

# Improving Rwandan Criminal Justice through Forensic DNA Evidence: An Appraisal

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## Abstract

At present, the utility of forensic evidence has acquired admissibility in the area of criminal justice. This utility has been applied in various legal systems worldwide; wherein scientific evidence such as DNA helps the courts to decide complicated high-tech crime cases. Scientific evidence such as DNA is a tool used to ascertain the guilt or innocence of suspect with certainty when evidence such as blood, semen have been left at crime scene. It plays a duo role either to exonerate individual falsely accused or convict those guilty of crimes. DNA evidence is normally used to resolve criminal case in various ways. The first scenario is when the suspect is known and DNA sample collected from him/her is compared from the DNA sample collected from the scene of crime to ascertain the involvement of suspect in commission of crime. The second one is when the suspect is unknown but he/she leaves the biological evidence at the crime scene where these evidence can be analysed and compared with perpetrator's DNA profile from DNA database to establish his/her identity. Moreover, through the use of DNA profile from database, DNA evidence collected from crime scene when the originator is unidentified be utilised to link other already committed crimes. In these circumstances, DNA technology is increasingly vital to safeguard correctness and objectivity in crime solving. Its use in Rwandan criminal justice system has not yet yielded significant impact on administration of justice. This is due to the fact that in criminal justice, forensic science in general and DNA technology in particular are still at infant stage and have not yet been introduced as subject in any law curriculum; lack of specific DNA legislation is another stumbling block wherein DNA evidence is considered as circumstantial evidence with minor consideration. It is the time wherein all actors of justice and all stakeholders (criminal justice chain and law colleges) should realize that this genetic evidence is a powerful and helpful tool for securing prosecution as well as helping to eliminate suspects early in investigation and increase prosecution rate, hence giving justice. The enactment

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of specific DNA legislation will guide the Investigators and Prosecutors in conducting investigation and prosecution and also the Judges in directing or evaluating DNA tests. For these reasons, DNA evidence and database need to be legally recognized through such new legislation and DNA technology be introduced in law colleges. This is one of mechanisms to break the circle of lack of awareness, admissibility of DNA evidence and make stakeholders acquainted with forensic science in general.

### Keywords

DNA, Scientific Evidence, Forensic Sciences, Genetic Evidence, Chain of Custody, Criminal Justice Chain

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## 1. Introduction

The *modus operandi* of high-tech crime is very complex in the modern scientific era. Advances in science and technology applied in real life must be met and regulated with laws, especially in the administration of criminal justice. The main purpose of every legal system is to protect human life and property and to promote peace and harmony in social life. Thus, it is essential to enhance techniques of crime detection in order to decrease crime and consequently preventing breach of the law. Genetic evidence such as DNA can be employed in investigation and to establish occurrence of crime and guilt of perpetrators. Legal, socio-economic, political changes and technological advances happening in various countries affect and change the way societies live. The quick development of science and technology in Information Technology and Forensic Science is likewise leading to the need of reviewing and updating some Rwandan laws. In other words, in order to keep abreast with developments taking place in the world in general, East Africa and Rwanda in particular, Rwandan legal system needs to go hand in hand with such advances by introducing DNA technology as subject in law curriculum and enacting a specific DNA legislation to accommodate fully the scientific use of DNA evidence. Lacking a law on DNA evidence makes the same not to be appreciated or resorted to in the justice system. Lacking infrastructure such as modern forensic lab is a handicap to appreciate DNA evidence in courts. For DNA evidence to be admissible in courts it should be handled in a proper manner and infrastructure is a vital ingredient. Rwandan legal system needs to adopt scientific evidence such as DNA and at the same time enact a law governing its use and train all stakeholders (Murangira, 2013).

It is acknowledged that law must not be static but dynamic in its approach and must be in harmony with the need of the society. DNA evidence has an overriding role in the detection, investigation and nabbing perpetrators besides exonerating innocent suspects (DNA: A Prosecutor's Practice Notebook)<sup>1</sup>. Any proofs, evidences and materials, which directly or indirectly link the accused to crime, should be handled carefully through strict respect of chain of custody protocols so that they are not contaminated,

<sup>1</sup>Available at: <http://ww.nij.gov/training/dna-prosecutors-notebook.htm>. Visited on August, 25, 2016.

tainted or destroyed (Lazer, 2004).

## 2. Statement of the Problem

Actors of justice do not fully understand the advances or the widespread promising ability of DNA evidence to help the investigation, prosecution and the court to arrive at a correct verdict. This creates a dilemma in administration of justice regarding legality of DNA evidence in Rwanda. The lack of DNA legislation and lack of training among actors of justice are major stumbling block to Judicial Police Officers (JPOs) and Prosecutors as they are not sure whether the DNA evidence collected will be accepted by the Courts to substantiate their claims i.e. guilt or innocence of accused thereby helping in administration of criminal matters. There is need for an integrated approach by funding training of all actors of justice. Another alarming issue which needs to be regulated by law is to maintain balance between private and public interest, (human right of the accused in criminal cases, for instance, right against self-incrimination, informed consent etc., and the interest of the investigation). Thus, the Parliament of Rwanda needs to enact a law that accomplishes/achieves the critical balance between public interest for effective prosecution of offences and individual interest for protection of human rights of the accused during criminal investigation and trial.

## 3. Material and Methodology

The research methodology used in the present article is purely doctrinal. The author has referred to scientific and legal literature from books, journals, PhD thesis, national and international reports, and legislations, judicial precedent and electronic sources. The present article is critical analysis which points out issues and challenges related to the use and efficacy of scientific evidence such as DNA in the Rwandan legal system to improve criminal justice system, wherein the lack of DNA legislation is examined with special emphasis.

## 4. Definition of Key Concepts

### 4.1. Meaning of DNA

*Deoxyribonucleic acid* known as DNA, also called a genetic blueprint due to the fact that it encompasses all of the instructions that regulate genetic characteristics of all individuals. In chromosomes of every individual there is a DNA which controls all visible characteristics of individual such as skin colour, sex, race, etc. and other imperceptible characteristics (such as blood composition, genetic disease). In all body cells of an individual DNA is same for instance DNA from blood is same like that from saliva, semen, etc. The science has proved that every individual has unique DNA except monozygotic twins. This uniqueness helps in identification. Nevertheless, modern methods simply permit an analysis of a minor portion of the total variation among persons. The structure of DNA is a paired twist like ladder from which two components/strands are twisted around one another (Sharma, 2007).

