Spatial patterns of crimes in Klaipėda and their assessment in social geographic approach

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Abstract. This article explores spatial patterns of crimes, their dynamics in structure, time and space since 1990 until 2010 in Klaipėda, Lithuania. A period of research involves the changes during the post-soviet time. The research is combined of two sets of data. One set combined by social geographic indicators (changes of population, unemployment, crimes and their structure, and social geographic features as density of crimes, distribution of spatial patterns of crimes). Another set of data combined by geo-information of main categories of crimes (thefts, robberies, criminal damages, hooliganism, extortions, grievous and intending bodily harms, producing and selling of narcotics and homemade alcohol, sexual assaults). The Kernel method was used as a key measure to estimate the changes of spatial patterns of crimes with their geographic shapes, scopes and density. The data was processed with Geographic Information Systems (GIS) and elaborated in cartographic representations. The research determined that a majority of criminal activities are mostly located along the main streets and around shopping centres. The distribution of criminal activities is explained by the concepts of opportunity theory and daily routine theory. Despite the changes of crime rates and unemployment, segregation of society and shrinking of urban population in Klaipėda city, the spatial patterns of crimes over the two decades were distributed more extensively but with lower density.

Key words: Crime, spatial patterns, structure, change, Klaipėda city.

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INTRODUCTION

Shrinking cities are urban areas that are experiencing population decline, along with an inability to maintain previous levels of infrastructure and services. These cities typically result from a combination of deindustrialization, suburbanization and demographic shifts (Hollander, Nemeth, 2011; Hollander, Pallagst, Schwartz, Popper, 2009; Frazier A. E. *et al.*, 2013).

Klaipėda, the third largest city in Lithuania, is also experiencing the processes characteristic of shrinking cities. Since 1993, the city experienced a significant decline of population. It decreased from 208,3 thousand inhabitants in 1993 to 168,0 thousand in 2010. During this period, the change of population was negative (-19,3%). Meanwhile, in 1990, 2,102 crimes were recorded in the city, and in 2010 already 4,683 crimes in total. During these decades, the amount of crimes increased by 222,8% in total.

The opportunity theory implies that crime density is closely related to population density (Harries, 2006). In case of Klaipėda, the change in density of population is related to emigration and suburbanization that is a consequence of social segregation within society. Suburbanization is an effect of transformation of economies as well, as it happened when the social groups became wealthier and started to settle down in the outskirts of Klaipėda. That was the result of newly established residential districts with private houses. In particular, the changing density of population in the inner city due to suburbanization, internal migrations and emigration caused a phenomenon of shrinking city. The routine activities of everyday life and changes in the lifestyles of people mediated and dictated by socio-economic changes and necessities of life shape crime trends, patterns, and distribution (Harries, 2006). Traditionally, a high crime rate had been seen as a phenomenon of city centres. The difference in residential density with an assumption that *ceteris paribus*, the presence of more persons per unit, area will serve to generate more crimes (Harries, 2006). Due to segregation of society in Klaipėda, the persons, who have higher social status, are looking towards the higher level of social security and neighbourhood watching in new residential suburban districts. In the meantime, in the shrinking inner city of Klaipėda more crimes have been committed. Especially, since the year of 2000, the intensive constructions of new shopping centres and establishment of new commercial

enterprises (pubs, small groceries, and trading centres) along the main streets of Klaipėda induced the new reshaping forms of spatial patterns of crimes and their territorial distribution in the city.

The fear of violence and crime in many cities has a spatial distribution (Bernasco, Elffers, 2010; Doran, Lees, 2005; McCrea, Shy, Western and Stimson, 2005) characterized by spatial segregation and an urban space reallocation (Low, 2006; Vesselinov, Cazessus and Falk, 2007; Alkimin, Clarke, Oliveira, 2013). The different perceptions of urban threat lead the individual to construct certain spatial relations with the space that creates geography of crimes. A time, space and social context are essential in researches of geography of crimes (Farral, Bannister, Ditton and Gilchrist, 1997).

In order for a crime to occur, a motivated offender and suitable target must converge in time and space with the lack of a capable guardian. Therefore, this can be perceived as the presence of crime's geodiversity, i.e., where there is more opportunity, there is more crime (Frank *et al.,* 2012). In case of Klaipėda city, more opportunities for crime were observed on the central streets in a proximity to newly functioning shopping centres. According to the routine activities theory, this economic, commercial environment is attractive for offenders mostly. These processes are leading towards looking for answers: why does crime level remain so high, when population is decreasing, especially in the inner city? What are the reasons for changes of spatial patterns of crimes in Klaipėda city? How could these changes be explained by opportunity and daily routine theories?

LITERATURE REVIEW

Although, crime is increasingly a problem in many smaller cities worldwide, the study of crime in these cities continues to be an underdeveloped area of research. In cities with a serious crime problem, regardless of population size, police departments, city officials and policy makers all recognize the importance of a better understanding of the dynamics of crime (Ackerman, Murray, 2004).

The crime studies by geographers and other social scientists have generated considerable supporting evidence on the distribution and spatial dynamics of crime (Brantingham and Brantingham, 1980; Brown and Oldakowski, 1986;

Bursik and Grasmick, 1993). Their findings reveal that higher than average rates of crime are disproportionately concentrated in areas with high rates of unemployment and poverty, large amounts of physical deterioration, and concentration of ethnic or racial minorities and youth (Harries, 1974; Ackerman, 1976; Rengert, 1981; Kohlfeld and Sprague, 1988).

An analysis of dynamics and spatial patterns of crimes in post-Soviet cities and countries are revealed by the following researchers: V. Ceccato, N. Lukytė (2011) (analysis of crimes in Vilnius, Lithuania); V. Ceccato (2009) (analysis of crimes in Tallinn, Estonia); V. Ceccato (2008) (Comparative analysis of crimes in the Baltic countries); V. Ceccato, D. Oberwittler (2008) (analysis of spatial patterns of robbery in Eastern and Western European city); M.A. Andresen (2009) (Crime in Lithuanian after accession to the European Union). These authors in their researches used the methods of spatial statistics and cartographic representations elaborated by GIS. The concepts of crime researches were based on methodology and applicated for analysis of crimes in western cities and countries. The reflective peculiarities of crime analysis in post-Soviet cities as in Vilnius and Klaipėda are discussed in the research of A. Eismontaitė, G. Beconytė (2012) (territorial distribution of crimes in Vilnius, Lithuania); L. Kraniauskas *et al.* (2012) (a chapter in monograph about crime dynamics in Klaipėda, Lithuania); A. Acus, L. Kraniauskas (2012) (crime dynamics and its assessment in sociological approach); A. Acus (2014) (statistical analysis and application of GIS for crime mapping in order to get outcomes for crime prevention); A. Acus (2011) (processes of criminality and their relations to culture).

Mapping crime to elicit information concerning its spatial distribution has a long history. Some of the earliest uses of crime mapping can be traced back as far as the 19th century in France where maps were utilized to visualize and analyze crime information (Brunsdon *et al.* (2007). The advent of computing and growth of GIS technologies has fuelled the development of a range of crime mapping systems (Brunsdon *et al.,* 2007). A criminological research has identified a number of factors that may promote the regional development of crime, including unemployment, economic deprivation (Felson, Poulsen, 2003). Thus, in addition to analyzing spatial patterns, it is also important to have an appreciation of how the distribution of crime locations changes over time (Brunsdon *et al.,* 2007). Geographic visualization is an area that has

been the focus of such research (MacEachren, Kraak, 2001). Theoretical ideas cover both space and time, but the spatial dimension is far more frequently researched. The reason for that might be that geographers have devised a variety of tools for mapping activities in space and for summarizing spatial processes statistically (Felson and Poulsen, 2003).

