

EDITORIAL SELECTION FROM CRIMINAL GEOGRAPHICAL JOURNAL PREVIOUS VOLUMES I.

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EDITORIAL SELECTION FROM CRIMINAL GEOGRAPHICAL JOURNALS' PREVIOUS VOLUMES I.

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LECTORI SALUTEM!

Dear Readers,

In the five years since its foundation, the Criminal Geographical Journal has published dozens of scientific articles, which have attracted increasing attention from those interested in the field. This is also shown by the fact that not only articles written by Hungarian authors have been published in the journal in recent years, but also articles by foreign (Russian and Chinese) authors.

The number of citations of studies published in the Criminal Geographical Journal is increasing, just like the number of authors with academic degrees, which also shows the journal's recognition.

At its annual committee meeting, the editorial board decided to publish a selection of the most cited and best-ranked papers, which we hope will reach even more people interested in criminal geography. This editorial selection is a kind of stock-taking, which will be looked back on with satisfaction by the editor and the readers alike. As an editor, I have been reviewing articles for weeks, sometimes months, and I have been in contacts with authors and editors.

The editorial selection will not stop at the first volume, but will be a regular publication of the International Criminal Geographical Association and the Hungarian Society of Police Science. I am pleased to announce that the first volume of the editorial selection of the *Bűnözésföldrajzi Közlemények* is also going to be published soon.

I wish you a pleasant time for (re-)reading the papers!

Szabolcs Mátyás Ph.D.
Chairman of the editorial board

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*felfoldi.peter@uni-nke.hu***SPATIAL DISTRIBUTION OF CYCLING ACCIDENTS IN BUDAPEST AND
THE WEB-BAL APPLICATION****Abstract**

Road traffic and accidents are unfortunately still inseparable concepts. The only real 'benefit' of accidents that do occur is that they can be learned from later, and are therefore less likely to happen in the future. However, in order to analyse accidents and draw the most accurate possible conclusions from them, it is necessary to have accurate input data as well. In this paper, we present an application capable of providing such a large amount of accident data. The data extracted from it can be used to analyse which accident hotspots are likely to occur. It will be illustrated through an example how it can be used as a source of input data to explore accident hotspots in cycling in the city of Budapest.

Keywords: Budapest, accident analysis, bicycle, traffic accident

1. Introduction, literature review

The most important aspect of road transport is the safety of its users. The primary source of danger in transport is kinetic energy, the level of which is one of the main factors influencing the outcome of the accidents. If there are no adequate passive safety devices in place to keep these energy levels within safe limits, the extent of injuries and the outcome of accidents can be more severe. This is particularly true for vulnerable road users. The time lost by the occurrence of accidents, the management of their consequences, and even the time lost by traffic disruption itself, can cause measurable, quantifiable losses. (Irk 1997, Holló – Hermann 2013). For this reason, accident prevention is an important task. Also identifying the causes of accidents and drawing the right conclusions from them in order to work more effectively on accident prevention. (Irk 1978) (Holló 2013) This is not only a public task, but it is necessary for the public authorities, coordinated primarily by the police, to maintain this task and to carry it out to the highest possible standard, thus guaranteeing citizens' rights to health and the right of mobility. On the police side, this task is primarily carried out by the traffic police (Mészáros

2017), but in parallel with this it can be a task for the officers of public order (Papp – Major, 2022), or a riot police task as well (Gál 2021) Traffic enforcement tasks may also be needed in these areas.

In this study, I focus on road accidents involving cyclists. The analysis of the subject area shows that during the resurgence of cycling in the capital over the last 15 years (Felföldi 2021b), the problem has been examined from several angles. However, in our country, cycling has not lost nearly as much of its popularity in recent decades, especially in certain flat areas, as it has in the capital, where the boom in motorisation since the late 1960s has shifted the focus away from both cycling and walking in mity mobility planning, providing facilities for cycling and transport on foot, and transport management itself. (Gáll 2005) After that it was only in the 2010s that it was reintroduced into conscious, strategic-level planning. (Ábel et al. 2014)

In parallel, the accident situation had to be dealt with at the Budapest, rural and Hungarian national level, and no mode of transport can be an exception to this. Although obviously different types of accidents are characteristic of different parts of the country and regions. These differences may also be reflected in the types of vehicles involved. Surveys have been wide-ranging, from the development of cycling traffic in several locations nationwide (Glász – Hóz 2021), to the analysis of accident data for Budapest (Baranyai – Török 2016), with a specific focus on the "safety in numbers" principle (Glász 2016, Felföldi 2015). There has also been analysis that has included age distribution among the aspects examined (Felföldi 2014, Glász et al. 2011).

There is, one aspect of accidents involving cyclists that has received little attention to date, in contrast to motorised transport, and that is location-based analysis. The existence of accident hotspots has long been known and studies have been carried out on them (Holló 1994b, Hóz 2002, Andrejszki et al. 2017), including a study of hotspots from the point of view of road signs (Mocsári 2004), but there are few examples in the Hungarian literature of the targeted investigation of cycling accident hotspots. (Mátyás et al. 2021) Although the data sources are available and can be analysed using geoinformational tools. One such data source is presented in Chapter 2.

In addition, international literature is available on the investigation of cycling accident hotspots. (Mahmoud et al. 2021, Loukaitou-Sideris et al. 2014) However this kind of investigation is not in the centre of international research either.

2. The Web-Bal application

The computer storage and use of road traffic data and information to improve road safety started decades ago. (Nahi 1973, James 1975, Koren et al. 1983, Dove et al. 1986, Holló 1994a) However, in Hungary the most relevant data source is the internal information system used by the police, called Robotzsaru (RZS NEO) (Hajzer 1999). This system contains the most comprehensive information on accidents occurring in the country, but access to it and the management of access rights are limited even within the police force, primarily for the reasons of information protection (Sütő 2016). Since not only information on accidents is stored here, but practically the entire administrative operation of the police is managed through this system, it is obvious that the RZS NEO cannot be searched directly by anyone. However, specific data on many events recorded here, including accidents reported to the police, must be anonymised and transmitted to the Hungarian Central Statistical Office (KSH) within a specified timeframe, as required by the legislation. This process is not fully automated and therefore requires continuous work by both police and KSH staff. Data sent to the KSH must be integrated into the international statistical system and must be anonymous. For this reason, the data stored in the RZS NEO contain more information than the statistical data sheets sent to the KSH, even beyond the personal data. (Hóz et al. 2015) However, the national accident situation recorded by the KSH and available to the general public is less effective from the point of view of accident research. In many cases, insufficient information makes it impossible to draw the right conclusions. It can therefore be stated that, in order to improve road safety, it is necessary to examine sources other than the data from the KSH, especially if these sources actually contain more relevant data.

The source of the data used for this analysis is the Web-Bal application, which is available for research purposes on the website of the Hungarian Public Roads NZrt (MK) and is reserved for the MK to perform its tasks as well as possible. The predecessor of Web-Bal was the Win-Bal software, developed in 2003 (Hóz 2005). Win-Bal software was available on CD, which database was therefore available at the place where the software was installed. Thus changes and updates could not be easily synchronised. This led to the development of a web interface with a cloud-based database, where all authorised users could use the same database. The input data for the Web-Bal are the National Road Data Bank (OKA), the National Cross-sectional Road Traffic Counting Database (OKKF) published annually by the Hungarian Public Roads (MK), the accident data set provided by the statistical module of the Hungarian Statistical Office (KSH), which contains information on the location data provided by the police, as refined by the MK staff. Web-Bal also provides an opensource visualisation based on Open

street map to visualise all this and, after selecting a number of query options and criteria, the results can be downloaded in spreadsheet form for later processing by additional applications (e.g. Google Earth/Maps, MS Excel, QuantumGIS, IBM SPSS).

It is also worth noting that the development of the road network visualisation based on the OKA has been ongoing since the early 2010s. The development of the Transport Information System and Database (KIRA) is also currently being carried out by the MK. This system is open to the public, anyone can register and view the national road network of Hungary, also using Open street map and other base map layers (e.g. Google Maps). The basic idea behind the development of KIRA was also to provide a wide range of possibilities for the registered users to investigate road transport issues. In order to achieve this goal, efforts were made to integrate data sources coming from several directions, and it was intended to include spatial information or Web-Bal data into this system (Stegena – Zubriczky 2015). Unfortunately, this integration has not yet been done.

3. Cycling accidents in Web-Bal

3.1. Query process

The online interface of Web-Bal allows a virtually infinite combination of accident queries. The main focus of this paper was the study of cycling in Budapest. Although the need to investigate accidents involving other means of micromobility is an interesting issue (Felföldi – Harangozó 2021). Unfortunately, this kind of mobility and accidents are increasingly topical, however it is not currently possible to use Web-Bal to investigate this issue. As micromobility devices, including the most common electric scooters, do not have a clear legal status among means of transport, the police cannot register them correctly in the RZS NEO, so this information is not passed on to the KSH and the MK. Although, from an accident point of view, the use of these devices is just as much a factor as pedestrians or cyclists.

Figure 1. –Web-Bal search interface

source: https://webbal.kozut.hu/webbal_kkk/AccidentList.aspx

Figure Figure 1. shows a detailed view of the Web-Bal search interface. Within this, Accident data (Baleset adatai), Involved persons data (Részvevők adatai) and Injured persons data (Sérültek adatai) have dozens of separately selectable attributes for location, time, traffic engineering and technology, traffic situation, accident conditions, severity of injury, who caused the injury, who was involved, etc.

In the following I will illustrate the possibilities offered by Web-Bal through only one possible query. From 1 January 2010 until the end of the last year with complete Web-Bal data (31 January 2021), I have queried road traffic accidents involving personal injury in which a cyclist was the accident causing participant, occurring in the administrative territory of Budapest. The result of the query was an Excel spreadsheet containing thousands of location data, which can be further processed together with the other accident characteristics included in the spreadsheet.

3.2. Geoinformational representation

The accident dataset obtained from the query can be processed by a number of additional software tools for better visualisation. One of these is QuantumGIS (QGIS). Although one of

the primary functions of Web-Bal is to assist the road administrator or any other user in the research of accident black spots, and it offers a map display and a number of parameterisation options, the graphical interface of the map displayed, the software ergonomics of navigating the map cannot be considered as user-friendly. Thus, a more spectacular result can be achieved by using other solutions. For instance, accident heat maps, which show us the road safety risk points of the time interval under consideration, not only on the basis of the density points, but also on the basis of the accident severities. The heat map generated in QGIS from the cyclist accident data is based on roughly 2800 accidents in which a cyclist was the causative participant. Accidents involving cyclists but not caused by their actions are not included in this heat map, but there would be no major differences in the really significant hotspots. Due to space constraints, they will be dealt with in another study.

It can be stated with a high degree of certainty, and this has been a known phenomenon, that cyclist accidents are concentrated on and within the Budapest Grand Boulevard. (Felföldi 2013) These accidents were weighted according to their severity, following the literature. (Holló 2011) 1 for minor injuries, 10 for serious injuries and 100 for fatalities. On the heat map I have marked the locations of minor accidents in blue, severe accidents in red and fatal accidents in black. The lack of representation of fatal accidents where the cyclist was not the causative participant may distort this map the most, as there have been accidents in the suburbs where the cyclist was not the perpetrator but a participant. However, these are isolated incidents and the hotspots are clearly more characteristic of the more densely built-up inner city.

The most prominent of the inner city hotspots are the section of Károly boulevard between Astoria square and Dohány street, the area around Blaha Lujza square, Szent Gellért square and the Gellért quay area, the section of Bajcsy-Zsilinszky street and Andrassy streets within the Grand Boulevard, the on- and off-ramps of Margaret bridge, the intersection of Oktogon square, Baross street and József boulevard. In these locations, interaction with motorised traffic is definitely one of the sources of danger. The heat map even shows congestion around Bem square, which is due to the segregated cycling infrastructure there which has the highest cycling rate in Budapest and, unfortunately, also a fatal tram collision there a few years ago.

The details are shown in the figures below. The specificity of the accident heat map produced by the QGIS geoinformational software is that it dynamically shifts the colouring according to the weighted accident values shown in the image zoomed in on the given areas. Accordingly, for the whole territory of Budapest, almost the entire area within the Grand Boulevard is a fatality hotspot, while zoomed in, different areas of the city appear with different colouring.

This also explains the phenomenon that the danger zone of the same Astoria square (where several fatal accidents have occurred) is black in most of the image crops, but "only" red on the left side of Figure 6., where it is shown together with Blaha Lujza square. In this figure, Astoria square has the same dangerousness as in the other images, only the software shows that Blaha Lujza square has had more accidents than the Astoria area in the eleven years under study, so that the aggregate value is more "blacked out" there.

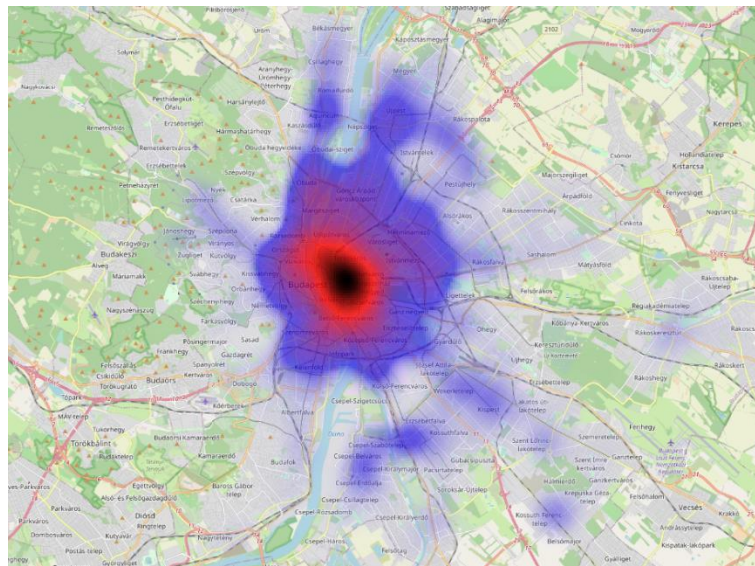


Figure 2. – Accident heat map of the entire Budapest area, cyclist causation 2010-2021
source: author's editing based on Web-Bal, QGIS 3.16.5

Figure 2. shows the heat map of all accidents caused by cyclists in Budapest between 2010 and 2021. It can be seen that in South Pest, e.g. around the Gubacsi bridge, there is a light blue density, but this does not mean that there were only light injuries in that area. There were fatalities there too, but there is a difference in severity of magnitude in the inner area of Budapest. Therefore the relative severity justifies the use of black for the inner districts compared to the outer areas.



Figure 3. – Accident heat map of Budapest city centre, cyclist causation 2010-2021
source: author's editing based on Web-Bal,, QGIS 3.16.5

Figure 3. shows the areas of Budapest city centre within the Grand Boulevard. Although the time period covered is between 2010 and 2021, the accident data are obviously influenced by the infrastructure reconstruction of the Grand Boulevard in 2020 (Felföldi 2021a), but the long-term impact of this cannot yet be evaluated. However, it is immediately apparent that there are two particularly dangerous hotspots with several fatalities, Astoria square, marked by the black spot on the left, and Blaha Lujza square to the east.

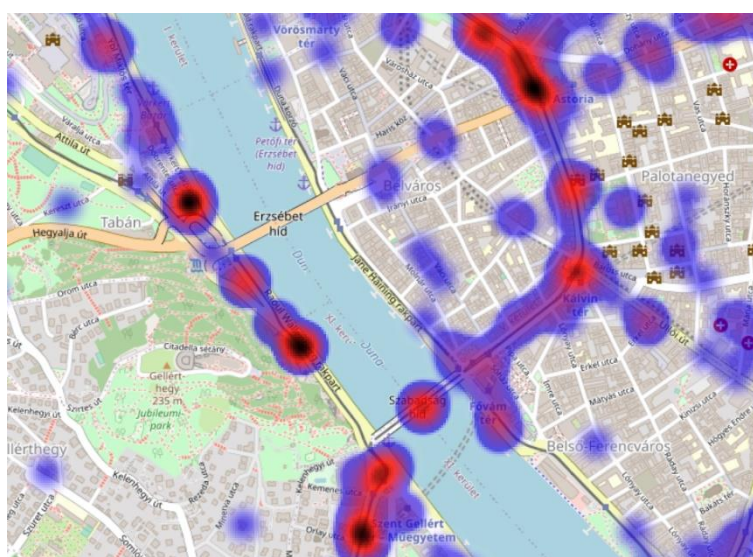
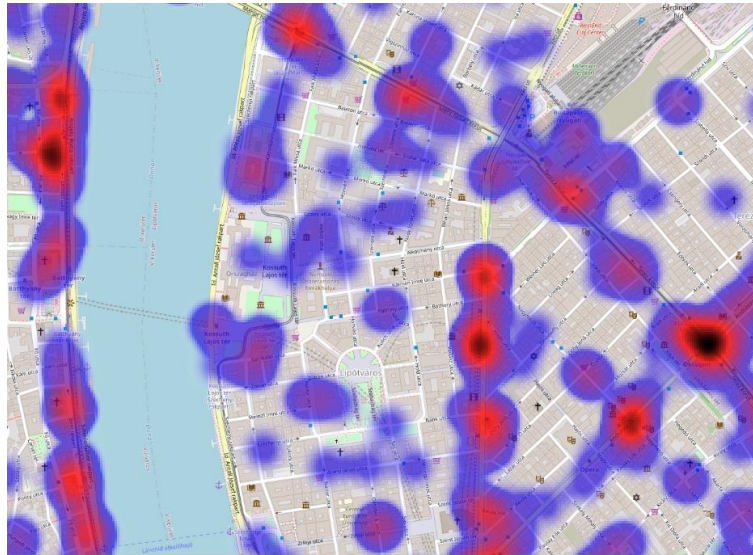


Figure 4. – Accident heat map, Astoria, Döbrentei square, Gellért square and Gellért quay, cyclist causation 2010-2021
source: author's editing based on Web-Bal, QGIS 3.16.5

Figure 4. shows the narrower downtown area of Budapest. Here it can be seen that the most dangerous area of the image is the Astoria area at the top right, but the Döbrentei square near the Tabán city park, the quay in front of Gellért-hill (Gellérthegy) and the area around Gellért square from north to south on the Buda side can also be described as a series of hotspots.



**Figure 5. – Accident heat map, Oktogon square, Bajcsy-Zsilinszky street, Bem square, cyclist causation
2010-2021**

source: author's editing based on Web-Bal, QGIS 3.16.5

Figure 5. shows the northern part of the Pest city centre, where the upper edge of the image is the St. Stephen's Boulevard section of the Grand Boulevard. In this crop, the most dangerous area is clearly the Oktogon square, in the centre right of the image. However, the whole of Bajcsy-Zsilinszky street can be considered dangerous compared to its surroundings, and unfortunately there has also been a fatal accident in Buda on Bem square, which is shown on the left side of the picture.

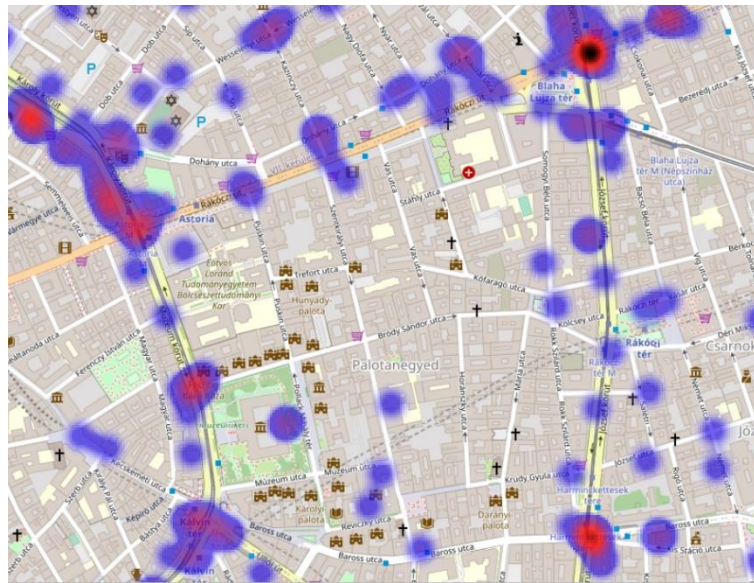


Figure 6. – Accident heat map, Astoria square, Blaha Lujza square, 32nd Infantry Regiment square, cyclist causation 2010-2021

source: author's editing based on Web-Bal, QGIS 3.16.5

Figure 6. shows the Palotanegyed district of Budapest, where only the boundary areas of the Museum Boulevard and József Boulevard are designated as hotspots. It can be seen that in this picture Blaha Lujza square appears to be the most dangerous. As we can talk about aggregated hazards in all cases, we should not only think of fatal accidents in these places, several serious injuries may also reinforce the severity marker of the given location. However it can be stated that the Budapest Grand Boulevard and its junction with Blaha Lujza square have been a risky location for cycling accidents in the last decade.

4. Conclusion

In the paper we reviewed some of the previous researches on accident hotspots in Hungary and the need for research. With the help of the Web-Bal application operated by Magyar Közút, which provides a very wide range of information, it is possible to further analyse the data of accidents occurring in Hungary and reported to the police in tabular form using various aspects. One example of such an examination was the analysis of cycling accidents in Budapest since 2010. In these accidents, cyclists were the causative participants. In the input data table of the accident heat map generated using QuantumGIS geoinformatics software, there were nearly 2800 accidents involving cyclists. While this amount of data is not worth examining in isolation, the large amount of data allowed for a cluster analysis to identify the points in the city where accidents have occurred at higher densities over the last decade. The most dangerous

intersection in the city was found to be around Blaha Lujza square. The full reconstruction of this square was completed at the end of 2022, but this reconstruction did not fundamentally change the traffic flow on the main intersecting roads. A much bigger transformation was brought by the opening of the cycle lane on the Grand Boulevard in spring 2020. The role of this facility in accident prevention will be examined in a few years' time by means of a spatial analysis similar to the one carried out in this study. In this case, a comparative analysis will reveal whether the location has become safer for the micromobility users. The other accident hotspot was the Astoria area, whose traffic environment and engineering have also changed due to bus replacement as a result of the metro renovation in recent years, and will change again in 2023.



Figure 7. – Bottleneck near Astoria square, worn road signs
source: Google Street View <https://goo.gl/maps/kLoUSSGHPnz9CQBN9>

At the same time, the bottleneck (Figure 7) in the cycle lane on Károly boulevard also posed an accident risk in traffic without bus replacement. A problem that could be addressed, if not by rebuilding the road, then by more visible warning signs or other traffic safety devices.

Making cycling safer is in the interest of all road users. If cycling is made safer, it can be a more attractive mobility alternative which also has a congestion-reducing effect. The present paper is only a thought provoking exercise in which I have presented one possibility. But it will be worthwhile to apply the same analysis to other types of transport in the future, even for accident investigations in the same locations but under different environmental conditions.

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**KNOWN INDIVIDUALS AND ANALYSIS METHODS OF CRIMINAL
GEOGRAPHY IN HUNGARY**

Keywords: crime, criminal geography, map, research

1. Introduction

"Public safety is a collective performance for society. The protection of public order and safety cannot be formulated as an official task, there is no authority, there is no authority competence that would leave public security without social assistance. Sin is born in society. The causes of sin arise in society and the members of society also commit crimes. Law enforcement is at the service of society and the authority is given to society. How powerful this authority is, how massive it is that depends on the law-abiding power of this society. It depends on the economic situation. It depends on knowledge, the quality of culture and depends on morality" – said Prof. Dr. Géza Finszter, Professor Emeritus at the National University of Public Service in his presentation by the Civil Guard on crime prevention and public weal, on November 26, 2012. Scientific criminological research have played an important role in recognizing what has been said, such as criminal geography studies, whose practical use can only be the first step in creating good public safety.

2. The history of criminal geographic research in Hungary

In Hungary, Béla Földes was the first associated person with a criminal geographic study (1889). From the period between the two world wars we can highlight the work of lawyers and statisticians. In the 1950s it was not possible to conduct criminological research, because the data of criminal statistics were secret. Criminology only revived in the early 1960s. From the 1980s onwards, more and more work by criminologists investigating the area of crime was born. Geographers can only carry out criminal geographic research since the late 1980s.

Zoltán Kovács was the first to draw attention to criminal geography in 1989. He considered the typing of crime, the designation of criminological districts and the creation of crime risk maps to be an important step.

István Vavró examined the territorial differences in crime in several of his studies, including in the Southern Great Plain region (2000). He also found it important to analyze the crime rate when analyzing territorial data, as there is a different detection rate besides the different crime rates of the population.

Klara Kerecsi, Géza Finszter, József Kó and Géza Gosztonyi have examined the districts of Budapest with different crime profiles for crime prevention. The crime maps of the districts were prepared and analyzed in detail. For the purpose of the investigation, they asked the people's opinion who living in the districts and suggestions were made on crime prevention (2003).

György Ritecz and János Sallai have published criminal geographic studies on the state border and border area on several occasions. The particular, special sub-area of criminal geography is the investigation of unlawful acts related to the state border and the border area.

István Kobolka researched the criminal geography of the border, with special regard to the crime of organization, including illegal migration and cross-border crime.

Gábor Michalkó primarily focuses on the specific relationship between tourism and crime, the spatial and temporal relationship of tourism-related crime through social geographic analysis of offenses committed by foreigners and the crime of foreign tourists. One of the first geographers has published a Criminal Geographic Cartographic Chart, an Intensity Cartogram, and a Point Map.

In his studies, Andrea Pődör formulated a comprehensive definition of the purposes of criminal geographic research, and drew attention to the possibilities and significance of the use of GIS in law enforcement and crime prevention.

In addition to the theoretical issues of criminal geography, Antal Tóth focused his research primarily on the unlawful acts revealed by Hajdú-Bihar County and the Border Guard. In addition, it defined the possible territorial dimensions of domestic criminal geography research, whereby it separated six territorial levels to investigate the spatial structure of crime: national or international level, regional level, county level, subregion level, settlement level, and level within the settlement: larger districts, smaller homogeneous neighborhoods, residential districts (TÓTH A. 2007, 21 p.).

Gábor Erdei demonstrated the role of crime analysis in social geography studies, with a historical overview of criminal geographical schools, and the introduction of the most important theoretical findings of foreign researchers and the application of GIS.

Szabolcs Mátyás, besides the investigation of Hajdú-Bihar County, dealt with the criminal geography of Debrecen primarily at the settlement level. In his work, the main indicators of

criminal statistics were analyzed and compared for Hungary's regional centers. He also conducted surveys on the ethnic investigation of criminals in Hajdú-Bihar county. At the national level, the topic of several studies and lectures was the geographic comparison of Hajdú-Bihar County and Debrecen as well as Bihar County and Oradea.

Zsuzsa Piskóti-Kovács studied the application possibilities of modern trends in criminal geography at three regional dimension, international, regional and county levels. During her research, he put special emphasis on exploring the socio-economic factors behind crime. Using GIS more complexly, it has highlighted crime prediction as one of the possible directions for domestic crime-related investigations. She found that the most suitable territorial dimension for the application of territorial statistical methods would be the level within the settlement in the future.

Antal Forró, PhD student at the University of Debrecen, carried out an investigation into the spatial appearance of crime in Békés County, highlighting the area of competence of the Gyula Police Department. Particular attention was paid to some socio-economic contexts determining crime, and to estimating latency within the settlement level.

3. Modern criminal geography

3.1 Crime map

The mapping of crime has a history of more than one and a half centuries. "The crime map itself is a thematic map that depicts the geographical location of a feature of crime." During its analysis, we can also see relationships that would distract us.

