipline that aims to study the future systematically. Futurists seek to discover, invent, present, test, and evaluate possible, probable and better futures (Bell 2002). For Bell (2002), futures studies is the discovery or invention, examination, evaluation, and suggestion of futures that may happen (possible), or are likely to happen (probable), aiming at improving the freedom and prosperity of the humankind (Bell 2002).

Futures studies encompass a lot of dimensions, including prediction, social foresight, changeable politics, and ideal imagery (Öner 2010). Futures studies, also called futurology, is the study of postulating possible, probable, and preferable futures and the worldviews and myths that underlie them (Sardar 2010). Future studies tend to be oriented towards the longer term – beyond the next two or three decades. It is essentially an open-ended and less definable process than forecasting and long-range planning. Often, futures studies are concerned with the sets of value considerations and preferences. Rather than assuming the given nature of larger causal relations, these are taken as open to question. There is an underlying shift from what it may be feasible under the given constraints to what it could or it should be possible and/or desirable – if we choose to alter the constraints upon present and future actions (McHale and Cordell McHale 1976).

The task of the futurist is to investigate this tree as a whole. Its branches define the alternative scenarios, which we might want to realize or avoid. More precisely, the received view is that the futurist should (i) construct alternative possible futures, (ii) assess the probability of alternative futures, and (iii) evaluate the preferability or desirability of alternative futures (Niiniluoto 2001). Futures studies are moving away from the pursuit to give accurate probabilities and foresight, and they attempt to provide technical information for people and organizations to control processes, information and structures. Futures studies are moving towards critical hermeneutical understanding, emancipatory dialects, and diversity (Kuosa 2011). Generally, future studies represent knowledge and art that helps people to identify the events, the opportunities and threats of the future, and to cleverly

select desirable and sought-after futures from the among possible, believable and probable futures, so that they will not consider the future as rigid, decisive, definite and unchanged.

Scenario planning

Scenarios are tools for ordering the one's perceptions about alternative future environments in which one's decisions might be played out. Alternatively, scenarios are a set of organized ways to dream effectively about our own future (Chermack 2005). Scenario planning — or, alternatively, scenarios — is a predictive approach that aims to envisage alternative futures in the form of different — but internally consistent — configurations of new events and drivers of change (Vecchiato 2019). Scenario planning, also called scenario thinking or scenario analysis, is a strategic planning method that some organizations use to make flexible long-term plans. It is in large part an adaptation and generalization of the classic methods used by the military intelligence (Bradfield et al. 2005).

The scenario illustrates how the future may be shaped by the current situations and it includes a set of hypotheses about the key factors (Geneletti 2012). Scenario planning may involve aspects of systems thinking, specifically the recognition that many factors may combine in complex ways to sometime create surprising futures (due to non-linear feedback loops). The method also allows the inclusion of factors that are difficult to formalize, such as novel insights about the future, deep shifts in values, unprecedented regulations or inventions (Mendonça et al. 2009).

The systems thinking used in conjunction with scenario planning leads to plausible scenario storylines because the causal relationship between the factors can be demonstrated (Gausemeier et al. 1998). Scenario planning can take on a higher profile role in strategic planning in turbulent environments (Ramírez and Selsky 2014). Scenario planning aims to distinguish between what people understand as predictable and what they perceive as unpredictably uncertain, where the latter means not only not predicted but not predictable (Ramírez and Selsky 2014). Scenario planning is an effective method for examining future uncertainties and for investigating the assumptions in organizations. There are four potential boundaries concerning the practice and theory of scenario planning (Fig. 2): (1) a process boundary, (2) a planning system boundary, (3) a performance system boundary, and (4) an organizational and contextual environment boundary (Chermack 2005).

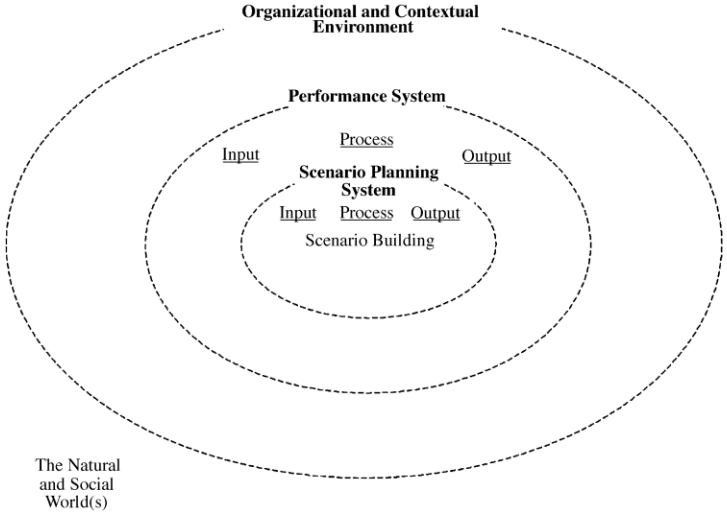


Fig. 2 **– The boundaries of a theory of scenario planning**

Methodology

Boyer Ahmad is a county in Kohgiluyeh and Boyer Ahmad Province in Iran (Fig. 3). The capital is Yasuj, and the population of the city in 2016 was 299855 people with 77569 households. The number of cities in 2016 was five, including Yasuj, Chitab, Madwan, Margoon, and Garab-e Sofla, as well as four districts of Margoon, the central district, Ludab, and Kabegian, and 11 villages and 977 rural districts and oases.

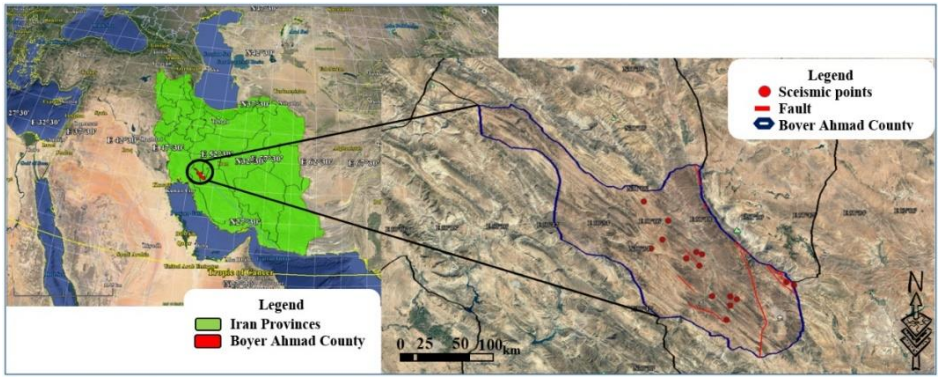


Fig. 3 **– Spatial location of Boyer Ahmad in Kohgiluyeh and Boyer Ahmad Province and Iran**

The research method is descriptive, analytical, structural-quasi-mathematical (a combination of quantitative/qualitative data) and it is an applied study in terms of research objectives. Different combinatorial methods, including the library method, the field method, and the Delphi method were used for data collection.

The study was analyzed in three parts. In the first part, the identification and zoning of vulnerable urban and rural settlements of Boyer Ahmad were carried out using the ARC GIS spatial analysis software and the GRA model. This part collected spatial and local layers from multiple sources, including satellite imagery, Google Earth software, the US Geological Survey, etc. (Table 1).

Table 1

Type and source of data to measure the vulnerability of urban and rural settlements in earthquake crisis

Parameter	Type	Source
Fault lines	vector	Iranian Seismological Center
Seismic points	vector	Google Earth Software
Geology	vector	Geological Survey & Mineral Explorations of Iran (GSI)
Land use	vector	Organization of Natural Resources
Rural and urban settlements	vector	The Ministry of Interior of the Islamic Republic of Iran
Communication roads	vector	Ministry of Roads & Urban Development
Height	raster	United States Geological Survey
Slope	raster	Extracted from Layer Height
Aspect	vector	Geological Survey & Mineral Explorations of Iran (GSI)
River	vector	Iranian Ministry of Energy

In the second part, the MICMAC software (cross-impact analysis model) was used to identify the most effective key factors to reduce the vulnerability and financial loss of citizens in Boyer Ahmad in the earthquake crisis. The MICMAC works on the principle of multiplication properties of matrices (Kadam and Bandyopadhyay 2020). The MICMAC method for structural analysis is aimed at determining the most important variables within a system among a set of variables, initially specified by an expert committee, and establishing their role in the system. This is accomplished by studying the influence relation among the variables. Basically, MICMAC consists in the following three steps: (1) defining the relevant variables, (2) specifying the relations between the variables, (3) identifying the key variables (Villacorta et al. 2014).

The Cross-Impact Analysis (CIA) is based on cross-impact questions that allow individuals to easily estimate the relationships among n events taken two at a time (n (n-1)/2 comparisons) (Bañuls and Turoff 2011). The Cross-Impact Analysis is a powerful model in the MICMAC software for taking a set of binary future events and for examining the potential causal impacts that the expectation or occurrence of each event may have on the others in the set (Panula-Ontto et al. 2018). In this context, the Cross Impact Analysis is one of the most used methods to study the possible futures or scenarios by identifying the system's variables (Fig. 4) and the role they play in it (Villacorta et al. 2014). The degree of relationship is numbered between 0 and 3, in which zero represents the lack of impact; one means weak impact; two means average impact, and three means high impact (Helmer 1977). So, if the number of known variables is x, the matrix x × x is obtained.

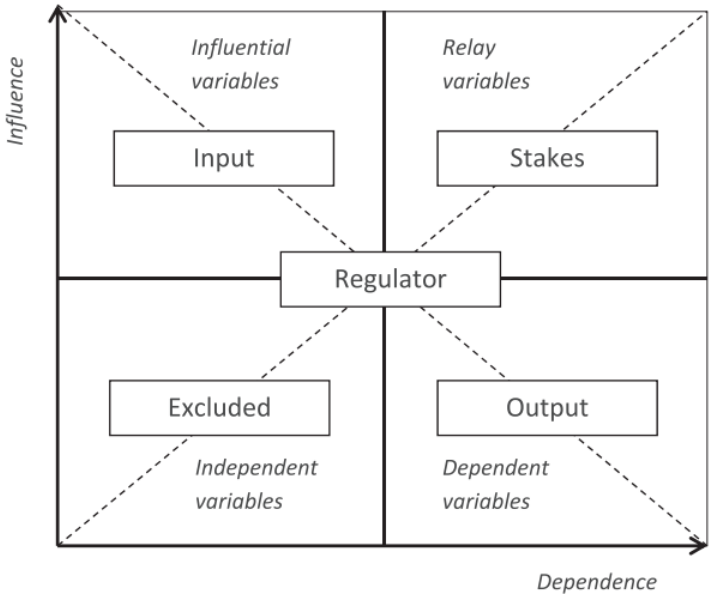


Fig. 4 **– The influence-dependence plane**

At this stage, the most effective and probable variables in reducing the causality and financial vulnerability in the earthquake crisis were identified through the experts and researchers in earthquake crisis management (20 experts and 15 researchers). In so doing, the provincial land preparation document was extracted and classified into 62 variables (Table 2). At this stage, experts and researchers were selected purposefully and identified using the Delphi method. Then, the effective variables in reducing causality and financial vulnerability of earthquake crisis in Boyer Ahmad were investigated. After the identification of variables and components, they were inserted into the cross-impact analysis matrix, and the degree of relationship between these variables was identified by the experts. Thus, the

sum of the data of the row variables shows the extent of impact and the sum of the data of the column variables shows the degree of impact.

Table 2

Effective and probable factors for reducing the causality and financial vulnerability in the earthquake crisis in Boyer Ahmad

Variable	Enhancing the capability of people and staff; intra- and inter-organizational coordination and overlap; budgeting and facilities; research and studies; proper planning; comprehensive earthquake crisis management document; earthquake alerting devices; buildings' retrofitting; construction status on the faults; telecommunications; vital infrastructures; specialized training of people and staff; preventing high population densities in worn-out textures; formulating search and rescue plans; enhancing urban equipment and infrastructure; securing and improving seismic devices of uses and facilities; improving the construction management and supervision by employing skilled workforce; master plan of reconstruction; development of metabolic flows; enhancement of the arena; formulation and modification of urban and rural development plans appropriate to the relative earthquake hazard zoning, sensitive and relevant to the zoning of the relative earthquake risk in the country and the formulation of a capacity reconstruction; remediation and refurbishment plan for worn-out textures; main and proper communication lines and new and durable materials; identifying special structures; identifying and designing emergency and temporary settlements; developing comprehensive scientific programs for the psychological and social rehabilitation of the affected people; restructuring the province's crisis management; proper distribution of urban open spaces; designing alternative routes if major roads are demolished; decentralization of traffic nodes in one area; familiarization of people to understand danger; risk mitigation program; shock absorption program; wide street design; building facades and maintenance, and holding earthquake maneuvers; insurance industry coverage; proper distribution of relief centers; preparation of training programs; improvement of land use compatibility; reduction of building lobbies; popular associations; reduction of building densities; decreasing population density; decreasing net residential density; planning for the accountability of managers; investing in operational infrastructure; appropriate accident prevention rules; development of air relief; utilization of international experience, and operational monitoring and guidance; data processing and continuous monitoring of critical events and indicators.

Source: *provincial preparation document and interview with provincial experts, researchers, and executive managers (2019)*

In the third part, the Morphol scenario software was run to formulate the most desirable scenario to reduce the causality and financial vulnerability of the citizens in Boyer Ahmad against the earthquake crisis. The morphological analysis provides a structured method for ensuring consistency and relevance in scenario development. The morphological analysis – strictly speaking on the study of forms – is well established as a method for modelling the structural relationships between objects and phenomena in several scientific fields (Johansen 2018). At this stage, the most important factors identified in Section II (Table 3) were given to the experts and researchers (15 experts and 10 researchers) in the field of earthquake crisis management to design different scenarios. The experts and researchers were selected purposefully and then, using the Delphi method, different scenarios were designed to reduce the causality and financial vulnerability of the earthquake crisis in Boyer Ahmad.

