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A Comparative Study of the Burden of Proof in Claims Based on Scientific Evidence in Iranian and English Law

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ABSTRACT

This study aims to identify the strengths and weaknesses of the Iranian and English legal systems regarding the use of scientific evidence and to propose solutions for overcoming obstacles to its acceptance. The results indicate that within Iranian law, the acceptance of scientific evidence is highly dependent on the judge's personal judgment and the principle of "the judge's personal knowledge," which can lead to contradictory opinions. By contrast, the English legal system employs stricter criteria, such as the Daubert principles, which have enhanced the accuracy of scientific evidence evaluation but have also resulted in more complex and costly processes. Both legal systems face challenges, including the potential misuse of scientific evidence and a lack of specialized training for judges and experts. The study concludes by suggesting that the Iranian legal system, drawing on the English experience, develop clear criteria for the acceptance of scientific evidence and standardize its evaluation process. Reforms have also been proposed for the English context to reduce costs and streamline procedures. The study highlights the importance of specialized judicial training and international cooperation for improving the efficiency of judicial systems.

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Introduction

Scientific evidence, as one of the most important means of proof in civil and criminal cases, plays a key role in ensuring a fair trial. Relying on modern technologies and specialized knowledge, this evidence helps improve the accuracy and credibility of the judicial process and can be a turning point in judges' decision-making, especially in complex cases such as those involving organized crime or medical issues.[1] However, the use of scientific evidence also presents several challenges. From a legal perspective, important questions arise regarding the validity, authenticity, and admissibility of this evidence. From an ethical perspective, issues related to privacy, the use of sensitive technologies, and the risk of misuse or abuse of scientific data require greater attention.[2]

Meanwhile, different legal systems, including Iranian and English law, have adopted different approaches to managing scientific evidence. In Iran, the strong reliance on the principle of "the judge's personal knowledge" and his decision-making role in the acceptance of scientific evidence allows for greater flexibility but also increases the risk of contradictory opinions. In England, by contrast, strict criteria such as the Daubert principles, which emphasize the reliability and dependability of scientific evidence, demonstrate a more systematic approach; however, this strictness may result in greater complexity and cost.

A comparative study of these two legal systems can help identify the strengths and weaknesses of each and propose solutions for improving judicial processes. Accordingly, the necessity for a comparative analysis in this study arises from the cultural, legal, and administrative differences between Iran and England. Examining these differences could lead to the development of more efficient approaches for the acceptance and use of scientific evidence.

This study attempts to examine the standards of proof in litigation based on scientific evidence from two perspectives: first, an analysis of the legal principles and standards in each legal system, and second, a practical assessment of the challenges in using this evidence. The research methodology is based on a comparative analysis of laws, a study of judicial procedures, and a review of relevant cases in both countries. The main research questions of this study are:

1 H Mohammadi, *Civil Procedure Code* (Danesh 2023) 34 [In Persian].

2 H Esmaili, *Civil Procedure: Merger and Separation of Claims* (Publishing Company 2022) 17 [In Persian].

What are the standards of proof for scientific evidence in civil and criminal litigation in Iran and the United Kingdom? What are the differences and similarities in the approaches of these two legal systems to scientific evidence? And how can the strengths of each system be utilized to improve judicial processes? By answering these questions, this study seeks to provide a foundation for effective changes in legal systems and to highlight the importance of scientific evidence in achieving judicial justice.

1. Review of Literature

1.1. Definition of Scientific Evidence

Scientific evidence is any information or data based on scientific principles, experimental tests, or expert analysis that can be used as a means of proof in civil and criminal cases.[1] This evidence includes various types of data, such as DNA tests, biometric analyses, digital data, forensic results, and expert technical analyses. What distinguishes scientific evidence from other forms of proof is its reliability, which is based on accepted and testable scientific principles. Due to its high accuracy and strong scientific support, scientific evidence plays a key role, especially in complex and specialized cases such as those involving organized crime, medical litigation, and cyber litigation.[2]

One of the most important characteristics of scientific evidence is its ability to be reviewed and verified by independent experts. This characteristic has led to the application of strict criteria for the acceptance and evaluation of this evidence in various legal systems. For example, in the English legal system, the Daubert principles establish a framework whereby scientific evidence is considered valid only if its testability, potential error rate, and general acceptance in the scientific community are confirmed.[3] In the Iranian legal system, scientific evidence is also used as a means of proof alongside conventional evidence such as confession, testimony, and oath; however, its position continues to face challenges due to the system's reliance on the principle of "the judge's personal knowledge" and the lack of clear acceptance criteria.[4]

1.2. Characteristics of Scientific Evidence: Accuracy, Reliability, and Expertise

Scientific evidence possesses unique characteristics that have made it a key tool in the litigation process. These characteristics include:

1.2.1. Accuracy

The accuracy of scientific evidence results from standardized processes and the use of advanced tools for data analysis. Scientific evidence, such as DNA testing or biometric data analysis, is designed based on scientific methodologies that minimize the possibility of error. For example, in criminal cases, DNA matching can determine the identity of the accused with a high degree of accuracy, which further emphasizes the role of scientific evidence in enhancing judicial justice.

