**PUBLIC ADMINISTRATION & REGIONAL STUDIES**
**9th Year, No.1 (17) – 2016**
**Galati University Press, ISSN 2065 -1759**

# FRESH PERSPECTIVES ON URBAN DYNAMICS: THE CASE OF ULAANBAATAR (MONGOLIA) AND LE HAVRE (FRANCE)

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**Abstract**

*Through the example of various measurements and a comparative study of the urban areas of two cities, Ulaanbaatar and Le Havre, this paper intends to illustrate the ways in which comparative urban geography studies can improve the urban planning strategy. Other aims of this paper are to describe how this collaboration has been established and to present both cities and their urban characteristics, and, finally to prove, despite the two very different urban shapes, the interest of a scientific collaboration.*

**Key words:** urban, French model, spatial, comparison

## 1. Introduction: Why a collaboration between Le Havre (LH) and Ulaanbaatar (UB)?

The spatial dynamics of urban areas is, mostly, the result of the driving force of economic and social changes in the country or the region. Although urban areas cover less than 2 % of the total land surface of the earth (Grubler, 1994), more than half of the world's population resides in urban regions. Urban growth generally leads to an increase in motorized transport, in air-, water- and noise-pollution, in energy consumption, in a loss of agricultural land and in a reduction in biological diversity (Seto and Kaufmann, 2003). Information on existing spatial use and the course of spatial change is essential for urban planning and management as it provides crucial clues for future development (Zhan et al., 2002).

An academic opportunity[1]has enabled authors to establish this fresh perspective. Indeed, an international agreement was signed in 2004. On the occasion of the renewal of this agreement in 2014, a scientific exchange begun among land-use researchers both in NUM and in ULH, with a focus on urban dynamics. Three professorial visits had been set up (two in Mongolia in April 2014 and May 2016, one in France in December 2015).These visits made possible an ongoing discussing and observing of French and Mongolian case studies, and led to formulating the first issues of comparison between Le Havre (LH) and Ulaanbaatar (UB). This collaboration is continuing thanks to this 5th International 'Europe-Asia' conference, which offers an opportunity to present the results of this recent collaboration. After specifying how collaboration was established, the general scope of this paper is to present the two cities and their urban characteristics, and, finally, although urban shapes are different, to prove the interest of a scientific collaboration.

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1Collaboration first established in 2004 with the School of Foreign Service of NUM (now SIRPA at NUM) and University of Le Havre.

## 2. Discovering spatial dynamics in Ulaanbaatar and Le Havre

### *2.1 Ulaanbaatar: the problem of expanding*

- **Population dynamics**

There is hardly a more significant case than Mongolia, where an unexpected scale and rate of urban expansion has occurred over the past 40 years, with 66.2 % of its 3 million inhabitants residing in urban areas. Compared with the beginning of the 20th century, where traditional rural nomadic populations were a majority and evenly inhabited the country's 1.5 million sq. km, this has been a very rapid rate of urbanization (Myagmartseren et al., 2013).

Mongolian urban areas are located along the Trans Siberian railways, and these are called the Greater areas of Ulaanbaatar, Darkhan, Erdenet, etc. Among them, the Ulaanbaatar area is the most concentrated in terms of demography, economy and political activity. Table 1 shows the percentage of Ulaanbaatar areas inhabitants in terms of national totals: each year and each period of 10 years show increasing urban population or urbanization vs. rural areas population ratio as becoming unequal (44 % of Mongolia's population resides in Ulaanbaatar in 2015).

**Table 1. Ulaanbaatar areas inhabitants in total nation**

| | | | 2000 | 2001 | 2005 | 2007 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|
| 1 | Percent of Ulaanbaatar city's population in nation | % | 32.6 | 33.3 | 37.7 | 39.1 | 40.4 | 41.4 |
| 2 | Migration to Ulaanbaatar | in thousand | 19.9 | 11.6 | 30.2 | 29.1 | 28.3 | 39.7 |
| 3 | Migration from Ulaanbaatar | in thousand | 0.6 | 0.8 | 2.8 | 7.4 | 10.7 | 14.5 |
| 4 | Births | in thousand | 11.8 | 12.3 | 15.5 | 22.7 | 27.9 | 26.8 |
| 5 | Deaths | in thousand | 5 | 5.1 | 6.0 | 6.4 | 6.3 | 7.1 |

Despite public decisions to limit centralization, halt urban population increase and promote out-migration from Ulaanbaatar, the city has constructs that are far above population density places elsewhere in Mongolia. The main

findings stated in Figure 1 show that Ulaanbaatar is growing at a high rate and sporadically, even though the geometrical growth has not been strictly planned and has become most dense urban area.

