

**MAŁGORZATA HREHOROWICZ**

## **Possibilities and Prospects for the Development of Criminalistics**

### **Introduction**

The aim of this paper is to present the possibilities and prospects for the development of modern criminalistics. Discussion of this matter is of importance due to the observation that criminalistics has, of late, lost its original form. The new techniques, including forensic analysis and biometrics, for example, are applied in traditional criminalistics. Fields of knowledge such as forensic archeology and forensic entomology play a significant role in solving common crimes and are also gradually forming a part of criminalistics. There are still no effective tools, however, to combat economic crime. This paper presents the research capabilities that academic research institutes have conducted in this field and possible ways to equip the authority conducting the proceedings with algorithms for identifying and combating economic crime.

The paper is divided into three parts. The first part demonstrates the shortcomings of criminalistics in terms of the fight against economic crime. The second part presents the author's achievements, such as establishing the types of economic opinions and presenting typical traces of economic crime. The third part presents the possibilities for further development of criminalistics.

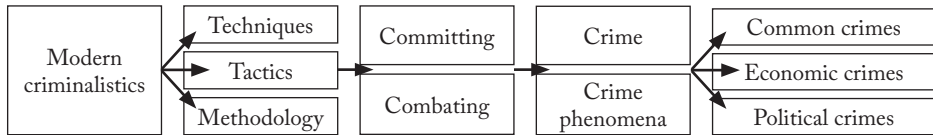
### **The Current State of the Solution to the Issue**

Currently the field of criminalistics dealing with the prosecution of economic crime is not specified as being a part of Polish or European criminalistics. Nonetheless, both Polish and European criminalistics table the issue of economic crime prosecution.

In Polish criminalistics the most important contribution in this field was made by H. Kołdecki. While constructing the modern structure of criminalistics, Kołdecki noticed

that prosecution of crimes applies to both common crimes and to economic crimes. The structure of modern criminalistics is presented in the diagram below.<sup>1</sup>

### The structure of modern criminalistics



Source: H. KołECKI, *Struktura współczesnej kryminalistyki*, p. 79.

From the above, it can be concluded that criminalistics deals with combating not only common but also economic crimes. What is more, the task of criminalistics is also to determine the methods, tactics and techniques employed in committing economic crimes, which is crucial for their prosecution by the authority conducting the proceedings. Moreover, determining the methods of committing economic crimes allows the types of traces occurring in economic crime cases to be determined. This makes it possible to establish their detailed classification. All these elements are important in combating economic crime. They are also the components for creating the field of criminalistics dealing with the prosecution of economic crime. On the basis of Polish criminalistics, the author proposed a working name for this department of criminalistics, i.e. *kryminalistyka gospodarcza*.<sup>2</sup> However, it is difficult to find an English equivalent. *Kryminalistyka gospodarcza* can be translated as either forensic economics or forensic accounting. Nevertheless, these are two different supportive forensic sciences with goals different than those of criminalistics.<sup>3</sup>

1 Vid. H. KołECKI, *Struktura współczesnej kryminalistyki*, in: „Zeszyty Naukowe ASW”, 1981, no. 28, p.79.

2 M. Hrehorowicz, *Kryminalistyka gospodarcza? – opinie biegłych w sprawach karnych gospodarczych*, in: *Dowodzenie w procesach karnych*, ed. R. Sztymmler, J. Kasprzak, J. Krzywkowska, Olsztyn 2014, pp. 189–197.

3 Forensic economics, as one of the supportive forensic sciences, applies economic theories and methods to the issue of pecuniary damages as specified by case law and legislative codes. It also deals with the analysis of claims and the calculation of damages in personal and commercial litigation. Vid.: Forensic economics, <https://www.forensiceconomics.com/>, 27.12.2017; National Association of Forensic Economics, <http://www.nafe.net/>, 27.12.2017.

Forensic accounting in turn, deals with the fraud from an accounting point of view. The definition of forensic accounting is very complex and will be presented later in the article. Vid. S. Hegazy, A. Sangster, A. Kotb, *Mapping forensic accounting in the UK*, in: “Journal of International Accounting, Auditing and Taxation”, 2017, no. 28, pp. 43–56.

The need to establish traces of economic crime was reintroduced by H. KołECKI over 20 years later.<sup>4</sup> Another author, B. Sygit, presented the problem of the so-called *white spots* in Polish criminalistics, pointing out that the problem that still remains unresolved is the systematization of the prosecution of economic crime.<sup>5</sup>

The prosecution of economic crime has, therefore, not been systematized either in Polish criminalistics or in other disciplines. Polish criminalistics literature, with minor exceptions, omits the issue of prosecuting economic crime. The existing publications on the prosecution of particular types of economic crime are presented.<sup>6</sup> However, the need to comprehensively develop important solutions concerning the fight against economic crime remains.

