DOI: 10.38146/BSZ-AJIA.2026.v74.i5.pp1421-1443

Crime analysis in the middle of Europe: methods and techniques in practice

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Abstract

Aim: The foundations of criminal analysis in Hungary were laid in the 1990s, based on international standards and recommendations. The emergence of transnational crime has necessitated the implementation of a unified approach to criminal analysis globally. This article presents these methods to highlight both the similarities and differences between national and international practices.
Methodology: The study presents the methods and techniques currently applied in domestic criminal analysis and provides an overview of the information obtained through international police cooperation relevant to the field.
Findings: The analytical methods used in Hungary and neighboring countries largely adhere to the recommendations issued in the 1990s. However, in the era of „Big Data,' all examined police agencies utilize advanced visualization tools to process the increasing volume of data, significantly facilitating the presentation of analytical results.
Value: Presenting domestic and international criminal analysis methods and tools may contribute to the potential re-evaluation of national analytical practices. The comparative approach allows for assessing the applicability of techniques used by criminal analysts in neighboring countries to the Hungarian context.

Keywords: criminal analysis, analytical methods, analytical techniques, big data

English-language republication. The Hungarian version of this article was published in Belügyi Szemle 2026, issue 5. DOI link: https://doi.org/10.38146/BSZ-AJIA.2026.v74.i5.pp1381-1404

Introduction

The pivotal role of crime analysis in investigations has now become evident to police personnel dealing with the detection and processing of criminal cases. Unlike past practices, when investigators marked relevant locations on maps with pushpins, today, an increasing variety of software solutions are available to carry out these tasks more efficiently. Based on practical experience, Hungarian professionals working in criminal analysis face further challenges related to the phenomenon of Big Data. Both information overload and the lack of information pose serious difficulties. In the era of transnational crime, there is an essential need to incorporate the crime analysis methods and techniques used by the police into a unified, regulated framework.

Regardless of whether regulations are implemented on a national or international level, uniformity, purpose-orientation, and evidence-based analytical activities are essential requirements for all law enforcement agencies. In this study, I aimed to explore the methods and tools used by criminal analysis professionals in Hungary and in neighboring Central European countries – specifically Austria, the Czech Republic, and Slovakia.

Relevance and Historical Background

Nothing highlights the relevance of crime analysis better than the fact that, in recent years, numerous domestic articles have addressed both its current state and future challenges. Among the researchers who regularly publish on this topic are Ágota Németh, Szabolcs Mátyás, Klaudia Lohner, and Endre Nyitrai. Me too, have contributed tot he field as an analyst (Bánáti-Nagy-Németh, 2022). The textbook „Crime Analysis in Modern Law Enforcement' by retired pol. Col. László Istvanovszki (Istvanovszki, 2012) is considered a comprehensive work in Hungarian law enforcement education. Given the growing importance of AI in policing, more scholarly articles are expected to be published in the near future, especially considering the significant support AI can offer to practitioners in criminal analysis.

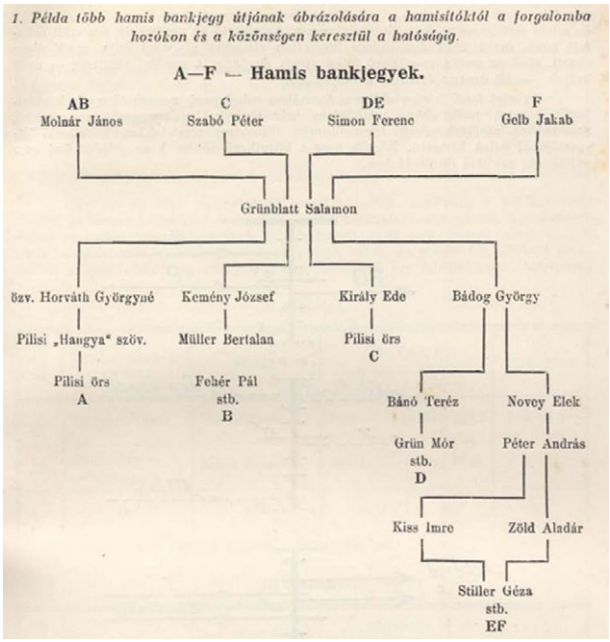
In Hungary, crime analysis in its classical sense appeared in the early 1990s, partly due to the first Interpol (International Criminal Police Organization) Crime Analysis Conference and partly as a result of Hungary's post-regime change European orientation efforts. At an international conference held in the Netherlands, twelve Interpol member countries adopted the definitions and classifications presented by Paul Minnebo of the Dutch police. Member countries

attending the conference on September 12-13, 1995, also accepted these recommendations. Thus, at the 2nd Crime Analysis Conference (September 16-17, 1997), it became standard for all 128 delegates from 48 countries to use this unified terminology in their presentations (Kunos, 1997).

Hungarian police Colonel Imre Kunos's study trips to the Netherlands and Belgium, along with the establishment of the first organized crime-fighting unit within the Hungarian police, played a significant role in developing national crime analysis. Consequently, following Interpol's recommendation, the national criminal analysis network was established, along with the human and technical infrastructure and organizational and legal frameworks. Within the Hungarian police forces, a dual development trajectory emerged. New organizational units were created on national, county, and local levels (in the form of departments and sub-departments) in the fight against organized crime. Based on foreign experience, information-processing and analytical units were established as early as the early 1990s.