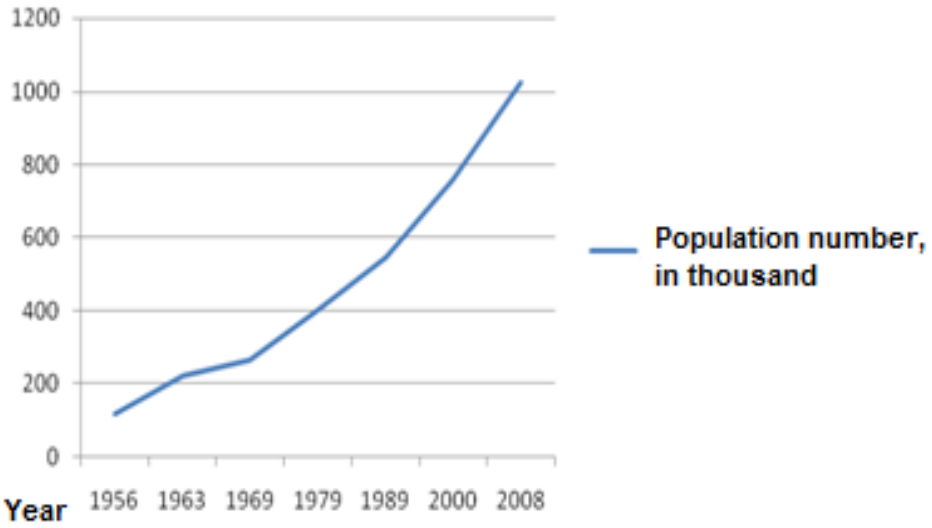



**Figure 1. Inhabitants number of Ulaanbaatar city in 50 years.**

Demographically, the number of Ulaanbaatar city residents increase was triggered by poverty in rural areas, unemployment and social infrastructure weakness compared with urban places. The rate of rural to urban migration increased in the period of natural disaster: *zhud* (harsh winter causing by huge loss of livestock) e.g.: during 2000-2001 year (the biggest *zhud*) disaster after which took place sudden raises of natural disaster migrants number moving to urban areas (Fig. 2).

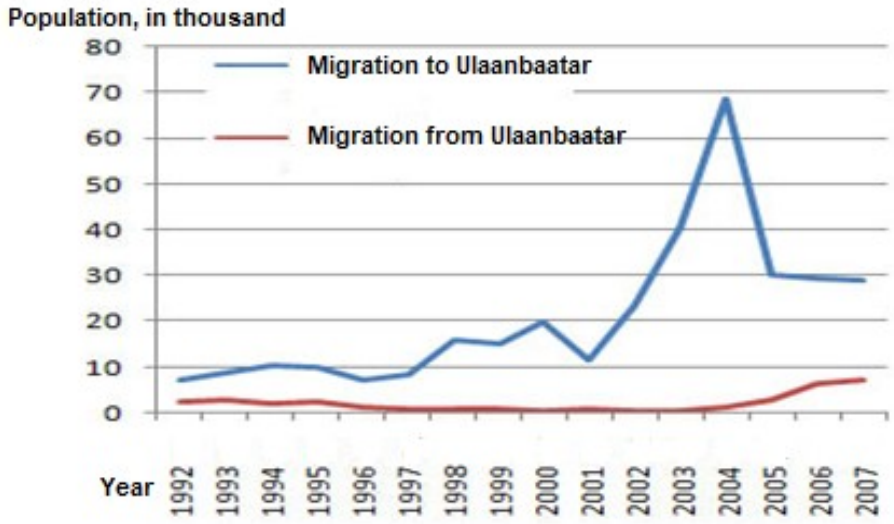



**Figure 2. Total migration of Ulaanbaatar greater area**

- **Urban spatial dynamics: Ulaanbaatar's problem of expansion**

Today, Ulaanbaatar has expanded into a city with a 1 300 000 population or 44% of the country's total residing in one city. This growth of Ulaanbaatar has created a chaotic expansion, beyond the calculated demographic planning for the last 20

years. For the identification of the urban dynamic changes, digital image processing of World View, Quickbird and Landsat-ETM satellite images in Ulaanbaatar were used and, based on these data, the expansion size is determined using a geographic information system's vector overlay method. Urban change was as presented in table 3 (Buyandelger, 2016).

**Table 2.Ulaanbaatar's spatial expansion in 2000-2015**

| Year | Area of city(ha) | Perimeter (m) |
|---|---|---|
| 2000 | 15141 | 155927 |
| 2005 | 17326 | 220076 |
| 2010 | 26541 | 483850 |
| 2015 | 36025 | 697519 |

Source: Buyandelger, 2016

The above table shows a significant increase in urban foot-print of Ulaanbaatar in 2000-2005 by 17326.4 hectares, by 26541 hectares in 2005-2010, by 36025.8 hectares in 2010-2015 (Figure 3).