After identifying the effective factors using the MICMAC software, different hypotheses were made for each key factor. In this way, by scoring the different hypotheses of each key proponent, the final score for each hypothesis was determined; finally, the best scenarios

were presented as the top scenarios. The relationships between hypotheses ranged from 0% to 100%, such that 0% meant no impact and 100% meant a high impact (Taghvaei and Hosseinekhah 2018).

Table 3

Key factors

Row	Factors
1	Specialized training of people and staff
2	Intra- and inter-organizational coordination and overlap
3	Budgeting and facilities
4	Research studies
5	Proper planning
6	Comprehensive earthquake crisis management document
7	Earthquake alerting devices
8	Buildings' retrofitting
9	Construction status on faults
10	Vital infrastructures
11	Main and proper communication lines
12	New and durable materials
13	Telecommunications

Source: *statistical processes derived from the Cross-Impact Analysis model and the MICMAC software (2019)*

Future studies, in their literal sense, emerged virtually from the middle of the twentieth century and more scientifically as one of the planning tools in the mid-twentieth century at the RAND Corporation, the United States Armed Forces. In the present study, two methods of cross-impact analysis and scenario planning were used to conduct the research process. The term futurology or futures studies were first introduced in 1966 by Flechteim (Sardar 2010). Modern futures studies, as "a full-scale futures movement", developed after the end of World War II (Son 2015). The history of using the cross-impact analysis dates back to the 1960s (Godet and Durance 2011), but in recent years, Glenn and Gordon (2009) have pioneered the use and introduction of this method in future studies and they have used the method in identifying, classifying, and ranking the elements that influence the future of different systems (Glenn and Gordon 2009). The MICMAC analysis has been used in extensive research, including Kumar et al. (2019); for a policy framework for city eligibility analysis: TISM and fuzzy MICMAC (Kadam and Bandyopadhyay 2020); for modelling the passenger interaction process (PIP) framework, using the ISM and MICMAC approach (Panula-Ontto et al. 2018); the cross-impact analysis of Finnish electricity system with increased renewables (Thorleuchter and Van den Poel 2014); and the semantic compared cross-impact analysis.

Scenario planning history dates to the World War II, when scientists used computer simulation to identify the effects of a nuclear bomb. The scenario concept originates from the 1950s and it is ascribed to Kahn, at that time working at the RAND Corporation (Haasnoot and Middelkoop 2012). Also, he demonstrated with scenarios that the US military planning was based on 'wishful thinking' instead of 'reasonable expectations' (Bradfield et al. 2005). Generally, the first use of scenario planning was in military planning, in the 1950s, while in the 1980s, scenarios became mainstream in futures research (Haasnoot and Middelkoop 2012).

So far, no research has been conducted in Iran regarding the planning of earthquake response with an eye on the scenario-based approach. However, the scenario-based analysis has been used in extensive research, including Rodgers et al. (2020). These are including: the creation of an earthquake scenario in China (Zhang et al. 2018); a scenario-

based model for earthquake emergency management effectiveness evaluation (Zolfaghari and Peyghaleh 2016); the development of optimization-based probabilistic earthquake scenarios for the city of Tehran (Valagussa et al. 2014); earthquake-induced rockfall hazard zoning (Verma and Bansal 2012); and earthquake precursory studies in India, with scenario and future perspectives.

Results and Discussion

Based on the geographical maps, Boyer Ahmad County has a high seismic potential due to being located among the four major faults, including Zagros, Qatar-Kazerun, Dena, Mishan, and Dasht-e Arjan. So that, the County of Boyer Ahmad has 321 km of fault lines according to the maps of fault lines. Although several factors are involved in the formation of the earthquake critical points in Boyer Ahmad County, the spatial and geometrical characteristics of fault lines have an important role in exacerbating the vulnerability of Boyer Ahmad population settlements. Final investigations show that the high vulnerability zones are adjacent to the fault lines in the County of Boyer Ahmad and the severity of earthquake hazards also decreases as the distance from the fault lines decreases. The survey and analysis of the final map shows that the north and south west and part of the southern district of Boyer Ahmad County have the highest risk of earthquake crisis and the main reason are the fault lines passing through these areas (Fig. 5).

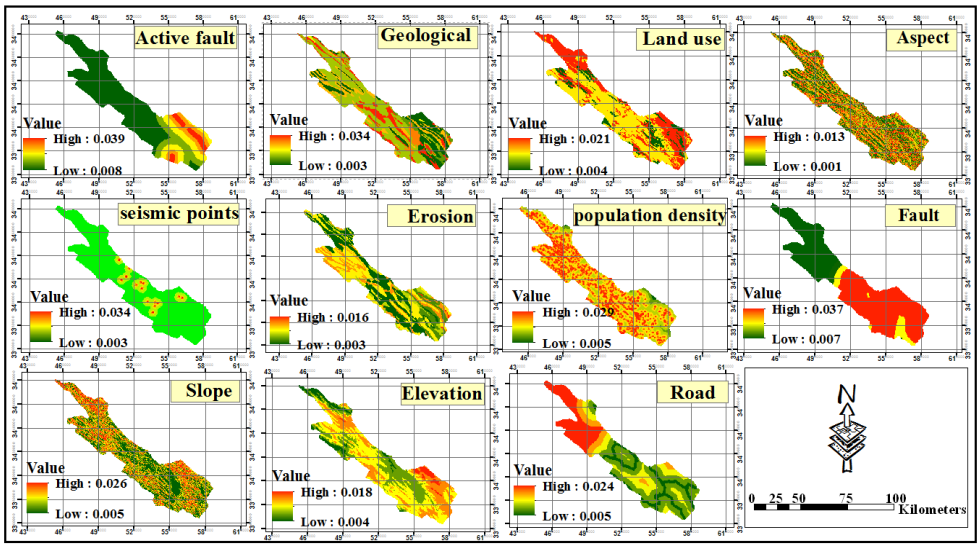


Fig. 5 **– Standardized layers**

According to the earthquake hotspots extracted map, most of the earthquakes occurred in the vicinity of the main fault lines of the County. According to the land use maps, parts of the County are located on the rugged (resistant) rocks that are more resistant to earthquakes and parts of the County are on the watercourse that has less resistance to the earthquake risk. Based on the geological maps extracted, part of the County's geological structure is of the formation type of Piedmont and of valley terraces deposit which has a very low resistance to earthquakes, and it is located in the central part of the County. And part of the County has the geological structure of the Asmari and Jahrum formation type that is more resistant to earthquakes and this formation is mostly located in the southern part of the County. According to the erosion map, the northern and western parts of the County are more eroded and therefore less resistant to earthquakes.

The evaluation of earthquake hazard severity in Boyer Ahmad zone based on the seismic survey shows that 8.83% (353.65 km^2) of the county has a very high seismic hazard, and 705 km^2 (17% of the total area) is without earthquake risk (Table 4).

Table 4

Evaluation of earthquake hazard severity in Boyer Ahmad

Earthquake hazard severity	Very high seismicity	High seismicity	Medium seismicity	Low seismicity	Very low seismicity	Total
Area (km^2)	353.65	725.41	993.93	1225.89	705.5	4004.38
Percent	8.83	18.12	24.82	30.62	17.61	100

Also, among the five cities of Boyer Ahmad, Garab-e Sofla is at very low seismic risk; Chitab and Yasuj are at low seismic risk; Margoon is at medium seismic risk; and Madawan is at high seismic risk (Fig. 6, Table 5). Its long distance from the fault lines of Boyer Ahmad County is the main reason that Garab Sofla is located in the low seismic hazard category. Also, the soil erosive structure in Garab Sofla is of VI type (medium vulnerability), the geological formation is of ASMARI type (medium vulnerability) and its land use is more of the pasturelands type (medium vulnerability). These factors have made the city of Garab Sofla lowly vulnerable and highly resistant to the seismic hazard.

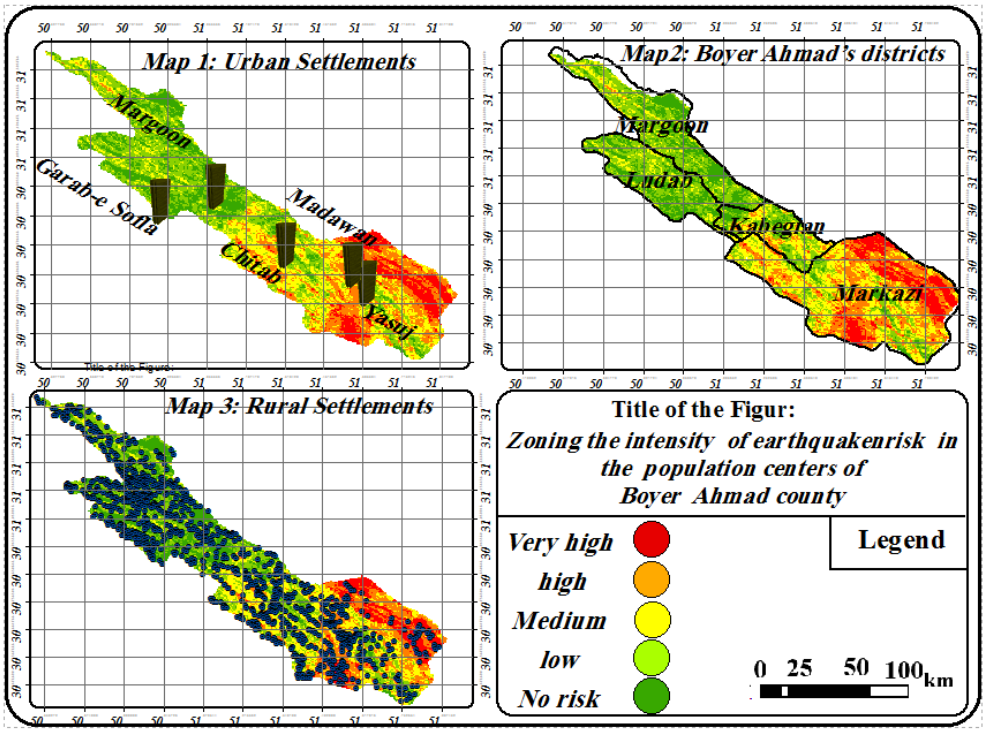


Fig. 6 **– Final zoning of the earthquake hazard severity in the populated settlements of Boyer Ahmad**

Seismic studies show that the physical development of the city of Yasuj lies on the geological formation of the Fluvial Conglomerate, making it more resistant to earthquakes. The studies of land use and erosional structure also show that the physical development of

Yasuj is located on erosion class VI and the land use of rocks and pasturelands partly reduces the risk of earthquake crisis from the city.

Seismic studies also show that the physical development of the city of Chitab lies on the geological formation of ASMARI, making the city of Chitab less vulnerable to the seismic hazard. The studies of land use and erosional structure also show that the physical development of the city of Chitab lies on the erosion III and the land use of rocks and pasturelands reduces the risk of earthquake crisis from the city.

Table 5

Earthquake risk assessment in the urban areas of Boyer Ahmad

City	Severity of vulnerability	Population	Percentage of vulnerable population to total population (%)
Garab-e Sofla	Very low	1164	0.38
Yasuj	Low	18078	6.02
Chitab		545	0.18
Margoon	Medium	3135	1.04
Madawan	High	18078	6.02

The soil erosion structure in Margoon city is of VII type (highly vulnerable), the geological formation is of GURPI type (highly vulnerable), and the land use is of poor pasturelands (medium vulnerable); these factors have made the city of Margoon vulnerable to seismic hazards.

Madavan city also has a high vulnerability to the seismic hazard due to its proximity to the fault lines, locating on the geological formation of MISHAN, the erosion class VII and a poor land layer.

Referring to the location of rural settlements in Boyer Ahmad County, they are mostly in low seismic hazard zones; except for a few of these villages, the rest of the villages are not located on fault lines. However, the concentration of the rural centers of Boyer Ahmad County around the fault lines and the high-risk zones is clearly visible. Therefore, in the event of a high-intensity earthquake, the villages located along the fault lines will be particularly vulnerable, in addition to the villages located directly on the fault lines and in the high-risk areas. Also, the spatial analysis of the vulnerability of rural and oasis areas shows that out of 977 rural and oasis settlements located in Boyer Ahmad, 72 human settlements, i.e. 7.36%, are at very high risk of earthquake risk. 189 villages are also located in the high seismic risk, and 135 villages are located in zones without earthquake risk (Table 6).

Table 6

Earthquake risk analysis in the rural settlements of Boyer Ahmad

Type	Earthquake hazard severity	Number of rural settlements	Ratio of the number of villages and oases to total villages (%)
Villages and oases	No risk	135	13.81
	Low	338	35.59
	Medium	243	24.87
	High	189	19.34
	Very high	72	7.36

Planning the response to the earthquake crisis in Boyer Ahmad using the scenario planning approach

The results of the cross-impact analysis model in the MICMAC software showed that out of 2980 relationships among the research variables, 863 of the relationships were without effect; 1296 had an effect of one; 907 had the effect of two, and 702 had the effect of four. Overall, 77% of the research factors were either influenced by each other or they have influenced each other (Table 7).

Table 7

MDI Matrix

Indicator	Matrix size	Iterations	Zeros	Ones	Twos	Threes	P	Fill rate %	Total
Value	62	2	863	1296	907	702	4	77.52	2980

After analyzing the effective factors in reducing the causality and financial vulnerability of earthquake crisis in the population centers of Boyer Ahmad, the research indices were distributed in five main areas of the open cross-impact analysis model to include: key factors, effective factors, negligible variables, outcome variables, and uncertain variables.