Parallel to this, the Criminal Information Department was created in 1991 under the Criminal Directorate of the National Police Headquarters (ORFK), with a dual function: to develop a data processing background for modern criminal activities and to provide analytical support for high-profile criminal cases. In summary, Hungary, like most European countries, gradually replaced or supplemented earlier criminal data processing activities with structured crime analysis methods and systems (Boda, 2019). It is worth noting that Hungarian crime analysis was not solely based on foreign influence. Even decades earlier, references to analytical activities were evident in both theoretical and practical training in criminal work. For example, the instructional manual issued for the gendarmerie by the Royal Hungarian Minister of the Interior (Decree No. 50.609/eln.VI-C.1936) used flow charts to depict a series of counterfeiting cases. The authors noted that the manual „serves the purpose of orientation during investigations but can also be attached to reports to assist prosecutors and judges' (Ridegh-Olchváry, 1936).

Figure 1
Flow diagram from the referenced manual



Note. Ridegh, & Olchváry-Milvius, 1936).

As shown above, by the end of the decade following the political transition, Hungary had established crime analysis organizational systems not only within the police but also in other law enforcement and national security bodies. At the county level, evaluation-analytical departments were established, while other specialized bodies (e.g., intelligence departments) formed analytical sub-units. Around the turn of the millennium, the reorganization of the Criminal Identification Service (KASZ) of the ORFK led to the creation of the Directorate for Analysis and Coordination (EKI), which included data processing and analytical-coordination divisions. The current structure of police units involved in crime analysis follows the principles set out in the effective Crime Analysis Regulation. The national supervisory body for crime analysis is the Crime Analysis and Evaluation Division of the ORFK Criminal Directorate, operating with nationwide jurisdiction.

Definitions and Regulation

In searching for a universally accepted definition of crime analysis, one finds a significant contrast between the concise wording used by Interpol and the more elaborate descriptions found in textbooks written for crime analysis professionals in the United States. According to one such definition, crime analysis is „the systematic study of crime and disorder problems, as well as other police-related issues – including sociodemographic, spatial, and temporal factors – that assist the police in apprehending criminals, reducing crime and disorder, preventing crime, and evaluating organizational procedures' (Santos, 2017). Regardless of which specific definition is adopted, the common objective remains the extraction of the highest possible amount of structured, crime-relevant information from datasets collected from various sources, mapping out relationships, and preparing decision-making support.

In Hungary, the legal regulation of crime analysis is applied nationwide. The earlier regulation was Decree 13/2001 (X.2.) of the National Police Headquarters (ORFK), which detailed the Crime Analysis Regulations of the Hungarian Republic Police. Even though this regulation is no longer in effect, its mention remains essential, as it not only incorporated the methodological principles recorded in Interpol's 1992 Hague-issued *Crime Analysis Manual* but also included domestic provisions for criminal data handling and processing and their governing legal and organizational frameworks. The currently effective regulation is the ORFK Instruction 23/2018 (VI.21.), hereinafter referred to as the „Regulation,' last amended in June 2025. The latest amendment, Decree 6/2025 (III.7.), published in Issue 13 of the 2025 Official Bulletin, supplemented the Regulation with several new definitions and modified training-related provisions for crime analysts. It is essential to note that the current Regulation adopts the definitions, analytical process types, data categories, and database classifications included in the 2014 „White Paper' issued by the International Association of Crime Analysts (IACA) titled „Definition and Types of Criminal Analysis' (Németh, 2023). According to the first section of the Regulation, its scope covers the entire personnel of the Police. Chapter I provides key definitions, while Chapter II outlines the fundamental principles of crime analysis. In the subsequent chapters, the legislator defined in detail the framework of analytical activities, listed specific analyst tasks, and enumerated the duties of the unit heads. In addition to laying down fundamental principles, the Regulation also formulates detailed rules concerning individual and team-based criminal analysis. The text further elaborates on the general framework of crime analysis activities, including associated educational practices. The following sections of the Regulation, which will be examined in detail,

concern the methods and techniques of crime analysis as well as its underlying principles. As previously mentioned, Chapter II presents the foundational principles of crime analysis. These principles align with both internationally established theoretical frameworks and the analytical practices of European member states. Although the foreign police bodies I contacted did not disclose the detailed regulations of their crime analysis practices, I assume substantial similarities exist between national and international procedures. This assumption is supported by the foundational principles articulated at crime analysis conferences and by the harmonization obligations imposed by European Union law.