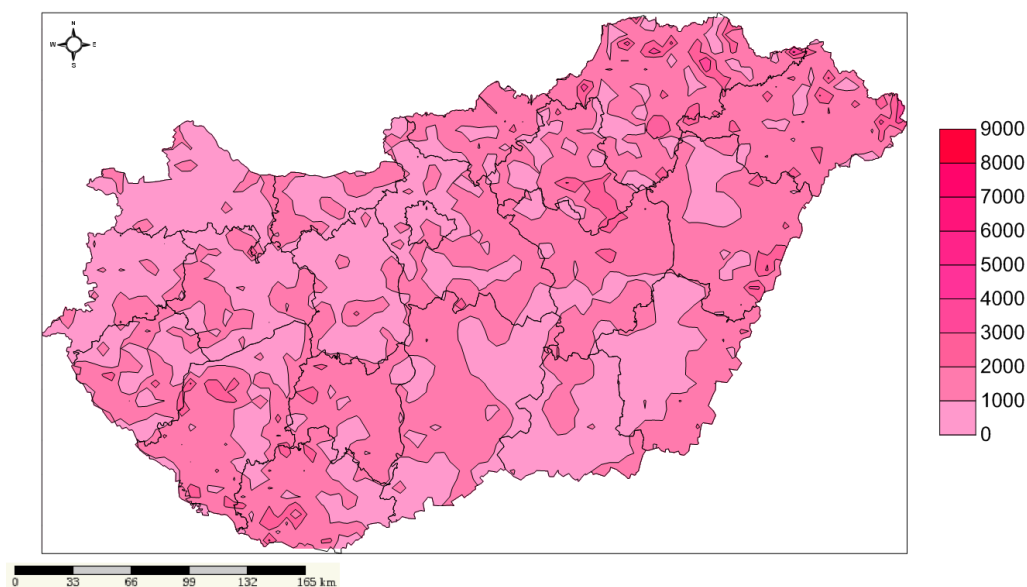
The evolution of the past decades can be best perceived by the use of the so-called "pin-point maps" known by the police around the world (otherwise used in our country to this day). Pin-point maps serve the purpose of clearly seeing where the crimes were committed. "However, there were limitations to its application, since it is not possible to archive these maps, which is why the static is represented by a given duration and condition. It is also difficult to read these maps because they usually represent a variety of crimes that are marked with different colors, but they can be confused." (PÖDÖR A. 2005, 5 p.)



8. Figure: Territorial distribution of crime in the administrative area of Gyula city in the first half of 2016

Database: Based on Robotzsaru-NEO and data from the questionnaire survey (own editing)

The old pin-point maps were replaced by the first computer crime mapping. The first was made in the middle of the 1960s in St. Louis. The "breakthrough" was the widespread of Geographic Information Systems (GIS) in the late 1980s. "In the research, the method of geospatial representation and analysis of statistical data on crime was then increasingly involved." (PISKÓTI-KOVÁCS Zs. 2011, 1 p.; TÓTH A. 2007, 22 p.).



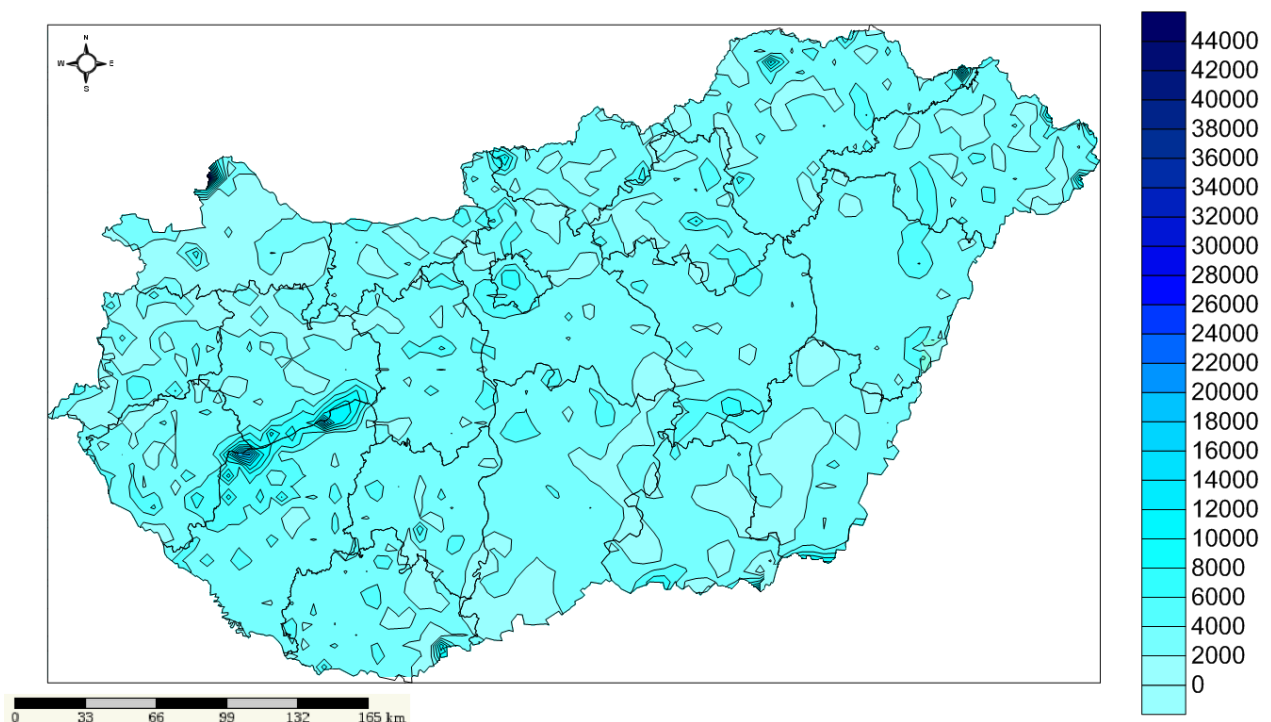
9. Figure: The arithmetic average and the number of registered crime offenders per 100,000 inhabitants in the settlements of Hungary (2001-2010)

Database: Based on data from the United Criminal Investigation and Prosecutor's Office and the Hungarian Central Statistical Office (own editing)

These maps can be used to represent the scene, time, type, and mode of committing the crime; depicting the place of residence of offenders and victims. Introducing patrols controlled by the police officers, illustrating the distance, and detecting serial crimes. It facilitates police work (efficient organization, investigation) and the work of police officers (strategic issues). (TÓTH A. 2007, pp. 24-25.).

3.2 Hot Spots Analysis

With the possibility of computer software, attention has been paid to the analysis of the so-called Hot Spots Analysis. There is no general accepted definition, but it is generally understood to mean areas that are infected with large-scale crime over a longer period of time, where crime is essentially concentrated. "These sites can be points (like a building) or patches (an area)." However, there is still no unanimous view on what criteria should be used to map the spatial distribution of hot spots. One of the characteristics of hot spots is that they change in space and time, and they are cyclical, so they may sometimes move away from smaller distances due to the protection against crime, and even may be retracted as a result of effective measures against crime. (TÓTH A. 2007, 28 p.; HARRIES, K. 1999, pp. 40-50.).



10. Figure: The arithmetic average and the number of registered crimes per 100,000 inhabitants in the settlements of Hungary (2001-2010)

Database: Based on data from the United Criminal Investigation and Prosecutor's Office and the Hungarian Central Statistical Office (own editing)

3.3 Crime Surface Model

The surface model produced from the crime data series is also suitable for the same spatial, surface examinations as crime maps. "Creating a surface model from a crime data series is basically based on the same procedure as for natural geographic factors: the coordinates "x; y" define the "horizontal" position in the same way, but the "z" values do not represent the height but the index of crime - in this case 3-dimensional aggregate map of latent crime in the downtown of Gyula city. The "accuracy" of the surface model could be achieved by densing the dots, but the availability of these data is limited." (PISKÓTI-KOVÁCS Zs. 2014, pp. 64-65.).



11. Figure: 3-dimensional aggregate map of latent crime in the downtown of Gyula city

Database: Based on data from questionnaire survey (own editing)

4. Summary

In conclusion, we can say that criminal geography studies are a novelty of today, as a relatively new trend in social geography which is also an area of interest for the wider public, and an important link of criminal sciences. At the same time, criminal geographic research not only deals with the territorial appearance of crime as a social mass phenomenon, but also with the analysis of its social, economic background, and the creation of a geographic profile that can assist in reconnaissance and develop a comprehensive crime prevention strategy.

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CRIMINAL GEOGRAPHICAL ANALYSIS OF CYCLING ACCIDENTS IN BUDAPEST

Keywords: criminal geography, traffic, accident, bike, traffic accident

Abstract

Several studies have already mentioned that geographic crime methods are also suitable for analyzing traffic accidents and crime. However, the theory was not followed by practical work, so like many research topics, it was only stuck at the level of theory. The study is part of a series of studies listing possible areas of research in criminal geography. The present study examines

the spatial location of bicycle traffic accidents in the Hungarian capital. It tries to shed light on regularities that can help to find out the cause of bicycle traffic accidents in the Budapest Police Headquarters and to reduce the number of accidents. In this paper the focus is on the Grand Boulevard in Budapest, highlighted the accidents on its Pest section.

1. Introduction

According to Nobel Prize-winning English scientist Bertrand Russel, "Sin is geographical." This finding is also valid in the investigation of traffic accidents. Geographical regularities can also be observed in the investigation of traffic accidents. Evident: an accident is not a "sin." However if we have a sufficiently large number of accident statistics it is possible to state spatial correlations between each accident that can be successfully used in subsequent accident prevention work. As we mentioned many authors have dealt with the possibility of the applicability of criminal geography in the field of traffic policing (Mátyás-Sallai 2014, Tóth 2007); however such research has not been carried out in Hungary so far.

Criminal geography research mostly covered the area of the capital; although this research usually analyzed the crime geography of only a few districts and examined only the spatial distribution of the events. The study covering the whole capital was carried out by the authors János Sallai - István Kobolka (2008) and Gábor Michalkó; the latter researcher analyzed the criminal geography of the capital from the aspect of tourism security (2002). Based on these, we can state that present research can be considered unique and novel in criminal geography and law enforcement in Hungary.

We are pleased to state that the depiction of crimes and accidents on digital maps is becoming more and more widespread in Hungary as well. There are still several websites where certain types of accidents and crimes can be displayed (eg. www.police.hu, <https://prestat.lechnerkozpont.hu>). However these allow only limited access to the public and in many cases to the investigation's interests. The available data is also delayed. However the PRESTAT system is also available from the RobotZsaru system (the main data processing system of the Hungarian Police) which contains up-to-date data and allows street-level analyses (with strict restrictions of usage and data security). However a standalone map cannot say much information in its own. It is necessary to have a competent specialist who can draw conclusions, establish regularities, shed light on the causes of accidents and possibly forecast for the future.

In the present study the authors want to study the primary spatial distribution of bicycle traffic accidents in the area of competence of the Budapest Police Headquarters and on the Grand Boulevard¹

2. Milestones in the history of cycling

According to a saying attributed to Lech Walesa, “I am a lazy person. But the lazy man also invented the wheel and the bike because he hated walking and sneaking.” (<https://www.brainyquote.com>) Did a really lazy person invent the bike? If I were Italian I would protest and argue with reference to the raw bicycle-like sketch of Leonardo da Vinci’s Codex Atlanticus² while in German I would mention Baron Karl Freiherr von Drais’s (1785-1851) treadmill. The treadmill dubbed “Draisine” was greeted with mixed emotions. The single-track pedal-less vehicle with two iron wheels and a steerable rod mounted on the front wheels could roll at speeds of up to 15 kilometers per hour; four times faster than the horse-drawn carriages used at the time (<https://ng.24.hu>).

To remedy the problem of the lack of pedal-less Scottish blacksmith Kirkpatrick Macmillan built the world’s first pedal-equipped treadmill in his village workshop in Dumfriesshire (Németh 2012). (Also to his name is the first bicycle fine in world history imposed by Glasgow police in five schillings for injury to a passing child /<http://www.bbc.co.uk/>.) In the early 1860s Piere Michaux (1813-1883) further developed the dandy horse.³ This resulted in the birth of the velocipede, which is considered the predecessor of today’s bicycle.⁴ A company called Michaux et Cie embarked on the mass production of bicycles initially mounted on a simple wooden frame then on more sophisticated two-piece cast-iron frames and later on a diagonal wrought iron frame. International and cross-continental bicycle sales as well as growing interest in bicycle

¹ Among the causes, many factors play a role that the study authors did not examine in the present research. When investigating the causes of accidents it is necessary to use transport geography, settlement geography, natural geography factors as well as examine the catchment area of a given settlement (see Bujdosó 2004 for more details). Unfortunately drug use is increasingly included as a causal factor among the causes of accidents. In the present research neither alcohol nor drugs were investigated among the causes of accidents which can only be investigated within a national framework. The regulation of intoxication and drug addiction is different in each country; there is no uniform European regulation (Mészáros 2016). Numerous studies have already shown that. Traffic accidents, various drugs are unfortunately occurring in increasing proportions in many areas of life (Major 2013, Sivadó 2016, Sivadó 2017).

² It has been proven that Leonardo’s bicycle does not belong to Leonardo not even to an talented disciple but to the drawing of a monk who restored manuscripts in the 1360s. The material of the paper and ink was analyzed and although the paper was originally from the XV. century but the ink is from the XX. century.

³ The dandy horse is a derogatory term for a human-powered two-wheeled vehicle that is considered the forerunner of the bicycle.

⁴ The bicycle is the forerunner of today’s bike. The difference between today’s bikes and velocipedes is in the drive. In the case of velocipedes, the front wheel was driven directly.

demand have resulted in the production of several additional products (e.g., more comfortable seat, tire, chain drive, mudguard, ball bearing) and further continuous development of the bicycle. (More than a hundred patents have been filed for the technical improvement of bicycles in Britain.) The late 19th-century bicycle was a sporting asset for wealthy citizens but it still struggled with significant technical shortcomings at the time. At this time we can talk about the widespread use of the bicycle mainly due to the lack of free time available for cycling and the low purchasing power of the lower classes. As part of an unstoppable development to this day John Kemp Starley (1854-1901) created a bicycle that can be slowed down with a brake and can be said safe in today's sense. Using the innovations of John Boyd Dunlop (1840-1921) Edouard Michelin (1859-1940) created the bicycle tire that could be pumped through a valve.

In 1878, the first bicycle that could be rolled by foot appeared in Hungary. Later bicycle shops were opened and large bicycle companies seeing the growing demand set up warehouses. Cycling schools have opened and published books on cycling maintenance throughout the country as well as newspapers on cycling. Cycling associations have played (and still play) a major role in creating a culture of cycling as they have taught people how to use the bike properly. These organizations nowadays carry out a wide range of activities to promote the bicycle as a means of transport (Frisnyák 1988).

3. Traffic in Budapest

Today, cycling is a form of urban transport as well. At the beginning of the 2010s cycling was also rising on Budapest's modal split (Felföldi 2020). This was mainly due to the flexibility of this mode of transport and the increase in congestion in the downtown areas which could also be explained by the increase in the level of motorization (Holló 1998). As a youthful and seemingly independent mode of mobility cycling emerged as a fashionable alternative by the early 2010s. However this growth reached an upper limit by the middle of the decade and it can be said that those who felt comfortable in cycling in Budapest changed their transport habits by then. This group did not expand significantly until 2019 based on traffic data.

The COVID-19 pandemic also appeared in Hungary in 2020. It has created an entirely new urban transport situation. The transport of big cities has changed with incredible dynamism thanks to the people's closures and their caution. This has resulted in a drastic passenger loss of public transport (Ekés et al. 2020) in favour of private transport. The total volume of turnover also decreased (Nagy 2020). The remaining turnover was significantly restructured therefore the decrease in turnover did not occur to the same extent. Thanks to this restructuring there has

been a 'now or never' attitude in transport management worldwide. Individual cities being given the opportunity to manage their long-standing transport management problems without the situation created by COVID-19. In this changed situation the possibility of diverting transport processes to a new channel was also included. One of the most visible examples of this in Budapest was the cycling infrastructure which was gradually being built on Nagykörút (Big Boulevard) and was considered temporary for the first time but was finalized in the autumn of 2020 after several technical changes.

3.1. Bicycle accidents on the Budapest Grand Boulevard

The present research's primary goal was to determine whether the distribution of accidents shows any geographical features in downtown Budapest. In the present paper, the whole city center means the area within the Grand Boulevard, which is south of the Margaret Bridge, north of the Petőfi Bridge. In Pest it bordered by the Ferenc, József, Erzsébet, Teréz and Szent István boulevards (classically it is the Grand Boulevard in the public discourse) and in Buda by Irinyi József street, Karinthy Frigyes road, Villányi street, Alkotás road, Széll Kálmán square and Margit boulevard. This area with its roughly 12 km² exceeds the size limits of the present research. Therefore we limited the focus of the study only to the Pest section of the Grand Boulevard.

One of the frequently asked questions is whether it is worthwhile or necessary to create a cycling infrastructure in an urban environment. The biker can travel on the road by following the rules even without the need of bicycle surfaces. As we can see from the traffic counts (Felföldi 2020) this ratio has stagnated in the last 4-5 years. In comparison as a result of the development of the infrastructure the proportion of cyclists rised in 2020 even in the less weather-attractive months. This fact clearly cannot be attributed to a random effect (Halász 2021).

However the question arises that how the modified infrastructure and the changed composition of road users affect road safety. The answer to this can be found out by a more detailed analysis of the accidents registered by the Budapest Police Headquarters (BRFK). Data are available for the research from 2011 to 2020 with the same method. From 2013 to the end of 2020 the location of accidents involving cyclists and investigated by the BRFK is also known if the cyclist causes the accident. Such an in-depth analysis was performed for the 2011 and 2012 data (Felföldi 2013) which can be used to determine the proportion of causes and participants for those two years. From the data collected from 2013 it is possible to determine the proportion

of causes and participants in relation to all accidents in Budapest. It is also possible to filter out the number and severity of accidents that apply only to the examined section of the Pest boulevard.

First of all, look at the accident numbers for 2011 and 2012 as location data for cyclists and participants is available. In later years, only the location data of the causes are known. In Chart 1, we can see their evolution from 2011 to 2020.

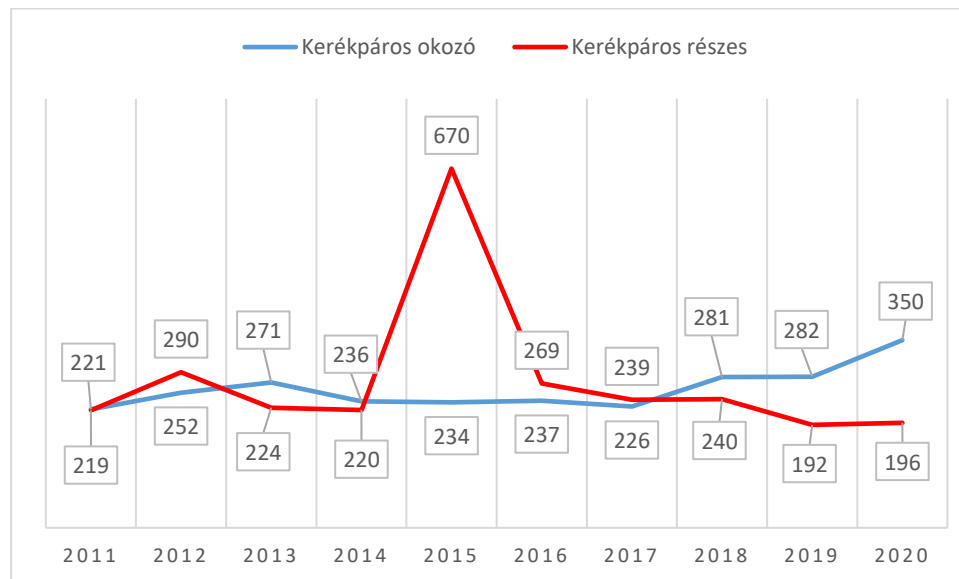


Chart 1: Bicycle accidents in Budapest (2011-2020) (blue: accident cause; red: injured)

Source: Own editing based on BRFK accident data

For the first time the chart shows the high proportion of bicycle accident victims in 2015. There is no logical explanation for this as there was no change in BRFK's accident recording methodology this year. However, the cycling traffic counters data do not show any discrepancy that would justify this leap.

However, from the point of view of the present study the period from 2017 to 2020 is much more interesting. The bikers' role played in the accident seems to be reversed. Cyclists cause a trend-like increase in the last 3 years.

It can also be said that while the usage of cycling has jumped, the emerging number of cyclists may also have a smaller traffic routine. However, the declining casualty rate also suggests that other road users pay more attention to cyclists. However in 2020 all other modes of transport generated a lower presence due to closures.

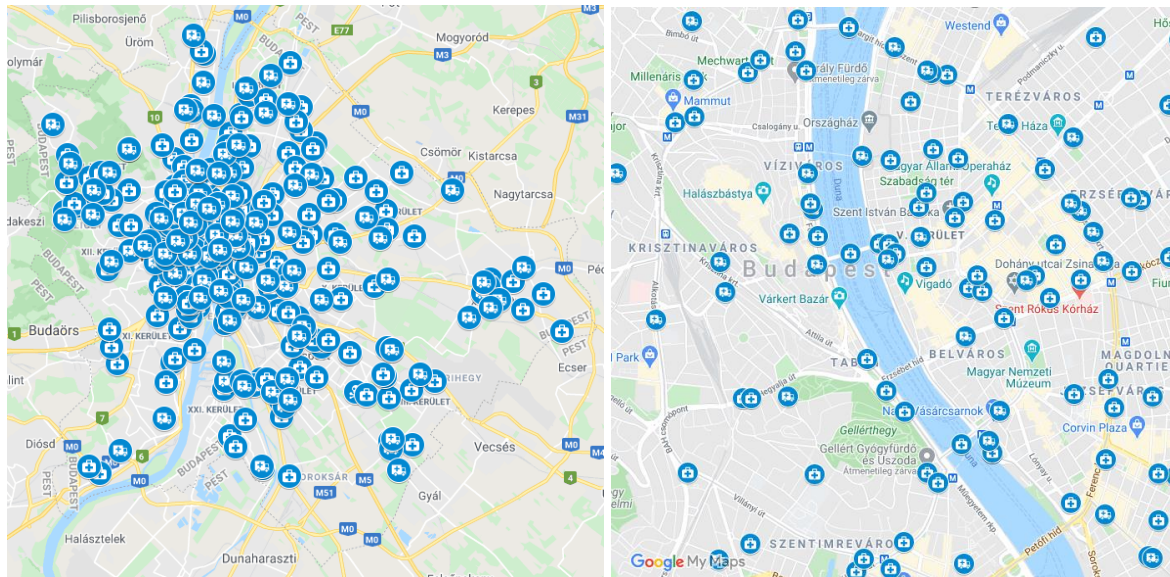


Figure 1: Locations of minor, serious and fatal accidents with cyclists in Budapest. Only the city center on the right (2020). (first aid kit: minor injury accident; ambulance: serious injury accident; skull and crossbones: fatal accident)

Source: BRFK accident data and Google Maps, own editing

As the rate of causes was the highest in 2020 we also plotted this year separately on a map for the whole city and approached the studied area in more detail. It can be seen that in the city center where we assume density based on the overview map we cannot find a more serious focal point of accidents on closer inspection. This is only a one year data and only the causes have been plotted.

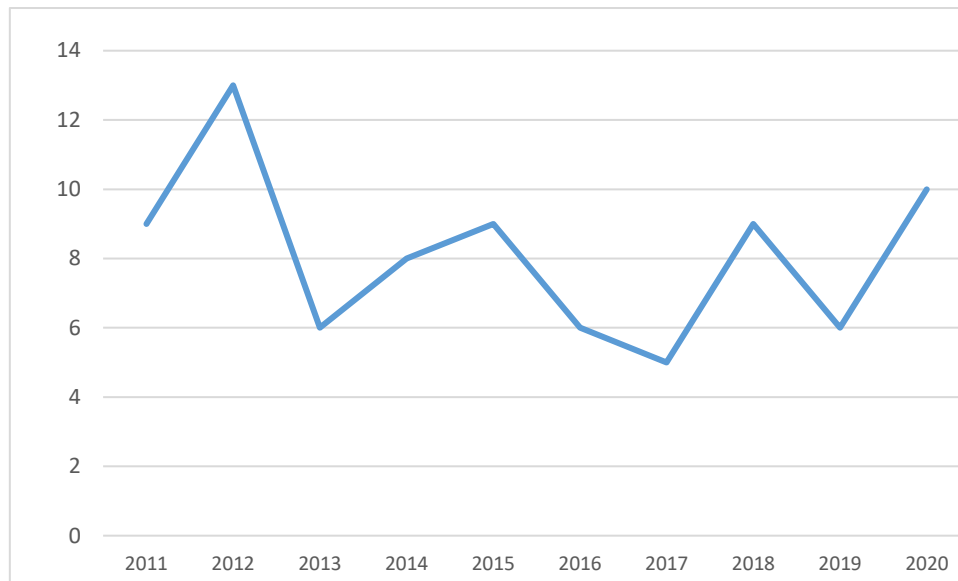


Diagram 2: Grand Boulevard, cycling causes, 2011-2020

Source: Own editing based on BRFK accident data

In connection with the Grand Boulevard in Pest, we can see in Figure 2 how the cyclists'-caused accidents developed. The number of cases is not high therefore the curve has a stochastic effect. It can be said that in the first half of 2010 the average value was higher than towards the end of the decade.

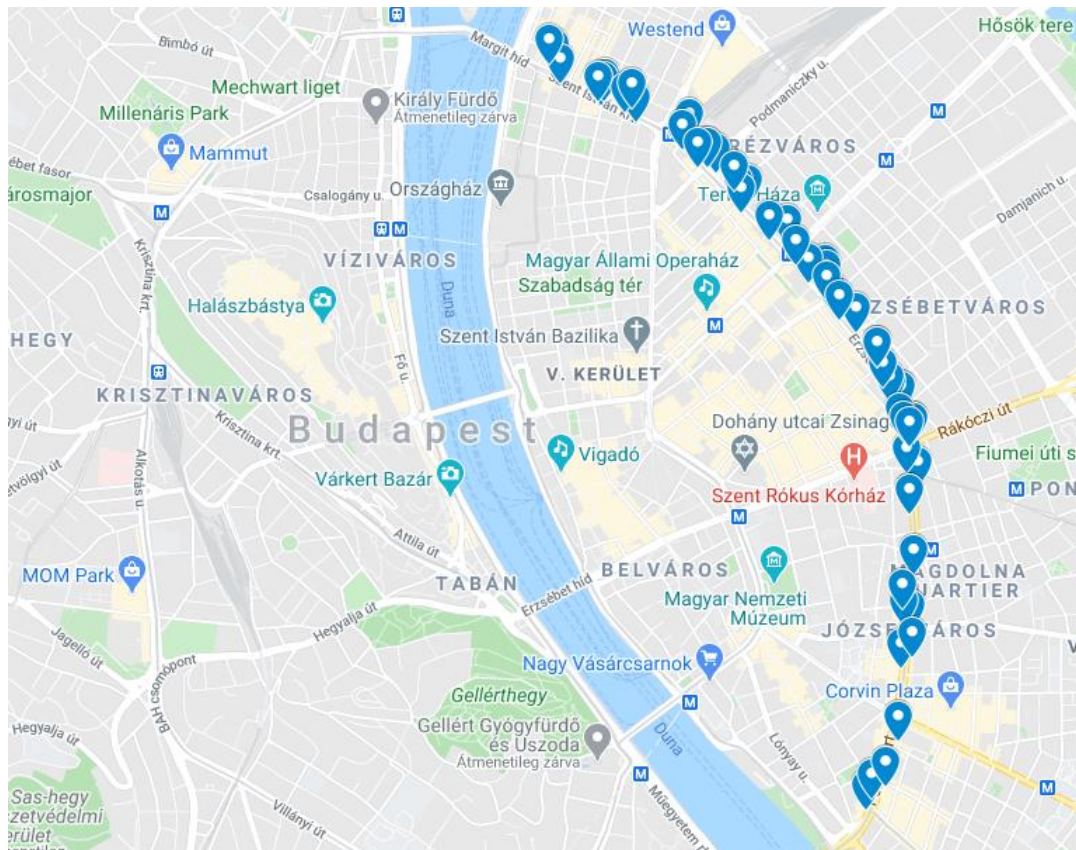


Figure 2: Bicycle accidents on the Pest section of the Grand Boulevard (2013-2020)

Source: BRFK accident data and Google Maps, own editing

Figure 2 shows the accidents on the examined Pest Grand Boulevard section between 2013 and 2020. Regarding to Budapest as a whole it can be said that instead of accident focal points it is possible to name more dangerous routes with a higher accident density in Budapest. From a distance the whole Grand Boulevard one of this dangerous routes. Although in detail accident densities can be discovered even within this section. In two cases, even accident hotspots can be found.