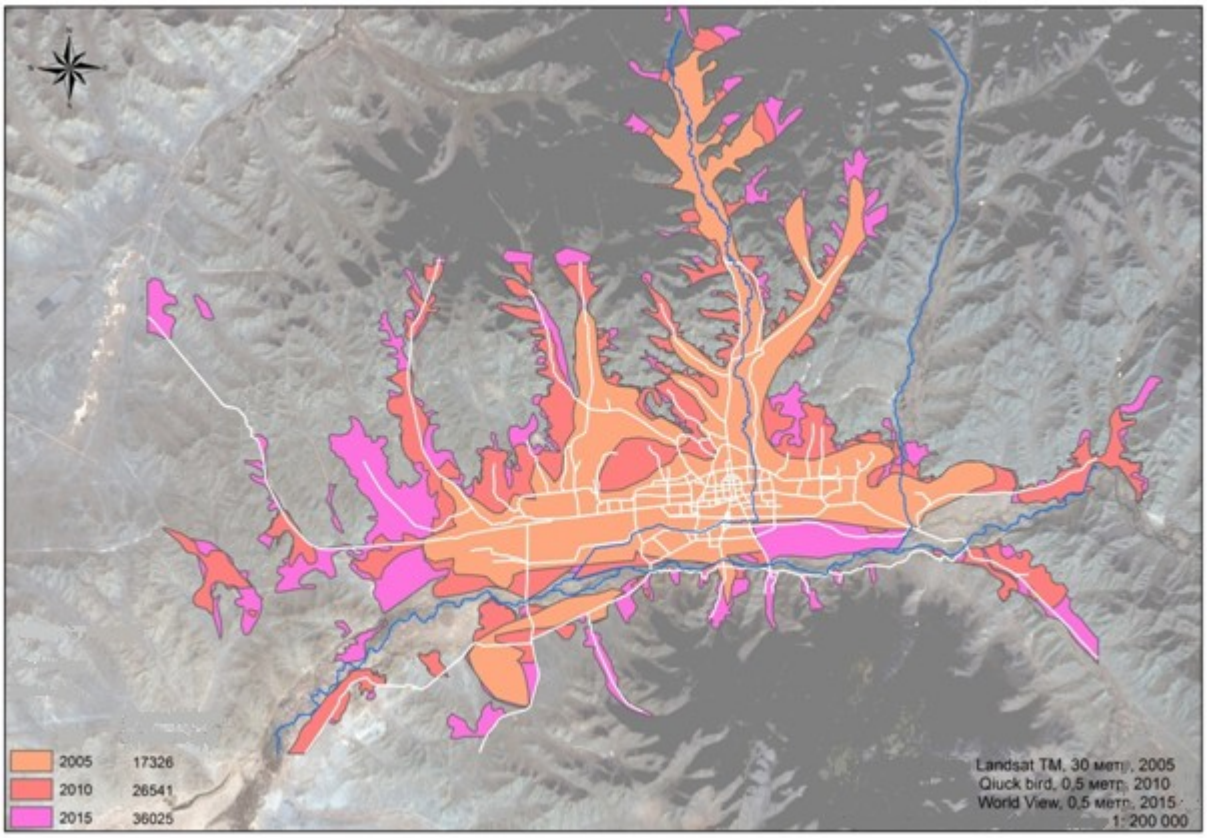
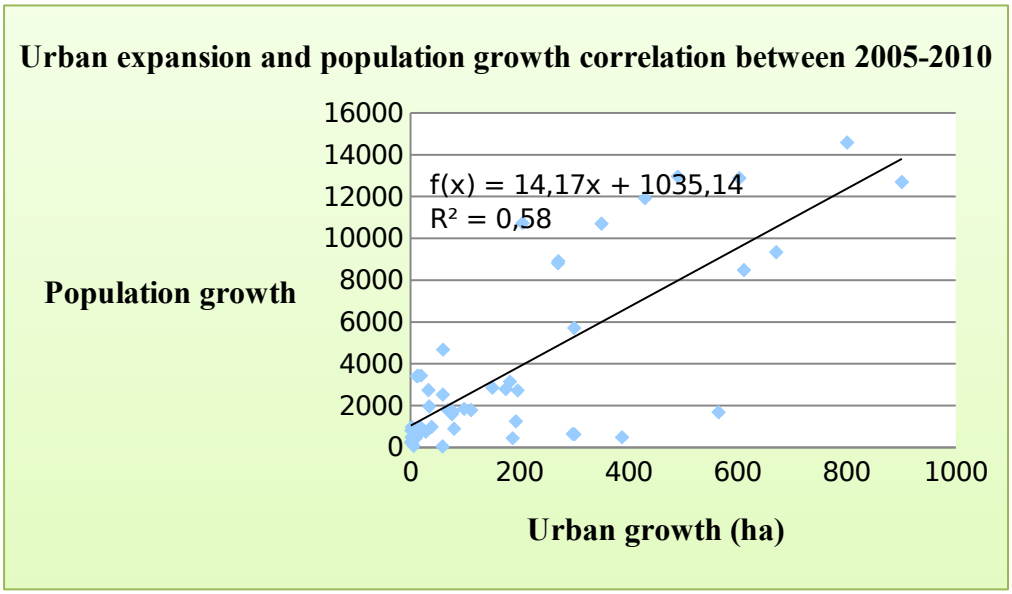



**Figure 3. Urban foot print expansion in 2010-2015.** Courtesy of Buyandelger M., 2016

To calculate the correlation relationship between the demographic and spatial expansion (Central Statistical office census of 2005, 2010, 2015), population data is used; the population growth in urban expansion correlation analysis retrieved with the following results (Figure 4).