The Regulation outlines the following principles of crime analysis:

a) *Purpose-orientation:* Crime analysis must be conducted and requested based on clearly defined questions aimed at achieving the specific objectives of the analysis.

b) *Continuity:* Crime analysis is a continuously performed activity involving sequential, logically structured phases that apply various crime analysis techniques to achieve the stated objectives.

c) *Cyclicality:* Crime analysis is a recurring sequence of actions ranging from task definition to goal achievement. These actions include defining tasks, data collection, data evaluation, data organization, analysis, and documenting the results.

d) *Objectivity*: Crime analysis tasks must be executed objectively, free from external influences, by thoroughly processing all available information.

e) *Data and information dependency*: The conclusions drawn during analysis must always be supported by the processed data and information.

f) *Flexibility and innovation*: Analysts are free to choose and combine crime analysis techniques and methods based on available data, using them individually or in combination as appropriate to the analysis.[1]

Methods and Techniques

Both domestic and international police crime analysts agree that crime analysis is the identification, recognition, and evaluation of relationships between criminal and other potentially relevant data to support effective law enforcement (Kunos, 1997b). As stipulated in the Regulation, the methods and techniques used in crime analysis can be freely selected and combined. To properly examine this topic, we must first define the terms „method' and „technique' as they

1 ORFK Decree 23/2018 (VI.21.), Chapter II.

relate to crime analysis. The Regulation serves as our reference for these definitions. It is worth noting that the *Law Enforcement Science Encyclopedia* contains no entries for the terms „crime analysis method' or „crime analysis technique.'

The guiding definition used in current Hungarian police crime analysis, according to the Regulation, describes *crime analysis as the quantitative and qualitative examination of criminal and law enforcement data and information, the determination and evaluation of relationships between them, to identify the extent, dynamics, and structure of crime overall or specific crimes, their long-term patterns and trends, to support investigations, to identify and apprehend perpetrators, prevent crimes, and inform related leadership decisions.*[2] Regarding types of crime analysis, the previously applied four-part classification remains valid – as seen in both the Interpol *Crime Analyst Handbook* and the 13/2001 ORFK Decree – and continues to be applicable today. According to this classification, crime analysis may be: a) *administrative,* b*) strategic,* c) *tactical,* or d) *investigative support* crime analysis.

Based on the Regulation, these types are defined as follows:

a) *Administrative crime analysis*: Conducted to meet the administrative needs of the police, this form supports managerial decisions related to the planning and allocation of resources, tools, methods, and budget.

n) *Strategic crime analysis*: Involves applying specific analytical methods to identify the extent, dynamics, and structure of crime, and the long-term patterns and trends of certain crime types.

o) *Tactical crime analysis*: Focuses on short-term crime developments based on police data, supports effective deployment of public safety and investigative resources, and informs decision-making, mainly at the local level.

k) *Investigative support crime analysis*: Examines data obtained during criminal procedures and covert intelligence gathering, aiding in identifying unknown perpetrators, planning investigative actions, recognizing relationships between individuals and related entities, uncovering organized criminal groups and their activities, and supporting enforcement strategies against these groups.[3]

The type of crime analysis that supports crime detection and evidence collection is the investigative support crime analysis. In this paper, I sought to answer the question of how much Hungarian practice is similar or different from the practice used by police units in neighboring countries, so I focused on this type of analysis in the following.

2 ORFK Decree 23/2018 (VI.21.), Chapter I, paragraph 2, point p).
3 ORFK Decree 23/2018 (VI.21.), Chapter I, paragraph 2.

But what exactly are „methods' and „techniques'? The Regulation provides clear definitions in sections e) and f). A *crime analysis technique* is a graphical representation method used to illustrate relationships and connections between individuals, events, and other informational entities. (Note: internationally standardized symbol systems have been developed for such techniques.) Meanwhile, a *crime analysis method* encompasses the consistent and sequential application of these techniques, in alignment with the principles of crime analysis, to achieve a desired outcome. According to the Hungarian classification, investigative support crime analysis techniques fall into two categories: a) *statistical representation techniques*, b) *operational representation techniques*. Statistical representation techniques include statistical tables, charts, point and density maps, heat maps, and organizational charts. Operational techniques include criminalistic tables, relationship matrices, link charts, flowcharts, event diagrams, process maps, event maps, timelines, images, and video recordings. (Given the rapid pace of technological advancement, this list is not exhaustive.) In domestic practice, investigative support analysis focuses on information from criminal intelligence and data from specific crimes, helping to reconstruct historical facts, identify unknown perpetrators, plan investigative actions, prove guilt, and combat criminal individuals or groups (Németh, 2023b).

Statistical and Operational Crime Analysis

Statistical Crime Analysis

The table presents the classification of the crime analysis system developed based on the proposal of Paul Minnebo, mentioned in the introduction, as well as a refined version of the UN classification. (Kunos, 1997; UNODC, 2011.) It should also be noted here that the division of analytical areas is not a finalized process, and the classification systems used in continental Europe and the United Kingdom are not entirely identical. The debate on this matter is still ongoing, and the emergence of new analytical categories can also be expected.

Table 1
Types of criminal analysis

Statistically based (strategic/tactical)	**Operational / case-related** (investigation support)
Crime pattern analysis	*Case analysis*
Trendanalysis	*Comparative case analysis*
General profile analysis	*Offender group analysis*
Reconnaissance method's analysis	*Invenstigation analysis*
Criminal situation assessment	*Special Investig. Supp. and Behavioral Analysis*
Threat assessment	*Communication analysis*
Risk analysis	*Social network analysis*
	Financial transaction analysis

Note. Author's own editing based on ORFK Decree 23/2018 (VI.21.).