1 J Levinson and others, 'Scientific Evidence in Courts of Law: An Overview' (2024) 22 Journal of Judicial Independence 140, 143.
2 T Albright, *A Scientist's Take on Scientific Evidence in the Courtroom* (University of St Louis 2023) 139.
3 D L Faigman, N Scurich and T D Albright, 'The need for anti-expert experts to rebut claims of junk forensic science' (2022) 46 Journal of Scientific American Law 37, 45.
4 M Haddadi, *International Arbitration in the Iranian Legal System* (Majd 2019) 78 [In Persian].

This high accuracy makes scientific evidence highly reliable in complex cases, particularly those where objective evidence is lacking.[1]

1.2.2. Reliability

The reliability of scientific evidence refers to the ability to obtain similar results under similar conditions upon repetition. In other words, if the scientific processes involved in producing the evidence are repeated, the results should be consistent and predictable. For example, in the English legal system, the Daubert principles emphasize that scientific evidence is considered valid only when its testability has been confirmed by the scientific community. This reliability allows judges and juries to place greater confidence in scientific evidence.[2]

1.2.3. Expertise

Scientific evidence is usually provided by professionals in various scientific fields. This characteristic indicates the direct dependence of scientific evidence on specialized knowledge and technical skills. For example, chemical tests or digital data analyses must be provided by experts who possess the necessary qualifications in that specific field. This expertise not only aids in the admissibility of scientific evidence in court but also plays an important role in the correct interpretation and effective use of this evidence during the trial process. The characteristics of accuracy, reliability, and expertise have made scientific evidence a powerful tool for discovering the truth.[3] However, these characteristics require careful management and clear criteria for acceptance and evaluation within legal systems. This issue becomes especially important in a comparative analysis of the legal systems of Iran and England, each of which has its own distinct criteria and challenges.

1.3. Definition of Burden of Proof and Related Standards

The burden of proof is the legal obligation of one party to a lawsuit to present sufficient evidence to the court to prove its claims. In civil and criminal litigation, the burden of proof determines which party is required to present evidence to establish liability or innocence.[4] This concept is divided into two parts:

- The burden of production (or going forward with the evidence): The duty to provide sufficient evidence to support the claim.
- The burden of persuasion: The duty to convince the judge or jury based on specified standards.[5]

In criminal litigation, the burden of proof rests primarily on the prosecution and must meet the "beyond a reasonable doubt" standard. In civil litigation, the burden of proof is usually on the claimant, and the common standard is the "balance of probabilities".[6]

1 R Shawa and others, 'A promising potential: Using the right to enjoy the benefits of scientific progress to advance public health in Africa' (2023) 23 African Human Rights Law Journal 30, 35.

2 E Cheng, *The Consensus Rule: A New Approach to Scientific Evidence* (Vanderbilt University Law School 2022) 415.

3 K Rao and others, 'Role of scientific evidence in the judiciary system: A Systematic Review' (2023) 17 Indian Journal of Forensic Medicine and Toxicology 79, 81.

4 N Scurich, D Faigman and T Albright, 'Scientific guidelines for evaluating the validity of forensic feature-comparison methods' (2023) 120 Journal of Law 112, 119.

5 G Eckhartt and G Ruxton, 'Investigating and preventing scientific misconduct using Benford's Law' (2023) 8 Journal of Research Integrity and Peer Review 68, 71.

6 M Zhu and L Fan, 'A comparative study of the judicial construction of scientific credibility in climate litigation' (2024) 33 Review of

Standards of proof refer to the degree of certainty and the quantum of evidence that must be presented to convince a judge or jury. The main standards include the following:

- **Beyond a reasonable doubt:** This standard represents the highest level of proof in criminal cases. Under this standard, the prosecution is required to present evidence that eliminates any reasonable doubt regarding the defendant's guilt. This standard is used to prevent wrongful convictions in criminal cases.[1]
- **Balance of probabilities (Preponderance of the evidence):** This standard is typically used in civil cases and requires a party to present evidence demonstrating that its claim is more likely true than not. In other words, the burden of proof is met if there is a greater than 50% chance that the claim is true.[2]
- **Clear and convincing evidence:** This standard is higher than the "balance of probabilities" but lower than "beyond a reasonable doubt." It is usually employed in specific civil cases, such as those involving family law or constitutional rights. It requires that the evidence presented provides a high degree of certainty to the judge.[3]
- **Judge's personal knowledge (Ilm-e Qazi):** In the Iranian legal system, particularly in criminal cases, the principle of "the judge's personal knowledge" plays an important role in determining the burden of proof. This principle allows the judge to reach a decision based on his or her personal knowledge or perception of the evidence.[4]

The burden of proof and its related standards are fundamental pillars of legal systems and play a crucial role in ensuring justice and preventing miscarriages of justice. The difference between the standards of proof in civil and criminal cases reflects a balance between protecting the rights of the claimant and those of the accused.[5] A comparative analysis of these standards in the legal systems of Iran and the United Kingdom provides valuable insights into the challenges and practical solutions related to this issue.