Although some attention has been paid to the prosecution of money laundering and combating organized crime,<sup>7</sup> in most cases, European criminalistics has not worked out a system for prosecuting economic crime in general. The issue of the prosecution of particular economic crime is emerging in European criminalistics.

4 H. KołECKI, *Stan i zadania kryminalistyki – 20 lat później*, in *Czynności procesowo-kryminalistyczne w polskich procedurach. Materiały z konferencji naukowej i IV Zjazdu Katedr Kryminalistyki. Toruń 5–7 maja 2004*, ed. V. Kwiatkowska-Darul, Toruń 2004, pp. 24–26.

5 B. Sygit, *Kilka refleksji o tzw. białych plamach w kryminalistyce*, in: *Problemy współczesnej kryminalistyki*, vol. XVIII, ed. E. Gruza, T. Tomaszewski, M. Goc, Warszawa 2014, pp. 71–89.

6 J. W. Wójcik, *Pranie pieniędzy. Kryminologiczna i kryminalistyczna ocean transakcji podejrzanym*, Warszawa 2002, 486 pp.; J. W. Wójcik, *Oszustwa finansowe. Zagadnienia kryminologiczne i kryminalistyczne*, Warszawa 2008, p. 496; J. Karaźniewicz, *Bankowe oszustwo kredytowe. Aspekty kryminologiczne i politycznokryminalne*, Toruń 2005, p. 310; A. Wujastyk, *Przestępstwa tzw. oszustw kredytowych w ustawie oraz praktyce prokuratorskiej i sądowej*, Warszawa 2011, p. 375; C. Kulesza, *Obrona w sprawach o przestępstwa gospodarcze i skarbowe*, Warszawa 2012, p. 282; W. Mądrzejowski, *Przestępczość zorganizowana. System zwalczania*, Warszawa 2008, p. 141; K. Buczkowski, M. Wojtaszek, *Przestępstwa gospodarcze w praktyce prokuratorskiej i sądowej*, Warszawa 1998, p. 170; *Przestępczość zorganizowana. Fenomen. Współczesne zagrożenia. Zwalczanie. Ujęcie praktyczne*, ed. W. Jaisński, W. Mądrzejowski, K. Wiciak, Szczytno 2013, p. 711.

7 Vid. F. Compin, *The role of accounting in money launderings and money dirtying*, *Critical Perspectives on Accounting* 2008, no 19, pp. 591–602 and references therein; D. S. Demetis, *Fighting money laundering with technology: A case study of Bank X in the UK*, *Decision Support Systems* 2018, no 105, pp. 96–107; S. Jayantilal, S. F. Jorge, A. Ferreira, *Portuguese Anti-money Laundering Policy: a Game Theory Approach*, *European Journal on Criminal Policy and Research* 2017, no 23, pp. 559–574; G. Ardizzi, C. Petraglia, M. Piacenza, F. Schneider, G. Turati, *Money laundering as a crime in the financial sector: A new approach to quantitative assessment, with an application to Italy*, *Journal of Money, Credit and Banking* 2014, no 46, pp. 1555–1590; R. Barone, D. Masciandaro, *Organized crime, money laundering and legal economy: Theory and simulations*, in: “*European Journal of Law and Economics*”, 2011, no 32, pp. 115–142; P. Leasure, *Combating the global crime of bribery: A report on Canadian foreign official anti-bribery policy*, in: “*Journal of Financial Crime*”, 2017, no 24 (4), pp. 496–512 and references therein; R. J. Lowe, *Anti-money laundering – The need for intelligence*, “*Journal of Financial Crime*” 2017, no 24 (3), pp. 472–479 and references therein.

The issue regarding the structure of modern criminalistics in European countries was introduced by D. Maver.<sup>8</sup> In his publication titled *Criminal Investigation / Criminalistics in Europe: State of the Art and a Look to the Future* he highlights differences in the criminalistics structures of different European countries.<sup>9</sup> He notices that in some countries, criminalistics has the status of an independent science, often connected to law (Germany, Russia, Serbia, Bosnia and Herzegovina, Poland), while in others it is a “half” science usually formally incorporated into criminology (Slovenia, Austria, Croatia), or a sub-discipline of police sciences and criminology, or recognized only as a forensic science (France, Italy, United Kingdom). It was also pointed out that the terminology used is different, especially between English-speaking and non-English speaking countries. Moreover, the connections between criminalistics and other disciplines such as forensic science, police science, investigative psychology, and criminology are not clear. Due to this, it is difficult, according to D. Maver, to develop a common European space for criminalistics.<sup>10</sup>

In his research, D. Maver referred to the different structures of criminalistics in individual European countries. On the basis of these studies, it can be concluded that in Germany the prosecution of economic crime is distinguished as part of criminalistics (Kube, *Kriminalistik* 1992, 1993). The prosecution of economic crime is also part of criminalistics in Slovenia (Dvoršek, 2003).<sup>11</sup>

