

**THE ROLE OF ELECTRONIC SIGNATURES IN COUNTERING DIESEL
THEFT IN MANUFACTURING SECTORS – A CASE STUDY OF TPC
LIMITED**

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**DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENT FOR THE DEGREE OF THE MASTER OF LAW IN
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2013

CERTIFICATION

The Undersigned certify that he has read and hereby recommend for examination a Dissertation entitled, “The Role of Electronic Signatures in Countering Diesel Theft in Manufacturing Sectors a Case Study of TPC Limited” in partial fulfillment for the Award of Master of Law Degree of the Open University of Tanzania

.....

Professor David Mellor

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Date.....

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DECLARATION

I, David Lumelezi Shilatu, declare that this Dissertation is my own original work and that it has not been presented and it will not be presented to any other University for a similar or any other degree award.

Signature.....

Date.....

DEDICATION

This study is dedicated to my sweet heart Mary, wife of my younger years, to you be the love for you are my everything, to my beautiful daughter Aneth-Cathleen and my boys Elisha-Yul and James, hope you walking my foot, to you be the courage and our God will never fails you.

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my research work, for the purposes of making this work complete and sound, but to all of them I express my most sincere thanks. However, for all the mistakes and errors if any contained in this work are hereby regretted, and the author remains solely responsible.

ABSTRACT

In this work the researcher has divided his work in five chapters and to be specific under chapter one the research is mainly divided into introduction where the researcher is introducing the matter for discussion and, it is explained inhere that security has become an issue all over the world and with the development in science and technology, manufacturers are urged to use electronic signatures to counter these problems. Furthermore in this part of the work the researcher explain the background to the problem explaining that in Tanzania Electronic Signatures have got no legal backing and hence, a need to have our relevant legislations amended. The researcher went on further into putting it clear that, at the time of writing this paper there have been no law or a proposed bill to address the problem and hence for the purposes of clearing this hurdle as to the application of electronic signatures, amendment need to be effected to the Tanzania Evidence Act, The Penal Code, The Civil Procedure Code, The Bank Of Tanzania Act, The Criminal Procedure Act and all other relevant laws that are key in the operation and recognition of electronic signatures. In Chapter two the paper explains as to the meaning and role signatures and the way on how the same has been applied in Tanzania, in this part of the research the researcher further defines what it is electronic signatures and types of electronic signatures, in this part as well it is explained the way on how electronic signatures have been legally recognized in other jurisdictions at national level. Chapter three explains advantages and disadvantages of electronic signatures as a means to try and control diesel theft in the manufacturing settings, in this part a series of advantages and disadvantages are given out to try and put is clear that, technology has its pro and cons.

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The United Nation Commission on International Trade Law

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ABBREVIATIONS AND ACRONYMS

AGAF	Australian Government e-Authentication Framework
AGSI	Association for Global Strategic Information
ATM	Automated Tailor Machine
CEO	Chief Executive Officer
CSEO	Corporate Services Executive Officer
DHL	Acronym; DHL: Dalsey, Hillblom and Lynn founders of DHL Worldwide Express.
DNA	Deoxyribonucleic acid
ESA	Electronic Signatures Act
EU	European Union
GX	Garage and Transport Executive Officer
IT	Information Technology
PKI	Public Key Infrastructure
PSM	Protective Security Material
TPC	Formerly Tanganyika Planting Company
UNCITRAL	The United National Commission on International Trade Law

CHAPTER ONE

1.0 INTRODUCTION

Around the world, security has remained one of the biggest issues in all sectors of production. Some companies today are thinking of using technology for the purposes of countering theft in their organizations. Since 1996, both international and supranational organizations on governmental and business level have been trying to promote the use of electronic signatures in electronic commercial transactions and set forth a common legal framework for electronic authentication over the internet¹.

1.1 Back Ground to the Problem

Electronic signature are a new phenomenon in most of the developing world, Tanzania being one of them; this is why the use of such signatures has no legal backing in the sense that there is no specific legislation that has been enacted to legislate the situation. International bodies, organizations and countries have adopted different definitions of electronic signatures. In essence, e-signatures are computer-based personal identities. They can take on a simple form, like bitmap signatures which are scanned images of handwritten signatures onto a document, or an advanced one, like the biometric signatures (e.g. iris scan) which require a special writing pad that records strokes and pressure². The most advanced and widely used form of electronic signature is the digital signature, which is based on the public key cryptographic method.

