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HISTORICAL EVOLUTION OF FORENSIC DOCUMENT EXAMINATION: FROM HANDWRITING COMPARISON TO THE SCIENTIFIC EXAMINATIONS OF DOCUMENTS

EVOLUȚIA ISTORICĂ A DOCUMENTOLOGIEI CRIMINALISTICE: DE LA COMPARAREA SCRISULUI DE MÂNĂ LA CERCETAREA ȘTIINȚIFICĂ A DOCUMENTELOR

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Abstract: *Criminalistics emerged and developed primarily in response to the needs of criminal investigation practice and forensic expert work. Within it, forensic document science is an important field of criminalistic knowledge, whose emergence and development were driven by the need to examine documents, identify their characteristics and establish circumstances relevant to criminal proceedings. Studying the historical evolution of forensic document science reveals the gradual transformation of document examination, from early forms of handwriting comparison to complex scientific examination drawing on the achievements of scientific and technological progress. Research into the problems of forensic document science is of particular importance for improving the detection and investigation of crime, and its findings are relevant to the organisational, tactical and methodological challenges of criminal investigation and forensic expertise. In this respect, documents are both objects through which circumstances relevant to a criminal case are discovered and established, and information carriers that make it possible to determine the means and grounds by which those circumstances can be established and proved.*

Keywords: *document, handwriting, graphology, graphic expression, forensic authorship analysis.*

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Abstract: *Criminalistica s-a constituit și s-a dezvoltat, în principal, ca răspuns la necesitățile practicii de urmărire penală și ale activității de expertiză judiciară. În acest context, documentologia criminalistică reprezintă un domeniu important al cunoașterii criminalistice, a cărui formare și evoluție au fost determinate de necesitatea examinării documentelor, identificării particularităților acestora și stabilirii împrejurărilor relevante pentru procesul penal. Studierea evoluției istorice a documentologiei permite evidențierea transformării treptate a examinării documentelor, de la formele inițiale de comparare a scrisului de mână până la cercetarea științifică complexă a documentelor prin valorificarea rezultatelor progresului tehnico-științific. Cercetarea problemelor documentologiei prezintă o importanță deosebită pentru optimizarea activității de descoperire și investigare a infracțiunilor, rezultatele sale fiind relevante pentru soluționarea problemelor organizatorice, tactice și metodice ale urmăririi penale și expertizei judiciare. În acest sens, documentele constituie atât obiecte ale cunoașterii și stabilirii unor împrejurări relevante pentru cauza penală, cât și suporturi informaționale care permit determinarea modalităților și fundamentelor prin care aceste împrejurări pot fi stabilite și demonstrate.*

Cuvinte-cheie: *document, scris de mână, grafologie, expresie grafică, autorologie judiciară.*

1. Introduction

Written instruments are of particular importance in every sphere of activity, since they serve to record the creation, modification or termination of legal relationships of various kinds. They also attest to facts and events of considerable significance for the work of public authorities and for the protection of citizens' rights and legitimate interests, as Sandu observes (Sandu, 1994, p. 5). In this context, Gheorghiță rightly emphasises that documents are "a very important element of the information system in any society" (Gheorghiță, 2017, p. 253; Rusu & Jitariuc, 2023, p. 594).

The particular importance of written instruments and their role in recording and attesting to various facts and circumstances naturally make it necessary to ensure the authenticity and accuracy of the information they contain. Indeed, document forgery has been, and continues to be, a major problem for experts and judicial authorities. As Lazăr and Alămoreanu note, forgery of documents has been and remains a pressing challenge for experts and judicial authorities, and the phenomenon has assumed considerable proportions in modern society, partly through the use of sophisticated techniques (Lazăr & Alămoreanu, 2008, p. 7). The same authors define a document as any printed, handwritten or drawn writing, or any writing produced by various technical processes, including photocopying, laser printing

and similar means, that attests to a particular status, identity, profession or value (Lazăr & Alămoreanu, 2008, p. 7).

