9. Daily urban system of Ljubljana

Nataša Pichler-Milanović, Marko Krevs

Central position within the country and historical development of Slovenian urban system in general, including relatively low level of urbanisation of the country and growing economic power of its capital, have led to a relatively extensive and lively daily urban system of Ljubljana. Daily (or local) urban system is defined as the area around a city in which daily migrations to this city take place (Bourne, 1975). It comprises of the city and its surroundings which is functionally related to the city on a daily basis. Although the term is based on such a simple feature as daily migrations, it expresses much wider spectrum of ties and interdependencies between the city and its surrounding territories. It usually brings forward economic, social and environmental aspects of the daily migrations and the related processes in the city and its gravitation area. Several aspects of the driving forces and consequences of the Ljubljana's daily urban system are presented in other chapters of this book. The main aims of this chapter are therefore to present different possible approaches to identification of daily urban system of Ljubljana, selected methodological issues and results of recent research related to Ljubljana's daily urban system, its character and relative strength within Slovenia.

9.1 Several approaches to defining daily urban system of Ljubljana

Studies of Ljubljana's daily urban system have usually focused on daily commuting to work (Pavlin, Sluga, 2000; Kreitmayer McKenzie et al., 2008), some included also daily migrations to public educational institutions (Gabrovec, Bole, 2009). Data used in such studies of daily migrations between municipalities or settlements have been extracted either from the national census databases (SURS) or the national Statistical register of active working population (SRDAP). Approximations of a daily urban system can also be based on city urban and suburban public transportation network, or on appropriate administrative area correlating the best with the local urban system of a city.

Urban pomerium (Vrišer, 2002) of Ljubljana, the administrative area of the city, has been historically only occasionally correlated to the local urban system. Its extent mostly followed the growth of the city itself since 1788 until 1945. The administrative area has been enlarged after World War II to incorporate surrounding urbanized settlements tightly connected to the city, and reached nearly the extend of today's Urban municipality of Ljubljana. That area has probably been quite a good spatial approximation of daily urban system in that time. Municipal division of Slovenia in 1955 discontinued to follow legal and administrative definitions of urban entities. Ljubljana has been divided among several municipalities which stretched from Austrian to Croatian border and therefore contained considerable areas beyond the actual daily urban system of Ljubljana. Such administrative organisation of Slovenia existed with slight modifications until 1994. Towards 1990s daily urban system of Ljubljana has grown considerably, but never really

reached the full extent of "five communes (municipalities) of Ljubljana". Since 1994 the pomerium of Ljubljana has been re-established by Urban municipality of Ljubljana with the area only slightly larger than in the period 1952-1955. The daily urban system has grown far beyond this area since 1950s. As shown further on, today's daily urban system of Ljubljana correlates quite well with the extent of NUTS 3 region Central Slovenia (known also as Ljubljana Urban Region).

The urban and suburban public transportation network in principle expresses the power of gravitation towards Ljubljana (Černe, 2002) and therefore its spatial extent should correlate with the area of daily urban system of Ljubljana. The main difference between the two is that the Ljubljana's suburban public traffic network does not cover the north-eastern gravitation area of Ljubljana, for example toward municipalities of Domžale, Litija, Lukovica, Moravče and Kamnik. These areas are serviced by other public transportation networks. Another important obstacle to use of public transportation network as an approximation for a daily urban system in general is the persisting extensive use of personal transportation for commuting. While this does not affect so much the spatial overlap between the two in our case, it could be misleading when considering the quantities of commuters from different parts of the daily urban system to the city.

In our research (Kreitmayer McKenzie et al., 2008) Local Labour Systems (LLS) have been applied as an effective approach to identification of daily urban systems in Slovenia. Some methodological issues of the approach and selected results related to daily urban system of Ljubljana are presented in this chapter.

The work on studying commuting patterns within Slovenia continues also as a basis to define »functional regions« in order to understand them better from the perspective of (inter)national competitiveness and effectiveness of development activities as the instrument for implementation of national policy recommendations for sustainable spatial and balanced regional development as well as the establishment of administrative NUTS 3 regions (provinces) in the near future (Pogačnik et al., 2011; Drobne, Konjar, Lisec, 2009; Drobne et al, 2009; 2010; Zavodnik, Drobne, Pichler-Milanović, 2009).