There have been a number of studies that have examined the use of dynamic visualization in spatio-temporal mapping (Andrienko, Andrienko, Gatalsky, 2003; Dykes, 1996; Koussoulakou, Kraak, 1992; Shepherd, 1995). Specifically, the application of pattern detection and spatial statistical analysis technique for exploring the occurrences of crime are critical in the analysis of criminal activity (Hirschfield *et al.* 1995; Weisburd, McEwen, 1997). The capabilities of these quantitative methods continue to evolve and allow for better evaluation of crime at the micro level (Anselin, 1998; Messner *et al.*, 1999; Murray *et al.*, 2001). Considerable attention has been paid to the hot spot concept – either the idea that crime may cluster in relatively small areas, more or less permanently, or ephemerally (Sherman, 1995; Block and Block, 1995, Buerger *et al.,* 1995; Gorr and Olligschlaeger, 2001). The hot spot detection is seen as a tactical weapon to assist the deployment of resources and to provide a geographic focus for public awareness of crime problems (Harries, 2006). The micro level kernel density patterns are useful in the explanation of crime location or reduced criminal activity (Ackerman, Murray, 2004).

Micro level research emphasizes the analysis of crime at individual locations (hot spots) and attempts to explain the relationship between site-specific physical features, social characteristics and crime (Bennett, 1986). Factor analysis at this scale also allows for a qualitative evaluation of crime patterns compared to patterns of socioeconomic characteristics (Ackerman, Murray, 2004).

Lithuanian researchers (Eismontaitė, Beconytė, 2011; Babachinaitė, 2011; Kraniauskas et al., 2012; Vasiliauskas, 2014) analyzed the crimes and their changes in social geographic approach. Consequently, according to these researches, it was determined that crimes and their geography are focusing rather on prediction, than on measuring. The application of geographical information (the locations of crimes) helps to locate certain types of crimes as well as predict geographic patterns (Rossmo, 2000).

METHODOLOGY

A period of research involves two decades since 1990 until 2000, and since 2001 until 2010. A research on structural changes of committed crimes involved the periods of 1991 and 1996, 1997 and 2003, 2004 and 2010. A comparative data of research of crime density according to kernel method involved the years of 1991, 1996, 2004 and 2010, as the intervals between these years indicate obvious distinctions of changes in time and space. The latter data after 2010 were not included into the research due to changes of methodologies in representations and classifications of registered and officially published crime statistics. Besides, during the research, the authors also used crime data from primary resources for the period since 1990 until 2010. The latter crime data form primary sources are not in the disposition of researchers. In this research, the data from primary sources were corresponded with the data from official sources. An analysis of crimes and their changes in structure, time and space was done according to the statistical data provided by *Statistics Lithuania, Klaipėda City Police Headquarters*. Data about registered and committed crimes were taken from archives, reports and other primary sources that are in disposition of police officers. The official sources of statistics provided aggregate data of crimes for the entire municipality, without any detailed links to geographical localities. Due to these deficiencies, the crime data from official sources of statistics are not sufficient in order to determine and research the geodiversity and spatial distribution of crimes within the city. Data from primary sources has the following geographic link as address (street name, number of building).

During the two decades (since 1990 to 2010), 107,270 crimes were committed in Klaipėda city in total. Only 71,391 of them had geolocation: 54,206 thefts (75,93%), 5,805 robberies (8,13%), 3,454 criminal damages (4,84%), 3,051 hooliganism (4,27%), 1,754 production and distribution of narcotics (2,46%), 1,697 grievous bodily harms (2,37%), 571 distillations and selling of homemade alcohol (0,80%), 525 intending hard bodily harms (0,74%), 181 extortions (0,25%), 147 sexual assaults (0,21%). Due to this, there are inaccuracies and discrepancies between the official sources and primary sources of crimes' statistics. In 1995, 4,512 crimes were registered and only 2,932 of them had geolocation, and in 2010, 4,683 crimes were registered and

only 3,282 with geolocation. Therefore, geocoded crime data were used in order to determine changes of crimes in their structure, as well as density in time and space. Thus, this research involved crime data about thefts, hooliganism, criminal damages, drug crime, robberies, grievous bodily harms, distillation and selling of homemade alcohol, extortions, intending hard bodily harms and sexual assaults. Other categories of crimes were not included into the research due to inaccuracies in data and their insufficiency in time series.

The precise identification of concentrations of crime (hot spot) is complex and various conceptualisations suggest different analytical methods that may be useful for evaluation (Goldsmith *et al.,* 2000). Hot spot maps are a traditional method of analysing and visualising the distribution of crimes across space and time (Gerber, 2014). Relevant techniques include kernel density estimation, which fits a two-dimensional spatial probability density function to a historic crime record (Silverman, 1986). This approach allows to rapidly visualise areas with historically high crime concentrations (Gerber, 2014), where one location may be the locality for multiple incidents, thus representation in point format can occlude the true risk, whilst not being constrained to a boundary as with aggregate mapping (Brunsdon, 2007).

In the discussion about gained results, the titles of residential districts and street names are used in the Lithuanian language: *Laukininkų* street, *I. Simonaitytės* street, *Taikos* avenue, *H. Manto* street etc. The division of city into 60 residential districts was done in 2001, but with no clear administrative function. The names of residential districts represent geographical locations and social-urban features of the districts. Traditionally, the known names such as *Žvejybos uostas* has an association with a former fishing port, higher criminality and social exclusion, ethnic minorities (the diaspora of gipsies); *Debrecenas* is associated with blocks of flats, dormitories, trade centre; *Miško kvartalas* is associated with a prestigious residential district in the Soviet times, as the district was planned nearby the forest and has distinguishable architectural features. The biggest density of inhabitants is characteristic of the southern part of Klaipėda, in the districts of *Baltijos, Pempininkai, Debrecenas, Neringa, Žardininkai, Alksnynė, Vingis, Bandužiai,* etc. These districts were planned and built from early 1970s to late 1990s, and recently all of them are in the shrinking processes.

CRIMES AND THEIR STRUCTURAL CHANGES

A trendline in Fig. 1a shows the dynamics of the total amount of crimes since 1990 until 1999. A number of crimes increased by 306,3 %, and geocoded crimes increased by 393,9% in total.