(*Source: Ulaanbaatar statistical office, 2014)*

**Figure 4.Correlation between urban expansion and population growth in 2005-2010**

According to the 2005-2010 urban-expansion and population-growth relationship of correlation analysis results, the population growth of 1,050 people has caused an urban expansion of 1 hectare, and the coefficient $R^2$ = 0.58 and the correlation coefficient of r = 0.76 indicates a strong dependence between the two variables. Besides, as a land-use analysis indicator case, we had analyzed the territory of one sub-district (Bayangol District, Ulaanbaatar) for the intensity of land-use and population density estimation. Land-use intensity is the ratio (Ki) of the total amount of land to the amount of land used for certain purposes. It defines the formula below, and more land used in certain purpose means that are higher economic profit and intensity (Buyandelger, 2016).

$$K_i = \frac{Amount\ of\ land\ for\ certain\ purpose}{Total\ amount\ of\ land} \qquad K_i = \frac{(10794.5+7384.63+17077.61)}{65189.02} = 0.54$$

The land-use intensity ratio of 0.54 confirms the selected area's land-use intensity has and concludes both a land-use low intensity and a need to improve land-use planning and spatial organization of urban areas. In total 618 households inhabit in selected sub-district and population density (as of 08 May 2015) is 821 persons in 1 hectare (Buyandelger, 2016).

- **Land use changes**

With respect to land use, the city has undergone a dramatic tend of urbanization during the last decade (Table 4 presents the urban land use distribution of Ulaanbaatar city). Just half a century ago, in 1956, the city's population was 118,000, but today 1.3 million residents, out of Mongolia's 3 million in total, are living in the Ulaanbaatar region (Myagmartseren et al. 2013). Sudden rates of growth of urban areas in 1990-2000 could be also explained by natural disasters occurring in rural areas which have accelerated migrations of the rural poor to Ulaanbaatar.

**Table 3. Urban Land Use Change Dynamic**

| | Land use | 2000 | 2010 |
|---|---|---|---|
| **1** | Residential total | 33.2% | 58.7% |
| | of sprawl | 28.2% | 51.8% |
| | of ger district | | 32% |
| | of belt zone in green | | 19.8% |
| **2** | Infrastructure | 5.2% | 9.4% |
| **3** | Industry | 10.0% | 8.3% |
| **4** | Service | 13.7% | 6.3% |
| **5** | Special purpose and others (defense, public land, water buffer etc) | 6.9% | 15.1% |
| **6** | Unused and Reservation | 28.2% | 10.0% |

In most areas, expansion was due to urban-sprawl growths caused by unregulated massive rural-to-urban population migration. But in the residential zone *ger* area, which covers about 32% percent of the territory of the city (see table 3), urban expansion has accelerated to such an extent that it adversely impacts green-belt areas, wetlands, water buffer zones, open space and public land conservation, as well as green developments (Myagmartseren et al. 2015).