It is worth pointing out is that the forensic aspects of the prosecution of economic crime are covered in Russian and Ukrainian criminalistics. The structure of criminalistics in these countries includes the prosecution of individual economic crimes, as well as the determination of traces and types of expert opinions that should be used in investigation.<sup>12</sup>

8 Professor at the University of Maribor in Slovenia. Specializes, among others in tactics and forensic technique. Vid. ed. D. Maver, *Visokošolski učitelj*, <https://www.fvv.um.si/o-fakulteti/seznam-zaposlenih/darko-maver.aspx>, 08.01.2017.

9 D. Maver, *Criminal Investigation/Criminalistics in Europe: State of the Art and a Look to the Future*, *Revija za kriminalistiko in kriminologijo* 2013, no. 3, pp. 233–244, [https://www.policija.si/eng/images/stories/Publications/JCIC/PDF/2013/03/JCIC2013-03\\_DarkoMaver\\_Criminal-InvestigationInEurope.pdf](https://www.policija.si/eng/images/stories/Publications/JCIC/PDF/2013/03/JCIC2013-03_DarkoMaver_Criminal-InvestigationInEurope.pdf), 26.12.2017.

10 Op. cit., pp. 233–234.

11 Vid. A. Dvoršek, *Kriminalistična metodika*, Ljubljana 2003; E. Kube, H. U. Störzer, K. J. Timm, *Kriminalistik: Handbuch für Praxis und Wissenschaft* (Bd. 1), München 1992; E. Kube, H. U. Störzer, K. J. Timm, *Kriminalistik: Handbuch für Praxis und Wissenschaft* (Bd. 2), München 1993, for: D. Maver, op. cit., pp. 236–237.

12 A multi-author monograph entitled *Nastilna kniga sledczogo* (*Настільна книга слідчого*) [Ukraine] contains subsections on the methodology of prosecuting particular economic crimes, such as fraud investigation, tax fraud, money laundering, fictitious enterprise, violation of sales rules, etc. But this is a monograph of the so-called series of methodologies and is not a strictly criminalistics handbook. Vid.: M.I. Panov, V.Yu. Shepitko, V.O. Konovalova, *Nastilna kniga sledczogo*, Kiev 2011, p. 736. An example of a handbook for prosecutors is a Rus-

Nevertheless, in most countries, the prosecution of economic crime is not included as part of criminalistics.<sup>13</sup> These shortcomings should be addressed immediately.

Forensic accounting is one of the possible solutions in this field. It is noticed that: "What the use of fingerprints was to the 19th century, and DNA analysis was to the 20th century, so financial information and forensic accounting has come to be one of today's most powerful investigative and intelligence tools available" (Chancellor of the Exchequer Gordon Brown, former Prime Minister of the United Kingdom, *The Telegraph*, October 11, 2006).<sup>14</sup> Forensic accounting is a type of supportive forensic science. It is growing rapidly, but mainly for the needs of entrepreneurs in detecting fraud and abuse among employees and contractors.<sup>15</sup> Due to the above, forensic accounting can be considered a forerunner of the part of criminalistics involved in the prosecution of economic crimes.

Forensic accounting is an interdisciplinary science. That is why over the years, especially in the area of British criminalistics, various definitions of forensic accounting have been formed. According to S. Hegazy, A. Sangster and A. Kotb, the definitions of forensic accounting found in literature are very specific to the study in which they appear and, virtually without exception, the definitions have an accounting focus. They state the following definitions of forensic accounting: forensic science that includes accounting, auditing, criminology, data mining, economics, finance, law, psychology, as well as sociology and all the relevant skills;<sup>16</sup> a profession in which it is not required to have accounting qualifications nor the computing tools that accountants use to overcome their lack of computing expertise, provided that a person possesses the above-mentioned skills and has the knowledge from the above-mentioned areas;<sup>17</sup> independent, multi-disciplinary forensic units that contain knowledge that lawyers, former police officers, private investigators and computer analysts with the legal, investiga-

---

sian-language monograph by I. Kozhevnikov ed. titled *Rasliedowanije prestuplenij w sferie ekonomiki. Rukowodstwo dla sledowateliej* (*Расследование преступлений в сфере экономики: Руководство для следователей*), Moscow 2001, p. 415; and also: N. P. Dudin, O. N. Korshunova, V. S. Shadrin, *Nastolnaja kniga sledovatelja*, Sankt-Peterburg 2008.