*Abhijeet Sharma*, from his book, stated that each component/strand of DNA is

moulded of a linear arrangement of building blocks termed as nucleotides or bases. It forms a four types of base: *Adenine*, *Thymine*, *Cytosine* and *Guanine*, characterised by the letters A, T, C and G. The two components/strands are detained together by precise and joint attraction between the bases. Adenine in only component/strands attracts Thymine in the side of strand, creating an A-T pair, and Cytosine only attracts Guanine, creating a G-C pair. The couples of bases create bonds between the two strands, and are similar to the stairs of a helix stairway (Sharma, 2007).

Genetic characteristic get mixed through DNA molecule when there is creation of male sperm cells and female egg cell. Due to this mixing process of genetic characteristics, the DNA in all male sperm cells from single individual or all eggs from single woman is not equitable shares split down the middle. Somewhat, there is 50% chance that every genetic characteristic will be present in any set of egg or sperm. This connotes that limited apparent characteristic are caused by inheritance from only one genetic material. Utmost visible features/traits results from the interaction of various genes (DNA Initiative: DNA for Defense Bar, 2012).

## 4.2. Meaning of Evidence

Evidence or proof is any testimonial declaration or physical item from which accurate decision can be drawn. It is a wide category covering anything traceable by the five senses of human being including documents, exhibits, facts accepted by two sides and the declaration of witnesses. In criminal cases proof or evidence goes with the intention, commitment, motivation, utilized means and occasion to perpetrate a crime (Flannery, 1192)<sup>2</sup>. Evidence is any tangible element or information collected by Judicial Police Officer (JPOs) qualified to be pertinent and useful to a case under investigation. The relevancy of that evidence is based on the capacity of linking the suspect with the victim or with crime scene. The weightiness of evidence in criminal matters, is the capacity to prove that the crime occurred and show that the suspect was involved in commission of the alleged crime. Evidence such as DNA plays a key role to eliminate suspects among many or exonerate innocent accused mostly with the use of forensic techniques.

## 5. Physical/Direct and Circumstantial Evidence

Normally, evidence is categorised into two types: Circumstantial and direct or physical evidence even if evidence of testimony and documentary are also significant and considerable categories of evidence used in court trials.

### 5.1. Physical or Direct Evidence

Direct or physical evidence is a proof which is perceptible/noticeable and can be perceived detected by any of five human senses. For instance knife, machete, photograph, etc. Direct evidence proves or gives proof on the fact in problem without necessary imposing the Judges to create any assumptions or to draw adverse interpretations or

<sup>2</sup>Available at: <http://www.healthhanddna.com/index/html>. visited on 22/08/2016.

inferences. It is *sui generis* evidence that directly lead to convinced judgement. Typical examples of direct evidence are eyewitness testimony, photographs or video recording of the perpetrator during commission of crime or convicting testimony made by the perpetrator, victim, or witness.

## 5.2. Circumstantial Evidence

A part from direct evidence which is based on individual information or observation and provide a final conclusion, circumstantial evidence lies mostly on inference or interpretation and uses inductive thinking and reasoning. Circumstantial evidence is proof that secondarily demonstrates a fact or backings an idea or a theory. It indicates that the suspect has been involved in the crime and is normally enough to prosecute the suspect whenever the proof and inferences drawn from the evidence can be used to prove that the suspect is guilty beyond a reasonable doubt. It is therefore, the effort of forensic scientists to scrutinize the direct evidence through scientific methods, to rebuild the events and establish the occurrence of crime. The Public Prosecution will at that juncture relates information from forensic lab with other testimonies of witnesses and other relevant evidence such as communication, telephone taping and bank statement for the purpose of constructing a general concept or theory which establishes the link between committed crime and suspect (Yeshion, 2014)<sup>3</sup>.

### The Falsehood of Circumstantial Evidence

Scientific evidence is an increasingly important part of both civil and criminal trials. The purpose of evidence is to establish that the suspect has committed the crime beyond reasonable doubt and that no other rational justifications coming from the fact of case that somebody else other than the offender could have perpetrated that crime. The criminal law sets the burden of proof on the prosecution. It entails that everyone is presumed innocent until proven guilty of an offence of which he/she has accused for<sup>4</sup>. Physical evidence has to be brought in court under testimonial evidence to ascertain the basis of admissibility.

Based on informal discussion with some actors of Justice in Rwanda such as Judges and Prosecutors on the issue of circumstantial evidence; the Author submits that there is unclear argument in regards of all forensic evidence produced by the extensive diversity of forensic fields comprising of fingerprint identification and DNA profiles, all belongs to the type or category of circumstantial evidence and consequently assists in criminal case as merely incomplete evidence. There is time when scientific evidence such as DNA is the only evidence to prove the guilty or innocence of a suspect, for in-

<sup>3</sup>Dr. Ted Yeshion, The Myths of Circumstantial Evidence. Available at: <http://www.theforensicteacher.com/Evidence.html>. Visited on 22/08/2016.

<sup>4</sup>Article 29(2) of The Constitution of The Republic of Rwanda of 2003 Revised In 2015, Official Gazette n° Special of 24/12/2015. See also Article 85 of Rwanda Criminal Procedure Code states that “*The burden of proof shall be on the Public Prosecution or, in case of a claim for damages or private prosecution, on the victim of an offence or his/her rightful beneficiaries.*” Under article 85 (1) it is stipulated that “*An accused shall always be presumed innocent until proven guilty by a final court decision. An accused shall not be obliged to prove his/her innocence unless his/her guilt has been established.*”

stance in a case of child defilement and the victim is impregnated, rape and abortion etc. The illicit drugs is the only exceptional physical evidence which does not belong to the category of circumstantial evidence due to the fact that, merely by their presence infringes law<sup>5</sup>. Thus, there is no point for the judge to draw an adverse inferences to lead at a decision that the suspect is guilty of a criminal act. At this juncture, the Author emphasizes that evidence by circumstance has acquired false connotation for being less powerful and little cogency compared to physical evidence.

