THE IMPORTANCE OF INTERDISCIPLINARY COLLABORATION IN FORENSIC SCIENCE

Pașcu Andreea Claudia
IV year, UMFST Law School

I. COLLABORATION BETWEEN FORENSIC EXPERTS, INVESTIGATORS, AND PROSECUTORS

The success of a criminal investigation depends on the collaborative relationship between forensic experts, investigators, and prosecutors. Each plays a crucial role, and none can be considered more important than the others, as they all have equally significant responsibilities.

The forensic expert is a specialist who, by applying scientific methods to analyze physical evidence in a criminal investigation, plays a key role in interpreting, examining, and providing conclusions based on scientific proof, ultimately contributing to uncovering the truth. Forensic experts do not interpret the law nor analyze how it is applied**.** In most EU countries, they are either employed by a state forensic institution or work independently[1].

Investigators are represented by investigative police officers**.** Their role is to gather information from witnesses, victims, and suspects, manage evidence, and prepare reports for prosecutors.

Thus, an interdisciplinary collaboration cycle is formed, as follows: forensic experts must communicate constantly to correlate the evidence they identify with that found in the field; prosecutors must have the ability to understand forensic reports in order to build a strong case; and investigators must maintain continuous contact with forensic experts to ensure the proper preservation and identification of evidence.

Poor communication, carried out superficially, hastily, or carelessly, can have serious consequences regarding a person's guilt or innocence. To improve collaboration between these professionals, various measures can be implemented, such as integrating clear cooperation and

[1] https://e-justice.europa.eu/550/RO/forensic_experts.

communication protocols, creating and using shared databases, or even organizing training meetings in the interdisciplinary field.

II. THE IMPORTANCE OF COLLABORATION WITH IT EXPERTS IN CYBERCRIME

Cyberspace is not only the technological universe used by people to do what they are genetically programmed to do, namely communicate with each other, but also a facet of social reality, an indispensable human habitat[2].

Cybersecurity represents the state of normalcy of digital information, resources, and services provided by public or private entities in cyberspace[3].

In 2002, cyber defense was included for the first time on NATO's agenda during the Prague Summit, and later confirmed as a priority in 2006 at the Riga Summit[4].

The main factors that have led criminal groups to focus on cybercrimes are the potential for large material gains in a relatively short time and with relatively low risks, the transnational nature of the crimes, easy access to modern IT equipment, as well as to software tools and tutorials that can be easily downloaded from the unindexed area of the Internet – the DarkNet. The police cannot fight these forms of attacks alone, especially ransomware, because payments to cybercriminals are made in the virtual currency Bitcoin. The fight against ransomware at the European level requires a joint effort between the police, the Department of Justice, Europol, and IT security companies. Another example in this regard is the collaboration between the Romanian Police (through the Cybercrime Fighting Service) and Bitdefender to obtain the decryption key for the malicious ransomware application Bart[5].

[2] Michel Benedikt, „*Cyberspace: First Steps”*, Editura MIT Press, Cambridge, Massachusetts, 1991, p. 122.
[3] Ioan-Cosmin Mihai, Costel Ciuchi, Gabriel-Marius Petrică, „*Provocări actuale în domeniul securității cibernetice – impact și contribuția României în domeniu”*, Institutul European din România, București, 2018, p. 24.
[4] https://intelligence.sri.ro/securitatea-cibernetica-prioritate-sectorului-de-intelligence-lumea-globalizata/. (accessed at 20.03.2025)
[5] Ioan-Cosmin Mihai, Costel Ciuchi, Gabriel-Marius Petrică, „*Provocări actuale în domeniul securității cibernetice – impact și contribuția României în domeniu”,* Institutul European din România, București, 2018, p. 59-60.

The Romanian Police have a structure called the Cybercrime Fighting Service, which is primarily responsible for preventing, investigating, and prosecuting cybercrime. It operates within the Directorate for Combating Organized Crime[6].

III. CASES WHERE INTERDISCIPLINARY COLLABORATION WAS DECISIVE

In this chapter, we will analyze two cases where interdisciplinary collaboration led to the resolution of the case and the identification of the perpetrator: the famous case of the serial killer Ted Bundy, who was identified through a dental impression left on a victim's body, and the identification of victims from the September 11, 2001 attacks using DNA and biometric data.