Figure 3: Accident densities in the Pest section of the Grand Boulevard.

**Left: Blaha Lujza Square, right: Szent István boulevard
Hegedűs Gyula street junction (2013-2020)**

Source: BRFK accident data and Google Maps, own editing

It can be misleading that Figure 2 and Figure 3 do not show accidents differentiated by time. It should be remembered that these markers show eight years of aggregate data. In such a time frame 3-4 accidents registered at the same address or adjacent addresses do not count as extraordinary. No long-term conclusions should be drawn from 2020 on either transport safety or urban development. There is an organic pace of traffic development that can be catalyzed by certain effects (for example the closures caused by COVID-19).

Closing thoughts

It is impossible to draw far-reaching conclusions from the number and location of accidents, not only in the Grand Boulevard case but even from the entire Budapest data set. As mentioned earlier in the Grand Boulevard case four significant changes were made only in 2020 in relation to cycling infrastructure development. COVID-19 created a situation that no one had encountered before. It is understandable that the legislators, traffic developers and managers of certain public areas had to solve a new and unknown challenge with no ready-made scenario. Traffic had to adapt to often changing conditions within six months. This turbulent situation in terms of traffic is still going on. In order to get to know the long-term impact of the cycling

infrastructures created as a result of COVID-19 further data collection and analysis will be necessary, among others a more thorough study of municipal law enforcement plans (see more: Christian-Bacsárdi 2017) and repetitive traffic counts on the examined areas.

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**NEW METHOD TO MEASURE CRIME: SHIFTING THE FOCUS
FROM SIMPLE COUNTING TO WEIGHTING****Abstract**

To evaluate the public safety of a certain spatial area, indicators of criminal situation and the investigation performance indicators are applied, which provide information about the work of the law enforcement authorities. The criminal situation is described by the number of known crimes, number of high-profile crimes, known crimes committed in public space and crime rate per 100 000 residents. However, it leads to several research questions: do the amount of crimes reflect properly the public safety? Does the current crime statistics provide an appropriate basis for the police for decision-making? Do all types of offences have the same effect on society? The Article focuses on a new trend of assessing criminality: it demonstrates the concept of crime harm indexes. In addition, it provides an overview about the existing ones. The Article could be interpreted as the first steps in the creation of Hungarian Crime Harm Index (HU-CHI).

Keywords: crime harm index, crime statistics, HU-CHI, methodology

1. Introduction

Police reports apply different indicators of crime and the investigation performance index to evaluate the public safety of a certain spatial area. The main research question is whether these indicators reflect properly the situation of public safety? Does the investigation performance index evaluate the work of law enforcement agencies correctly? Do all crime types have the same effect on society?

The Article provides information about the traditional measurement of public safety in Hungary and points out the problems. Thereafter it demonstrates the methods for estimating crime harm and introduces the concept of Crime Harm Index (CHI). A comparison of CHI methodologies will be carried out in order to find the best fitting one to Hungarian circumstances. The Article could be interpreted as the first step in the creation of Hungarian Crime Harm Index (HU-CHI).

2. The ‘traditional’ measurement of public safety according to police reports

To evaluate the public safety, the following crime indicators are applied in reports:

1. number of known crimes,
2. crime rate per 100 000 residents,
3. number of high-profile crimes,
4. number of crimes committed in public area,
5. crime investigation index for all crimes, for high-profile crimes and for crimes committed in public space.

While the first four provide information about the criminal situation of a certain area, the last one is for evaluating the efficiency of law enforcement authorities.

The *number of known crimes* involves all offences which are known for law enforcement authorities. *Crime rate per 100 000 residents* is applied for the sake of spatial comparisons. Change in the number of offences could be due to the change in criminal law, population, trust in authorities, etc. (VAVRÓ 1996). In addition, the presence of latent crime has to be taken into account during the analysis of crime statistics: according to KORINEK (1996) these are the crimes that are unknown, unreported for law enforcement agencies. There are several initiatives around the world that attempts to estimate the real volume of crime. The different crime victim surveys could provide a good example, for instance International Victim Survey or British Crime Survey. SKOGAN (1975, 2003) deals extensively with the reliability of crime data and his results lets us to be optimist. This statement is supported by HARRIES (2003) who found a connection between British Crime Survey data and known crimes. Besides the crime victim surveys there are questionnaire surveys which target the analysis of subjective safety feelings of residents and the extent of latency (for instance: PISKÓTI 2012; MÁTYÁS 2015; MÁTYÁS – CSEGE 2019; PÖDÖR 2020). The reports involve the *number of high-profile crimes and crimes committed in public areas* as well, because these have a particular impact for the safety feelings of residents.

In the police reports the *investigation performance indicator* is applied for assessing the work of the law enforcement authorities. VÁRI (2014) demonstrates the creation methods of investigation performance indexes in details and describes its general formula:

$$\text{Investigation performance} = \frac{\text{successful investigations}}{\text{successful investigations} + \text{unsuccessful investigations}} \times 100$$

VÁRI (2014) establishes that the investigation performance provides a view about the work of the law enforcement authorities, but these indexes – in spite of the crime statistics – are not specific, consequently the performance indicators of certain authorities are not comparable to each other. This is because these indicators do not represent the certain regulatory conditions, workload, ability, otherwise do not involve information about capacity.

The international literature pays attention to the problem of counting crimes as if they were created equal. SHERMAN ET AL. (2016) suggest an alternative method by integrating all crimes in a weighted index, which represents a far more useful approach for resource allocation and crime prevention. They state that the essential principle of a meaningful measure of crime is to classify each crime type according to its harmfulness, relating to all other crimes (SHERMAN ET AL. 2016). SHERMAN ET AL. (2016) summarized the 6 main problems of weighing crimes equally (Table 1).

Table 1. Problems of counting police-recorded criminal events as if they were equal according to SHERMAN ET AL. (2016, 6.)

1.	There is no meaningful, “bottom line” indicator of whether public safety is higher or lower in any year, place, offender’s record, or agency caseload.
2.	High volume, low seriousness crimes are disproportionately influential in driving crime counts up or down.
3.	Total counts of crimes, as distinct from crimes reported solely by individual victims and witnesses, include crimes detected solely or mostly by proactive police or corporate enforcement, which can be driven up or down by state action rather than by the behavior of criminals.
4.	If there are budget cuts it often leads to reducing investments in proactive enforcement, which can indicate a decrease in crime counts, however crime harm may rise.

5.	The management of offenders may be distorted by the tendency of prolific offenders to have relatively modest levels of seriousness, while very serious offenders may have very few convictions.
6.	Police face identical problems with counts in comparing areas at same point in time, or changes over time within areas.

SHERMAN ET AL. (2020) demonstrate extensively the problems of recent crime statistics and recommend an alternative way. They provide seven ‘statistical series’⁵ for counting crime in a more useful way. The advantage of these statistical series is that they are based on existing systems of data collection and reporting, consequently they are inexpensive to create and report. One of them is the crime harm index, which will be detailed in the next chapter.

3. Methods for estimating crime harm

According to international literature there is an increasing interest on assessing harm in the last few years, SHERMAN ET AL. (2016) find three main reasons in the background: firstly, the growing demand for analyzing and understanding the harm caused to victims, secondly, after the economic crisis of 2008 the fiscal austerities and criminal justice budget cuts forced police to reassess their focus on traditional crimes and crime counts. Finally, the third reason is that there is renewed emphasis on the importance of harm reduction as an objective of law enforcement.

Before providing information about the estimation of harm and the concept, it is essential to demonstrate the definition of harm. According to SPROAT (2014) it can be established that *harm* and *harm reduction* is poorly defined in the field of policing, which led to different interpretations and competing methods of measurements. According to RATCLIFFE (2015) ‘harm is an amorphous term that is easily understood in the abstract but vague in a policy context’ (RATCLIFFE 2015, 3.). CURTIS-HAM – WALTON (2017) uses the term of harm in a broad-view, which includes the various negative physical, psychological, social and economic impacts caused by crime as a whole and a specific crime relative to each other.

Generally, ‘harm can be defined as the negative consequence deriving from an adverse event in a broad sense’ (TUSIKOV AND FAHLMAN, 2009, 157.). Harms caused by crime can be merged in different forms. ASHBY (2017) highlights its complexity: it could cause financial costs, emotional harm, environmental and social harm. Due to the different forms of harm it is a

⁵ Article of SHERMAN ET AL. (2020) provides detailed description of the statistical series.

challenge to identify the real harm, which leads to the problematic estimation of it (ASHBY 2017).

Regarding harm it is worth mentioning the *seriousness* of crime. According to ROSSI ET AL. (1974) ‘the seriousness of criminal acts represents a conceptual dimension of criminality indispensable in every discourse, in legal theory and practice, and in sociological work. The seriousness of a criminal act may be viewed as a normative evaluation, an overall judgement, which allows comparisons among criminal acts, cultural values in different societies and cultures, and individual value differences’ (ROSSI ET AL. 1974, 224.). SHERMAN ET AL. (2016) treat harm as a synonym of seriousness.

The demand of estimating crime harm using a common metric merged in the 60’s, also there is a long tradition of harm measurement. RACTLIFFE (2014) distinguishes three basic methods: the *crime seriousness indexes*; *cost of crime estimates* and the *crime harm indexes*. BARNHAM (2018) uses the same classification, he divides the methods into the following categories: *public opinion*, *cost* and *sentencing in court*. He found the third method the most promising, because it is democratic and reliable.

The first *crime seriousness index* was the *Sellin-Wolfgang index*. It involved 3 components and each elements of components had a score, which expressed the seriousness of certain character of the offence (Table 2). The score for a criminal event was the sum of the component scores for each victim of crime. The crime index for the nation was simply the sum of those seriousness scores for these individual crime events (BLUMSTEIN 1974).

Table 2. Sellin-Wolfgang Seriousness Components and Scores (source: BLUMSTEIN 1974, 855.)

Components	Score
Injury Component	
<i>Victim assaulted</i>	
Minor injury	1
Treated and discharged	4
Hospitalized	7
Killed	26
Intimidation Component	
<i>For each forcible sex offence</i>	
The sex offence	10

Intimidation by weapon	2
<i>For non-sex offense</i>	
Physical or verbal intimidation	2
Weapon intimidation	4
Property Component	
Premises forcibly entered	1
Stolen vehicle	2
<i>Value of property stolen</i>	
Under \$ 10	1
\$ 10-\$ 250	2
\$ 251- \$ 2 000	3
\$ 2 001- \$ 9 000	4
\$ 9 001- \$ 30 000	5
\$ 30 001- \$ 80 000	6
Over \$ 80 000	7

RACTLIFFE (2014) states that this approach was briefly popular due to two reasons: on the one hand there were methodological problems regarding the survey on which the determination of weighting was based (MALTZ 1975), on the other hand because of the difficulty of distinguishing generic harms from individual victimizations (COHEN ET AL. 1994). One of the biggest problems relating to an index using weights that are based on public opinion is the fact that these kinds of surveys could be very expensive, and according to BARNHAM (2018) changes in public opinion would make long-term comparisons unstable (SHERMAN ET AL. 2014).

An alternative approach has emerged focusing on *the cost of various offences*. Cost of crime estimates involve two aspects: they try to express that which crimes mean greater cost to the society and they also examine the effectiveness of prevention programs from an economic perspective. RACTLIFFE (2014) summarizes four main challenges with operationalizing these measures: firstly, due to the inflation the calculations have to be reviewed by year to year, secondly, 'the monetary costs to society mean little to the police as they do not recoup the cost of any crime reduction directly'. The third thing is that many significantly harmful crimes have low volume and do not have easily calculable costs, finally 'cost of crime generally calculated

for sweeping categories (such as robbery or homicide) and are limited by not being able to distinguish between types of crimes within these large categories' (RACTLIFFE 2014, 166.). WICKRAMASEKERA ET AL. (2015) reviewed the literature focusing on the estimation of the cost of crime and they concluded that these estimations are not effective.

In the last few years, several studies have emerged which have focused on *crime harm indexes (CHI)*. But what is CHI? To create a crime harm index, 'crimes are integrated into a weighted index, based on how much harm the different offences cause. Technically, a *CHI is a score derived from the application of a metric, which weights different offences based on a proxy measure of the harm it causes, relative to other crimes*' (KÄRRHOLM – NEYROUD – SMAALAND 2020, 16.). From the usefulness of CHI, it is essential to comprehend that a small minority of all crimes cause a great portion of the total harm (KÄRRHOLM – NEYROUD – SMAALAND 2020). SHERMAN (2007) calls this phenomenon as the *power few*.

SHERMAN ET AL. (2020) provide an example and detailed description about how to calculate a crime harm index. These data represent the crime data of a hypothetical village, which suffered the following count of by category during a year (Figure 1).

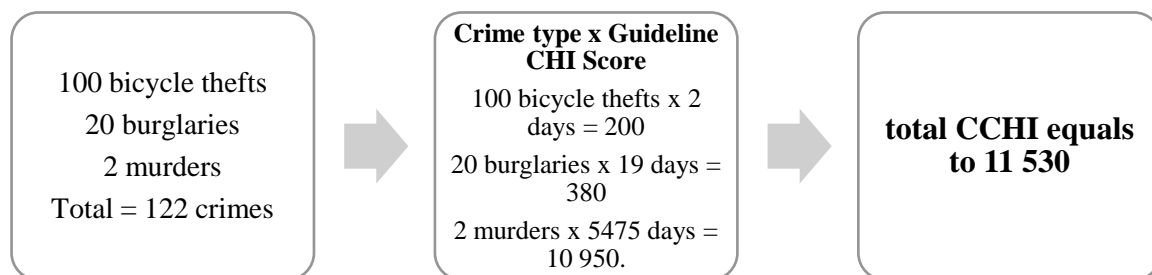


Figure 1. Sample calculation of CHI according to SHERMAN ET AL. 2020.

In case of Cambridge Crime Harm Index (CCHI), the weights are derived from the Sentencing Council of England & Wales "starting point" guidelines. Consequently, the CHI can be calculated by multiplying the number in each category by the days of imprisonment. According to the calculation, total CCHI equals to 11 530.

SHERMAN ET AL. (2016) summarized three basic criteria toward CHIs. These criteria are interpreted as questions by MITCHELL (2019, 105.):

1. *Democracy test*: does the metric reflect the resolution of conflicting viewpoints by a process adopted by a democratic government reflecting the will of the people?

2. *Reliability test*: Does the metric provide reliable measure that can be consistently applied to each unit of analysis – time, place, people – with the same results for the same levels of harm?
3. *Cost test*: Is the metric readily available at virtually no cost to be adopted without any new budgetary appropriation?

CURTIS-HAM – WALTON (2017) completed these three criteria with two following implicit, but related ones:

4. *Validity*: The metric needs to measure harm simply and objectively, the harm value must be associated solely with the offence type, without adjustment for prior criminal history, other offender attributes or the circumstances of the particular offence.
5. *Easily operationalized*: the index must be simple, not too complex. For the creation a minimal instruction or training is expected.

If any CHI does not pass these three tests, a standard metric will most likely not be adopted in policing (MITCHELL 2019).

4. Methodologies in the literature

MITCHELL (2019) states that ‘harm indexes lack a broad sense of research, as it is a relatively new approach evaluating policing interventions’ (MITCHELL 2019, 104.). The main aim of this chapter to provide an overview of the existing crime harm indexes. Studying the international literature, seven crime harm indexes have been developed until today (Table 3.). To create the HU-CHI, it is worth to know that which methodologies are applied in the existing ones. This is the reason why the Authors focuses on the methodology and the source document of weights.

Table 3. Developed Crime Harm Indexes according to the literature

Name	Source Document of the weight	Methodology
California Crime Harm Index (CA-CHI) (MITCHELL 2019)	<u>Sentencing statutes derived from the Californian Penal Code</u>	First, they count up the number of crimes of each type, then they multiplied it with the maximum number of prison days recommended for crimes of that type by first offenders. It is calculated in all crime types, then they summed it up to yield the total crime harm (MITCHELL 2019)
Cambridge Crime Harm Index	<u>English-Welsh sentencing guidelines</u>	The number of years or days imprisonment is converted into a total number of days.

<p><i>(Cambridge CHI - CCHI)</i></p> <p>(SHERMAN – NEYROUD – NEYROUD 2016)</p>		<p>They applied the lowest starting point guideline for each offence.</p> <p>In case of offences, where the minimum tariff is a period of days or hours Community service, the days/hours have been converted into number of days.</p> <p>Where the starting point is financial penalty, they calculated the weighting by assessing the number of hours/days it would take to earn the money to pay the fine while working for the minimum wage for an adult. (SHERMAN – NEYROUD – NEYROUD 2016)</p>
<p>Danish Crime Harm Index</p> <p>(DCHI)</p> <p>(ANDERSEN – MUELLER-JOHNSON 2018)</p>	<p><u>Prosecutor Guidelines</u></p>	<p>The analysis coded the recommended number of days in prison for each offense type based on guidelines set out by the Danish Office of Public Prosecutions. The sentencing value from the prosecutor guidelines was reviewed by five prosecutors. (ANDERSEN – MUELLER-JOHNSON 2018).</p>
<p>New Zealand Crime Harm Index</p> <p>(NZ CHI)</p> <p>(CURTIS-HAM – WALTON 2017)</p>	<p>Actual sentences delivered by the <u>Courts</u></p>	<p>The NZ CHI uses an alternative approach to existing CHIs developed overseas, by estimating the minimum sentence for a first-time offender using actual sentencing data. The data set is provided by the Ministry of Justice containing the outcomes of charges for the period 2004-15 inclusive.</p> <p>Relevant outcomes and sentences are translated into Equivalent Prison Days; for the used transformation formula see CURTIS-HAM – WALTON 2017; 6.</p>
<p>Queensland Crime Harm Index</p> <p>(RANSLEY ET AL. 2018)</p>	<p>Community and police officers <u>survey</u></p>	<p>The index based on community and police officer surveys of perceptions of crime harm.</p> <p>(RANSLEY ET AL. 2018)</p>
<p>Swedish Crime Harm Index</p>	<p><u>Sentencing statistics</u> published by The Swedish National Council for Crime Prevention</p>	<p>They applied 5 alternative methods to develop the CHI: the weight could be based on expert estimates; sentencing data; penal code maximum, minimum or average. They compared the 5 alternatives, in addition tested the 5 criteria showed above, and concluded that the average prison</p>

(KÄRRNHOLM – NEYROUD – SMAALAND 2020)		sentence was the best one. Data derived from sentencing statistics. (KÄRRNHOLM – NEYROUD – SMAALAND 2020)
Western Australian Crime Harm Index (WACHI) (HOUSE – NEYROUD 2018)	<u>Criminal court and traffic court cases</u> captured by the WA Department of Justice	They studied four possible methods for deriving relative harm values for each offence category: sentencing guidelines, maximum sentences, actual sentences and first offender sentences. Finally, the WACHI based on the median number for each offence category. (HOUSE – NEYROUD 2018)

According to the international literature, the development of CHI could be based on several methodologies. However, there is an emerging academic consensus suggesting that the preferable method to develop a CHI is using the law and sentencing outcomes. The main reason behind this is that these sources are subordinated to the criteria of the rule of law and therefore they are considered to produce a compromise of conflicting viewpoints of how to assess harm, expressed through law (KÄRRHOLM ET AL. 2020).

What makes it difficult to create a system for Hungary is the fact that *no sentencing guidelines are available* for the legal practitioners and in addition, there are legal obstacles for obtaining court sentences in individual cases. There are some types of case law which are published but these court decisions are primarily focusing on legal questions and less information are available for assessing the judge's concept regarding the form and amount of the penalty given to the accused person. We believe that the cornerstone of the HU-CHI should be the rules of the Criminal Code, in particular the rule of imposing median penalty (Section 81 paragraph 2).

5. Summary

One of the main aims of the recent Article was to provide an overview about the literature of Crime Harm Indexes. The goal of the Authors was to demonstrate the different methodologies existing worldwide and to show the basic criteria for creating such an index. The Article could be considered as a prelude of the construction of the Hungarian Crime Harm Index (HU-CHI). The application of CHI has several benefits: according to SHERMAN ET AL. (2016) it 'would provide far greater clarity for evidence-based policies, ensuring a standard 'currency' for cost-effectiveness comparisons of alternative strategies of targeting, testing, and tracking resource allocation by police, law enforcement agencies and wide range of government policies (SHERMAN ET AL. 2016, 8). 'CHI values can more meaningfully measure national trends in public safety year-on-year, annual comparisons in safety and performance' (SHERMAN ET AL.

2016, 9.). BARNHAM (2018) supports this idea, he states that the application of CHI could result more effective targeting of police resources and help in portraying the nature of crime in the community.

The Authors believe, that the above-mentioned benefits could be achieved in Hungary as well and the HU-CHI could be a useful additional “tool” for the police and decision-makers. The Authors strongly agree with BARNHAM (2018), that ‘the use of crime harm index should not replace traditional counts of crime but complement them in order to give a rich picture of crime’ (BARNHAM 2018, 17.). It could be applied in several fields of law enforcement: for instance, it could make the police work more efficient by allocating their dwindling resources to the most harmful areas, or it could be involved into the evaluation of police departments. Moreover, it could provide information about the public safety feelings of residents. It is obvious that it is impossible to find a perfect index which reflects all harm of crime, but according to the international literature we are going to create it taking into account the available crime data sets and legal environment in Hungary.

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**THE CRIMINOLOGICAL PROFILE OF HUNGARIAN
SMALL VILLAGES****Abstract**

The study aims to analyse the criminological profile of the smallest elements of the Hungarian settlement network. The criminological characteristics of the settlements correlate with geographic characteristics, location in the spatial structure, inherited economic drawbacks, distribution of income, migration and many other social and economic features. According to our hypothesis the above mentioned effects have an even stronger impact due to the weakness of their external connections. The research revealed that in general, small villages show a better but distinct criminological structure, compared to towns and cities. Besides it is also remarkable that the rate of known offenders is the highest in case of the smallest settlements. This confirms the hypothesis that the peripheral location and the cumulative disadvantages of small villages intensify the reproduction process of crime (mostly violent ones) but the offenders tend to choose bigger settlements to commit their crimes.

Keywords: geography of crime, small villages, violent crimes, reproduction of crimes, crime related factors, Hungarian settlements

1. Introduction

Small villages, the smallest population entities of the Hungarian settlement network that nevertheless increase in their numbers have been quite thoroughly studied by geography in the past decades. This is not without reason, because settlements with less than 500 inhabitants make up more than one third of all Hungarian settlements, and have accumulated and reproduced many social, economic and infrastructural drawbacks during their history. Mostly due to these drawbacks and the unique spatial situation of small settlements, their criminological

profile, too, is quite special. This appears most spectacularly in how the qualitative and quantitative parameters of their crime indices differ from both the national average and the values of larger settlements.

Criminological motifs, entwined with a range of various deprivations, allow for the formation of reproduction cycles referred to by sociology (Giddens, 2003), psychology (György, 1967) and criminology (Adler et al., 2005, Gönczöl, 2012). During this, social and economic drawbacks evolve into criminogenous factors which survive as a heritage from one generation to the other, meaning that crime or certain types of crime can reproduce themselves. All this finally leads to a situation in which small villages (more precisely: regions with small villages) enter into a downward spiral breaking out from which becomes increasingly difficult.

The purpose of the present study is to investigate and present about the criminological status of small villages and how crime is reproduced in this unique social setting.

2. Theoretical background

The social environment with the social processes that are taking place in it – including crime – are fundamentally determined by the matrix of the actual physical parameters within which the community exists (e.g. natural environment, size of the settlement, level and nature of economic activity, infrastructural background and social institutions), as well as the evolutionary process, which is referred to as history. As a result, significantly different social environments can be found in urban and rural areas. Amongst the principal differences we can mention the dense population of cities, which also led to the accumulation of wealth/property; the city residents engage in a more individualistic lifestyle, while maintaining complex and extensive relationships outside of their local environment.

Consequently, crime is expected to show different characteristics at different locations, according to the factors influencing its formation, extent, structure and further specifications. The urban lifestyle, the crowded living spaces, the constant stress, the lack of strong communities coupled with the weakness of interpersonal relationships and the ignorant attitude towards the problem of others are all affecting the members of the urbanized society. This mass of humans includes and accepts a variety of personality types; hence a wide range of deviances and crimes are being tolerated, not noticed or simply ignored by the people (Wirth, 1938; Pacione 2009; Haggett 2006). This behaviour would be unimaginable in a smaller, rural and often strictly conservative community. On the other hand, there are characteristic types of crimes in these localities, as the specific scenarios leading to them are more likely to occur (e.g. Donnermeyer, 2015; Scott and Hogg, 2015; Gönczöl, 2010; Reid and Pell 2015). Therefore,

crime altogether tends to concentrate in the urban areas (Glaeser and Sacerdote, 1996; Adler et al. 2004), but according to our hypothesis significant differences can be revealed in its characteristics depending on the functional type and the size of settlements.

In relation to crime, it is also important to note that over the last decades the economic inequalities have also increased in the European Union – especially in the eastern member states (Smith and Tímár, 2010). This strengthening social polarization appears with a varying degree across the member states, regions of a given state or even inside a specific city (Inequality in Europe, 2018; Lang, 2015). Simultaneously the internal migration processes are also intensifying, as a response to the spatial distribution of these inequalities (Pingzhong, 2008; Spéder, 2002; Kulcsár et al, 2011). Such changes of the social environment have a notable impact on the spatial pattern of crime. An ever-growing number of residents from the small villages are moving to closer or even more distant cities, which triggers an increase in the crime rate in urban areas and in the meantime leads to further distortion of the societies and criminal structure in rural regions.

As crime – or the “lack” of it – can be a significant aspect on our everyday life, human geographers (Evans, D., and Herbert, D. 1989) started to deal with the mapping of crime statistics on national and regional levels, but recently many of the studies focused on urban centres (Herbert, D. 1982) of the developed world. Little attention was paid to smaller communities (Denys, 2016, Donnermeyer, 2015); therefore our aim is to reveal the unique criminological features of small villages and their role in the reproduction of crime.

3. Methodology

The primary methodological dimension of our research was secondary data processing and a comparison of databases⁶. Crime data of the total Hungarian pool of settlements between 2009 and 2012 were compared in the case of three groups of settlements separated based on their population sizes.⁷ The three groups were (i) small villages with 500 inhabitants or less, (ii) small towns with 5,000-25,000 inhabitants, and (iii) larger towns and cities with 100,000 inhabitants

⁶ The basic crime data was provided by the National Institute of Criminology for the period between 2009 and 2012. This period was selected in order to match as much as possible in timing the latest national census, the other most important database for our research.

⁷ Categorisation was done based on data of the 2011 Hungarian census.

or more.⁸ The most important point in selecting these groups was to obtain markedly different categories so that differences in criminological tendencies can be clearly pointed out.

Statistical distortion resulting from small sample sizes was found to be a fundamental methodological difficulty. Such distortions can be encountered virtually any time when data of small settlements are studied, including criminal statistics. Strikingly high crime data can easily occur among the years, which are usually caused by cumulative offence.⁹ Another typical situation is when the number of crime cases is low, which in several delict types, can impede or even prevent the researchers from making settlement-level statistical studies and the analyses of trends. In order to avoid these difficulties, our analyses normally focus on major groups of crime instead of particular crime types.¹⁰

3. General problems of small villages

Small villages are highly typical characters of the East-Central European region, and are thus quite general in Hungary, too. Their formation was influenced primarily by physical geographic features (rugged terrain, valleys, ridges and poor soil quality), and then, unlike other rural settlements, their development came to a halt, mostly due to their low population carrying capacity. While others could continue to grow, develop higher concentrations of population, or even undergo urbanisation during the capitalist transformation, small villages mostly retained their size and were losing on their relative position. The socialist forced planning system did not favour small villages, but instead it preferred towns from ideological, economic and size-effectiveness aspects, thus the resources granted for small village development were always scarce. Between 1870 and 1990 Hungarian towns grew to an average of 3.5 times their former size, while villages increased by only 30% in this respect, and villages with less than 1,000 inhabitants lost 25% of their population, the share of this settlement category in the total population dropping from 21% to 7% (Tóth, 1996). Due to the ageing of their population and

⁸ Nevertheless, it has to be noted that the lack of town legal status was not considered to be an excluding factor regarding entities grouped with the small town category, meaning that villages with town-like characters, too, with more than 5,000 inhabitants, were included in the sample. On the other hand, the data of Budapest were not included in the group of large towns, because the capital, due to its exceptional size, would have substantially distorted the data of typical large towns and cities around the country.

