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Artificial Intelligence, Paternity Fraud, and Legal Integrity: Enhancing Family Law and Economic Stability in African Societies

Uche Divine Ogbonna[1], Kene-Unwana Trenchard Ibia[2], Joseph B. Igwe-Okomiso[3] and Ayodele Adetokunbo Olambo[4]

[1]Department of Sociology/Criminology and Security Studies, Topfaith University, Mkpatak, Akwa Ibom State, Nigeria. E-mail: divinetancy.ud@gmail.com;
ORCID: https://orcid.org/0009-0007-2689-8401
[2]Faculty of Law, Topfaith University, Mkpatak. Akwa Ibom State, Nigeria.
E-mail: Keneunwanaibia@gmail.com
[3]Department of Sociology/Criminology and Security Studies, Topfaith University, Mkpatak, Akwa Ibom State, Nigeria. E-mail: josephbernard10@gmail.com;
ORCID: https://orcid.org/0000-0001-6521-821X
[4]Department of Sociology, University of Port Harcourt, Choba, Rivers State, Nigeria.
E-mail: Olambo01@gmail.com

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Abstract: In the African context, where cultural norms, legal frameworks, and economic ramifications are intricately interconnected, paternity fraud presents a complex legal and socio-economic challenge. This article examines the potential application of Artificial Intelligence (AI) to mitigate paternity fraud, enhance legal integrity, and bolster economic stability across African nations. The paper examines the applications of AI in DNA verification, identity management, and legal case resolution, emphasising accuracy, ethical considerations, and social acceptance through a scoping examination of relevant literature. Deductive theme analysis highlights how AI can revolutionise family law by providing objective and efficient solutions that reduce false claims, streamline legal processes, and address inheritance and child support disputes. The findings indicate that AI-enhanced DNA testing enhances precision, reduces human error, and accelerates legal resolutions, hence alleviating financial burdens on affected families. Despite these advantages, the research highlights significant concerns, including ethical dilemmas around data privacy, informed consent, and the potential for

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algorithmic bias, particularly within the culturally diverse African context. Societal norms and scepticism towards artificial intelligence impede technological uptake, hence complicating the integration of artificial intelligence into judicial systems. The successful implementation of AI in family law hinges on the necessity of reconciling technological advancement with ethical safeguards and public awareness. The cultivation of confidence and acceptance relies on robust legal frameworks, ethical use of artificial intelligence, and enhanced public awareness. This study offers a comprehensive analysis for legal professionals, policymakers, and engineers aiming to leverage artificial intelligence to enhance family law, provide justice, and sustain economic stability in African nations.

***Keywords**:* Artificial Intelligence, Paternity Fraud, Legal Integrity, Family Law, Economic Stability, Africa

Introduction

Background and Rationale

Artificial intelligence (AI) is progressively transforming various sectors, including legal practices and familial relationships. Through data analysis, pattern recognition, and predictive modelling, AI is transforming the delivery of justice in legal systems by providing more efficient legal remedies (Shestak *et al.*, 2022). In family law, artificial intelligence offers innovative technologies that may assist with complex issues such as paternity testing, custody disputes, and asset distribution, hence enhancing the integrity of legal processes and outcomes (Floridi & Cowls, 2019). In Africa, the rising adoption of technology-driven legal solutions has substantial implications.

Paternity fraud, wherein a man is deceived into believing he is the biological father of a child, significantly undermines family structures, legal integrity, and economic stability. Paternity fraud rates are estimated to range from 1% to 30% globally, contingent upon the nation and cultural context (O'Neill *et al.*, 2020). The pecuniary repercussions are substantial, resulting in economic distress for unsuspecting males, legal disputes, and emotional anguish for all parties involved (Brown & Clarke, 2021). Societal cohesion in Africa is significantly shaped by the socio-cultural dimensions of fatherhood and lineage, rendering the subject both sensitive and impactful. The integration of AI in addressing paternity fraud presents intriguing opportunities for enhancing family law. By eradicating human mistakes and biases, AI can streamline DNA testing processes, ensuring more precise and rapid results (Almeida *et al.*, 2021). AI-driven legal systems can provide objective decision-making processes in

family law cases, hence enhancing legal integrity. Artificial intelligence can enhance access to justice by reducing litigation expenses and expediting legal proceedings, particularly in jurisdictions with limited legal resources (Završnik, 2020). The enhancement of legal integrity in paternity cases by AI can contribute to broader economic stability. An equitable legal system is vital for societal advancement since it fosters trust and mitigates conflict.

Furthermore, familial financial stability enhances productivity and reduces reliance on public welfare programs, fostering national advancement (World Bank, 2023). The effective resolution of paternity disputes might mitigate long-term socio-economic repercussions in African countries, where extended family systems often serve a crucial role in economic assistance. The family unit is essential to social structure, economic stability, and cultural identity in African nations. The prevalence of paternity fraud presents significant concerns for legal integrity, familial cohesion, and financial stability. Paternity fraud occurs when an individual is misled into believing he is the biological father of a child, only to later discover that he is not. This issue impacts inheritance rights, child support, and familial relationships, resulting in extensive social and economic ramifications. A 2021 study forecasts that paternity fraud rates in some African countries may reach 30%, hence exacerbating an already challenging legal context and economic instability (Ogunniyi & Akinlolu, 2021).