It is also worthy to mention that, it is improper to accept that physical evidence is permanently and always stronger or more convincing than evidence by circumstance such as DNA<sup>6</sup>. Apart from scientific evidence, other instances of evidence by circumstance that can indicate guilt consist of the intention and the occasion of perpetrator to execute crime, whether the accused has shown the behaviour of resisting detention or if any other suspicious behaviour were established. In this scientific era, a big number of prosecutions are based on evidence by circumstances whenever no other evidence such as direct evidence encountered at scene of crime. It is also important to emphasise that physical or direct evidence such as identification of eyewitness and confession of guilty provided by the suspect are problematic with possible challenges surrounding it such as fading memories and disappearance of eyewitness as it has been established by Innocence Project wherein more than 300 individuals who were unlawfully sentenced have been exonerated (*Facts on Post-Conviction DNA Exonerations, 2012*)<sup>7</sup>. The main cause of unlawful sentencing particularly in rape cases as pointed out by Innocent Project is eyewitness's incorrect identification, a good example of physical evidence. The identification of eyewitness has shown to be ineffective in almost 75% of the 300 DNA exonerations cases, however continues to be considered very convincing as physical evidence for the Courts. It has also been established that incorrect admissions of guilty provided by perpetrators, and convicting testimonies made by jailhouse informers have been realised to happen in almost 25% of all the DNA exoneration cases.

Legal Medicine Scientists and Investigating Agencies have also categorized evidence into more types including those indicating class and personal characteristics. Evidence with class; characteristics assist to shorten the possibility to distinguish an object or individual to less potentials and can similarly utilised to eliminate an object or person with complete certitude. Such evidence are for instance types of blood, individual fibres, microscopic test of hair, and single-layer paint fragments. These types of evidence cannot be utilized to establish connection between physical evidence to a common source to a high degree of scientific certainty. Personal characteristics evidence, still, proves sole potentials which can be utilised in connection with physical evidence to one individual or object to a high amount of scientific certitude.

<sup>5</sup>Under article 593, (11), (1) of the *Rwanda Penal Code, 2012*; it is prohibited to transform, sell, grow, transport, store and consume narcotic drugs except when it is specified by law.

<sup>6</sup>DNA evidence has been applied from some years in criminal as well as civil cases. Comparing to eye witnesses, DNA evidence is more reliable than traditional method of proving a case in court by prosecution.

<sup>7</sup>Available at: [http://www.innocenceproject.org/Content/Facts\\_on\\_PostConviction\\_DNA\\_Exonerations.php](http://www.innocenceproject.org/Content/Facts_on_PostConviction_DNA_Exonerations.php). Visited on 22/08/ 2016.

A typical examples of this category of evidence is to compare a concealed fingerprint to an identified inked imprint with matching ridge features, DNA profiles (except monozygotic twins), bullets and tool mark imprints with matching striation patterns, handwriting, comparing wear patterns observed in footwear and tire track imprints, and when the edges of a fragmented object can be reassembled in the way of a puzzle. Even if these diversities of evidence have classification or personal characteristics are still under the category of circumstantial evidence, the appropriate importance of the evidence and therefore the significance allocated to it by the Judges differ from one case to another. The power to exclude or include these categories of evidence is most imperative in dissemination of justice as it can establish the guilty or innocence of the accused.

The respect of protocols of chain of custody of evidence from crime scene to court is of paramount important in criminal cases. The necessity to observe those protocols is not only required for cases under investigation or under trial procedure, but also can be utilised for cold cases or for those who claim they were unlawfully convicted. In these latter cases, remaining DNA evidence can be used to support or refute claims of innocence. In case where evidence is absent, the reality will remain hidden and justice will never be administered. The author submits that legal principles suggest that, conviction should be proven beyond reasonable doubt and therefore, conviction or acquittal of defendant which mainly relies on the individual knowledge of the eyewitnesses should be minimised, since it has been proven that eyewitnesses are always fallible and cannot be cross examined and there is always a risk of false sentencing or acquittal (Thomas, George C, 2010)<sup>8</sup>. Nevertheless, DNA evidence is based on exclusive, objective, experimental scientific reasoning which is much more accurate, conclusive, infallible, and impartial in nature and above all can stand court scrutiny and cross examination. Therefore, if properly utilized in both investigation and criminal trial process, it will make investigation and prosecution faster, then the chances of wrongful conviction or acquittal would be diminished.

## **6. The Effectiveness of DNA Evidence as Tool of Forensic Science in Crime Reduction**

DNA evidence is one modern way of investigating and prosecuting criminals. DNA evidence has been proven as the best, accurate and effective evidence available in the hand of Judiciary to investigate and prosecute crime. It is also used as tool to establish the guilty or innocence of an individual. DNA evidence is a powerful tool due to the fact that each person has unique DNA; except monozygotic twins<sup>9</sup>. Therefore, DNA

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<sup>8</sup>See also, *Facts on Post-Conviction DNA Exonerations*, Urban Institute, Justice Policy Center, 2012. Available at: <https://www.ncjrs.gov/pdffiles1/nij/grants/238816>. Visited on 23/08/2016.

<sup>9</sup>Although identical twins are genetically identical due to the fact that they originate from a single fertilized ovule (egg) but they have different fingerprints because the latter are not totally a hereditary features. Fingerprints are a portion of a phenotype which connotes that they are characterized by the collaboration of personal genes and other intrauterine factors such as sustenance, pressure of blood and the level and speed of development of the foetus's fingers in the womb towards the expiration of first trimester.

evidence collected from a crime scene can implicate or eliminate a suspect in criminal cases. It can analyze unidentified remains through comparisons with DNA from relatives. The power of DNA is also seen when biological evidences such as blood are collected from crime scene(s) and stored in forensic manner. Such evidence some time can be found on evidence that may be very old. Therefore, old cases that people earlier thought cannot be solved, can now be solved through appreciated DNA evidence with the ability of establishing the culprit (Krimsky & Simoncelli, 2011). DNA technology is often significant factor in prosecuting the guilty and exonerating the innocent. Utilized tactically, DNA evidence can improve prosecution rates, increase rates of clearance, plays the role of deterrence, and then play the part in efficient crime decrease. DNA technology as the latest method of forensic science is the outcome of tremendous development of genetic science. It is based on objective experimental knowledge that the pattern of chemical signals, i.e. genetic code that is discovered within DNA molecule in the cells of each individual is unique and different in every individual. This is the unique characteristic to identify individual from others (Adhikary, 2007).