⁹ These are offences that can be committed in a single act. Such are typically serial fraud, misuse of personal data or public information, copyright violations and related offences.

¹⁰ The expression 'crime type' means certain states of affairs (e.g. theft, truculence, homicide, battery, etc.), whereas major groups of crime are joint categories (e.g. crime against the person, against law and order, against property, etc.).

permanent emigration, serious problems emerged in Hungary as early as in the 1970s, and dwarf villages appeared: in 1980 there were already 27 settlements in Hungary whose population size was below 100, and in 1990 three villages were recorded with less than 20 inhabitants. This process of dwarf village formation is known among Hungarian specialists as the 'Gyűrűfü-szndrome'¹¹. According to data from the 2011 census, population size was below 500 in 1,126 settlements (this figure meaning 36% of all Hungarian settlements), and there were 402 settlements (13% of Hungarian settlements) in which the size of the population did not reach a mere 200. The term 'small village', denoting a typical settlement type in Baranya, Borsod-Abaúj-Zemplén, Somogy, Vas and Zala counties, was gradually becoming a synonym for backwardness, lagging, exclusion and untreatable problems (Fig. 1).

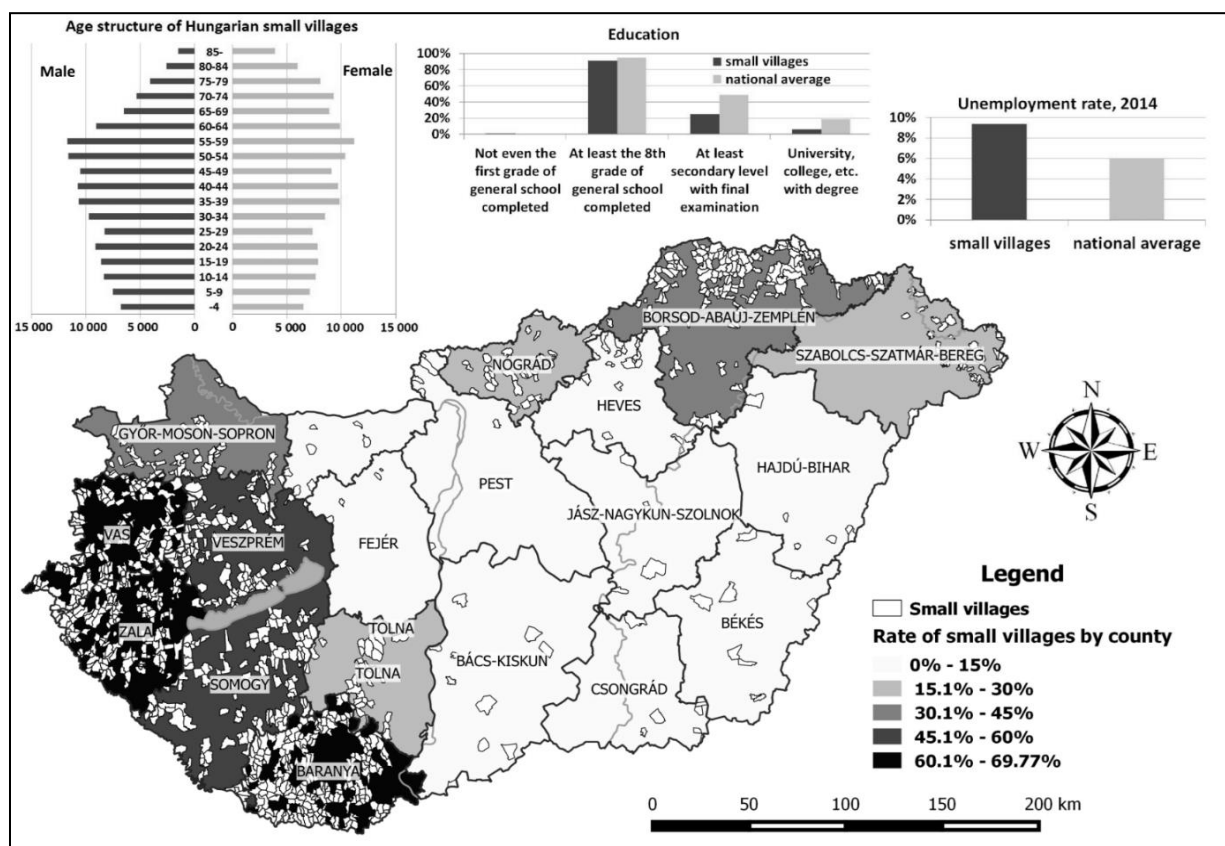


Figure 1: The spatial distribution and demographic characteristics of small villages in Hungary

Source: Edited by the authors on the basis of the data sets of Hungarian Population Census 2011 and the National Employment Service 2014

¹¹ Gyűrűfü, a village in Baranya County had 317 inhabitants in 1830, 261 in 1938, 193 in 1960, and at the time of the January 1970 census altogether 37 were counted. The last resident deserted the village on 25th November 1970. The same phenomenon was observed in many other parts of the country, and was later named after Gyűrűfü, the first depopulated village.

Several authors working in various segments of social sciences (e.g. Rudolf Andorka, Péter Bajmócy, András Balogh, Pál Beluszky, Ferenc Bódi, Antal Bóhm, Bálint Csatári, György Enyedi, Katalin Forray R., Éva G. Fekete, Klára Józsa, László Laki, Tamás Sikos T.) have discussed about the problems of small villages, applying quite different approaches, which is not surprising with a view to the fact that this settlement type is very common in Hungary, and has quite special types of difficulties. Studies of crime with regard to settlement types are much rarer, but small villages do have criminal geographic studies appearing in Hungarian geographic literature (Balogh, 2008). There are many common points regarding the problems of small villages and their regions in the works by various authors, thus in the present paper we undertake to collect those dominant factors which are more or less related with crime, its characteristics and its reproduction. It is not easy to look at these factors in separation, since there are quite a few feedback mechanisms and substantial mutual interdependence acting between them, but for the sake of clarity it seems more reasonable to discuss them separately, one after the other. *Demographic relations* in general are most easily described as 'strongly declining', but it is quite natural that such a huge group of settlements cannot be completely homogeneous in this respect either (Bajmócy et al., 2002; Trócsányi et al., 2012; Balogh, 2014). During the recent decades the number of small settlements has increased steadily, at a varying pace, while their population sizes have decreased, meaning that there are less and less people living in an average Hungarian small village. This large group of settlements can be divided into two major types: one is the typical ageing, depopulating small village, and the other is the one with increasing population, attracting the lagging parts of the society (Kulcsár et al., 2011), undergoing ghettoisation (Ladányi et al., 2009; Taylor et al., 2018). Decreasing and ageing populations or ones that grow but have to fight multiple social and economic drawbacks highly diminish the chances of these small villages to reach a breakthrough and start an upswing. It is quite typical that due to migrational turbulence, the settlements lose the most highly educated part of their population who can approach and even reach a breakthrough and who are most capable of internalising norms. Thus, less alternative possibilities remain for forwarding the prevailing norms, and a highly special condensing community is created from people who do stay. Those who stay normally lose all their hopes, with nothing more left for them than the chance to live from one day to the other. The original population remaining in the village is many times joined by impoverishing people who cannot continue their more costly way of life elsewhere, and are forced to leave the larger, more centrally located settlements. This process is often supported by local politics in towns which tend to choose this way to get rid of a population that generate

minimal income but imply substantial costs. The chances of conflicts arising between groups with different socialisation backgrounds and with multiple drawbacks can be more frequent. *Size-effectiveness* issues, too pervade the lowermost level of settlement network (Bódi, 1999; G. Fekete, 2010; Pirisi, 2014). For a number of institutions and services, population size in the case of small villages is simply too small, and the combined supply to a number of settlements together is problematic due to their dispersed location and transportation handicap. The effectiveness of supply to these villages is so low that not only profit-oriented services are difficult to access but public services too; the barriers to accessing these are sometimes really hard to overcome. A further impeding factor is the scarcity of effective demand. In a situation when even the basic supply of the citizens is incomplete, it is not realistic to talk about the free choice between services or about equal rights, although education and health services have outstanding role in forming social relations or improving them.

The low levels of education are among the most important components responsible for the reproduction of drawbacks, since school education is one of the most significant institutions serving social integration, if not the most significant one of all. In some of the small villages the low levels result from the age structure with many elderly people, but in many cases there are settlements with young age structures with low levels of education (Trócsányi et al., 2002). This situation is partly due to access problems to the institutional system, the narrow supply, and the rigid educational ideologies. On the other hand, the reasons for schools not being able to fulfil their roles of norm-giving and educating include the non-conventional¹² value systems – which are many times evoked by poverty (Gans, 1992) – often observed in local communities (families in the first place). These value systems differ from what is presented in the school, and cause the partial rejection of the conventional norms. The pressure on students to comply with school expectations, and the related problems can generate tension in them. Values that are brought from home often confront with school norms, this situation forcing the youngsters to choose, who tend to consider the values represented by their family to be relevant. On the other hand, by rejecting to meet school expectations, they make the easier choice, thus avoiding the experience of failure. In many cases it is the families appearing to be normal or average that cannot socialize their children in the right directions, with a result that the first conflicts emerge inside the family: the youngsters slowly becoming antisocial will be confronted with not only the school, but the family in the first place, which is their primary socialisation environment

¹² The non-conventional value system is considered to be including the more frequent occurrence of deviances (e.g. alcoholism, use of drugs), the lower level of self-control, the higher acceptance and legitimacy of violent behavioural elements, the lower prestige of knowledge as opposed to physical strength, etc.

(György, 1967). This eventually can lead to a substantial rejection of generally accepted social norms, and this system of rules will no longer be able to encourage the young people to follow the laws (Gönczöl, 1987). The situation is somewhat different in cases where education is highly segregated, mostly on ethnic and social basis. In such an institutional structure, school will not play an effective norm-giving role for these handicapped youngsters who do not experience the norms of the majority society during their primary socialisation. This roots in the fact that these children, arriving from similar social, economic and cultural environments, will not meet the values of the middle class, and through their own coevals will meet a different value system from that of the majority society (Csanádi et al., 1978; Gerő et al., 1996). The same segregated environment can easily lead to the formation of antisocially behaving groups of coevals (gangs, bands).

Unemployment and the *lack of capital* are perhaps the most typical two economic problems in these settlements. Most certainly, this is closely related with social and infrastructural relations, and contributes strongly to the preservation of the backward situation and the negative migration trend of the educated part of the society, which together further intensify the lag (Balogh, 2007; Balogh, 2014; Tésits et al., 2013).

As a combined effect of all the above factors, *deep poverty and extremely low incomes* are present in the majority of the small villages with a much higher occurrence rate than either the national or the countryside average (Andorka, 1996; G. Fekete, 1997; Laki, 1997). There is an extremely wide gap between the limited financial resources and the satisfaction of true or imaginary needs and the finances available for these. This tension can be resolved sometimes by keeping the needs at a low level, or sometimes by finding illegal ways of satisfying the needs. However, having to survive from one day to the other and feeling total insecurity narrow down the possibilities of target-oriented thinking and planning for the future, in both cases. Tension that persists for longer durations can increase the chances of new conflicts emerging and escalating, and the occurrence frequency of deviances (other than crime).

Developing *deviances other than crime* is a typical alternative escape route from the problems of everyday life. These include alcoholism, the use of drugs or even suicide, all of which occur more frequently in our smallest settlements than in ones with larger population (Andorka, 1996). Many times these self-destructive forms of deviance can be considered to be violence-venting behaviour types similar to violent crime.

From the small-scale economic sector operating with low effectiveness, from modest incomes, seclusion and size-effectiveness problems it follows that *the infrastructural system is poorly established, undeveloped and incomplete*, be it public utilities, transportation or human

infrastructure. This, of course, further reduces the chances of social integration and of catching up, connecting to economic circulation (G. Fekete, 1997).

The *underdeveloped status or complete absence of the civil sphere*, a typical feature of small villages, also needs to be mentioned. Among the reasons the unfavourable income situation can be noted along with the phenomenon that low numbers of inhabitants are normally not accompanied by a sufficiently differentiated society which would be required for a more active civil life (Pirisi et al., 2014). People with various fields of interest normally do not reach a critical mass on which civil activities, associations could be based. The fact that civil activities are not established, along with the lack of diverse leisure time activities for the society, can be critical from the aspect of crime prevention: civil guards / village guards or militia are fundamental types of civil activity in larger villages.

The phenomena of *seclusion* and *confinement*¹³ appear in the case of many small settlements, adding extra burden to all the other types of social, economic and infrastructural handicap, whilst the majority of small villages are located in peripheral areas. These areas then turn to special spaces of ghettoisation, typical for East-Central European circumstances. Their function is the same as that of city slums in North America and Western-Europe, i.e. through lower costs of living they concentrate the disadvantaged part of the population, but in peripheral locations (Ladányi et al., 2005). Thus, the phenomenon is much less in view, providing less motivation for easing or solving the problem. From the aspect of crime, these two phenomena have a dual effect. On the one hand they mean a certain degree of protection, obstructing the penetration of crime from the outside world, but on the other, seclusion also offers the possibility of hiding for potential crime committer. When criminal behaviour appears, the smaller size of the community makes it more likely for social disadvantages and non-conventional models to be passed on, and it can also strengthen conflict situations.

4. Criminal status of small villages

One of the fundamental laws of criminology is that crime is a problem much more related with cities than with smaller settlements, and maybe the least threatened settlement category is that of small villages (Fig. 2). Of course, it must be emphasised that this statement is only valid if the entire pool of small villages is considered, whilst the differences between the various settlements can be substantial, due to their particular social-economic features. As it has been pointed out in a number of Hungarian research papers (Piskóti, 2011; Patkós et al., 2012), often

¹³ Being secluded is understood as being difficult to physically access, whereas confinement is the weakness or absence of outward social connections.

there is considerable difference in the criminological features of like-sized settlements located near each other, thus one must not overlook historic differences or unique geographical and social settings either.

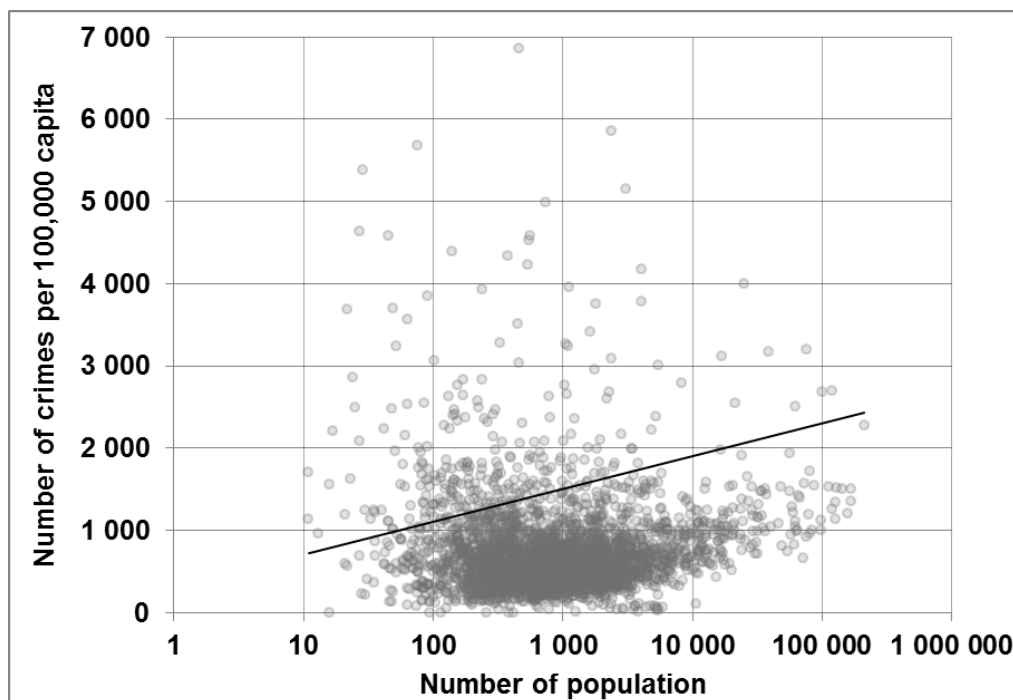


Figure 2: Correlation between crime rate (average number of crimes between 2009 and 2012) and the population size of settlements (2012) on the example of the Hungarian settlements (Budapest is represented as districts)

Source of data: National Institute of Criminology

More details are added to this picture if not only the total numbers of crime instances are analysed, but the occurrence rates of various major crime groups too (*Fig. 3*). The higher figures of criminal statistics in cities are caused by the increased concentration of crime against property, against law and order, and economic crimes. Cities have the highest concentration of economic assets and the majority of economic activities are done here, too, thus it is not surprising that crimes for financial gain occur more frequently in these settlements. This phenomenon is intensified by the possible migration or commuting of criminals from the countryside towards the cities, by the significant individualist attitudes prevailing in cities, and by the anonymity of city dwellers even for their immediate environments. *However, there are certain main crime groups which have the highest occurrence figures in the case of small villages* (crimes against the person, crimes against administration, jurisdiction and against the purity of public life). Among these, it is mostly crimes against the person that pose the highest threat to the society and have typical capacities of reproducing themselves, and thus deserve

the greatest attention.¹⁴ Such differences between crimes in cities and in the countryside (crimes against property dominating in towns and crimes of passion dominating in villages) were recognised and articulated by Júlia György in her work published about the formation and nature of the antisocial personality (György, 1967).

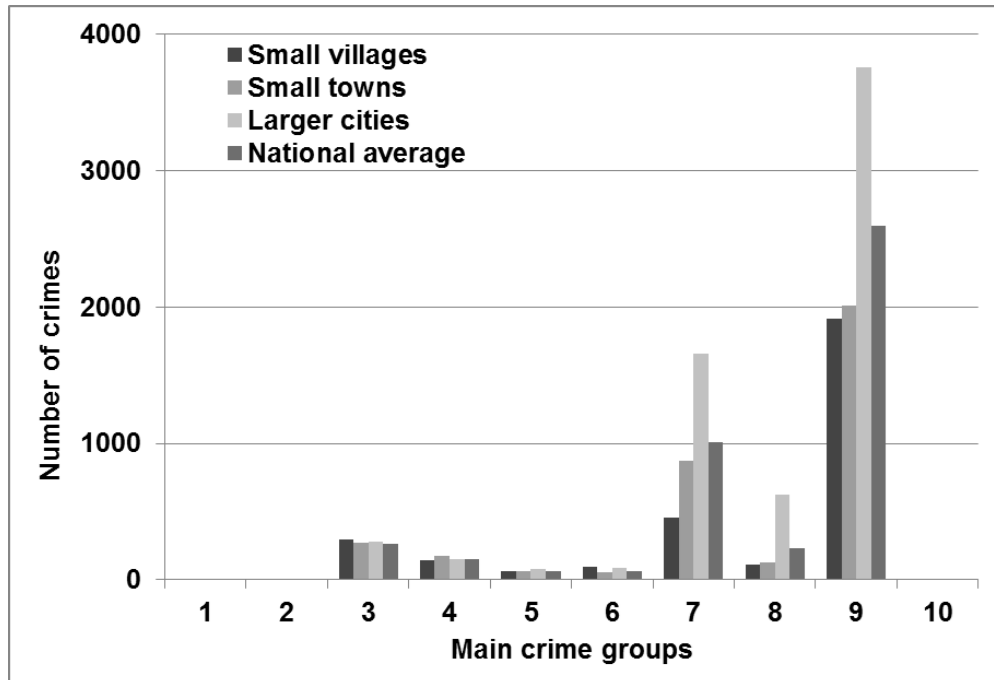


Figure 3: Number of crime events per 100,000 capita by main categories between 2009 and 2012

(1: crimes against the state, 2: crimes against humanity, 3: crimes against the person, 4: traffic offences, 5: crimes against matrimony, family, youth and sexual morality, 6: crimes of corruption in the administrative and law enforcement sectors and other segments of society, 7: crimes against law and order, 8: economic crimes, 9: crimes against property, 10: military offences)

Source of data: National Institute of Criminology

Even more interesting tendencies can be recognised if not only the rates of crimes but the distribution of known crime committers is also investigated (*Fig. 4, Fig. 5*). From that it appears that even though the number of crime instances is the lowest in small villages, the highest number of known crime committers are from these settlements. This can be explained in various ways. One possibility is that law enforcement works more effectively in areas where everybody knows almost everyone else, making it more difficult for criminals to remain in cover. On the other hand, it is also possible that criminals in cities commit more crimes until they are arrested

¹⁴ The major group of crimes against the person is a quite broad category, ranging from the minor “misuse of personal data” or “misuse of public data”, “confidentiality of correspondence abuse” through libel and “tribute insult” to homicide, but the most frequent state of affairs in this crime group is “physical assault”.

than those who are active in the two other settlement types, thus more crime instances are recorded per capita. This logic can work the other way round, too: if crimes committed as a group are more typical in small settlements, this will result in higher numbers of criminals per unit crimes committed.

Although it is possible that the aforementioned theories could all play a role, yet our former experience suggests that these effects do not have enough power, even if combined, to account for such a difference in the ratios of crimes per criminal. What we consider to be a more important factor is the migration of criminals. Commuting and long-term migration from small village regions to the larger, centrally located settlements are well known phenomena, thus it is a feasible option that the spatial concentration of material assets, functions, workplaces and capital, etc. in larger settlements is followed by an increasing concentration of not only people but crime instances as well. This entails that there are offenders who commit their crimes in cities but their official place of residence is in one of the small villages, thus they will contribute to crime instance statistics in the city, and to the criminals' statistics in the villages. In an extreme case it is also possible that the criminal has stayed in the city for years, but unless there is something forcing him to update his registered official place of residence, he will not do so, and will remain a village resident for statistics. This hypothesis would be worth looking at in more detail, as part of a study later on.

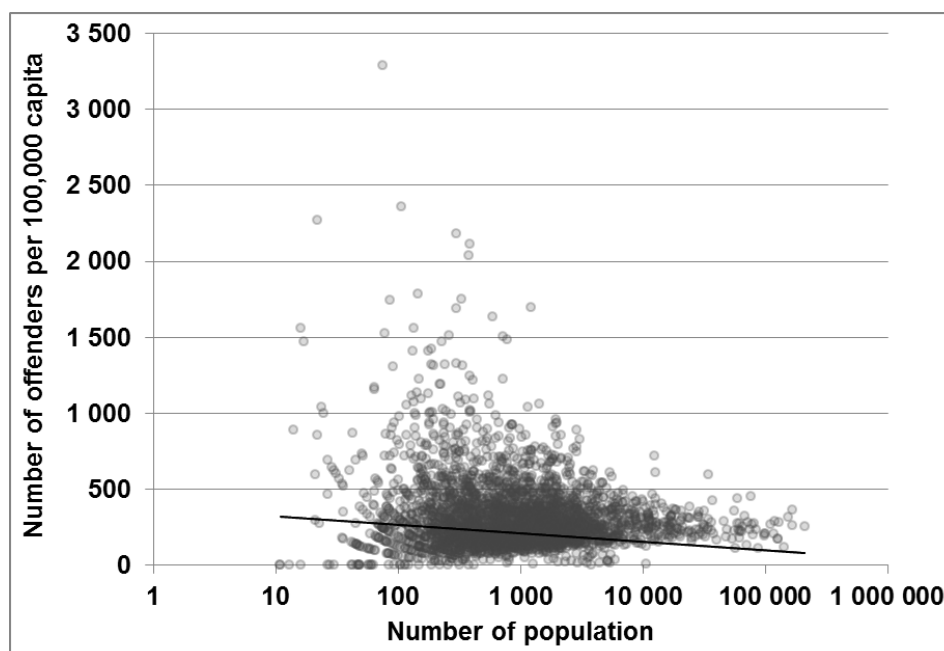


Figure 4: Correlation between the rate of offenders (average number of offenders between 2009 and 2012) and population size of settlements (2012), on the example of Hungarian settlements (Budapest is represented as districts)

Source of data: National Institute of Criminology

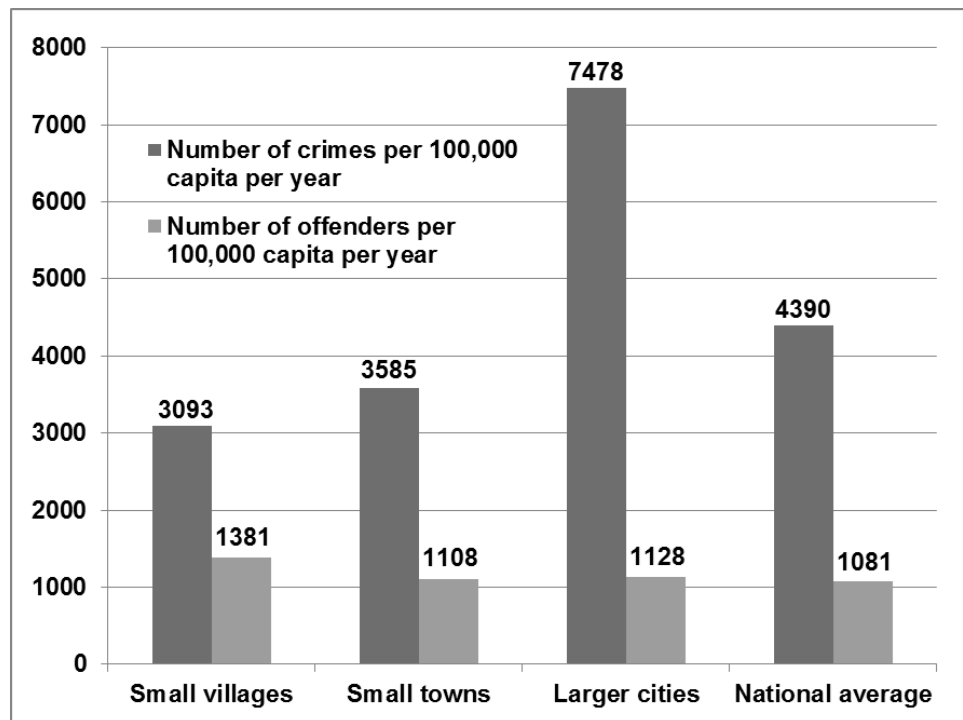


Figure 5: Number of known crime events and known offenders per 100,000 capita between 2009 and 2012

Source of data: National Institute of Criminology

From all these it appears that *small villages are less infested by instances of crime against property as compared to the country average and to other settlement types*, since the possible financial gain in the impoverished settlements is very low in many cases, thus a rationally thinking offender will commit the crime in a city in order to obtain greater profit. *At the same time, crimes of passion – such as physical assaults – which happen as a result of the offender trying to resolve a conflict by means of a violent behaviour, will have higher concentrations in settlements with 500 inhabitants or less where disadvantages, tensions and conflicts tend to accumulate more readily.* This is well illustrated by physical assault data of Baranya County (Fig. 6). Small villages appear to be an adequate environment for such types of crimes, situations and offenders to be present and these scenarios to be reproduced time after time. In the next section the authors attempt to present this process.