¹ See Christina Spyrelli., *Electronic Signatures: A Transatlantic Bridge? A EU and US Legal Approach Towards Electronic Authentication.*, Law School of University of Strathclyde

² Ibid

Some of the institutions such as leading banks in the country are already applying this kind of electronic signature and the same has been very much effective as a means of identifying individuals in the course of doing banking transactions. In Tanzania banks like CRDB PLC, NBC Limited, Standard Chartered, Tanzania Post Banks, NMB, Barclays, Stanbic, the Tanzania Postal Bank, BoA Bank and so many others by introducing technology of Automated Tailor Machines popularly known by its initial of ATM have managed to introduce electronic signature and the same has had a big impact on the way how banks do business in the world today.

It is without doubt that there is a lot to be gained by the manufacturing sector. The sectors currently still very much manual generated in terms of the way how security matters are being handled despite the fact that, technology has taken its shape and everyone is using technology to try and counter theft in the manufacturing sectors as it has been the case in the banking and financial institution industry. Before the coming into force of the new technology the manufacturing sector had mainly relied on the manuscript signature as a means of authentication of documents for it is clear that the primary purpose of a signature serves to provide admissible and reliable evidence that comprise the following elements:

- (i) To furnish tangible evidence that the signatory approves and adopts the contents of the document.
- (ii) In so doing, the signatory agrees that the content of the document shall be binding upon them and shall have legal effect.
- (iii) Further the signatory is reminded of the significance of the act and the need to act within the provision of the document.

Above cited are some of the basic functions of signature, it should however be noted that there exist other functions of signature and this include the provision of evidence of identification and authentication. In other jurisdictions, greater emphasis has been placed on manuscript signature for the purposes of determining authorship and in actual fact thereby authenticity, as a primary purpose. Other considerations (this is not exhaustive) include to establish the identity of a particular characteristic, attribute, or status of the person (such as a government minister or company director); the existence of a signed document provide a record of the intent of signatory, and to demonstrate that the content of the document has not been altered subsequently to the affixing of the signature³.

As mentioned above before the coming into force of a new technology the manufacturing sector was very much dependent on manuscript signature for the purpose of identification and authentication and this trend has a encountered a series of problems, among them, forgery of signature as a result in most of the manufacturing sectors in the country theft is common and it has been very difficult to pin down who the actual thief is.

Basing on the manufacturing sector where diesel is the key component in as far as production is concerned and under normal context at TPC Limited, it is the duty of the company management to supply diesel to all the machineries that are participating in production at any time of the season, furthermore it is the duty of the company management to ensure security of the supplied diesel to all the machinery

³ See S Mason, "Informal Debate on the Issues Relating to Terminology and Clarification of Concept in Respect of the EU e- Signature Legislation", (2012) 9:1

in seeing to it that this important resource is not stolen for the purposes of protecting the company's profitability.

This is why in every diesel transaction, that is to say, at start of each shift a driver will have to be furnished with his portion of diesel that he/she will have to utilize for the period of eight hours and she/he will have to account for any discrepancy that might occur, such as consumption of above average amounts of diesel, then he/she will be subjected to a disciplinary hearing to answer the charge of diesel theft. Many of these hearings do end up with termination and in most cases without notice. It is without doubt that, the company as the owner of machineries and employer of the human capital at the workplace, has the primary duty to ensure that diesel is appropriately used and the same is kept in safe manner that nobody can simply access this valuable resource and make an appropriation he/she deems fit, contrary to this, the manufacturer(s) will be held liable for all the losses that might occur in the course of doing business.

The situation is quite different in the electronic age, dependence of manuscript signature is becoming history, organizations or companies are now increasingly relying on technology and particularly electronic signature to try and counter things like fraud, theft, forgery, phishing, hacking and other cybercrimes. To counter these kinds of crimes the world, and particularly the manufacturing sector, it is important that a clear legal framework is put in place so as the same can allocate the responsibility and limits of liabilities to the players in the manufacturing sector. For it is clear that awareness of the problem does not mean a thing if law is not there to tackle to problem.

It is important therefore to have a way of allocating risks and liabilities on electronic system in the manufacturing sector, by using scientific means to identify a responsible person who happens to be diesel thieves in production setting and to ensure that there is security, privacy and confidentiality among key players, including the company who in actual fact is the owner of this valuable asset and employees who some of them seem to be victims of the situation without actually participating in stealing. Nevertheless, these victims when their manuscript signatures are used in various documents used for diesel transactions it is concluded that they are either stealing or have conspired into stealing exercise.