9.2. Main methodological problems in defining daily urban system

Several methodological questions need to be answered in a study of daily urban systems, among them the following.

- Who are daily migrants within a daily urban system? How to measure the contribution of different groups (or types) of daily migrants to daily urban system? Which is the structure of daily migrants? What is the relevance and quality of data available for the study?
- Which are the spatial units, between which the daily migrations are studied? Do we take the actual travelling routes into account?
- How to define the spatial extent of the daily urban system? How to take the overlapping between the neighbouring daily urban systems into account?

There is no possibility to take all daily migrants and all possible daily migrations into account in such a study. We therefore always focus on a selected part of the migrants and migrations and suggest they are a reasonable basis for representation of the whole daily urban system. The above mentioned selection usually depends on the availability of relevant data. In our case data about daily commuting to work have been the main and the most detailed source of information. Migrations to work are the prevailing type of daily migrations to Ljubljana. However, we are aware that spatial patterns of other types of migrations, like migrations to schools, health related institutions, or recreational facilities, might locally differ from the "core" daily urban system we are recognizing on the basis of the analysis of commuting to work. The structure of the daily migrants has been estimated indirectly, on the basis of another study (Gabrovec, Bole, 2009).

Among the problems related to the quality of data the following might be affecting the results of the analysis the most. Many (more than 5 %, estimated by Zaletel, Ziherl, Dolenc, 2004; about 10 %, estimated by Gabrovec, Bole, 2009) individuals keep their formal address of permanent residence after moving to other settlement or municipality. Several employers do not report adequately the actual locations of individual jobs because some firms present all the employed at the location of the seat of the firm instead of at the locations of actual branches. Since a daily migration is analytically derived from databases on the basis of difference between the registered place of residence and place of work (or selected other activity) of an individual, the above mentioned errors result in erroneously derived daily migrations.

The two main data sources for studying daily migrations in Slovenia, population censuses (SURS) and the register of commuters-to-work (SRDAP), should theoretically allow studying daily migrations between settlements or even at more detailed spatial scale. Population census registers the address of each resident and in case of migrations to schools also the settlement of the relevant school. It does not register the location of work, but it allows linking with relevant database to extract such information for each employed resident. In practice the local level daily migrations are usually studied on the basis of data aggregated by municipalities, which was also the case in our study (Kreitmayer McKenzie et al., 2008).

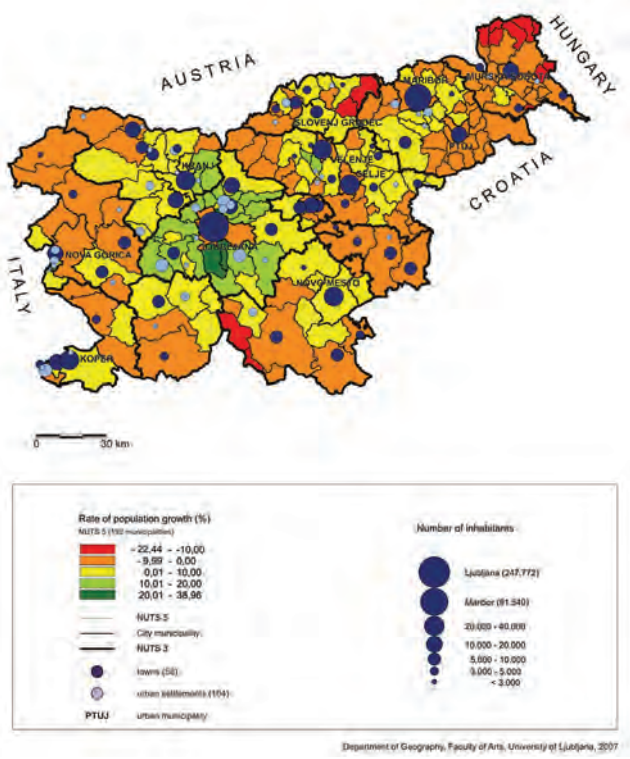
In such studies only the source and destination locations (in our cases municipalities) are usually taken into account. We assume that at this spatial scale the actual travel routes, e.g. to shopping or recreational activities by the way to work or home, lie within the analysed daily urban system.