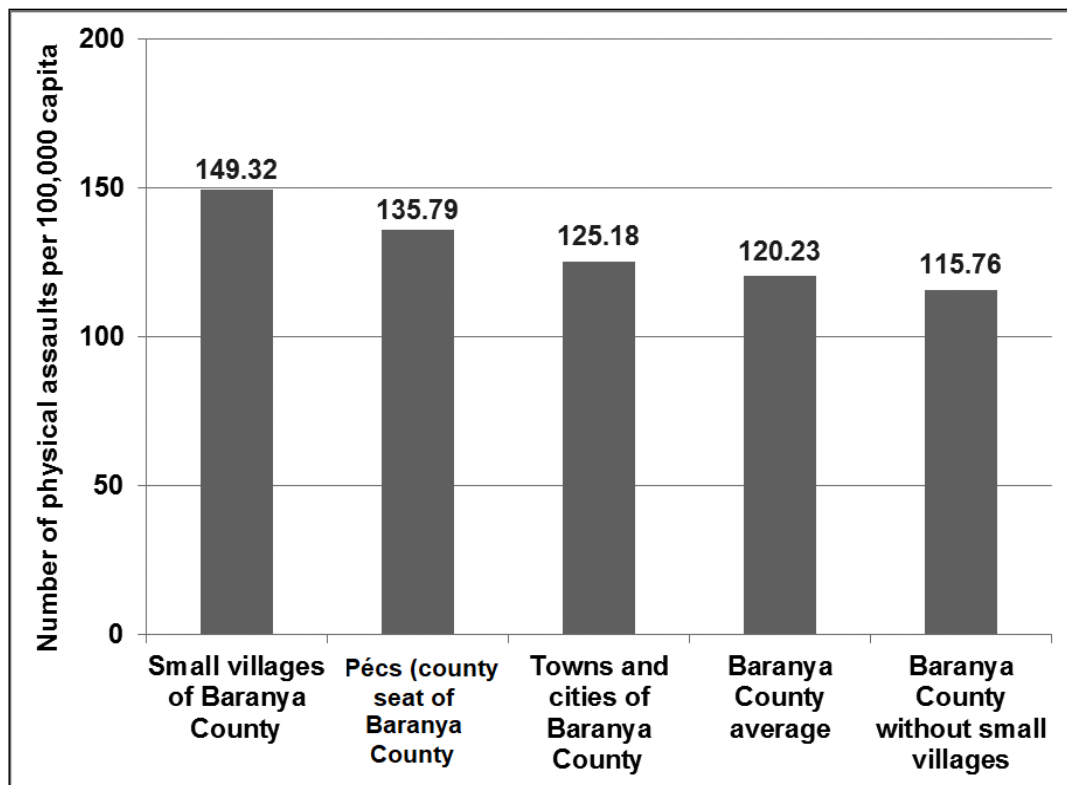


Figure 6: Number of physical assaults per 100,000 capita in Baranya County between 2010 and 2014

Source of data: Baranya County Police Headquarters

Despite that this settlement type is quite characteristic, it does not cause significant difference in the crime data of even those counties where small villages have the highest representation (over 60%) such as Baranya, Vas and Zala. Even in these cases, residents of small villages account for only 13-14% of the total population, thus criminal cases recorded in other settlements of the county can easily overcast the specific features of small villages.

5. The formation and reproduction of violent crimes in small villages

The expression 'violent crime' has long been used in criminal research as a collective term for states of affairs in various crime groups which are all characterised by violent behaviour (either physical or psychic) occurring when they are committed by the criminals.¹⁵ This means that

¹⁵ On the basis of the 1978 Criminal Code, this category contained more than 30 states of affairs, which we are not listing here. Their enumeration is available in: Nagy, 2008.

violent crimes and crimes against the person are not in the least equal, however, physical assault is the most abundant and most typical state of affairs in both crime groups.¹⁶

The likelihood of being able to reproduce themselves is a typical feature of violent crimes (Gönczöl, 1987), a process which can be studied in *Fig. 7*. Of course, this is a simplified scheme of how violent crime is being reproduced in a cycle. Not every single violent criminal comes from a disadvantaged family environment and proceeds along the stages shown in the chart, and not everyone coming from a disadvantaged family will necessarily commit violent crimes. The shown effects are rather ones that make young people more threatened and more prone to committing crimes, during their socialisation. Although the model cannot be extended over all types of crimes, the possibility of many non-violent offenders go through or have gone through similar life situations.

The essence of the process is that young people acquire a non-conventional value system from the family during their primary socialisation, which later cannot be overwritten by the institutional systems of norm transfer (especially not by school), moreover their often dysfunctional operation moves these social groups further away from the acceptance of majority standards. The failure of their social integration eventually reproduces those disadvantages which mean the starting point of the whole process, thus the next generation will once again have to fight against similar difficulties.

¹⁶ Due to content limitations, the authors of this paper do not intend to go into details about the subject of violent crimes. The following works, however, include details about this group of crimes, its committers and victims: Kerezsi, 1998; Adler et al., 2005; Korinek, 2010; Nagy, 2012

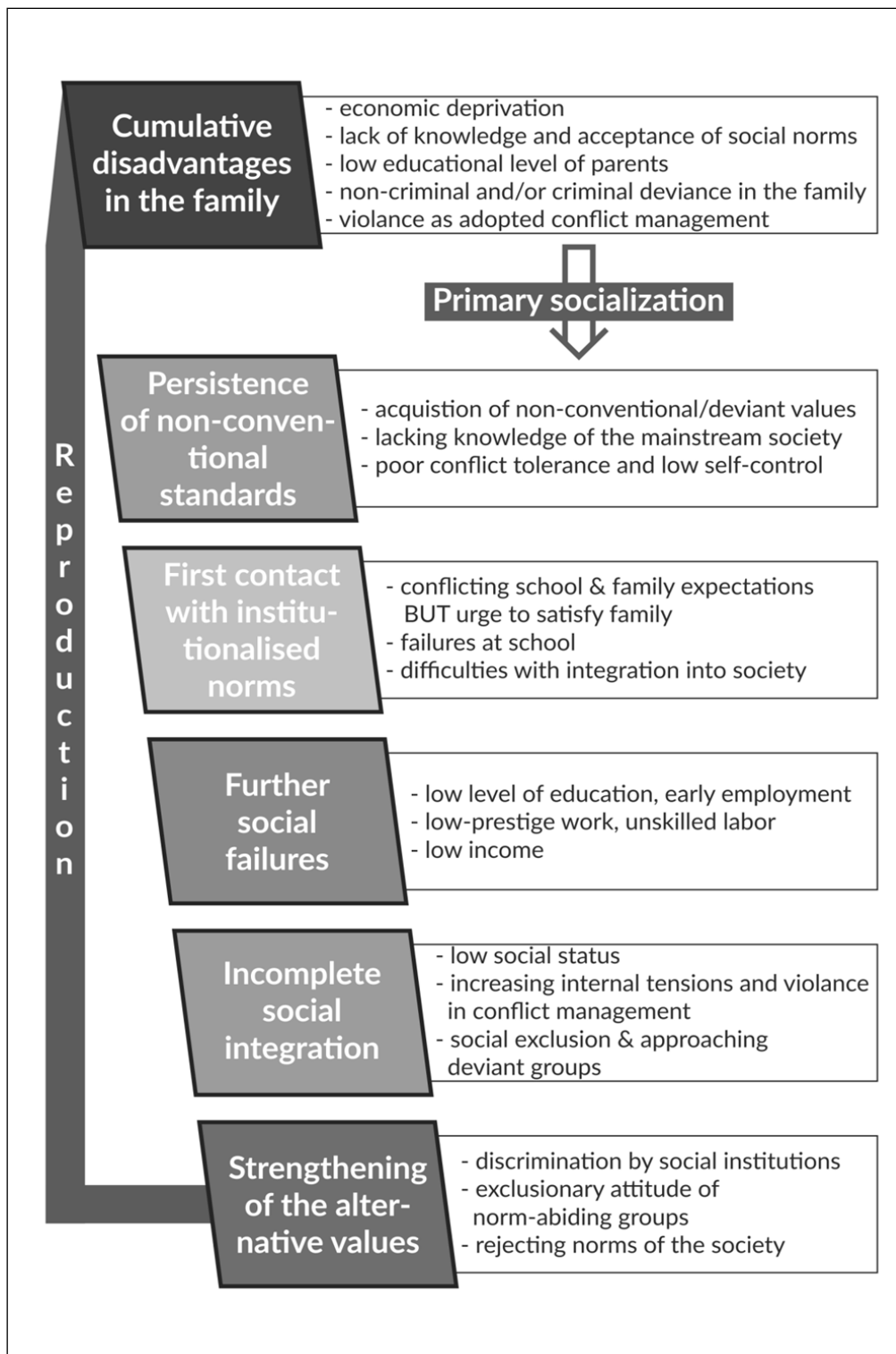


Figure 7: The general model of the formation and reproduction of violent crimes

Source: Edited by the authors and E. Józsa based on K. Gönczöl (1987)

As part of the drawn up process, the non-conventional values become the mainstream model, while the alternatives of acquiring the majority value system are narrowed down, restricted to the framework of the institutional norm transfer which cannot really compete with family expectations that mean a stronger bond and are active from a very young age. *Based on this*

process it can be assumed that the reproduction of violent crime from generation to generation becomes more typical than in the case of larger settlements. Basically, there are two factors contributing to this: on the one hand the narrow social environment offers young people much less alternatives for learning and acquiring the majority standards; and on the other, the institutionalised norms find their way more difficultly down to the institutionally less developed elements of the settlement hierarchy. The best immunizing factor against criminogenic effects is the appropriate family environment (Reckless, 1940). If that is missing, the innately low-standard school, the most important norm transferring institution, will be highly ineffective in performing its socialising duties in these regions. Other social institutions (and the values represented by them) will not boldly appear either in the smallest settlements, and have significant effect on local residents. Moreover, the tensions can be more pronounced in a deprived society burdened with exclusion and hopelessness, which can again forecast the substantial reproduction of crimes.

Another characteristic effect in the case of small settlements is the presence of relatively low-intensity but long-lasting micro-societal conflicts. In a condensed social environment the interactions re-occurring day by day either intentionally or unintentionally highly impede the resolution of already existing inter-personal conflicts and the elimination of tensions, especially when macro-level processes going on in the global society promote or evoke the intensification of tensions, the declining levels of tolerance, the lack of trust, and existential uncertainty (Kerezsi, 2011). It is due to these effects that “neighbour dispute” type of conflicts are quite frequent in these areas, as opposed to the more individualistic “live and let live” attitude typical in urban settings. These long-accumulating tensions sometimes abruptly overflow, causing an instance of serious crime every now or then.

Looking at crimes, one should not overlook the migration and commuting tendencies we have mentioned earlier. Crimes that form and are reproduced in small villages often appear in larger settlements due to the commuting or permanent migration of offenders. Accordingly, the following principle is set forth: *to improve the measures (mostly of socio-political nature) aiming at preventing crimes from being reproduced in small villages is important not only for local residents and for social solidarity reasons, but it is essential for larger settlements, too, to treat the problems of small settlements in their attraction zones.*

Summary

Regarding their criminological profiles, our small village regions do not appear to be threatened environments at all, since they have the lowest crime rates, but in the case of certain

crime types, extremely high figures are observed. Based on a thorough analysis it can be stated that economic crimes, crimes against property and against public order occur rarer in our smallest settlements, whereas crime cases against the person, against public administration and jurisdiction and against the purity of public life have a much more frequent occurrence rate per 100,000 residents than in larger settlements, meaning that the small-village type of crime really does exist in Hungary.

However, it is notable that the occurrence rate of criminal offenders per capita is highest in these regions, which fact supports the assumption that small villages are a *more suitable environment for the reproduction of criminal deviances from one generation to the other*, mostly due to the condensed social environment, demographic, social and economic disadvantages, seclusion and the deficiencies of the institutional system serving social integration. These criminological tendencies, however, partly have their effect in the larger, centrally located settlements in the form of crime instances, meaning that they are a burden not only on the studied settlements. Of course, in these cases it is impossible to separate the effects of the urban and the former rural environment on the incoming people. Another possibility cannot be excluded either, i.e. that it is the urban social environment that influences the arriving rural residents in a way that they will become crime committers in higher proportions, because these people had not been subject to these effects during their primary socialisation, and thus are more vulnerable to them.

From those mentioned above it can be assumed that *in trying to fight against the reproduction of crimes, greater attention should be paid to the societies of small settlements, and local residents should be provided with more chances and better assistance for social integration*. This can be achieved, along with simultaneous economic development, by reconsidering the local sociopolitical institutional system, and by considerably activating the civil sphere. There are three fundamental fields of intervention and assistance that are the most suitable for achieving this: firstly, and most importantly, *the system of family assistance and family funding*, secondly *the initiatives supporting school integration and inclusion*, and thirdly *the local conflict management organisations*. Nevertheless, it must be emphasised that these three should be treated as a single unit, so that they can be integrated within one institution, since the problems themselves do not show up in separation, but instead they evolve in close interaction with each other. Accordingly, they can be effectively solved or eased only through a comprehensive approach.

However, it is also clear that this is not feasible without narrowing down the economic gap and providing job opportunities. No matter how many young people are provided with better

education, higher qualifications, greater degree of social integration, without jobs these young people will have no other chance than to migrate. Public work¹⁷ cannot be a good solution either, since employees with higher qualification will have a choice between public work and the true labour market, and from these labour market is the more reasonable alternative, necessarily accompanied by migration. Through the most highly trained, least disadvantaged, norm following part of the society having to migrate away again and again, the vicious circle of self-reproducing disadvantages will be preserved.

In this paper we have attempted to outline the profiles of small-village crimes, to clearly find that *there is a well-identifiable crime-structure typical for these settlements*. It has also become obvious that the natural, social and economic *drawbacks that characterise the smallest settlements can be reproduced through crime too*, which implies that intervention is vital in these regions. The investigations have also shown that an important relationship as well as a certain type of “division of work” have formed between the criminalities of rural and urban spaces, related to the migration of people. This negative effect is maybe better treated in the smaller and more vulnerable communities, i.e. small villages, but through transmission it can have country-level outcomes. The well-thought crime prevention action plans of complex regional development programs can bring about comprehensive, maybe even country-level results even if concentrating on just single regions or settlement types.

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¹⁷ The Hungarian Government created a comprehensive public work system in 2011, in which unemployed people mostly with low qualifications are offered job opportunities. The rate of active-age people employed in the public work sector is the highest in Hungary throughout Europe, having reached 130,000 individuals in 2013 (Eurostat 2014).

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INVESTIGATION OF DIFFERENT VISUALISATION METHODS FOR CRIME MAPPING¹⁸

ABSTRACT

There are a quite many GIS application available on the internet showing crime statistics all over the world. The usual visual methods for these statistics are generally pictograms and point symbols. These visualisation methods raise two problems that they are not able to transmit the real crime situations to the users, because it is not easy to interpret the content of it. The other problem is that they may harm the confidality of the victims. Therefore in this study the authors tested the applicability and effectiveness of other visualisation methods.

Keywords: crime mapping, visualization, usability study

1. INTRODUCTION

Crime mapping recently is a very important communication platform between the citizens and police. This type of visualisation of crime data is widespread all over the world. In some countries it is also ubiquitously used among citizens when they would like to buy a flat, to decide where to find school for their children etc. If someone browsing the web the usual visualisation methods for crime maps is aggregation for a greater district level, point symbols, Crime information can be shown on a map shaded to show crime rates in each area compared to the average across London, or as text by clicking on the "Text view" tab. All the data is aggregated to the level of sub-wards. Sub-wards are the smallest areas shown on the map. Sub-wards are known formally as lower super output areas (LSOA), with an average of 633 households [3].

Another common solution of visualisation of crime on maps is using different symbols or points for showing crime locations. Leitner and Curtis [4][5] had found that point symbols can be reversed geocoding from maps, and that the preservation of someone's spatial confidentiality depends on population and structure of the neighbourhood independently from the scale of the

¹⁸ Originally was published in the 14th International Multidisciplinary Scientific Geoconference.

map. From the visualisation point of view using point symbols is not a very good solution as spatial patterns cannot be revealed. On the contrary the public weal requires that the spatial patterns of crime should be available for safety purposes.

Also building a surface using geostatistical method, like kernel density estimation, has been already used [6] but only for scientific purposes. With using this method spatial differences between blocks become smooth. This method is mostly used in hot spot detection. Though for the citizens it would be interesting to see the spatial patterns of their surroundings also.

The authors think for crime mapping purposes other visualisation methods can be tested. A previous work of Pődör, A. already proved that contiguous cartogram can be a good alternative solution for showing spatial tendencies of crime in a city [7]. Although using this method a problem acquiring because some previous research showed that cartograms only be understood if there is a map showing original spatial reference [1][2]. Therefore the users need to use two maps: one with original polygons and one with distorted polygons. In this research the author found that creation of reference polygons can be based on the blocks of a city.

In this context the purpose of this study is to analyse the effectiveness of two very common and essential cartographic methods for visualising quantitative data: graduated colours and graduated point symbols for crime mapping purposes referenced on block polygons. In the study authors investigate (1) how successfully these two methods can be applied for visualising crime data in municipal surroundings and (2) how well users can define differences according the classification used on the maps.

2. MATERIALS AND METHODS

In fall semester 2013, 24 land surveyor BSc students participated in the introductory course on Cartography. The age of each students, taking part in the survey, were 18 to 25. This semester was the fourth semester at the University of West Hungary for the 90% of the students.

The city of Székesfehérvár was used as the pilot area. The city is a medium sized Hungarian settlement which can model the average circumstances of Hungarian cities. Crime statistics shows that usually there are 6-7 000 crimes happen yearly.

The test consisted of two parts. In the first part the participants got the map using graduated colours where the reference polygons were coloured according the total number of crime than they should also process the second map where graduated point symbols method were used. On both maps all the blocks inside the city was indicated and labelled with an ID number.

2.1. PREPARATION OF THE TEST MAPS

First the authors processed the crime data which was the main thematic attribute of the map. In the test all kind of crime data was used. The crime data were geocoded and it was stored as a point layer. The main purpose was to see how certain areas are affected by all type of crime in the city of Székesfehérvár and the test was a modelling the process how effectively can test persons retrieve information from the maps using different thematic cartographic methods.

In preparing the test maps the authors used a method previously used in a former research [7] where polygon blocks were created by using the street network. Then a spatial join were applied between crime data and polygon blocks of the city, so in this method crime data became the attribute of the polygon blocks. The structure of the city is irregular. In the inner city medieval part can be found with narrow streets, but also block houses are located there. These structure causes that there are a lot of irregular shaped polygons with a great variety in size, though regular forms are also presented. Not the whole city was used in the study. There were 724 blocks of polygons appeared on the maps.

The maps were prepared in ArcGIS at a scale 1:20000. In the case of both test maps the same classification method of natural breaks of Jenks were used and the data were sorted into 5 categories in order to be able to compare the result. The 5 categories were: 0-14; 14-46; 47-119; 120-270; 271-736.

On MAP1 (Fig 1.) the “Orange Bright” colour range were used. On MAP2 (Fig. 2) graduated symbols were coloured by dark blue and the symbol size were varied from 4 to 20 points.

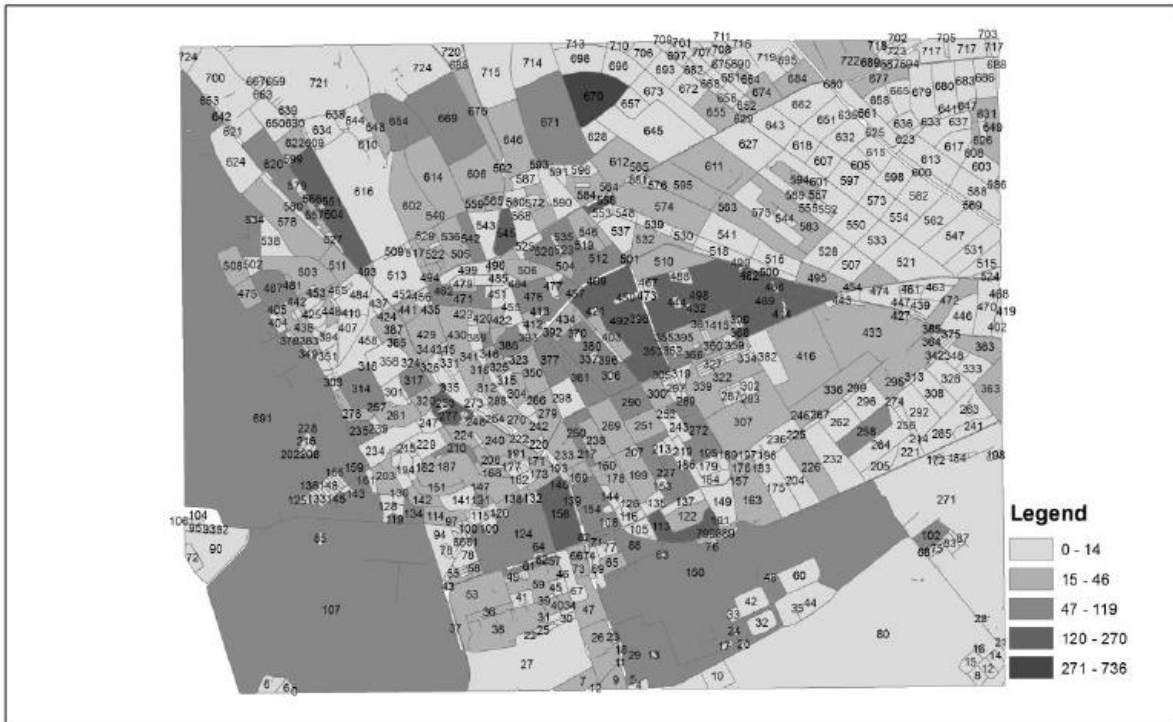


Fig. 1 Graduated colours method used in the study of test maps

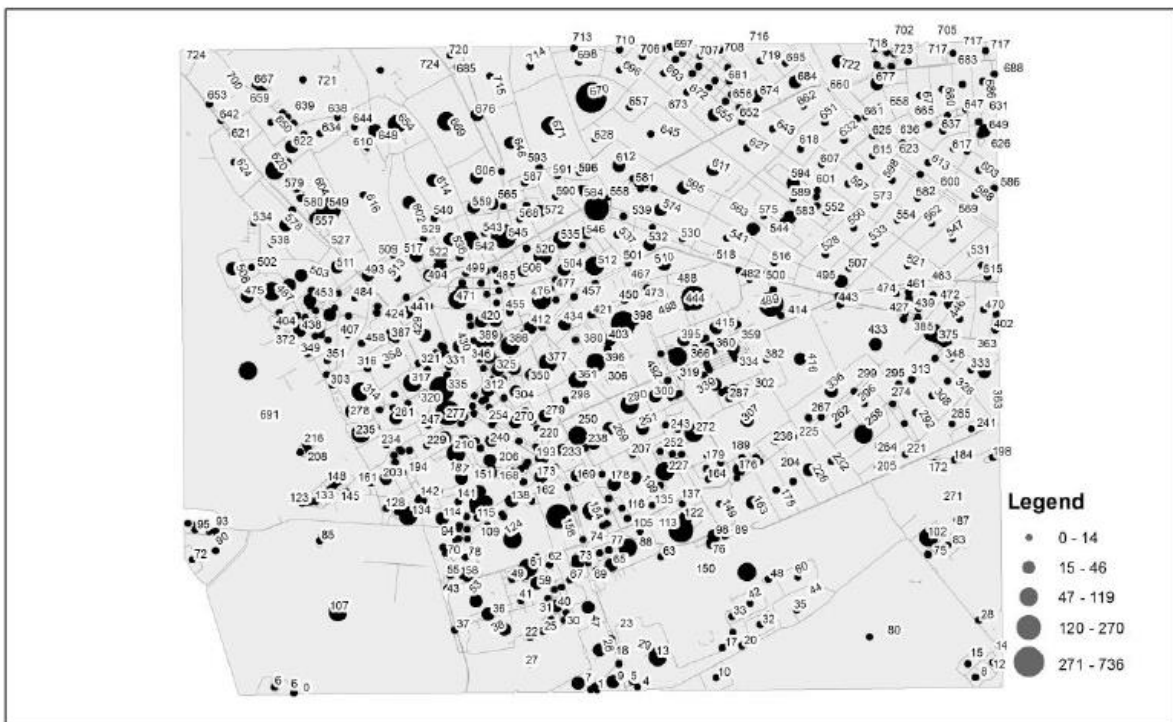


Fig. 2. Graduated point symbols method used in the study on test maps

2.2. EXPERIMENTAL TASK

The purpose of the test was to simulate the experimental phases when users studying the structure of the crime map and they try to reveal information connected to spatial patterns.

The participant conducted the experiment in a computer lab and an e-learning platform was used to store the maps, also the test participants had to upload their results to that platform. The test took minimum 17 maximum 68 minutes for the participants.

In test they had to study MAP1 and when they were finishing they had to continue with studying MAP2. In the test their task was to define five polygons using the ID number of the polygons written on the maps within each classification categories used on the maps. They had the freedom to choose any polygons which was classified into a certain class according their number of crimes. On the first maps they could use the colours as a graphic variable to identify each category and discriminates between polygons, on the second map they could refer to the size of the symbols which was generated according the previously mentioned classification method. In the case of the second map, where graduated symbols were used to show the quantities, the maximum and the minimum size of the symbols were dependent on the size of the blocks inside the city. As it was mentioned before the sizes of the blocks were showing a great variety and therefore could not be too much difference generated in the size of the symbols, because the most crime are usually occurs in the inner cities where blocks are relatively small.

3. RESULTS

The results of the overall performance of each participant can be seen on Fig.3. Investigating the most simple statistical values of the two data files, it is evident there are quite a big similarity between them. Concerning mean values in case of MAP1 it is 68, 9% in the case of MAP2 it is 71, 1 %, also the values of standard deviations are quite close to each other 24,43 in case of MAP1 and 24,46 in case of MAP2.

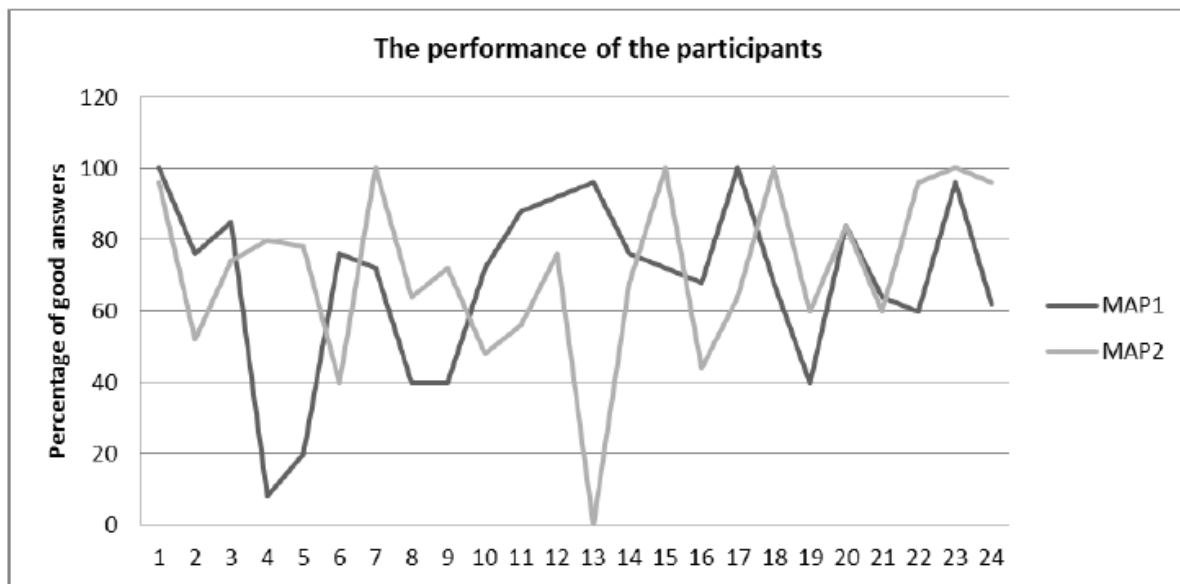


Fig. 3. Comparison of the overall results of the test participants

If we analyse in detailed both results we can see that in case of MAP2 there were 7 person whose solution were above 95%, although in case of MAP1 only 4 of them were bale to reach this result. Analysing the personal performance of the test persons the result is very interesting beacuse it shows that only 3 person were able to fulfill both task at the same level, which means that only 3 person were able to produce the same results in both task the others made the task with different effectiveness, almost half of them were more succesful with graduated colors method, the others were more efficient with graduated symbols method.

