

Article Information

Received date : 04 May, 2026

Published date: 25 May, 2026

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DOI: 10.54026/IJFSCI/1008

Key Words

Due Diligence; Forensic Investigation
And Analysis; Scientific Integrity;
Multidimensional Requirement

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Due Diligence as the Core of Forensic Investigation and Analysis

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Abstract

Due diligence entails a pivotal forensic investigation and analytical principle. Unfortunately, the theoretical and applied consequences of the discipline are often least explored. This paper contends that due diligence is not simply a procedural activity but a multidimensional ethical, scientific, and institutional requirement. Extant forensic science literature, legal standards, and documented failures in forensic practice enables the paper to argue that due diligence must be seen as an evolving and continuously reinforced discipline. Forensic investigation and analysis necessitate methodological rigor, cognitive awareness, ethical responsibility, and organizational standard operating procedure. As forensic science grows given the rise of digital forensics, computational tools, and the ever-expanding landscape of crime, forensic practitioners must rise to the increasing challenges of their profession. This paper emphasizes that strengthening due diligence is critical to maintaining scientific integrity, ensuring the admissibility of forensic evidence, and preserving public trust in the justice system. Also, the paper recommends that due diligence across forensic domains is indispensable to standardization, transparency, quality assurance, and ethical training in the field.

The field of forensic science is a complex and intricate one that requires conscientiousness and due diligence to thrive. This fact is essentially indubitable because errors of omission or commission will damage the integrity of the entire process of trying to determine the fact of any matter. Those whose calling and passion lead them down the path of forensic investigation and analysis ought to be religiously inclined to the objective performance of their duty. Instances abound where dubious forensic investigations and analyses produced unintended consequences for individuals whose fates lay in the forensic outcomes of investigations and analyses. Hence, the need for stakeholders, policymakers, and practitioners to rise to the challenges the field of forensic science poses every day in the face of new scientific discoveries and technological advancements.

Forensic investigation is at intersection of science and law, where the consequences of error can be weighty and permanent. Due diligence, as a concept means the reasonable, expected standard of care exercised by a competent professional, serves as a safeguard against such errors. In forensic environments, due diligence guarantees that evidence is collected, analyzed, interpreted, and reported with the highest degree of scientific objectivity and ethical obligation [1]. Despite its significance, due diligence is often treated as a procedural formality rather than a comprehensive professional requirement. This paper contends that due diligence must be reconceptualized as a holistic, proactive, and culturally embedded practice. It is not basically about complying with protocols; it is about developing a mindset of meticulousness, skepticism, and accountability. The stakes of forensic work such as wrongful convictions, failed prosecutions, and erosion of public trust call for nothing less. Through an examination of the ethical, operational, legal, and organizational aspects of due diligence, this paper posits that due diligence is the foundation of credible forensic science and must be reinforced across all forensic disciplines.

Defining Due Diligence in Forensic Science

In forensic investigation, due diligence signifies the watchful, systematic, and scientifically rooted actions that practitioners must take at every stage of the investigative process. It includes:

1. Using validated scientific methods
2. Accurate and unbiased evidence collection
3. Proper documentation and chain of custody maintenance
4. Critical evaluation of analytical results
5. Transparent reporting of limitations and uncertainties
6. Awareness of cognitive and contextual biases
7. Commitment to continuing professional development

[2] stresses that forensic science must be rooted in empirical validation, standardized procedures, and rigorous quality assurance. Due diligence is the instrument through which these principles are operationalized. It behooves every forensic practitioner, irrespective of the area of the field the individual specializes in, to underscore that doing a thorough and credible job devoid of bias and scientific dubiousness constitutes the hallmark of the forensic discipline.

The Ethical Imperative of Due Diligence

Forensic specialists occupy uniquely ethical space. Their work directly impacts legal outcomes, and errors can lead to miscarriages of justice. There are three core ethical duties that undergird due diligence:

Responsibility to the truth:

Forensic science is fundamentally concerned with uncovering factual information. Due diligence certifies that conclusions are based on reliable evidence rather than assumptions, shortcuts, or external pressures. Ethical codes across forensic disciplines emphasize objectivity, impartiality, and scientific integrity [3].



Responsibility to the legal system:

Courts rely on forensic expert witnesses to provide accurate, unbiased, and scientifically admissible information. When due diligence is missing, the legal process becomes distorted. The [4] decision underscored the judiciary's expectation that scientific evidence must be reliable, relevant, and a product of sound scientific methodology generally accepted by practitioners in that discipline.