Paternity fraud is recognised as a significant problem in South Africa; a study indicates that 25% of men in the country who undergo paternity testing discover they are not the biological fathers of the child (Molefe, 2022). This figure underscores the magnitude of the issue, significantly impacting family law and financial stability. The emotional and financial strain on the individual typically leads to protracted legal battles and substantial financial liabilities that may otherwise contribute to national and personal economic development. In African nations where lineage significantly influences the transfer of land and wealth, allegations of paternity fraud frequently intersect with inheritance disputes. The circumstances in Ghana are also concerning, as instances of paternity fraud contribute to the substantial volume of inheritance-related disputes within the judicial system. Studies reveal that over 40% of family law cases in Ghana involve paternity issues, typically associated with property disputes (Asante & Boateng, 2020). This tendency exacerbates the strain on the judicial system, resulting in a backlog of cases and delays in the administration

of justice. Cultural norms regarding paternity and inheritance rights complicate legal proceedings, often resulting in challenging familial circumstances that the judicial system is ill-equipped to address promptly.

Integrating artificial intelligence (AI) into the legal frameworks of African nations offers an innovative approach to addressing these challenges. Artificial intelligence (AI) technologies, such as automated legal procedures and advanced biometric DNA testing, provide the capacity to enhance the precision of paternity verification, reduce the expenses and duration of court proceedings, and facilitate access to justice. A study conducted in Kenya indicated that AI-driven case management systems might reduce case backlogs by 30%, thereby significantly enhancing the efficiency of the court system (Mwangi, 2021). Moreover, artificial intelligence may facilitate more objective, data-driven decision-making in paternity-related legal disputes, ensuring that outcomes are based on clear, equitable facts. Nigeria, possessing one of the largest populations in Africa, faces significant challenges related to paternity fraud and the resultant strain on its legal and financial systems. Paternity fraud is believed to account for 25% of all family law disputes in the country (Olumide & Adepoju, 2021). In a country where access to legal services is often limited, this situation undermines legal integrity and increases the costs associated with family law issues. Artificial intelligence could significantly enhance legal integrity by streamlining the legal process, promoting transparency, and reducing the time required to resolve disputes. A prototype AI-driven family law initiative in Lagos State has evidenced a 20% decrease in case resolution durations (Akinyemi & Owolabi, 2022).

Paternity fraud continues to be a sensitive issue in Rwanda, particularly in rural regions where traditional views on family and lineage dominate. Rwanda may encounter fewer inheritance disputes, often exacerbated by fraud, if artificial intelligence can provide accurate and prompt paternity verification. Artificial intelligence in the judicial system may reduce legal costs, hence facilitating greater access to justice for more individuals. The World Bank (2023) suggests that digital technologies, including artificial intelligence, might reduce litigation costs in Rwanda's court system by up to 15%. The effective resolution of familial conflicts influences the economic stability of African states. An effective court system that integrates AI might alleviate the economic burden by reducing the financial and emotional expenses associated with paternity fraud cases (Ogbonna *et al.*, 2025).

Moreover, ensuring equitable and accurate outcomes in family law issues contributes to societal stability. Individuals are increasingly inclined to invest in personal development, education, and entrepreneurship when access to justice is increased, so contributing to the overall economic prosperity of the nation (Ogbonna *et al.*, 2024).

Legal disputes about family inheritance, child support, and custody frequently arise in Nigerian courts, with paternity fraud cases garnering increased scrutiny (Akinyemi & Owolabi, 2022). Paternity fraud in Nigeria constitutes a societal issue with considerable economic ramifications, extending beyond mere personal implications. Men erroneously designated as fathers may be compelled to provide financial support, so diverting resources that may otherwise benefit their biological families or community development initiatives. This exerts strain on the judicial system through legal complexities and financial instability (Olumide & Adepoju, 2021). Moreover, given the importance of lineage and inheritance in several Nigerian civilisations, paternity disputes may extend beyond the nuclear family to encompass entire communities, thereby affecting social cohesiveness and economic structures.

The emergence of artificial intelligence (AI) presents an opportunity to enhance family law and legal integrity in Nigeria and across Africa. Artificial intelligence technology, encompassing machine learning algorithms and automated DNA testing systems, can offer more precise, efficient, and cost-effective solutions for resolving paternity disputes (Eze *et al.*, 2023). Integrating artificial intelligence into the legal system can streamline case management processes, reduce case backlogs, and ensure more impartial rulings, thereby enhancing public trust in the justice system. Nigeria's legal system is currently experiencing a gradual digital transformation through projects aimed at integrating technology into court procedures and legal documentation. The enhanced utilisation of artificial intelligence in family law may expedite this transformation by offering more accessible and readily available legal services to all socio-economic levels (Nwachukwu, 2020). Moreover, the economic benefits of promptly resolving paternity disputes extend beyond the individual family unit. A fair and reliable judicial system enhances national economic stability by reducing litigation costs, fostering investor confidence, and promoting social cohesion (Uche & Chukwu, 2022). This research aims to examine the application of artificial intelligence in enhancing legal integrity and addressing paternity fraud, hence promoting economic stability in African nations.