Although this paper focuses primarily on investigative (operational) crime analysis, it is essential to clarify the core elements of statistical crime analysis to ensure a comprehensive understanding. The Regulation discusses the conceptual components of statistical analysis under the headings of administrative, strategic, and tactical crime analysis. In domestic law enforcement and justice sectors, the outcomes of statistical analysis are typically used by ministries and judicial bodies to plan resource needs, while investigative authorities rely on them to measure and forecast changes in the quantity and quality of crime.

Main areas of statistical crime analysis include:

- Analyzing data on known criminal offenses,
- Analyzing data on victims and perpetrators,
- Analyzing data on law enforcement performance,
- Evaluating police resource use and its effectiveness,
- Assessing self-evaluation and control reports.

Primary recipients of statistical crime analysis:

- Ministry of Interior, Ministry of Justice, Courts, Prosecution Administration,
- National Tax and Customs Administration, Central Statistical Office,
- Senior and mid-level police leadership,
- National Institute of Criminology, National Expert and Research Centre,
- Educational institutions for law enforcement and justice.

Investigative Support (Operational) Crime Analysis

Investigative support crime analysis is a form of activity that focuses on examining data obtained during criminal proceedings, covert intelligence gathering,

and the use of undercover methods. It supports the identification of unknown perpetrators, the planning of investigative actions, the recognition of relationships among individuals and connected entities, the detection of organized criminal groups and their activities, and the formulation of enforcement strategies against such groups.

Forms of investigative support (operational) analysis include (but are not limited to):

- Case analysis,
- Comparative case analysis,
- Offender group analysis,
- Special investigative support and behavioral analysis (SNYV),
- Communication analysis,
- Social network analysis,
- Financial transaction analysis,
- Facial image analysis.

Case analysis involves reconstructing the commission process of a specific crime, understanding the roles of those involved, identifying proposed directions for further investigation, and supporting evidence collection. *Comparative case analysis* seeks to determine whether crimes under review may be linked to the same perpetrator(s) as part of a series. *Offender group analysis* organizes information about criminal groups to clarify their structure, activity, and internal roles. A new dimension of crime analysis is the *Special Investigative Support and Behavioral Analysis* (SNYV), a complex analytical-interpretive activity based on behavioral science methods. It integrates disciplines such as linguistics, psychology, psychiatry, criminology, sociology, statistics, geography, and body language analysis. SNYV is conducted by a special unit of the Crime Analysis and Evaluation Division of the ORFK Criminal Directorate, established in 2021. Beyond investigative support, its functions include specialized profiling, interrogation strategy consulting, and victimology assessments.[4] By analyzing financial data, communication links, and constructing social networks, crime analysts can map relationships among suspects and associates. This has led to the development of network analysis in criminal work, which involves analyzing relationships between crime-relevant entities and individuals, identifying distances, frequencies, and nodes, while filtering irrelevant or misleading elements.

Another modern aspect of crime analysis is *facial recognition*, a component of biometric identification. One major advantage is that facial images can be

4 ORFK Decree 23/2018 (VI.21.), Chapter I, paragraph 2, point p).

captured remotely, without knowing the identity of the person in question. Additionally, identification does not require direct interaction – an evaluable photo or video image is sufficient. Facial recognition plays a crucial role across police departments, particularly for identifying individuals involved in proceedings or tracking their movements. Such identification often forms the starting point for further law enforcement actions (Németh, 2022).

Crime Analysis Tools

Hungarian law enforcement crime analysts no longer use pushpins on physical maps to indicate relevant locations. Instead, software solutions have replaced these traditional tools. Neither entities discovered during analysis nor their relationships need to be represented with red string, as seen in movies. For those nostalgic about these visualizations, there is unfortunate news: in the age of Big Data, such practices are no longer effective. The vast quantities of data used in crime analysis are primarily digital, stemming from a wide array of sources and structures. These digital data are generated rapidly, transmitted just as quickly, and may even become inaccessible in moments. It is therefore essential to process them as soon as possible. Analysts only use verified, crime-relevant information, which must then be subjected to further scrutiny. This involves evaluating the source, content, timeliness, usability, and correlation with pre-existing knowledge.