1.4. Difference Between the Standards of "Beyond a Reasonable Doubt" and "Balance of Probabilities"

1.4.1. Beyond a Reasonable Doubt

This standard represents the highest level of proof in criminal cases and protects the accused from unjust convictions. According to this standard, the prosecution must present evidence that eliminates any reasonable doubt in the mind of the judge or jury regarding the guilt of the accused. This doubt must be so insignificant that it cannot be considered reasonable. The purpose of this standard is to prevent wrongful convictions and to ensure the maximum protection of the rights

European, Comparative & International Environmental Law 250, 256.

1 K Ruggeri and others, 'A synthesis of evidence for policy from behavioural science during COVID-19' [2024] Journal of Private Law 134, 138.

2 H Keller and P Ganesan, 'The Use of Scientific Experts in Environmental Cases before the European Courts of Human Rights' (2024) 73 International and Comparative Law Quarterly 997, 1007-1008.

3 C Castelliano, P Grajzl and E Watanabe, 'Does electronic case-processing enhance court efficacy? New quantitative evidence' (2023) 40 Government Information Quarterly 276, 281.

4 B L Garrett, N Scurich and W E Crozier, 'Mock jurors' evaluation of firearm examiner testimony' (2020) 44 Journal of Law and Human Behavior 412, 416.

5 L Chauhan, 'Admissibility and Evidentiary Value of Scientific Evidence: Legislative and Judicial Approach in India' (2023) 8 International Journal for Research Trends and Innovation 145, 152.

of the accused.[1] Due to the high sensitivity of criminal cases and their grave consequences, this standard is used to ensure justice in criminal proceedings.[2]

1.4.2. Balance of Probabilities (Preponderance of the Evidence)

This standard is commonly used in civil cases and means proving that the probability of one party's claim being true is greater than the probability of the other party's claim being true. To meet this standard, it is sufficient for the claimant to present evidence that would convince the judge that his or her claim is even slightly (for example, 51 percent) more likely than the defendant's claim.[3] This lower level of certainty is appropriate for civil cases where the legal consequences are not as severe as in criminal cases.

The fundamental difference between the two standards is the level of certainty required to prove a claim. In criminal cases, the proof must reach a much higher level of certainty due to the serious risks associated with conviction. In contrast, in civil cases, which are more concerned with compensation, the "balance of probabilities" standard is deemed sufficient.

1.5. The Role of Scientific Evidence in Determining the Burden of Proof

Scientific evidence, especially in complex cases, can play a crucial role in meeting the standards of proof. Due to its high accuracy and reliability, this type of evidence can convince a judge or jury of the truth of a claim.

1.5.1. In Criminal Cases

Under the "beyond a reasonable doubt" standard, scientific evidence can play an important role in eliminating reasonable doubt. For example, DNA or fingerprint matching in criminal cases is commonly used as conclusive evidence to prove guilt or innocence.[4] This evidence can provide the necessary certainty for the conviction or acquittal of the accused, surpassing oral or non-scientific claims.

1.5.2. In Civil Cases

In civil cases where the "balance of probabilities" standard prevails, scientific evidence can play a decisive role in supporting the claimant's claim. For example, medical evidence in compensation cases or digital data in commercial litigation can elevate the probability of the claimant's claim to the level required to meet this standard.[5]

Despite its key role, the acceptance of scientific evidence also presents challenges. For example, in Iran, the role of "the judge's personal knowledge" as a primary criterion for decision-making can sometimes lead to a subjective assessment of scientific evidence. In the UK, stricter standards such as the Daubert principles are applied, which require the testability and confirmation of evidence by the scientific community.[6]

1 B Eze, 'An Overview of the Impact of the Evidence (Amendment)Act 2023 on Legal Proceedings in Nigeria' [2023] Journal of Law 1, 8.
2 O Khalifa, A Yaacob and I Masri, 'The Modern Scientific Proofs and their Authenticity in Criminal Evidence: Literature Review' (2023) 13 International Journal of Academic Research in Business and Social Sciences 970, 974.
3 P Roberts, 'Theorising Evidence Law' (2023) 43 Oxford Journal of Legal Studies 629, 635.
4 Ruggeri and others (n 13) 140.
5 Zhu & Faan (n 12) 258.
6 P Adams, *President of the Supreme Court of the United Kingdom; How do Judges Decide Cases in the Judicial Committee of the Privy Council?* (University of the West Indies 2024) 173.