A clear way of allocating risks and liabilities will almost certainly make all key players enjoy reasonable degree of legal certainty for, absence of clear regulations in this regard makes the employer in the case of TPC Limited to take a great risk and hence makes big losses each and every season of production.

1.2 Statement of the Problem

At the time of writing this paper there is no specific statute in Tanzania law that regulates electronic signature. More often responsibilities and charges are being placed onto the employers on one hand and employees on the other hand and these cases are determined within the legal structures that have been there many years. Most legislation in Tanzania, such as the Evidence Act, Penal Code, Civil Procedure Code, The Bank of Tanzania Act, The Criminal Procedure Act etc., was enacted without contemplation that at a certain point in time there would exist electronic signature and risks that emanate from manuscript signatures are going to be very

much exposed and through this lacuna manufacturers are not protected. It is conspicuous that in Tanzania this imported technology has by any means to go *mutatis mutandis* with a designated legal framework to cover the whole transaction in electronic signature by imposing rights, duties and liabilities to those in the transaction.

The main problem with the existing legislation, or traditional law, if you can call it that, is that it does not cover electronic signature and hence it leaves the risks resulting from the use of the same to be very much ungoverned. However, it should be noted that court of laws in the country seem to be proactive and hence they seems to be moving in accordance to what is currently prevailing, the issue on admissibility of computer printout marked a big difference of the way on how the judiciary views the development in science and technology so that in the case of Trust Bank Ltd vs Le-Marsh Enterprises Ltd, this case led into moving the parliament into amending some of the provisions of the Tanzania Evidence Act⁴.

In as far as the development of science and technology and the way on how our legislations are lagging behind, Bwana⁵ said that the development of electronic banking is thwarted by legal uncertainty and that they should be viewed as risks that should not fall foul of existing laws which were enacted not taking into account electronic transaction⁶.

⁴ See Cap. 6 R.E. 2006

⁵ Bwana J.A., "Electronic Banking and Laws in Tanzania: Approaches to its Regulation", The Tanzania Lawyers: The Tanganyika Law Society Journal Issue of April, 2004.

⁶ Op. cit

1.3 Literature Review

This part of our research reviews and discusses some of the studies that have been conducted on the role of electronic signature in countering diesel theft in manufacturing sector. It is obvious that there are few or limited specific literature that have been written focusing on the area of electronic signature in the country let alone those written putting emphasis on manufacturing sector and the way on how the same has helped in countering theft and particularly in diesel theft.

Mambi⁷, while writing on this area tries to show the legal regime of digital signature and other electronic signature, legal meaning of digital signature, cryptography technology and digital signatures in Tanzania. It is clear that there has been a massive increase in the use of technology in the course of performing various functions in Tanzania, he further submits that most laws governing business in transactions provides that, the contract must be in writing and duly signed or authenticated before a witness.

This requirement is no longer applicable in cyberspace world, hence off-line laws have to be changed and reformed to accommodate e-commerce principles. Our concern in this research paper is how the law, even if enacted, allocates risks and liability related to the role of electronic signature in countering theft in the manufacturing sector settings and of course the way on how the same shall limit liabilities to the parties involved.

⁷ Adam J. Mambi., ICT Law Book a Source book for Information & Communication Technologies and Cyber Law

Spyrelli⁸ in her paper among other things states the benefits of electronic signatures and goes on saying that the benefits are not only commercial but also non-commercial entities benefit from the implementation of e-signatures especially digital signatures in e-commerce. First of all, as far as Business to Business [B2B] and Business to Consumer (B2C) e-commerce is concerned, e-signatures can offer greater security, reliability and transparency in e-transactions by minimizing the risk of dealing with frauds, or persons who attempt to escape responsibility by claiming to have been impersonated.

In particular, digital signatures can satisfy the need of message integrity by preventing unauthorized access to data, detecting any message tampering and diminishing the danger of false claims that data was changed after it was sent. Therefore open network systems can be gratified with efficiency in data interchanges among businesses and costs effective and safe information gathering, while respecting consumers' rights of online privacy. In addition, when an e-contract is digitally signed, the formal legal requirements (writing, originality of signature and of document) are satisfied, since digital signatures are functionally equivalent to paper forms. In this paper it has been shown the way on how the European nations and America have put in place legislations that have tried to allocate the risks related to electronic signatures, it is further obvious that the shortcomings in those legislations have been clearly identified.