Responsibility to society:

Public trust in forensic science is highly breakable. High profile failures like the FBI hair microscopy scandal or the Houston Crime Lab crisis are indicative of how lapses in due diligence can undermine confidence in the justice system [5]. Due diligence protects that trust by ensuring transparency, accountability, and scientific rigor.

Due Diligence in Evidence Collection

Evidence collection is the foundation of forensic investigation. Errors at this stage are often irreparable, and even the most sophisticated laboratory analysis and expertise cannot compensate for improperly collected or contaminated evidence.

Scene Security and control:

Maintaining scene integrity is essential. Uncontrolled access increases the risk of contamination, loss, or alteration of evidence. Due diligence requires establishing clear perimeters, documenting all personnel entering the scene, and ensuring that evidence is not disturbed [6].

Systematic search methods:

Search strategies must be tailored to the environment and nature of the incident. Grid, spiral, zone, and strip searches each have advantages depending on scene characteristics. Due diligence requires selecting and executing the appropriate method with precision.

Proper packaging and labeling:

Evidence must be packaged in materials that prevent contamination and degradation. Biological samples, for example, require breathable packaging to prevent mold growth. Mislabeling or improper sealing can compromise chain of custody and render evidence inadmissible.

Chain of custody documentation:

The chain of custody is a legal record demonstrating who handled evidence, when, and under what conditions. Due diligence requires meticulous documentation to ensure that evidence remains credible and legally admissible [7].

Opinionated stance: Many forensic failures originate not in the laboratory but at the scene, where haste, overconfidence, or poor coordination leads to avoidable errors. Due diligence requires humility and recognition that every scene demands careful and disciplined attention.

Due Diligence in Laboratory Analysis

Laboratory analysis is where scientific rigor must be at its best and highest. Due diligence in this context involves methodological validation, instrument maintenance, quality assurance, and objectively unbiased interpretation.

Method validation:

Analytical methods must be validated before use in casework. Validation ensures that methods are reliable, reproducible, and appropriate for their intended purpose [8]. Failure to validate methods has been a recurring issue in forensic disciplines such as bite mark analysis and microscopic hair comparison.

Instrument calibration and maintenance:

Analytical instruments require regular calibration and maintenance to ensure accuracy. Due diligence requires adherence to manufacturer specifications, laboratory protocols, and accreditation standards such as ISO/IEC 17025.

Quality assurance and peer review:

It is not enough to produce results from forensic analysis. There must be a verification process to validate the result. Therefore, quality assurance programs such as proficiency testing, blind testing, and peer review are crucial components of due diligence. They help to identify errors, reduce bias, and ensure consistency by all analysts [9].

Interpretation and reporting:

Interpretation must be grounded in scientific evidence, not subjective judgment. Analysts' personal views are not and should not be parts of the results of forensic analyses. Personal bias renders opinionated expert testimonies and evidence illegally acceptable to the judiciary. Analysts must acknowledge uncertainty, avoid overstating conclusions, and clearly articulate the limitations of their methods for the analyses [10]. emphasizes the importance of probabilistic reporting and transparency.

Documentation and Reporting: The Written Record of Due Diligence

Documentation is the clearest reflection of whether due diligence was exercised. It provides a transparent record of investigative actions, observations, and conclusions. The ability to write clearly and in comprehensible language is very critical because the written record of the analysis is a demonstration of due diligence employed in the process. The documentation of the result of an analysis must be comprehensive and inclusive of the following:

1. Scene notes
2. Photographs and diagrams
3. Evidence logs
4. Analytical procedures
5. Instrument settings and calibration records
6. Observations and interpretations
7. Limitations and uncertainties

Transparency and reproducibility

A well documented investigation allows others to independently evaluate the evidence. Transparency is essential for scientific reproducibility and legal defensibility. A forensic report should not be a persuasive narrative. It should be a factual, transparent account that enables independent assessment. Overly confident language or selective presentation of findings undermines due diligence. The duty of the forensic expert or professional is to present the facts of the investigation and analysis without interjecting subjective slants.

Cognitive Bias and the Human Factor

Even highly trained forensic professionals are vulnerable to cognitive biases. According to [11], "bias refers to prejudice, or preconceived beliefs, for or against a particular person, group, or idea" (p.59). Cognitive bias, therefore, is the utilization of prejudice or bias when investigating or analyzing evidence with the intent of arriving at preconceived results. Due diligence requires active approaches to moderate these influences.