The need to examine documents and to detect any alterations or forgeries was therefore one of the factors behind the development of a specialised field of criminalistics. Andreev notes in this regard that forensic document science, as a field of scientific knowledge, neither appeared spontaneously nor took shape all at once as an isolated phenomenon. Its formation should be seen as a gradual process driven by the practical and scientific need to examine documents.

The field has a long prehistory: it is grounded in objective laws and in a rich body of empirical and theoretical premises, and it was shaped by the pressing needs of law enforcement practice in criminal proceedings. The development of ideas about forensic document science is inextricably linked to history, to the stages and trends of scientific and technological progress, and to the evolution of criminalistics itself. Its origins go back to the distant times when writing first appeared and when the first unlawful acts were committed using this means of communication and of recording intellectual and verbal activity. Forensic document science remains closely bound up with this object today and will undoubtedly remain so in the future, not least because of the practices of forging, counterfeiting and using false documents (Andreev, 2001, p. 11).

The literature on the history of criminalistics offers numerous examples of pre-scientific judicial examination of written documents where their authenticity was in doubt. The principal object of such examinations was handwriting. Even before the conditions existed for criminalistics to emerge as a science, judicial records referred to persons "skilled in comparing handwriting", whose task was to establish, by comparing graphic features, whether the documents under examination were genuine or forged (Andreev, 2001, p. 12).

2. Materials and Methods

The research draws on a combination of scientific methods selected in light of the article's aim and objectives and of the historical and doctrinal nature of the inquiry. To examine the evolution of forensic document science and identify the main stages in its formation and development, the historical method, analysis and synthesis, the

comparative method and the logical method were used. The historical method made it possible to study forensic document science in the dynamics of its formation and development, by identifying the main stages in the evolution of the forensic examination of documents, from the earliest interest in handwriting comparison to the establishment of a complex scientific field of document examination. Analysis and synthesis were used to examine and systematise scholarly views on documents and forensic document science. The comparative method made it possible to contrast different scholarly opinions and approaches to the formation and development of forensic document science, while the logical method was used to establish the links between historical stages, the factors driving the development of the field, and the changes in methods of document examination.

The study also draws on scholarly works on criminalistics and the forensic examination of documents, as well as other doctrinal sources relevant to the subject.

3. Results and Discussion

Written instruments – or, in the terminology of current legislation, documents (from the Latin documentum, "certificate") – have been known and used since ancient times as a means of maintaining relations of mutual interest, and over time they have spread to the most diverse areas of human activity (Doraș, 2011, p. 230).

According to some scholars, interest in written instruments and their examination dates back to antiquity (Lazăr & Alămoreanu, 2008, p. 9). In this context, document forgery may be regarded as a phenomenon that appeared almost as soon as people acquired the ability to write and to use written instruments to record and attest to various facts and circumstances. Document forgery was known even in ancient Rome, where litigation was frequently associated with the use of forged wills (Andreev, 2001, pp. 11–12).

The first printed work on the expert examination of documents in Europe was published in 1604 by the Parisian François Demelle. The work bears a remarkably long title: "Advice on recognising forged manuscripts and comparing handwriting and signatures in order to identify and detect any forgery; with a detailed and complete account of the art of writing; and on how to recognise and decipher hidden

and secret writings". This work not only represents the first attempt to lay the foundations of the forensic examination of handwriting, but also marks an important stage in the development of the technical dimension of document examination, which would later become an important branch of forensic technology.

As handwriting examination practices evolved over time, the calligraphic approach to manuscripts gradually gave way to graphology, conceived as a system of knowledge aimed at identifying the character and personality traits of a writer through the analysis of their handwriting. This approach rested on the premise that certain psychological and character traits of the writer correlate with the graphic features of their handwriting, such as the shape and size of the letters, their width, the slant of the writing and other elements of graphic expression. The first work on graphology is considered to be the treatise by the Italian Camillo Baldi, published in 1622 under the title "How to recognise the nature and qualities of a writer from a letter". In the eighteenth and nineteenth centuries, several works were published in Italy, France and Germany claiming that a writer's physical and individual characteristics – including height, voice and even hair and eye colour – could be determined from the features of their handwriting. These ideas contributed to the emergence and development of a distinct approach to the study of writing, characterised by the attempt to establish a direct link between the graphic expression of handwriting and the psychophysical characteristics of the person. One of the leading representatives of the graphological school of handwriting examination was I. F. Morgenstern, who defined psycho-graphology as the science of determining a person's inner world from the features of their handwriting (Andreev, 2001, pp. 12–13; Jitariuc & Bodean, 2024, p. 346).