⁸ See Christina Spyrelli., *Electronic Signatures: A Transatlantic Bridge? An EU and US Legal Approach Towards Electronic Authentication*

Luhwago⁹ in his paper states that, the evolution of electronic commerce has brought with it the new methods of authentication of electronic documents. Electronic signature is the main method of authentication of an electronic document or record. The importance of a signature in this context is whether electronic signatures can perform the same function which manuscript signature performs.

Furthermore Luhwago contends that the discussions on electronic signature technologies demonstrate that electronic signatures are actually harder to forge than manuscript signatures. Identification of a piece of handwriting is not as simple as it may be seen to be. It requires professional skills of comparing the handwriting. The only function which electronic signatures cannot provide is that of making a visible mark on a document. Its mark is in digital form. However, it is currently contended that a signature, whether electronic or on paper, is first and foremost a symbol that signifies intent.

The primary focus is on the intention to authenticate is which distinguishes a signature. Luhwago's work shows the way on how signature has evolved today from those good old days where the manuscript signatures were ruling the day to the current situation of digital or electronic signature, his work, however, does not clearly indicate as to how the electronic signature allocates risks and or liabilities and the way how the same can help the manufacturing sectors to counter theft in their business, to which this paper shall center in the area and shows how manufacturers

⁹Luhwago Wilberforce S., "Perceived Problems surrounding the admissibility of Electronic Evidence with Particular Reference to Tanzania Mainland" May 2008

in the country can very much benefit through the introduction of electronic or digital signature in their setting.

Lloyd I. J¹⁰ in his book states that, the basis for much of the Electronic Communication Act's¹¹ provision in this field lies in the European Directive on Electronic Signatures¹². Although much of the work relating to the legal status of such signatures has concerned the use of public key encryption, the Directive and the Act seek to be technologically neutral. Its implementation would have the effect of providing for electronic equivalents to writing and signature to be accepted within the Member States. The Directive is expressly stated to be unconcerned with contractual and other procedural requirements.¹³ Its purpose is stated to be:

...to facilitate the use of electronic signatures and to contribute to their legal recognition. It establishes a legal framework for electronic signatures and certain certification services in order to ensure the proper functioning of the internal market.¹⁴

Establishment of the legal framework in the country that recognize electronic signature is the cornerstone of this research paper, hence the paper shall borrow most of the provisions of the Electronic Signatures Directive and those in the Electronic Commerce Directive and those relevant provisions might be guiding one's toward enactment of a legislation to carter for the situation in the country.

¹⁰ See Information Technology Law 6thedn. Pg. 472

¹¹ See the 2000 Act in the United Kingdom

¹² See Directive 99/93/EC

¹³ See the provisions of the Electronic Commerce Directive 2000/31/EC

¹⁴ See Article 1 Op. cit

1.4 Research Objectives

Our research intends to find out as to whether there is a legal framework that clearly governs and controls electronic signatures in the country. This paper further assesses the risks and extent to which manufacturers and/or businesses entities in the country can protect themselves through the use of electronic signatures against thieves, fraudsters and those who under today's context can do phishing so as to defraud the manufacturers in the country, the paper further looks at legal remedies available to manufacturers in case problems that might occur as a result electronic signature in the manufacturing sectors.

1.1 Specific Objectives

- (a) To find and analyze the risks that has been occurring in the manufacturing sectors as a result of non-usage of electronic signatures.
- (b) To check out as to whether there are regulatory systems in Tanzania that focus attention on electronic signature for the purposes of protecting manufacturers in the course of doing their businesses.
- (c) To check out as to the limitation of liabilities between the key players in electronic signatures in Tanzania Legal framework.

1.2 Research Questions

1. Whether the existing criminal and civil legislations in Tanzania are adequate to accommodate electronic signatures transactions.
2. Whether the existing criminal and civil legislations in Tanzania provide a clear distribution of liabilities to the key players in electronic signatures

transactions.

1.3 Research Methodology

This study has been carried out through library research and fieldwork. The researcher decided to use the doctrinal method of conducting this research so as to understand what other researchers have discovered pertaining to the matter. Field work approach has also been applied by the researcher to try and collect views of key people involved in the business particularly executives in the garage department within TPC Limited where the research title has an exceptional focus. Other necessary materials used were from the Open University of Tanzania Library, University of Dar es Salaam, The Moshi University College of Business and Cooperative Studies Library where the researcher is actually staying, a nearby Library from the University of Stefano Moshi in Kilimanjaro, The Library of the Mwenge University College of Education in Kilimanjaro.