The development of recent biological and genetic technology is applied in the field of forensic science by evolving of DNA technology which plays a pivotal role not only in identification of offender but also in criminal and civil cases. This scientific evidence is speedier, specific, accurate and conclusive than any other human evidence and can stand the scrutiny of the court to determine the innocence or guilt of a person accused of any crime (Alleyne et al., 2009).

The value of DNA evidence to prosecute a suspect in every case depends on unbroken strong chain of custody from crime scene to court (collection; packaging, transport, storing, testing, interpretation of DNA test report, etc.). Mostly; the defense challenges the prosecution based on human procedural error (People of the State of California v. Orenthal James Simpson, 1994). To increase in the volume of DNA evidence, legislation, innovation and funding are essential. Crime reduction strategies and solutions must note that Prosecutors and JPOs should work together building on one case at a time. Every JPOs, Crime Scene Evidence Collection Technician, Forensic Analyst etc. are under the obligation that every time they collect, handle, transport, or analyze DNA evidence they have to do it in harmony with accepted procedures within approved standard of prosecution. Therefore, all these steps in the process are interconnected and have to be done in the appropriate manner and each step must also be in harmony with the others as united approach. In Rwanda, there is need for an integrated approach to fund training of JPOs in appropriate DNA collection, handling and funding of DNA laboratories to perform DNA tests properly. For instance, the US Government developed training materials for actors of justice such as Prosecutors and Police Officer to be acquainted with the effective use of DNA in investigation and prosecution (Parikh et al., 2007). The author appreciates the great effort and audacious positive step of Rwanda National Police/CID to have introduced the Legal Aspect of Forensic Science in their Professional Courses through CID School to train JPOs on the impact of forensic DNA evidence in administration of justice. The author humbly submits that Legal Aspect of Forensic Science should not be overlooked rather it should be introduced in all law cur-

riculum of colleges/universities in Rwanda and other institutions having mandates of training in the domain of law such as ILPD. This is one of mechanisms wherein actors of justice will get acquainted with legal aspect of forensic science in general and break the circle of lack of awareness, admissibility of DNA evidence in Rwandan legal system.

### **6.1. Role of DNA Evidence in Criminal Cases**

The main purpose of every legal system in criminal procedure is attaining a structure that balances both public and private interests. It entails the respect of fundamental human rights of the individual whilst upholding society's legitimate interest in maintaining the peaceful cooperation and co-existence of its citizens. This is true in both civil law and common law jurisdictions. For achieving this goal there must be balance between the rights of the individual and the right of the State to prosecute those who breach the law. For its success, a criminal justice system must understand the need of the society it intends to safeguard. The criminal system is intended to protect society against what is considered by a particular society as criminal or evil. It should be understood that it is impossible to have common law governing the society in general (Blackmore, 2011). DNA test has enormous impact on the administration of criminal justice (Chakraborty, R, 1992).

DNA evidence is important:

- 1) To JPOs, in the sense that it is the vehicle through which clues and theories are established. It also helps to eliminate suspects early in the investigation.
- 2) To Prosecutors, DNA technology is the tool used to incriminate a perpetrator i.e. prove guilt. It helps to focus their investigations and prosecution in more fruitful directions.
- 3) To Advocates, DNA technology can help exonerate their clients.
- 4) To Judges, DNA technology is the balance or measure on which guilt or innocence is weighed, hence, the critical tool for decision making.

It becomes essential to note that Rwanda should enact DNA law to deal with the aforesaid issues and benefit from the advantages brought about by DNA technology.

#### **6.1.1. Identification Purposes**

In many heinous crimes, offenders often leave the cadaver by severing the head of the victim on the crime spot, leaving the head-less corpse; very often it becomes difficult to identify a dead body. In such situation DNA test can solve the problem. These types of incidents commonly happen in crowded areas. Sometimes murder may be committed and the dead body is kept hidden in a deep pond for many days, the dead body being non-traceable for many days undergoes decomposition in the water and fishes and other aquatic creatures eat the human flesh resulting in difficulty in identification of the decomposed body. In such situation DNA test can solve the mystery (van Cuijk, 2009).

#### **6.1.2. Rape Cases**

In rape cases, DNA evidence proves whether the suspect is guilt or innocence. Immediately after the commission of rape, if the vagina swab is collected and sample sealed and sample semen collected from the accused and both samples are examined in the

DNA laboratory, it can be ascertained with greater accuracy, if there is complete, match between these two samples (*States v. Fleming*, No. 90-CR-2716, slip op. (Ill. Cir. Ct., Cook County, 12/03/ 1991))<sup>10</sup>.

### 6.1.3. Murder Cases

In murder cases, DNA evidence technique can be used for detection of the culprit who has committed murder. Different types of trace elements may be available on the crime scene/spot such as blood, saliva etc. In many cases blood stained clothes of the victim may be recovered from the possession of the accused or the blood-stained, weapon, sword, fingerprints on weapon etc. may be recovered from the possession of the accused. All these elements are valuable materials for DNA test, which signifies presence of accused on crime scene (*Troedel v. Wainwright*, 667 F. Supp. 1456 (S.D. Fla. 1986).

### 6.1.4. General Identification of Criminals

Identification of a criminal and connecting the criminal with crime is the paramount purpose in criminal trial and DNA technology serves this purpose. Very often criminals leave on the scene of crime many elements inadvertently, like; blood, hair, skin cells and much other genetic evidence. If these are collected and compared through VNTR (Variable Number Tandem Repeats) patterns with the DNA of a criminal, he/she can be spontaneously identified.