Zone one (key factors): indicates the most key strategic priorities in reducing the vulnerability and financial loss of the earthquake crisis in Boyer Ahmad. These factors consist of specialized training of people and staff, intra- and inter-organizational coordination and overlap, budgeting and facilities, research and studies, proper planning, comprehensive earthquake crisis management document, earthquake alerting devices, buildings' retrofitting, construction status on faults, telecommunications, vital infrastructures, main and proper communication lines, and new and durable materials (Fig. 7).

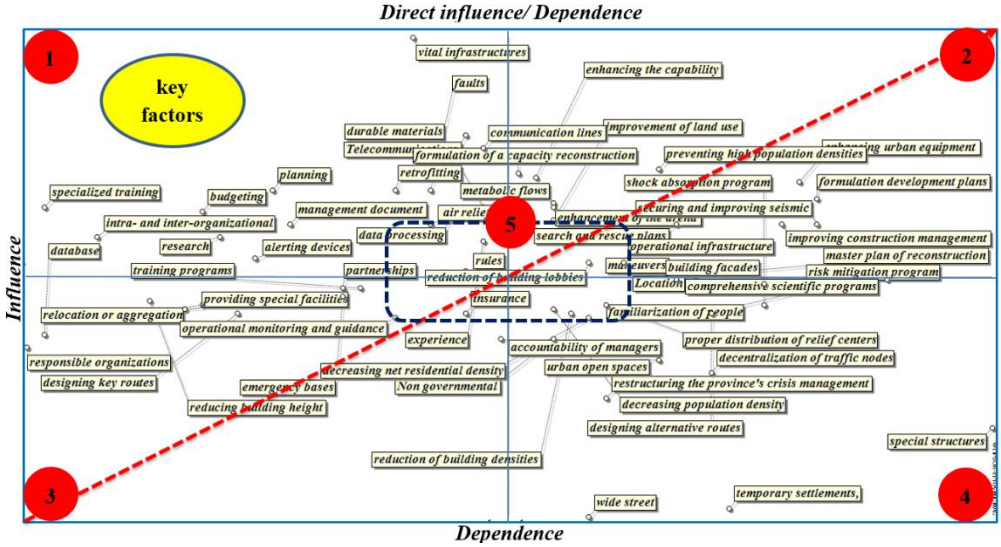


Fig. 7 **– Distribution diagram of earthquake response propulsion planning in Boyer Ahmad**

Source: *graphical processes derived from Cross-Impact Analysis model (2019)*

Zone two (effective factors): indicates the variables that have both effectiveness and an affectedness role in reducing the causality and financial vulnerability of the earthquake crisis in Boyer Ahmad. These include: enhancing the capability of people and staff, preventing

high population densities in worn-out textures, formulating search and rescue plans, enhancing urban equipment and infrastructure, securing and improving seismic devices of uses and facilities, improving the construction management and supervision by employing skilled workforce, master plan of reconstruction, development of metabolic flows, enhancement of the arena, formulation and modification of urban and rural development plans appropriate to relative earthquake hazard zoning, sensitive and relevant to the zoning of the relative earthquake risk in the country and the formulation of a capacity reconstruction, remediation and refurbishment plan for worn-out textures.

Zone three (negligible variables): represents the variables that have little effectiveness and affectedness. These factors include: detailed statistics and information about the different features of the city (database), designing key routes in crisis, providing special facilities and incentives, developing partnerships, identifying responsible organizations, reducing the buildings' height (number of floors), developing emergency bases, and the relocation or aggregation of population centres in seismic areas.

Table 8

Direct impact intensity of key and effective factors of cross-impact analysis for disaster response planning

Key factors	**Effectiveness**	**Affectedness**	**Net effectiveness**
Specialized training of people and staff	103	104	-1
Intra- and inter-organizational coordination and overlap	86	100	-14
Budgeting and facilities	110	95	15
Research and studies	97	96	1
Proper planning	107	103	-4
Comprehensive earthquake crisis management document	108	88	20
Earthquake alerting devices	97	104	-6
Buildings' retrofitting	97	102	-5
Construction status on faults	85	97	-12
Vital infrastructures	109	87	22
Main and proper communication lines	84	96	-12
New and durable materials	97	96	1
Telecommunications	84	108	-24
Effective factors	**Effectiveness**	**Affectedness**	**Net effectiveness**
Enhancing the capability of people and staff	101	60	39
Preventing high population densities in worn-out textures	100	69	31
Formulating search and rescue plans	94	70	26
Enhancing urban equipment and infrastructure	109	87	23
Securing and improving seismic devices of uses and facilities	89	72	17
Improving construction management and supervision	105	80	25
Development of metabolic flows	100	99	1
Formulation and modification of urban and rural development plans	97	74	23
Allocation site	105	92	13
Remediation and refurbishment plan for worn-out textures	115	85	30
Master plan of reconstruction	94	63	31
Enhancement of the arena	102	1001	1

Source: *statistical processes derived from the Cross-Impact Analysis model (2019)*

Zone four (outcome variables): represents the variables that have little effectiveness but high affectedness. These factors include: identifying special structures, identifying and designing emergency and temporary settlements, developing comprehensive scientific

programs for the psychological and social rehabilitation of the affected people, restructuring the province's crisis management, the proper distribution of urban open spaces, designing alternative routes if major roads are demolished, decentralization of traffic nodes in one area, familiarization of people to understand danger, risk mitigation program, shock absorption program, wide street design, building facades and maintenance, and holding earthquake maneuvers.

Zone five (uncertain variables): these variables are systematically uncertain in the future. They include: data processing and continuous monitoring of critical events and indicators, insurance industry coverage, proper distribution of relief centres, preparation of training programs, improvement of land use compatibility, reduction of building lobbies, popular associations, reduction of building densities, decreasing population density, decreasing net residential density, planning for the accountability of managers, investing in operational infrastructure, appropriate accident prevention rules, development of air relief, utilization of international experience, and operational monitoring and guidance.

The results showed that the most effective factor among the key and effective factors to reduce the causality and financial vulnerability against earthquake crisis in the population centres of Boyer Ahmad are, respectively, the comprehensive earthquake crisis management document, as well as capacity reconstruction, refurbishment, and the reconstruction of worn-out textures (Table 8).

The specialized training of people and staff, and the proper earthquake crisis planning had the highest correlation in the case of indirect factors (Fig. 8). Regarding indirect effects, the organization coordination and overlap (Fig. 9) had the highest correlations in the relationships.

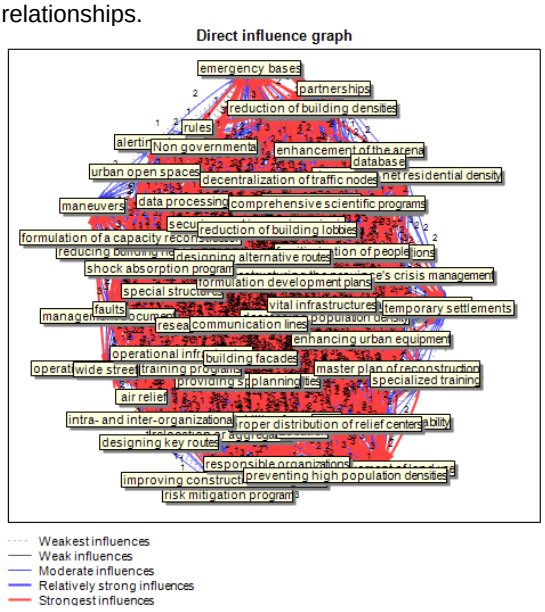


Fig. 8 **– Indirect impact of the factors with 100% coverage and the relationships between them**

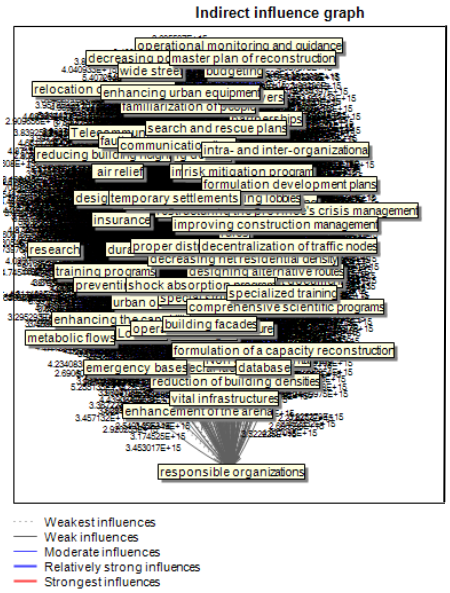


Fig. 9 **– Direct impact of the factors with 100% coverage and the relationships between them**

Source: *graphical processes derived from Cross-Impact Analysis model (2019)*

Formulation of the long-term vision scenario based on the morphological analysis

After identifying the most important key factors to reduce the causality and financial vulnerability against earthquake crisis, we formulated the hypothesis for each key factor using the experts and elites' views. Then, using the participation of elites and experts, the weights for each of the hypotheses were presented based on two parameters: quantitative (0 <X> 100) and qualitative (ideal, optimistic, intermediate, and pessimistic) (Table 9).

Table 9

Designed hypotheses and their percentage of validity for each key factor

Factors	Hypothesis			
	H1	H2	H3	H4
Comprehensive document of earthquake crisis	Compilation of comprehensive document for earthquake crisis (76%)	Injection of earthquake crisis management principles in all projects (15%)	Failure to formulate a comprehensive earthquake crisis document (5%)	Keeping up with the current trend (4%)
Earthquake alert systems	Design and construction of earthquake alert systems (40%)	Purchase of earthquake warning systems (50%)	Lack of attention to purchasing and designing earthquake warning systems (5%)	Keeping the earthquake alert strategy current (5%)
Strengthening the buildings	Increasing the retrofitting of buildings (63%)	Demolition of unstable buildings (17%)	Lack of attention to retrofitting buildings (10%)	Persistence of the status quo (10%)
Construction in the vicinity of faults	Preventing construction at fault (80%)	Prevention of the construction at seismic zones (14%)	Relocation and integration of earthquake-prone population centres (6%)	Continuation of the existing status of building construction (0%)
Telecommunications	Development of modern telecommunications infrastructure between people and government (60%)	Development of telecommunication infrastructure among the people (16%)	Development of telecommunications infrastructure among government agencies (20%)	Persistence of the status quo (4%)
Vital infrastructures	Increasing investment in critical infrastructure (48%)	Lack of investment in critical infrastructure (30%)	Persistence of the status quo (22%)	—
Main and appropriate routes	Development of road communication routes (20%)	Development of emergency helicopters (58%)	Lack of investment in communication infrastructure (11%)	Persistence of the status quo (11%)
Durable and new materials	Use of new and durable materials in construction (51%)	Use of durable materials in construction (37%)	No use of new materials in construction (0%)	Maintaining trends in building materials (12%)
Training the citizens	Development of earthquake crisis training facilities (40%)	Development of earthquake learning culture (30%)	Lack of attention to learning culture (15%)	Persistence of the status quo (15%)
Coordination and overlap within and outside the organization	Relative increase in coordination between organizations (30%)	Elimination of crisis management responsibilities of all organizations and creation of a crisis management organization (48%)	Increased conflict between organizations (10%)	Continuation of existing status of communication between organizations (12%)
Budgeting and facilities	Increasing earthquake disaster management credits (30%)	Provincial budget increase in some dimensions of city earthquake management (53%)	Earthquake disaster management credits' decrease (8%)	Persistence of the status quo (10%)
Research study	Development of earthquake related research in the city (20%)	Development of priority earthquake related research in the city (64%)	Decrease of earthquake related research in the city (16%)	Persistence of the status quo (0%)
Planning	Macro-planning based on earthquake crisis (27%)	Provincial-based planning based on organizational integrity (66%)	Provincial-based planning based on the lack of organizational integrity (7%)	Persistence of existing planning process (0%)

The findings showed that 5000 valid scenarios were identified out of 10,000 scenarios (Table 10). Finally, ten scenarios were selected and analyzed as significant scenarios with 90% replicability in subsequent scenarios.

Table 10

Description of extracted scenarios

Row	Explanation	Number of scenarios
1	Number of scenarios	10000
2	Number of valid scenarios	5000
3	Number of selected scenarios	10

Source: *statistical analysis of Morphol software (2019)*

In the cross-impact analysis of the scenarios, the seventh scenario with eleven ideal hypotheses and two optimistic ones was selected with the highest stability, and then scenario six was selected by changing the two hypotheses with the highest stability and resistance (Table 11).

Table 11

Quantitative characteristics of extracted scenarios (value=3)

Row	Scenario	Sustainability	Row	Scenario	Sustainability
1	S - No. 1	2.153	6	No. 6 -S	2.692
2	S -No. 2	2.076	7	No. 7 -S	2.769
3	S - No. 3	2.230	8	No. 8 -S	1.461
4	S -No. 4	2	9	No. 9 -S	1.384
5	S -No. 5	1.923	10	No. 10 -S	1.307

Source: *statistical analysis of Morphol software (2019)*

Nowadays, one of the strategies for scenario planning is to reduce the probable dimensions of scenarios from millions of scenarios to a few scenarios with high adaptability and ultimately to prepare a scenario to guide the development of a sector or region or country in the future. In this regard, the most desirable scenario to reduce the casualty and financial vulnerability caused by the earthquake crisis in Boyer Ahmad was scenario 7 which had 13 ideal situations to meet the earthquake crisis management goals with proper decision making and accurate implementation of earthquake management strategies (Table 12).

The research findings indicated that one of the key strategies for the reduction of financial damage and human life loss resulting from the earthquake crisis in Boyer-Ahmad County is the formulation of a comprehensive earthquake crisis document. However, not only there is no such a comprehensive earthquake crisis document formulated for urban and rural residences of Boyer-Ahmad County, but also still no comprehensive earthquake crisis document has been formulated at the more general scale (for the whole country) for proper coping with the earthquake crisis.