The source was very much focused on the theoretical as well as practical part of it, by revisiting works of various scholars on e-commerce and particularly on electronic signatures. Interviews were administered with experienced human experts who are in the manufacturing sector, IT professionals, lawyers and in actual fact informal discussions conducted by those involved in the distribution of diesels in the fields.

1.4 Scope of the Study

The study is limited to the manufacturing sectors and a case study has been very specific to TPC Limited a sugar manufacturing company that ply its business in the Southern part of Moshi in the Kilimanjaro region, Tanzania Law Reform

Commission, Commercial Lawyers, Advocate and other IT professional and particularly academicians in Kilimanjaro.

The fact that the researcher has had limited resources that did not allow him to visit other areas he was therefore limited to regional areas. Understandably this research is of beneficial not only to the manufacturing sector but other sectors as well such as roads works and the like, however, time was limited for the researcher to go up country for data collection. However, the researcher is of the view that, TPC limited one of the biggest tax payer in the country can represent fairly other manufacturing sectors in as far as diesel theft and its impact in the cost of production is concerned if the sector cannot be helped by legislations to go electronic.

CHAPTER TWO

2.0 THE MEANING AND ROLE OF SIGNATURES

2.1 Introduction

From the abstract of the Webster's English Dictionary¹⁵ a signature is defined to mean a person's name written by him or herself. It is further stated in Stroud Judicial Dictionary that:

“Speaking generally” a signature is the writing or otherwise affixing a person's name, or a mark to represent his name, by himself or by his authority... with the intention of authenticating a document as a being, or as binding on, the person whose name or mark is so written or affixed...”

In my opinion the above cited definition is really very important for the same demonstrate the function the signature performs, namely to authenticate documents. For the purposes of clarity, it is significant to define the term “authenticate”. The Oxford Advanced Learner's Dictionary¹⁶ defines the term ‘authenticate’ as to prove that something is genuine, real or true. The Macquarie Dictionary defines the term authenticate as to make authoritative or valid; to establish as genuine. The term ‘valid’ goes on being defined as legally sound, effective, or binding, having legal forces sustainable at law¹⁷. Putting aside all the definitions as to signatures and authenticity what is key to this study is that, the term actually means ‘genuine, true, real, reliable, trustworthy, having the character and authority of the original, dully

¹⁵ 2nd Edn. Vol. 4., p. 2783

¹⁶ New 8th Edn., p. 83

¹⁷ 2nd Edn. Vol. 4 opcit

vested with all necessary formalities and legally attested. A signature always identify a person and hence it remain to be a good evidence as to the sincerity of an act that has been committed for the purposes of initializing and in actual fact execution of a certain activity or transactions of any sort, bottom line as to signature is that the same certifies that a certain record is in due form of law and the person who sign in certifies that she/he is accountable as to whatever sanction upon signing.

The law in Tanzania before the amendment of the Tanzania Evidence Act¹⁸ in the year 2007 did not recognize electronic records in respect of the admissibility in court proceedings. It should be noted that before the amendment of the Tanzania Evidence Act¹⁹ governed the law relating to principles of evidence in Tanzania and the same was very much ignoring testimony relying on computer generated evidence.

The legislation had had clearly laid down procedure to be very much adhered over the way on how evidence can be adduced. The statute did set out two methods through which evidence can be adduced before the court and these were oral and documentary evidence. The Statute provides under section 63²⁰ that the contents of documents may be proved either by primary or secondary evidence. The statute further defines primary evidence under section 64²¹ to mean the document itself produced for inspection of the court. The legislation under section 66²² recognizes the best evidence rule; the statute furnishes that for the purposes of documents where the same is to be proved it will always be done so by primary evidence.

¹⁸ The Written Laws (Miscellaneous Amendments), Act (Act No. 2) of 2007.

¹⁹ Act No. 6 of 1967 currently referred to as the Evidence Act (Cap. 6 R.E. 2002).

²⁰ Op. cit.

²¹ Ibid

²² Op. cit.

It is obvious therefore that in the course of examining the contents of the evidence Act as it stand today, one can simply conclude that the Act has had put more weight to paper documents until recent amendments made in January 2007²³. That can be termed as legislative status as to the admissibility of evidence before court of laws. However, the world is currently moving with the development in science and technology, reliance on paper works is increasingly diminishing and for the purposes of safety in various transactions that are taking shape today the importance of electronic signature has become an order of the day.