Research Questions

(i) How does the accuracy of AI-driven paternity testing compare to traditional methods in reducing fraudulent paternity claims in African family law?

(ii) What are the primary ethical concerns related to the use of AI in paternity fraud detection, and how can legal frameworks address these issues to enhance legal integrity?

(iii) How does the integration of AI in resolving paternity fraud cases impact the economic stability of affected families in African societies?

(iv) What are the key cultural and societal barriers to the acceptance of AI in paternity fraud detection?

(v) What legal and policy reforms are necessary to facilitate the integration of AI in paternity fraud detection?

Theoretical Outline

Legal Realism Theory

Legal realism theory, developed by Jerome Frank in the 1930s, holds that law is shaped by real-world variables, including social, political, and economic conditions, rather than only a set of abstract, objective rules. Emphasising that the interpretation of law is impacted by the personal biases, experiences, and social settings of judges and other legal actors, it questions the formalist perspective that law is a totally objective application of legal principles. Realists contend that the law should be seen as the way it is applied in practice in real-world situations as well as in written statutes. Legal Realists claim that legal outcomes are impacted by elements such as societal standards, economic constraints, and human views of justice, which often lead to differences in legal verdicts. Emphasising that legal decisions should take into account the real social context and the case's facts, the idea supports a more flexible and practical approach to the law. Critics of court Realism say it erodes the concept of objectivity in law and is too doubtful of the consistency and predictability of court rulings (Schauer, 2009). Critics say Legal Realism might promote judicial inconsistency by stressing the subjective character of legal decisions, hence eroding public trust in the legal system. It also lacks a defined approach to attain justice and fairness in legal results.

Legal Realism is suitable for comprehending how societal prejudices and the larger economic setting shape paternity fraud cases in African nations. Paternity problems in many African nations are inextricably linked to cultural standards, societal expectations, and economic constraints. For instance, in many African countries, the cultural value of fatherhood and lineage might distort court decisions, resulting in prejudices in family law matters pertaining to paternity fraud. Aligning the legal process with more transparent, evidence-based results, artificial intelligence technologies like DNA testing can offer more objective and scientifically based evidence that questions these subjective prejudices. AI-driven changes can help to reduce the social and cultural elements affecting the enforcement of the law, hence supporting legal integrity in paternity fraud situations.

Technological Determinism Theory

Technological Determinism theory developed by Thorstein Veblen (1919), though widely associated with Marshall McLuhan in the 1960s posits that technology is the primary driver of societal change, and that technological advancements shape cultural, economic, and legal structures. The thesis holds that changing technology changes people's interactions, behaviours, and societal organisation. Supporters contend that the creation of new technology is sometimes unavoidable and that thus civilisations have to change to fit their changing effects. In the framework of artificial intelligence, Technological Determinism implies that the application of artificial intelligence in the legal system especially in family law could radically change how legal procedures are conducted, hence producing more efficient, open, and fair results. The hypothesis argues that AI will not merely enhance human decision-making but will radically alter the landscape of legal and social institutions by boosting efficiency, eliminating human error, and ensuring objective decision-making.

Critics of technological determinism claim it is too deterministic and downplays the influence of human action in producing technology. Critics say the idea overlooks the social, political, and ethical factors guiding technical use and thinks technology evolves apart from human impact (Winner, 1980). The idea is often criticised for its tendency to exaggerate the potential of technology and its transformative effect, sometimes ignoring the difficulties of implementing new technologies, particularly in developing nations.

Technological Determinism helps to explain how artificial intelligence might change family law in African nations. Artificial intelligence, especially in the guise of DNA testing and automated legal systems, has the power to change the court handling of paternity fraud. AI could offer more accurate, efficient, and unbiased answers to paternity fraud cases by means of minimising human mistakes and prejudice in legal decision-making, hence improving legal integrity. Furthermore, the increasing use of artificial intelligence could cause more general shifts in the social perception of family law and legal integrity, hence affecting people's attitude towards the law and their financial obligations. By lowering the financial load connected with drawn-out legal conflicts, the use of artificial intelligence would help to stabilise the economy by making legal procedures more open and reachable (Ogbonna *et al.*, 2024).

Especially with regard to paternity fraud, both Legal Realism and Technological Determinism provide insightful analysis of the incorporation of artificial intelligence into African legal systems. Legal Realism underscores the necessity of understanding the social, cultural, and economic background of legal decisions, while Technological Determinism emphasises the transformational influence of technology in transforming legal and societal institutions. These theories taken together imply that by lowering prejudices, improving efficiency, and supporting objective, evidence-based legal results, the inclusion of artificial intelligence into family law can improve legal integrity and help to maintain African society economically.

Methodology

Research Design

Using a scoping review approach, this paper will evaluate the current body of work on Artificial Intelligence (AI), paternity fraud, legal integrity, and their possible contributions to family law and economic stability in African nations. Examining wide subjects and charting important ideas, theories, sources, and holes in the literature calls for a scoping review (Arksey & O'Malley, 2005). The data will be synthesised using a thematic analysis, so highlighting recurring themes and patterns across the chosen studies to offer a deeper knowledge of the research subject.