1.6. The Role of Scientific Evidence in the Evolution of Standards of Proof

1.6.1. How Conventional Standards of Proof Changed with the Introduction of Scientific Evidence

The introduction of scientific evidence into legal processes has significantly affected conventional standards of proof, which were mainly based on evidence such as confessions, testimonies, and documents. In conventional legal systems, proving a case relied more heavily on non-scientific evidence such as eyewitness testimony or documentary evidence, which in some cases was erroneous or contradictory.[1] With the advent of advanced technologies and scientific evidence, standards of proof have moved towards accepting tools that are more accurate and reliable.

For example, in criminal cases, the use of DNA to identify a defendant or victim has created a significant evolution in the "beyond a reasonable doubt" standard. This evidence, due to its strong scientific support and testability, is more accurate than conventional evidence and reduces the possibility of judicial errors.[2] In civil litigation, the use of scientific analysis in fields such as medicine, the environment, or information technology has transformed the criteria for evaluating claims.[3] For instance, in lawsuits related to environmental damages, scientific data on pollution or environmental harm have played a decisive role in proving claims.

These changes, especially in the English legal system with the introduction of principles such as Daubert for evaluating scientific evidence, indicate a move towards accepting evidence that is scientifically testable, reliable, and relevant to the subject of the lawsuit.[4] In Iran, although the principle of "the judge's personal knowledge" remains central to decision-making, scientific evidence has gradually gained greater standing, and its impact on the evolution of the standards of proof is visible.[5]

1.6.2. Challenges to Accepting Scientific Evidence as a Tool of Conclusive Proof

Despite the undeniable advantages of scientific evidence, its acceptance as a tool of conclusive proof faces several challenges. These challenges are divided into two general categories: operational challenges and legal-philosophical challenges.

1.6.2.1. Operational challenges

One of the most important challenges is the technical and specialized complexity of scientific evidence, which may be difficult for judges and juries to understand. Insufficient familiarity with scientific principles or related technologies can lead to misunderstanding or incorrect evaluation of this evidence. For example, in DNA cases, errors in analysis or interpretation of results can lead to incorrect judicial conclusions.[6] Furthermore, the high cost of analyzing and presenting scientific evidence, especially in complex cases, is another challenge that may prevent its widespread use. For instance, in civil cases, the party with the greater financial ability to provide scientific evidence may gain an unfair advantage.[7]

1 R Shokri, *Privacy in Iranian and English Criminal Law* (Majd 2018) 13 [In Persian].
2 N Cross, *Criminal Law & Criminal Justice: An Introduction* (tr Amir Etemadi, Majd 2019) 231 [In Persian].
3 J Mansour, *Code of Procedure of General and Revolutionary Courts (in Civil Matters)* (Doran 2025) 106 [In Persian].
4 J Spark, *Sentencing in English Criminal Law* (tr Reza Ehsanpour, Mehrsa 2020) 57.
5 E Firuzian Haji, *Comparative Studies of the Prosecutor in the Iranian Legal System and the International Criminal Court* (Mahris 2023) 28 [In Persian].
6 E Sipiorski, *Scientific Knowledge: Its Impacts on Judicial Decision-Making and International Law in the Era of Sustainability* (Tilburg University 2023) 135.
7 C Dawson and others, 'Evidence-based scientific thinking and decision-making in everyday life' (2024) 9 Journal of Cognitive Research Principles and Implications 50, 54.

1.6.2.2. Legal and philosophical challenges

From a legal perspective, the main challenge to accepting scientific evidence as a definitive means of proof is establishing standards that can ensure the validity and relevance of the scientific evidence presented. For example, in the English legal system, challenges have been raised regarding the testability and relevance of scientific evidence to the subject of the dispute, which necessitates a review and updating of the laws.[1] In the Iranian legal system, reliance on the "judge's personal knowledge" may cause scientific evidence to be considered merely as one piece of evidence alongside other conventional evidence, which can diminish its value in some cases.[2] From a philosophical perspective, some critics argue that accepting scientific evidence as a definitive means of proof can jeopardize the principle of a fair trial, because in some cases scientific evidence may not fully clarify all aspects of a case.[3]

2. Scientific Evidence in the Iranian Legal System

2.1. Burden of Proof in Lawsuits Based on Imamiyyah Jurisprudence

2.1.1. Evidence to Prove a Claim in Civil Matters

Civil lawsuits are lawsuits that are filed in a public court and are mostly related to damages and compensation. In fact, crimes and punishments are not addressed in civil lawsuits. According to Article 1258 of the Iranian Code of Civil Procedure, evidence to prove a claim in civil matters includes the following:

- **Confession:** Confession is among the evidence to prove a claim in both civil and criminal matters. A confession in a civil lawsuit means that a person states a matter that is to his own detriment and to the benefit of another, provided that the confessor is of legal age, mature, and acting freely; an immature's confession is not admissible in financial affairs. If one of the litigants confesses to his own detriment, the other party is no longer required to provide evidence or proof.
- **Written documents:** The most important evidence to prove a claim in a civil lawsuit is a document. In evidence law, a document is any written instrument that can be relied upon and accepted by the court as evidence to prove a claim and establish a right.
- **Testimony:** Another form of evidence in both civil and criminal matters is testimony. If the claim cannot be proven by confession or the presentation of a document, witnesses can be summoned to testify. Testimony in civil matters means that a person who has heard or seen something related to the subject of the claim, whether by accident or design, is asked to state what he knows in court. The witness must be mature, sane, Muslim, believing, and just.
- **Oath:** An oath is the least used form of evidence in civil law to prove a claim and is mostly used to conclude a dispute. If the claimant does not have evidence to prove his claim and the other party denies it, the claimant can request that the denier take an oath.