This is why in the European context the UNCITRAL Model Law²⁴ is been transposed to members of the EU and in the model law it is provided that and I quote:

“In an electronic environment, the original of a message is distinguishable from a copy, bears no handwritten signature, and is not on paper. The potential for fraud is considerable, due to the ease of intercepting and altering information in electronic form without detection, and the speed of processing multiple transactions. The purpose of various techniques currently available on the market or still under development is to offer the technical means by which some or all of the functions identified as characteristic of handwritten signatures can be performed in an electronic environment. Such techniques may be referred to broadly as “electronic signatures”.

²³ Op. cit.

²⁴ The UNCITRAL Model Law on Electronic Signatures with Guide to Enactment 2001

Development in science and technology is currently an order of the day not only in Tanzania but all over the world, this is why in the manufacturing sector today handwritten signature has become more vulnerable as compared to electronic signature. The attitude of those in the heart of manufacturing sector (finance department), those who supply fuel to enable other department moves on smoothly with production activities have been caught in quote with the serious problem of theft and those suspected to have been involved in this dubious activities seems to easily shift burden to other people who are completely not in the business.

It is fortunate that courts have not kept quite as to the development in science and technology in the country this is why in Tanzania Cotton Marketing Board Vs Cogecot Colton Co. SA²⁵ the Court of Appeal while taking into account the development in science and technology interpreted in a very bold way the term registered post to include postage by DHL²⁶ so as to take into account the development in the communication technology that has now days engulfed the world.

It is only through this good work of bold minded judges that the legislations that are currently going against the trend in development of science and technology can be amended to accommodate the essence of electronic signatures in countering diesel theft in the manufacturing sectors, so as the same is admissible in courts or tribunals, and it only through this way technology can be taken on board in our court systems.

²⁵ (1997)TLR 165

²⁶ DHL is an acronym for Dalsey Hillblom and Lynn, who are the founders of DHL World Express

Most of the statutes in the country some enacted at a time our country was attaining its independence and some were borrowed hence statutes in *pari matiria* with other countries mostly the commonwealth ones, such as the Penal Code, Banking and Financial Institutions Act, the Civil Procedure Code, the Criminal Procedure, the Interpretations of Laws Act, the Employment and Labour Relations Act, the Evidence Act, etc, all these are very important legislations that governs daily activities in the country but unfortunately are not in line with the development in science and technology that is currently sweeping the world like a wild fire.

Amendment of the Evidence Act might be argued that was in line with the current trend in the development of science and technology that is shaping almost everything to be certain hence amendments were inevitable. Our research regarding the role of electronic signatures in countering diesel theft in manufacturing sector – a case study of TPC Limited has been founded on the following questions of concern. The first question would be, whether an electronic generated signature can help in countering diesel theft in the manufacturing sector as opposed to the traditional manuscript signature. Secondly whether the data entered by one person can easily be manipulated by another.

Thirdly whether the data are kept or stored in a system that does not allow tempering and an unauthorized copying. It should be noted that these questions centers on authenticity, integrity and of course security as to electronic signatures. Clear answers as to the posed question will always attract institutions as well as individuals to rely on electronic signatures as a modern way of securing their business transactions.

One would note that the second question is very much associated with the nature of electronic signature, for the same might come from a variety media, that the signature is subject to manipulation and the third party of it is that electronic signature is not as tangible as traditional or manuscript signatures. Our research looks as well into contests that are associated with electronic signatures in banking transactions, where it have been reported of serious fraud that involves customers account and this very much casts doubt as to the reliability of electronic signatures. For it have been normal that customers do complain of their account being accessed by persons who were unauthorized by the account owners and in so doing they managed to defraud the account and went away with huge amount of money.

In other cases it have been reported that, crook customers using their own Automated Teller Machine Cards have accessed their account that have a less amount of money but managed to draw an amount that is bigger as opposed to what is actually in their account. Our research will have a look into the amendment made in the Evidence Act and our argument as to the amendment will be that, the same are not adequate to satisfy the requirement under todays contexts in as far the development of science and technology is concerned and particularly when dealing with the issue of electronic signatures.

Our research will look into other jurisdictions and particularly Europeans countries and see how these countries have tried to accommodate the issue in their countries and finally we will conclude and recommend by pointing some possible solutions to the problems that have been discussed above.