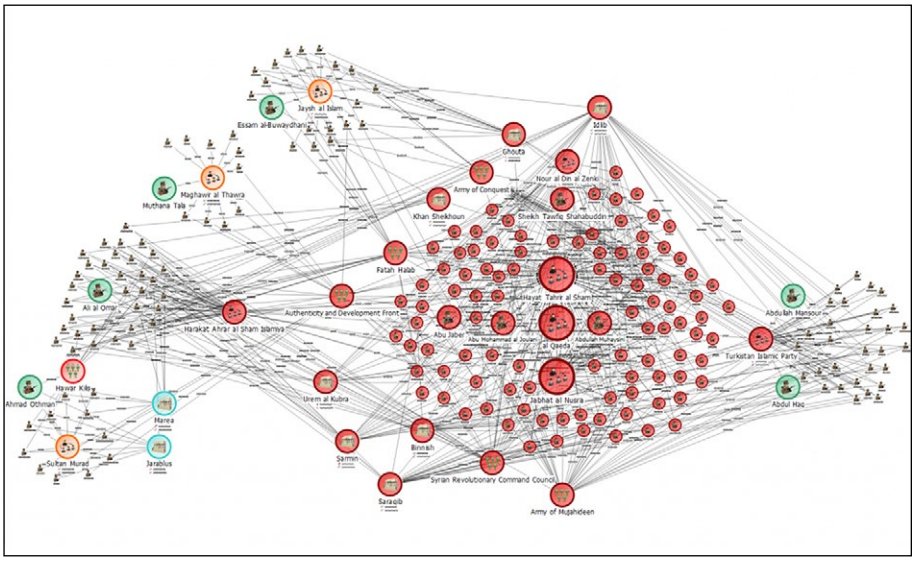
Such evaluations require the use of both hardware and software tools capable of visually presenting analytical results. Complex, multi-actor criminal cases can no longer be properly adjudicated without the visual presentation of crime analysis results produced during investigations. Crime analysis software must comply with both legal and technological criteria. Once these systems pass the necessary tests, they must also be cost-effective, easy to operate, and accessible to users. Meeting these criteria is not easy, yet most programs currently in use by Hungarian crime analysts do so.

Although this study cannot detail the full scope and direction of technical advancement due to space constraints, it is sufficient to highlight the opportunities offered by artificial intelligence to law enforcement. The following brief descriptions are limited to tools used in network analysis and geographic visualization. Among the key applications are i2 Analyst's Notebook, Gangikonspi, Maltego, and QGIS – all of which, alongside Microsoft Excel –, have become indispensable tools.

i2 Analyst's Notebook

i2 Analyst's Notebook (i2ANB), a software product by IBM, is used for data analysis and investigation. It is considered a NATO-standard criminal analysis tool, widely used in Hungary and by law enforcement agencies worldwide.

Figure 2
Network of connections in the i2ANB program



Note. Using i2 Analyst's Notebook to Map al-Qaeda's Influence in Syria (Praescient Analytics).

The software supports link analysis, financial transaction analysis, and risk assessment. Its features include data processing, visualization, and intelligent graphics that assist analysts and, indirectly, law enforcement officers involved in criminal procedures (URL1).

The i2ANB allows analysts flexible access to data. Depending on the purpose of the analysis, users can retrieve and filter structured and unstructured datasets too. These can be mobile phone records, call logs, financial transaction data, social media activity, and other crime-relevant, unstructured information. Additional tutorials and demonstrations are available across major video platforms.

A Gangikonspi

Gangikonspi is a domestically developed analytical software tool designed to process law enforcement electronic data. It is the result of many years of innovative work by an experienced Hungarian detective. In day-to-day criminal intelligence analysis, it is essential to conduct the fastest and most efficient possible evaluation of call detail records (CDRs) obtained during investigations, cell tower data**,** vehicle movement logs**,** and other forms of digital evidence. By transforming available data, Gangikonspi significantly speeds up this process. The program supports visual analysis through various modules, including the integration of map-based displays using the Google Maps API (Gaál, 2011-2018).

Figure 3
Gangikonspi surface

Note. Gaál Szabolcs's lecture at the basic crime analysis course 10.04.2025.

One of the most commonly used features is call list analysis, and the software is not constrained by Excel-like data input limits. Its most important capability may be its ability to combine data from multiple sources such as highway toll records, hungarian national police databases (e.g., Minerva, Netzsaru), and even platforms like Facebook (Gaál, 2025).

Gangikonspi enables wide-ranging data processing capabilities during crime analysis. Without attempting an exhaustive list, the tool can handle:

- Individual mobile and landline call records,
- Cell site location data and tower records,
- Specialized operational tower lists,
- Data extracted via UFED[5] readers,
- Toll gate and speed monitoring system data,
- GPS data from vehicles,
- Information from national police administration systems.

5 The UFED (Universal Forensic Extraction Device) is a product developed by the Israeli company Cellebrite, designed for the extraction and analysis of data from mobile phones, PCs, tablets, and other digital devices. The tool enables comprehensive data acquisition, including password cracking and the recovery of deleted data.

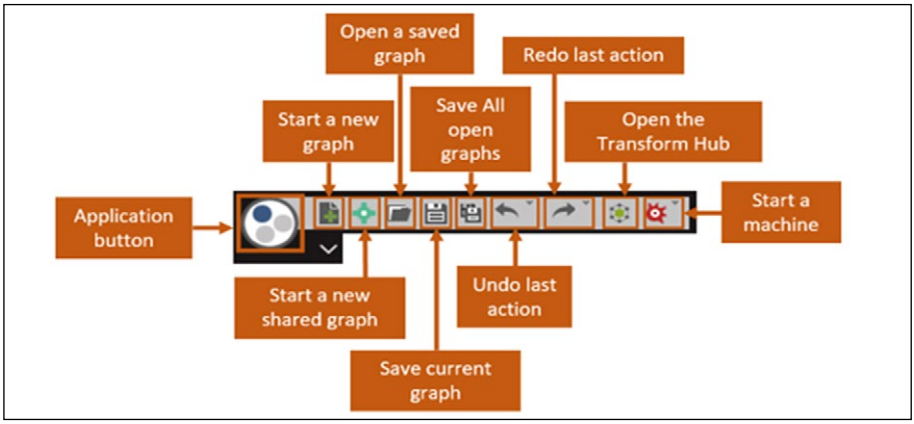
The program's key advantage is that digital data collected during investigations can be imported immediately without the need for further formatting. Once inside the software, data is converted into a standardized format, allowing immediate comparison and analysis.