13 Vid. R. Saferstein, *Criminalistics: An Introduction to Forensic Science*, Harlow 2017, A. Buquet, *Manuel de criminalistique moderne et de police scientifique*, Paris 2001, p. 438, V. E. Kurapka, S. Matulienė, E. Bilevičiūtė, R. Burda, R. Davidonis, E. Dereškevičius, J. Juškevičiūtė, R. Krikščiūnas, L. Novikovienė, E. Latauskienė, E. Radzevičius, *Kriminalistika, Taktika ir metodika*, Vilnius 2013, [http://wdn.ipublishcentral.net/association\\_lithuania\\_serials/viewinside/509701090993033](http://wdn.ipublishcentral.net/association_lithuania_serials/viewinside/509701090993033), 17.08.2017.

14 S. Hegazy, A. Sangster, A. Kotb, op. cit., p. 43.

15 Vid. Forensic Accounting and Fraud Examination, <https://www.coursera.org/learn/forensic-accounting>, 24.08.2017 r. The course treats about "accidental" fraudsters, "preditor" fraudster, data analysis, characterization of money laundering and cyber-crime and whistleblowing.

16 W. D. Huber & J. A. DiGabriele, *Research in forensic accounting - what matters?*, *Journal of Theoretical Accounting Research* 2014, no. 10(1), pp. 40-70.

17 G. Cook & L. Clements, *Computer-based proactive fraud auditing tools*, *Journal of Forensic & Investigative Accounting* 2009, no. 1(2), pp. 1-23.

tive and technical know-how have.<sup>18</sup> They also mentioned that ‘forensic accounting’ is sometimes termed ‘forensic services’ and it is not surprising that Crumbley<sup>19</sup> drew attention to the fact that forensic accounting is not a natural part of the accounting profession and that the accounting profession does not have monopoly over forensic accounting. The author also mentioned that forensic accounting is a relatively new field of academic inquiry. He also noticed the lack of any particular professional group that has ownership of forensic accounting.<sup>20</sup>

Therefore, a good solution would be to incorporate forensic accounting into criminalistics. It would allow for the development of this field of science in the framework of criminalistics. It would also contribute to the systematization of the traces of particular economic crimes and further development within the framework of criminalistics. The systematized methodology, techniques and tactics of economic crime prosecuting will give measurable results to the prosecution of economic crime. Criminalistics has so far determined no successful methods to prosecute economic crimes. Neither have traces of economic crime, their disclosure, protection and use in the course of court proceedings, including in the form of expert opinion, been specified as yet.

The first hurdle would be to determine the role of criminalistics in Europe. Poland is a part of the European Union and the amalgamation of the laws of EU member states means that it can be expected that the issues in the context of economic crime they deal with are quite similar. Therefore, there is an opportunity to start cooperation in order to create an area of criminalistics specializing in economic crime prosecuting.

### **Research Conducted on Expert Opinions in Cases of Economic Crimes**

On the basis of the above-mentioned conclusions, the author undertook studies aimed firstly at determining the types of expert opinions that appear in cases of economic crimes and then determining the types of traces in cases of particular economic crimes.<sup>21</sup>

The analysis concluded that the most common opinions in cases concerning economic crimes are: accounting opinions (50.6%), IT opinions (21.9%) and opinions in the field of property valuation (13, 2%). Opinions in the fields of economics, construc-

---

18 J. Williams, *Private legal orders: Professional markets and the commodification of financial governance*. *Social & Legal Studies* 2006, no. 15(2), pp. 209–235.

19 D. L. Crumbley, *So what is forensic accounting?*, <http://www.bus.lsu.edu/accounting/faculty/lcrumbley/abo.fa2009.html>, 03.04.2016.

20 S. Hegazy, A. Sangster, A. Kotb, op. cit., p. 44.

21 The research was carried out in 2007–2009. The research concerned criminal cases, which were recorded in the Courts of the Poznań appeal in 1996–2006.

tion and banking are slightly less frequent (respectively: 5.5%, 4.4%, 2.2%).<sup>22</sup> Each of the above-mentioned opinions is characterized by a different subject and scope.

The subject of the accounting opinion is the financial activity of the given entity, and the scope of this opinion is a specific part of this activity, i.e. the financial situation of the entity which is subject to expert's examination when requested by the authority conducting the proceedings. The source materials for expert testing are usually accounting books. Therefore, the purpose of accounting reviews is essentially to determine the financial position of a given entity at a selected time and, if necessary, to indicate specific business operations on the basis of its financial documents.<sup>23</sup>

The economic opinion should be distinguished from the accounting opinion. The purpose of the economic opinion is different to the purpose of the accounting opinion, although in practice these opinions are often considered equivalent to each other. The aim of the economic opinion is to answer the question concerning the economic justification of specific activities of the economic entity. The task of an expert is therefore to determine whether the examined entity, when starting a specific business venture, acted within justified economic risk. The subject of such an opinion is therefore also the financial activity of the company, however the scope of such an opinion is quite different from the scope of the accounting and accounting opinion. The scope of this opinion is the assessment of the business, enterprise and economic decisions made by the managers of this company.<sup>24</sup> IT opinions in cases related to economic crimes can be divided into:

- information and computer data expertise – the subject of this type of opinion is the data of the computer system being in the area of interest of judicial authorities, collected on electronic data carriers (computer hard drive, memory stick, CD, floppy disk, etc.); the key elements of this opinion are the determination of the type and selected properties of data collected on IT media, e.g. whether they contain illegal computer programs, and determining their properties;<sup>25</sup>
- opinions on the principles of building the operation of a specific computer system – the subject of this opinion are computer programs and operating systems; the scope of the opinion strictly depends on the circumstances which the authority conducting the proceedings intends to establish, most of it may concern the determination of the principles of operation of a specific computer program, possibly setting the characteristics of the original computer program;<sup>26</sup>

---

22 Vid.: M. Hrehorowicz, *Opinia biegłego w sprawach karnych gospodarczych i jej ocena sądowa*, Poznań 2013, p. 111.

23 Ibidem, pp. 123–125.

24 Ibidem, pp. 136–138.

25 Ibidem, pp. 153–154.

26 Ibidem.



- computer and network opinions – they have an IT network and its objects as their subject, the scope of this type of opinion is to determine the selected properties of both the network itself and the objects placed in it;<sup>27</sup>
- opinions in the field of construction and operation of computer hardware;
- opinions on the use of IT methods in the fields of human activity.<sup>28</sup>

Opinions in the field of property valuation are very common in cases of economic crimes. In principle, they can appear in cases concerning all economic crimes, where the amount of damage caused by the suspect/accused is significant. The purpose of this type of opinion is to determine the value of a given property in a given period. The subject of an opinion in the field of property valuation is a specific real estate, enterprise or movable property, and the scope of this opinion is determining its value – depending on the need – within particular time frames or with regard to particular economic indicators.<sup>29</sup>

The last of these opinions – banking and construction opinions – are connected with the market on which the entrepreneur is conducting the business activity. For this reason, these opinions may also arise in cases regarding any economic crime in which this entrepreneur's activity is involved. In each particular case, the subject matter and scope of the opinion may be different and depends on what the procedural body intends to determine and to what extent.<sup>30</sup>

On this basis, the following types of traces in cases related to economic crimes were established:

- accounting traces,
- IT traces,
- traces in banking,
- traces in property valuation,
- technical, mathematical and other traces (e.g. in construction).<sup>31</sup>

Traces of accounting are used in accounting and economic opinions. They are disclosed by accounting tools. These are mainly entries made in the accounts of a given entity and their changes. Carriers of accounting traces are accounting books and documents constituting the basis for making postings, i.e. invoices and receipts.<sup>32</sup> The financial statements of the entity are carriers of these kind of traces.<sup>33</sup> IT traces can be divided into:

---

27 Ibidem, p. 158.

28 Ibidem, pp. 155–156.

29 Ibidem, pp. 148–151.

30 Vid. M. Hrehorowicz, op cit., pp. 146–148, 160–162.

31 Idem, *Ślady przestępstw gospodarczych i ich funkcje*, in *Paradygmaty kryminalistyki*, ed. J. Wójcikiewicz, V. Kwiatkowska-Wójcikiewicz, Kraków 2016, p. 155.

32 Vid.: J. T. Wells, *Nadużycia w firmach. Vademecum. Zapobieganie i wykrywanie*, Warsaw 2006, pp. 175–202.

33 J. T. Wells, op. cit., pp. 353–400.



- traces whose carriers are computer programs and operating systems, including signs of damage and changes;
- traces whose carriers are computer hardware (broadly understood), including traces of damage and changes;
- traces whose carriers are electronic documents and carriers of these documents (e.g. CDs, DVDs, memory sticks, pagers);
- traces used by computer and network reviews; these traces are entries of network users and system logs (network connection traces – IP addresses).<sup>34</sup>

Forensic traces in banking are a specific type of trace. These traces constitute both accounting traces related to the conduct of bank accounting as well as IT traces such as data entered into bank IT systems and any changes they underwent.<sup>35</sup> Both types of traces can take the form of a transactional trace depicting the history of transactions made with the use of electronic and tracing banking.<sup>36</sup>

The documents are the carriers of traces used by experts in property valuation opinions. The documents contain information aimed at presenting the real or false value of the property. Often, the relationship between the information content of several documents is the forensic trace of a given economic crime.<sup>37</sup> These are called functional and situational traces.<sup>38</sup>

Similar forensic traces are used by other experts appointed to give an opinion during the economic process (including mathematical and technical fields, as well as construction). In the case of this kind of opinion, the documents are also carriers of forensic traces.<sup>39</sup>

The above classification of forensic economic traces is the most useful from a practical point of view. It allows for a comprehensive coverage of the essence of forensic traces in cases related to economic crimes and constitutes a starting point for the further characterization of these type of traces. Thus far, no Polish or European forensic classification of traces in cases of economic crimes has been made. Due to this, it is necessary to take efforts from representatives of science to fill this gap.