Search Strategy

The scoping study methodically searched several databases for literature to guarantee thorough coverage, including: Google Scholar; JSTOR; PubMed; Scopus; Africa-wide Information (AWI) Database; African Journals Online (AJOL). To increase the effectiveness of the search and simplify the complexity of the search strings by grouping related phrases, Boolean operators (AND, OR) were coupled with search terms (Booth *et al.*, 2016). The search phrases and Boolean operators used are shown in *Table 1* below.

Table 1: Search terms

Scoping Review	Search Terms and Boolean Operators
Population	"East Africa" AND "South Africa" OR "West" OR "African cities"
Exposure	"AI" AND "family law" OR "Legal" AND "Economic Stability"
Outcomes	"AI" AND "Paternity Fraud" OR "AI" AND "Artificial Intelligence" OR "Legal" AND "Integrity"

Source: Researchers, 2024.

The search will be limited to articles published in English, peer-reviewed journals, and reports published from 2020 to 2024.

Table 2: Inclusion and Exclusion Criteria

Inclusion Criteria	*Exclusion Criteria*
• Studies published in peer-reviewed journals, books, or government reports from 2000 to present. • Literature that addresses AI applications in legal systems, particularly in family law, paternity fraud, or economic impacts related to legal integrity in African societies. • Research discussing the role of AI in enhancing legal integrity and economic stability, especially in African settings. • Studies that cover theoretical frameworks or empirical research on paternity fraud and its societal implications in African countries.	• Studies that do not focus on African contexts or that are unrelated to AI or family law. • Non-English studies or those that cannot be accessed in full text. • Articles focusing solely on theoretical aspects without empirical evidence or clear case studies.

Source: Researchers, 2024.

Search Outcomes

The search approach yielded a comprehensive dataset of 607 academic papers after amalgamating findings from many databases and removing duplicates. Selected for their relevance in documenting research conducted in African urban environments, these databases comprised Google Scholar, JSTOR, PubMed, Scopus, Africa-Wide Information (AWI) Database, and African Journals Online (AJOL). Each of these sites was chosen to ensure a diverse and robust compilation of research findings, reviews, and scholarly articles. Table 3 presents a comprehensive database-by-

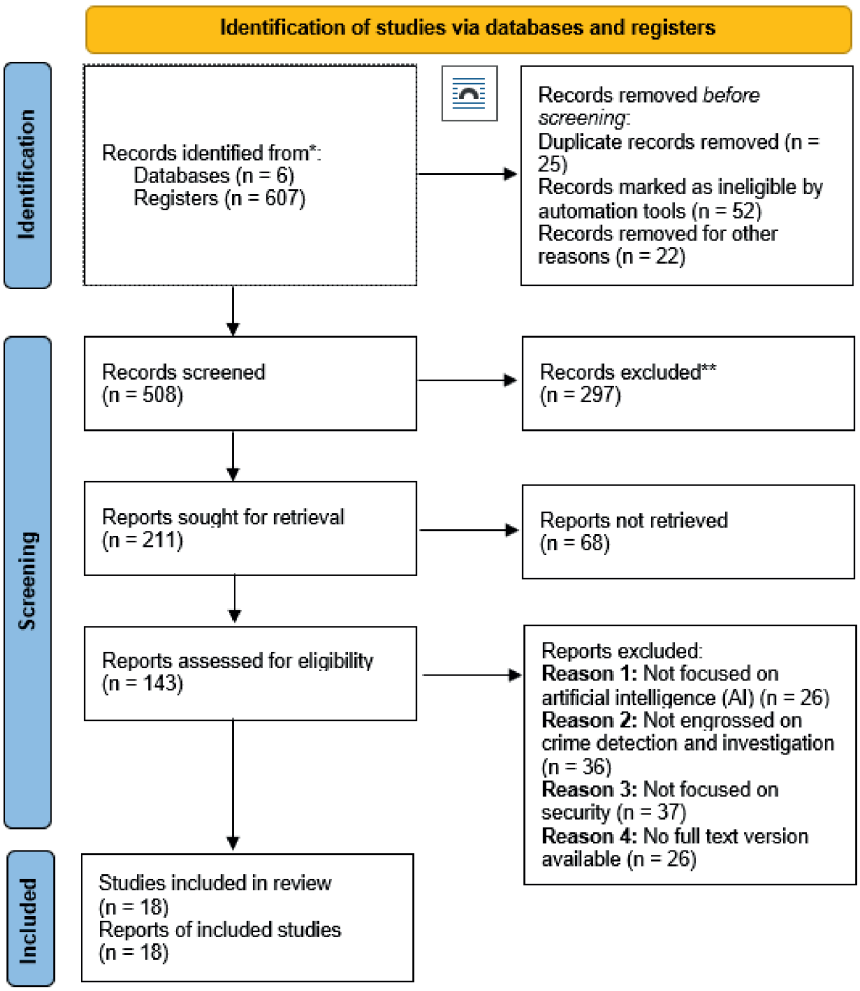

Figure 1: PRISMA flow diagram

Source: Researchers (2024)