Maltego

Maltego is an interactive data mining tool that enables crime analysts to graphically represent and explore relationships and networks between various digital entities such as individuals, social media profiles, organizations, domain names, and more. The software is known for its advanced link analysis and data visualization capabilities, which allow users to map and analyze complex relationships among entities sourced from both public and private data sets (URL2).

Figure 4

Maltego program interface



Note. Maltego.

The software offers powerful investigative support. In addition to open-source intelligence (OSINT), Maltego can process user-defined databases, including suspects, postal or email addresses, IP addresses, and phone numbers. It integrates information from multiple data sources and displays it in a unified, graph-based format. The resulting networks are customizable, can be exported in various formats, and can be further analyzed. Maltego's query sources are continually expanding through its network of data partners. These sources include data on individuals, social media, cryptocurrencies, transactions, DNS records, and search engines.

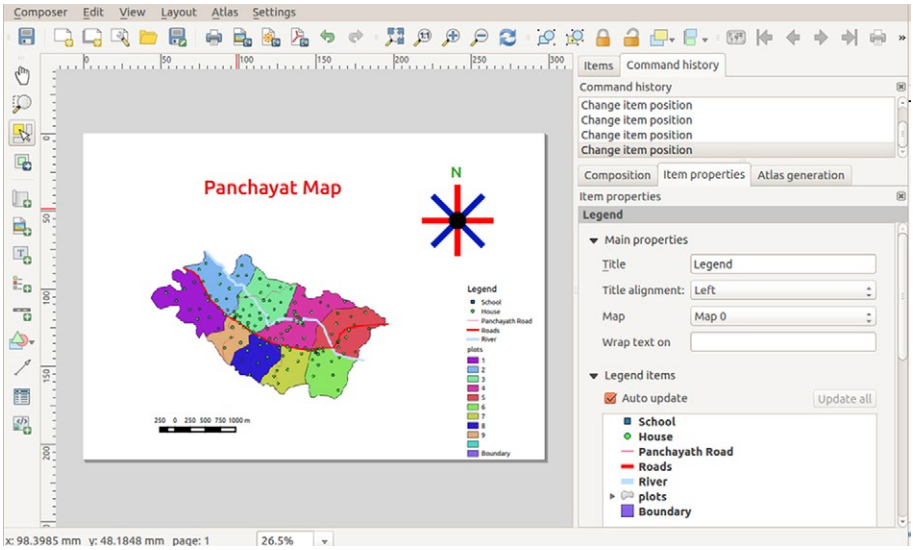
The tool enables the integration and joint analysis of open-source and law enforcement data within a single platform, significantly streamlining analytical workflows.[6] Maltego is subscription-based, with its default OSINT bundle offering access to the most commonly used data partners and associated transforms (e.g., person, social media, email, and phone number queries). The data stored in the user's own database remains private and is not shared with third parties, eliminating data protection concerns. The integration of diverse information into a single system and its visualization through graph structures provide analysts with an intuitive overview of connections among known and open-source entities. For instance, multiple Facebook profiles connected to a target individual can be identified, revealing their interests and social networks.

QGIS

GIS, or Geographic Information System, refers to technology used to collect, manage, and analyze geographical data. One version applicable to investigations is QGIS, an open-source GIS platform freely accessible online. This free and open-source geographic information system supports the viewing, editing, and analysis of geospatial data. Numerous tutorials and demonstration videos are available on major video-sharing platforms. Using QGIS, crime analysts can visualize multiple data layers from different sources within a single interface. In addition to its open-source nature, a major advantage of the software is its high level of customizability.

6 All continuously updated data sources and their precise descriptions can be found on the official Maltego website (URL3).

Figure 5
Print format in QGIS



Note. (URL4).

QGIS allows users to prepare print layouts using the „Print Layout' feature, which supports the addition of various views, icons, labels, and legends. The importance of criminal geography in crime analysis is a well-established fact, and the application of this scientific field is also unquestionable within predictive policing methods. By integrating artificial intelligence and Big Data, law enforcement can link systems such as those described above to facilitate advanced investigative capabilities – including the detection of urban crime hotspots, facial recognition-based comparison of surveillance footage against image databases, and even the prediction of probable crimes (including time and location) before they occur (Grana&Windell, 2021).