---

34 Ibidem, p. 158. Cf. A. Machnac, *Gromadzenie i zabezpieczanie materiału dowodowego w zakresie przestępstw komputerowych*, in *Przestępczość teleinformatyczna. Materiały seminaryjne. VII Seminar*, ed. J. Kosiński, Szczytno 2004, pp. 170–172.

35 Vid. M. Hrehorowicz, *Ślady przestępstw gospodarczych...*, op. cit., pp. 155–158.

36 J. W. Wójcik, *Oszustwa finansowe. Zagadnienia kryminologiczne i kryminalistyczne*, Warsaw 2008, p. 77.

37 Ibidem.

38 H. KołECKI, *Pojęcie i klasyfikacje śladów kryminalistycznych*, *Zeszyty Naukowe ASW* 1977, no. 18, pp. 139–161.

39 M. Hrehorowicz, *Ślady przestępstw gospodarczych...*, op. cit., pp. 155–158.

## The Future of Criminalistics

In view of the above, it can be pointed out that forensic science in the European space can develop in two possible directions:

- developing tactics, techniques and methodology for common crimes; which can be achieved by creating new techniques for identifying people and objects or the incorporation of achievements in other fields of knowledge especially in the field of the natural sciences;
- creating tactics, techniques and methodology for dealing with economic crimes, which is, as was mentioned, an urgent problem which needs addressing.

Both directions of the development should take place within the framework of international cooperation, especially on the European ground. Creating an international research group, that would combine achievements in the field of criminalistics from individual countries, would be a good idea. This would be particularly valuable given the varying levels of criminal intelligence development in various European countries. Such a research group would also be able to create solutions responding to the needs of individual countries, and would initiate the amalgamation of forensic systems in individual countries. The publishing of the research results in English would be, of course, an essential condition to allow a multinational scientific community to benefit from the group's findings. The above would contribute to the popularization of the team's achievements, and would strengthen the aspirations to create a common European space for the development of criminalistics.

Building a common European space for criminalistics is challenging. First of all, it should be pointed out that, as D. Maver indicates, the lack of publication in English presenting the findings of European scientists, which results in the inability to reach mutual achievements, is the main obstacle to the development of the common space of criminalistics.<sup>40</sup> Furthermore, creating tactics, techniques and methodology for dealing with economic crimes requires time-consuming court records investigation on a relatively large research group. It also requires a large team of researchers and it will result in high costs. These costs are related, among other things, to the necessity to ensure the accommodation for more than one person at the place where the query is conducted, as well as transport costs. Such research would be particularly costly in Poland, where there are 366 common courts in the whole country.<sup>41</sup> At the same time, approximately 130,000 economic crimes are detected in Poland every year.<sup>42</sup> Therefore, even if the research were

40 D. Maver, *op. cit.*, p. 240.

41 Vid. Lista sądów powszechnych [Subject: Ministry of Justice in Poland], <https://bip.ms.gov.pl/pl/rejstry-i-ewidencje/lista-sadow-powszechnych/>, 07.01.2018.

42 Vid. Przestępstwa gospodarcze wg jednostek podziału administracyjnego kraju – przestępstwa stwierdzone, przestępstwa wykryte, % wykrycia [Subject: statistical data of the Police in Poland], <http://www.statystyka.policja.pl/st/przestepstwa-ogolem/przestepstwa-gospodarcz/122291,Przestepstwa-gospodarcze.html>, 07.01.2018.

conducted only in every second court it would be very time-consuming (predictably lasting about 3 years), not to mention the costs. In view of the above, research in the field of economic crime requires cooperation and a prudent plan of action. Such studies are necessary, regardless of their scope (on an international or national scale).

## Conclusions

Summing up, the future of criminalistics, understood as an interdisciplinary science created in the common European space, depends on close international scientific cooperation. The condition for establishing this cooperation is first of all the publishing of the countries' own research results in English. This will allow multinational scientific achievements to be benefited from, and the establishment of cooperation in specific research areas. One of the most important directions for the development of criminalistics should be the creation of a field of criminalistics that deals with the prosecution of economic crimes. To this end, it would be desirable to create an international research team. In Poland, only a small part of this has been developed. In developing this part of criminalistics, it would be helpful to use the achievements of forensic accounting and to further develop it in the framework of criminalistics.