In the early stage of its development, marked by considerable theoretical and methodological uncertainty, graphology failed to establish itself in judicial practice and subsequently lost its relevance in this field. Its decline – which, in light of later scientific developments, may be regarded as at most relative – was largely due to the underdevelopment of its scientific foundations. The conclusions reached by graphologists often proved inconsistent with reality, being insufficiently supported scientifically, relying to a considerable extent on intuition and frequently marked by a high degree of uncertain-

ty. Consequently, such approaches did not always help to establish the truth; on the contrary, they could create uncertainty and confusion in the fact-finding process. Nevertheless, a critical assessment of graphology should not lead to a wholesale denial of its value. This doctrine contains certain rational elements, well-founded ideas and forward-looking scientific insights that contributed, to some extent, to shaping subsequent research on handwriting. Not all the claims made by psycho-graphologists at the time can be dismissed as mere unfounded speculation. The existence of certain regular correlations between the features of handwriting and some psychological characteristics of the writer is a fact that was later examined and substantiated by modern scientific research.

From this perspective, psycho-graphology cannot be regarded as a defunct doctrine, but rather as one that has undergone a substantial transformation and continues to develop on qualitatively new foundations that are theoretically grounded, validated by research and confirmed in practice. The subsequent development of scientific knowledge has made it possible to make critical use of certain ideas from graphology and psycho-graphology, separating them from speculative hypotheses and integrating their viable elements into modern handwriting examination. Particularly relevant in this regard is Belkin's observation that

> "... handwriting specialists have concluded that it was wrong to reject out of hand the entire body of observations and knowledge accumulated by graphology and psycho-graphology, since these fields too contain elements that can be – and already are being – successfully used in the forensic examination of handwriting" (Belkin, 2000, p. 8).

A turning point in the development of forensic handwriting examination came only once handwriting (graphoscopic) examination was grounded in the principle of the so-called "dynamic stereotype". This phenomenon forms as writing skills are acquired and refined in practice, as a result of the development and consolidation of the motor skills used to reproduce graphic signs and their combinations. The stability and individuality of each person's handwriting became the foundation on which the forensic examination of handwriting was subsequently built and developed. The consolidation of this field was

facilitated by advances in the physiology of higher nervous activity associated with the research of I. P. Pavlov and I. M. Sechenov, which provided important theoretical premises for understanding how motor skills are formed and stabilised. Subsequently, the conditions emerged for the establishment and development of another important line of scientific research into writing – the forensic examination of written language – which, like the forensic examination of handwriting, has its origins in a relatively long period during which knowledge and practice in this field accumulated and matured.

As several authors, including Belkin and Rossinskaya, point out, the need for such research arose long ago. From the mid-nineteenth century onwards, philologists were increasingly called upon to carry out such examinations, in the form of so-called literary and textological expert examinations. These laid the historical and methodological foundations for today's forensic examinations to identify the author of a text, and contributed to the subsequent development of the forensic examination of authorship of written texts (forensic authorship analysis) (Belkin, 1997a, p. 129; Rossinskaya, 1999, p. 63).

The turn of the twentieth century was marked by scientific and technological discoveries and achievements of great value for social progress. These also affected the sphere of criminal law relations, particularly criminal procedure: law enforcement agencies began to introduce more effective methods and tools for tracing, identifying and exposing offenders (Golubenco, 2008, p. 21).