2.0 The Definition of Electronic Signature

In our circumstances electronic signature is a new phenomenon hence it is difficult to find a single definition in our statutes, this is why for the purposes of this research definition as to the term is to be very much relied on what is happening in Europe. The European Directive on Electronic Signatures²⁷ this Directive identifies two forms of signature that is to say electronic signatures and advanced electronic signatures and the same are defined as follows:

1. 'Electronic signature' means data in electronic form which are attached to or logically associated with other electronic data and which serve as a method authentication; and
2. 'advanced electronic signature' means an electronic signature which meets the following requirements:-
 - (a) It is uniquely linked to the signatory;
 - (b) It is capable of identifying the signatory;
 - (c) It is created using means that the signatory can maintain under his sole control; and
 - (d) It is linked to the data to which it relates in such a manner that any subsequent change of the data is detectable²⁸.

The term 'electronic signature' is very broad. It would encompass, for example, the use of scanning equipment to create a digital image of a person's signature, with this image being reproduced at the end of a word-processed letter. Advanced forms of

²⁷ Directive 99/93/EC

²⁸ See Directive 99/93/EC., Article 2(1).

signature will require the use of some form of encryption. The Electronic Signatures Directive refers to this under the heading of ‘Secure-Signature-Creation Device’. The technical attributes to be possessed by such devices are specified in Annex 3, whilst the Directive provides that Member States may, acting in accordance with criteria to be specified by the Commission, establish mechanisms to verify the conformity of particular system of encryption.²⁹

In terms of the legal status to be afforded to electronic signatures, the Directive provides that:

1. Member States shall ensure that advanced electronic signatures which are based on a qualified certificate and which are created by a secure-signature-creation-device:
 - (a) Satisfy the legal requirements of a signature in relation to data in electronic form in the same manner as a hand-written signature satisfies those requirements in relation to paper-based data; and
 - (b) Are admissible as evidence in legal proceedings.

2. Member States shall ensure that an electronic signature is not denied legal effectiveness and admissibility as evidence in legal proceedings solely on the ground that it is:
 - i. in electronic form; or
 - ii. not based upon a qualified certificate; or
 - iii. not based upon a qualified certificate issued by an accredited certification-service provider; or

²⁹ Ibid Article 3(4).

- iv. not created by a secure signature-creation device

Above explained are some of the key and important features of an electronic signature applying under the European contexts, and in most of the European countries these features have been transposed to their municipal legislations some with minor modifications and in other jurisdiction the provisions of the Directive are *mutatis mutandis* with the provisions of the municipal law as to electronic signatures.

2.1 Electronic Signature as Provided Legally in other Jurisdiction at National level

As opposed to Tanzania, in other countries in the world electronic signature is well established and very much enacted in their municipal law, a very good example that can be cited here is the Australian³⁰ legislation that has borrowed to the greatest extent the position in Utah on digital signature. The Utah statute on electronic signature very much compliments what is provided in the UNCITRAL Model Laws by furnishing satisfaction of signature requirements.

The Utah Act for instance provides under Section 46-3-401 that:.

- (1) Where a rule of law requires a signature, or provides for certain consequences in the absence of a signature, that rule is satisfied by digital signature if:
 - (a) that digital signature is verified by reference to the public key listed in a valid certificate issued by a licensed certification authority;

³⁰ See the Australian Electronic Transaction Act

- (b) that digital signature was affixed by the signer with the intention of signing the message and
- (c) the recipient has no knowledge or notice that the signer either:
 - (i) breached a duty as a subscriber; or
 - (ii) does not rightfully hold the private key used to affix the digital signature.

For the purposes of authenticating the Australian government has developed security principles and modules for electronic authentication. A good example is the Protective security Manual (PSM) and the Australian Government Information and Communication Technology Security Manual (referred also as ACSI 33) this provide for security structure within which the Australian Government operates.³¹

The Australian Government e-Authentication Framework (AGAF), with supporting government authentication standards, provide a consistent, whole of government approach to authentication of businesses that conduct electronic transactions with government bodies. Within these and related frameworks, the Australian Taxation Office public key infrastructure (PKI) provides businesses with digital certificates so that they can authenticate themselves to gain access to personalized services within the Business Portal and Electronic Commerce Interface. This infrastructure was developed and implemented prior to July 2000 and is now used by more than 300,000 businesses³².