1 M Medvedeva and P McBride, *Legal Judgment Prediction: If You Are Going to Do It, Do It Right*(Leiden University 2023) 77.
2 Firuzian (n 28) 83.
3 M Thomaidou and C Berryessa, 'Bio-behavioral scientific evidence alters judges' sentencing decision-making: A quantitative analysis' (2024) 95 International Journal of Law and Psychiatry 1, 8.

- **Judicial evidence (Persuasion of the judge - Qana'at-e Qazi):** This refers to circumstances and factors that, in the opinion of the judge or a judicial officer, constitute evidence of a matter. Although not listed as independent evidence to prove a claim, judicial evidence assists the judge in understanding the matter and influences his decision in issueing a verdict. Cases such as expert opinions, local investigations, and inspections are among judicial evidence.[1]

2.1.2. Evidence to Prove a Claim in Criminal Matters

Criminal claims are claims that are brought in the prosecutor's office or criminal court as a result of an alleged crime. The methods for proving a crime and defending against an allegation in criminal matters are specified in the Code of Criminal Procedure. According to this Code, the ways to prove a crime and the evidence to prove a claim in criminal matters are:

- **Confession:** Confession is one of the common forms of evidence to prove a claim in both civil and criminal matters. It is a method of proving a crime in which the accused or perpetrator declares that he committed the crime. The number of confessions required in criminal matters, unlike in civil matters, varies depending on the type of crime committed. Some crimes are proven with a single confession, others with two, and some require four confessions.
- **Testimony:** Testimony in a criminal case means that someone other than the two parties to the case states in court whether or not the crime was committed by the defendant or provides information on any other matter related to the crime.
- **Oath:** An oath in criminal matters means that the person swearing takes God as a witness that he is telling the truth. Taking an oath in criminal cases has specific conditions that must be observed. The oath must be taken in the name of God (Allah) or one of the specific attributes of God Almighty. It should be noted that, as in the principle "the burden of proof is upon the claimant and the oath is upon the denier," it is the claimant's responsibility to present evidence and the denier's responsibility to take an oath.
- **The personal knowledge of the judge (Ilm-e Qazi):** The knowledge of the judge means that the judge, based on a body of information, becomes certain about the case in question and can rule based on that certainty. Among the things that inform a judge are expert opinions, local investigations, statements from informed sources, and reports from judicial officers, such as the police and Basij forces.[2]

2.2. The Position of Scientific Evidence in Iranian Laws (such as the Islamic Penal Code and the Code of Criminal Procedure)

Scientific evidence is recognized in the Iranian legal system as one of the means of proof alongside other evidence such as confession, testimony, and oath. In the Islamic Penal Code (2013), Article 160 refers to the types of evidence in criminal cases and also introduces the "personal knowledge

1 M R Mousavifard, *Islamic Criminology* (Majd 2018) 107-110 [In Persian].
2 Mohammadi (n 1) 263-266.

of the judge" as a legal tool for decision-making. This knowledge can be based on scientific evidence. Specifically, Article 211 of the said law stipulates that the personal knowledge of the judge must be based on evidence and documents that are logically and rationally acceptable.[1]

In the Code of Criminal Procedure, various articles refer to the use of scientific evidence. For example, Article 194 addresses the manner in which evidence is presented and evaluated by the parties to the dispute and emphasizes the use of specialized expertise and scientific evidence. Also, Article 158 allows the judge to employ official experts to accurately evaluate scientific evidence.[2]

2.3. The Role of the Judge in Evaluating Scientific Evidence Based on the Principle of "Judge's Personal Knowledge"

In the Iranian legal system, the principle of "the judge's personal knowledge" holds a special place as one of the criteria for judicial decision-making. According to Article 211 of the Islamic Penal Code, a judge can issue a ruling based on knowledge derived from the available evidence and documents. This knowledge can also originate from scientific evidence, provided that this evidence is valid and logical.[3] However, the judge's role in evaluating scientific evidence, due to its dependence on judicial knowledge and experience, presents challenges. For example, the judge may lack the specialized knowledge necessary to analyze and interpret complex scientific evidence such as DNA analysis or digital data. In such cases, it is necessary to rely on the opinion of official judicial experts. This issue is also emphasized in Article 158 of the Code of Criminal Procedure, which states that the evaluation of scientific evidence should be carried out using expert opinions.[4]