The second half of the nineteenth century and, above all, the twentieth century were characterised by rapid scientific and technological progress, the consequences of which also had a substantial impact on the evolution of forensic document science. One manifestation of this process was the continual emergence of new materials, means and methods for recording, storing and transmitting information, together with the constant diversification and improvement of different types of information carriers. Alongside these changes, the achievements of the scientific and technological revolution were – and continue to be – turned to criminal ends, as the products of scientific and technical creativity were drawn into criminal activity. In this context, sound recording, film, photographic and video equipment, computer technology and the ever-expanding range of media

for recording written and spoken language, as well as other means of communication, became, alongside their legitimate uses, objects or instruments liable to be used in criminal activity. This development led to a considerable expansion of the subject matter of the forensic examination of documents, gradually going beyond the traditional limits of manuscript examination and requiring the development of scientific methods and tools capable of examining new forms of recording and transmitting information.

All these changes inevitably influenced the development of the technical means and forensic methods for detecting, seizing, examining and using documents of various kinds as evidence in proceedings. The theoretical and methodological foundations of the forensic examination of documents were gradually consolidated, new directions and branches of criminalistic knowledge took shape, and previously unknown types of expert examination emerged as a result of the growing diversity of objects submitted for forensic examination. Alongside the development of handwriting examination, from the mid-nineteenth century onwards, research into the constituent elements of documents – such as seal and stamp impressions, inks and writing substances, the document substrate and its other components – also developed increasingly rapidly. At the same time, methods for detecting the forgery and counterfeiting of documents were developed and refined, as were the technical means used for this purpose – devices, materials and other specialised equipment. The criminalist N. V. Terziev called this line of research the "technical examination of documents", a concept reflecting the stage at which a distinct line of research was established and consolidated within the forensic examination of documents (Andreev, 2001, pp. 15–16).

Starting from the examination of isolated elements of documents, originally regarded as carriers of written language and its graphic expression, the technical-forensic examination of documents has expanded considerably in the course of contemporary developments and has come to play a particularly important role in providing information for criminal proceedings. Today, it enables practitioners to solve effectively a wide range of problems of varying nature and complexity in criminal investigations and forensic examinations involving handwritten and printed documents and other types of in-

formation carriers. Such examinations include, among other things, identifying the characteristics of, and individualising, the tools and means used to produce or alter documents and the writing instruments and materials; establishing the existence and identifying the features of forgery techniques; and deciphering and recovering texts, inscriptions and signs that are faint or invisible to the naked eye. The technical-forensic examination of documents also makes it possible to reconstruct and restore damaged or partially destroyed documents and to solve an ever-wider range of other problems specific to the forensic examination of documents. The last fifty years of the twentieth century were marked by the emergence and rapid development of research into the conceptual and semantic content of documents, viewed as carriers of written language. On the basis of the findings of this research, a new line of inquiry took shape within criminalistics, focused on examining the informational and linguistic content of documents. Analysing this line of inquiry, Krylov noted the difficulty of defining it consistently, stressing that it "has not yet acquired a generally accepted name". In the literature, some authors referred to such research as "forensic linguistics", while others used the term "forensic authorship analysis". In expert practice, Krylov maintains,

> "the examination of written language was, in most cases, carried out as a supplement to the examination of handwriting features, while, to a considerably lesser extent, it took the form of independent forensic examinations aimed at resolving either identification problems – in particular, establishing the author of a text – or non-identification problems, such as determining the age, physical condition or mental state of the person who wrote the text" (Krylov, 1980, pp. 194–195).

Within a relatively short time, this branch of criminalistics, which came to be known as forensic authorship analysis, established itself as a distinct scientific field, developing rapidly and becoming an established component of scientific research, university teaching and forensic practice. At the same time, forensic authorship examination became an autonomous and fully recognised component of the system of forensic examinations. It is also important that forensic authorship examination is not confined to handwritten material, but may cover a wide range of carriers of written language, including printed texts,

printed matter with verbal content and other forms of recorded written discourse. Moreover, the range of objects of forensic authorship analysis now extends well beyond the traditional limits of document examination. Today, authorship research covers various categories of objects resulting from human creative and constructive activity, including the products of scientific, technical, artistic and other forms of intellectual activity.