Spatial extent of a daily urban system could be defined on the basis of all daily migrants (of a selected type) to Ljubljana. But already if we take commuters to work alone into the account, this method would recognize the whole Slovenia as Ljubljana's daily urban system, since there is no municipality without at least a few commuters to Ljubljana, as registered by SRDAP (2005). Among the reasons against such an approach the following is probably the most persuasive: it is very unlikely that the registered commuters from country's border areas actually migrate to Ljubljana on a daily basis. The above mentioned errors in data affect the most the representation of daily migrations from these areas. Besides, even when the data from SRDAP are taken as reliable, majority of daily migrants from these "far-away areas" are migrating to other centres, and only a small share of them to Ljubljana. Another approach to defining daily urban system of Ljubljana, based on the share of local commuters to Ljubljana, was used in our research.

9.3. Relative situation of Ljubljana's daily urban system within Slovenia

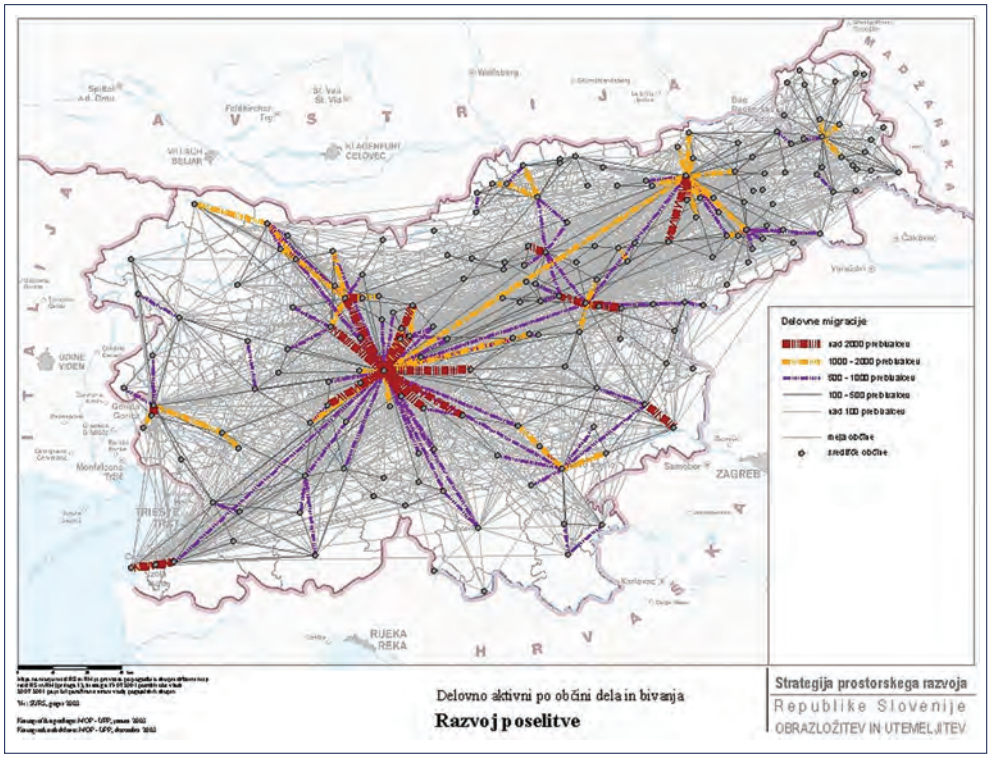
Between census years 1991 - 2002 the number of population in Slovenia had increased for 2.6 %, and in the period 2002 – 2009 additionally for 3.5 %, while share of urban population stagnated around 50 % (50.5 % in 1991, 49.0 % in 2002 and 50.1 % in 2009). Slight urban population decline was mostly visible in the largest urban municipalities and towns in Slovenia: Ljubljana, Maribor and Celje. However, by far the biggest population growth in Slovenia has been documented in suburban municipalities around Ljubljana (Figure 34). Ljubljana is a capital of Slovenia and its economical and political powers are growing, so we should expect strengthening and growing of its daily urban system. The aforementioned contiguous population growth area, with Urban Municipality of Ljubljana as the area of population stagnation in the centre, spreads well beyond the limits of Urban Region of Ljubljana[39]. Since this area of strong process of suburbanization, partly in a form of urban sprawl and supported by migrations of urban population to suburban areas, overlaps quite expectedly with the daily urban system of Ljubljana, the processes of intensification of daily commuting to Ljubljana can be quite clearly noticed. Travel-to-work migration flows in Slovenia (Figure 35) illustrate clearly the relative strength of the daily urban system of Ljubljana within the national perspective.