2.4. Examples of Iranian Judicial Cases Using Scientific Evidence

Scientific evidence has played a key role in many Iranian judicial cases. One of the most prominent examples is cases related to identification based on DNA testing. This type of evidence has been widely used in family lawsuits, such as those involving the proof or denial of lineage. For example, in one lineage case, the court ruled to accept the claimant's claim based on DNA testing because the scientific results presented could definitively prove the biological relationship between the parties.[5] Also, in criminal cases, scientific evidence such as fingerprints, crime scene analysis in murder cases, and examination of digital data have played an important role in proving the guilt or innocence of the accused. For instance, in a cybercrime case, data collected from the defendant's mobile phone and its comparison with technical reports was the main factor in issuing a conviction.[6]

2.5. Challenges in Admitting Scientific Evidence in Iran

2.5.1. Legal and Procedural Limitations

One of the most important challenges regarding the admissibility of scientific evidence in the Iranian legal system is the lack of clear and comprehensive laws to regulate the admission and use

1 M Ashouri, *Criminal Procedure* (SAMT 2021) 71 [In Persian].
2 A Ghafouri, *Criminal Procedure Code* (Ariadad 2023) 62-63 [In Persian].
3 J Nikbakhti, *Code of Criminal Procedure* (Majd 2022) 142 [In Persian].
4 B Pourghahremani, *Restitution of Trial in Criminal Matters* (Khorsandi 2024) 85 [In Persian].
5 A Zeraat, *Principles of Iranian Criminal Procedure* (Majd 2021) 102 [In Persian].
6 M Abazari Fumshi, *Practical Method of Preparing and Writing Various Types of Defense Bills in Criminal Matters* (Khorsandi 2022) 27.

of this type of evidence. Existing laws, such as the Islamic Penal Code and the Code of Criminal Procedure, albeit refering to the admission of scientific evidence, do not provide clear and specific criteria for assessing its accuracy and reliability. For example, Article 211 of the Islamic Penal Code allows a judge to issue a verdict based on personal knowledge, but this knowledge can be based on a personal perception of scientific evidence, which increases the possibility of errors in its interpretation.[1] Furthermore, judicial procedures in many cases lack sufficient transparency, and the absence of standard guidelines for the use of scientific evidence causes courts to act in a discretionary and inconsistent manner. These limitations are particularly evident in complex cases, such as cyber litigation or forensic cases.[2]

2.5.2. The Role of Conflict Between Conventional Evidence (Testimony, Confession) and Scientific Evidence

Due to its jurisprudential and conventional roots, the Iranian legal system has always emphasized evidence such as confession, testimony, and oath. Although these forms of evidence have an important place in proceedings, they sometimes conflict with scientific evidence. For example, in cases related to proving lineage, scientific evidence such as DNA testing can reach conclusions contrary to the testimony of witnesses or oaths. In such cases, judges may be hesitant about which type of evidence to rely upon.[3] This conflict is particularly challenging in criminal cases, where the guilt or innocence of the accused depends heavily on the quality of the evidence. For instance, in murder cases, scientific evidence such as fingerprints or forensic analyses may conflict with witness testimony. The lack of a clear legal framework for prioritizing evidence can cause the judge to either lean toward conventional evidence or disregard scientific evidence.

2.5.3. Issues Related to Training Judges and Experts in Interpreting Scientific Evidence

One of the major challenges in accepting scientific evidence in Iran is the lack of specialized training for judges and judicial experts in analyzing and interpreting this evidence. Judges usually do not possess in-depth knowledge of empirical sciences or new technologies, and this can lead to the incorrect evaluation or rejection of scientific evidence. For example, in cybercrime cases, digital data presented as scientific evidence may not be used properly due to an inability to understand its nature. On the other hand, official judicial experts tasked with analyzing scientific evidence sometimes lack the necessary training to provide clear and understandable reports to the courts. This can confuse judges and ultimately reduce confidence in scientific evidence. Developing training courses for judges and experts and establishing clear standards for scientific reporting could help to reduce this challenge.

2.6. Scientific Evidence in the English Legal System

2.6.1. Accepted Principles for Evaluating Scientific Evidence in the English Legal System, such as the Frye and Daubert Standards

The English legal system employs specific principles and criteria for evaluating and accepting scientific evidence in court. Two important standards that have played a role in evaluating this evidence are the Frye Standard and the Daubert Standard.

1 Mohammadi (n 1) 241.
2 Pourghahremani (n 39) 174.
3 A Shakeri, *Criminal Procedure Code of Arrest in Iranian Criminal Procedure* (Majd 2018) 58 [In Persian].