If analysing the effectiveness of the test participants with defining the different categories, it can be seen that MAP1 proved to be a little bit more effective in the case of small quantities (Fig. 4.), on the contrary in case of high values of crime graduated symbol methods (MAP2) could be more helpful for analysing the map for the participants

For the participants the task of identifying small values first and second categories on the maps proved to be the more easiest task. As we can see from Fig. 4., the higher the values on the map the lowest the performance of the test participants were.

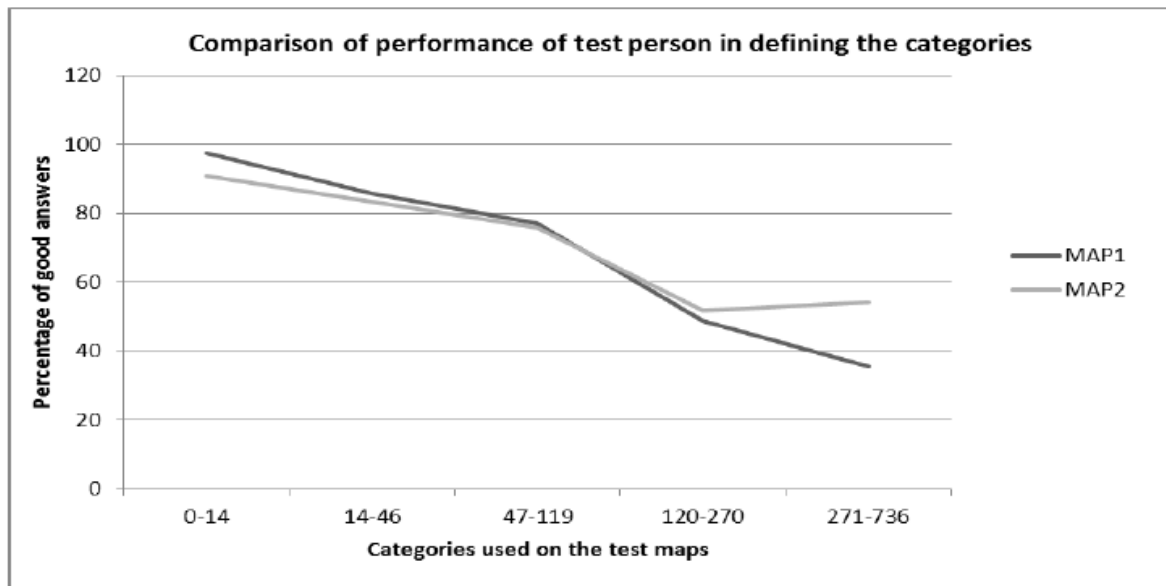


Fig. 4. Overall results of the identification of different categories on the test maps.

4. CONCLUSIONS

The results of test identified some essential problems in visualising crime data. As analysing the result of the experiment it can be clearly seen that with higher values (with more crimes) it was more difficult to identify the categories on maps although in this case, from the two tested methods, graduated symbols proved to be more effective. The results indicates that the combination of other visualisation method with the tested ones can be a good solution in visualising crime data on blocks in the cities.

5. ACKNOWLEDGMENTS

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*wenqiangbnu@163.com***ANALYSIS OF REGIONAL DIFFERENCES IN SENTENCING FOR CRIMES OF
INFRINGING ON CITIZENS' PERSONAL INFORMATION****Abstract**

The analysis of 578 valid verdicts by basic people's courts in four representative regions from 2021 to 2022 reveals significant regional differences in the sentencing practice in infringing on citizens' personal information. For example, in terms of free punishment, a major difference is found between the eastern region and the southern region, the application rate of probation is the lowest in the central region, and the allocation of free punishment and fine punishment among regions is unreasonable. Regional differences in sentencing do not only have the risk of violating the principle of balance between crime and punishment, but also hinder the realisation of the purposes of punishment. The role of the case guidance system should be further brought into play to do a good job in searching for similar cases, especially for the application of probation, the configuration of free punishment and criminal fine, and to develop guiding principles to achieve "same case and same sentence" to maximise the function of criminal punishment and achieve legislative purposes.

Keywords : personal data violation, sentencing practice, regional differences, penalty function, the balance between criminal offence and punishment

Introduction

Advanced internet technology has made information an important resource. There have been many cases of trading and leaking personal information on the Internet, which has led to crimes such as fraud, extortion, and theft. To prevent such misconduct and protect citizens' privacy, Article 7 of the Amendment (VII) to the Criminal Law of P.R.C, which came into force as of February 28, 2009, added two new delicts: the crime of selling or illegally providing citizens' personal information and crime of illegally obtaining citizens' personal information.¹⁹ The

¹⁹ This article stipulates that the staff of state organs or financial, telecommunications, transportation, education, medical and other units, in violation of state regulations, sell or illegally provide to others the personal information of citizens obtained by the unit in the process of performing duties or providing services, If the circumstances are

legislation limits to two special subjects, i.e., According to Yu Haisong (2022), "staff of state agencies or financial, telecommunications, transportation, education, medical and other units" (pp. 122-125). The statutory maximum penalty lasts only for 3 years of fixed-term imprisonment, which hinders the preventive function of punishment. The promulgation of the "Personal Information Protection Law" and "Network Security Law" and other pre-laws have led to difficulties in the connection of executions. Because of this, Article 17 of the Amendment (IX) to the Criminal Law of P.R.C, which came into effect on August 29, 2015, combined the above two crimes into the crime of infringing on citizens' personal information. At the same time, the subject of the crime is extended to general, and the statutory maximum penalty is increased to 7 years in prison.²⁰

According to Xu Fengxue and Wang Lei (2020) 'The judgments on violating citizens' personal data have obvious regional characteristics. The number of eastern coastal provinces is generally higher than that of the mainland, and the number of cases in the Yangtze River Delta region is significantly higher volume than it occurred in other areas (Fengxue – Lei, 2020, 32). In China's judicial practice, there has always been a "strike hard" mentality, and severe punishment is prone to occur in times or locations with a high crime rate. Do the regional differences in the distribution of crimes infringing on citizens' personal information also imply regional differences in sentencing? Adding the crime of infringement on citizens' personal information to the legislature is to prevent crimes through punishment, the most severe sanction. If there are regional differences in sentencing, not only will there be a risk of violating the law and adapting the sentence to the crime, but also unfair sentencing will affect the performance of the preventive function of the punishment. The purpose of this article is to determine whether there are regional differences in the sentencing practice for violating citizens' personal information

serious, the offender shall be sentenced to fixed-term imprisonment of not more than three years or criminal detention, and shall be fined concurrently or solely. Stealing or illegally obtaining the above-mentioned information by other methods, if the circumstances are serious, shall be punished in accordance with the provisions of the preceding paragraph. Units that commit crimes in the preceding two paragraphs shall be fined, and the directly responsible managers and other directly responsible personnel shall be punished in accordance with the provisions of the respective paragraphs.

²⁰ This article stipulates: Whoever sells or provides citizens' personal information to others in violation of relevant state regulations, if the circumstances are serious, shall be sentenced to fixed-term imprisonment of not more than three years or criminal detention, and shall also be fined or only fined; Fixed-term imprisonment and a fine. Whoever, in violation of relevant state regulations, sells or provides to others the personal information of citizens obtained in the course of performing duties or providing services, shall be severely punished in accordance with the provisions of the preceding paragraph. Those who steal or otherwise illegally obtain citizens' personal information shall be punished in accordance with the provisions of the first paragraph. Units that commit crimes in the preceding three paragraphs shall be fined, and the directly responsible managers and other directly responsible personnel shall be punished in accordance with the provisions of each of these paragraphs.

by analysing the judgment documents of the crime of violating citizens' personal information from 2021 to 2022.

1. Sample selection and variable design

Although there are currently many databases that can search for judgment documents, such as the China Judgment Documents Network, in comparison, the judgment documents collected by the Peking University Chinalawinfo Database (<https://www.pkulaw.com>) including different courts levels and case types and contain judgments and the authority. This article deals with data retrieved from there if otherwise indicated.

1.1. Sample selection

Using "crime of infringing on citizens' personal information" as the keyword to search the Peking University Chinalawinfo Database, the results show that in judicial practice, -because most defendants choose to plead guilty and accept punishment from 2021 to 2022-, the whole country will enter the second-instance procedure for violating citizens. There were only 97 cases involving personal information, which were not statistically significant, while 1,133 cases were heard by grassroots courts across the country. Therefore, this article selects the judgment documents made by the basic courts as the research object.

The analysis shows that the cases of violations of citizens' personal information are unevenly distributed among provinces, which is consistent with the existing research results. However, as described below, there is no direct correlation between the specific distribution and the degree of economic development. To make the selected samples more in line with the needs, this paper does not use the sampling method to choose pieces but directly selects the top six provinces with the largest number of trial cases as research samples. After the screening, a total of 578 valid judgments were obtained, and the top six provincial-level administrative regions were Hunan Province, Shaanxi Province, Henan Province, Jiangxi Province, Guangxi Zhuang Autonomous Region and Jiangsu Province. From the perspective of geographical distribution, these six provincial-level administrative regions also happen to represent different regions of China: Jiangsu Province represents the eastern region, Shanxi Province represents the Western region, Hunan, Henan, and Jiangxi provinces represent the central region, and Guangxi Zhuang Autonomous Region represents the southern region, so these six regions can roughly show the sentencing situation of violations of citizens' personal information nationwide. At the same time, because the purpose of this article is to count the regional differences in sentencing, and the first defendant has the heaviest sentence when depending on the samples, only the first

defendant is selected as the statistics for the same judgment with multiple defendants. In this way, 578 judgment documents involved a total of 578 defendants. The reason for using the defendant as a sample for statistics is also because this method can more clearly show the application of the crime in judicial practice, which is conducive to the analysis of the impact of sentencing circumstances on the sentence of free punishment and fine punishment, and the analysis of sentencing in different regions.

1.2. Variable design

After confirming that the defendant is used as a sample for statistics, this paper further designs the independent and dependent variables. Specifically, this paper mainly creates related variables from the following aspects:

First, the basic information is mentioned, including case name, region, and two variables. ①

The name of the case is labelled in the selected judgment, which is used to mark the specific judgment, which is convenient for the analysis of the perpetrators in the sample in the follow-up research, and is used to check the accuracy of the selected judgment and entered data. ②

The region is, the specific region where the defendant was convicted. This article will involve 6 provincial-level administrative regions and divide them into four regions: eastern, Western, central and Southern.

Secondly, the independent variable in this article is the sentencing plot. According to the relevant laws of our country, the sentencing circumstances of the crime of violating citizens' personal data mainly include confession, surrender, meritorious service, pleading guilty and accepting punishment, actively returning compensation and stolen goods, and whether they are repeat offenders, a total of 6 statistical standards.

Thirdly, the design of the dependent variable, in this article is the sentence of freedom and fine. Specifically, it includes three dependent variables: the type of free punishment, the time of free punishment and the amount of fine punishment. Liberal punishment includes four types: free punishment, criminal detention, fixed-term imprisonment, and probation. The period of free punishment is counted as months. In order to facilitate the statistics of the probation period, two months of probation are uniformly converted into one month of fixed-term imprisonment, that is, one year of probation is calculated. Six months of fixed-term imprisonment, and one month of criminal detention is counted as one month of fixed-term imprisonment; fines are calculated in RMB as the statistical standard.

2. General situation of sentencing and regional characteristics

Based on the selection of the above samples and the design of independent variables and dependent variables, this paper uses SPSS to process and analyse the obtained data, to fully understand the application status of the crime of violating citizens' personal information in judicial practice. Specifically, from the perspectives of the general situation of judicial application of the crime of infringing on citizens' personal information and the main differences in sentencing in different regions, this paper conducts a statistical analysis of the corresponding data obtained to obtain the main factors that affect the sentencing of this crime in different regions.

2.1. Sentencing overview

Here, mainly based on the two factors of the region where the crime occurred and the actual sentencing in each region, the spatial distribution of this crime in judicial practice is outlined to prepare for the subsequent analysis of regional differences in sentencing.

2.1.1. Judgment area

It can be seen intuitively from Figure 1 that in the four regions counted in this paper, the number of the defendants in descending order is the central region, eastern region, southern region, and western region. The central region tried 306 defendants, accounting for 53%; the eastern region tried 156 defendants, accounting for 27%; the southern region tried 64 defendants, accounting for 11%; the western region tried 52 defendants, accounting for 9%. The formation of this geographical distribution feature may be related to the level of digital economy development in each region. According to the 2022 China Top 100 Digital Economy City Development Rankings²¹, it can be found that the cities in the central region rank at the top15 in the digital economy, the cities in the eastern region rank at the top10, while the cities in the western region rank after 20. It fully demonstrates that in areas where the digital economy is relatively developed, the number of crimes of infringement of citizens' personal information is relatively large, but it is not absolute, because the number of cases in the central region is more than that in the eastern region. This distribution feature reflects the actual situation of the crime

²¹ The data comes from CCID Consulting, an institution directly under the China Electronic Information Industry Development Research Institute of the Ministry of Industry and Information Technology, <https://www.163.com/dy/article/HV2ROJ6205561PSI.html>.

committed in different regions, which provides an objective basis for further analysis of the actual impact of sentencing circumstances on sentencing in different regions.

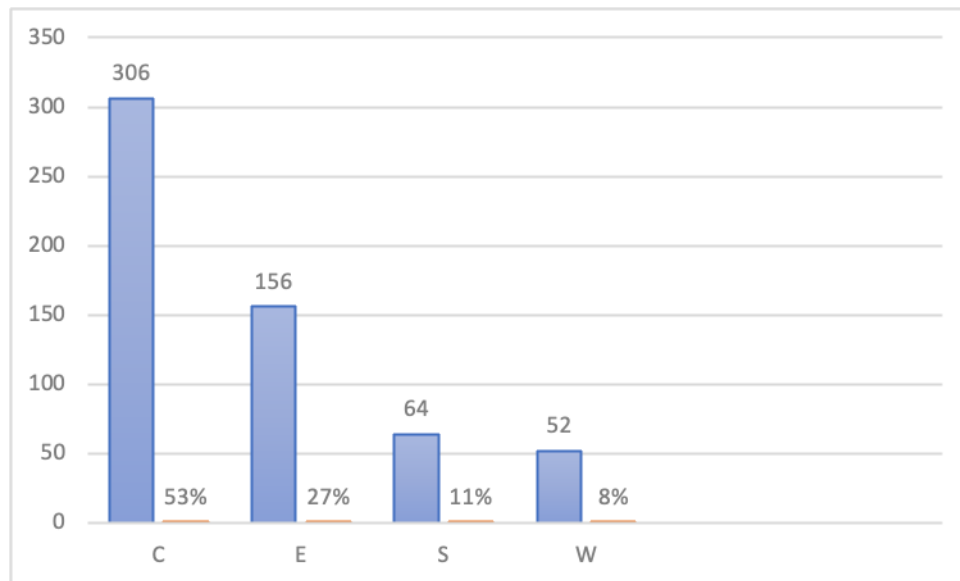


Figure 1: Statistical map of the geographical distribution of the defendants

2.1.2. Regional characteristics of sentencing results

From the perspective of the average value of the sentence of freedom (see Table 1 for details), the eastern region is the highest at 11.19 months, followed by the central region at 8.45 months, the western region at 7.21 months, and the southern region at 7.16 months. In terms of penalties for free punishment, the eastern region has the highest average value, and the southern region has the lowest average value, with a mean difference of nearly 4 months.

In terms of fines, the central region has the highest average value of about 34,383 yuan, followed by the eastern region at about 32,079 yuan. The region with the lowest fine penalty is the south, about 14,373 yuan, and the difference between the highest and lowest fine penalty is nearly 20,010 yuan. As the economically backward area in my country, the southern region's fine penalty reflects the impact of the local economic development level on the fine penalty to a certain extent. However, as the central region with a relatively underdeveloped economy, the number of fines is much higher than that of the eastern regions with a relatively developed economy. There are large differences in the application of fines among regions, and there is a difference between the application of fines and the degree of economic development, which is not directly related.

However, comparing the free punishment and the fine punishment in each region, it can be found that in the western region, although the average value of the fine punishment is at a high

level, the average value of the free punishment is at a low level. In the central region, the fine penalty is also at a relatively high level, but the average value of the free penalty is also at a high level. Both the fine penalty and the free penalty in the eastern region are at a relatively high level. This statistical analysis also breaks the public's misunderstanding of the fine penalty, which is believed to be "ransom with money" (Mingxuan – Xiao, 2009, 6). At the same time, it also shows that there are great differences in the application of free punishment and fine punishment to defendants in different regions, and the configuration of free punishment and fine punishment is unreasonable. It can be seen from this that there are differences in the application of free punishment and fine punishment to defendants in different regions.

Table 1 Statistical Table of Differences in Sentencing Means Between Regions

Region	N	Minimal	Maximum	Mean	Standard deviation	
		value	value			
E	Sentence of liberty	156	0	66	11.19	17.291
	Sentenced to a fine	156	1000	1200000	32079.49	108251.189
C	Sentence of liberty	306	0	55	8.45	13.529
	Sentenced to a fine	306	1000	4000000	34383.33	229608.079
S	Sentence of liberty	64	0	48	7.16	13.035
	Sentenced to a fine	64	2000	80000	14373.44	16070.077
W	Sentence of liberty	52	0	48	7.21	14.017
	Sentenced to a fine	52	2000	750000	30521.15	106224.114

It can be seen from Table 2 that there are differences in the types of freedom punishments applicable in different regions. In terms of the application for probation, the western region has the highest application rate of 67.3%, and the central region has the lowest application rate of 37.3%. Only 114 of the 306 people were sentenced to probation. The difference in the application of probation between the two regions exceeds 30%. As for the application of fixed-term imprisonment, the central region is the highest at 47.4%, and the western region is the

lowest at 28.8%. It can be found that in the central region of our country, in the selection of free punishment types, not only the application rate of probation is low, but also the application rate of fixed-term imprisonment is the highest. As a non-penal punishment, probation has not been used rationally in the region. Perhaps felonism is deeply rooted in the ideology of the people in the region. They believe that the defendant should "either be sentenced to death or be imprisoned. If the criminal is still in society after being sentenced, they believe that they have not been punished" (Xuexiang, 2004, 80). In the western region, the application rate of probation is high, and the application rate of fixed-term imprisonment is also the lowest, which shows that the digital economy in the western region is relatively underdeveloped, and no severe punishment measures have been taken to prevent the occurrence of violations of citizens' personal information. The applicable situation of criminal punishment almost confirms that "crime will increase along with economic development"(Jianjun, 2010, 148). The above shows that there are significant differences in the choice of punishment types in different regions.

Table 2 Statistical Table of the Differences in the Types of Freedom Penalties between regions

Region			Frequency	Percentage
E	Valid	Suspended Sentence	98	62.8
		Penal Servitude	2	1.3
		Fixed-term Imprisonment	56	35.9
		Total	156	100
C	Valid	No Sentence of Liberty	6	2.0
		Suspended Sentence	114	37.3
		Penal Servitude	41	13.4
		Fixed-term Imprisonment	145	47.4
S	Valid	Total	306	100
		Suspended Sentence	38	59.4
		Fixed-term Imprisonment	26	40.6
		Total	64	100
W	Valid	No Sentence of Liberty	1	2
		Suspended Sentence	35	67.3
		Penal Servitude	1	1.9
		Fixed-term Imprisonment	15	28.8
		Total	52	100

2.1.3. The geographical characteristics of the application of sentencing circumstances

Table 3 counts the application of the above-mentioned regions to the main sentencing circumstances in this crime, such as confession, meritorious service, confession and punishment. From the statistics in the table, it can be found that confession, guilt and punishment, and active restitution are the sentencing circumstances with the highest proportion in each region and have become the main sentencing circumstances considered by judicial organs in judicial practice. The confession and punishment rates in the eastern and western regions have reached 100%, and even if they have not reached 100%, the confession and punishment rates in the central and southern regions are as high as 99.7% and 98.4% respectively, to a similar extent. In terms of frank application, the highest application rate is in the southern region, about 95%, followed by the western region, about 90%, and the lowest in the central region, about 73%. However, the surrender rate in the central region is the highest among the above-mentioned regions, reaching 19%, but the application of probation is the lowest among all regions, at about 37%. For active compensation, the southern region has the highest refund rate of 79.7%, followed by the central region at 75.2%, and the lowest refund rate is the western region at 55.8%.

From the statistics in Table 3, it can be found that in all regions, the defendants' pleas of guilt and acceptance of punishment are very high. When the defendant pleaded guilty and accepted punishment, as some people said: "The judiciary may deliberately abandon the legitimate interests of the injured party" (Junfeng, 2021, 116). At the same time, the analysis shows that in judicial practice in various regions, there are more cases where the defendant confesses and pays compensation, and there are fewer cases where he surrenders himself and makes meritorious service. This may be due to statistical data, but it does not rule out that in specific cases, the circumstances of self-surrender and meritorious service are less objective, so they are not significant.

Table 3 Statistical Table of Differences in Sentencing Circumstances between Regions

Region			Frequency	Percentage
E	Valid	Confession of Offence	132	84.6
		Meritorious Service	4	2.6
		Plea for Leniency	156	100
		Restitution	98	62.8
		Voluntary Surrender	25	16
		Recidivism	2	1.3
C	Valid	Confession of Offence	247	80.7
		Meritorious Service	3	1
		Plea for Leniency	305	99.7
		Restitution	230	75.2
		Voluntary Surrender	58	19
		Recidivism	4	1.3
S	Valid	Confession of Offence	61	95.3
		Plea for Leniency	63	98.4
		Restitution	49	76.6
		Voluntary Surrender	2	3.1
W	Valid	Confession of Offence	47	90.4
		Plea for Leniency	52	100
		Restitution	29	55.8
		Voluntary Surrender	5	9.6

2.1.4. The influence of the same plot in different regions

Tables 4 and 5 take the above-mentioned sentencing circumstances as the independent variable and the free punishment and fine penalty as the dependent variables. Through regression model analysis, the impact of sentencing circumstances in various regions on the discretion of free punishment and the fine penalty is analysed. The results show that in the central region, there are four significant factors: whether to refund compensation, whether to confess, whether to surrender, and whether to repeat offenders. The significant factor in the eastern, central, and western regions is whether to refund or not. Pleas and punishments were prominent factors in the southern region. It can be seen from the table that there is a negative correlation between the sentencing circumstances and the sentencing of free punishment and fine punishment, indicating that the relevant statistical analysis conforms to the law between the sentencing circumstances and the discretion of the penalty, that is, the independent variable increases, and the dependent variable shows a downward trend. Both Table 4 and Table 5 show this trend.

It can be seen from Table 4 that when judging the defendant's free sentence, whether to refund or not is a sentencing factor that is considered by judicial organs in different regions when judging the penalty. From the absolute value of the relevant B value, it can be found that the sentencing circumstance of confessing guilt and accepting punishment has the greatest impact on the sentencing of free punishment, and its absolute value of B value is about 41; followed by surrender, its absolute value of B value is about 22. For the eastern, central, and western regions, which all have the significant factor of compensation or not, the absolute value of the B value is the largest in the eastern region, indicating that the sentencing context of active compensation has the greatest impact on the sentencing of free sentences in the eastern region. Although the sentencing circumstance of refund and compensation is considered in different regions when sentencing, there are also certain differences in its impact. It can be seen from the above that judicial organs in different regions consider different aspects of sentencing circumstances when making penalty decisions. Even if the same sentencing circumstances are considered, there are differences in penalty discretion.

Table 4 The impact of sentencing circumstances across regions on the free sentence

Region	Model		Non-standardized		t	Sig.
			coefficient			
			B	Standard Error		
E	1	Restitution	-11.263	2.773	-4.061	0.00
		Confession	-20.117	10.304	-1.952	0.05
C	1	Restitution	-5.199	1.77	-2.938	0.00
		Voluntary Surrender	-22.607	10.359	-2.182	0.03
		Recidivism	13.326	6.672	1.997	0.05
S	1	Plea Leniency	-41.417	12.754	-3.247	0.00
W	1	Restitution	-9.349	3.783	-2.471	0.02

Table 5 shows the impact of the sentencing circumstances on the fine penalty between regions. It can be seen from the table that there are no significant factors in the eastern, southern, and western regions, because this paper does not select samples by sampling, which leads to selection bias, resulting in no significant factors in related areas. For the central region with significant factors, whether to refund or not has become a significant factor in this area. This shows that in different regions, different sentencing circumstances have different effects on the penalty of fines, which leads to differences in the application of fines for this crime in different regions.

Table 5 The impact of sentencing circumstances on the penalty of fines between regions

Region	Model	Unstandardised Coefficient		t	Sig.	
		B	Standard Error			
E	1	No significant factors				
C	1	Restitution?	-59044.781	30537.627	-1.934	0.05
S	1	No significant factors				
W	1	No significant factors				

3. Regional Differences and Reason Analysis

The above analysis shows that in the sentencing practice of cases of infringement of citizens' personal information, there are large differences in the selection of punishments and the application of sentencing circumstances by judicial organs in different regions. The reasons for these differences are both legislative and practical.

3.1. Regional differences

First of all, in terms of the application of the penalty of freedom, the average value of the penalty of freedom in the central and eastern regions is higher than 8 months; the average value of the penalty of freedom in the southern and western regions is lower than 8 months, and the average value of the penalty of freedom in the southern region is 7.16 months. There are large differences in the period of free punishment between different regions. The judicial organs in the central and eastern regions impose heavier punishment on the defendant, while the western and southern regions have moderate punishment. The difference in sentencing between different regions does not know whether the purpose of punishment and crime prevention can be achieved. This difference also shows that the judiciary in areas with a large average free penalty tends to punish and prevent crimes by severely punishing defendants. However, in terms of the choice of the term of free sentence, the difference between the highest and the lowest average value of free sentence is nearly 4 months, which shows that even in regions where fixed-term imprisonment is used as the punishment discretion, there are still large differences in the choice of free sentence term.

Secondly, in terms of the choice of the type of free punishment, non-custodial sentences (suspended sentences) are mostly adopted in the regions, and the applicable proportions in the eastern, southern, and western regions are all over 50%, and the application of probation in the western region has reached 67.3%, which is much higher than other regions. The regions and the application of fixed-term imprisonment in the above regions is lower than 50%. However, the application rate for probation in the central region is only 37.3%, while the application rate for fixed-term imprisonment is as high as 47.4%. This shows that there is a big difference in the choice of the type of free punishment in different regions. Most regions tend to choose non-custodial measures (suspended sentence) for the defendant, and a few regions prefer adopting prison sentences (fixed-term imprisonment). Compared with regions that adopt custodial measures, non-custodial sentences have fewer restrictions on defendants, and to some extent are more conducive to their reintegration into society. If the purpose of social defense can be achieved by taking non-custodial measures, there is no need to apply prison sentences (Wanqin, 2018, 131).

Thirdly, in terms of the application of fines, the average value of fines in the central region is the highest, followed by the eastern and western regions, while the average value of fines in the southern region is the lowest. There are great differences in the application of fines among the above-mentioned regions. Article 52 of the *Criminal Law* stipulates: "The amount of fines shall be determined according to the circumstances of the crime." The determination of the amount of fines based on the circumstances of the crime is mainly determined by the principle of adapting the punishment to the crime. That is, the amount of the fine imposed on the defendant depends on the nature and consequences of the defendant's criminal behavior. When comparing the average value of free punishment with the average value of fine punishment in each region, it will be found that there is a big difference in the application of the two. For example, in the central region, the average fine penalty is the highest among the above-mentioned regions. The high average fine penalty indicates that the defendant's crime is serious, but the average free penalty is not as high as the similar fine penalty in the eastern region. In the allocation of free punishment and fine punishment, the central and western regions have achieved relative coordination, while there is a certain imbalance in the allocation of free punishment and fine punishment in the eastern and southern regions. Statistical analysis shows that there are differences in the configuration of fine punishment and free punishment in different regions.