Figure 34: Population change (%) in municipalities (NUTS 5) in Slovenia in the period 1991-2002.



[39] Urban Region of Ljubljana coincides with Statistical region of Central Slovenia (NUTS 3).

Figure 35: Travel-to-work migrations in Slovenia according to municipality of residence and municipality of work.



Source: Strategy of Spatial Development of Slovenia (2004).

Ljubljana attracted 103.000 inter-municipality commuters-to-work in 2007, which is nearly 30.000 more (41 % more) than in the year 2000 (Gabrovec, Bole, 2009, 26). The number of those that work and have residence in Urban Municipality of Ljubljana have stayed the same in this period of time, which clearly shows the intensity of the process of growing daily commuting to work in Ljubljana. Estimation of the total number of daily migrants to work, to secondary and higher education in Ljubljana approached 150.000 (ibid., 26). This is about a half of the population of Ljubljana. In other words, the daily migrants represent about one third of the daily population of Ljubljana.

Based on register of commuters-to-work (SRDAP, 2005), there were more than 186.000 jobs in Urban Municipality of Ljubljana, nearly 90.000 incoming migrants to work, more than 13.400 outgoing migrants to work, while nearly 97.000 residents of Urban Municipality of Ljubljana worked in this municipality in 2005 (Kreitmayer McKenzie et al., 2008).

In Slovenia the number of daily migrants related to public education of different levels (from elementary school to university) has increased by 40 % between the censuses in 1991 and 2002, while the number of daily commuters to work has increased by 13 % (Gabrovec, Bole, 2009, 24). In the total number of daily migrants in Slovenia, the share of daily commuters to work has been about two thirds, and the share of daily migrants related to public education about one third in 2002. In Ljubljana the relation among the two groups of migrants is different: about 43 % daily migrants to schools, and about 57 % to work.

9.4. Local Labour System as approximation of daily urban system of Ljubljana

Daily urban system is ideally understood as monocentric area of daily migrations. In reality cities are increasingly interdependent and daily urban systems are increasingly overlapping. One of the possible approximations of a daily urban system is the area for which the city is the main daily migrations' target. That principle was used in defining Ljubljana's Local Labour System (LLS), our approach to identify its daily urban system.

An international definition used in INTERREG III B CADSES RePUS project (Kreitmayer McKenzie et al., 2008) defines LLS as a »microregion« consisting of urban centre and its commuting catchment areas. It is defined and delimited according to the number of jobs in the urban centre (NUTS 5 municipality) and travel-to-work area to the urban centre. LLS area is spatially delimited using the method of regionalisation. In the first step preliminary set of urban centres were selected as those NUTS 5 municipalities with a minimum of 1000 jobs. This includes also smallest towns and urban settlements with population below or around 3000 and some industrial or growing suburban villages in metropolitan areas. Not all of these municipalities really play the role of the urban centre. The urban centre is such NUTS 5 municipality which is the main commuting destination for at least one another municipality. Therefore information about job commuting between municipalities needs to be utilised (SRDAP, 2005). After selection of urban centres that have at least 1000 jobs, that are the major travel-to-work destination for commuters for at least one other municipality, the next step is clustering the municipalities that are not selected as job centres for delimitation of LLS boundaries. Municipalities belong to the LLS area to which they have the strongest commuting flow[40] to selected urban centres. The principle of territorial coherence is acknowledged leading to spatial adjustments in the case of some municipalities in between two or more LLS.

Local Labour System of Ljubljana consists of 9 NUTS 4 areas. This is the largest LLS in Slovenia representing the metropolitan area of the capital city of Ljubljana. LLS Ljubljana is larger than NUTS 3 Ljubljana urban region (or Central Slovenian NUTS 3 region) for NUTS 4 Zagorje located in Zasavje NUTS 3 region east from the city of Ljubljana and NUTS 4 Trebnje, located south-east from the city of Ljubljana in South-eastern Slovenia NUTS 3 region.