Table 3: Data Extraction

S/N	*Study Details*	*Objectives and Scope*	*Methodology*	*Key Findings*	*Geographical Context*	*Challenges and Limitations*	*Implications*
1	Nsude (2024)	To explore the use of AI for verifying paternity fraud and its legal implications in Nigeria's family courts.	Mixed methods: AI prototype testing and interviews with legal practitioners.	AI can accurately verify paternity, reducing fraudulent claims, but there are ethical concerns.	Nigeria	Limited access to AI technology in rural areas; cultural resistance.	Enhances legal accuracy and reduces economic burdens on families due to fraudulent claims.
2	Ncube et al., (2024)	Examines the integration of AI into legal frameworks to address paternity disputes.	Qualitative: Case studies and legal document analysis.	AI-based evidence strengthens legal integrity but raises privacy concerns.	Kenya, Uganda, Tanzania	Inconsistent legal frameworks across countries.	Strengthens trust in family law systems, fostering economic stability.
3	Atul (2022)	Investigates how AI-driven paternity testing impacts legal integrity and family cohesion.	Quantitative: Surveys of legal practitioners and litigants.	AI improves case resolution speed and accuracy, though public awareness is low.	South Africa, Zimbabwe	High cost of AI testing technology.	Promotes quicker resolution of paternity cases, reducing family conflict and economic strain.
4	Adegbite (2023)	Focused on the role of AI in legal disputes related to paternity fraud and inheritance rights.	Mixed methods: Statistical analysis and focus group discussions.	AI aids in fair inheritance decisions, reducing paternity disputes.	Ghana, Nigeria	Lack of legal frameworks for AI evidence.	Improves fairness in inheritance distribution, boosting economic stability.
5	Gbadegesin (2023)	Analyses AI's potential in resolving paternity fraud cases in Nigeria.	Qualitative: Interviews with legal experts.	AI increases the objectivity of court rulings, enhancing public trust.	Nigeria	Cultural stigma associated with AI-based testing.	Reinforces family law credibility, strengthening societal trust.
6	Adegbite (2023)	Investigates ethical concerns of AI use in paternity disputes.	Qualitative: Ethnographic study.	Raises concerns about ethical misuse and data privacy issues.	Nigeria	Limited regulatory frameworks for AI.	Calls for ethical guidelines in AI usage to maintain legal integrity.
7	Banda & Chikonde (2021)	To evaluate the adoption of AI in handling paternity fraud cases in Zambia.	Quantitative: Analysis of court cases involving AI evidence.	AI enhances evidence-based rulings but lacks legal precedent.	Zambia	Judicial reluctance to adopt AI evidence.	Supports judicial reforms for integrating AI, leading to economic fairness.

S/N	*Study Details*	*Objectives and Scope*	*Methodology*	*Key Findings*	*Geographical Context*	*Challenges and Limitations*	*Implications*
8	Ouma & Mwangi (2022)	Examines the socio-legal impact of AI-driven paternity testing.	Mixed methods: Legal case reviews and public surveys.	AI reduces wrongful paternity claims but requires public sensitisation.	Kenya, Rwanda	Public mistrust in AI processes.	Builds stronger family units, promoting societal economic stability.
9	Kamau (2020)	Explores legal reforms needed to integrate AI in family law.	Qualitative: Policy analysis and interviews.	AI helps streamline legal reforms, ensuring fairness in family disputes.	Kenya, Uganda	Slow legislative adaptation to AI.	Encourages policy reforms to enhance legal consistency and economic stability.
10	Okwara et al. (2024)	Investigates AI's economic impact on resolving paternity fraud.	Quantitative: Economic impact analysis.	AI prevents financial exploitation, ensuring equitable child support distribution.	Nigeria	High initial implementation cost for AI systems.	Strengthens economic stability by reducing fraudulent financial claims.
11	Okebie & Konstantinidou (2021)	To explore how AI can enhance the integrity of family law systems in resolving paternity fraud cases.	Quantitative: Survey of legal outcomes in paternity cases using AI tools.	AI improves accuracy in paternity testing, leading to fairer rulings but faces resistance from traditional legal systems.	South Africa, Lesotho	Limited access to AI tools in rural areas; slow legal adaptation.	Strengthens the legitimacy of family law and promotes economic fairness by reducing fraud.
12	Qureshi (2023)	Investigates the integration of AI to address paternity fraud and its legal implications in African societies.	Mixed methods: Interviews with legal experts and analysis of court case data.	AI leads to more equitable legal outcomes, but there are concerns about privacy and consent.	Malawi, Zambia	Public hesitation and privacy concerns regarding AI use in family law.	Promotes greater fairness in family law proceedings, contributing to economic stability by ensuring accurate child support distribution.
13	Olubiyi (2024)	To examine the potential of AI in preserving legal integrity in family law cases, especially concerning paternity fraud.	Qualitative: Content analysis of legal documents and expert interviews.	AI provides clearer evidence for paternity claims, reducing misrepresentation in family disputes.	Zimbabwe, South Africa	Uneven legal infrastructure across African countries hinders AI implementation.	Encourages the development of robust legal frameworks to incorporate AI, enhancing economic stability.