According to the research geographical analysis, Boyer-Ahmad County is one of the most prone areas of earthquake, while no earthquake warning system has been installed in the population centres of Boyer-Ahmad County and even in the other provinces of Iran. Although the time between the warning and the actual earthquake is only a few seconds or a minute, this time period is important in rescuing people and the negligence to install the warning systems in Boyer-Ahmad County and other population centres in Iran can cause catastrophic damage during the earthquake crisis.

In recent years, attention has been paid to retrofitting buildings against natural disasters, especially earthquakes, in the urban and rural settlements of Boyer-Ahmad by the Housing Foundation (providing low-interest loans to the applicants for retrofitting, refurbishing, and renovating the buildings). However, the pace of building retrofitting is slow and not fast, so since the safety of the residents is the most important purpose of reinforcing and retrofitting structures against earthquake hazards, it is necessary to retrofit the buildings faster.

Table 12

The most desirable scenario extracted for formulating a road map for Boyer Ahmad to reduce vulnerability to earthquake crisis

Row	Scenario	Scenario status	Key factor
1	Formulation of comprehensive document of earthquake crisis	Ideal	Comprehensive earthquake document
2	Design and construction of earthquake alarm systems	Ideal	Alarm system
3	Increasing the strength of buildings	Ideal	Strengthening
4	Prevention of constructions on faults	Ideal	Fault
5	Development of telecommunications infrastructure among government agencies	Optimistic	Telecommunications
6	Increasing investment in critical infrastructure	Ideal	Vital infrastructures
7	Development of road communication routes	Optimistic	Access
8	Use of new and durable materials in construction	Ideal	Building materials
9	Development of educational facilities for citizens and organizations in connection with the earthquake crisis	Ideal	Education
10	Elimination of the crisis management responsibilities of all organizations and creation of an integrated crisis management organization	Ideal	Coordination and overlap within and outside the organization
11	Increasing funding for some important components of earthquake crisis management in the city (components of earthquake warning systems design and building retrofit)	Optimistic	Budgeting and facilities
12	Development of priority earthquake related research at city level (research based on earthquake damage reduction strategies)	Optimistic	Research and study
13	Changing the crisis management planning approach from macro to city level (designing and planning based on geographical conditions, fault status, etc. at county level)	Ideal	Planning

Source: *statistical analysis of Morphol software (2019)*

In the urban settlements of Iran and Boyer-Ahmad County, not only the fault setbacks and the rural areas have not been specified, but also no attention has been paid to the fault setbacks to prevent the construction on them. In fact, specifying the legal fault setbacks in the urban and rural settlements of Boyer-Ahmad County prevents the irregularities in construction that have led to the construction of important buildings on the fault setback and it identifies safe locations in the cities. Therefore, the plan to determine the legal fault setbacks in the population centers of Iran and Boyer-Ahmad County can at least prevent

continuing the construction of important centres on faults, compensating the 50-year negligence over time.

The telecommunications infrastructure in the population centres of Boyer-Ahmad is in poor condition, while communication disruption is another crisis after the earthquake, and like the earthquake crisis, it can create another crisis. Hence, the development of the communication infrastructure can be considered as a targeted strategy for coordinating aid provision, as well as taking effective measures during and after the earthquake crisis to reduce vulnerability in the population centres of Boyer-Ahmad County.

Although in recent years attention has been paid to the strengthening and developing of critical infrastructure (health network, emergency, rescue centres, fire stations, etc.), the critical infrastructure in Boyer Ahmad is still poor. In fact, the main arteries of the Boyer-Ahmad County, which generally include health network, emergency, rescue centres, military centres, transmission lines (water, oil, and gas), as well as telecommunications and media networks, as the main components of the urban and rural settlements of Boyer-Ahmad, should be a top investment priority. In other words, if the critical infrastructure was seriously vulnerable and failed, the urban activities or relief operations would be paralyzed in times of crisis, thus increasing the cost of life and financial losses.

All urban and rural settlements of Boyer-Ahmad have access to transportation lines, including roads, but these roads are highly vulnerable due to their inability to withstand the earthquake crisis and because of the mountainous nature of the County, many roads would be blocked during the earthquake crisis due to the mountain falls and breaking the bridges. Therefore, the development and strengthening of road lines in the population settlements of Boyer-Ahmad County (due to the importance of time for quick access to the injured) can play an important role in providing services to the citizens in an earthquake crisis.

Unfortunately, Iran, as well as Boyer-Ahmad County, has many problems concerning the construction and the supervision of construction. The use of weak and instable materials, the inadequate supervision of buildings, especially in the case of mass housing, and the very simple surveillance have caused extensive building demolition in events like an earthquake. In fact, the buildings in Boyer-Ahmad County look durable with high quality and up-to-date materials, but the materials used in the buildings are of poor quality and old materials, and even their potential against earthquakes has not been calculated. Thus, in order to reduce the severity of buildings demolition in the event of an earthquake crisis, the standardization of building materials should be considered, and the building materials should be modern and of high quality.

Today, there are no programs for informing, for raising awareness, and for educating the citizens in the urban and rural settlements of Boyer-Ahmad County, and even in Iran, to deal with earthquake crisis preparedness. There is very little training given to people in dealing with the earthquake crisis, and it is only given in schools. In fact, education is a very important issue that must be at the level of both the authorities and the public, and the training must be face-to-face, complete and comprehensive, through the national media (television channels), the cyberspace, administrative and private organizations, educational centers (universities and schools), as well as at the scale of urban and rural areas, which significantly reduces the damage caused by earthquakes.

In Iran and Boyer-Ahmad, there is not a single organization that takes all earthquake crisis measures to properly manage the crisis, and all influential organizations in earthquake management are involved in relief operations that cause irregularities and inadequate earthquake management. Therefore, the lack of unified and integrated management during the earthquake crisis is one of the most important problems of the earthquake zones in Iran and Boyer-Ahmad County. Thus, establishing a single crisis management as well as

identifying the main crisis management centre and assigning the tasks of each organization during the earthquake crisis will lead to a proper crisis management during the earthquake.

Another strategy adopted to deal with the damages caused by the earthquake crisis in Iran and in Boyer-Ahmad County is to pay attention to the practical and priority issues related to the earthquake crisis in Boyer-Ahmad County. In fact, most of the research on the earthquake crisis in Boyer-Ahmad has no practical application and it does not address the priority problems and challenges associated with the earthquake in this County, so the issue of earthquake research should mainly be followed by applied research so that the County problems in the earthquake crisis and the priority issues can be addressed.

There is no planning for the proper management of the funds and resources allocated to managing the potential earthquake disasters, as well as to the development of infrastructure, equipment, and facilities related to the potential earthquake crisis in Iran and Boyer-Ahmad. In fact, for the proper management of the earthquake crisis, the budget for each priority sector needs to be identified first, and then priority actions, facilities, and equipment will be identified in the event of an earthquake crisis.

In addition, most of the planning to deal with the earthquake crisis in Iran is done without any consideration of the geographical, ecological, and demographic situation of the provinces and cities of the country. If a plan is formulated to deal with the earthquake crisis for the County of Boyer-Ahmad, the program will not consider the geographical, ecological, demographic, political, economic, and cultural situation of the County. However, all the cities of Iran are different in geographical, ecological, etc. dimensions. Thus, if planning for the County of Boyer-Ahmad needs to be formulated, it must be tailored to the different situations of Boyer-Ahmad in order to achieve a comprehensive and optimal planning.

Conclusions

The results revealed that the main cause of seismicity in the urban and rural settlements of Boyer Ahmad is the location of the settlements in the vicinity of Zagros fault with 321 km length. The results also showed that out of the total area of Boyer Ahmad, 1079.06 km^2, i.e., 26.95%, is at risk of earthquake; furthermore, of the cities of Boyer Ahmad, Madwan is at risk of earthquake, and of 997 villages and oases, 261 are at risk of earthquake.

Accordingly, the most important factors extracted to reduce the casualty and financial vulnerability of human settlements in Boyer Ahmad against the earthquake crisis indicate that a comprehensive earthquake crisis management document should be developed at the city level first, followed by earthquake warning systems and earthquake-resistant building design and installation. The constructions on faults should be prevented; telecommunications in urban and rural organizations and settlements have to be developed and strengthened; and the investment in vital urban and rural settlements should be enhanced. All urban and rural settlements should have access to communication routes; the quality of building materials should be improved; durable and classy building materials have to be used. Citizens and professionals should be educated how to deal with the earthquake hazard. To co-ordinate organizations against the earthquake crisis, only one specific organization called the City Crisis Management Agency has to be established; funding an additional budget in some components of earthquake management, including the designing of an earthquake warning systems and building retrofitting should be augmented. Priority research on the earthquake crisis at city level should be based on solutions to the earthquake damage at city level, and planning for the earthquake crisis management should be changed from a macro to a city-based approach while planning only at city level and within a specific organization.

References

BAÑULS V. A., TUROFF M. (2011), *Scenario construction via Delphi and cross-impact analysis*, Technological Forecasting and Social Change 78 (9), 1579-1602.

BELL W. (2002), *A community of futurists and the state of the futures field*, Futures 34, 235-247.

BELL W. (2003), *Foundations of Futures Studies: History, Purposes, and Knowledge*, Routledge, London.

BRADFIELD R., WRIGHT G., BURT G., CAIRNS G., VAN DER HEIJDEN K. (2005), *The origins and evolution of scenario techniques in long range business planning*, Futures 37 (8), 795-812.

CHERMACK T. J. (2005), *Studying scenario planning: Theory, research suggestions, and hypotheses*, Technological Forecasting and Social Change 72 (1), 59-73.

DE RISI R., BHATTACHARYA S., GODA K. (2018), *Seismic performance assessment of monopile-supported offshore wind turbines using unscaled natural earthquake records*, Soil Dynamics and Earthquake Engineering 109, 154-172.

DONG L., SHAN J. (2013), *A comprehensive review of earthquake-induced building damage detection with remote sensing techniques*, ISPRS Journal of Photogrammetry and Remote Sensing 84, 85-99.

DOOCY S., JACQUET G., CHEREWICK M., KIRSCH T. D. (2013), *The injury burden of the 2010 Haiti earthquake: A stratified cluster survey*, Injury 44 (6), 842-847.

EINALI J., YEGANEH B. M., CHERAGHI M., FEYZOLAHPOUR M. (2020), *Evaluating the effects of reconstruction of the damaged villages in the 2002 earthquake in Avaj, Iran*, International Journal of Disaster Risk Reduction 43, 101373.

FOULGER G., WILSON M., GLUYAS J., JULIAN B., DAVIES R. (2017), *Global review of human-induced earthquakes*, Earth-Science Reviews 178, 438-514.

GAUSEMEIER J., FINK A., SCHLAKE O. (1998), *Scenario Management: An Approach to Develop Future Potentials*, Technological Forecasting and Social Change 59 (2), 111-130.

GENELETTI D. (2012), *Environmental Assessment of Spatial Plan Policies through Land Use Scenarios: A Study in a Fast-Developing Town in Rural Mozambique*, Environmental Impact Assessment Review 32 (1), 1-10.

GLENN J. C., GORDON T. J. (eds.) (2009), *Futures Research Methodology – Version 3.0*, The Millennium Project, Retrieved from: www.millennium-project.org.

GODET M., DURANCE P. (2011), *Strategic Foresight for Corporate and Regional Development*, UNESCO, Retrieved from: www.laprospective.fr.

HAASNOOT M., MIDDELKOOP H. (2012), *A history of futures: A review of scenario use in water policy studies in the Netherlands*, Environmental Science & Policy 19-20, 108-120.

HADDOW G. D., BULLOCK J. A., COPPOLA D. P. (2017), *2 - Natural and Technological Hazards and Risk Assessment*, in: Haddow G. D., Bullock J. A., Coppola D. P., Introduction to Emergency Management, Butterworth-Heinemann, Oxford, pp. 33-77.

HELMER O. (1977), *Problems in futures research: Delphi and causal cross-impact analysis*, Futures 9 (1), 17-31.

HINES A. (2002), *A practitioner's view of the future of futures studies*, Futures 34 (3-4), 337-347.

ICRC (2011), *ICRC Annual Report 2010*, International Committee of the Red Cross, Retrieved from: www.icrc.org.

JOHANSEN I. (2018), *Scenario modelling with morphological analysis*, Technological Forecasting and Social Change 126, 116-125.

KADAM S., BANDYOPADHYAY P. K. (2020), *Modelling passenger interaction process (PIP) framework using ISM and MICMAC approach*, Journal of Rail Transport Planning & Management 14, 100171.

KAHANDAWA K.A.R.V.D., DOMINGO N. D., PARK K. S., UMA S. R. (2018), *Earthquake damage estimation systems: Literature review*, Procedia Engineering 212, 622-628.

KASSEM M. M., NAZRI F. M., FARSANGI E. N. (2019), *Development of seismic vulnerability index methodology for reinforced concrete buildings based on nonlinear parametric analyses*, MethodsX 6, 199-211.

KUMAR H., SINGH M. K., GUPTA M. P. (2019), *A policy framework for city eligibility analysis: TISM and fuzzy MICMAC-weighted approach to select a city for smart city transformation in India*, Land Use Policy 82, 375-390.

KUOSA T. (2011), *Evolution of futures studies*, Futures 43 (3), 327-336.

LIU H., ZHANG D., WEI Q., GUO Z. (2017), *Comparison study on two post-earthquake rehabilitation and reconstruction modes in China*, International Journal of Disaster Risk Reduction 23, 109-118.

MCHALE J., CORDELL MCHALE M. (1976), *An assessment of futures studies worldwide*, Futures 8 (2), 135-145.

MENDONÇA S., PINA E CUNHA M., RUFF F., KAIVO-OJA J. (2009), *Venturing into the Wilderness: Preparing for Wild Cards in the Civil Aircraft and Asset-Management Industries*, Long Range Planning 42 (1), 23-41.