## Literature

- Buczowski K., Wojtaszek M., *Przestępstwa gospodarcze w praktyce prokuratorskiej i sądowej*, Warsaw 1998.
- Buquet A., *Manuel de criminalistique moderne et de police scientifique*, Paris 2001.
- Dudin N. P., Korshunova O. N., Shadrin V. S., *Nastolnaja kniga sledowatelja*, Sankt-Peterburg 2008.
- Dvoršek A., *Kriminalistična metodika*, Ljubljana 2003.
- Hrehorowicz M., *Opinia biegłego w sprawach karnych gospodarczych i jej ocena sądowa*, Poznań 2013.
- Jaisński W., Mądrzejowski W., Wiciak K. ed., *Przestępczość zorganizowana. Fenomen. Współczesne zagrożenia. Zwalczanie. Ujęcie praktyczne*, Szczytno 2013.
- Karaźniewicz J., *Bankowe oszustwo kredytowe. Aspekty kryminologiczne i politycznokryminalne*, Toruń 2005.
- Rasliedowanije prestuplenij w sferie ekonomiki. Rukowodstvo dla sledowateliej*, ed. I. Kozhevnikov, Moscow 2001.
- Kube E., Störzer H. U., Timm K. J., *Kriminalistik: Handbuch für Praxis und Wissenschaft* (Bd. 1), München 1992.

- Idem, *Kriminalistik: Handbuch für Praxis und Wissenschaft* (Bd. 2), München 1993.
- Kulesza C., *Obrona w sprawach o przestępstwa gospodarcze i skarbowe*, Warszawa 2012.
- Mądrzejowski W., *Przestępczość zorganizowana. System zwalczania*, Warszawa 2008.
- Panov M. I., Shepitko V. Yu., Konovalova V. O., *Nastilna kniga slidczogo (Настільна книга слідчого)*, Kiev 2011.
- Saferstein R., *Criminalistics: An Introduction to Forensic Science*, Harlow 2017.
- Wells J. T., *Nadużycia w firmach. Vademecum. Zapobieganie i wykrywanie*, Warszawa 2006.
- Wójcik J. W., *Oszustwa finansowe. Zagadnienia kryminologiczne i kryminalistyczne*, Warszawa 2008.
- Idem, *Pranie pieniędzy. Kryminologiczna i kryminalistyczna ocean transakcji podejrzanych*, Warszawa 2002.
- Idem, *Oszustwa finansowe. Zagadnienia kryminologiczne i kryminalistyczne*, Warszawa 2008.
- Wujastyk A., *Przestępstwa tzw. oszustw kredytowych w ustawie oraz praktyce prokuratorskiej i sądowej*, Warszawa 2011.
- Ardizzi G., Petraglia C., Piacenza M., Schneider F., Turati G., *Money laundering as a crime in the financial sector: A new approach to quantitative assessment, with an application to Italy*, Journal of Money, Credit and Banking 2014, no. 46.
- Barone R., Masciandaro D., *Organized crime, money laundering and legal economy: Theory and simulations*, European Journal of Law and Economics 2011, no. 32.
- Compin F., *The role of accounting in money launderings. and money dirtying*, Critical Perspectives on Accounting 2008, no. 19.
- Cook G., Clements L., *Computer-based proactive fraud auditing tools*, Journal of Forensic & Investigative Accounting 2009, no. 1(2).
- Demetis D. S., *Fighting money laundering with technology: A case study of Bank X in the UK*, Decision Support Systems 2018, no. 105.
- Hegazy S., Sangster A., Kotb A., *Mapping forensic accounting in the UK*, Journal of International Accounting, Auditing and Taxation 2017, no. 28.
- Hrehorowicz M., *Kryminalistyka gospodarcza? – opinie biegłych w sprawach karnych gospodarczych*, in *Dowodzenie w procesach karnych*, ed. R. Sztuchmiller, J. Kasprzak, J. Krzywowska, Olsztyn 2014.
- Idem, *Ślady przestępstw gospodarczych i ich funkcje*, in *Paradygmaty kryminalistyki*, ed. J. Wójcikiewicz, V. Kwiatkowska-Wójcikiewicz, Kraków 2016.
- Huber W. D., DiGabriele J. A., *Research in forensic accounting – what matters?*, Journal of Theoretical Accounting Research 2014, no. 10(1).
- Jayantilal S., Jorge S. F., Ferreira A., *Portuguese Anti-money Laundering Policy: a Game Theory Approach*, European Journal on Criminal Policy and Research 2017, no. 23.
- Kołecki H., *Pojęcie i klasyfikacje śladów kryminalistycznych*, Zeszyty Naukowe ASW 1977, no. 18.