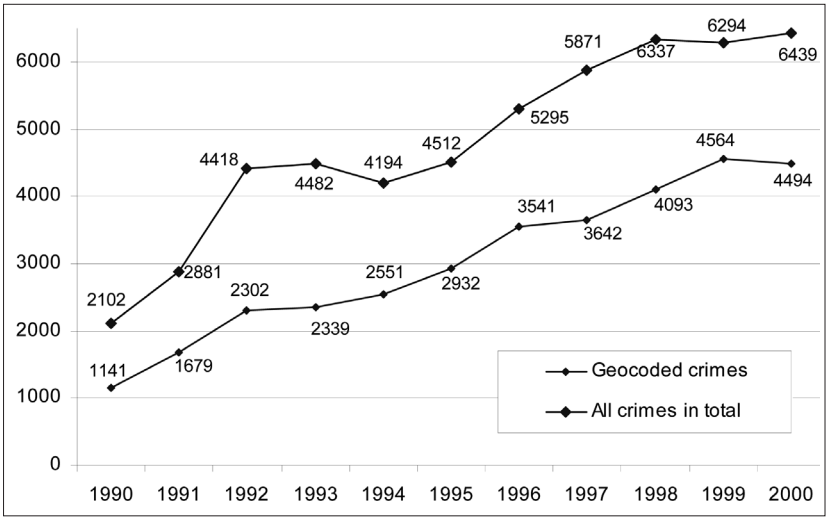


FIGURE 1A. Dynamics of all crimes in total and geocoded crimes in Klaipėda, 1990–2000

Source: Klaipeda City Police Headquarters (as data of geocoded crimes) and Statistics Lithuania (as all crimes in total).

The main reasons for the increased criminality were the city economy entering into a regime of free market, bankrupts of state-owned industrial enterprises, growth of unemployment and increase of social insecurity, which induced more poverty. Together with these processes the social segregation of society began. The wealthier persons with their families moved to the outskirts of the city and started to establish new residential districts. Meanwhile, the quality of life in the city fell, as the majority of inhabitants were in a similar social and economic situation and expected an improvement in their living standards.

The peak of geocoded crimes was reached in 2004 (*Fig.1b)*. This significant dynamics explained by new codes that came into the force in 2003 in the

Republic of Lithuania: a new criminal code, a new code of criminal process, and a new code for the register of crimes. The new codes made an influence on statistics of registered crimes.

Since 2004 and 2005, after the accession to the European Union, a decreasing number of crimes was related to the intensive emigration for working purposes. At that time, even the unemployed and the persons with low incomes were eager to live and work abroad. That convinced even the criminal persons to follow the emigrants and to look for new living spaces. In addition, the decrease of crimes is related to the economic growth that was experienced until 2008. This period of economic growth was significant and the growing incomes confirmed more social and economic stability.

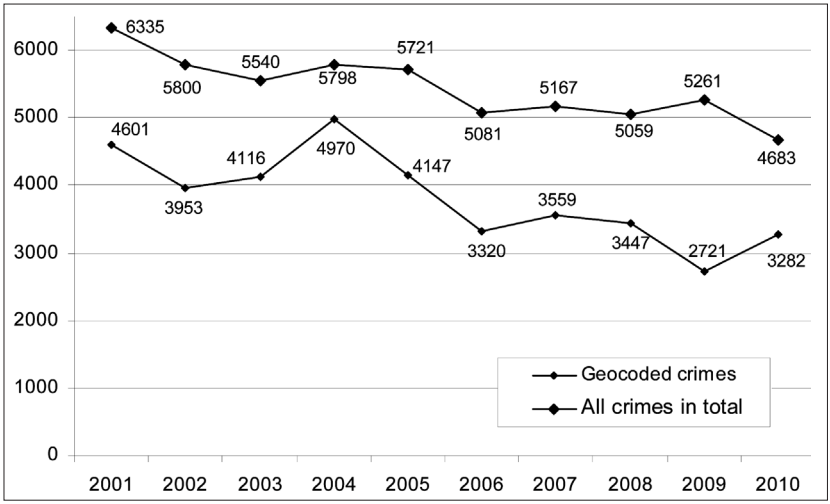


FIGURE 1B. Dynamics of all crimes in total and geocoded crimes in Klaipėda, 1990–2000

Source: Klaipeda City Police Headquarters (as data of geocoded crimes) and Statistics Lithuania (as all crimes in total).

A notable drop of geocoded crimes in 2009 is being ascribed to the consequences of economic crisis and increased unemployment, when socially and economically active persons lost their working places, businesses and decided to emigrate in order to look for better economic conditions. After

these processes, the structure of society has changed, i.e., the working-age population decreased and the amount of unemployed persons and other persons in social exclusion increased.

The thefts were and still are dominant among all categories of crimes. According to *Statistics Lithuania,* in Klaipėda city in 1990, 1,048 thefts were registered, in 2000 – 4,187, and in 2010 – 1,970 thefts. According to police data, 1,012 thefts were registered in 1990, and 1,541 geocoded thefts already in 1991 (an increase of 52,3% in one year). Later, in 1995 – 2,398, in 1996 – 2, 830, in 2000 – 3,363, in 2004 – 3,384 and in 2010 – 2,157 thefts were registered with geolocation. These changes kindled a fear within society's daily routines. In order to feel safer, the dwellers in the blocks of flats put bars on their windows and balconies. These new installations significantly changed the urban aesthetics in residential districts and commercial areas. The fear to be a victim of hooligans, robbers or thieves reinforced the feeling of carefulness in public areas and in the places of residence: yards, backyards, closed streets etc.

In the structure of crimes in 1991–1996 the following changes are observed: increased thefts, hooliganism, criminal damages, producing and selling of narcotics, robberies, grievous bodily harms. Within other crimes, an increase was characteristic of distillation and selling of homemade alcohol, extortions, intending hard bodily harms and sexual assaults *(Table 1)*.

TABLE 1. Structural changes of geocoded crimes in 1991 and 1996

	1991		1996		1991–1996
	In total	Structure (%)	In total	Structure (%)	Change (%)
Thefts	1541	*91,78*	2830	*79,92*	*+ 83,6*
Hooliganism	56	*3,34*	155	*4,38*	*+ 176,8*
Criminal damages	23	*1,37*	118	*3,33*	*+ 413,0*
Producing and selling of narcotics	19	*1,13*	56	*1,58*	*+ 194,7*
Robberies	18	*1,07*	305	*8,61*	*+ 1594,4*
Grievous bodily harms	18	*1,07*	31	*0,88*	*+ 72,2*
Other crimes*	4	*0,24*	46	*1,3*	*+ 1050,0*
In total:	**1679**	***100 %***	**3541**	***100 %***	***+ 110,9***

* Other crimes: distillation and selling of homemade alcohol, extortions, intending hard bodily harms, and sexual assaults.

In the structure of crimes between 1997 and 2003, increased robberies, grievous bodily harms and other crimes, and decreased hooliganism, criminal damages, producing and selling of narcotics are noted. The prevailing of thefts, robberies and criminal damages is characteristic of the whole researching period *(Table 2)*. Such structure of crimes indicates a very high level of social insecurity, especially in public spaces at that time.

Since 2000, during the period of early stages of the economic growth, and due to development of commercial structures (shopping centres, small and medium-sized enterprises (hereinafter SMEs), infrastructure of hospitality) in Klaipėda prompted the processes of economic recovery and rejuvenation. Increasing incomes and purchasing power were inducing social segregation within society. The continuing formation of social and economic inequalities within society fomented the hate towards those who were more successful in their businesses and the labour market in general. The thefts and robberies became a part of daily routines.

An increase of thefts was observed until 2004 (3,384 geocoded cases) *(Table 3)*. Since 2004, after accession to the European Union, significant changes in the structure of crimes started taking place. The main reasons for changes were: the liberalisation of labour market and emigration of work force seeking better economic environment.