NIINILUOTO I. (2001), *Futures studies: science or art?*, Futures 33 (5), 371-377.

ÖNER M. A. (2010), *On theory building in Foresight and Futures Studies: A discussion note*, Futures 42 (9), 1019-1030.

PANULA-ONTTO J., LUUKKANEN J., KAIVO-OJA J., O'MAHONY T., VEHMAS J., VALKEALAHTI S., BJÖRKQVIST T., KORPELA T., JÄRVENTAUSTA P., MAJANNE Y., KOJO M., AALTO P., HARSIA P., KALLIOHARJU K., HOLTTINEN H., REPO S. (2018), *Cross-impact analysis of Finnish electricity system with increased renewables: Long-run energy policy challenges in balancing supply and consumption*, Energy Policy 118, 504-513.

PARISI F., AUGENTI N. (2013), *Earthquake damages to cultural heritage constructions and simplified assessment of artworks*, Engineering Failure Analysis 34, 735-760.

RAMÍREZ R., SELSKY J. W. (2014), *Strategic Planning in Turbulent Environments: A Social Ecology Approach to Scenarios*, Long Range Planning 49 (1), 90-102.

RODGERS J., SU G., QI W., MILLEDGE D., DENSMORE A., DAVIS C., ENGLAND P., YOUNG J., CAO Y., CHAKOS A., LI X., SIM T., SO E., PARSONS B., SUN L., YU J., GUO C. (2020), *Creating an earthquake scenario in China: A case study in Weinan City, Shaanxi province*, International Journal of Disaster Risk Reduction 42, 101305.

SARDAR Z. (2010), *The Namesake: Futures; futures studies; futurology; futuristic; Foresight–What's in a name?*, Futures 42 (3), 177-184.

SOŁTYSIK B., FALBORSKI T., JANKOWSKI R. (2017), *Preventing of earthquake-induced pounding between steel structures by using polymer elements – experimental study*, Procedia Engineering 199, 278-283.

SON H. (2015), *The history of Western futures studies: An exploration of the intellectual traditions and three-phase periodization*, Futures 66, 120-137.

TAGHVAEI M., HOSSEINEKHAH H. (2018), *Tourism Development Planning Based on Futures Studies and Scenario Case Study: Yasouj*, Tourism Planning and Development 6 (23), 8-30.

THORLEUCHTER D., VAN DEN POEL D. (2014), *Semantic compared cross impact analysis*, Expert Systems with Applications 41 (7), 3477-3483.

TREUER G., BROAD K., MEYER R. (2018), *Using simulations to forecast homeowner response to sea level rise in South Florida: Will they stay or will they go?*, Global Environmental Change 48, 108-118.

UNDP (2004), *A global report: Reducing Disaster Risk, A Challenge for Development*, United Nations Development Programme, New York.

VALAGUSSA A., FRATTINI P., CROSTA G. B. (2014), *Earthquake-induced rockfall hazard zoning*, Engineering Geology 182 (Part B), 213-225.

VECCHIATO R. (2019), *Scenario planning, cognition, and strategic investment decisions in a turbulent environment*, Long Range Planning 52 (5), 101865.

VERMA M., BANSAL B. K. (2012), *Earthquake precursory studies in India: Scenario and future perspectives*, Journal of Asian Earth Sciences 54-55, 1-8.

VILLACORTA P. J., MASEGOSA A. D., CASTELLANOS D., LAMATA M. T. (2014), *A new fuzzy linguistic approach to qualitative Cross Impact Analysis*, Applied Soft Computing 24, 19-30.

VITORINO H., RODRIGUES H., COUTO C. (2020), *Evaluation of post-earthquake fire capacity of reinforced concrete elements*, Soil Dynamics and Earthquake Engineering 128, 105900.

YARI A., ZAREZADEH Y., OSTADTAGHIZADEH A. (2019), *Prevalence of Fatalistic Attitudes toward Earthquake Disaster Risk Management in Citizens of Tehran, Iran*, International Journal of Disaster Risk Reduction 38, 101181.

ZARRABI A., MOHAMMADI J., HOSSEINI KHAH H. (2015), *Crisis management strategy for uses, With an emphasis on urban-sensitive uses (case study: Yasouj)*, Spatial Planning 6 (3), 37-58.

ZHANG Y., WENG W. G., HUANG Z. L. (2018), *A scenario-based model for earthquake emergency management effectiveness evaluation*, Technological Forecasting and Social Change 128, 197-207.

ZOLFAGHARI M. R., PEYGHALEH E. (2016), *Development of optimization-based probabilistic earthquake scenarios for the city of Tehran*, Computers & Geosciences 86, 129-145.

Initial submission: 20.10.2019
Revised submission: 03.09.2020
Final acceptance: 22.12.2020

Correspondence: Department of Geography and Urban Planning, University of Isfahan, Azadi square, 8174673441 Isfahan, Iran.

Email: asgharzarrabi2000@gmail.com

Journal of Urban and Regional Analysis,
vol. XII, 1, 2020, p. 401 - 415
https://doi.org/10.37043/JURA.2021.13.2.11

IDENTIFYING PATTERNS OF LABOUR EXCLUSION BY RESIDENTIAL CAUSES IN SOUTH AMERICA: THE CASE OF QUITO

Susana **HERRERO OLARTE**
Universidad de Las Américas, Quito, Ecuador

Abstract: The lack of opportunities for employment is still present in most South American cities. This arises as a problem due to its impact on chronic poverty and social mobility, two of the main challenges in the region. Therefore, the aim of this paper is to identify the causal link between residential location and labour market exclusion, and its effects on development, geography, and urbanism. This paper uses an urban mobility approach to define the geographic poverty pattern and to generate new tools for the development of local policies in Quito. It also delves the lack of opportunities to access employment, as representing the main source of urban poverty growth in South America, especially due to residential location. The analysis applies the Multidimensional Poverty Index (MPI) and the Labour Exclusion by Residential Causes Index (LERCI) to each Quito parish. LERCI includes variables of distance, cost, and public transportation density. Our results regarding the correlation between the two indices suggest a pattern of labour exclusion by residential causes that includes two different dimensions of urban poverty – one in downtown parishes and the other in the periphery.

Key Words: *urban poverty, labour exclusion, urban mobility, Quito*.

Introduction

The term of exclusion, used to refer to a lack of opportunities, focuses on the causes rather than the symptoms of poverty and it can reduce chronic poverty and the limits of social mobility (Lenoir 1974, Commission of the European Communities 1992, Room 1992, Silver 1994, Gore and Figueiredo 1997), two of the main challenges in South American cities (Gacitúa et al. 2000, UN-Habitat 2003). This paper delves into the lack of opportunities to access employment, the main source of urban poverty reduction in the region (Bauer 1957, Carrión 1990, Unda 1990, Paes De Barros et al. 2008). It explores the idea that residential location is a cause of exclusion from the labour market, which implicitly includes other reasons, such as gender or ethnicity (Bastia 2015), and it has externalities in different areas, such as development studies (Seers 1969, Maxwell 1998), human geography and urbanism. The study of the challenges of the relationship between urban mobility for arriving in the labour market and poverty can offer a pattern to define new tools for the development of local policies.

Focusing on recent demography and poverty data, and especially on its projections, many South American cities with more than one million people (excluding largest urban agglomerations), have become priorities. They have the worst poverty data, and they are expected to undergo a major increase of population in the future (Borsdorf et al. 2002, United Nations 2014). Under such considerations, we explore patterns of labour exclusion by residential causes in the city of Quito.

Theoretical Framework

The exclusion condition is understood as relative deprivation (Townsend 1979, De Haan 1998) or as lack of opportunities to participate (Bourguignon and Chakravarty 2019) in basic economic,

political and social activities in the area of reference (Figueroa 2001) — or, in Sen's (1997) words, a deprivation of the ability to overcome poverty.

As relative deprivations are different depending on the time and the chosen area, strategies to reduce them must consider similar experiences but they also must be individually designed. In addition, as deprivations are multi-faceted and changeable (De Haan 1998), the design of public policies to reduce the lack of opportunities must also quantify its positive and negative externalities into other related dimensions of exclusion.

To operate a public policy to reduce exclusion and poverty (Kaztman 2003), it is necessary to define the "attribute" and the "space" (Zohir 2006). The "attribute" is the reason of relative deprivation or the lack of opportunity, while the "space" is the relative deprivation or the lack of opportunity (Zohir 2006). The "attribute" must be objective and measurable, such as the place of residence, gender, and ethnicity (Zohir 2006). "Space" must consider the weight of each possible relative deprivation in each area (Zohir 2006). For example, regarding economic participation, it can consider employment, self-employment, and the public support but it is necessary to define which issue in each area and moment is relevant. In addition, the lack of opportunities must increase poverty. Examples of "spaces" could be the difficulty of finding a job or the limit of access to a corporate credit.

Attaining facts is the first step to define public policies with the objective of reducing exclusion and, consequently, poverty. In South America, urban poverty is a case of residential segregation (Massey et al. 1996, Wilson 2012). It is characterized by the trend of social groups concentrating in homogeneous neighbourhoods with the subjective perception of objective segregation (Rodríguez Vignoli 2001, Sabatini et al. 2009). This segregation is a consequence of the historical arrangement of cities defined by the regional dominant class and the public budget dedicated to investing in urbanism. The main South American cities were created to accumulate people with a military objective (Slack et al. 2016), following the Spanish and Portugal model around a central plaza, which we now identify as the downtown. Professionals and employees arrived from the villages to the nearby neighbourhoods (Portes 1976). Those who obtained titles to possess land had not just economic sources but also belonged to the dominant class. As the budgets of the towns were minimal, the areas that received the greatest part of the public budget were the neighbourhoods where the dominant classes lived. In the 19th century, the pressure over the downtown increased because of the demographic growth of the dominant class and the proximity of the poor neighbourhoods. As a result, the dominant class moved, creating other neighbourhoods. Such was the case of La Mariscal in Quito (Bustamente-Patiño and Herrero-Olarte 2017) or of "Barrio Republica" in Santiago de Chile (Rodríguez Vignoli 2008). The scheme repeated in every generation, and new dominant class neighbourhoods were created, giving shape to the current cities. At the same time, people in poor conditions created new neighbourhoods not just because of the natural rise of demography but due to new migration from the rural areas (Muwonge 1980, Costello 1987). As the number of poor neighbourhoods increases, their density rises, and the stagnation of living conditions call the attention of development studies, human geography, and urbanism.

Development studies on urban poverty deepened into the causes of marginality and they seek the ability to reduce it. Based on the "marginality theory" (Park 1928, Smith 1934, Goldberg 1941, Green 1947), the lack of access to development (Giusti 1973) and their non-participation in the decision structures of the society (Vekemans and Silva 1969) were by-products of the inability of cities to modernize and to integrate the rural migrants (United Nations 1963). According to the "dependent urbanization theory", the heir of the works related to the "dependency theory" of South America; in developed countries (Cardoso and Faletto 1971), the problem was the capitalism that

permitted marginality to press salaries downward and to have workforces available (Murmis 1969). Focusing on the search of possible solutions independently of the causes (Singer 1977) and taking into consideration the public capability to avoid marginality, Perlman (1977) voiced the ability of the outsiders to improve their quality of life and to overcome poverty. At the end of the "lost decade", there was reinforced the idea of the capabilities of the outsiders and of their heterogeneity, even within the groups, to improve their quality of life and to overcome poverty in each specific area and to negotiate public policies (Herrero-Olarte and Díaz-Márquez 2020).

In the nineties, the concept of marginalization in South America was related to urban poverty, which was influenced by the ideas of Sen (Sen and Williams 1982, Drèze et al. 1995, Sen 1997), and it was very similar to the exclusion idea developed at the end of the 20th century in order to refer to urban poverty in Europe (Deleeck and Van Den Bosch 1992, Secretary of State for Social Security 1999). The proposals on marginalization agreed that the poor people were not outsiders; they were in marginal conditions because of their relationship with the economic, political, and social structures. Generally, they could not have access to these structures, or they were used because of the system (Castells 2020). When poor people could not change the system, they were "vulnerable", but if they could change the system, they had the needed "assets" or the economic, social, or natural resources to improve their quality of life (Kabir et al. 2012).

Despite that there are a lot of dimensions that influence poverty, especially considering its multidimensionality, the low income is especially relevant. In the case of the World Bank and the European Union, the variable income is still used to measure poverty and it is included in the calculation in the majority of multidimensional poverty indices, such as UBN, HPI-2 or MPI.

In South American cities, the access to employment is the primary source of income; as such, it is the fundamental variable for analysing poverty reduction. In the future, it will be increasingly significant because of the growing trend of market forces and the reduction of the role of the state (De Mattos 2002), as well as the growing trend of low-skilled workers in urban areas (Sepúlveda Morales 2019).

Studies of economic and urban geography in South America developed the concept of residential location as an attribute of exclusion through qualitative works to describe the living conditions in the socioeconomic segregated neighbourhoods, as well as the relationship between them and the rest of the city (Prévôt Schapira 2000 – in Buenos Aires, Sabatini and Arenas 2000 – in Santiago de Chile, Pérez Valbuena and Salazar Mejía 2008 – in Cartagena, or Tachner and Bógus 2001 – in Sao Paulo).

To deepen the relationship between residential location and the lack of access to employment in South America, it is necessary to attend transport studies of urbanism and economy related to the concept of mobility, understood as the group of individual forms of displacements, their reasons, results, context, and conditions (Miralles i Guasch et al. 2000, Miralles-Guasch 2002, Figueroa 2005, Sanz 2005). Most of them perform qualitative work reinforcing the link between the access to opportunities to reduce poverty and the increase of mobility in general (ITRANS 2004, Castañeda Nordmann and Gómez López 2020). Some of them go deeper into the relationship between poor mobility and the access to employment (Sabatini et al. 2009, Venter 2016).