International Outlook

As indicated in the title, my primary interest was to explore the extent to which crime analysis practices in neighboring countries resemble or differ from Hungarian practice. Through the official liaison platform of the Hungarian police, the International Criminal Cooperation Center (NEBEK), and with the support

of the Europol Hungarian National Unit, I sent formal inquiries to EU member state police authorities. Specifically, I contacted the national Europol offices of Austria, the Czech Republic, and Slovakia, posing the following questions related to crime analysis:

1) Does the police force of the respective member state have a crime analysis unit/department? If yes, does it operate at local (regional) or national level?
2) Is crime analysis regulated, and if so, do they have a dedicated analytical regulation? At what level (regional or federal) is it implemented? Can we obtain a copy or gain access to the regulation?
3) Are there specialized crime analysts, or do all investigators/examiners carry out analytical activities?
4) What is the organizational structure of the units (e.g., staff size, resources, guidelines, practical recommendations, procedures)?
5) What analytical methods are used by the crime analysis units?
6) What tools (software, applications, etc.) do the crime analysis units use?

Upon receiving the responses, I compiled the information by country. Since not all agencies answered every question, and some responses were general or combined, the findings have been summarized per member state.

Austria

According to information provided by the Austrian police, due to the country's federal structure, the crime analysis system operates on two levels. Federal-level crime case analysts (*Polizeiliche Fallanalytiker/innen*) belong to the Austrian Federal Criminal Police Office (*Bundeskriminalamt/BK*) and work within Department 4, which specializes in criminal analysis (*Abteilung 4. Kriminalanalyse*).

This department comprises six subdivisions, each dealing with different areas of crime analysis, such as investigative support, OSINT, criminal psychology, spatial crime analysis, and the operational case analysis unit (OFA), which focuses on psychological support for investigations (URL5). These analysts rarely conduct on-site visits to police stations but oversee the technical aspects of local units' analytical tasks.

At the regional level, analysts work within the provincial criminal investigation departments and handle cases under the jurisdiction of the regional police. These analysts, too, prepare case analyses upon request and in close cooperation with investigative officers, although they function separately from police stations, just like their federal counterparts.

As for the regulatory framework, the Austrian authorities confirmed the existence of a federal-level regulation that governs the presence and cooperation of both federal and provincial crime analysis units. However, unlike Hungary's detailed internal police directives, there is no known Austrian regulation or directive of similar scope and detail.

In terms of analytical methodology, the Austrian colleagues confirmed that their approach to crime analysis is almost identical to that practiced in Hungary. This is not surprising, given that Austria also adheres to the Interpol Crime Analysis Manual and the methods outlined therein. Notably, Austria's operational behavioral support function (OFA) closely resembles Hungary's recently introduced SNYV methodology.

Regarding analytical tools, Austrian crime analysts use software similar to those employed in Hungary, including *i2 Analyst's Notebook*, *Microsoft Excel*, a custom-developed application comparable to Gangikonspi, and a dedicated internal database system.

Czech Republic

According to the Czech liaison officer's response, the Analytical and Legislative Department operates within the Office of the Police President (*Kancelář Policejního Prezidenta*) and performs administrative and statistical analyses for national-level police organizations. Its tasks include developing proposals to address policing and security issues, assessing the impact of legislation on police activities, and coordinating legislative-technical amendments. Tactical and investigative support crime analysis is conducted by the Central Analytical Department (*Centrální Analytické Oddělení*), which functions within the Criminal Police and Investigation Service (*Služba Kriminální Policie a Vyšetřování*). This department is responsible for:

- Collecting and analyzing information, including issuing recommendations for follow-up actions in cases requiring crime, case, or tactical analysis,
- Ensuring the transmission of data from national information systems to authorized police and government bodies,
- Providing and conducting offender profiling and behavioral analysis using analytical information systems,
- Establishing methodologies for behavioral analysis and facilitating international cooperation in this area.

At the regional level, each territorial law enforcement directorate includes analytical departments assigned to the Criminal Police and Investigation Service

(*Služba Kriminální Policie a Vyšetřování*). These departments handle information analysis and application. While no further organizational details were provided, it appears that both detectives and analytical officers stationed in these departments are involved in investigative crime analysis. Analytical activities are governed by an internal regulation of the Czech Police, but this document is not publicly accessible.

Although the Czech response did not specify particular methods, it can be inferred that their practices align with those used in Hungary. In terms of tools and software, the Czech analysts reported using several dozen programs. Among the most notable are *i2 Analyst's Notebook*, the Czech-developed *Tovek Tools*, video analysis tools like *Certicon* and *Briefcam*, the *Phonexia* voice analysis program, *GeoTime* (similar to QGIS), and applications from the Europol Tools Repository (URL6).

Slovakia

According to the response from Slovak colleagues regarding organizational structure, the central criminal analysis unit of the Police Force of the Slovak Republic is the Criminal Analysis Department of the Police Presidium (*Odbor Kriminalistiky Policajného Riaditeľstva*). The regional unit is the Criminal Analysis Management Department (*Katedra Manažmentu Kriminalistiky*), which operates as a regional unit based in Bratislava with nine personnel. This department also has regional crime analysis units located in Nitra, Banská Bystrica, and Košice, with a total staff of eleven.