TABLE 2. Structural changes of geocoded crimes in 1997 and 2003

	1997		2003		1997-2003
	In total	Structure(%)	In total	Structure (%)	Change (%)
Thefts	2840	*77,98*	3198	*77,70*	*+ 12,6*
Hooliganism	165	*4,53*	53	*1,29*	*- 67,9*
Criminal damages	176	*4,83*	143	*3,47*	*- 18,8*
Producing and selling of narcotics	84	*2,31*	51	*1,24*	*- 39,3*
Robberies	284	*7,80*	417	*10,13*	*+ 46,8*
Grievous bodily harms	38	*1,04*	144	*3,50*	*+ 279,0*
Other crimes*	55	*1,51*	110	*2,67*	*+ 100,0*
In total:	**3642**	***100 %***	**4116**	***100 %***	***+ 13,0***

* Other crimes: distillation and selling of homemade alcohol, extortions, intending hard bodily harms, and sexual assaults.

During this period, the amount of geocoded thefts decreased from 2,729 in 2005, to 2,233 in 2006, and 1,817 in 2009 *(Table 3)*. The structural changes in crimes' categories were characteristic of a decrease in hooliganism, criminal damages, robberies, grievous bodily harms and other crimes with an exception of increase of crimes related to narcotics. During this period, the cases of committed thefts decreased (by 36,3%) *(Table 3)*.

TABLE 3. Structural changes of geocoded crimes in 2004 and in 2010

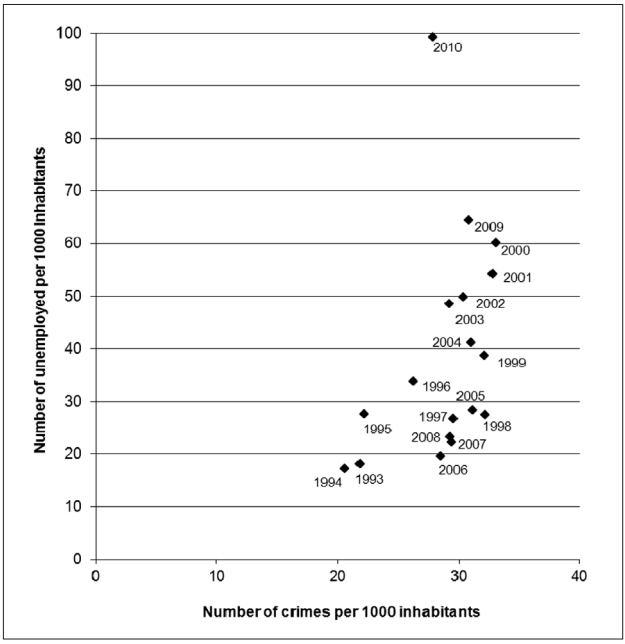
	2004		2010		2004-2010
	In total	Percent	In total	Percent	Change (%)
Thefts	3384	*68,09*	2157	*65,72*	*- 36,3*
Hooliganism	207	*4,16*	181	*5,51*	*- 12,6*
Criminal damages	249	*5,01*	213	*6,49*	*- 14,5*
Producing and selling of narcotics	174	*3,50*	186	*5,66*	*+ 6,9*
Robberies	521	*10,48*	361	*11,00*	*- 30,7*
Grievous bodily harms	279	*5,61*	105	*3,20*	*- 62,4*
Other crimes*	156	*3,15*	79	*2,42*	*- 49,0*
In total:	**4970**	***100 %***	***3282***	***100 %***	***- 33,96***

* Other crimes: distillation and selling of homemade alcohol, extortions, intending hard bodily harms, and sexual assaults.

Nonetheless, in the structure of crimes, robberies, criminal damage, hooliganism, producing and distribution of narcotics remained the dominating thefts. The most significant changes were observed in 2010. The reason for that was an intensification of crime activities related to changes in demographic and economic environment mostly. The shrinking processes became characteristic not only for urban places, but also for society and its separate demographic groups. The shrinking work force induced the social and economic environment in more negative ways like deterioration, decreasing of purchasing power, deepening of social exclusion and appearance of open poverty.

During the period since 1990 until 2010, the decrease of population was smaller than the increase of crimes. According to *Statistics Lithuania*, about 207,000 inhabitants lived in Klaipėda in 1990, and 2,102 crimes were recorded in total. In 2010, there were 168,143 inhabitants living in Klaipėda and 4,683

crimes were recorded in total. Also, the number of registered unemployed persons in 1993 was 3,700, in 1997 – 5,300, in 2000 – 11,700, in 2004 – 7,700, in 2008 – 4,000, in 2010 – 16,700 in total. Relatively, the highest crime rates were in 2000 (33,1 crimes per 1000 inhabitants), in 2001 (32,8), in 1998 (32,2), in 1999 (32,1) *(Fig. 2)*. The lowest rates were in 1990 (10,3), in 1991 (13,9), in 1994 (20,6), in 1992 (21,3), in 1993 (21,8), in 1995 (22,2). During the period of 1990-2010 an average rate of crimes per 1,000 inhabitants was 26,9.



*Data provided since 1993, as for the previous years there are not any official data about number of unemployed in Klaipėda city.

FIGURE 2. Spatial relations between the rates of unemployment and crimes in Klaipeda, 1993–2010 (per 1,000 inhabitants in time series)

Source: Statistics Lithuania.

The lowest rates of unemployment per 1,000 inhabitants were in 1994 (17,3), in 1993 (18,2) and in 2006 (19,6). The highest rates were in 2000 (60,1), in 2009 (64,4) and in 2010 (99,3). An average number of unemployment per

1,000 inhabitants during the period of research was 38,9. Spatial statistical relations between numbers of crimes and numbers of unemployed per 1,000 inhabitants indicate progressive and regressive changes in the development of social economic environment. According to the results, the lowest interrelation between crime rates and unemployment rates were characteristic of the years of 1993, 1994, 2006, 2007 and 2008. The highest rates were characteristic of the years of 2002, 2001, 2000 and later for 2009 and 2010. A situation in 2010 is a consequence of the global economic crisis, bankrupts of SMEs, increased unemployment, continuous emigration of work force and increasing of poverty. All these factors caused the deterioration in public social environment that induced a geodiversity of crimes. The unemployment rate was at its highest due to a decrease of population and especially those of working age. In Klaipėda, in 1996, crime rates per 1,000 inhabitants were 26,3, in 2004 – 31,0, in 2005 – 31,2, in 2007 – 29,5. In the previous years, the city was more populated and there were less unemployed persons. This evidence signifies an intensive criminality and extensive employment in 2009 and 2010.

RELATIONS BETWEEN SPATIAL PATTERNS OF CRIMES AND SOCIAL GEOGRAPHIC ENVIRONMENT

Spatial patterns of crimes show their territorial distribution and their dynamics in space and time. According to the kernel method, the surfaces of risks indicate a density of committed geocoded crimes in order to understand their spatial layout and relations to social geographic environment in urban areas. The results of crime density research show random distribution of crimes in 1991 *(Fig. 3)*. A medium and low density was characteristic of the southern part of the city, namely between the residential district of *Debrecenas* and the "Eglė" market. After regaining of independence, this space was the most important for trading and commercial deals. A very low crime density was characteristic of the districts of *Vėtrungė* (central part), *Žvejybos uostas* (hinterland of the former fishing port) and *Vingis* (in the South), with an exception of *Naujamiestis* (northern part), wherein were located the municipal social housing and at that time the newly developed, private commercial structures (groceries, pubs, other shops, etc.).