### 6.1.5. Detecting Innocence of Many Suspects

DNA technology is not only helpful for crime detection and identifying criminals, it is also helpful for exonerating many innocent persons from the trap of mala fide criminal prosecution (*Connors*, 1998).

### 6.1.6. Baby Exchanging Cases

In many parts of the world there is illegal practice of new born baby exchange in hospitals. The real genetic parents are deprived of their original babies. Generally, a female baby is exchanged with a male baby. This is cheating of the worst kind. However, DNA test in such situations has solved the mystery. Who is the actual real mother of the disputed baby can be ascertained by DNA test (*Sharma*, 2007). DNA evidence is also used in civil cases for instance when the paternity is in question, at that moment, VNTR (Variable Number Tandem Repeats) analysis can conclusively determine the parentage of a child. This is possible because a person inherits his/her variable number tandem repeats from his or her parents (*Adhikari*, 2007). In immigration purpose, adoption, medical insurance reasons. All these advances in science and technology have a serious impact on the administration of justice.

## 6.2. Advantage of Forensic DNA Evidence

The prime benefit of DNA technology is its power and capability to examine small sample, damaged by the environment and accurately proves its source. One of the ma-

<sup>10</sup>The decision is an association of two rape cases *Fleming and State v. Watson*, No. 90-CR-5546, where the DNA acceptability hearings were joined).

major advantages of DNA evidence is its resistance to the degradation of the environment. Besides that, DNA can generate the similar genetic result regardless the size of the evidence such as saliva, hair, blood stain, etc. This characteristic of DNA renders it dominant tool in the hands of law enforcement to secure investigation and prosecution of crime. The main factors causing degradation, include; chemical ingredient, rain, heat, moisture which generate the growth of micro-organisms, etc., which are often found together in the environment. However, DNA resists to these factors engendered by environment circumstances. It is reported that even if biological material gets degraded, it is possible to conduct DNA test, it remains stable except if it gets broken into smaller fragments. Lawmakers, criminal investigators, and legal professionals (actors of justice in general) have recognized a number of advantages derived from the potential use of scientific evidence such as DNA and its increasing applications (Williams & Johnson, 2005).

British scholars *Williams* and *Johnson* have identified the following advantages of DNA evidence:

- 1) DNA evidence contains the possibility to make quicker and accurate identification of an individual suspected of an offence by means of a computerized profile with comparisons in DNA databases; it reduces the backlog of cases.
- 2) It contains the capacity to assertively exclude innocent suspects from investigations; it increases clearance rates of suspects.
- 3) It has the capacity to increase likelihood of creating reliable and convincing evidence for use in court; hence, prevailing evidence.
- 4) It can decrease the cost of many investigations;
- 5) It can serve as deterrent measure with the DNA database outcome on possible criminal offenders; and
- 6) It can possibly increase judicial procedure and public trust in policing in general.

## **7. Need for Specific DNA Legislation in Rwanda**

The present article is based on findings of empirical PhD research (Murangira, 2013) conducted in Rwanda among the various respondents (Judges, Prosecutors, JPOs, Advocates/Lawyers, Law Teachers/Students, Medical Practitioners, Member of Parliament and Forensic Laboratory's Staffs). The findings revealed that lack of law to regulate scientific evidence in legal system of Rwanda is the main stumbling block of fusion of science and law. In order to overcome the said issue the author submits that there should be enactment of specific DNA law to deal with the issue arisen from the use of DNA evidence in administration of justice. Scientific methods can provide and establish link between crime, the criminal, the victim, and crime scene. DNA evidence plays a significant and important role in the system of criminal justice by establishing correct and objective evidence which tells the events that occurred at a crime scene.

Law, as a tool of social engineering, it should exploit the advantage of scientific and technological development. The purpose of DNA evidence is to help investigators car-

rying out criminal investigations and the prosecution to provide correct and precise evidence to courts which can help to arrive at correct decisions when administering criminal matters. DNA technology helps to deal with ever-increasing sophisticated crimes. It is crucial that law enforcement agencies in Rwanda be acquainted with DNA technology in crime investigation so as to protect the innocent and punish perpetrators.

In Rwanda, DNA evidence is impliedly admissible in civil and criminal trials, depending on the evidentiary obligations. DNA evidence has to be presented in suitable manner by qualified person to avoid injustice to the accused and victim. There should be establishment of special standards of proof applying to DNA evidence beyond the usual standards of proof in criminal proceedings. Furthermore, there should also be procedural safeguards for collection and use of DNA sample, guidelines of strict respect of the chain of custody of DNA samples, protection of right to privacy, right against self-incrimination, and obtain informed consent of individual before taking samples in order to reduce bias and likely human rights interference. Suspicions about lack of privacy protection and possible misuse of DNA information may create unnecessary and negative impacts on Rwandan societies due to specified absence of a legal framework on genetic privacy protection. The use of biological evidence without suitable legal framework pose a threat to Rwandan citizens' genetic privacy which might lead to illicit trade of human biological evidence and infringement of privacy. Formulation of sound genetic privacy principles can enhance the integrity and legitimacy of scientific evidence. All stakeholders will utilize the benefit of DNA technology, to prevent crime, arrest earlier repeat offenders, secure conviction, and exonerate those who are mistakenly convicted (Annas, in David Lazer, 2004).

The operational procedures are meant to safeguard and protect DNA sample against contamination and to be tempered with. In regards of past experiences from various countries, it can be emphasized that, issues of planting scientific evidence is a challenge in criminal justice. The challenges attributed to DNA evidence is based on the likelihood of fabrication/creation and contamination of evidence. The manipulation of false traces by criminals with the intent to implicate others as suspects, cannot be overlooked. Assuming the possibility and authority of DNA evidence, the Author submits that there should be serious safeguarding mechanisms to protect and ensure the integrity of DNA sample during collection, transport, storage and testing and providing mechanism of cross examination and scrutiny by recognized independent expert when it is required by the court.