In the case of Ted Bundy, several disciplines collaborated, including forensic dentistry, psychological profiling, investigators, and the police.

With the help of psychologists, it was concluded that Bundy was a charming individual who often used his pleasant appearance to lure his victims, fitting the profile of a manipulative and methodical criminal. After many years of studying his behavior, experts concluded that, from a medical standpoint, he exhibited traits of a psychopath. He was able to easily manipulate and maintain his composure in tense situations where he had to conceal the truth[7]. This case reinforced forensic dentistry as a key piece of evidence.

Forensic dentistry made the greatest contribution in this case, as Bundy was caught after a bite mark was discovered on the body of one of his victims during a brutal attack in a student dormitory. The bite mark was clear, allowing it to be compared to his dental impression. The match between the two was perfect, providing indisputable evidence in court.

Regarding the investigators, they played a crucial role in the investigation by interviewing eyewitnesses, gathering evidence, and coordinating between states, as his victims came from various states across the United States.

This case highlights the importance of interdisciplinary collaboration by combining the knowledge of forensic dentists with that of psychologists and, not least, the skills of police officers

[6] Idem p. 60.
[7] https://psychology.as.uky.edu/psychology-researcher-unravels-serial-killer-ted-bundys-mental-health (accessed at 20.03.2025).

and investigators to gather this information, understand it, and share it across America, as the case involved multiple states.

The second case concerns the terrorist attacks of September 11, 2001, where the World Trade Center twin towers were destroyed. Authorities faced challenges in identifying nearly 3,000 bodies, as many were either destroyed by carbonization or fragmented due to the extreme temperatures and internal pressure. Additionally, the tons of debris made body retrieval exceptionally difficult.

Authorities employed identification methods such as DNA analysis by comparing it with the DNA of relatives, dental identification, photographs and databases, fingerprinting, and skeletal analysis[8].

When it comes to such fatalities, DNA is considered the last resort because it is more costly and the analysis takes a long time. However, the nature of the terrorist attack pushed specialists toward this option, as there was no more efficient alternative. In this case, the DNA analysis of the victims took years. Investigators were forced to take material for analysis from the crime scene (bones or tissue) and compare it with material from an object belonging to the victim (such as a toothbrush) or with DNA from a close relative, such as parents or children[9]. The bodies that could be identified through fingerprints were identified in this way.

Another method used was dental identification, as teeth withstand high temperatures. Additionally, less affected bodies could be recognized through photographs from official documents with the help of scanning, and regarding skeletal analysis, this method allowed for the determination of age, sex, and other characteristics of some victims.

The September 11, 2001 tragedy led authorities to engage in long-term interdisciplinary collaboration, with the investigation extending over several years. Therefore, the information had to be transmitted and properly preserved to avoid interfering with the investigation's progress. It also had a huge impact on the development of DNA analysis, as researchers had to come up with new methods, contributing to the evolution of the field of genetics.

[8] https://pmc.ncbi.nlm.nih.gov/articles/PMC128417/ (accessed at 20.03.2025)
[9] https://www.nist.gov/blogs/taking-measure/reflections-assisting-911-world-trade-center-dna-identifications (accessed at 20.03.2025)

Both cases represent human catastrophes, but what can be extracted from them is the immense importance of interdisciplinary collaboration. Without communication, attention, patience, and dedication, their resolution would not have been possible.

BIBLIOGRAPHY

1. Ioan-Cosmin Mihai, Costel Ciuchi, Gabriel-Marius Petrică, „*Provocări actuale în domeniul securității cibernetice – impact și contribuția României în domeniu”*, Institutul European din România, București, 2018;
2. Michel Benedikt, „*Cyberspace: First Steps”*, Editura MIT Press, Cambridge, Massachusetts, 1991, p. 122;
3. Reflections on Assisting With the 9/11 World Trade Center DNA Identifications
4. Article by Lindsey Piercy: https://psychology.as.uky.edu/psychology-researcher-unravels-serial-killer-ted-bundys-mental-health;
5. https://e-justice.europa.eu/550/RO/forensic_experts;
6. https://intelligence.sri.ro/securitatea-cibernetica-prioritate-sectorului-de-intelligence-lumea-globalizata/;
7. https://pmc.ncbi.nlm.nih.gov/articles/PMC128417/ ;
8. https://www.nist.gov/blogs/taking-measure/reflections-assisting-911-world-trade-center-dna-identifications ;