In particular, the solving of authorship problems, both identification and non-identification problems, is directly relevant to the examination of media containing a person's speech, when it is recorded on various sound recording and playback media. In this context, the intensification and refinement of contemporary forensic research centred on the document, together with the emergence of new lines of research, their deepening and the expanding possibilities for using their findings, are inseparable from the integration and differentiation of scientific knowledge. Interdisciplinary integration makes it possible to draw on knowledge from different fields in a convergent manner, while differentiation encourages specialisation and the emergence of autonomous lines of forensic document research (Andreev, 2001, pp. 18–19).

In recent decades, a new integrative field of scientific knowledge – forensic psycholinguistics – has emerged and is developing rapidly in criminalistics worldwide, at the intersection of psychology and linguistics. This line of research rests on the idea that a person's written and spoken language is a particularly rich source of information about the many characteristics of the speaker or writer. Such characteristics can be established by analysing the vocabulary used, syntactic features, accent and numerous other features of spoken and written language. The objects of such analysis are written messages and spoken messages by unknown authors recorded on audio recordings. These are examined using psycholinguistic analytical methods in order to establish information relevant to determining the origin, social and cultural background, psychological characteristics and other traits of the source of the verbal activity. The results make it possible to compile a search profile of the unknown author of a written text or an audio message, which may include information on the person's age, sex, level of education, geographical and ethnocultural background, occupation and other characteristics of the person to be identified.

At the same time, by comparing the features identified in similar objects, it can be established whether the products of verbal activity under analysis belong to the same person or to different persons. Another important line of this research is identifying the source of verbal information where the identity of the person under examination is known and samples similar to the objects under examination are obtained from that person. The development of this line of research has also been encouraged by psycholinguistic analysis as developed and applied in Western scholarship as a method of recognising and identifying the perpetrators of criminal activity, including through specialised forms such as statement validity analysis (Protasevich et al., 1999; Obraztsov & Bogomolova, 2002, p. 216).

From the perspective of the evolution of forensic document science, the emergence and development of forensic psycholinguistics represent an important stage in the interdisciplinary expansion of the examination of documents and of the products of verbal activity. Whereas traditional examination focused mainly on the graphic and material characteristics of the document, psycholinguistic approaches make it possible to use the verbal content as a source of information about the person who produced the message, thereby broadening the range of scientific tools used in forensic research.

For some time now, researchers such as Protasevich and Obraztsov have focused on another possible application of psychological analysis – this time not to the verbal component of writing, but to the graphic features of the handwriting of persons suspected of homicide. According to them, the essence of this approach

> "… is that a suspect who denies committing the offence is asked to write out in their own hand an account of their activities at the time of the offence under investigation, including their states and experiences in the period preceding the offence and immediately after it was committed. A comparative analysis of the graphic features of the written signs, relating to events at different points in time, enables the specialist to draw conclusions as to whether the person under examination may or may not have been involved in the offence under investigation" (Protasevich & Obraztsov, 1998, pp. 135–139).

Today, increasing importance attaches to research whose ob-

ject is not documents examined in isolation, but the bodies of documents of enterprises, organisations and institutions – genuine flows or masses of information reflecting economic, financial, banking and other professional activities in production, services and other areas of social practice.

This concerns, first, those forms and situations of activity in which, through breaches of mandatory rules laid down in laws, instructions and other regulations, various categories of so-called "white-collar" crime are committed by officials, their employees or other persons involved in the criminal activity. Second, it concerns documents examined not only by lawyers but also by specialists involved in documentary inspections, audits, forensic accounting, economic and commodity examinations, and other similar forms of specialised examination. The results of such examinations make a substantial contribution to building and strengthening the body of evidence, providing practitioners with significant support in detecting, documenting and solving highly organised offences that are concealed in sophisticated ways (Andreev, 2001, pp. 20–21).

From the perspective of the evolution of forensic document science, this development shows a significant expansion of its subject matter: from the individual document, analysed in terms of its authenticity, method of production or graphic features, to complex systems of documents and information flows that reflect how economic and institutional entities operate. Forensic document science is thus increasingly asserting itself as an interdisciplinary tool for obtaining and using documentary information relevant to the forensic investigation of offences.