Concerning the legal regulation of criminal analysis, they informed us that it is governed by Decree No. 32/2023 of the Ministry of the Interior of the Slovak Republic on Criminal Analyses, which, however, is not publicly accessible. Their response stated that criminal analysis is exclusively carried out by groups within the Criminal Analysis Department of the Police Presidium (*Odbor Kriminalistiky Policajného Riaditeľstva*), and they have no direct contact with investigators. Analysts receive assignments from the requesting party via an internal police communication channel: the „Analyst's Notebook' application, and the results of the criminal analysis are also delivered through this channel. The criminal analyst often performs only partial tasks, such as processing bank account statements, telecommunications data, or tax account records. The processed data are visualized in the „Analyst's Notebook' application. In high-profile cases, investigation teams are formed, in which the criminal analyst also participates as a contributing member. Members of the Criminal Analysis

Management Department (*Katedra Manažmentu Kriminalistiky*) provide analytical support to regional units in detection efforts and in criminal proceedings, as well as in Big Data processing and evidence discovery.

Regarding the crime analysis methods applied by Slovak colleagues, it can be concluded that they align almost entirely with the methods used in Hungary, Austria, and the Czech Republic. In response to the question on techniques used, they listed *i2 Analyst's Notebook* as their primary tool, followed by *Python* analysis software, *MS Office Excel*, *Power BI*, the *Analyst's Notebook* application, *GeoTime* tools similar to QGIS, Google Maps, and – similarly to the Czech colleagues – the Europol Tools Repository instruments.

Conclusion

Based on domestic intelligence reports and the feedback received from foreign crime analysts, it can be clearly established that significant similarities can be observed at the regional level. The practices of units conducting criminal intelligence analysis within the police forces of the European Union member states continue to be shaped and fundamentally influenced to this day by the foundational frameworks established in Western Europe during the 1990s. Naturally, the evolution of the technological environment, advances in information technology, and the changing dynamics of crime all impact the necessary modernization of police units. This is evidenced by the emergence and application of custom-developed programs and tools referenced in the responses. Big Data analysis and the examination of metadata from, for example, banking fraud cases now require teams of analysts with significant IT expertise. At the same time, the international outlook confirms that cooperation among European police units is progressing in a positive direction. To support this, and to achieve common goals, Europol has made the tools of the Europol Tools Repository freely and easily accessible to analysts in member states – many of which are already in use by national police forces. This initiative is particularly welcome, as the domestic analytical profession also adheres to the view that the selection of methods and techniques should be primarily based on the objective of the analysis, and only then should the type of analysis be defined, depending on the techniques and information used (Szabó, 2023).

Experience shows that, similar to Hungarian practice, in Slovakia, the Czech Republic, and Austria, criminal analysis tasks are not exclusively performed by professionals from specialized analytical units. When necessary, investigators and examiners also take on partial analytical responsibilities. Analyzing the responses reveals that both the Hungarian and the other member state police

forces place strong emphasis on the continuous analytical support of investigations into major criminal cases.

In such cases, analysts – who typically operate separately – become integrated into investigative teams, thereby eliminating delays in data transmission and enabling real-time analysis when needed. The massive volume of data forming the basis of crime analysis can originate from various sources and exhibit a wide range of structures. Effective operational response requires the use of advanced computational resources capable of providing visual representation of analytical results, thereby accelerating decision-making and reducing the time required for investigations. Choosing and, where necessary, combining analytical methods and techniques that align with specific analytical goals offers excellent opportunities for achieving desired outcomes. Criminal intelligence and investigations increasingly demand specialized knowledge. The collection, organization, and processing of more and more specialized information requires the application of new analytical methods and techniques, along with the continued professional and technical development of the crime analysis field and its further specialization (Németh-Vári, 2024).

I conclude my study with a fundamental principle: crime cannot be eradicated, nor is that our goal. What we do aim for – and what is in our shared interest – is to increase the effectiveness of the fight against crime. Shared training, common tools, and unified thinking form the weapon with which we can take joint, united action in defense of law-abiding citizens.

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Online links in the article

URL1: *Hogyan használható fejlettebb keresés az Analyst's Notebook-ban?* https://precognox.com/hu/blog/hogyan-hasznalhato-fejlettebb-kereses-az-analysts-notebook-ban/

URL2: *From data to intelligence - in minutes.* https://www.maltego.com/

URL3: *Data Sources in the Data Hub.* https://www.maltego.com/transform-hub/#transform-hub

URL4: *QGIS.* https://en.wikipedia.org/wiki/QGIS#/media/File:Print_composer_in_QGIS.png)

URL5: *Abteilungen im BK*. https://www.bundeskriminalamt.at/101/abteilungen.aspx#a4

URL6: *3053/2023/WEB Europol Tool Repository: operational impact of innovation.* https://www.cepol.europa.eu/training-education/3053-2023-web-europol-tool-repository-operational-impact-innovation

Applied legislation

ORFK Decree 13/2001 (X.2.) - Instruction on the Crime Analysis Regulations of the Hungarian Police

ORFK Decree 23/2018 (VI.21.) - Instruction on the Criminal Analysis Policy

Reference of the article according to APA regulation

Bánáti, T. (2026). Crime analysis in the middle of Europe: methods and techniques in practice. *Belügyi Szemle*, *74*(5), 1421–1443. https://doi.org/10.38146/BSZ-AJIA.2026.v74.i5.pp1421-1443

Statements

Conflict of interest

The author has declared no conflict of interest.

Funding

The author did not receive any financial support for researching, writing, and/or publishing this article.

Ethics

The data will be made available upon request.

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