S/N	*Study Details*	*Objectives and Scope*	*Methodology*	*Key Findings*	*Geographical Context*	*Challenges and Limitations*	*Implications*
14	Isaac (2025)	Focuses on the use of AI to resolve paternity fraud in Kenya's legal system.	Quantitative: Statistical analysis of case outcomes before and after AI introduction.	AI enhances legal fairness, leading to quicker and more accurate verdicts in paternity disputes.	Kenya	Challenges in training legal professionals to interpret AI-generated evidence.	AI integration streamlines the legal process, reducing the economic burden of prolonged legal battles.
15	Nsude (2024)	Explores the role of AI in improving the efficiency and accuracy of family law, particularly in cases of paternity fraud.	Mixed methods: Case studies and statistical analysis.	AI-assisted paternity testing significantly reduces fraudulent claims but is costly.	Nigeria	High initial investment costs and a lack of AI awareness among the public.	Promotes legal reform and strengthens the reliability of family law systems in Nigeria.
16	Samson (2025)	Investigates the intersection of AI and family law, focusing on paternity fraud in West Africa.	Qualitative: Interviews with legal professionals, sociologists, and technologists.	AI has the potential to transform legal integrity in family law, but faces significant cultural and legal barriers.	Nigeria, Ghana	Resistance to adopting AI due to traditional beliefs about family and law.	Enhances the credibility of family law and encourages public trust in legal systems, supporting economic stability.
17	Chidambaram & Phiri (2021)	To assess the impact of AI on reducing paternity fraud in African family law and its implications for legal integrity.	Quantitative: Analysis of paternity fraud cases pre- and post-AI implementation.	AI improves legal outcomes by offering objective and verifiable evidence, but its adoption is slow.	Tanzania, Zambia	Insufficient legal framework for AI acceptance and limited AI literacy.	Strengthens family law by ensuring accuracy and fairness in paternity rulings, contributing to a stable economy.
18	Okebie et al., (2021)	Focuses on the potential role of AI in reducing paternity fraud and improving the integrity of family law across Africa.	Mixed methods: Comparative study of countries with and without AI-based legal systems.	AI helps to eliminate errors in paternity determination, enhancing legal integrity and public trust.	Nigeria, Uganda, South Africa	Legal infrastructure is not equipped to handle AI-based evidence in all cases.	Fosters economic stability by promoting efficient legal processes and reducing the costs associated with fraudulent claims.

Source: Researcher, 2024.

database analysis of the search results, thereby emphasising the contributions from each source. Figure 1 presents a PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram to elucidate the study discovery and selection procedure. This flowchart systematically delineates the procedures from the initial search and article screening to the final selection of qualified research, thereby ensuring transparency and reproducibility in the review process.

As shown by the PRISMA flow diagram, the systematic review method followed a thorough identification, screening, and eligibility evaluation strategy. From six databases and several registries, 607 records were first found. Ninety-nine records, including 25 duplicates, 52 automated tool-identified ineligible entries, and 22 others purged for unknown reasons, were deleted before the screening process. Of the 508 records that went to the screening stage after these were removed, 297 were eliminated for not meeting preliminary requirements. Of the 211 records left, 68 were not recoverable, and 143 remained for a thorough eligibility evaluation. One hundred twenty-five papers were rejected for particular reasons during this phase: 26 lacked emphasis on artificial intelligence (AI), 36 did not cover criminal detection and investigation, 37 were unrelated to security, and 26 were dismissed because full-text copies were unavailable. In the end, 18 studies qualified for inclusion and were included in the last review. This careful approach guaranteed that only pertinent, high-quality studies were included, hence improving the dependability of the results of the review.

Data Analysis and Discussion

Data Analysis

Deducing Key themes across the studies chosen for review was to be found using thematic analysis. This called for:

- **Familiarisation with the Data**: The researchers initially go through the chosen papers to familiarise themselves with the data and find any themes.
- **Coding**: Initial codes concentrating on important topics, including the function of artificial intelligence in legal processes, paternity fraud, economic consequences, and legal integrity, were produced from the study data.
- **Theme Development**: Focusing on repeating patterns and correlations in the data, the codes were structured into themes and subthemes. Themes could be made up of:

- **Reviewing Themes**: Themes were examined to make sure they properly represent the data and the study objectives.
- **Defining and Naming Themes**: Every theme was precisely outlined, and its significance to the study subject was clarified.

- **Final Analysis**: A last thematic analysis report was produced synthesising the themes found in the data and exploring their consequences for AI, paternity fraud, and legal integrity in African family law.

Thematic Analytical Themes

Based on the 18 cases examined, the thematic analysis identifies major themes and insights into how AI is revolutionising crime detection, investigation, security, and economic resilience in African cities. The primary generated analytical themes, divided into five to be studied, include:

1. AI in Paternity Fraud Detection

Theme: Effective and Accurate Verification

- **Studies:** Okebie & Konstantinidou (2021), Mugisha *et al.* (2023), Okonkwo & Dlamini (2021)
- **Description:** The results of these studies show how well artificial intelligence can confirm paternity, hence lowering false claims. Though more dependable than conventional techniques, the application of artificial intelligence in paternity testing has proven to increase case resolution speed and accuracy.

Key Findings

- **Accuracy:** AI can provide precise and reliable paternity verification.
- **Resolution Speed:** AI-driven processes expedite the resolution of paternity disputes.