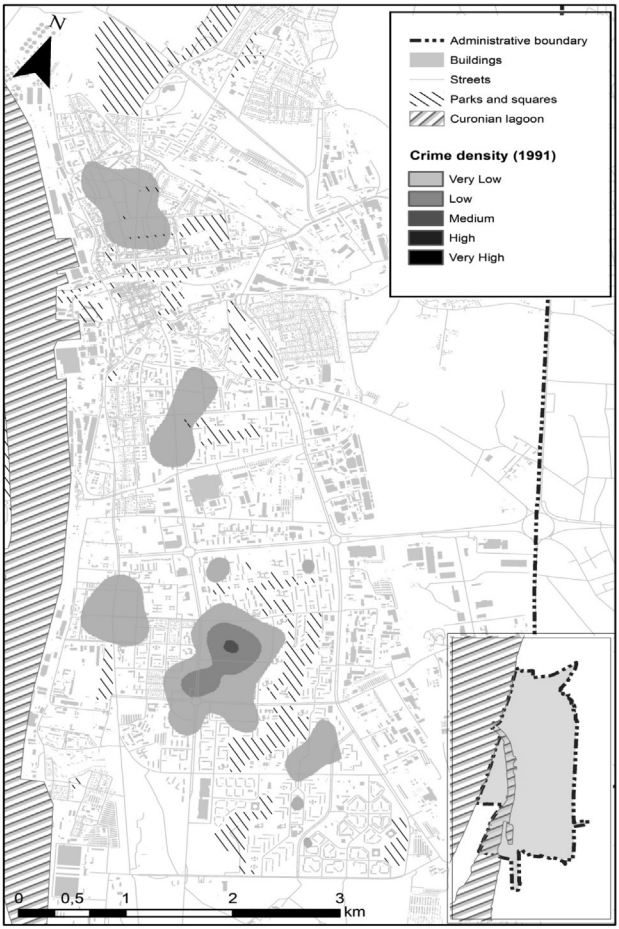


FIGURE 3. Crime density in Klaipeda in 1991 according to kernel method (n=1 679 geocoded crimes)

In 1996, the spatial patterns of crimes fined down *(Fig. 4)* due to essential changes in economy and in social environment that was a cause of increasing unemployment and lowering living standards. The crimes were distributed all over the city partitioning it into two obvious parts (southern and northern).

The dense distribution of crimes in the southern part was related to a higher concentration of residents and mainly due to blocks of flats there,

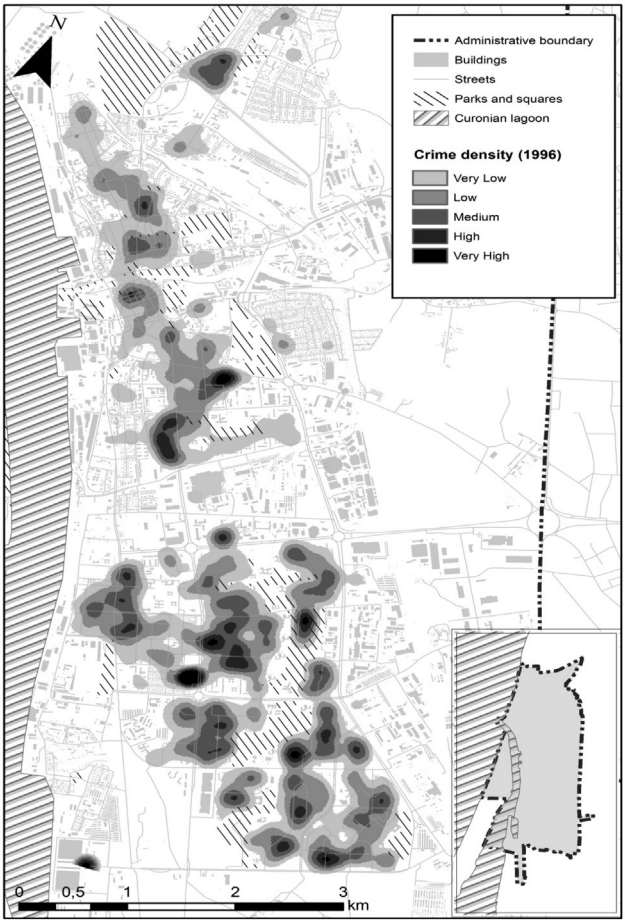


FIGURE 4. Crime density in Klaipėda in 1996 according to kernel method (n=3 541 geocoded crimes)

while in the northern part the concentration of inhabitants was lower. It was dominated by private houses and smaller blocks of flats. A high and very high density of crimes prevailed in the surroundings of shops and shopping centres which were the main hot spots of committed crimes. In the southern part, the criminality has spread in all residential districts.

Similar processes were observed in the northern part, wherein the criminality was also high, but geographically located along the main streets.

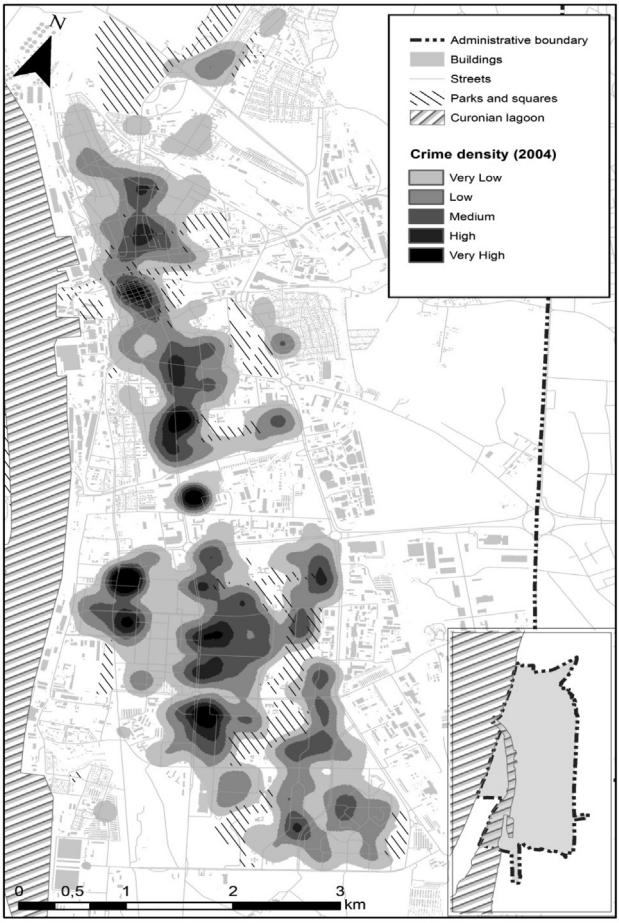


FIGURE 5. Crime density in Klaipėda in 2004 according to kernel method (n=4,970 geocoded crimes)

Less criminality was characteristic of the surroundings of private houses. The spatial patterns of crimes were smaller in their geographical scopes, but more intensive in their density. The dense distribution of crimes can be explained by the lowering living standards that induced a higher risk of keeping the property.