Finally, in terms of the application of sentencing circumstances, confession, guilt and punishment, and active compensation are the sentencing circumstances with the highest proportion in each region, which shows that the above circumstances will be considered in the

judgment of punishment in different regions. However, the proportion of confessions and punishments is abnormally high. The confession and punishment rates in the eastern and western regions have reached 100%. Even if the rates in the central and southern regions have not reached 100%, the confession and punishment rates are as high as 99.7% and 98.4% respectively. When selecting the research samples, this article only selects the first-instance judgments made by the basic courts, because the proportion of defendants pleading guilty and accepting punishment is high, and there are few appeal cases. Although pleading guilty and accepting punishment as a significant factor has a positive impact on the judgment of punishment, it is doubtful whether this system will deprive the defendant of his legal rights. "The leniency system for pleading guilty and accepting punishment should undoubtedly ensure that the accused's confession of guilt and punishment is voluntary, consistent and sufficient. Otherwise, the superficial plea of guilt and acceptance of punishment will easily lead to wrongful convictions, which will not only damage the rights of the accused, but also damage the interests of the victim and weaken the credibility and authority of the judicial system" (Weimin, 2017, 164). When the judiciary implements the plea system, it should pay attention to the protection of the legal rights of the defendant and should not plead guilty for the sake of pleading guilty but should plead guilty and accept punishment on the basis of fully protecting the defendant's procedural rights.

As for the cases of self-surrender, most of them are in the eastern and central regions, and less in other regions. To a certain extent, it shows that the judicial departments in the above-mentioned regions pay attention to the publicity of the self-surrender policy and encourage criminals to actively surrender. From the statistical judgments, it can be found that the central and eastern regions accounted for nearly 80% of all judgments, which shows that the crime of infringing on citizens' personal information is severe in the eastern and central regions, which has a certain relationship with the developed digital economy in the eastern and central regions. For this reason, the eastern and central regions need to take effective measures to curb this crime trend and provide legal protection for the healthy development of the digital economy.

Whether or not compensation is a significant factor in the eastern, central, and western regions indicates that whether the defendant is compensated or not has become an important factor considered by the judiciary when judging the defendant's penalty, and it also reflects the profit-seeking nature of the defendant who committed this crime. Selling other people's information for financial gain. Therefore, the defendant's active restitution of stolen goods has become a key factor considered in the judgment of punishment in the eastern, central, and western regions, while for the southern region, pleading guilty and accepting punishment is the

sentencing circumstance that is mainly considered in the judgment of punishment. To a certain extent, it shows that the profits of the defendants who commit this crime in the southern region are lower than those in other regions. When judging the punishment of the defendant, different regions focus on different sentencing circumstances, which reflects the differences in the governance of the crime of infringing on citizens' personal information in different regions.

3.2. Cause Analysis

The above-mentioned regional differences in sentencing are due to both legislative and judicial reasons, as well as objective factors such as the social situation.

First of all, at the level of substantive law, as some scholars have said: "There are reasons for the difference in sentencing at the level of substantive law and the level of procedural law. The level of substantive law is mainly because China's criminal legislation sets too broad a range of statutory penalties" (Lei, 2021, 71). The *Criminal Law* divides the statutory penalties for the crime of infringing on citizens' personal information into two categories: "serious circumstances" and "especially serious circumstances", and in the "Interpretation of Several Issues Concerning the Application of Law in Handling Criminal Cases of Infringement of Citizens' Personal Information" (referred to as "Interpretation") are specifically defined. However, the "Interpretation" remains an abstract and general provision. Due to technical factors and potential disparities in judges' interpretations, many of the normative provisions within the interpretation still necessitate further explication (Xiuzhe, 2018, 31). The expansive yet non-specific statutory penalties, coupled with the abstract nature of the judicial interpretation, inevitably place the onus on judges to exercise their discretionary powers judiciously when determining specific sentencing. Although it is necessary to grant discretionary power to judges, "the purpose of granting certain criminal discretionary powers to examination and approval organs is to require judicial organs to make timely and fair judgments that do not exceed the law according to specific circumstances and specific objects, so as to better punishment and crime prevention" (Kefang, 2001, 30). In practice, our country lacks clear guidance of substantive laws and effective regulations on procedures for judges' sentencing activities, and judges' sentencing activities are always in a "hidden" state, which makes discretionary powers unreasonably exercised. To a certain extent, it has led to differences in the penalties of similar cases in different places.

Secondly, at the level of procedural law, the main reason is that the sentencing procedure is not independent enough. In current judicial practice, trial procedures and sentencing procedures are carried out simultaneously. However, sentencing and trial are two different procedures. The

trial is to synthesize the case evidence and legal provisions to characterise the case, while the sentencing procedure is to judge the type and range of the defendant's punishment. At present, courts do not use special procedures to select the type and the range of punishment. Public prosecutors, defenders, victims, and defendants cannot substantially participate in sentencing issues, and sentencing activities are in a "hidden" state. Because of the "hidden" state of sentencing activities, it is difficult for judges in different regions to refer to the practices of judges in other regions when they encounter similar cases, which will lead to differences in sentencing to a certain extent. Secondly, the absence of the procedural law of the lenient system for pleading guilty and accepting punishment also has a certain impact on the generation of sentencing differentiation. When a criminal suspect or defendant pleads guilty and accepts punishment for his crime, the judiciary will give him a lenient punishment. The statistical analysis in this paper also shows that the rates of guilty pleas and punishments of defendants in all regions are very high. However, there are situations in which the leniency varies in practice. The reason is that the *Criminal Procedure Law* as a procedural law only applies to trial procedures. However, in the *Criminal Law* for cases where criminal suspects or defendants plead guilty and accept punishment, how to deal with leniency? There is no definite stipulation on the extent of the leniency. For cases of pleas of guilt and punishment, sentencing is mainly carried out by referring to previously judged cases, and the decision-making power of penalty discretion is mainly in the hands of judges (Jing, 2021, 79), which has a certain degree of individualism and empiricism. Therefore, for similar cases, even if the criminal suspect or defendant pleads guilty and accepts punishment, there will be differences in sentencing. Thirdly, judges in different regions are subject to their own comprehensive quality²² and social environment, which have a certain impact on the generation of sentencing differences. Judges' personal emotions and personal concepts may affect their views on criminal behavior, thereby affecting their concept of punishment. "Different judges usually hold different sentencing philosophies, and different sentencing philosophies are often in conflict with each other, which inevitably leads to wide differences in sentencing" (Jiangang, 2011, 22). Some regions may place more emphasis on maintaining social order, and judges may tend to adopt severe penalties punish crimes. In other areas, judges may prefer to reform criminals through lenient sentences, so they choose light sentences or leniency. The judge's personal criminal trial experience may

²² One's comprehensive quality refers to the general term of cognitive factors that may affect the judge's penalty judgment process and results, and refers to the judge's personal emotion, life experience, individual criminal trial experience, and individual position. Such as personality, moral concepts of right and wrong, individual emotions, the social harm of crime reflected in individual emotions, and the potential impact of personal experience on judicial trials. Long Guangwei (2003): On Sentencing Imbalance and Its Countermeasures. *Jilin University Social Science Journal*, (2):59.

also affect the discretion of the penalty. When judges in various regions face the behavior of violating citizens' personal information, their trial experience will affect the judge's cognition of the behavior and the choice of the type and range of punishment. Furthermore, the social security situation in different regions may also affect the judge's sentencing activities. The social environment, crime rate and public attitudes towards crime in different regions may be different, and these factors may also affect the judge's choice of punishment. For example, in some areas with a high crime rate, judges may tend to choose heavier penalties to severely punish crimes in order to maintain social order and security.

Finally, the macro-social situation, especially the development of the digital economy, also affects the sentencing of cases of infringement of citizens' personal information to a certain extent. Therefore, the development of the digital economy is highly dependent on citizens' data or information, which indirectly becomes a violation of citizens' personal information. Specifically, from the perspective of the relative degree of digital economy development in the southern and western regions, the grassroots courts have only tried 116 cases in the past two years, which is significantly lower than other regions. In contrast, due to the relatively developed digital economy in the eastern and central regions, crimes involving citizens' personal information are more frequent. The average value of free punishment, and fine penalty in the two regions is relatively high.

4. Negative impacts and countermeasures

As mentioned above, the purpose of adding the crime of infringement of citizens' personal information by the legislature is to play the deterrent function of penalties and prevent infringement of personal information. However, the regional differences in sentencing will have a negative impact on both the macro and micro levels, hindering the realization of legislative purposes. Therefore, specific measures should be taken for the above reasons.

4.1. Negative impacts

At the macro level, regional differences in sentencing affect judicial authority, affects the implementation of laws. "Judicial authority, as a special type of authority, refers to the credible position and power of the judiciary in social life" (Guangzhong - Peiquan, 2011, 3). It is crucial to maintain social harmony and stability and the normal implementation of laws. Judicial authority symbolizes social credibility, and credibility is the degree to which the public agrees with and is convinced of the judiciary. The differences in sentencing for the crime of infringing on citizens' personal information in various regions not only have the principle of balanced

penalties for crimes, but also inevitably make criminal suspects or defendants question whether they have been treated fairly in the judicial process or not. Judicial activities are the last line of defense to resolve disputes. Failure to uphold justice will have a major impact on social harmony and stability.

At the micro level, the differences in sentencing in various regions may affect the function of punishment. Penalties have the functions of punishment, reformation and deterrence. The differentiated sentencing between different regions will have a certain impact on the function of punishment. The severity and appropriateness of punishment have an important impact on the rehabilitation of offenders and their social reintegration. The differences in sentencing for the crime of violating citizens' personal information in various regions will affect the function of punishment to some extent. In some areas, the penalty is too trivial for criminals to realise the consequences of their crimes, so they cannot form a sufficient understanding of their behaviour. This will affect the deterrent function of penalties, increase the possibility of re-offending and bring more harm to the society. In some areas, the punishment is so strict that criminals may think that they have been treated unfairly, and then have reluctance to reformation, resulting in the failure of their reformation, and may even cause criminals to resent the society more, increasing the possibility of re-offending and affecting the function of reformation and deterrence of law.

4.2. Proposals on Countermeasures

Based on the reasons above, measures are suggested to be taken from the following aspects to improve the regional differences in sentencing in cases of infringement of citizens' personal information.

First, give full play to the function of searching guiding cases and similar cases, and implement the same judgment for the same case. The same case refers to seeking a delicate stability between the tension between the law and social life within the scope permitted by the law, while the same judgment means that for similar cases, the judgment results should be generally consistent, even if there are subtle differences (Yongzhao, 2022, 33). As long as the difference does not exceed the scope of the law, it should be classified as the category of the same case and the same judgment. Therefore, the same sentence for the same case does not require that the crimes of infringing on citizens' personal information in different regions have the same verdict, but that cases with similar circumstances in different regions should be given the same sentence as much as possible to maintain judicial authority. At the national level, a case guidance system should also be established as soon as possible to make "unified" penalties for

similar cases in different regions as much as possible. "Pursuing the natural justice of the same case with the same judgment and maintaining the unity of law application is the goal that any country's case system strives for" (Xiao, 2011, 72). Regarding the sentencing of free sentences, judges in the above-mentioned regions have different judgment standards, whether in terms of the duration of free sentences or the choice of types of free sentences. In order to achieve the goal of the same judgment, a reasonable case guidance system should be used to bridge the differences between different regions. The case guidance system with practical guiding significance should be based on the legislative and judicial reality of China, in order to solve practical problems and achieve the unification of law application (Yunteng – Tongzhi, 2008, 10).

Second, improve criminal legislation. At the level of criminal substantive law, regarding the relatively broad provisions of the criminal law on penalties, more detailed provisions should be made on the discretion of penalties in combination with judicial interpretations to make the criminal law and its judicial interpretations more operable, thereby reducing the difference in sentencing. In terms of criminal procedure law, we should explore the establishment of a sentencing procedure different from the trial procedure, so that the public prosecutor, the defendant, and the defender can effectively participate in sentencing activities, so as to ensure the openness and fairness of sentencing.

Third, promulgate normative documents to regulate the application of prison sentences, especially to increase the application of non-custodial sentences (probation). Statistics show that, except for the central and southern regions, the application rate of probation in other regions is at a relatively high level, reaching more than 60%. It shows that in judicial practice, most regions have adopted more lenient measures than fixed-term imprisonment for criminal acts of infringing on citizens' personal information. Even in the eastern region, which is as severe as the crime situation in the central region, the application rate of probation exceeds 60%. Moreover, China is establishing and improving the community correction system (Zongxian, 2022, 81), which provides a more solid institutional guarantee for the expansion of non-custodial sentences, "carrying out punishment execution work for criminals in the community" (Zongxian, 2020, 68). Criminals do not need to be detained but return to their communities. Of course, this does not mean that criminals are free from any constraints.

Fourth, formulate guiding rules or release guiding cases to standardise the application of free punishment and fine punishment, and improve the practical allocation of punishment. "The rationalisation of the punishment allocation structure is the organisational basis for the effective performance of the punishment function" (Zhixiang – Ning, 2011, 42). As shown in the analysis

above, the average value of free punishment and fine punishment in the eastern region is at the highest level at the same time, while in other regions there is a reasonable negative correlation structure between free punishment and fine punishment. The irrational allocation between free punishment and fine punishment makes it difficult to play the punishment and preventive functions of punishment. Judiciary agencies in different regions should consider the circumstances of the defendant's crime and the economic development level of the region in the penalty of fine punishment but should also pay more attention to the reasonable allocation of free punishment and fine punishment to give full play to the punishment and prevention functions of punishment.

Finally, at the level of criminal policy, it is recommended that while developing the digital economy in the eastern and central regions where the digital economy is relatively developed, it is recommended to pay attention to the governance of violations of citizens' personal information, especially to give full play to corporate compliance, which will help promote "The crime governance strategy based on the concept of "co-governance and cooperation" can not only protect the legitimate rights and interests of citizens from infringement, but also provide legal protection for the development of the digital economy and better promote the development of the digital economy.

5. Conclusion

The analysis shows obvious regional characteristics in the sentencing practice in the cases of violating citizens' personal information. There are great differences in the choices of the type of free punishment and the application of probation in different regions especially the eastern and central region. This not only has the risk of violating the principle of balance between crime and punishment, but also hinders the realisation of the purpose of punishment. Therefore, the role of the case guidance system should be further brought into play to do a good job in searching for similar cases, especially for the application of probation, the allocation of free punishment and fine punishment, and to develop guiding principles to achieve "same case and same sentence" in order to achieve the legislative purpose.

It should be noted that, due to the limitation of sample selection and research methods in this paper, individual variables are not significant, so the relationship between independent variables and dependent variables needs to be further studied to make the research results more accurate. It should objectively and truly reflect the status of this crime in judicial practice, so as to better guide judicial practice.

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**AN EMPIRICAL STUDY OF GEOGRAPHICAL DIFFERENCES IN CRIMES OF
AIDING INFORMATION NETWORK CRIMINAL ACTIVITIES**

— **SAMPLE OF 1,081 JUDGMENTS**

Abstract

The crime of aiding information network criminal activities is a new crime added by the "Criminal Law Amendment (IX)", which shows significant geographical differences in practice. In the Chinalawinfo database of Peking University, a total of 1,081 judgments and 2,131 defendants were obtained by searching with this crime as the keyword. Taking the seven regions of North China, Northeast China, East China, Central China, South China, Southwest China, and Northwest China as the empirical research, it is concluded that this crime mainly presents the characteristics of progressively severe crime situation from North to South and progressively diverse types of criminal acts. There is a problem that the sentencing around the crime situation does not match the problem, and put forward four suggestions: the three northern regions should moderately relax the application of probation for this crime; Central China should focus on combating the "two cards" type of help; East, Southwest and South China should focus on the prevention of technical support type of help, combat; Southwest China should moderately increase the punishment for this crime.

Keywords: Crime of aiding information network criminal activities, Network complicity, Geographical differences, Empirical study

Introduction

According to the "Characteristics and Trends of Cybercrime in Judicial Data Special Report" released by the Supreme People's Court on November 19, 2019, the volume of cybercrime cases has been increasing year by year in recent years, and they are mostly found in the southeastern coastal areas, followed by the eastern non-coastal areas and the northeastern coastal areas and central areas, with significant geographical differences²³. Among the increasingly frequent cybercrimes, the crime of helping information network criminal activities, as a new crime added

²³ See China Judicial Big Data Service network (<http://data.court.gov.cn>)

by the Criminal Law Amendment (IX) enacted in 2015, belongs to the predicate crimes of many cybercrimes in terms of crime positioning. The three main forms of "technical support", "advertising promotion" and "payment settlement" regulated by its elements are all necessary links of network fraud, online gambling, and other mainstream network crimes.

Therefore, an analysis of the characteristics of the geographical differences of the crime of aiding information network criminal activities can demonstrate the overall geographical differences of the current Chinese cybercrime to a degree, and provide a practical basis for each region to formulate the corresponding criminal policy in response to the specific crime situation in its region.

I. Research Methodology

1.1. Sample Selection

The sample selected for this paper was taken from the Peking University Chinalawinfo Database (<http://www.lawinfochina.com/search/SearchCase.aspx>). The reason why the Peking University Chinalawinfo Database is chosen as the source of the research object instead of the official Magistrate's Document website is mainly because the former has certain advantages in terms of the number of cases. Moreover, its cases can include the cases provided by the Magistrate Document Network completely. At the same time, to maximize the sample size and improve the credibility of the research results, all the judgments obtained from Peking University Chinalawinfo Database were selected in this paper, and no sampling method was used.

A search using the keyword "Crime of aiding information network criminal activities" showed that as of January 4, 2021, the database contained a total of 1,124 verdicts. After eliminating the duplicate content, a total of 1081 judgments were obtained, with a total of 2131 defendants, including units and natural persons. The reason for counting the number of defendants is that, in terms of the definition of the specific sample, there are a large number of accomplices in the "crime of aiding information network criminal activities", the subject of the study. At the same time, compared with the statistical method of using cases or judgments as samples, the statistical method of using specific defendants as samples can more clearly show the application of this crime in practice, and also help to analyze the regional differences in the specific conviction and sentence of this crime.

1.2. Variable Design

After determining the statistical criteria for the sample of defendants, the paper further designed the variables. Specifically, this paper designed the research variables in the following dimensions:

Firstly, Basic information, including a total of seven variables: case title, trial level, time, geographic area, name of the perpetrator, nature of the perpetrator, and the perpetrator's complicity status. ①Case name refers to the name of the case explicitly stated in the judgment, which is used to identify the specific case so that it can be easily compared with the perpetrator as a sample in the subsequent study, and to facilitate finding the specific case and checking the accuracy of data entry. ②Trial level refers to whether the case is a criminal case of first or second instance, and is a record of the specific trial procedure to which the actor belongs. ③Time refers to the specific time of the verdict, in years. ④Geography refers to the specific geographical area where the perpetrator was sentenced. For the sake of statistics, this paper takes seven geographical regions, namely, North China, Northeast China, East China, Central China, South China, Southwest China, and Northwest China, instead of all provincial administrative regions, as the statistical standard for the geographical area. (The regions are referred to in following as N, NE, E, C, S, SW, NW. ⑤The name of the actor is the name or designation of the perpetrator, which is similar to the name of the case. The main purpose of the statistics of this variable is to facilitate subsequent data processing.

Secondly, the variables related to the circumstances of the crime include seven variables: the number of objects to help, and the amount of payment and settlement, the number of funds provided, the amount of illegal income, the specific sentencing circumstances, the type of positive offense behavior and the type of helping behavior. Among them, the number of objects in order to help, the amount of payment and settlement, the number of funds provided, and the amount of illegal income are the "Interpretation of Several Issues Concerning the Application of Law in Handling Criminal Cases of Illegal Use of Information Network and Aiding Criminal Information Network Activities" published by the Supreme People's Court and the Supreme People's Procuratorate on October 21, 2019, which stipulates in Article 12 the determination of "serious circumstances" criteria²⁴. The specific sentencing circumstances include confession,

²⁴ This law also provides for three sentencing circumstances: those who have received administrative punishment within two years for illegal use of information network, aiding criminal information network activities, or endangering computer information system security and aiding criminal information network activities; those who have been helped to commit crimes with serious consequences; and other circumstances of seriousness. However, the above three are difficult to count purely from the perspective of the judgment, and thus are not included in the statistical variables.

surrender, merit, guilty plea, active refund, special subject, other mitigating circumstances, recidivism, other aggravating circumstances, a total of 10 statistical standards. The statistical criteria for the types of principal offender behaviors include failure to mention, network fraud, network gambling, infringement of citizen information, dissemination of obscene pornography, destruction of computer information systems, and other positive offense behaviors. In addition, since this crime explicitly specifies four types of specific behaviors to provide technical support, advertising promotion, payment settlement, or other helping behaviors for others, by designing the variable of specific behavioral types, the above four main behavioral types of this crime are counted, and the specific practical application of the four types can be derived.

Thirdly, the variables related to penalty disposition include only three variables: the type of free sentence, the length of free sentence, and the amount of fine sentence. Among them, the types of free sentences include free sentences, custodial sentences, fixed-term sentences, and suspended sentences. The duration of the free sentence is calculated in months of fixed-term imprisonment, and for the convenience of statistics, every two month is calculated as one month of fixed-term imprisonment, and one month of detention is calculated as one month of fixed-term imprisonment, that is, three years of probation is calculated as 18 months of the free sentence. The fine sentence is calculated in RMB.

2. Data Basic Overview and Geographical Variation Characteristics

Based on the above-mentioned sample selection and variable design, the data obtained can be processed by using SPSS software to paint a broad picture of the judicial application of this crime. In the following section, we intend to analyze the data in terms of the general application and the main differences in the application of the crime among the regions, to verify the conclusions of the above-mentioned official reports and find answers to the theoretical disputes in practice.

2.1. General Overview

Here, the overall temporal and spatial distribution of judicial practice is outlined based on three main scalars: time of trial completion, geographic area of trial completion, and the number of cases, to facilitate subsequent analysis of the status of geographic differences.

2.1.1. Time of trial completion

Figure 1 clearly shows that in 2020, a total of 1,797 defendants, 84.3% of the total, were tried for the crime of aiding information network criminal activities; in 2019, only 219, 10.28% of

the total, were tried; and only 115, 5.40% of the total, were tried in the previous three years. This trend is largely consistent with the aforementioned findings reported by the Supreme Court and the Supreme Prosecutor. This trend is not surprising considering that the "Criminal Law Amendment (IX)" Act has only been in force since November 1, 2015, a relatively short period of time, and that it was treated as an act of complicity under the heavier statutory penalty when it occurred.

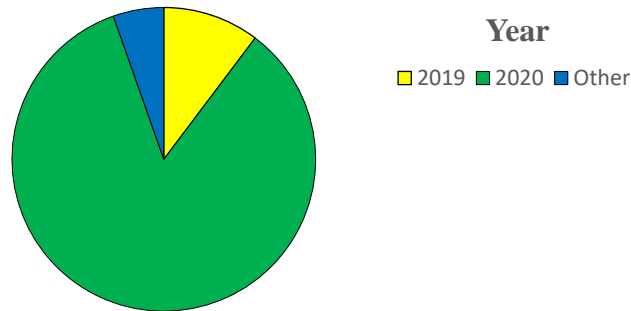


Figure 1 Statistical chart of the year of trial completion for each defendant

2.1.2. Geographic distribution of trial completion

It can be easily seen from Figure 2 that the 2,131 defendants counted in this paper were mainly tried in E and C, with a total of 1,584 defendants in both, accounting for 74.3% of all defendants. NW accounted for only 2.1% of the total number of cases, and was the region with the lowest number of cases; NE was the second, with 3.6%; followed by N with 4.8%. The total number of cases in S and SW is similar, accounting for 8.1% and 7.2% respectively. This proportional distribution is consistent with the data released by the Supreme People's Court, once again proving that crimes of aiding criminal information network activities are mainly concentrated in E and C, with more significant geographical concentration characteristics.

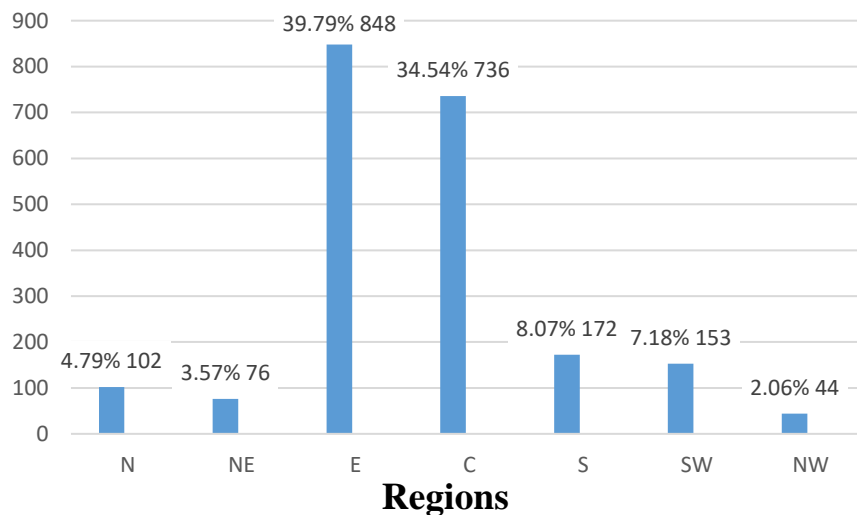


Figure 2 Statistical map of the geographical distribution of the defendants

2.2. The main characteristics in geographical differences

Several key differences in the application of this crime in practice are found through statistical analysis of the specific sentencing status, the application of sentencing circumstances, and the differences in the performance of the crime circumstances in each region.

2.2.1. Differences in sentencing situations between geographic regions

As can be seen from Table 1, in terms of the average value of free sentences, NW and N has the highest value of about 12.7 months, followed by NE with about 12.5 months, and SW has the lowest value of about 9.6 months, and the difference in its average value is more than three months, which shows that there is a large variability in free sentence disposition among regions. Similarly, the highest average value of fine sentences was in N at about RMB 21,971, followed by E, at about RMB 19,603, and the lowest in NW, at RMB 12,125, with a difference of nearly RMB 10,000. Even taking into account the fact that compared to the NW, N and E are more economically developed, and there is a tendency for their fine sentences to change according to the regional economic development, this difference is still too large. In particular, the average value of fines in the NE, which is also relatively underdeveloped, still reaches about 18,553 yuan, which is not only much higher than that in the NW but also higher than that in S and SW, which shows that there is also a large variation in the punishment of fines between regions.

Table 1 Statistics on the differences in sentencing mean values

Region	N	Minimal value	Maximum value	Average value	Standard deviation	
N	Sentence to freedom penalty	102	.0	24.0	10.480	6.2896
	Sentence to fine punishment	102	0	980000	21970.59	96687.560
NE	Sentence to freedom penalty	76	3.0	23.0	12.520	5.6707
	Sentence to fine punishment	76	1000	380000	18552.63	56037.462
E	Sentence to freedom penalty	848	.0	34.0	9.719	5.4519
	Sentence to fine punishment	848	0	650000	19602.59	42911.162
C	Sentence to freedom penalty	736	.0	36.0	9.781	5.1338
	Sentence to fine punishment	736	1000	600000	13043.81	31502.100
S	Sentence to freedom penalty	172	.0	33.0	10.680	5.0546
	Sentence to fine punishment	172	1000	60000	11566.86	11788.333
SW	Sentence to freedom penalty	153	3.0	24.0	9.552	4.2229
	Sentence to fine punishment	153	1000	200000	14728.76	25626.876
NW	Sentence to freedom penalty	44	5.0	30.0	12.659	5.1847
	Sentence to fine punishment	44	2000	150000	12125.00	22965.375

As for the differences between the types of liberal sentences applied between regions, as shown in Table 2, the highest proportion of probation was applied in SW, accounting for 37.7%, and the lowest in S, where only 9 defendants out of a total of 172 were applied to probation, accounting for 5.2%, with a difference of more than 20%, again significantly reflecting the large differences in the application of probation between regions.