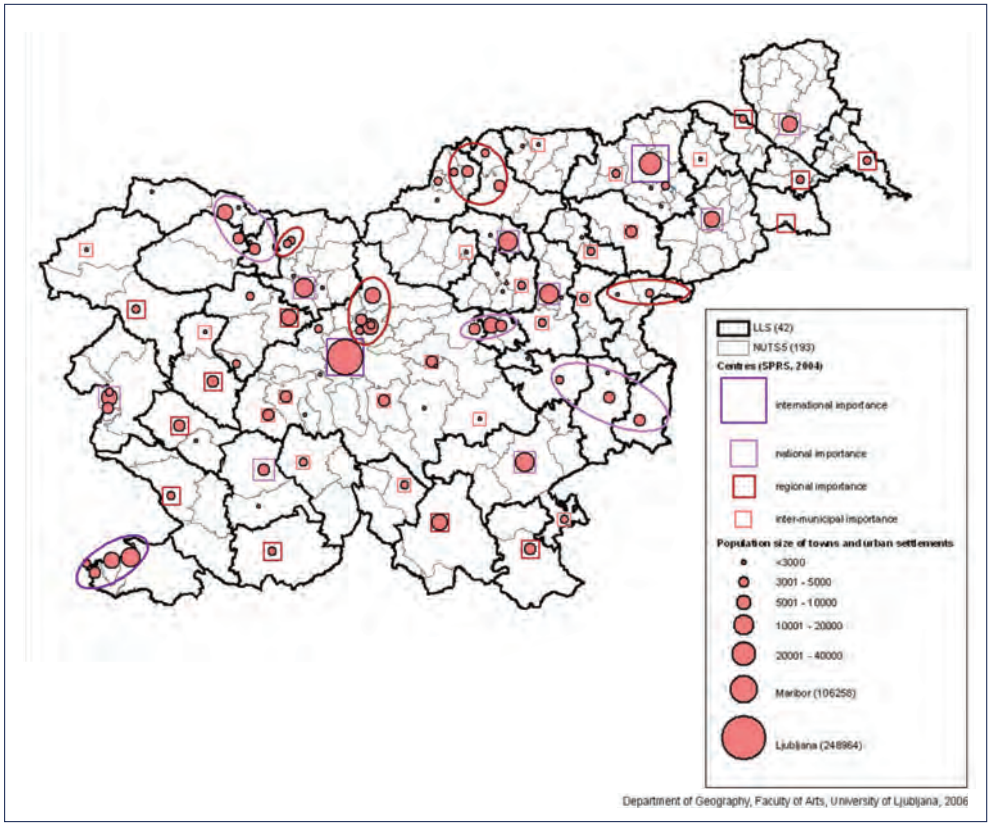
Table 19: Population of urban municipality, urban centre and its catchment area (NUTS 4, LLS) of Ljubljana (2002).

Urban municipality	Urban settlement	Urban area	NUTS 5	NUTS 4		LLS
More urban than rural population						
Ljubljana	247.772	249.442	265.881	323.200	Urban 267.815 Rural 55.385	523.221 (9 NUTS 4)

Sources: SURS; Kreitmayer McKenzie et al., 2008.

[40] With additional criteria that >20 % of the commuters daily migrates to work in that LLS.

Figure 36: Polycentric urban system of Slovenia: distribution of urban settlements, towns, LLS and their role as »centres of (inter)national, regional, intermunicipal importance« in Strategy of spatial development of Slovenia (2004).



Source: Kreitmayer McKenzie et al., 2008.

Figure 36 shows distribution of 42 LLS in Slovenia with their urban centres (and sub-centres) according to the number of inhabitants in officially defined 104 urban settlements (NUTS 7) of which 58 urban settlements have the status of a »town«, and their role in the polycentric urban system of Slovenia according to the Spatial Development Strategy of Slovenia (2004), defined as »centres of (inter)national, regional and inter-municipal importance« (together 51 centres with 64 urban settlements). The most complex is the largest LLS Ljubljana – metropolitan urban area with the dominance of the capital city of Ljubljana, with other small towns and/or city clusters (conurbations) which also serve as a local labour market for resident population in LLS Ljubljana. LLS Ljubljana is larger than Central Slovenian (or Ljubljana urban region) NUTS 3 region - for NUTS 4 Trebnje (south east from Ljubljana) and NUTS 4 Zagorje (east from Ljubljana), both located along the motorways, and therefore easily accessible from the city of Ljubljana, the most important employment centre in Slovenia.