In 2004, the spatial patterns of crimes merged into bigger geographical scopes *(Fig. 5)* and became more differentiated. A high and very high crime

density was characteristic of the areas within and around either newly established or rejuvenated shopping centres, which became the main hot spots for criminality (apparently for thefts and shoplifting). The merging spatial patterns of crimes became consolidated spaces with different density of crimes within. A geographical layout indicates an increasing crime density along the main streets of Taikos avenue and H. Manto Street, with some sub-axes towards the district of *Žvejybos uostas* on the left side and towards the districts along the Šilutės road until the sub-streets in the southeast part of the city. The geographical surface of crimes was being reshaped due to the establishment of new commercial enterprises devoted for shopping and satisfaction of the public needs. The development of services induced reshaping of spatial patterns of crimes along the main streets. Nonetheless, the background of crime density remained relatively high.

In 2010, significant changes in the geographical location of spatial patterns of crimes were determined *(Fig. 6)*. A medium, high and very high density of crimes became characteristic of the areas along the central streets due to concentration of shopping centres there. A shopping centre *Akropolis* and its surroundings in the middle of the city dominate as the main hot spot for crimes. Meanwhile, the crime density in the rest of residential districts became low and very low, except with certain hot spots around the shopping centres. These hot spots became the main hubs for daily purchases in residential districts. The hot spots reshaped geographical scopes of spatial patterns of crimes. Even if the city is shrinking and deteriorating, its social and economic activities are concentrating along the main streets, as the majority of offenders and crimes as well. A theory of daily routine explains that crimes are being committed in areas, wherein offenders and victims are not the locals.

Thefts make up the biggest part of the total number of committed crimes in the structure of all the crimes' categories. In 1991, about 91,9% of total crimes were thefts, in 1996 – 79,9%, in 2004 – 68,1%, in 2010 – 65,7%. Even though the number of thefts was decreasing, the thefts remained the most frequent criminal action.

In 1991, a medium and high theft density was characteristic of the area between the *Debrecenas* residential district to the market "Eglė" (*Fig.7).* A medium and low density was characteristic of the district of *Žvejybos uostas*, and in the northern part of the city. At that time, *Debrecenas* and "Eglė" market

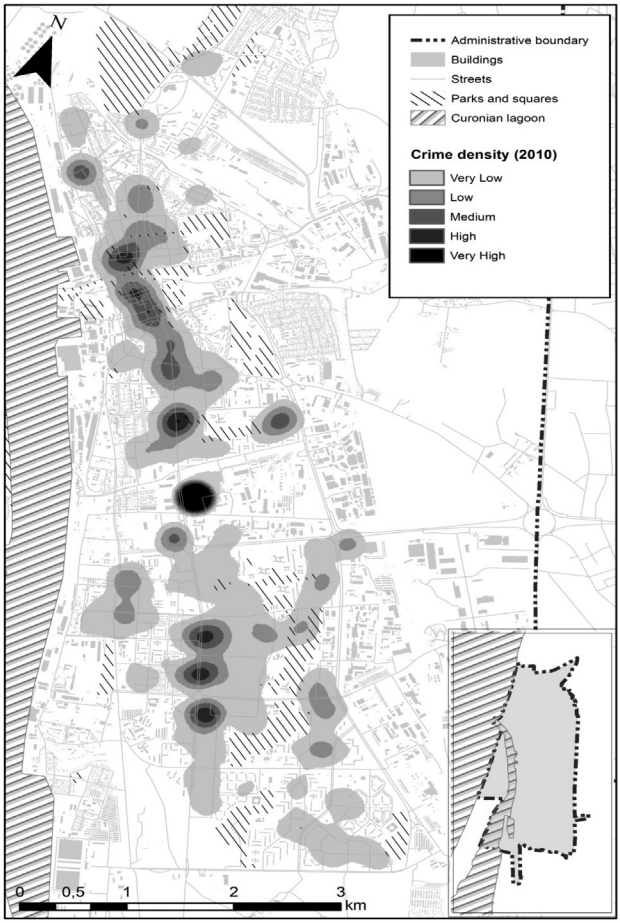


FIGURE 6. Crime density in Klaipėda in 2010 according to kernel method (n=3,282 geocoded crimes)

were the places with newly developing private commercial activities, which induced intensive criminality in the forms of thefts.

In the district of *Žvejybos uostas* the density of thefts was also low in comparison to the rest of Klaipėda. A social infrastructure there was less developed and less attractive due to a higher concentration of gipsies and other groups in social exclusion. Also, the proximity of the fishing port induced higher criminality rates. Groups of thieves existed in that space and they used

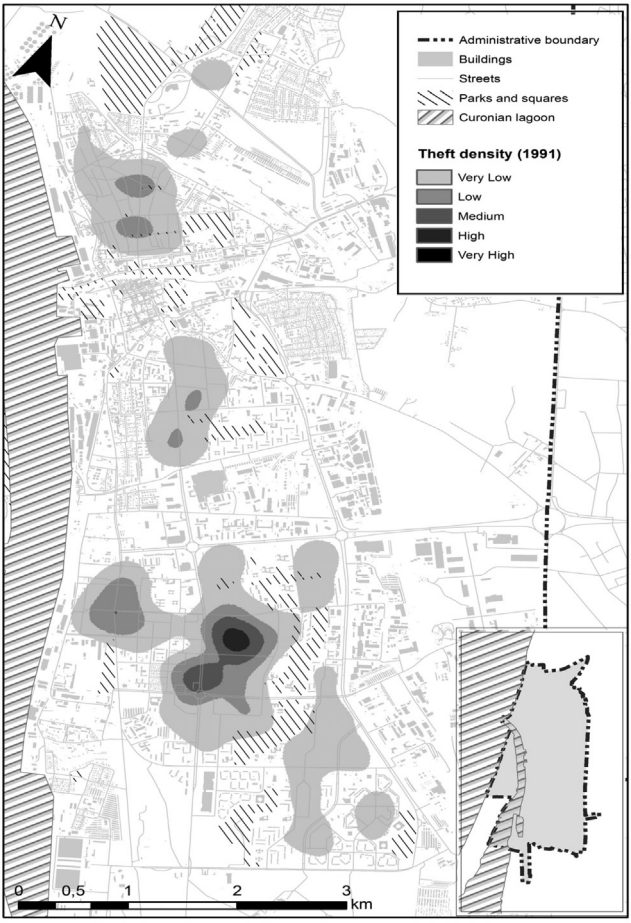


FIGURE 7. Theft density in Klaipėda in 1991 according to kernel method (n=1,541 geocoded thefts)

operating schemes for stealing goods, materials and other items from the territory of the fishing port. They used to sell the stolen things within the same district.