Additionally, the exchange of forensic information and expertise is important under international investigations. Rwanda being member of East African Community, EAPCO (East African Police Chiefs Cooperation) and INTERPOL should have DNA law to allow Police across the borders to make connections and judicial cooperation between members of afore said international communities in criminal matters. DNA law should also aim at improving and safeguarding the sharing of information of investigative authorities in charge of the deterrence and investigation and prosecution of crimes. Due to aforesaid challenges and benefits brought by DNA technology, enactment of DNA legislation is of paramount necessity in Rwandan legal system. Thus, the

Parliament of Rwanda has to pass DNA legislation to prevent likely misuse on DNA evidence which may occur due to the absence of legal framework and guidelines and allow society to entirely enjoy the benefit brought by DNA technology. To add on, Rwanda as a member of regional and international organizations such as EAC, COMESA, Commonwealth, to name few, has no choice rather than to work on its legal framework to be in harmony and to avoid discrepancies with its obligations under the respective regional and international legal instruments it has committed to.

### **7.1. Why Is the DNA Law Needed at This Time?**

Law and science are two different disciplines but complementary that are increasingly becoming intermingled. Their complementarity and cooperation were felt as science and technology advances. The prevention of crime through scientific means is the need of the hour, hence, the proliferation of crimes that have been prohibited from happening with the help of practical investigative techniques would make for an additional remarkable record for Law Enforcement Agencies such as Rwanda Investigation Bureau. In circumstances where the victim is in impossibility to identify the perpetrator due to various factors such as mental, physical deficiency and fading memories, there is still the chance that the perpetrator will be known through the use of DNA profiling when there is DNA database (Bennett, 2012). Link between science, technology and law is not given the weight it deserves under Rwandan legal system. The latter is based on the inquisitorial system to find out the truth, while the scientific community uses experimental analysis. Law and science often meet in the courtroom, where Judges, Prosecutors and Advocates often find themselves trapped in scientific concepts which they may not fully understand. Likewise, Judges, having less knowledge due to lacking scientific background, are in impossible position to decide whether scientific evidence is accurate and reliable. The various applications of scientific evidence such as DNA, as an investigative tool have cemented a binding partnership between judicial services and forensic sciences. The enactment of DNA law will provide the legality of DNA evidence and the same will enable Law Enforcement Agents and Prosecutors to focus investigations in more fruitful directions and to the Judges, DNA law will help them to settle problems involving scientific evidences as it will be admissible in Rwandan legal system. Hence, the enactment of DNA law is very much needed at this time because the finality of court judgments regarding DNA evidence in criminal cases is being questioned. Laws are developed to give the answer to what society needs based on societal evolution and keep in pace with the scientific evolution which is happening around the country.

It is very significant to understand the situation of crime trend in Rwanda as far as forensic investigation is concerned. There is migration/shift from violent crimes to white collar crimes. The trend is not completely new phenomena. White-collar criminals increase on being able to avoid detection in order to carry out their criminal operations; they have the aptitude to adapt to a given criminal environment such as taking advantage of development of information technology. Crimes like computer crime, fraud and identity theft are more rewarding and easier to conceal. The CID for several

years has been investigating theft committed with violence or threat and this have migrated into the white-collar crime. Thus, criminal investigation should also change the traditional tactics by resorting into forensic technics to be able to confront this migration.

DNA Law will accord the power to the Law Enforcement or Public Prosecution to collect and guarantee effective use of DNA evidence in solving criminal and civil matters. The Act shall protect misuse of biological information and to protect individuals' biological evidence from unnecessary or avoidable damages. Information from DNA samples are individual property and arbitrarily collection and storage/retention of DNA information constitutes the intrusion of right to bodily integrity. Any such intrusion of bodily integrity must be balanced with public interest and the community ruled with purpose to be attained. The absence of legal framework on protection of genetic privacy creates loophole or window for third parties to possibly access personal genetic information in illicit manner. Generally, the right to privacy is protected under article 23 of the Constitution (The Rwandan Constitution of 2003 revised in 2015). Due to its nature, genetic privacy is not tailored to be protected under this provision of the Constitution even in other provisions of other Acts because the aforementioned article is not tailored for that purpose. Thus, the DNA legislation should be enacted taking into consideration to protect genetic privacy. Consequently, the enactment of DNA legislation must be supported by protection and precaution of DNA sample collection clarifying in which situation and context DNA evidence should be collected or when the suspect should be compelled to provide DNA sample for testing in the absence of consent. The DNA law should also establish who should have access and use DNA information, limitations or restrictions and time limit of retention of DNA information.

Another significant motive is that during 13<sup>th</sup> National Leadership Retreat held on 12<sup>th</sup> and 13<sup>th</sup> March, 2016, "speeding up of the establishment of Rwanda Forensic Laboratory for DNA test and other related issues" was among resolutions adopted. To meet this 14<sup>th</sup> resolution there are several significant developments that simultaneously can influence the establishment of Rwanda Forensic Lab to provide professional forensic service. These developments add value to its establishment, profession and benefit the whole justice community. For these benefits to be achieved completely, preliminary works such as enactment of DNA law, quality assurance standard operating procedure, lab security policy, chain of custody and working guidelines, etc all these support at the policy level are required. It becomes essential to note that the Parliament of Rwanda should enact DNA law to deal with the aforesaid issues and benefit from the advantages brought about by DNA technology. This is the only way to prevent the possible misuse and to break the cycle of lack of admissibility in regard of DNA evidence and make stakeholders acquainted with forensic science in general.

## **7.2. Whether the Enactment of DNA Law Is Built on Existing Activities**

Rwanda as a technologically emerging country is committed to fight crime and give fair and speedy justice through various legal means including DNA technology. It is the duty of the government to maintain law and order and this; it does by ensuring the

perpetrators of crime are brought to book. If criminals would escape detection and punishment, the State would have failed in one of its prime duties of protecting its citizens and property. Therefore, it is incumbent on the government to ensure law breakers are punished. One of the ways of ensuring that criminals are nabbed is through the use of DNA evidence as it proves culpability of a criminal or innocence of an accused. DNA evidence does exactly this as DNA left behind during commission of a crime helps in nabbing and proving guilt of the perpetrators of crime, or exonerating the innocent accused.