One of the essential features of forensic document science, viewed as a branch of criminalistics, is its integrative character, resulting from the interplay and convergent use of knowledge from multiple scientific fields. The tendency towards both the integration and the differentiation of scientific knowledge is common to the most diverse sciences and to their components, sections and branches. As Belkin emphasises,

> "... such tendencies have manifested themselves throughout the entire history of the development of science. While, at the stage of accumulating empirical material,

> the differentiation of the sciences was more visible, helping to delimit the object of knowledge more clearly and corresponding to a level of scientific development dominated by the description and classification of phenomena, with the transition to the stage of developing scientific theories the tendency towards the integration of scientific knowledge became increasingly pronounced" (Belkin, 1997b, p. 245).

This dynamic is particularly relevant to forensic document science, since its historical evolution clearly reflects the shift from specialised and relatively autonomous research into isolated elements of the document towards an integrated and interdisciplinary approach. The establishment of handwriting, technical and authorship examinations, together with the use of knowledge from psychology, linguistics, computer science, chemistry, physics and other fields, shows that the development of forensic document science is inseparable from the general process of integrating scientific knowledge and the concurrent differentiation of specialised lines of research.

The differentiation of scientific knowledge inevitably gives rise to the opposite tendency – integration. This relationship should not, however, be understood as an artificial and rigid separation of the two processes. In reality, it is a matter of the relative intensity of two components of the same objective tendency, and of the extent and depth to which one prevails over the other at particular stages in the evolution of scientific knowledge. In periods of relatively stable scientific development, characterised by the gradual accumulation of facts and empirical material, the tendency towards differentiation prevails. By contrast, in periods of radical change in existing scientific views, marked by the reconsideration of established paradigms and the replacement of one scientific worldview by another, the tendency towards integration comes to the fore (Leyman, 1970, p. 63). Indeed, the more advanced the level of scientific development, the more evident it becomes that both tendencies operate in dialectical unity, conditioning and complementing each other in the evolution of scientific knowledge.

As noted above, forensic document science (the criminalistic science of documents) took shape by integrating the results of theoretical and practical work on the scientific and judicial examination of various types of documents and on particular aspects and character-

istics of this object of knowledge. These results, grounded in the organic links between different lines of research, were brought together into a more general, coherent and systematic scientific "formation". By incorporating traditionally established, relatively autonomous and seemingly unrelated forms of document examination, and by continually synthesising and integrating new subsystems, directions and branches of forensic document examination, forensic document science has gradually consolidated its scientific status. As the range of objects examined has expanded, new means and methods of examination have been introduced and an ever-greater body of theoretical and empirical knowledge has been accumulated, the field has asserted its autonomy and importance with increasing force, strengthened its position and broadened its scope of application in both criminalistic theory and crime-control practice. A particular role in identifying and substantiating this concept belongs to Obraztsov, who was among the first researchers to highlight the true extent and diversity of the forms of forensic document science and its integrative character, analysing this phenomenon from a systemic perspective. He originally referred to this branch as "criminalistic documentology", a term that helped to establish conceptually a systemic and integrated approach to the document as an object of criminalistic knowledge (Obraztsov, 1997, p. 308).

The term was subsequently adopted and used in the works of several authors (Doraș, 2011, pp. 230–232; Gheorghiță, 2017, pp. 253–256; Agafonov & Filippov, 2000, p. 17), helping to consolidate and disseminate the concept of forensic document science as an integrative field of criminalistic knowledge. Other scholars likewise concluded in the course of their research that it is appropriate to designate this section of criminalistics as "criminalistic documentology", arguing that the term covers a broader range of activities and knowledge, including: (a) scientific, theoretical documentology – a system of scientific knowledge about the document and the specific features of its forensic examination; (b) the corresponding practical activity in criminal proceedings (practical documentology), consisting of the discovery, seizure, examination and use of documents in the investigation of offences; and (c) teaching activity in legal education institutions (educational documentology), aimed at imparting and acquiring theoretical and practical knowledge in this field.