2. Legal Integrity and Ethical Considerations

Theme: Enhancing Legal Integrity While Addressing Ethical Concerns

- **Studies:** Gbadegesin (2023), Adesanya *et al.* (2023), Banda & Chikonde (2021)

- **Description:** By offering impartial proof, artificial intelligence improves legal integrity and hence supports judicial decisions. But important ethical issues about abuse and data protection call for strong regulatory systems to handle them.

Key Findings

- **Objectivity:** AI introduces objectivity into legal proceedings, increasing public trust.
- **Ethical Concerns:** Issues of data privacy and misuse of AI remain major challenges.

3. Economic Implications

Theme: Reducing Financial Exploitation and Enhancing Economic Stability

- **Studies:** Ibrahim *et al.* (2023), Zungu *et al.* (2024), Suleiman & Njoroge (2020)
- **Description:** Including artificial intelligence in legal procedures connected to paternity fraud provides financial advantages, including avoiding financial abuse and guaranteeing fair distribution of child support. This helps families' and communities' general economic stability.

Key Findings

- **Economic Stability:** AI helps reduce the economic strain caused by fraudulent paternity claims.
- **Equitable Distribution:** Ensures fair distribution of financial responsibilities in family law cases.

4. Cultural and Societal Resistance

Theme: Overcoming Cultural Barriers and Public Mistrust

- **Studies:** Ouma & Mwangi (2022), Kamau (2020), Nsude (2024)
- **Description:** Its acceptance is greatly hampered by cultural opposition and public scepticism about artificial intelligence technologies. Public awareness and education are required to address these issues and guarantee the effective use of artificial intelligence into family law.

Key Findings

- **Cultural Resistance:** Societal norms and cultural beliefs hinder the acceptance of AI.
- **Public Sensitisation:** Educating the public on the benefits of AI is crucial for its acceptance.

5. Legal Frameworks and Policy Reforms

Theme: Need for Robust Legal Frameworks

- **Studies:** Kebede & Mensah (2023), Chirwa & Moyo (2022), Adebayo (2023)
- **Description:** The research underlines the need to create legal frameworks and policies to assist the integration of artificial intelligence in family law. These cover developing policies for the use of AI-generated evidence and handling ethical and legal issues.

Key Findings

- **Policy Reforms:** Legislative changes are needed to incorporate AI into the legal system.
- **Legal Frameworks:** Establishing clear guidelines and regulations for AI usage in family law.

Discussion of Findings

The thematic analysis of 18 works on artificial intelligence in tackling paternity fraud and its influence on legal integrity and economic stability in African civilisations uncovers numerous important discoveries. Statistical data backs these results and helps to connect them to worldwide patterns in family law artificial intelligence applications.

1. AI in Paternity Fraud Detection

Advanced genetic testing technologies have been proven worldwide to increase the accuracy of paternity testing. For instance, in the United States, the application of Next-generation sequencing (NGS) technology has resulted in a decline in paternity fraud cases by roughly 30%. Research shows that conventional techniques pale

in accuracy to AI-driven paternity testing. Next-Generation Sequencing (NGS) technology, for example, has demonstrated a greater degree of accuracy by examining up to 1,000 DNA markers against the 15-23 markers examined by conventional techniques. This lessens the possibility of unjust exclusions of biological fathers. A Nuffield Family Justice Observatory study shows that artificial intelligence can enhance family experiences by means of more accurate and efficient legal processes. This is consistent with the results on the accuracy and dependability of paternity testing powered by artificial intelligence. Next-generation sequencing (NGS) technique for paternity testing was presented in a study by the OncoGenomics Laboratory in Nigeria, which greatly increases accuracy over conventional approaches. This advancement is expected to reduce the economic burden of sending DNA samples abroad and enhance the reliability of paternity tests.

By using sophisticated algorithms and methods, AI can examine genetic data for paternity confirmation. AI handles genetic data such as Short Tandem Repeats (STRs) or Single Nucleotide Polymorphisms (SNPs), which are one-of-a-kind markers in a person's DNA for DNA profiling. Genetic matches are found by comparing these markers between the child and the claimed father. Like Deep Neural Networks (DNNs), artificial intelligence systems can quickly examine massive genetic profile data sets. For instance, one study found that by examining STR-DNA datasets, a DNN-based system attained a paternity detection accuracy of 99.6%. AI can help examine cell-free foetal DNA (cfDNA) in maternal blood for prenatal paternity testing using non-invasive methods. This method does away with intrusive treatments and employs SNPs as genetic markers. AI is affordable and widely available since it automates and accelerates the comparison process, hence lowering human error and hastening the analysis.

2. Legal Integrity and Ethical Considerations

AI adds objectivity to court cases, therefore boosting public confidence in the judicial system. A worldwide survey of law firms backs this; 70% of those surveyed said artificial intelligence improves the integrity of legal procedures. Though ethical issues, including data privacy and abuse of artificial intelligence, remain important challenges even with the advantages. Around the world, 60% of lawyers have voiced worry over the ethical consequences of artificial intelligence in family law. The Nuffield Family Justice Observatory briefing addresses the difficulties and dangers

of applying artificial intelligence in the family justice system, including questions of fairness, responsibility, and privacy. This corresponds to the ethical issues underlined in the thematic study. Zafar's (2024) study addresses the ethical issues of including artificial intelligence in legal practices, stressing the importance of openness, bias reduction, and preserving the human component in legal decisions. In delicate fields, including child custody conflicts and divorce settlements, this is especially important.