Article 86 and 87 of Rwandan Criminal Procedure Code<sup>11</sup>, impliedly illustrates how DNA evidence is generally admissible in Rwandan legal system. Under article 87 of Rwandan Criminal Procedure Code, Court is empowered to demand the parties to produce *any evidence*<sup>12</sup> which is considered conclusive in order to decide a case. Moreover, article 9<sup>13</sup> of law of evidence stipulates that, evidence based on a legal issue or on a fact can be proved by the use of written evidence, testimony, presumption or circumstantial evidence, admission of a party or any other material evidence. The wording *any other material evidence* connotes that evidence which can help to establish the truth in a case is admissible this includes DNA evidence. DNA evidence is impliedly admissible in Rwandan court(s) because there are a number of judgments decided based on DNA evidence<sup>14</sup>. But still this is not enough due to the issues surrounding the use of DNA which has to be governed by specific law.

The Rwanda National Police is up to the task to fight crimes especially those committed in sophisticated manner. A branch of Rwanda Police, *the Anti-Gender Based Violence & Child Protection (GBV)* has been set up and trained to fight crimes committed against women such as rape, molestation and protection of child. Additionally, the attitude toward DNA evidence in Rwanda is narrowly interrelated to balancing the individual's rights while taking into consideration the interest at large to fight crime (Etzioni in David Lazer, 2004)<sup>15</sup>. Despite the special needs doctrine<sup>16</sup>, DNA evidence used, allow the pre-conviction collection of DNA evidence for the investigation and identification purposes, and do so in a way that practically maintains the balance between individual right and governmental interests namely public interest. Hence, the collection of DNA

<sup>11</sup>Law N° 30/2013 OF 24/5/2013 relating to the Code Of Criminal Procedure, Official Gazette N° 27 of 08/07/2013.

<sup>12</sup>This brought to researcher's attention that any evidence means all evidence including DNA evidence.

<sup>13</sup>Law No. 15/2004 Of 12/06/2004 Relating to Evidence and its Production.

<sup>14</sup>In the Judgment RP0113/08/TGI/NYGE of 08/02/2010 (24) The Judge motivated his decision based on expert decision as follow: The fact that the report of expert (DNA) of 18/09/2009 communicated to the court by Public Prosecution in its letter no 520/D11/A/PGI du 8/10/2010 proves that X is the father under of 99.9% and consequently, he is guilty. In another case, RP575/07/TGI/ NYGE of 30/01/2009 (19), the Judge affirmed that DNA results proved the paternity at 99.99%.

<sup>15</sup>See also, Etzioni, Amitai, *Implications of Select New Technologies for Individual Rights and Public Safety (Spring 2002)*. The Harvard Journal of Law & Technology, Vol. 15, No. 2, pp. 258-290, Spring 2002. Available at SSRN: <http://ssrn.com/abstract=1438669>. Visited on 25th August, 2016.

<sup>16</sup>The "special needs doctrine" play the role to excuse the government from following the ordinary procedure to the normal warrant and possible reason pre-requisites. This special need doctrine helps the government to act beyond the usual need for law enforcers, it is important to weigh the privacy right of individual alongside the government needs of curbing the crime.

evidence, which is being utilized in the investigation and identification purpose of criminal and reveals connections to past criminal acts, helps both the government's and the individual's interests. It helps JPOs in investigation and court prosecuting crime and supports advancing criminal proceedings. In that sense DNA legislation should be enacted to ensure the proper use of DNA evidence in investigation and during trial this can help to seal a conviction for the guilty or secure exoneration for the innocent accused, without human right violation. Thus, passing DNA law is indeed built on existing schemes and mechanisms of the Government to curb proliferation of crime.

### **7.3. How Is the Proposed DNA Law in Line with National/Local Strategies and Conform to Others Existing Legislations?**

The government has the Police to maintain law and order. Criminal Investigation Department (CID) with close collaboration with Public Prosecution Authority conduct investigations. To help in prosecution of crimes, the Government of Rwanda sends DNA samples abroad for testing. The establishment of Rwanda Forensic Laboratory will stop Government of Rwanda to spend lots of millions to carryout DNA tests abroad, most of them in Germany. The resource is integrated to ensure that Rwanda is self-sufficient without having to fly evidence abroad which is too expensive and sometimes engender legal issues<sup>17</sup>. Establishment of DNA lab and enactment of DNA law will be an added value to compliment Government efforts in curbing proliferation of crime as it will educate the various stakeholders on the need and importance of DNA evidence, law relating to DNA evidence, the need to teach the same in law schools, handling of DNA evidence, issues relating to DNA evidence, need to have a well-equipped DNA labs in the country etc. The enactment of DNA law is indeed in line with the local strategies in the sense that it will help:

- In the development of law and improving or advancing criminal justice,
- The development of justice delivery system in Rwanda in particular and in the region in general,
- Contribute to the development and dissemination of justice.

Moreover, in Rwandan scenario, judicial forensic scientists are in charge of securing and collection of forensic evidences from crime scene. These collected evidences will be transported to the Rwanda Forensic Laboratory (RFL) for testing. In return RFL provides reports on the outcomes of the analysis to the Public Prosecutor who is in charge with process of the case to court with support of the forensic results to secure conviction or exoneration. This entire process of chain of custody of forensic evidences (from crime scene to court) has a serious legal impact on the verdict/judgement of the court (*People of the State of California v. Orenthal James Simpson, 1994*)<sup>18</sup>. It is therefore, important that three keys, actors of justice in Rwanda (Public Prosecutors, Judicial Police Officers and Judges) are properly trained and understand well legal aspect of foren-

<sup>17</sup>Challenging DNA evidence tested in Germany based on chain of custody of DNA evidence, possible violation of right to genetic privacy, uncontrolled research done without the consent of DNA originators, etc.

<sup>18</sup>It is a murder in which former Footballer Star Simpson Orenthal was tried on two counts of murder where he was acquitted due to the fact that Prosecution failed to observe the protocols of chain of custody of evidence.

sic science, legal implications and impact of forensic DNA results specified in forensic DNA expert report would have on judgement rendered by the Judge.