In the central part, the hot spots of thefts were characteristic of the surroundings of food shops, which played a significant function in servicing the daily needs of inhabitants. In northern part, a low and very low theft density encompassed residential districts, wherein the main places of entertainment

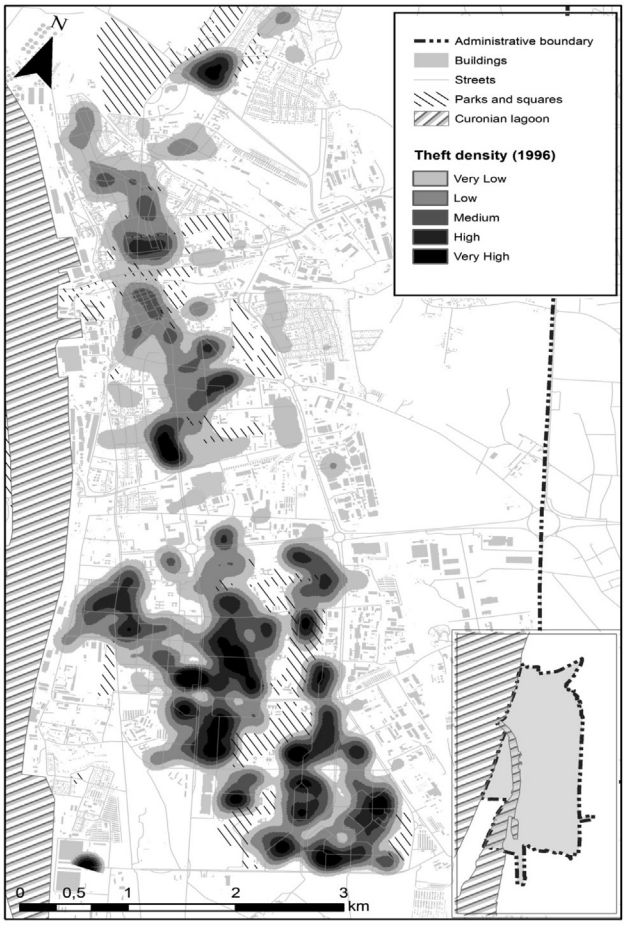


FIGURE 8. Theft density in Klaipėda in 1996 according to kernel method (n=2,830 geocoded thefts)

were located (bars, nightclubs), private commercial shops and social municipal housing. In 1991, the spatial patterns of thefts were located in four spaces with low and medium density in general.

In 1996, the density of committed thefts was more intensive in the southern part of Klaipėda city, wherein the spatial patterns of crimes spread in all residential districts, and in some industrial districts as well *(Fig. 8)*. The geographic scopes of spatial structures of crimes were bigger, but densely

distributed mainly around shopping centres and new commercial enterprises. The concept of the daily routine theory explains the dense distribution of thefts within commercial areas. In general, the overall situation of criminality was rather high due to the lowering living standards and increasing social exclusion. The rates of thefts in residential districts were also high due to a lack of security measures in public social environments around the blocks of flats and smaller shops at that time in particular. At that time, the level of security in all places was relatively low, e.g. close to dormitories, schools, kindergartens, small shops, bars, trade centres, markets, policlinics, libraries and even in the proximity of the nearby police offices. The space of the hot spots of danger for thefts began to concentrate around the main streets and basic shopping centres and close to the places of daily routines.

In 2004, the spatial patterns of thefts merged into even bigger geographic scopes with bigger hot spots and higher density of thefts around them *(Fig.9)*. A polarisation within geographic surface of thefts is observed, wherein in the northern part the spatial patterns of thefts were distributed along the streets of H. Manto and Taikos avenue. In the southern part, the spatial patterns of thefts continued along Taikos avenue and other main streets and their sub-streets within the residential districts. In 2004, the geographic surface of thefts was broad and rather intensive as the general level of criminality was the highest during the entire period of research *(Fig. 9)*. The economic growth was used to increase the incomes and purchasing power. These processes induced a sharpening social segregation within society. Wealthier inhabitants continued to move and settle down in the suburbs of Klaipėda. The economic growth aroused a differentiation in property and increased the general level of criminality in the inner city.

In 2010, the density of thefts was reshaped significantly *(Fig. 10)*. The surroundings of the shopping centre *Akropolis* became the main hot spot for thefts in the city. In the central part, the distribution of theft crimes was within and around *Akropolis,* and northwards along the main streets through old town and into the new town beyond the river Danė, until the northernmost hot spot of *Miško kvartalas* residential district.

In the southern part, the majority of thefts were committed within and around the trade centres in residential districts of *Žardininkai*, *Alksnynė*, *Eglė*, *Debrecenas*, *Žvejybos uostas*, *Pempininkai*, *Neringa*, *Vingio* and *Bandužiai* in

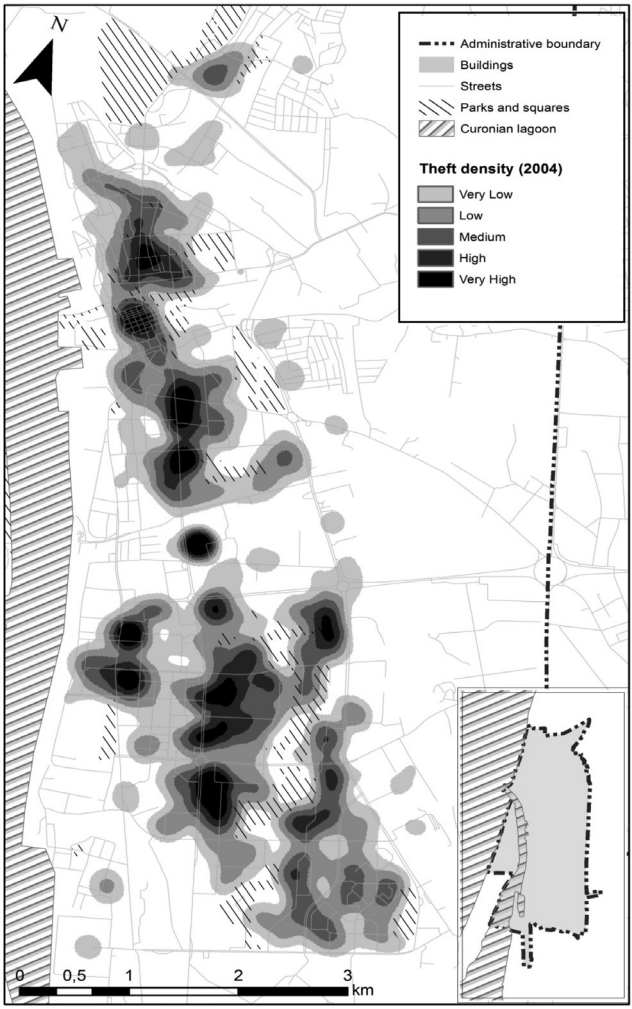


FIGURE 9. Theft density in Klaipėda in 2004 according to kernel method (n=3,384 geocoded thefts)

particular. In the southern part, the density of thefts was very low, and low around the shopping centres. Meanwhile, in the northern part, the spatial patterns of thefts were distributed along the main street and its sub-streets. The density of thefts was medium, low and very low.