Table 2 Statistical table of differences in the types of freedom penalty

Region			Frequency	Percentage
N	Effective	Not sentenced to freedom penalty	11	10.8
		Probation	15	14.7
		Detention	3	2.9
		Fixed-term imprisonment	73	71.6
		Total	102	100.0
NE	Effective	Probation	8	10.5
		Detention	7	9.2
		Fixed-term imprisonment	61	80.3
		Total	76	100.0
E	Effective	Not sentenced to freedom penalty	16	1.9
		Probation	245	28.9
		Detention	69	8.1
		Fixed-term imprisonment	518	61.1
		Total	848	100.0
C	Effective	Not sentenced to freedom penalty	17	2.3
		Probation	128	17.4
		Detention	33	4.5
		Fixed-term imprisonment	558	75.8
		Total	736	100.0
S	Effective	Probation	9	5.2
		Detention	10	5.8
		Fixed-term imprisonment	153	89.0
		Total	172	100.0
SW	Effective	Probation	57	37.3
		Detention	1	.7
		Fixed-term imprisonment	95	62.1
		Total	153	100.0
NW	Effective	Probation	6	13.6
		Detention	3	6.8
		Fixed-term imprisonment	35	79.5
		Total	44	100.0

2.2.2. Regional differences in sentencing circumstances and circumstances of the crime

Table 3 provides statistics on the application of the major sentencing circumstances of this crime in seven regions. It can be seen that in most regions, the three sentencing circumstances that account for the highest proportion are confession, guilty plea, and active return of stolen goods. This shows that these three mitigating circumstances are the high proportion of this crime in practice, the judicial authorities mainly consider the sentencing circumstances. In all regions, the highest percentage of confessions for the northwest region, accounting for 75.0%, followed by E, accounting for 74.6%; the lowest in SW, accounting for 15.7%; S second,

accounting for 30.8%. The highest percentage of guilty pleas was in NW, accounting for 88.6%, followed by SW, accounting for 84.3%; the lowest percentage was in NE, accounting for 61.8%, followed by S, accounting for 76.2%. In the positive return of stolen goods, the highest proportion of the region is C, accounting for 38.3%; followed by E, accounting for 33.7%; the least region is S, accounting for only 4.1%; NW is the second, accounting for 11.4%. Comprehensive three sentencing circumstances, the SW region in the confession and surrender of two sentencing circumstances on a more special performance, is the only surrender accounted for a higher proportion than probation, reaching 58.8% of the region. And the proportion of guilty pleas in this region is also higher, indicating that the attitude of the perpetrators in this region is more favorable than that in other regions, or the judicial authorities in this region are more lenient in determining the above-mentioned mitigating circumstances. In S, the proportion of confession, surrender, guilty plea, and active return of stolen goods is low, which indicates that the attitude of the perpetrators in this region is poorer, or the judicial organs in this region are harsher in determining the above mitigating circumstances.

Table 3 Statistical table of the differences in sentencing circumstances

Region	Types of sentencing circumstances	Frequency	Percentage
N	Confession	60	58.8
	Surrender	18	17.6
	Merit	2	2.0
	Plead guilty to a fine	80	78.4
	Actively return stolen goods	32	31.4
	Other leniencies	2	2.0
	Recidivism	5	4.9
	Other severe punishment	2	2.0
	Confession	38	50.0
NE	Surrender	14	18.4
	Merit	2	2.6
	Plead guilty to a fine	47	61.8
	Actively return stolen goods	24	31.6
	Other leniencies	3	3.9
	Recidivism	3	3.9
	Other severe punishment	3	3.9
	Confession	633	74.6
	Surrender	134	15.8
E	Merit	13	1.5
	Plead guilty to a fine	662	78.1
	Actively return stolen goods	286	33.7
	Other leniencies	18	2.1
	Recidivism	32	3.8
	Other severe punishment	18	2.1

	Confession	488	66.3
	Surrender	154	20.9
	Merit	12	1.6
C	Plead guilty to a fine	600	81.5
	Actively return stolen goods	282	38.3
	Other leniencies	3	.4
	Recidivism	18	2.4
	Other severe punishment	3	.4
	Confession	53	30.8
	Surrender	18	10.5
	Merit	3	1.7
S	Plead guilty to a fine	131	76.2
	Actively return stolen goods	7	4.1
	Other leniencies	9	5.2
	Recidivism	3	1.7
	Other severe punishment	9	5.2
	Confession	24	15.7
	Surrender	60	58.8
	Merit	7	4.6
SW	Plead guilty to a fine	129	84.3
	Actively return stolen goods	44	28.8
	Other leniencies	0	0
	Recidivism	7	4.6
	Other severe punishment	0	0
	Confession	33	75.0
	Surrender	4	9.1
	Merit	2	4.5
NW	Plead guilty to a fine	39	88.6
	Actively return stolen goods	5	11.4
	Other leniencies	0	0
	Recidivism	0	0
	Other severe punishment	0	0

Table 4 shows the regional differences in the mean values of the main crime circumstances of this crime, which can depict the differences in the severity of the crime situation between regions. First of all, from the viewpoint of the number of objects of help, the SW region has the highest mean value of the number of objects of help, which is 7.67; S region is the second-highest, which is 7.06; N region and NW region both have the lowest, which is 1.4. On the whole, the number of people helped by this crime varies greatly from region to region, among which the mean value of SW and S regions is significantly higher than other regions, while N and NW regions are significantly lower than other regions, which shows that the manifestation of the help of this crime is significantly different among regions.

Second, in terms of the payment settlement amount, the difference between regions is more obvious. Among them, the region with the largest average payment settlement amount is C with

RMB 339,301,963.62, followed by SW with RMB 173,809,661.7, while the lowest region, N has an average payment settlement amount of only RMB 627,145.08, with a difference of more than 300 million yuan. Even considering that a few cases with high payment settlement amounts raised the regional average, this difference is still too large.

Again, in the amount of illegal income, each region also showed a large variation. Among them, the E region is the highest average value of illegal income, the average value of more than 150,000 yuan; the SW region is the second, more than 148,000 yuan; the lowest average value of illegal income is NW region, the average value of only 9,500 yuan.

In general, Table 4 shows the differences in the circumstances of the crimes committed by the perpetrators in each region: SW region not only has the highest average value of the number of objects helped, but also has a higher amount of payment and settlement and the amount of illegal income, which is the most serious crime situation among all regions. In contrast, N and NW regions have lower average values of the number of targets helped and lower average values of payment and settlement amounts and illegal income amounts. In addition, the two regions are characterized by a low caseload, which means that this crime is less frequent and less serious.

Table 4 Statistical table of differences in crime circumstances

Region		Minimal value	Maximum value	Average value	Standard deviation
N	Number of people helped	1	6	1.40	1.194
	Payment settlement amount	0	13295904	627145.08	1716016.692
	Amount of illegal proceeds	0	987304	56294.50	176635.049
NE	Number of people helped	1	25	2.98	4.997
	Payment settlement amount	0	274781070	5535731.50	35470249.502
	Amount of illegal proceeds	0	3745350	102878.92	488099.253
E	Number of people helped	1	100	3.06	8.459
	Payment settlement amount	0	657256486	7239152.32	43877729.920
	Amount of illegal proceeds	0	7700000	153765.99	603007.076
C	Number of people helped	1	59	4.15	9.526
	Payment settlement amount	0	219535921972	339301963.62	8525853767.331
	Amount of illegal proceeds	0	13400000	109185.91	996834.562
S	Number of people helped	1	60	7.06	14.408
	Payment settlement amount	0	28876000000	173809661.70	2221016662.063
	Amount of illegal proceeds	200	2000000	60838.47	238854.201
SW	Number of people helped	1	300	7.67	28.710
	Payment settlement amount	0	90000000	4511258.95	15727780.811
	Amount of illegal proceeds	100	4764397	148443.96	630768.586
NW	Number of people helped	1	3	1.40	.737
	Payment settlement amount	0	4000000	714666.02	1366877.948
	Amount of illegal proceeds	600	42000	9526.19	11452.878

Table 5 shows the differences in the principal offender behavior facilitated by this crime across regions. Overall, Internet fraud is the most predominant type of principal offender behavior facilitated by this crime, with Internet gambling coming in second and other types of

principal offender behavior accounting for a lower percentage. Specifically, the highest percentage of Internet fraud was in NW and NE, both of which exceeded 80%, showing significant differences from other regions, especially in NW, where all of the principal offenders explicitly mentioned in the verdicts were Internet fraud; while E had the lowest percentage, 62.6%, but the difference is not significant compared to other regions.

Table 5 Statistical table of the differences in the types of principal offender behaviors

Region		Frequency	Percentage	Cumulative percentage	
N	Effective	Not mentioned	11	10.8	10.8
		Internet fraud	66	64.7	75.5
		Internet gambling	21	20.6	96.1
		Dissemination of obscene and pornographic information	1	1.0	97.1
		Damage to computer information system	3	2.9	100.0
		Total	102	100.0	
		NE	Effective	Not mentioned	2
Internet fraud	61			80.3	82.9
Internet gambling	8			10.5	93.4
Infringement of citizens' information	1			1.3	94.7
Damage to computer information system	2			2.6	97.4
Other crimes and violations using the network	2			2.6	100.0
Total	76			100.0	
E	Effective	Not mentioned	92	10.8	10.8
		Internet fraud	531	62.6	73.5
		Internet gambling	109	12.9	86.3
		Infringement of citizens' information	17	2.0	88.3
		Dissemination of obscene and pornographic information	30	3.5	91.9
		Damage to computer information system	19	2.2	94.1
		Other crimes and violations using the network	50	5.9	100.0
C	Effective	Total	848	100.0	
		Not mentioned	102	13.9	13.9
		Internet fraud	500	67.9	81.8
		Internet gambling	89	12.1	93.9
		Dissemination of obscene and pornographic information	18	2.4	96.3
		Damage to computer information system	1	.1	96.5

		Other crimes and violations using the network	26	3.5	100.0
		Total	736	100.0	
		Not mentioned	12	7.0	7.0
		Internet fraud	111	64.5	71.5
		Internet gambling	30	17.4	89.0
		Infringement of citizens' information	2	1.2	90.1
S	Effective	Dissemination of obscene and pornographic information	13	7.6	97.7
		Other crimes and violations using the network	4	2.3	100.0
		Total	172	100.0	
		Not mentioned	16	10.5	10.5
		Internet fraud	101	66.0	76.5
		Internet gambling	24	15.7	92.2
		Dissemination of obscene and pornographic information	2	1.3	93.5
SW	Effective	Damage to computer information system	3	2.0	95.4
		Other crimes and violations using the network	7	4.6	100.0
		Total	153	100.0	
		Not mentioned	8	18.2	18.2
NW	Effective	Internet fraud	36	81.8	100.0
		Total	44	100.0	

Table 6 shows the differences in the types of conduct aided by this crime across regions. Similar to the aforementioned fraudulent acts, payment settlement acts also dominate all regions, followed by technical support acts, and advertising promotion is a lesser type of act. Specifically, the highest percentage of payment settlement type is in C, which is consistent with its high average value of payment settlement amount; the percentage of technical support acts exceeds that of payment settlement acts in S and SW regions, with SW region S and SW regions, have a higher share of technical support than payment settlement, with SW region having the highest share of technical support and the lowest share of payment settlement.

Table 6 Statistical table of differences in types of aiding behaviors

Region		Frequency	Percentage	Cumulative percentage
		Technical support	25	24.5
		Advertising promotion	8	7.8
N	Effective	Payment settlement	63	61.8
		Other aiding behaviors	6	5.9
				100.0

		Total	102	100.0	
		Technical support	19	25.0	25.0
		Advertising	5	6.6	31.6
NE	Effective	promotion			
		Payment settlement	52	68.4	100.0
		Total	76	100.0	
		Technical support	221	26.1	26.1
		Advertising	64	7.5	33.6
		promotion			
E	Effective	Payment settlement	509	60.0	93.6
		Other aiding	54	6.4	100.0
		behaviors			
		Total	848	100.0	
		Technical support	138	18.8	18.8
		Advertising	26	3.5	22.3
		promotion			
C	Effective	Payment settlement	542	73.6	95.9
		Other aiding	30	4.1	100.0
		behaviors			
		Total	736	100.0	
		Technical support	79	45.9	45.9
		Advertising	12	7.0	52.9
		promotion			
S	Effective	Payment settlement	73	42.4	95.3
		Other aiding	8	4.7	100.0
		behaviors			
		Total	172	100.0	
		Technical support	72	47.1	47.1
		Advertising	20	13.1	60.1
		promotion			
SW	Effective	Payment settlement	61	39.9	100.0
		Total	153	100.0	
		Technical support	6	13.6	13.6
		Advertising	6	13.6	27.3
		promotion			
NW	Effective	Payment settlement	27	61.4	88.6
		Other aiding	5	11.4	100.0
		behaviors			
		Total	44	100.0	

2.2.3 Analysis of the effect of geographic regions sentencing circumstances and crime circumstances on sentencing

Table 7 and Table 8 analyze the effects of sentencing and offense circumstances on the sentencing of the two types of penalties in each region by linear regression using the aforementioned sentencing and offence circumstances as independent variables and the freedom penalty and fine punishment as dependent variables, respectively (due to space

limitations, variables that are not significant, i.e., sig. > 0.05, are excluded from both tables, and only significant factors other than constants are retained). In addition, due to the small sample size in NW, the variables in this study are not statistically significant in this region, while in N the only significant factor is the number of illegal proceeds in Table 7 and Table 8 analyze the effects of sentencing and offense circumstances on the sentencing of the two types of penalties in each region by linear regression using the aforementioned sentencing and offense circumstances as independent variables and the freedom penalty and fine punishment as dependent variables, respectively (due to space limitations, variables that are not significant, i.e., sig. > 0.05, are excluded from both tables, and only significant factors other than constants are retained). In addition, due to the small sample size in NW, the variables in this study are not statistically significant in this region, while in N the only significant factor is the number of illegal proceeds in the fine punishment.

Table 7 shows that, among the five regions with significant factors, the E region has the most significant factors in imposing the freedom penalty. This includes payment settlement amount, amount of illegal proceeds, whether it constitutes surrender, and whether it constitutes recidivism, all of which have a significant effect on the imposition of freedom penalty; C follows, except for the number of illegal proceeds and whether it constitutes Recidivism, which also has a significant effect in this region. In C, except for the number of illegal proceeds and whether it constitutes recidivism, whether to actively return stolen goods also has a significant impact on the freedom penalty in this region. On the whole, the number of illegal proceeds and whether it constitutes surrender are the most influential factors in determining freedom penalty in most districts, while payment settlement amount and whether it constitutes plead guilty to a fine, actively return stolen goods, and recidivism are the most influential factors in determining freedom penalty in most districts. On the whole, the number of illegal proceeds and whether it constitutes Surrender are the most influential factors in determining liberty sentences in most districts, while payment settlement amount and whether it constitutes plead guilty to a fine, actively return stolen goods, and recidivism are the most influential factors in determining liberty sentences in most districts. The payment settlement amount and whether it constitutes plead guilty to a fine, actively return stolen goods, and recidivism are the elements that have a significant effect in a few areas, while the number of people helped, confession, and both elements do not have a significant effect in all areas. Although there is also no significant effect of merit, the conclusion is not representative because the sample size of the existence of merit circumstances is too small.

Table 7 Statistical table of the differences in sentencing and crime circumstances on the disposition of freedom penalty

Region	Model		Non-standardized coefficient		t	Sig.
			B	Standard Error		
N	1	No significant factors				
		Plead guilty to a fine	-4.189	1.642	-2.550	.016
NE	1	Actively return stolen goods	-8.365	1.451	-5.763	.000
		Payment settlement amount	3.204E-008	.000	6.343	.000
E	1	Amount of illegal proceeds	8.936E-007	.000	2.040	.042
		Surrender	-2.843	.930	-3.057	.002
		Recidivism	3.311	1.195	2.771	.006
		Amount of illegal proceeds	6.581E-006	.000	2.187	.029
C	1	Actively return stolen goods	-1.967	.530	-3.715	.000
		Recidivism	3.524	1.490	2.365	.019
S	1	Surrender	-3.793	1.569	-2.417	.019
		Amount of illegal proceeds	2.281E-006	.000	5.019	.000
SW	1	Surrender	-3.990	2.002	-1.993	.050
NW	1	No significant factors				

Table 8 shows that E and SW regions have the most significant factors in influencing fine punishment. Among them, the number of people helped, payment settlement amount, amount of illegal proceeds, and recidivism are the factors that have a significant influence on the imposition of fine punishment in E. While SW has the same number of people helped and amount of illegal proceeds as E. In the SW region, except for the number of people helped and the amount of illegal proceeds, whether the perpetrator constitutes plead guilty to a fine and actively return stolen goods are the factors that have a significant impact on the fine punishment in the region. The regression coefficients of amounts of illegal proceeds (i.e., B) are the same as those of E. The regression coefficient (i.e., B-value) of the number of illegal proceeds in each region shows that N is the region with the largest increase of amounts of illegal proceeds, while E is the region with the smallest increase of amounts of illegal proceeds, which shows that although amounts of illegal proceeds are considered in different regions, the effect of amounts of illegal proceeds is the same. It can be seen that although the amounts of illegal proceeds are considered in different regions, there are also some differences in their effects.

In addition, there are some problems with some of the data in Table 8, such as the negative correlation between recidivism and fine punishment in E and the negative correlation between the number of people helped and fine punishment in SW. If we exclude the possibility that there are problems in the construction of the model and the statistics of the variables in this study, there are some problems in the determination of sentencing circumstances and fine punishment in the above two regions.

Table 8 Statistical table of the differences in sentencing and crime circumstances on the imposition of fine punishment

Region	Model		Non-standardized coefficient		t	Sig.
			B	Standard Error		
N	1	Amount of illegal proceeds	.460	.092	5.024	.000
		Payment settlement amount	.000	.000	15.510	.000
NE	1	Amount of illegal proceeds	.303	.008	36.162	.000
		Plead guilty to a fine	-5475.631	2398.048	-2.283	.030
		Number of people helped	589.948	193.912	3.042	.002
E	1	Payment settlement amount	.000	.000	10.913	.000
		Amount of illegal proceeds	.038	.004	10.601	.000
		Recidivism	-20299.018	9724.932	-2.087	.037
C	1	Payment settlement amount	5.506E-005	.000	2.840	.005
		Amount of illegal proceeds	.103	.012	8.524	.000
S	1	Plead guilty to a fine	-8159.235	2733.387	-2.985	.003
		Recidivism	19822.881	8032.609	2.468	.017
SW	1	Number of people helped	-431.772	152.351	-2.834	.006
		Amount of illegal proceeds	.041	.001	31.641	.000
		Plead guilty to a fine	5556.983	2788.103	1.993	.050
NW	1	Actively return stolen goods	10424.422	2179.923	4.782	.000
		No significant factors				

3. The main problems of geographical differences and suggestions for improvement

The comprehensive data above shows that the geographical differences of this crime are mainly manifested in the following aspects:

Firstly, there are large differences in the judging amount of penalty between regions. In terms of the freedom penalty, the average value of the freedom penalty imposed in all three northern regions is above 10 months. Among them, especially NE and N regions, the average value of imposed freedom penalty is higher than 12 months, which is significantly higher than other regions and is the region with heavier freedom penalties. In terms of specific types of freedom penalty, the percentage of probation imposed in the S region is significantly lower than that of other regions, but the three northern regions are still the regions with the lowest percentage of probation imposed right behind them, with the percentage of all three being below 15%, which differs greatly from C, E, and SW regions. Thus, from the perspective of free sentences, the NW, NE, and N regions, in general, have heavier penalties, and the S region not only has a higher average value of freedom penalty than the N region, but also has the lowest proportion of probation, and is also a region with heavier penalties; while C, E, and SW are less punitive.

And from the perspective of fine punishment, the mean values in N E, and NE are significantly higher than other regions, and the mean value in S is the lowest, but the difference is not significant compared with other regions. In General, the imposition of fine punishment should be influenced by the differences in crime circumstances and economic development, and income levels in each region. However, except for the E region, the N and NE regions have relatively more moderate crime circumstances, but their mean values of fine punishment are still higher.

Secondly, the crime situation varies greatly from region to region; SW has the most severe crime situation, and S has the most severe penalties overall, with a higher number of people helped and a higher payment settlement amount. Although the average proceeds of crime are low, the overall crime situation is second only to SW in terms of severity. N and NW regions are more moderate, not only the number of cases is lower, the overall crime situation is lighter, and the positive offence behavior is mostly fraud, and the type of behavior is mostly payment settlement behavior, and the overall reflects the characteristics of single crime behavior. NE region number of people helped and the payment settlement amount is in the lower position, and the average value of illegal income is in the middle of the water, which shows that the crime situation in this region is generally lighter than in other regions. E and C regions, as the regions with the most concentrated case volume, also have certain characteristics of the crime situation they face: although the number of people helped and the average payment settlement amount in the E region are in the middle stage of each region, its average illegal E has the highest average illegal income. In addition to the higher level of economic development and higher

average income in this region, it may also be because the perpetrators in this region tend to show the characteristics of committing crimes in pursuit of economic benefits. At the same time, the region also shows the lowest proportion of fraud among the types of the principal offender, a higher degree of diversification of the types of the principal offender, and a relatively high proportion and the largest absolute number of technological support behaviors, indicating that the criminal behavior in this region is more variable. In C, the average value of payment settlement amount is significantly higher than other regions, and the proportion of payment settlement behavior is also significantly higher than other regions, which indicates that this region is the most serious in terms of the situation of "two-card"²⁵ type help information network crime.

Thus, the overall crime situation in the northern region, including NW, N NE, is more moderate and less serious; E and C in the central region not only have a large number of cases but also have significant characteristics of the crime situation, which should be considered from the perspective of criminal policy. From the perspective of criminal policy should be targeted to consider; SW, S, two regions of the overall crime situation is more severe and reflects the characteristics of technological support behavior. In general, this crime in practice generally shows the characteristics of the crime from north to south, the crime is gradually serious, the type of criminal behavior is gradually diversified, and the proportion of technological support behavior is gradually increased.

Thirdly, there are some variabilities in the determination of sentencing circumstances and circumstances of the offence from region to region. As mentioned earlier, not only did the proportion of specific sentencing circumstances identified differ somewhat from region to region, but the effect of various sentencing circumstances on the imposition of freedom penalty and fine punishment also differed significantly from region to region. In general, the proportion of surrender was higher in SW, and this circumstance had a significant effect on the determination of freedom penalty in this region, which shows that this region is more lenient in the determination of freedom penalty. In S, not only was the overall sentencing circumstance more severe but also the only sentencing circumstance that had a significant effect on the

²⁵ The so-called "two-card" type of aiding information network crime refers to the helping behavior of using one's information to handle on behalf of the perpetrator, or selling to him or her the telephone card, bank card, company account, etc. handled by himself or herself or others with real information. See, Huang Cheng and Kong Yao, "Personal Information Infringement and Regulation in the Chain of Telecommunication Network Fraud "Black Industry"--The Helpful Acts of "Two Cards" Crime", in Taiyuan City Vocational College Journal, 2021. *Journal of Taiyuan City Vocational College*, No. 7, 2021

freedom penalty was surrender. In addition, there were only 18 cases of surrender in this region, so it can be considered that this region is more stringent in terms of the leniency of sentencing.

The above geographical difference characteristics are not only the different performance of the crime of aiding information network criminal activities between the various regions but also from the side to reflect current China's network crime in the formation of significant differences between the regions. Its overall presents the Internet fraud crime and related crimes occupy the main position of network crime; the number of cases is concentrated in central E, C region; the crime situation presents the characteristics of lighter in the north and heavier in the south; the means of crime are more single in the north, more complex in the central and southern regions; the overall heavier sentences in the north and central and southern regions as a whole lighter, but S region exception of the significant features. This trend is consistent with the current trend that the development of China's overall network technology and environment in the north are more backward than that in the south, and also reflects the characteristics of the crime situation in the SW and S regions based on the prevalence of cross-border cybercrime, which leads to the crime of aiding information network criminal activities heavier than that in the north. However, this overall trend reflects an important issue: there is a contradiction between the current penalties imposed in each region and the crime situation they face. In general, from the perspective of criminal policy, regions with more severe crime situations should have harsher sentences. N NE, and NW regions face a more moderate crime situation, but their freedom penalties are the heaviest, and the average value of fine punishment in N and NE regions are also at the top, which shows that the above three regions are suspected of having heavier penalties.

The crime situation in E and C has its characteristics, among which the E region reflects the higher average value of fine punishment imposed according to the crime situation of the higher average value of illegal income in the region. It can be said that this is to some extent a combination of punishment and crime situation, while the C region does not show the correlation between its sentence and the crime situation of "two-card crimes" in the region. The SW and S regions, where the crime situation is most severe, show opposite characteristics in terms of sentencing. The SW region has the most lenient sentences overall, while the S region has the most severe sentences.

This problem may arise from the differences in the identification and application of specific sentencing circumstances by the judicial authorities in each region. Although sentencing sentences in each region are generally influenced by the more central element of the number of illegal proceeds in the circumstances of the crime. However, as the aforementioned

data show, except for surrender, other leniency sentencing circumstances, especially confession and plead guilty to a fine, which occupy the highest proportion overall, do not have a significant effect on the freedom penalty and fine punishment in practice. In addition, whether or not to actively return the stolen money is also an important factor in examining whether the perpetrator substantially confesses and repents, and should be a discretionary sentencing circumstance that plays an important role in the sentencing process of this crime. The fact that this circumstance only has a significant effect on the sentencing of the freedom penalty in C and fine punishment in SW indicates that there are problems in the application of this circumstance in each region. In addition, the data alone do not reveal the relationship between the sentencing circumstances and offence circumstances that have a significant impact on sentencing in each region and the specific crime situation in that region. For example, in the C region, which is characterized by a high concentration of "two-card" crimes, the payment settlement amount does not have a significant impact on the discretionary sentences; in the SW and S regions, where technological support behaviors are high, the number of people in the region does not have a significant impact on the sentences. In SW and S, where technological support behavior is high, the number of people helped only had an effective impact on the determination of fines in SW. Therefore, to solve this problem, each region must introduce appropriate criminal policies to regulate this crime according to its specific crime situation.

Specifically, this paper puts forward the following recommendations in response to the above issues:

First, the three northern regions should moderately relax the application of probation for this crime. Since the overall number of cases in the three northern regions is relatively small and the crime situation is not severe, but the penalties in the region are significantly heavier, moderately relaxing the application of probation to perpetrators in the region can help achieve balanced sentencing between regions.

Second, C should focus on combating the "two-cards" type of assistance, not only in the sentencing process to consider the payment settlement amount as a sentencing circumstance, but also strengthen the standardized management of bank cards, telephone cards, and other common tools of such crimes, to combat the high incidence of "two cards" crime in the region.

Third, E, SW, and S should focus on preventing and combating the technical support type of help. The number of people helped, which has a strong correlation with technical support behaviors²⁶. Therefore, by strictly dealing with technical support behaviors that help a large

²⁶ Most scholars believe that the harm of technical support is mainly reflected in the characteristic of "one-to-many" help, and the number of helpers is a visual indication of this characteristic. See Hu Yunteng, "Theoretical

number of positive offenders, it is an effective way to suppress the crime situation in the above-mentioned regions where technical support-type help behaviors account for a high percentage.

Fourth, the SW region should increase the penalties for this crime moderately. As mentioned above, compared with S, where the crime situation is more serious, the penalty in the SW is too light to achieve the effect of preventing this crime utilizing punishment. Therefore, the region should moderately increase the punishment for this crime, such as reducing the proportion of probation and moderately increasing the amount of fine punishment, so that the average value of sentencing in the region is not significantly lighter, which will help to achieve balanced sentencing between regions and also help to control the more serious crime situation in the region.

4. Conclusions

Based on the above study, the crime of aiding information network criminal activities reflects the characteristics of significant regional differences, as well as the trend of progressively severe crime situations from north to south, and progressively diverse types of behavior. At the same time, it also shows the main problems in the application of sentencing circumstances and discretionary penalties in each region, i.e., the existence of incongruity between penalties and regional crime situations, and gives relevant criminal policy recommendations accordingly.

However, it should be noted that this paper is still slightly inadequate in the depth and breadth of data mining, especially in the specific application of sentencing circumstances. The relevance of the data and conclusions, and the rationality of the mathematical model used are worthy of deeper exploration. At the same time, issues such as the main influencing factors of sentencing probation around the world and the effect of the type of principal offender behavior on the penalty still need further research and discussion.

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