- Idem, *Stan i zadania kryminalistyki – 20 lat później*, in *Czynności procesowo-kryminalistyczne w polskich procedurach. Materiały z konferencji naukowej i IV Zjazdu Katedr Kryminalistyki. Toruń 5–7 maja 2004*, ed. V. Kwiatkowska-Darul, Toruń 2004.
- Idem, *Struktura współczesnej kryminalistyki*, Zeszyty Naukowe ASW 1981, no. 28.
- Leasure P., *Combating the global crime of bribery: A report on Canadian foreign official anti-bribery policy*, *Journal of Financial Crime* 2017, no. 24 (4).
- Lowe R. J., *Anti-money laundering – The need for intelligence*, *Journal of Financial Crime* 2017, no. 24 (3).
- Machnacz A., *Gromadzenie i zabezpieczanie materiału dowodowego w zakresie przestępstw komputerowych*, in *Przestępczość teleinformatyczna. Materiały seminaryjne. VII Seminar*, ed. J. Kosiński, Szczytno 2004.
- Sygit B., *Kilka refleksji o tzw. białych plamach w kryminalistyce*, in *Problemy współczesnej kryminalistyki*, vol. XVIII, ed. E. Gruza, T. Tomaszewski, M. Goc, Warszawa 2014.
- Williams J., *Private legal orders: Professional markets and the commodification of financial governance*. *Social & Legal Studies* 2006, no. 15(2).
- Crumbley D. L., *So what is forensic accounting?*, <http://www.bus.lsu.edu/accounting/faculty/lcrumbley/abo.fa2009.html>, [access: 03.04.2016].
- Forensic Accounting and Fraud Examination, <https://www.coursera.org/learn/forensic-accounting>, [access: 24.08.2017].
- Forensic economics, <https://www.forensiceconomics.com/>, [access: 27.12.2017].
- Kurapka V. E., Matulienė S., Bilevičiūtė E., Burda R., Davidonis R., Dereškevičius E., Juškevičiūtė J., Krikščiūnas R., Novikoviėnė L., Latauskienė E., Radzevičius E., *Kriminalistika, Taktika ir metodika*, Vilnius 2013, [http://wdn.ipublishcentral.net/association\\_lithuania\\_serials/viewinside/509701090993033](http://wdn.ipublishcentral.net/association_lithuania_serials/viewinside/509701090993033), [access: 17.08.2017].
- Lista sądów powszechnych* [Subject: Ministry of Justice in Poland], <https://bip.ms.gov.pl/pl/rejstry-i-ewidencje/lista-sadow-powszechnych/>, [access: 07.01.2018].
- Maver D., *Criminal Investigation/Criminalistics in Europe: State of the Art and a Look to the Future*, *Revija za kriminalistiko in kriminologijo* 2013, no 3, pp. 233–244, [https://www.policija.si/eng/images/stories/Publications/JCIC/PDF/2013/03/JCIC2013-03\\_DarkoMaver\\_CriminalInvestigationInEurope.pdf](https://www.policija.si/eng/images/stories/Publications/JCIC/PDF/2013/03/JCIC2013-03_DarkoMaver_CriminalInvestigationInEurope.pdf), [access: 26.12.2017].
- National Association of Forensic Economics, <http://www.nafe.net/>, [access: 27.12.2017].
- Przestępstwa gospodarcze wg jednostek podziału administracyjnego kraju – przestępstwa stwierdzone, przestępstwa wykryte, % wykrycia* [Subject: statistical data of the Police in Poland], <http://www.statystyka.policja.pl/st/przestepstwa-ogolem/przestepstwa-gospodarcz/122291,Przestepstwa-gospodarcze.html>, [access: 07.01.2018].
- Maver D., red. Visokošolski učitelj, <https://www.fvv.um.si/o-fakulteti/seznam-zapolslenih/darko-maver.aspx>, [access: 08.01.2017].

## SUMMARY

**Possibilities and Prospects for the Development of Criminalistics**

The aim of this paper is to present the possibilities and prospects for the development of modern criminalistics. Discussion of this matter is of importance due to the observation that criminalistics has, of late, lost its original form. The new techniques, including forensic analysis and biometrics, for example, are applied in traditional criminalistics. Fields of knowledge such as forensic archeology and forensic entomology play a significant role in solving common crimes and are also gradually forming part of criminalistics. There are still no effective tools, however, to combat economic crime. This paper presents the research capabilities that academic research institutes have in this field and possible ways to equip the authority conducting the proceedings with algorithms for identifying and combating economic crime. The paper is divided into three parts. The first part demonstrates the shortcomings of criminalistics in terms of the fight against economic crime. The second part presents the author's achievements, such as establishing the types of economic opinions and presenting typical traces of economic crime. The third part presents the possibilities for further development of criminalistics.

Keywords: economic crime, criminalistics, future development opportunities

MAŁGORZATA HREHOROWICZ, Adam Mickiewicz University Poznań, Faculty of Law and Administration, Al. Niepodległości 53, 61-714 Poznań, Republic of Poland, e-mail: malgorzata.hrehorowicz@amu.edu.pl.