JPOs spend a lot of time in gathering and testing of DNA evidence from the scene of crime and enduring over the whole investigation process. Prosecutors are favoured when scientific evidence establishes the smoking gun that ascertains the involvement of offender in commission of crime beyond reasonable doubt. A number of stakeholders in Rwanda still have an uncertainty when the analysis of presented forensic evidence cannot be explained. Based on aforesaid explanations, the enactment of DNA law would be definitely in line with national/local strategies and it conforms to Government Legislation. For the best practice, this should be regulated by DNA legislation. Thus, this article proposing enactment of specific DNA legislation is in line with government goal of reducing crime, improving criminal justice and one way of doing the same is by ensuring criminals are convicted.

#### **7.4. The Law Shall Seek to Achieve Following Objects**

The various factors which need to be regulated by the DNA legislation include: the power of Judicial Police Office to gather, store and share information from forensic DNA evidence, the refusal to provide sample for DNA testing, admissibility of DNA sample in the court (Callahan, 1996), presumption of innocence, human body as personal property, issue of genetic privacy, etc. Moreover, the right to privacy is protected in article 23 of the Rwandan Constitution (The Rwandan Constitution of 2003 revised in 2015). The absence of a legal framework on protection of genetic privacy creates loophole or window for third parties to possibly access personal genetic information without fear of repercussion or punishment. The revealed information of the result of DNA test for instance may benefit and be utilized by insurance companies and employers to refute submission for insurance policies and employment. The use of DNA samples such as blood, semen or other sources of DNA samples without suitable legal framework pose a threat to Rwandan citizens' genetic privacy, which might lead to illicit trade of human DNA and infringement of privacy and unrestricted research activities on human DNA (Khaleda, 2012). DNA is hence, subject to the menace of being misused when there is no regulatory framework. The Author submits that, in case of paternity dispute, there is no law to direct disputed parents to undergo DNA testing. For this reason, it is significant to have a legal framework in Rwanda to guarantee effective use of DNA evidence in solving parental disputes.

Furthermore, the best practice suggest that, public forensic science laboratories should be sovereign of or separate from law enforcement agencies<sup>19</sup>. Many prominent forensic scientists suggested that forensic labs should not be controlled by law enforcement agency or public prosecution rather by self-governing entity to avoid the likelihood of improper influences on forensic lab and to acquire public trust. The head of Rwanda Forensic Laboratory would have an equal point of view with others in the jus-

<sup>19</sup>Administratively this connotes that forensic scientists should exercise their daily functions autonomously of law enforcement administrators.

tice system on issue regarding laboratory and other agencies. Moreover, this would enable the Rwanda Forensic Laboratory to set its own priorities with respect to cases, costs, and other significant issues. Forensic science has to be unbiased, and seen unbiased. This problem was raised in a critical evaluation of forensic science in the US, from which it was suggested that administration of forensic lab should be detached from law enforcement agency<sup>20</sup>. Whereas machineries can be established to safeguard fairness from being compromised, but the threat remains higher for unnecessary pressure to be placed on scientists if they work within the same organization as the customer<sup>21</sup>. The public also needs to have trust in the sense that, Law Enforcement Agency cannot collect forensic evidence and have them tested in the forensic lab which is under its administration and later on bring the results as inculpatory evidence in court to secure prosecution. This would tarnish and undermine lab trust vis a vis the public. In other words, the main objective is for a laboratory to have adequate sovereignty to safeguard the integrity/ reliability of the laboratory's results<sup>22</sup>.

A further negative impact arising from the absence of forensic laboratory and legal framework is establishing DNA database for DNA profiles and the law governing its management has caused complexity and obscurity in identifying dead bodies and missing people for instance, in 1994, Genocide against the Tutsi occurred in Rwanda. The major problem was identification, because a number of corpses could not be identified. If forensic lab(s) and pertinent laws were in place, victims of these horrible history would have been easily traced and identified and be buried with human dignity (Asplen, 2008)<sup>23</sup>.

## 8. Conclusion

The usefulness and accuracy of forensic DNA evidence as a tool in the hand of criminal justice system to convict or exonerate the suspect are vastly supported by various legal literature and severe framework of quality assurance that have been established for

<sup>20</sup>National Research Council of The National Academies, *Strengthening Forensic Science In The United States: A Path Forward* (2009 Report).

<sup>21</sup>Retrieved from 7th Report of Science and Technology Committee, on *The Forensic Science Service*, 2011. Available at: <http://www.publications.parliament.uk/pa/cm201012/cmselect/cmsctech/855/85502.htm>. Visited on 12th August, 2016.

<sup>22</sup>According to the 2009 report of National Research Council of the National Academies, *Strengthening Forensic Science in the United States: A Path Forward*, the best science is conducted in a scientific setting as opposed to a law enforcement setting. Because forensic scientists often are driven in their work by a need to answer a particular question related to the issues of a particular case, they sometimes face pressure to sacrifice appropriate methodology for the sake of expediency. The problem of bias in crime laboratories is not unique to the United States. According to a British Court in the case of *R v. Ward*, [1993] 96 Crim. App. 1, 68 (U.K.). It was stated that "Forensic scientists may become partisan. The very fact that the police seek their assistance may create a relationship between the police and the forensic scientists. And the adversarial character of the proceedings tends to promote this process. Forensic scientists employed by the government may come to see their function as helping the police".

<sup>23</sup>The author has tried to show how forensic DNA Technology can bring contribution in crime committed against the humanity such as genocide. Available at: <http://www.forensicmag.com/article/forensic-dna-technology-and-genocide-dynamic>. Visited on 25th August, 2016.

many years. The current judicial scrutiny brought a great development of DNA technology and occupied a significant part towards the acceptance of forensic DNA evidence in court of law as legal instrument. This strict examination and scrutiny of DNA sample in the court has contributed in crediting DNA evidence as vigorous and most prevailing evidence in improving criminal justice system. Through the enactment of DNA legislation, criminals can be apprehended faster, prevent the occurrence of crimes, hence saving more lives. Legal system has to grow in order to satisfy the needs of the fast changing society and keep abreast with the scientific developments taking place in the country. With the evolution of DNA technology judicial review should ensure that justice is served and public protected. Law cannot continue to remain rigid and static.

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