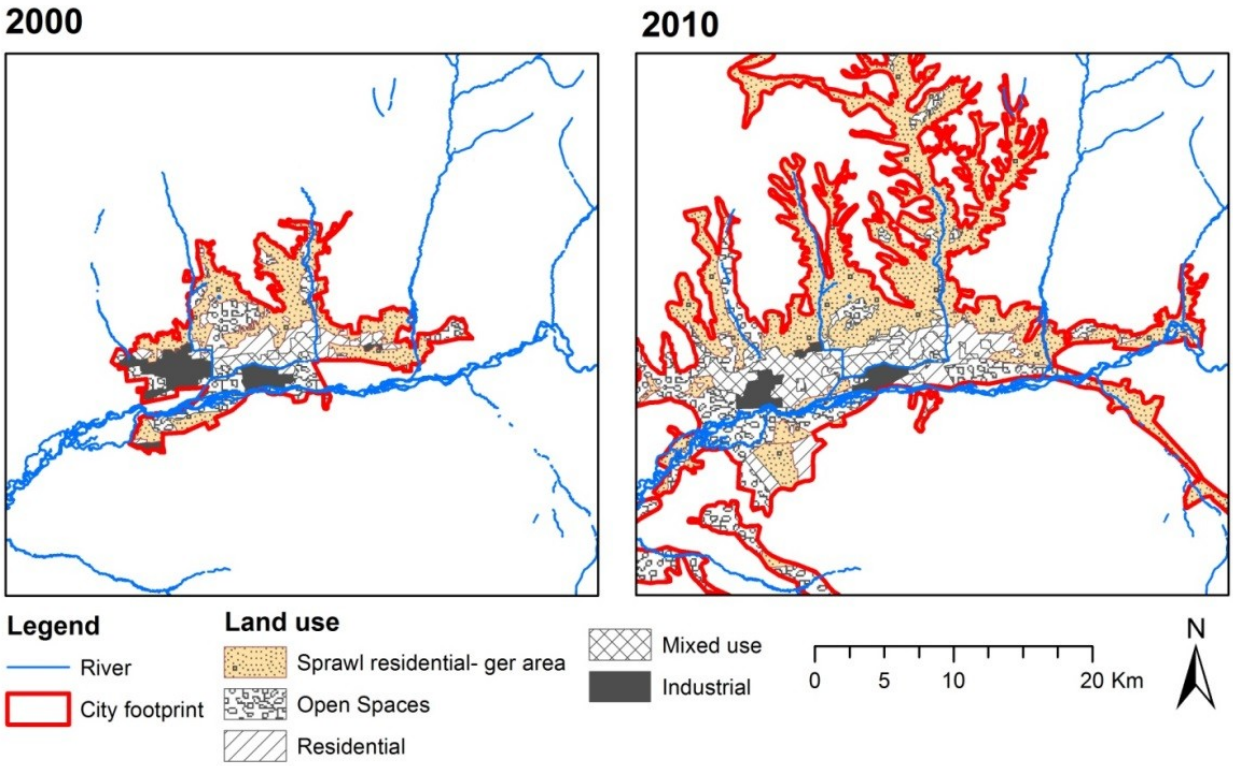



**Figure 5. Land use map of Ulaanbaatar in 2000 and 2010 (Myagmartseren et al. 2015)**

*Source: Adapted from Cadastral map and time series land use planning data. National Land Information Database, Agency of Administration of Land Affair, Geodesy and Cartography of Mongolia (ALAGaC) and Lanres Co.*

The '*Ger* area' / residential sprawl are semi-detached: plotted nomadic tents with enclosed fences which are mostly adversely possessing all vacant land, whereas after the visualization of the main land use change of Ulaanbaatar could be concluded in the following manner. Particularity, the rapid increase of urban area between 2000 and 2010 could be interpreted as an unregulated process of informal settlement in form of sprawl, structured around city edges and added city footprint about 3 times larger. In 2004, informal settlements transformed into a *de facto* status were legally given permission by the government to intensify land privatization and improve social infrastructure, which nevertheless accelerated adverse possession and land grabbing.

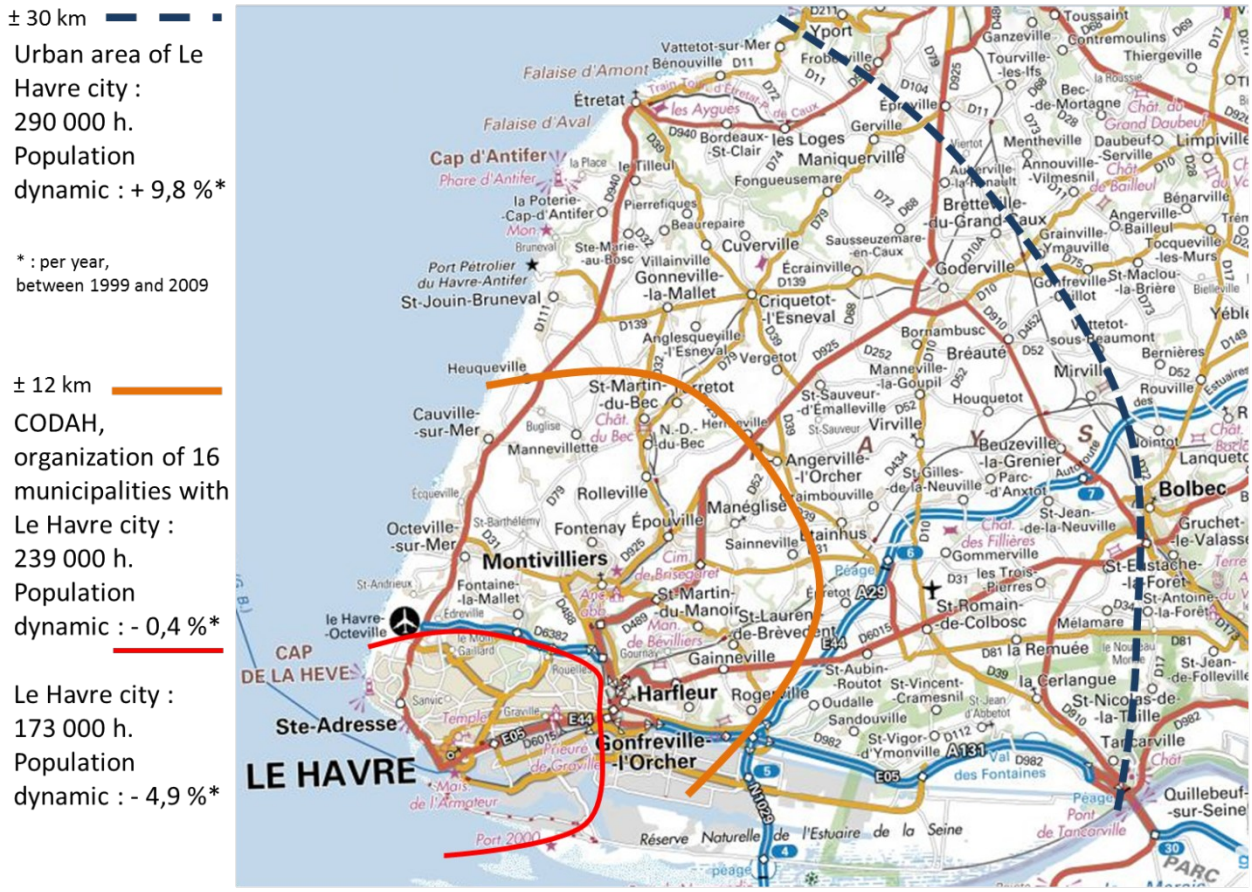
### *2.2. Le Havre: problem of shrinking*