9.5 Alternative characterizations of daily urban system Ljubljana

Using measures proposed by Van der Laan (1998) outward openness (OO) and inward openness (IO) of urban areas using commuting flows have been assessed. The »inward and outward openness« of urban areas take into consideration travel-to-work migrations between urban areas. For measuring the inward and outward openness of urban areas, the following formula is used:

$$OO = \frac{OUT - OUT_{reg}}{EA_{reg}}$$

OUT (sum of all working emigrants from NUTS 5 municipalities in LLS)

OUTreg (sum of working emigrants from NUTS 5 municipalities within the same LLS)

EAreg (number of active working population living and working in the same LLS)

and

$$IO = \frac{INC - INC_{reg}}{J_{reg}}$$

INC (sum of all working immigrants in NUTS 5 municipalities in LLS)

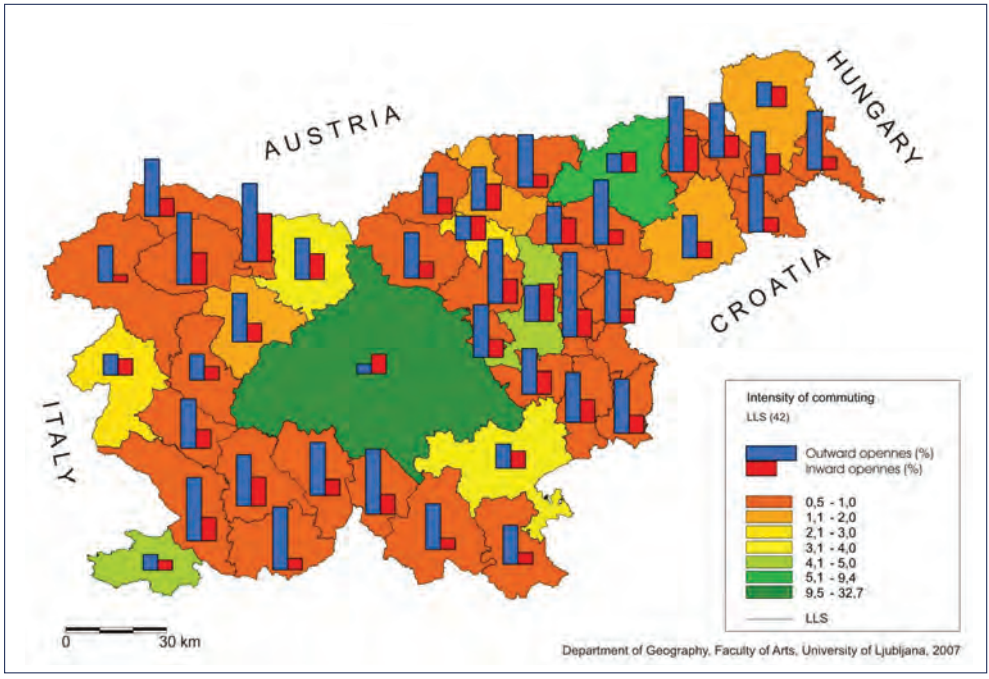
INCreg (sum of all working immigrants from NUTS 5 municipalities within the same LLS)

Jreg (number of employees working in the same LLS).

Figure 37 shows distribution of jobs in each of 42 LLS as a share in total number of jobs in Slovenia and the proportion of the »inward and outward openness« of each LLS taking in consideration travel-to-work commuting to job (urban) centres in LLS.

In Slovenia most jobs are concentrated in LLS Ljubljana (32,7 %) and LLS Maribor (9,5 %), followed with the LLS: Coast (Koper-Izola-Piran), Celje, Kranj, Novo mesto, Velenje and Nova Gorica. The numbers of jobs in other 34 LLS areas are equally distributed, showing the polycentric structure of the urban system in Slovenia. The largest LLS Ljubljana, LLS Maribor, and LLS Coast (Koper-Izola-Piran) show relatively small values of »inward and outward openness« or daily commuting flows within 42 LLS areas – as most active working population living in these LLS are also employed in the same LLS, therefore travel-to-work migrations are occurring inside the same (large) LLS. The overall values of »outward openness« of most LLS are higher than »inward openness« of LLS showing the intensity of travel-to-work migrations from smaller LLS to larger LLS (regional centres) due to higher concentration of jobs in larger urban centres and suburbanisation tendencies towards neighbouring smaller LLS.