People who live in places where the economy is not thriving tend to respond to insecure labour markets by moving to residential areas where there are more opportunities for them and their families (Preece 2018). Nonetheless, some argue that mobility is less common for the unemployed, as economically inactive agents who live far from residential areas (Bailey and Livingston 2008). Parts of the population who perceive low-income levels and are economically

vulnerable may live in rural areas, not close to the economic parts of the city. Hence, they may be forced to encounter low-quality transport, longer journeys, higher costs, and exposure to pollution and accidents (Titheridge et al. 2014).

The link between the lack of mobility and economic and social exclusion derives from the supply of transport. In fact, transport provides access to labour market participation, education, and social activities for the marginalized parts of the society (Lucas 2012). For example, due to the concentration of educational and labour opportunities in specific parts of Bogotá, Colombia, inequality has risen because of the poor access to these activities that affected primarily the agents with low-income levels (Bocarejo and Oviedo 2012). In addition, Guzmán et al. (2017) find that, in Colombia, transport policies for urban mobility have helped to cope with the inequalities caused by the poor transport and socio-spatial infrastructure, where economic and education opportunities are concentrated in specific parts of the capital.

There is still a discussion on whether the parts of the population who live in disadvantaged urban and rural areas are immobile. In fact, they are often seen as trapped because of a lack of aspiration and access to mobility into economically competitive urban areas (Preece 2018). As unemployment remains a long-term factor for the marginalized and working-class agents, they may feel insecurity in moving in the search of new opportunities (Bourdieu 1990, Atkinson 2008). Therefore, the agglomeration of economic activities in certain parts of cities, the uncertainty and insecurity of labour markets and the difficult access to transportation deter the probability of mobility for low-income individuals to places of opportunity and growth (MacKinnon and Driscoll Derickson 2013, Martin et al. 2016).

The objective of this study is to find if residential location and economic agglomeration are determinants of exclusion from the labour market. Its aim is to define new tools for the development of local policies in Quito, a city with a high concentration of the population, where poverty and inequality are present and rising. We focus on finding the link between urban mobility towards the areas with more labour market opportunities and poverty, to propose policies that foster economic opportunities, equality, and development for the least favoured parts of the population. This paper deepens the relationship between mobility, employment, and poverty, known as residential labour exclusion in urban South America, modelled on a medium-sized city such as Quito.

Despite the significant poverty and inequality reductions achieved in Latin America, some types of exclusion and inequality remain to this day, one of them being related to mobility and its barrier to equitable progress (Deneulin and Sánchez-Ancochea 2018). Mobility policies and regulations have been at the centre of many cities in Latin America, with the objective of increasing the inclusion of low-income individuals and to reduce inequality (Oviedo et al. 2019). However, these methods for urban mobility follow the traditional guidelines that focus on efficiency rather than on spatial and social equality (Keeling 2008). Most economic epicentres in Ecuador and the Latin American region keep centralized distributions of educational and economic opportunities. Therefore, housing and land prices increase in these areas with strong economic activity, pushing poor people towards the urban peripheries, where the living costs are more affordable (Drewnowski and Scott 1966), and accentuating the exclusion of people who live far away (Guzman et al. 2017a, Guzman et al. 2017b).

As the region contains most of its population in urban areas, more complex transport and travel structures have arisen. However, these are served by formal and informal systems with low-quality standards and services (Hidalgo and Huizenga 2013). Hence, inequalities become an issue regarding the location of the citizens, affecting their mobility and access to the urban economic and employment opportunities (Jouffe 2011). Ecuador is not an exception when it comes to

economic exclusion within urban regions and between urban and rural areas. In fact, poverty levels reach 20% in urban areas, but this percentage increases to 33% in rural areas and it accentuates for the indigenous people, with 64.8% in 2014 (Palacio Ludeña and Díaz Pabón 2020). In the capital of Ecuador, Quito, approximately 70% of people use public transport as their main mean of transportation (Zárate 2018). In Quito, peripheral areas suffer from the low quality and supply of public means of transportation. So, as in many other cities in the country and the region, the individuals who live in the marginalized sectors need public transport to seek and to access economic, educational, and social opportunities (Guzman Jaramillo et al. 2019). This is of great importance, given the fact that some studies have found that roughly 88% of poverty in Quito is attributed to distance, density of public transportation, education, ethnicity, and healthcare (Herrero Olarte 2019).

Methodology

To define the pattern of the relationship among urban mobility, employment, and exclusion, we relate two indices calculated using data from 32 urban parishes in Quito. The first is a product of exclusion, which is the Multidimensional Poverty Rate (MPR); the other is the Labour Exclusion by Residential Causes Index (LERCI), which studies the variables of distance, cost and public transportation density in each parish using Iñaquito as reference, the financial centre and the parish that generates the most jobs in Quito (22.5%).

The methodology of the National Institute of Statistics and Censuses (NISC) of Ecuador, based on the work of Alkire and Foster (2011), was used to calculate the Multidimensional Poverty Rate (MPR) by parish (Table 1). NISC uses twelve indicators obtained from the National Survey of Employment, Unemployment and Underemployment (NSEUU). From this survey, it is not possible to calculate data at a parish level because it becomes non-representative[1]. Consequently, in the present study, data from the National Census of Population and Housing 2010 were used; these data are representative at a parish level[2]. From the census database, it is possible to calculate ten of the twelve indicators that NSEUU considers, omitting those that include income.

The MPR is calculated as the percentage of citizens that keep three of the ten poverty indicators. When a person has five or more poverty indicators, (s)he is considered extremely poor.

To determine if social exclusion produces more poverty, it is necessary to match each poverty area with a limit of opportunities and to construct an indicator with those limits. In this case, each dimension or group of dimensions of the MPR corresponds to a limit to overcome it. Labour Exclusion by Residential Causes Index (LERCI) includes the limit of access to employment.

For the current model, the independent mobility variables were aligned with the social inclusion and exclusion model of Shove (2002). When considering physical access to work, it can be said that the lack of accessibility will depend on: (a) the distance, measured as the average in kilometres that a person travels until arriving to work; (b) public transport, understood as the public transportation infrastructure available in each parish; and (c) the cost, understood as the monetary value to move from one parish to another.

[1]Loss of representativeness prevented the use of NBI, which is by parish but based on both the Census and the NSEUU.

[2]The bases of the census of housing, home, emigration, and population have been unified to avoid the duplication of records and to consider only housing data with their corresponding homes and population.

Table 1

Variables for calculating the Multidimensional Poverty Index (MPI) by parishes in Quito and by cantons at national level

Dimension		Deficiencies	Definition of Deficiency	INEC Weighting (National)	CENSUS Weighting (Parishes)
Education	25%	Non-attendance at basic and high school education	Children between 5 and 14 years old who do not attend a basic education centre and young people between the ages of 15 and 17 who do not attend high school.	33%	50%
		No access to higher education for economic reasons	Young people between the ages of 18 and 29 who, having completed high school, cannot access a third-level higher education centre due to the lack of financial resources.	33%	–
		Incomplete educational achievement	Persons between the ages of 18 and 64 who have not completed basic education, i.e., who have less than 10 years of schooling and who do not attend a formal school.	33%	50%
Work and social security	25%	Child and adolescent employment	Boys and girls between the ages of 5 and 14 who are employed during the school week are identified as deprived, since child labour is prohibited. Adolescents between 15 and 17 years of age are considered deprived of the right to work if, although employed, during the school week they fulfil one of the following conditions: they received a remuneration lower than the Unified Basic Salary, they did not attend classes, or they worked more than 30 hours.	33%	33%
		Unemployment or inadequate employment	People 18 years of age or older who, in the reference period, were unemployed. In addition, employed persons with inadequate employment (underemployment) are considered deprived.	33%	33%
		Non-contribution to the pension system	Employed people aged 15 years or over who do not contribute to any kind of social security, excluding the persons aged 65 and over who do not contribute but receive retirement pensions. People aged 65 or over who are unemployed or economically inactive are considered deprived if they do not receive a retirement pension, the Human Development Stipend or the Joaquín Gallegos Lara Stipend.	33%	33%
Health, Water and Food	25%	No public water service	Households that obtain water through a medium other than the public grid.	50%	100%
		Extreme poverty based on income	People whose per capita household income is lower than the extreme poverty line.	50%	–
Habitat, housing, sanitation, and environment	25%	Overcrowding	Households who have more than three people per bedroom.	25%	25%
		Housing deficit	People whose housing, due to the materials or condition of their walls, floors, and ceilings, are deemed to have a qualitative or quantitative deficit.	25%	25%
		No sewage service	People in urban areas whose homes do not have toilet service connected to a sewer. In rural areas, deprived people are those whose dwellings do not have a sewer or a septic tank.	25%	25%
		No trash collection service	People living in homes that do not have access to the municipal waste collection service are classified as deprived in this indicator.	25%	25%

Source: *the author's elaboration using data from the National Institute of Statistics and Censuses (NISC) of Ecuador*

The independent variable *distance* (a) estimates the average in kilometres that the citizens travel to arrive from the centre of their parish of residence to the centre of the parish of Iñaquito[3]. To measure (a), it is necessary to calculate (a.1), which is the distance by public transport from the centre of each parish to the centre of the parish of Iñaquito[4]. For this, the average distance in kilometres of several possible routes is taken. The information to calculate (a.1) was provided by the Ministry of Mobility for the Municipality of Quito.

The independent variable *public transportation density* (b) by parish is calculated by multiplying the number of public transportation lines (b.1) per parish by the frequency of lines (b.2) and by dividing this result by the total population of the parish. The number of available lines is defined as all those in operation[5] while the frequency takes the number of available units per hour in each parish (articulated and bi-articulated buses used for the Ecovía and the Central Corridor Trolleybus are excluded). Frequency takes the number of units for the different modes of transportation. The last independent variable is the *cost* (c), which is calculated according to the best possible routes by the public transportation that citizens can take to get to the centre of the parish of Iñaquito.

The formula to calculate the Labour Exclusion by Residential Causes Index (LERCI) is presented by this equation:

$$\text{LERCI}_p = [Ln\ a - Ln\ b + Ln\ c]_p$$

(a) Average distance in kilometres, (b) public transportation density, (c) cost of public transportation, and (p) each parish.

Results

The Multidimensional Poverty Rate (MPR) in Quito was 16%, which means that 268,906 people have three of the eight poverty indicators of the National Institute of Statistics and Censuses (NISC) obtained by the census database. The parishes with the highest MPR were Guamaní to the south of Quito, La Libertad in downtown and El Condado in the north, with values of 32%, 30% and 29%, respectively. The parishes with the lowest MPR were Iñaquito with 2%, La Concepcion with 3%, and Mariscal Sucre with 4% (Table 2).

LERCI ranges from less than 0 to approximately 5.5 among the parishes; those that are closer to 0 are those that show a better indicator, while those that are close to 5.5 present problems of distance, which results in time expenditure, lack of infrastructure for public transportation and a higher cost of transportation. Turubamba (5.4), El Condado (4.8), La Mena (4.6), Chillogallo (4.3) and Gumaní (4.2) are the five parishes with the biggest indicator within Quito; consequently, they show the most problems in terms of distance, public transportation, and cost. On the other hand, Mariscal Sucre (-0.01), Centro Historico (0.01), Jipijapa (0.36), Rumipamba (0.46) and Itchimbia (0.65) are the parishes with the lowest LERCI, indicating good features in transportation and location.

[3]The parish of Iñaquito generates the largest number of jobs in Quito, with 22.5% of the total. This figure was identified based on the analysis of a sample of 347 companies out of the nearly 3,600 active people in Quito in 2010. This information was provided by the Municipality of Quito.
[4]The modes of transportation considered are all those used in Quito: Ecovía, Central Corridor Trolleybus, North Central Corridor, Southeastern Corridor, Southwestern Trunk, Integrated System Routes, Extensions, Inter-parish, and Intra-parish Routes and Conventional and Individual Routes.
[5]Idem.