- **Urban data of Le Havre**

Le Havre is located in the North West of France, about 200 km from Paris, in a famous administrative region called Normandy.

Le Havre is the 27th national urban area, structured with a central city (LH) and two pieces of rings due to the Channel on the West and the estuary of La Seine on the south (fig.6):

- The central city Le Havre gathers 173 000 inhabitants
- The first ring with 16 municipalities plus LH gathering 239 000 inhabitants, called CODAH (Urban agglomeration Community of Le Havre) and drawing the perimeter of a Public Body for Intercommunal Co-operation (EPCI). Municipalities have contracted an agreement to co-manage some urban aspects of everyday inhabitants' life, such as transport, water, artistic networks. This is also the ring of Le Havre's suburbs and commuters.
- The second ring with approximately 60 municipalities and 50 000 inhabitants, principally small villages, which Le Havre might attract or employment, cultural events, shopping.




Source : Sajous d'après Géoportail, 2016 et Rapport d'observations définitives : Communauté d'agglomération du Havre - Politique des transports urbains, 2014

**Figure 6. Population and spatial dynamics**

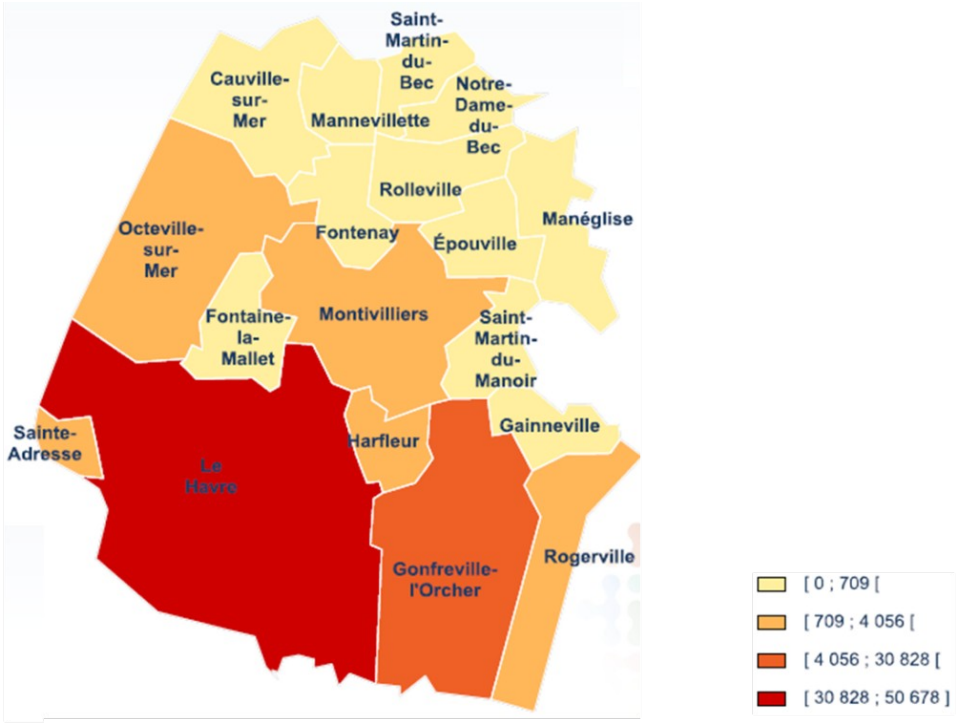
- **Residential mobility affected by urban sprawl**

The urban sprawl has been in progress since 1975 and is currently causing inhabitants leave Le Havre to the first or second urban area ring. Some data provided by the National Statistics Institute (Insee) highlight this dynamic:

- Le Havre lost on average 5.2 % inhabitants per year between 1975 and 1990, then 4.9 % per year between 1990 and 2009.
- The 16 other municipalities of the CODAH gained 13.2 % inhabitants per year between 1975 and 1990 and lost 0.4 % per year between 1990 and 2009 between 1990 and 2009.
- The second ring gained on average 15.5 % inhabitants per year between 1975 and 1990 and 9.8 %per year between 1990 and 2009.