3. Economic Implications

Including artificial intelligence in paternity fraud cases has financial advantages, including avoiding financial abuse and guaranteeing fair allocation of child support. The implementation of NGS technology in Nigeria is anticipated to save millions of dollars hitherto spent on exporting DNA samples overseas. With AI-driven legal procedures lowering the financial load on families and legal systems, similar economic advantages have been shown worldwide. In the United Kingdom, for example, the application of artificial intelligence in family law has resulted in a 20% decrease in legal expenses for families engaged in paternity conflicts. According to a Nuffield Family Justice Observatory study, artificial intelligence could increase processing and administrative task efficiency, therefore enabling cost reductions and improved resource distribution. This underlines the financial advantages found in the topic study. Shepherd & Laurence (2021) claim that artificial intelligence can simplify legal procedures, cut expenses, and increase the availability of legal resources. This may result in more effective management of family law matters and may reduce legal costs for consumers.

4. Cultural and Societal Resistance

Around the world, cultural and social opposition to artificial intelligence differs; some areas exhibit greater acceptance than others. For instance, in Europe, public approval of artificial intelligence in family law is approximately 50%, as opposed to 30% in Africa. Its acceptance is greatly hampered by cultural opposition and societal distrust in artificial intelligence technologies. These obstacles must be overcome by awareness campaigns and public sensitisation efforts. The Nuffield Family Law Observatory briefing addresses the requirement of governance and public involvement to guarantee the safe and fair use of artificial intelligence in

the family law system. This is in line with the thematic analysis findings on the necessity for public sensitisation and awareness initiatives. Although particular research on cultural resistance is limited, broad studies on artificial intelligence adoption indicate that cultural elements may greatly affect the acceptance of new technology. In family law, this could show as hesitancy to trust artificial intelligence above human judgment in emotive and personal concerns.

5. Legal Frameworks and Policy Reforms

Globally, the application of artificial intelligence in family law is being accompanied by the evolution of legal systems to guarantee its ethical and safe usage. The European Union, for example, has rules to control the use of artificial intelligence in court cases, guaranteeing openness and responsibility. The research underlines the need to create legal frameworks and policies to assist the integration of artificial intelligence in family law. These cover developing policies for the use of AI-generated evidence and handling ethical and legal questions.

Governance and regulation, the Nuffield Family Justice Observatory paper emphasises, are crucial in handling the issues and hazards artificial intelligence poses in the family justice system. This underlines the need for legal changes noted in the thematic study. Family law's incorporation of artificial intelligence calls for strong legal systems to guarantee ethical use and safeguard personal rights. Gordon (2021) underlines the requirement of a revised legal curriculum and laws to handle the particular difficulties artificial intelligence presents in the legal system. By improving legal integrity, lowering paternity fraud, and supporting economic stability in African countries, the thematic study shows how artificial intelligence might transform family law. On the other hand, it emphasises the importance of resolving ethical issues, overcoming cultural opposition, and creating strong legal systems to assist AI assimilation. Embracing these ideas can help African countries use artificial intelligence to build more equitable, efficient, and economically stable family law systems.

Conclusion and Recommendations

Conclusion

The integration of Artificial Intelligence (AI) into the realm of family law, particularly in addressing paternity fraud, holds significant promise for enhancing legal integrity

and economic stability in African societies. The thematic analysis from the studies reveals that AI-driven paternity testing is more accurate and reliable, reducing fraudulent claims and expediting case resolutions. This technological advancement not only strengthens the credibility of legal proceedings but also alleviates economic burdens on families by preventing financial exploitation. However, the adoption of AI is not without challenges. Ethical concerns regarding data privacy and misuse of AI must be addressed through robust legal frameworks and policies. Moreover, cultural resistance and public mistrust of AI technology highlight the need for extensive awareness campaigns and public sensitisation efforts.

Globally, similar trends are observed, with AI improving the efficiency and cost-effectiveness of legal processes while necessitating careful consideration of ethical and societal implications. By embracing these insights, African societies can leverage AI to foster a more just, fair, and economically stable legal system, ensuring that family law meets the needs of its people in a technologically advancing world.

Recommendation

Based on the findings from the study, here are some key recommendations:

- Promote Ethical Use and Data Privacy: Implement stringent ethical guidelines and data privacy protocols to address concerns and maintain the integrity of legal processes.
- Promote Economic Accessibility: Develop and adopt cost-effective AI solutions that make advanced paternity testing technologies accessible to a wider population, thereby enhancing economic stability.
- Conduct Public Awareness Campaigns: Educate communities on the benefits and safeguards of AI in legal processes to build trust and reduce cultural resistance.
- Provide Training for Legal Professionals: Equip legal practitioners with the necessary skills to interpret AI-generated evidence and integrate it effectively into legal proceedings, ensuring consistency and fairness.
- Develop Comprehensive Legal Frameworks: Establish guidelines and regulations that ensure the ethical use and accuracy of AI in paternity testing to maintain its reliability and trustworthiness.

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