Figure 37: Distribution of jobs in 42 LLS (%) with »inward / outward openness«.



Source: Kreitmayer McKenzie et al., 2008.

Table 20: »Inward and outward openness« of 42 LLS in Slovenia.

LLS	outward openness %	LLS	outward openness %
Ljubljana	6,1	**Škofja Loka**	33,7
Obala	11,3	**Krško**	35,2
Maribor	12,6	**Postojna**	35,9
Nova Gorica	13,8	**Šmarje pri Jelšah**	37,0
Novo mesto	16,5	**Radlje ob Dravi**	37,1
Velenje	16,6	**Cerknica**	37,1
Murska Sobota	17,1	**Zasavje**	37,1
Idrija	18,0	**Gornja Radgona**	37,7
Celje	24,5	**Brežice**	38,2
Tolmin	24,5	**Ormož**	39,1
Slovenske Konjice	26,2	**Jesenice**	40,1
Črnomelj	26,7	**Lendava**	40,5
Ravne na Koroškem	28,6	**Ilirska Bistrica**	43,9
Kranj	29,3	**Sevnica**	44,1
Slovenj Gradec	29,5	**Žalec**	44,9
Ptuj	30,0	**Slovenska Bistrica**	45,1
Ljutomer	30,0	**Ribnica**	45,7
Sežana	31,5	**Bled**	49,7
Mozirje	31,7	**Lenart**	51,8
Kočevje	31,8	**Radovljica**	55,3
Ajdovščina	33,7	**Šentjur pri Celju**	59,1

Table 20: Continued

LLS	inward openness %	LLS	inward openness %
Tolmin	4,7	**Zasavje**	12,7
Obala	6,8	**Ljubljana**	12,9
Črnomelj	7,5	**Ljutomer**	13,6
Kočevje	7,9	**Ribnica**	13,8
Ilirska Bistrica	8,0	**Murska Sobota**	13,9
Lendava	8,8	**Maribor**	14,4
Radlje ob Dravi	8,8	**Gornja Radgona**	14,9
Idrija	9,0	**Sežana**	15,5
Šmarje pri Jelšah	9,3	**Sevnica**	16,3
Ormož	9,6	**Krško**	16,3
Slovenska Bistrica	10,4	**Žalec**	17,3
Nova Gorica	11,1	**Velenje**	17,3
Mozirje	11,2	**Kranj**	17,6
Cerknica	11,3	**Slovenske Konjice**	17,9
Ravne na Koroškem	11,4	**Slovenj Gradec**	18,0
Ptuj	11,4	**Šentjur pri Celju**	19,3
Jesenice	11,5	**Postojna**	20,2
Novo mesto	11,6	**Bled**	22,2
Brežice	12,4	**Lenart**	25,1
Škofja Loka	12,7	**Celje**	26,3
Ajdovščina	12,7	**Radovljica**	33,6

Source: Kreitmayer McKenzie et al., 2008.

9.6 Conclusions

Our research results supported the idea of Ljubljana's daily urban system as lively and strong within Slovenia's overall commuting patterns. It represents the biggest Local Labour System in Slovenia with very high level of "self-sufficiency" as shown also by the values of "inward and outward openness" of the LLS Ljubljana. Strong daily urban system in one way shows the attractiveness of Ljubljana as a centre of employment for many living in the surrounding urban, suburban and rural areas. On the other hand increasing commuting brings also several negative effects to quality of life of residents of Ljubljana as well as those commuting, experiencing traffic congestions on a daily basis, air pollution, parking problems and costs, and also time spent for the commuting alone. The idea of balanced regional development which actually continues such a strategy since 1970s, is included also in the current Strategy of spatial development of Slovenia (2004). Hopefully the implementation of this strategy will keep the benefits of a strong and relatively well organized daily urban system of Ljubljana while minimizing its negative impacts on the development of Ljubljana, and on the quality of life of its population.