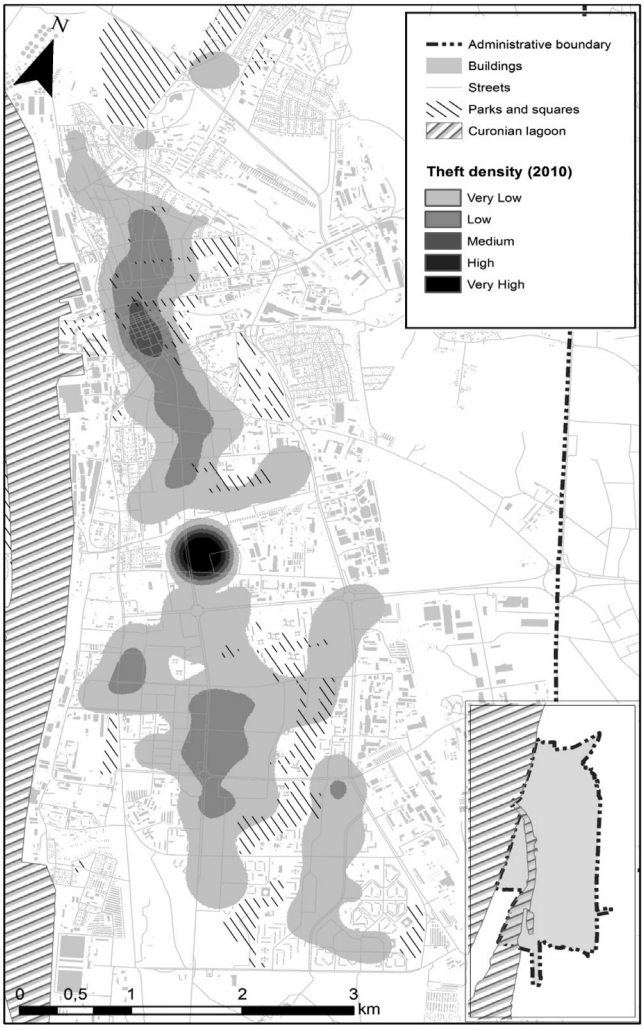


FIGURE 10. Theft density in Klaipėda in 2010 according to kernel method (n=2,157 geocoded thefts)

The geographical surface of theft density was expanded but it was less intensive *(Fig. 10)*. The spatial patterns of thefts amalgamated into three main ranges:

- in the northern part along the streets of H. Manto street with a hot spot in the old town;
- in the central and southern parts along the street of Taikos avenue with hot spots in residential district of *Žvejybos uostas* and agglomerated hot spot between *Žardininkai* and *Debrecenas*;
- in the southeast part along the street of Vingio street, I. Simonaitytės street, Laukininkų street, mainly in the shrinking and deteriorating residential districts.

The shrinking and segregating society was living in a social and economic environment that induced the spatial patterns of crimes with different density and its geographical distribution. This outcome of research argues that application of the concept of opportunity theory that crime density is closely related to population density, and is characteristic of the analysis of the central part of Klaipėda only, but not for the whole city. Due to the transformation of economies, segregation of society, suburbanisation, liberalised labour market, and emigration, there is a weakening relation between the density of crimes and the density of population. Therefore, the theory of daily routines implies the socio-economic changes in the lifestyles of inhabitants. The most attractive places for daily routines are the areas within and around the shopping centres along the main streets where intensive daily economic and commercial acivities are concentrated, and where the density of local population is lower or is decreasing.

CONCLUSIONS

The structure of crimes within Klaipėda city was changing due to the transformations in economies, labour market and social environment. These transformations elicited a decrease in population, suburbanisation, and emigration. Due to shrinking population, the social landscape of the city became attractive for crimes in residential districts, namely around trade centres and along the main streets.

The different categories of crimes include hooliganism, robberies and criminal damages, producing and selling of narcotics dominated. The number of thefts within the structure of committed crimes had decreased, but remained the dominating category of crime with its extensive geographical distribution.

The spatial patterns of crimes were changing in their geographical scopes, density and intensity. They were characteristic of the surroundings of shopping centres, as these surroundings were the main places for gatherings of inhabitants for daily purchases and other actions of daily routines.

According to the empirical data of this study, the concept of opportunity theory is becoming less correlated with the density of crimes and density of population, as the majority of crimes were committed in the districts with a shrinking population and deteriorating physical and social infrastructure.

The concept of daily routine theory verifies an increase of crime density along the main streets and shopping centres, with a higher concentration of local and non-local population in order to satisfy their needs. The theory of daily routine explained that crimes are being committed in areas, wherein offenders and victims are not the locals.

The economic-commercial environment along the main street is attractive for offenders, but there is still no efficient public guardianship.

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Nusikaltimų erdvinės struktūros Klaipėdoje ir jų vertinimas socialiniu geografiniu požiūriu

EDUARDAS SPIRIAJEVAS, LAIMONAS BETEIKA

S a n t r a u k a

Šiame straipsnyje tiriamos nusikaltimų erdvinės struktūros Klaipėdoje, jų dinamika 1990-2010 metų laikotarpyje. Analizuojama bendra nusikalstamų veikų kaita bei jų ryšys su gyventojų skaičiaus mažėjimu, kintančiu nedarbo lygiu mieste, miesto visuomenės socialine segregacija, suburbanizacijos procesais. Tyrime naudoti nusikalstamų veikų duomenys pagal Klaipėdos miesto vyriausiojo policijos komisariato pirminius

statistinių duomenų šaltinius, kuriuose nusikalstamos veikos susietos su konkrečiais adresais (gatvių pavadinimais, pastatų numeriais). Lentelėse pateikti tyrimo duomenys, parodantys nusikalstamų veikų dinamiką ir jų struktūrą 1991-1996, 1997-2003, 2004-2010 metais.

Nusikaltimų erdvinės struktūros kernelio (branduolio) metodu pavaizduotos 8 žemėlapiuose, kuriuose parodomas bendras nusikalstamų veikų tankumas bei vagyčių tankumas, jų teritorinis paplitimas 1991, 1996, 2004 ir 2010 metais. Pavaizduotas šių erdvinių struktūrų išsidėstymas, jų geografinės formos, nusikaltimų "karštieji taškai" bei skirtingi nusikaltimų tankumo lygiai. Tyrimo rezultatai bei jų interpretacija susieti su kasdienės veiklos bei galimybių teorijų konceptais.

Nustatyta, kad Klaipėdoje 1991 m. nusikaltimų erdvinėms struktūroms buvo būdingas monocentrinis išsidėstymas, t.y. daugiausia nusikalstamų veiklų vyko teritorijoje tarp naujojo turgaus „Eglė" ir *Debreceno* rajono. 1996 m. skirtingo intensyvumo erdvinės struktūros buvo paplitusios visame mieste, ir jos telkėsi aplink prekybos centrus gyvenamosiuose rajonuose bei centrinėje miesto dalyje. 2004 m. nusikaltimų erdvinės struktūros jungėsi į didesnes erdvines struktūras su didesniu nusikalstamų veikų tankumu gyvenamosiuose rajonuose bei centrinėse miesto gatvėse. 2010 m. šios erdvinės struktūros tapo labiau ekstensyvios, su mažesniu nusikalstamų veikų tankumu, ir telkėsi palei centrines miesto gatves.

Tyrimo rezultatais nustatyta, kad pagal galimybių teorijos konceptą, silpnėja ryšys tarp nusikalstamų veikų tankumo ir gyventojų tankumo, nes dauguma nusikalstamų veikų vyko miesto rajonuose, kuriuose gyventojų skaičius mažėja. Pagal kasdienės veiklos teorijos konceptą, nusikalstamumas didėja centrinėse miesto gatvėse, kuriuose būna didesnis vietinių ir nevietinių gyventojų sutelktumas.