- **Economic activities: main activities and location**

Figure 7 shows the job distribution pattern in Le Havre. One can note especially a high density in the city center and close to the port area, in relation with supply-chain management. The location of jobs touches upon the Seine river estuary with a second employment area in particular in the Gonfreville-l'Orcher and Rogerville municipalities. The industrial port zone welcomes several international companies. The two biggest employers are Total, for the oil industry, and Aircelle–Safran, for the aeronautic industry with, each, an average of 2000 workers.




Source : CCI Seine Estuaire, 2014.
http://seine-estuaire.cci.fr/sites/seine-estuaire.cci.fr/files/2013%2011%20-%20Monographie%20du%20Territoire%20CODAH%20-%20CCIH%20VF.pdf

**Figure 7. Location of employment in CODAH area**

We are so far in a traditional model of a French urban area according to:

- the residential mobility in the hinterland, out of the central city and high densities of housing. Families look for single or dwelling houses with garden, for the benefit of their children.
- location of employment in the city center and in the Seine river estuary in relation with port and industrial activities. Nevertheless, Le Havre is always in an industrial model and there does not really exist a knowledge economy sector. Currently, according to competitiveness pressure, it is a problem to ensure the competitiveness of the urban area.

- **A serious problem: shrinking**

Between 1944 and 1964, the post-war reconstruction of Le Havre was achieved after its massive destruction towards the end of WW II (after being bombed in September 1944). The city then became one of the first trading port and industrial port-zone in France (for containers, oil-refining and other types of chemical industry). However, the economic crisis, the increase of competition between ports, at the end of the 20th century, caused local problem concerning employment, reconversion of industrial activities. Since the middle of the 90's, Le Havre has been losing industrial attractiveness and tried developing tourism and a "knowledge economy" (Sajous, Martinet, 2012).Thus, like other cities in general in the north of France (20 % of French urban areas, Cauchi-Duval et al., 2016),Le Havre is losing inhabitants each year. In 1975, there were approximately 218 000 inhabitants. In 2013, there are 173 000 inhabitants. Le Havre and the urban area seem to become a "shrinking city".
Indeed, "shrinking" in Le Havre coincides with:

- ***global factors causing this phenomenon*** (Cauchi-Duval et al., 2016):

- increased competition between territories due to economic globalization ;
- peri-urban process which is translated into more and more households with jobs in the core of the urban area but with housings in the countryside;
- an appropriate fertility rate but negative migratory balance: shrinking cities do not loss more inhabitants than other cities but they do not welcome enough new inhabitants.

- ***global characteristics of the phenomenon*** (Cauchi-Duval et al., 2016):

- rising of rental- and trading units vacancy, large urban waste lands, less use of urban infrastructures, decline of local taxes;
- Le Havre is one of the few central cities affected by the phenomenon (6 in France). Suburbs towns are more usually impacted;
- under-representation of socio-professional categories of "professionals/managers and higher intellectual occupations" (7%) and, proportionally, strong representation of manual workers (20%);
- high level of unemployment: 12 % of labour force compared with a national average of 10%.

## 3. Discussing the question of comparison: going beyond frames and interests of a scientific collaboration

### *3.1. Ulaanbaatar and Le Havre: two cities non-comparable?*

After the descriptions of each city, we note that UB and LH have two opposite spatial dynamics. Ulaanbaatar is a sprawl-dominated expanding city and Le Havre has shrinking dynamics in spatial context. But could we conclude that Ulaanbaatar and Le Havre are two non-comparable cities?

It might be probably the case concerning comparisons taking into account the size, the history, the dynamics, the national economic context, etc. But in this way, we only compare things which, in fact, are the same or quite similar. Researchers want to explore this challenge. However, in this manner, we only compare things which are, in fact, the same or quite similar. But, using derived factors behind the spatial dynamics of the two cities, Ulaanbaatar and Le Havre could be similar and comporting in each case opposite spatial changes. Researchers want to explore this challenge. In other words, we can say that we are in a “co-construction process” of a comparison methodology.

That is why this has been the central point of scientific discussion since December 2015. Two questions need answers:

- How do we define “comparison”?
- What do we expect of the comparison between Ulaanbaatar and Le Havre?