- **Frye Standard:** This standard, first articulated in the case of *Frye v. United States*,[1] states that scientific evidence is only admissible if it is based on principles that are generally accepted within the relevant scientific community. This standard emphasizes scientific consensus and was influential for years in various legal systems, including England's.
- **Daubert Standard:** The Daubert standard, established by the United States Supreme Court in *Daubert v. Merrell Dow Pharmaceuticals*,[2] emphasizes four main factors:
    - The testability of the theory or technique used;
    - The known or potential rate of error;
    - The peer review and publication status of the theory or technique;
    - The general acceptance of the theory or technique in the relevant scientific community.[3]

This standard, which remains influential in the UK today, emphasizes the quality and scientific validity of the evidence and represents a stricter approach than Frye. In the UK, the Daubert principles are utilized in a modified form within judicial procedures. Before admitting scientific evidence, the judge must consider whether this evidence is based on valid scientific methods and whether it is relevant to the case.[4]

2.6.2. The Role of the Jury and the Judge in Accepting and Evaluating Scientific Evidence

In the English legal system, the roles of the judge and the jury in evaluating scientific evidence are distinct:

- **The Role of the Judge:** The judge acts as a «gatekeeper» and has the duty to assess the validity, reliability, and relevance of scientific evidence *before* it is presented to the jury. The judge must ensure that the scientific evidence presented meets the required legal standards and will not unfairly influence the jury's decision.
- **The Role of the Jury:** The jury›s primary task is to determine the facts of the case. It receives and evaluates scientific evidence only after the judge›s approval for its admission. Since jurors typically lack scientific expertise, it is the judge›s responsibility to explain this evidence in comprehensible language. This is particularly challenging in complex cases, such as those involving forensic science or cybercrime.[5]

2.6.3. Examples of Court Cases in England Where Scientific Evidence Played a Key Role

- ***R v. Adams*:**[6] This case is one of the most famous early uses of DNA evidence in England. Scientific evidence was used as conclusive proof to connect the defendant

1 *Frye v United States 293 F 1013 (DC Cir 1923).*
2 *Daubert v Merrell Dow Pharmaceuticals, Inc* 509 US 579 (1993).
3 K Lesciotto and A Christensen, 'The over-citation of Daubert in forensic anthropology' (2023) 69 Journal of Forensic Legal Science 19, 22.
4 C Leonhard, 'Through Smoke and Mirrors: Excluding Malingering Expert Testimony Under the Daubert Standard' (2024) 59 Georgia Law Review 1, 15.
5 M Behrens, *A Brief Guide to the 2023 Amendments to the Federal Rules of Evidence* (The Federalist Society 2024) 7-8.
6 *R v Adams (G W)* [1996] 3 SCR 101.

to the crime scene. The court stressed that scientific evidence must be considered alongside other evidence to avoid potential bias.

- ***R v. Clark*:**[1] In this case, flawed scientific evidence relating to statistical and forensic analysis concerning the deaths of two children led to the wrongful conviction of the accused. The case highlighted the critical importance of careful scrutiny and an understanding of the limitations of scientific evidence, leading to a revision of the criteria for its assessment in the UK.[2]
- ***R v. T*:**[3] This case concerned the use of shoeprint evidence at a crime scene. The court stressed that scientific evidence must not only be scientifically valid but also relevant and clearly understandable in relation to the facts of the case.[4]

2.6.4. Challenges in English Law

2.6.4.1. Complexity of Scientific Evidence and the Risk of Jury Misinterpretation

A fundamental challenge in the English legal system is the complexity of scientific evidence, which can lead to jury misinterpretation. Juries are usually composed of laypeople who lack specialist scientific or technical knowledge, whereas evidence such as DNA analysis, biometric data, or statistical studies often requires in-depth expertise. This lack of technical knowledge can result in juries either failing to understand the evidence properly or being overly influenced by it, potentially leading to unfair decisions. For example, in *R v. Adams*, the use of DNA evidence led to significant debate over its assessment, as the jury struggled to understand the associated statistical probabilities. This demonstrates that scientific evidence, while a powerful tool, can lead to unjust outcomes if not interpreted correctly.[5]

2.6.4.2. Costs and Time-Consuming Nature of Using Scientific Evidence

Scientific evidence often requires sophisticated equipment, complex analytical methods, and the expertise of professional specialists, which can make its use costly and time-consuming. In UK criminal and civil litigation, the expenses associated with analyzing scientific evidence, such as DNA testing, digital data analysis, or crime scene reconstruction, can prevent its widespread use. This challenge is particularly acute when the parties have unequal financial resources. In such instances, the party that cannot afford the costs of scientific analysis may be at a serious disadvantage, potentially jeopardizing the fairness of the proceedings.[6] The time-consuming nature of scientific processes can also cause significant delays in judicial proceedings. For example, conducting complex forensic tests or analyzing large volumes of digital data can take weeks or even months. These delays not only prolong the trial process but also impose additional costs on the judicial system.[7]

1 *R v Clark* [2003] EWCA Crim 1020.
2 M Dembour, 'The Evidentiary System of the European Court of Human Rights in Critical Perspective' (2023) 4 Journal of European Convention on Human Rights Law Review 363, 368.
3 *R v T* [2010] EWCA Crim 2439.
4 Lesciotto & Christensen (n 47) 27.
5 Sipiorski (n 29) 63.
6 L Bachmaier, 'Mutual Admissibility of Evidence and Electronic Evidence in the EU' (2023) 26 European Journal of Law 223, 227.
7 J Rwetembula, 'Legal and Practical Challenges for the Admissibility of Artificial Intelligence (AI) Evidence in Criminal Proceedings in Mainland Tanzania' (2024) 7 East African Journal of Law and Ethics 136, 139.