Table 2

Multidimensional Poverty Rate (MPR) and Spatial Exclusion Index (SEI) in Quito

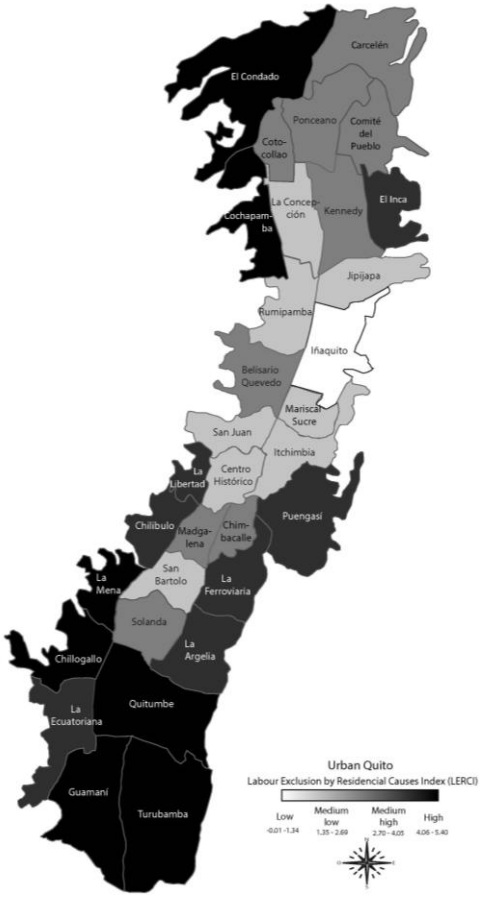
	Parish	**MPR**	**SEI**		**Parish**	**MPR**	**SEI**
1	Belisario Quevedo	15%	1.69	17	LA ARGELIA	23%	3.70
2	Carcelén	12%	2.40	18	LA ECUATORIANA	24%	2.91
3	Centro Histórico (*)	22%	0.01	19	LA FERROVIARIA	21%	2.75
4	CHILIBULO	18%	3.46	20	LA LIBERTAD (*)	30%	3.84
5	CHILLOGALLO	24%	4.27	21	LA MAGDALENA	7%	1.63
6	CHIMBACALLE	10%	1.61	22	LA MENA	16%	4.58
7	COCHAPAMBA	22%	4.12	23	MARISCAL SUCRE	4%	-0.01
8	COMITÉ DEL PUEBLO	19%	2.31	24	PONCEANO	10%	1.81
9	LA CONCEPCIÓN	3%	0.90	25	PUENGASÍ	16%	2.95
10	COTOCOLLAO	7%	2.29	26	QUITUMBE	19%	4.06
11	EL CONDADO	29%	4.83	27	RUMIPAMBA	5%	0.46
12	GUAMANÍ	32%	4.19	28	SAN BARTOLO	10%	1.02
13	ITCHIMBÍA	10%	0.65	29	SAN ISIDRO DEL INCA	17%	3.44
14	IÑAQUITO	2%	–	30	SAN JUAN (*)	18%	1.04
15	JIPIJAPA	7%	0.36	31	SOLANDA	11%	2.46
16	KENNEDY	7%	1.70	32	TURUBAMBA	28%	5.40

Source: *the author's elaboration from the model estimates*

There is a positive relationship between MPR and LERCI, which means that there is a direct relationship between multidimensional poverty and the distance in kilometres to the parish with more jobs, as well as the cost of arriving and the public transportation available (Fig. 1, Fig. 2). Indeed, the parishes with the higher MPR were the same in general with the higher LERCI, which is the farthest from the parish of Iñaquito. The value of the correlation coefficient between MPI and LERCI is 0.75, and the R coefficient is 0.56, which shows a relationship between residential location and poverty. Despite the strong correlation between the two indicators, there is a group of parishes with a small correlation between MPR and LERCI, including the parish in the natural centre of the city. Excluding downtown parishes (the Historical Centre, San Juan, and La Libertad), the value of the correlation coefficient is 0.86, and the R coefficient is 0.75. The results suggest a pattern of labour exclusion by residential causes that includes two dimensions of urban poverty: in downtown parishes and in the periphery.

Note: geographical scale of 1:20000

Fig. 1 **– Multidimensional Poverty Rate (MPR) in urban parishes**
Source: *compiled by the author using the Population and Housing Census of 2010 and the database provided by the Municipality of Quito*



Note: geographical scale of 1:20000

Fig. 2 **– Labour Exclusion by Residential Causes Index (LERCI) in Quito urban parishes**
Source: *compiled by the author using the Population and Housing Census of 2010 and the database provided by the Municipality of Quito*

Discussion

The correlation between the MPI and the LERCI in each parish is stronger without considering that the three parishes in the centre of the city suggest that there is a pattern of labour exclusion by residential causes in Quito. The pattern relates labour exclusion and urban mobility in two ways. On one hand, there is a link between the parishes with low mobility, given the distance, the cost, and the available public transportation, as well as with multidimensional poverty. There are also parishes on the periphery of the city. On the other hand, some parishes in the centre have high levels of poverty and good mobility. Comparing poverty on the periphery and in the city

centre, the origin was obvious; in the centre, poverty is a legacy of the impoverished employees of the first dominant classes, but in the periphery, they are migrants who arrived later to the city.

Public policies to reduce poverty in Quito should devise a strategy to breakdown the social barriers to overcoming poverty in the city centre. Two scenarios appear in this context. On one hand, there is a possibility of improving public and private transport to approach the parishes on the periphery to the parish of Iñaquito. There are different options in this course of action. The invest would increase and create the number of public transports available on the existing routes and it would create new other routes. It could improve the people capability to have a work, and consequently to reduce poverty. Nowadays, there are some many objections to this strategy. In the case that the roads don't increase, the most probable scenario, the traffic would increase, generating two undesirable consequences. There would be more contamination and the time to arrive to the work would increase. These are two of the main challenges of South American cities (Zalakeviciute et al. 2018, Díaz-Márquez 2019). Consequently, the approaching of the parishes on the periphery through increasing public transport can be doubted as the selected public policy to improve the possibilities of working. On the other hand, the idea of multiple centralities has become especially relevant in this context. Multiple centralities generate small economies of scale that produce different nucleus to increase the jobs supply. This proposal can reduce contamination, and the time to arrive to work, setting it up as the best in this context.

Conclusions

Although this research limits its operational analysis to Quito, cities with a similar past and population, one to five million people, will increase from 45 million in 2015 to 52 million in 2030. These large cities, but not the megalopolises, will grow larger, and most of their people will live in urban poverty. This search for patterns of labour exclusion by residential causes can be developed in other cities too to offer more tools from development studies, human geography, or urbanism to decision makers in the region. The results would be an opportunity to reduce poverty and to avoid future slums, which would positively affect poverty. In addition, improving urban mobility to access the labour market would redesign cities to support productivity, infrastructure development, quality of life, equity and social inclusion, the other major challenges in South America. Attending to the possible urban strategies, to reinforce centralities seems to be the most adequate.

References

ALKIRE S., FOSTER J. (2011), *Counting and multidimensional poverty measurement*, Journal of Public Economics 95 (7-8), 476-487.

ATKINSON W. (2008), *Not all that was solid has melted into air (or liquid): A critique of Bauman on individualization and class in liquid modernity*, The Sociological Review 56 (1), 1-17.

BAILEY N., LIVINGSTON M. (2008), *Selective migration and neighbourhood deprivation: Evidence from 2001 census migration data for England and Scotland*, Urban Studies 45 (4), 943-961.

BASTIA T. (2015), *Transnational migration and urban informality: Ethnicity in Buenos Aires' informal settlements*, Urban Studies 52 (10), 1810-1825.

BAUER P. T. (1957), *Economic Analysis and Policy in Underdeveloped Countries*, Cambridge University Press, London.

BOCAREJO S. J. P., OVIEDO H. D. R. (2012), *Transport accessibility and social inequities: a tool for identification of mobility needs and evaluation of transport investments*, Journal of Transport Geography 24, 142-154.

BORSDORF A., BÄHR J., JANOSCHKA M. (2002), *Die Dynamik stadtstrukturellen Wandels in Lateinamerika im Modell der lateinamerikanischen Stadt* (The dynamic of urban structural change in Latin America in the model of the Latin American city), Geographica Helvetica 57 (4), 300-310.

BOURDIEU P. (1990), *The Logic of Practice,* Stanford University Press, Stanford.

BOURGUIGNON F., CHAKRAVARTY S. R. (2019), *The measurement of multidimensional poverty*, In: Chakravarty S. (ed.), Poverty, Social Exclusion and Stochastic Dominance, Springer, Singapore, pp. 83-107.

BUSTAMENTE-PATIÑO B., HERRERO-OLARTE S. (2017), *La clase dominante como determinante de la forma de Quito* (The ruling class, determinant of Quito's shape), Bitácora Urbano Territorial 27 (3), 81-90.

CARDOSO F. H., FALETTO E. (1971), *Dependencia y desarrollo en América Latina: ensayo de interpretación sociológica* (Dependency and development in Latin America: a sociological interpretation essay), Siglo Veintiuno, Buenos Aires.

CARRIÓN F. (ed.) (1990), *La Investigación Urbana en América Latina. Caminos Recorridos y por Recorrer: Estudios Nacionales* (Urban Research in Latin America. Paths Travelled and to Go: National Studies)*,* Ciudad, Quito.

CASTAÑEDA NORDMANN A. L., GÓMEZ LÓPEZ C. (2020), *¿Relocalización o bienestar social? Evaluación de las condiciones de accesibilidad en erradicaciones del Área Metropolitana de Tucumán* (Relocation or social welfare? Evaluation of accessibility conditions in the eradications of Tucumán Metropolitan Area), Estudios Demográficos y Urbanos 35 (1), 185-214.

CASTELLS M. (2020), *Space of flows, space of places: Materials for a theory of urbanism in the information age*, in: LeGates R. T., Stout F. (eds.), The City Reader, Routledge, London, pp. 240-251.

COMMISSION OF THE EUROPEAN COMMUNITIES (1992), *Towards a Europe of Solidarity: Intensifying the fight against social exclusion, fostering integration*, Commission of the European Communities, Retrieved from: www.eur-lex.europa.eu.

COSTELLO M. A. (1987), *Slums and squatter areas as entrepots for rural-urban migrants in a less developed society*, Social Forces 66 (2), 427-445.

DE HAAN A. (1998), *'Social Exclusion': An Alternative Concept for the Study of Deprivation?*, IDS Bulletin 29 (1), 10-19.

DE MATTOS C. A. (2002), *Transformación de las ciudades latinoamericanas. ¿Impactos de la globalización?* (Transformation of Latin American cities. Impacts of globalization?), EURE 28 (85), 5-10.

DELEECK H., VAN DEN BOSCH K. (1992), *Poverty and Adequacy of Social Security in Europe: a Comparative Analysis*, Journal of European Social Policy 2 (2), 107-120.

DENEULIN S., SÁNCHEZ-ANCOCHEA D. (2018), *Urban inequality, youth and social policy in Latin America: introduction to special section*, Oxford Development Studies 46 (1), 3-9.

DÍAZ-MÁRQUEZ Á. M. (2019), *Revisión bibliográfica sobre la circulación de ideas urbanas en América Latina y el Caribe* (Bibliographic review on the circulation of urban ideas in Latin America and the Caribbean), EURE 45 (134), 279-294.

DREWNOWSKI J., SCOTT W. (1966), *The Level of Living Index*, United Nations Research Institute for Social Development, Geneva.

DRÈZE J., SEN A., HUSSAIN A. (1995), *The Political Economy of Hunger: Selected Essays*, Oxford University Press, Oxford.

FIGUEROA A. (2001), *Social exclusion and rural underdevelopment*, in: Feinstein O. N., Picciotto R., Wolfensohn J. D. (eds.), Evaluation and poverty reduction, Routledge, New York, pp. 329-337.

FIGUEROA O. (2005), *Transporte urbano y globalización. Políticas y efectos en América Latina* (Urban transport and globalization. Policies and effects in Latin America), EURE 31 (94), 41-53.

GACITÚA E., SOJO C., DAVIS S. H. (eds.) (2000), *Exclusión Social y Reducción de la Pobreza en América Latina y Caribe* (Social Exclusion and Poverty Reduction in Latin American and the Caribbean), FLACSO – The World Bank, San José.

GIUSTI J. (1973), *Organización y participación popular en Chile: el mito del "hombre marginal"* (Popular organization and participation in Chile: the myth of the "marginal man"), FLACSO, Santiago de Chile.

GOLDBERG M. M. (1941), *A Qualification of the Marginal Man Theory*, American Sociological Review 6 (1), 52-58.

GORE C., FIGUEIREDO J. B. (eds.) (1997), *Social exclusion and anti-poverty policy: a debate*, International Labour Organization, Geneva.

GREEN A. W. (1947), *A Re-Examination of the Marginal Man Concept*, Social Forces 26 (2), 167-171.

GUZMAN L. A., OVIEDO D., BOCAREJO J. P. (2017a), *City profile: the Bogotá metropolitan area that never was*, Cities 60 (Part A), 202-215.

GUZMAN L. A., OVIEDO D., RIVERA C. (2017b), *Assessing equity in transport accessibility to work and study: The Bogotá region*, Journal of Transport Geography 58, 236-246.

GUZMAN JARAMILLO A., PHILIPS I., LUCAS K. (2019), *14 - Social impact assessment: The case of bus rapid transit in the City of Quito, Ecuador*, in: Lucas K., Martens K., Di Ciommo F., Dupont-Kieffer A. (eds.), Measuring Transport Equity, Elsevier, Amsterdam, pp. 217-229.

HERRERO OLARTE S. (2019), *Territorial Exclusion as a Limit to Urban Development: The Case of Quito, Ecuador,* Theoretical and Empirical Researches in Urban Management 14 (4), 53-69.

HERRERO-OLARTE S., DÍAZ-MÁRQUEZ A. (2020), *Análisis de la relación entre accesibilidad y pobreza. Estudio de caso en Quito, Ecuador* (Analysis of the relationship between accessibility and poverty. A case study in Quito, Ecuador), AUS [Arquitectura/Urbanismo/Sustentabilidad] 27, 50-58.

HIDALGO D., HUIZENGA C. (2013), *Implementation of sustainable urban transport in Latin America*, Research in Transportation Economics 40 (1), 66-77.

ITRANS (2004), *Mobilidade e pobreza* (Mobility and poverty), Instituto de Desenvolvimento e Informaçáo em Transporte, Retrieved from: www.mcadaval.com.br.

JOUFFE Y. (2011), *Las clases socio-territoriales entre movilidad metropolitana y repliegue barrial. ¿Tienen los pobladores pobres una movilidad urbana de clase?* (Socio-territorial classes between metropolitan mobility and neighborhood withdrawal. Do poor people have a class urban mobility?), Revista Transporte y Territorio 4, 84-117.

KABIR M. S., HOU X., AKTHER R., WANG J., WANG L. (2012), *Impact of small entrepreneurship on sustainable livelihood assets of rural poor women in Bangladesh*, International Journal of Economics and Finance 4 (3), 265-280.

KAZTMAN R. (2003), *La dimensión espacial en las políticas de superación de la pobreza urbana* (The spatial dimension in urban poverty alleviation policies), United Nations, Santiago de Chile.

KEELING D. J. (2008), *Latin America's transportation conundrum*, Journal of Latin American Geography 7 (2), 133-154.

LENOIR R. (1974), *Les exclus: un Français sur dix* (The excluded: one in ten French people), Seuil, París.

LUCAS K. (2012), *Transport and social exclusion: where are we now?*, Transport Policy 20, 105-113.