Common Biases in forensic work:

1. Confirmation bias: seeking evidence that supports an existing theory
2. Contextual bias: being influenced by irrelevant case details
3. Anchoring bias: relying too heavily on initial impressions
4. Overconfidence bias: overestimating one's accuracy



Research by [12] demonstrates that forensic decision making is susceptible to cognitive influences, particularly in subjective disciplines such as fingerprint analysis and pattern matching. To ensure that is prevented or reduced, the following strategies should be adopted by organizations to maintain structural precautions required by due diligence.

Those safeguards are:

1. Blind or semi blind analysis
2. Sequential unmasking
3. Peer review
4. Standardized protocols

These measures will reduce opportunities for bias to influence results, and strengthen the scientific integrity of forensic conclusions.

Legal and Procedural Dimensions of Due Diligence

The legal system expects forensic professionals to meet a duty of care consistent with their training and the norms of their discipline. Failure to exercise due diligence can result in evidence rejection, professional sanction for misconduct, civil liability, and criminal liability in extreme instances. Courts more and more examine forensic evidence, particularly in light of scientific evaluations and wrongful conviction cases. Due diligence is crucial for both scientific accuracy and legal defensibility.

Consequences of Failing to Exercise Due Diligence

The absence of due diligence can have devastating consequences.

Wrongful convictions

Firstly, inadequate forensic practices have led to numerous wrongful convictions which were later overturned by DNA evidence. [13] reports that flawed forensic evidence played a role in virtually half of DNA exoneration cases.

Failed prosecutions

Secondly and sadly too, poor forensic work can allow guilty individuals to evade accountability. When evidence is mishandled or improperly analyzed, prosecutors may be forced to drop charges or courts may exclude critical findings.

Loss of public trust

Thirdly, forensic scandals minimize confidence in the justice system. Adherence to due diligence ensures rebuilding visible trust and sustained commitment.

Institutional damage

Fourthly, forensic laboratories risk reputational harm, loss of accreditation, and reduced funding when due diligence is lacking. Forensic organizations and agencies should create fitness-for-duty evaluation their new hires and existing employees to assess their skills and suitability for the job.

The Evolving Landscape: New Challenges for Due Diligence

Modern forensic investigation faces emerging challenges that make due diligence more complex and more essential. New technologies like digital forensics, rapid test DNA, and AI assisted analysis provide powerful tools but also introduce foreseeable and unforeseeable risks. Due diligence requires validation, understanding of limitations, and ethical consideration of privacy and data integrity. Globalization, cybercrime, and sophisticated criminal networks demand multidisciplinary approaches. Due diligence now demands collaboration across fields and jurisdictions. Many forensic laboratories face backlogs, staffing shortages, and budget limitations but despite these challenges, they cannot justify shortcuts. Due diligence must remain nonnegotiable. High profile cases attract intense media attention, thereby creating pressure to produce quick results. Due diligence requires resisting such pressures and prioritizing accuracy over speed.

Due Diligence as a Cultural Imperative

This paper argues that due diligence must be understood not as a task but as a culture. A culture of due diligence is characterized by transparency, accountability, constant improvement, scientific humility, and ethical consciousness. Such a culture cannot be mandated solely through policies. It must be cultivated through leadership, training, mentorship, and organizational values. The forensic community must reject the notion that errors are inevitable or acceptable. While perfection is unfeasible, the pursuit of excellence is not. Due diligence is the pathway through which that pursuit becomes operational. It must be pursued with unflinching commitment and dedication.

Recommendations for Strengthening Due Diligence

Due diligence as an imperative for forensic astuteness and certainty can be strengthened through the following adoptions and practices such as the standardization of Protocols (uniform procedures reduce variability and ensure consistent quality; mandatory continuing education (science is dynamic exacting the same from forensic professionals); blind or semi-blind analysis (reducing contextual information diminishes bias); robust quality assurance programs (regular audits, proficiency testing, and peer- review support due diligence; investment in resources (adequate staffing, equipment, and training are necessitous); and ethical training (ethics must be integrated into every facet of forensic education).

Conclusion

Due diligence is the keystone of reliable forensic investigation and analysis. It is a multi-layered discipline that encapsulates scientific rigor, ethical obligation, legal mindfulness, and professional honor. As forensic science continues to advance, the demands placed on practitioners will only increase. To meet those demands, an unwavering commitment to due diligence is required, not as a procedural requirement but as a guiding philosophy. The stakes are too high for anything less than that. Lives, freedoms, and the legitimacy of the justice system depend on the diligence of the practitioners entrusted with uncovering the truth. Forensic professionals must embrace due diligence both as personal and institutional obligation by guaranteeing that their work withstands scrutiny, serves justice, and upholds the highest standards of scientific and ethical practice.

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