2.6.5. Legal Restrictions on the Admission of Certain Scientific Evidence

In English law, although principles such as Daubert and Frye are used to evaluate scientific evidence, legal restrictions on its admission remain. A primary restriction is the requirement that scientific evidence must be both relevant and reliable. If it fails to meet these criteria, the judge can exclude it from being presented to the jury.[1] Furthermore, new or novel scientific evidence may be rejected due to a lack of acceptance within the relevant scientific community or insufficient validation. For example, the use of some emerging biometric techniques or data from new technologies may not be admitted due to an absence of extensive scientific background and testing.[2] Additionally, existing UK laws sometimes fail to keep pace with rapid technological advancements. This creates difficulties for courts when assessing cutting-edge scientific evidence that has not yet been subjected to established standards. This challenge is particularly evident in cases involving cybercrime and complex digital data analysis.[3]

Discussion and Conclusion

In recent years, both the Iranian and English legal systems have recognized the growing importance of scientific evidence in civil and criminal proceedings and have attempted to utilize this tool to achieve justice. In both systems, scientific evidence has been employed to reduce judicial errors and increase the accuracy of judicial decisions. However, common challenges persist, including the difficulty judges and juries face in understanding complex scientific evidence and the need to establish appropriate structures for the admission and evaluation of this type of evidence.

One of the main differences between Iranian and English law is the central role of the judge's personal knowledge in Iran versus the role of the jury in England. In Iran, decision-making depends largely on the judge's personal judgment, while in England, the jury, guided by the judge, is responsible for evaluating scientific evidence. This difference in the decision-making structure significantly impacts the outcome of trials, especially in complex scientific cases. Furthermore, the standards for admitting evidence in the UK are stricter, with criteria such as those derived from Daubert being applied, whereas in Iran such explicit and strict standards are absent. The common law tradition in the UK, which is based on case law and flexibility, creates important distinctions in the application of scientific evidence compared to the Iranian legal system, which is based more on codified statutes. These differences significantly impact trial outcomes. The UK system, with its stricter approach and extensive use of scientific standards, offers greater precision in assessing scientific evidence but may render trial processes more complex and costly. In contrast, in Iran, greater flexibility in judicial decision-making can facilitate quicker case resolution but also carries a greater risk of bias and misuse of scientific evidence.

Common Challenges

Both the Iranian and UK legal systems face similar challenges:

- The analysis of scientific evidence is often costly and time-consuming, which can place a heavy financial burden on litigants and the judicial system.

1 T O'Brien, S Hawkins and A Loesch, 'Scientific Disciplines and the Admissibility of Expert Evidence in Courts' (2022) 14 Sage Law Journal 11, 19.
2 T Ward and A Ferguson, 'Proof of foreign law: a reduced role for expert evidence?' (2024) 20 Journal of Private International Law 95, 100.
3 D Brodowski, *Admissibility of Evidence in EPPO Proceedings* (SAGE 2023) 191-192.

- There is a risk of bias in interpreting scientific evidence, particularly in cases where judges or juries lack sufficient expertise.
- A shortage of trained professionals in areas related to scientific evidence can affect the accuracy and efficiency of the judicial system.

Suggestions for Improving Practices

To address these challenges and promote the effective use of scientific evidence, the following measures are suggested:

- **Reform Iranian law:** It is necessary to define clear and standardized criteria for the admission of scientific evidence to reduce ambiguity in judicial decision-making.
- **Specialized training:** Advanced training courses for judges and legal experts in both countries are essential. This training should focus on fostering a better understanding of scientific evidence and its evaluation.
- **Increasing international cooperation:** Establishing legal and scientific cooperation between Iran and the UK could facilitate the exchange of knowledge and experiences regarding scientific evidence. Furthermore, efforts to harmonize standards with international best practices could improve the quality and efficiency of judicial processes.

This research has shown that scientific evidence is recognized as a key tool for ensuring justice in both the Iranian and English legal systems. However, structural differences and practical challenges in admitting and evaluating this evidence persist. The Iranian legal system could operate more efficiently by leveraging the UK's experiences in standardizing scientific evidence and developing clearer legal frameworks. Conversely, the UK could consider incorporating greater flexibility in dealing with scientific evidence to simplify its judicial processes and reduce costs. Establishing a common framework and harmonized standards for evaluating scientific evidence could represent an important step towards enhancing judicial justice in both countries.

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