MACKINNON D., DRISCOLL DERICKSON K. (2013), *From resilience to resourcefulness: A critique of resilience policy and activism*, Progress in Human Geography 37 (2), 253-270.

MARTIN R., PIKE A., TYLER P., GARDINER B. (2016), *Spatially rebalancing the UK economy: Towards a new policy model?*, Regional Studies 50 (2), 342-357.

MASSEY D. S., WHITE M. J., PHUA V.-C. (1996), *The dimensions of segregation revisited*, Sociological Methods & Research 25 (2), 172-206.

MAXWELL S. (1998), *Comparisons, Convergence and Connections: Development Studies in North and South*, IDS Bulletin 29 (1), 20-31.

MIRALLES-GUASCH C. (2002), *Ciudad y Transporte: el binomio imperfect* (City and Transport: the imperfect binomial), Ariel, Barcelona.

MIRALLES I GUASCH C., TULLA I PUJOL A. F., CEBOLLADA A., REQUENA R. (2000), *Mobilitat sostenible: innovacions conceptuals i estat de la qüestió* (Sustainable mobility: conceptual innovations and state of the art), Universitat Autònoma de Barcelona, Retrieved from: portalrecerca.uab.cat.

MURMIS M. (1969), *Tipos de marginalidad y posición en el proceso productive* (Types of marginality and position in the production process), Revista Latinoamericana de Sociología 2, 413-421.

MUWONGE J. W. (1980), *Urban policy and patterns of low-income settlement in Nairobi, Kenya*, Population and Development Review 6 (4), 595-613.

OVIEDO D., SCHOLL L., INNAO M., PEDRAZA L. (2019), *Do bus rapid transit systems improve accessibility to job opportunities for the poor? The case of Lima, Peru*, Sustainability 11 (10), 2795.

PAES DE BARROS R., FERREIRA F. H. G., MOLINAS VEGA J. R., SAAVEDRA CHANDUVI J. (2008), *Midiendo la desigualdad de oportunidades en América Latina y el Caribe* (Measuring the inequality of opportunities in Latin America and the Caribbean), The World Bank, Washington, D.C.

PALACIO LUDEÑA M. G., DÍAZ PABÓN F. A. (2020), *Urban inequality and protests in Ecuador and Chile*, SALDRU, Cape Town.

PARK R. E. (1928), *Human migrations and the marginal man*, American Journal of Sociology 33, 881-893.

PERLMAN J. (1977), *O Mito da Marginalidade: favelas e política no Rio de Janeiro* (The Myth of Marginality: favelas and politics in Rio de Janeiro), Paz e Terra, Rio de Janeiro.

PÉREZ VALBUENA G. J., SALAZAR MEJÍA I. (2008), *La pobreza en Cartagena: un análisis por barrios* (Poverty in Cartagena: an analysis by barrios), Revista del Banco de la Republica 82 (967), 16-55.

PORTES A. (1976), *The Economy and Ecology of Urban Poverty*, in: Portes A., Walton J. (eds.), Urban Latin America: The Political Condition from Above and Below, University of Texas Press, Austin, pp. 7-69.

PREECE J. (2018), *Immobility and insecure labour markets: An active response to precarious employment*, Urban Studies 55 (8), 1783-1799.

PRÉVÔT SCHAPIRA M.-F. (2000), *Segregación, fragmentación, secesión. Hacia una nueva geografía social en la aglomeración de Buenos Aires* (Segregation, fragmentation, secession. There is a new social geography in the agglomeration of Buenos Aires), Economía, Sociedad y Territorio 2 (7), 405-431.

RODRÍGUEZ VIGNOLI J. (2001), *Segregación residencial socioeconómica: ¿qué es?, ¿cómo se mide?, ¿qué está pasando?, ¿importa?* (Socioeconomic residential segregation: what is it? how is measure it? does it matter? what is happening?), United Nations. CEPAL, Santiago de Chile.

RODRÍGUEZ VIGNOLI J. (2008), *Movilidad cotidiana, desigualdad social y segregación residencial en cuatro metrópolis de América Latina* (Daily mobility, social inequality and residential segregation in four Latin American metropolises), EURE 34 (103), 49-71.

ROOM G. (ed.) (1992), *Observatory on national policies to combat social exclusion*, Commission of the European Communities, Retrieved from: researchportal.bath.ac.uk.

SABATINI F., ARENAS F. (2000), *Entre el Estado y el mercado: resonancias geográficas y sustentabilidad social en Santiago de Chile* (Between the State and the market: geographic resonances and social sustainability in Santiago de Chile), EURE 26 (79), 95-113.

SABATINI F., SARELLA ROBLES M., VÁSQUEZ H. (2009), *Gentrificación sin expulsión, o la ciudad latinoamericana en una encrucijada histórica* (Gentrification without expulsion or the historical crossroads of the Latinamerican city), Revista_180 24, 18-25.

SANZ A. (2005), *El viatge de les paraules* (The journey of words), SAM 3, 7-14.

SECRETARY OF STATE FOR SOCIAL SECURITY (1999), *Opportunity for All: Tackling Poverty and Social Exclusion*, The Stationery Office, London.

SEERS D. (1969), *The meaning of development*, Institute of Development Studies, Retrieved from: www.ids.ac.uk.

SEN A. (1997), *Resources, Values and Development*, Harvard University Press, Cambridge.

SEN A., WILLIAMS B. (eds.) (1982), *Utilitarianism and beyond*, Cambridge University Press, Cambridge.

SEPÚLVEDA MORALES R. (2019), *Evolución de la segregación residencial: grupos ocupacionales y politicas de vivienda popular en el gran Santiago, 1960-2005* (Evolution of residential segregation: occupational groups and popular housing policies in Greater Santiago, 1960-2005), Universidad de Chile, Santiago de Chile.

SHOVE E. (2002), *Rushing around: coordination, mobility and inequality*, Lancaster University, Retrieved from: www.lancaster.ac.uk.

SILVER H. (1994), *Exclusión social y solidaridad: Tres paradigmas* (Social exclusion and solidarity: Three paradigms), Revista Internacional del Trabajo 113 (5-6): 607-662.

SINGER P. (1977), *Desenvolvimento Econômico e Evolução Urbana, Análise da Evolução Econômica de São Paulo, Blumenau, Porto Alegre, Belo Horizonte e Recife* (Economic Development and Urban Evolution, Analysis of the Economic Evolution of São Paulo, Blumenau, Porto Alegre, Belo Horizonte and Recife), Companhia Editora Nacional, São Paulo.

SLACK J., MARTÍNEZ D. E., LEE A. E., WHITEFORD S. (2016), *The Geography of Border Militarization: Violence, Death and Health in Mexico and the United States*, Journal of Latin American Geography 15 (1), 7-32.

SMITH W. C. (1934), *The Hybrid in Hawaii as a Marginal Man*, American Journal of Sociology 39 (4), 459-468.

TACHNER S. P., BÓGUS L. M. M. (2001), *São Paulo, uma metrópole Desigual* (São Paulo, an unequal metropolis), EURE 27 (80), 87-120.

TITHERIDGE H., CHRISTIE N., MACKETT R., OVIEDO HERNÁNDEZ D., YE R. (2014), *Transport and poverty: A Review of the Evidence*, University College London, Retrieved from: www.ucl.ac.uk.

TOWNSEND P. (1979), *Poverty in the United Kingdom: A Survey of Household Resources and Standards of Living*, Penguin Books, Harmondsworth.

UNDA M. (1990), *La Investigación Urbana en América Latina: Caminos Recorridos y por Recorrer. Viejos y nuevos temas* (Urban Research in Latin America: Roads and Trails. Old and New Topics), CIUDAD, Quito.

UNITED NATIONS (1963), *Social development of Latin America in the post-war period*, United Nations, Retrieved from: repositorio.cepal.org.

UNITED NATIONS (2014), *World Urbanization Prospects: The 2014 Revision*, Department of Economic and Social Affairs: Population Dynamics, Retrieved from: population.un.org.

UN-HABITAT (2003), *The challenge of slums: global report on human settlements 2003*, Earthscan, London.

VEKEMANS R., SILVA I. (1969), *La Marginalidad en América Latina: un ensayo de conceptualización* (Marginality in Latin America: an essay on conceptualization), DESAL, Santiago de Chile.

VENTER C. (2016), *Assessing the potential of bus rapid transit-led network restructuring for enhancing affordable access to employment – The case of Johannesburg's Corridors of Freedom*, Research in Transportation Economics 59, 441-449.

WILSON W. J. (2012), *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*, The University of Chicago Press, Chicago.

ZALAKEVICIUTE R., RYBARCZYK Y., LÓPEZ-VILLADA J., DIAZ SUAREZ M. V. (2018), *Quantifying decade-long effects of fuel and traffic regulations on urban ambient $PM_{2.5}$ pollution in a mid-size South American city*, Atmospheric Pollution Research 9 (1), 66-75.

ZÁRATE C. N. (2018), *Qué esperar tras el fin de los subsidios anunciados* (What to expect after the end of the announced subsidies), GK, Retrieved from: www.gk.city.

ZOHIR S. (2006), *Participation of non-government organizations in the delivery of social services*, in: Ahmed S., Mahmud W. (eds.), Growth and poverty: the development experience of Bangladesh, University Press Limited, Dhaka, pp. 285-304.

Initial submission: 27.02.2020
Revised submission: 30.11.2020
Final acceptance: 22.12.2020

Correspondence: Centro de Investigaciones Económicas y Empresariales (CIEE), Facultad de Ciencias Económicas y Administrativas, Universidad de Las Américas, Av. de los Granados E12-41 y Colimes esq., Quito EC170125, Ecuador.

Email: olartesusana@hotmail.com

Aims and scopes

Analysis of the urban and regional condition needs to be interdisciplinary. In reality, urban researchers usually tend to belong to a discipline reflecting their training whether as sociologists, geographers, planners or any number of subjects concerned with the study of space and place. Our training very often endorses an appreciation of how other disciplines explore the city. For the journal the acknowledgement of the many disciplines that concerned with understanding cities and regions will be indicated by the different disciplinary back-grounds reflected in the papers published. Articles will be published by geographers, sociologists, planners, economists, political scientists, to mention just few of the disciplines involved in urban and regional study.

The Journal of Urban and Regional Analysis plans to be a key outlet publishing topical articles dealing with cities and regions. In later issues we plan to include sections devoted to notes and comments as well as a policy section outlining and discussing state and non-state initiatives aimed at improving cities and regions, together with the problems confronted by their implementation.

Instructions to Authors

1. The Journal of Urban and Regional Analysis seeks to redefine and revigorate the links between geography, sociology, planning, economy, political science. It aims to publish original academic research, critical studies and discussions of the highest scholar standard in the field of urban and regional development. Submitted papers will be evaluated on the basis of their creativity, academic quality and contributions to advancing understanding of the complex problems related to urban and regional development.

2. Submitted manuscripts must be original, unpublished contributions. They must not be submitted or accepted by any other publications. All articles submitted to the Journal will be available online, free of charge.

3. One electronic copy of the manuscript (sent by email in PDF format) should be submitted to Editor listed below.

Ioan IANOŞ
University of Bucharest -
Interdisciplinary Centre for Advanced Research on Territorial Dynamics (CICADIT)

030018, Bucharest, Romania 4-12, Regina Elisabeta Blv.

E-mail: office@cicadit.ro

4. Layout: Manuscripts should be written in English and contain no more than 8000 words. Page setup: A4 size, 3 cm. all margins; title: Arial Bold, 12 pts, all caps, centered.; 2 empty rows (same font); name of authors using Arial, 10 pts.: first name italic, last name upper-case, centered. Affiliation follows below, centered; 2 empty rows (same Font). The abstract: start with the word "Abstract", followed by the text, not to exceed 150 words. Use Arial, 8 pts., justified alignment, indent 2 cm. left and right; 1 empty row, same font. Three or four keywords should start after the word "keywords", written using Arial, 8 pts., justified alignment, indent 2 cm. to the left. Keywords should be written using Arial Italic, 8 pts.; 2 empty rows, same font. The text uses Arial, 9 pts., Justify alignment. Headings use Arial Bold, 9 pts., centered. Research articles should use the following headings: Introduction, Materials and Methods, Results and Discussion, Conclusions, References. The text of tables uses Arial, 9 pts. Captions and tiles of tables are centered and use Arial Bold, 9 pts. Tables and figures should be centered and numbered consecutively throughout the manuscript and referred in the text using Arab numbering. Captions should use the word table/figure with italic characters followed by the title with bold font. Citations in the text should use the Harvard System of short references, for example, (Geyer 2002) followed by a, b,... when two or more references to works by one author are given for the same year, e.g. (Geyer 2002a, 2002b). Page numbers should be indicated for quotations. At the end of the article, a full listing of references in alphabetical order should be provided in the following style; use Arial, 9 pts, hang at 1cm:

GIDDENS A. (1990), *The Consequences of Modernity*, Polity Press, Cambridge.

MARSHAL R. (1995), *The global job crisis,* Foreign Policy, 100, 50-68.

*** (1938-1941), *General Romanian Population and Settlements Census on December the 29th 1930*, I-X, ICS, Bucharest.

Images should be submitted in their final form, both as good quality hard copy and electronically.
Authors not proficient in English should have their manuscripts checked before submission by a competent English speaker. To edit your manuscript, use the template available at www.jurareview.ro.

5. Paper submissions must be printed on one side of A4 or US Letter-sized paper, double spaced (including footnotes and references) with a 1.5 inches margin and numbered pages. Submissions will not be normally returned to authors. Avoid excessive use of footnotes. Tables and figures should be attached on separate pages at the end of the manuscript and their approximate position indicated in the text .

6. Final versions of papers accepted for publishing should be submitted electronically in a MS Word compatible format suitable for editing.

Open-access journal

ISSN 2067-4082
9 772067 408006
www.editurauniversitara.ro