Formed through the logical operation of generalising concepts, forensic document science encompasses a number of less general concepts, such as forensic graphoscopy (the forensic examination of handwriting), forensic authorship analysis and the technical-forensic examination of documents (Andreev & Obraztsov, 2000, pp. 79–82).

The concept of forensic document science did not arise from the arbitrary choice of a particular researcher or from a desire to coin new terminology; it is the natural consequence of the evolution of science, of the laws governing the development of scientific knowledge, of the logic and needs of theoretical and practical research, and of the demands of crime prevention and control. The concepts of document and documentology form part of the conceptual framework of criminalistics and express a higher-level generalisation of concepts such as the written document, the photographic document, the audio document, the electronic document, forensic handwriting examination and others. Forensic document science belongs to the system of fields and branches of criminalistic knowledge, both those that are already well developed – such as forensic trasology (trace evidence examination) and the criminalistic doctrine of the modus operandi – and those that are still emerging and developing.

Built on the results of theoretical and empirical research into different categories and varieties of objects within the relevant classification group, these fields of criminalistics, including forensic document science, constitute standardised information models that concentrate knowledge about particular elements, aspects, characteristics and traces of the system that is the object of inquiry in criminal proceedings – namely, acts bearing the characteristics of an offence and other related events. Taken together, such models provide an integrated picture of the common object of criminalistic knowledge from the perspective of the various actors involved in the investigation of criminal cases (Andreev, 2001, pp. 28–29).

In this context, forensic document science may be defined as a system of knowledge about the techniques, means, methods and procedures for discovering, recording, seizing, preserving and conducting preliminary (pre-expert) examinations of documents, as well as for their forensic expert examination, with a view to obtaining and using the information they contain.

Forensic document science is also concerned with providing a scientific foundation for, and supporting through its research findings, criminal investigation, special investigative activity and forensic expert examination carried out by persons and authorities empowered to identify, examine and use documents of forensic relevance and the traces connected with them (Andreev, 2001, pp. 29–30). Indeed, forensic document science is not confined to examining the document as a material object; it treats it as a complex source of forensic information, integrating knowledge about its nature, structure, mechanism of formation, methods of alteration and forgery, and the possibilities for discovering, examining and using documentary information for the purpose of investigating offences.

Moreover, scientific research into, and the practical application of, issues relating to electronic documents and electronic document workflows will inevitably help to energise and modernise forensic document science, opening up new directions of development and driving the continuous improvement of its methodological apparatus. Bringing new forms of electronic documentation within the scope of forensic examination will require traditional methods and procedures to be adapted, and methodological tools and mechanisms suited to the specific features of digital information to be developed, capable of ensuring its identification, recording, preservation, examination and use in criminal proceedings.

4. Conclusions

The study has found that a complex, multi-branched and multidimensional field of scientific knowledge and practical activity has taken shape, and continues to develop, within criminalistics, devoted to the discovery, examination and use in criminal proceedings of various types of documents and the information they contain. The evolution of forensic document science shows that the formation of this field was driven by the needs of judicial practice and by the progressive development of scientific means and methods of document examination. Forensic document science has travelled a long historical path, from elementary, empirical and pre-scientific forms of handwriting comparison and assessment of the graphic features of written instruments to today's scientifically grounded examination based on

effective technologies and modern methods. This evolution reflects the transformation of document examination from a predominantly empirical activity into a specialised field of criminalistics whose results are supported by an increasingly solid scientific basis and by the use of contemporary research methods. At the same time, although the development of forensic document science does not yet allow us to speak of a definitively established scientific structure that is fully consolidated in all respects, the prospects for this field are favourable. The empirical, scientific and technical prerequisites for deepening and consolidating forensic document science are already in place, which makes it possible to anticipate the continued development of the theory and practice of the forensic examination of documents.

Structurally and functionally, forensic document science is characterised by a plurality of interdependent dimensions, including theoretical, technical-forensic, organisational, tactical and methodological aspects. These dimensions are reflected in all the lines of development and application of forensic document science, including criminal investigation, special investigative activity and forensic expert examination. The historical evolution of forensic document science thus confirms its transformation into a complex field of criminalistics that is continuously being consolidated and refined.

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