To develop a “co-construction process” of a comparison methodology needs time because we have to elaborate specifications. Various papers in French and in the international scientific literature highlight the approach of comparative situation like UB / LH:

1. The impossibility of elaborating a comparison /juxtaposition with a common observation chart (Margier, 2015)

2. Compare in order to keep an analytical distance from personal scientific topic(s): it is an interesting means of confronting oneself and improving scientific objectivity by way of compariing two cities whose shapes are so different (Bourdin, 2015, Mcfarlane, 2010).

### *3.2. Going beyond the shapes*

In order to apply the first-stage conclusions (admitting that it is impossible to work on all urban topics and testing specifications about comparisons), each researcher has decided to define a main interest topic and to focus on it.

- **Interest in France for Mongolia**:

In France, there is no problem to define, with a good level of prediction, the future areas impacted by urban development. Some laws and regulatory documents identify goals and rules, and cover each municipality of all the French territory.

Currently, the scientific discussion focuses on the understanding of reasons for the mobility of people (residential and daily mobility). Behind the peri-urban location of households, there lies the issue of car use. Public policies established at the end of the 20th century and at the beginning of the 21st century have proved that improving infrastructures of public transport is not enough or that is not the right response to persuade people to keep their car in the garage. The attractiveness of these means increases a little bit, at best, and in the city-center only and the car-use continues in the other areas: 76 % of people use their car in low-density areas (+2% between 1994 and 2008) and 55 % of people use their car in the major French conurbation (-1% between 1994 and 2008) (Hubert, 2009).

For several years, we have been working on “personal reasons”, factors connected with biography and cognitive functioning to explain car choice. For ULH geographers working with the NUM geography-and-planning team this is an opportunity to study nomadic situations.

One of the hypotheses of the French scientific literature is that the answer of daily mobility is in the duet nomadic/sedentary which “is carrying on living in each person” (Maffesoli, 1997). Other researchers suggest paying attention to nomadic shapes (Gohard-Radenkovic, Veillette, 2015, Legrand, 2007, Mayer, 2015).

So we would focus comparison on this notion. P. Sajous’ first stay in Mongolia in 2014, our discussions in December 2015 and literature reviews suggest one assumption: in France especially, we do not really understand what “nomadic” is. We still have a nostalgic and folk approach or a limited approach to rural areas. Ulaanbaatar shows a contemporary nomadic dimension, having a spatial and cultural influence upon the urban dynamics.

- **Mongolia’s interest in France:**

Our interest is to measure urban spatial dynamics, based on urban land-use and geographic parameters, to discover practical dynamic changes, in time series that change trends of Ulaanbaatar city and Le Havre city as case-studies and to present methods of combining urban measurement using the geographic information system (GIS). This will be achieved through fulfilling the following objectives: (i) to study a variety of urban geographic measurements through literature review; (ii) to identify the main driving force of economic and social changes of each city; (iii) to explore appropriate measurements suitable for case-cities and characterize the urban spatial changes and to interpret spatial dynamics to be carried out in prospective urban policies.

## 4. Conclusions

This paper presents the first stages of a recent scientific collaboration. First, as we showed, work was carried out analyzing urban landscapes of UB and LH: our first tasks consisted in collecting information (literature and fieldwork) about landscapes structuration, and starting to understand their development using a historical approach of the economy and demography.

Ulaanbaatar city's chronological development is carried out to represent urban spatial change, demography and changes. Our main conclusion of the preliminary work concern spatial dynamic is diverse expansion. Ulaanbaatar city expands and becomes a city with one million three hundred thousand inhabitants or 44% of Mongolia's total 3 million population, residing in one city which covers 0.3% of total land area of the country. Regarding the land use changes, the city has undergone a vast urbanization or expansion trends during the last 5 decades. Unemployed and natural-disaster migrants from rural places triggered the main urban sprawl expansion. In 1956, the city's population was 118,000 and in 2015 1.3 million residents live in the Ulaanbaatar greater area. The total urban area increased 3-fold in ten years and, except industrial land use, most land uses focus especially on urban sprawl in the *ger* area. The spatial dynamic between 2000 and 2010 could be interpreted as an unregulated process of informal settlement in form of a sprawl appearing around the city edges and adding a footprint about three times larger. Ulaanbaatar and its agglomeration seem to show it as an "expanding city".

Since the middle of the 20th century, Le Havre has had a very erratic history. Economic cycles alternate quickly between the best (before WWII and 1960–1980) and the worst (bombing in September 1944 and the economic crisis of 1990). Naturally, these cycles have impacted the demography and the shapes of urban areas. Currently LH is situated between a traditional French urban model and a shrinking model not yet really recognized by French stakeholders. Hopefully, stakeholders have a large range of urban management tools to imagine the future of the urban area.

The collaboration between NUM and UH colleagues is going to develop, trying to improve the tasks already started. The next challenge is represented by the process of clearly drafting recommendations for urban planning management. In order to do that, it will be necessary to find another way of understanding the political processes of decision. In this field, there is still a long way to go.

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