It should be noted that the use of Australian Taxation Office digital certificates as a

³¹ See the Australian e-government Strategy Document 2006 at page 39

³² Ibid

pilot project was further extended to other agencies commencing the 17th October 2005. This pilot project enable 200 businesses that deal online with Centerlink to use their Australian Taxation Office digital certificates to authenticate themselves and gain access to secure Centerlink services. Use of Australian Taxation Office digital certificates by businesses to access secure/authenticated services across multiple agencies provide major cost savings for the government. More importantly, this means that a business may need only one security credential to deal online with a range of agencies, making interaction with government both easier and more secure.³³

In Singapore the country has enacted the Electronic Transaction Act the same recognizes digital signature and other related e-signatures. In the statute and certainly the provision of Section 20 clearly furnishes for the followings: When any portion of an electronic record is signed with a digital signature, the digital signature shall be treated as a secure electronic signature with respect to such portion of the record; if

- (a) the digital signature was created during the operational period of a valid certificate and is verified by reference to the public key listed in such a certificate; and
- (b) the certificate is considered trustworthy, in that it is an accurate binding of a public key to a person's identity because:-
 - (i) the certificate was issued by a license certification authority operating in compliance with the regulations made under section 42;

³³ Ibid

- (ii) the certificate was issued by a license certification authority outside Singapore recognized for this purposes by the controller pursuant to regulations made under Section 46.
- (iii) the certificate was issued by a department or ministry of the government, an organ of State or a statutory corporation approved by the minister to act as a certification authority on such conditions as he may by the regulations impose or specify; or
- (iv) the parties have expressly agreed between themselves (sender and recipient) to use digital signatures as security procedures, and the digital signature was properly verified by reference to the sender's public key.

In the southern part of Africa, a noticeable statute that govern electronic transaction is the South African Electronic Communications and Transactions Act, in this Act there is a relevant provision that provides for functional equivalence between manuscript signatures and e-signatures. The cited Act in South Africa defines a signature to mean:.

Signature

13. (1) where the signature of a person is required by law and such law does not specify the type of signature, that requirement in relation to a data message is met only if an advanced electronic signature is used.³⁴

Another country that uses common laws that has a specific legislation that govern electronic signatures is Malta, in Malta electronic signatures and manuscript

³⁴ See Section 13 of the Electronic Communication and Transaction Act

signatures have been given equivalence in the statute, under the following provisions of the Act.

6. If under any law in Malta the signature of a person is required, such a requirement is deemed to have been satisfied if such signature is an electronic signature and such signature shall not be denied legal effectiveness on the ground that it is:

- (a) in electronic form; or
- (b) not based upon a qualified certificate; or
- (c) not based upon a qualified certificate issued by an accredited signature certification service provider; or
- (d) not created by a secure signature creation device

Provided that the electronic signature is in the form of an advanced electronic signature, which is based on a qualified certificate and is created by a secure creation device, it shall for all intents and purposes of the law be presumed to be the signature of the signatory.³⁵ Another country that has enacted a legislation to govern for electronic signatures and their authenticity is India, the notable legislation in that regard in India is the Information Technology Act of the year 2000. The followings are provided in this Act.

S. 67A. Except in the case of a secure digital signature, if the digital signature is of any subscriber is alleged to have been affixed to an electronic record the fact that such digital signature is the digital signature of the subscriber must be proved.

³⁵ See the E-Commerce Act Cap. 426

S. 85B. (1) In any proceedings involving a secure electronic record, the Court shall presume unless contrary is proved, that the secure electronic record has not been altered since the specific point of time to which the secure status relates.

(2) In any proceedings, involving secure digital signature, the Court shall presume unless the contrary is proved that:-

(a) the secure digital signature is affixed by the subscriber with the intention of signing or approving the electronic record;

(b) except in the case of a secure electronic record or a secure, digital signature, nothing in this section shall create any presumption relating to authenticity and integrity of the electronic record or digital signature.

S. 85B. Presumption as to electronic records and digital signatures

In any proceeding involving a secure electronic record, the court has to presume, unless the contrary is shown, that such record has not been altered since the specific point of time to which the secure status relates.³⁶

It should be noted that, the Information Technology Act in India further provides under Section 5 legal certainty as to electronic signature as follows:-

Where any law provides that information or any other matter shall be authenticated by affixing the signature or any document shall be signed or bear a signature of any person then, notwithstanding anything contained in such law, such requirement shall

³⁶ See the Information Technology Act; 2000. See also Sarkar S.,

be deemed to have been satisfied, if such information or matter is authenticated by means of digital signature affixed in such manner as may be prescribed by the central government.³⁷

Malaysia is among those countries that recognizes electronic signatures and this fact is very much supported by the Digital Signature Act of 1997. The Act regulates the use of digital signatures and other related matters. The Digital Signature Act also provides for the certification and licensing authorities.³⁸

Sections that are most important to be looked at under the Digital Signature Act in Malaysia are 62, 63, 64 and 65, these are important sections for they reflect the truth as to the future amendment of our Acts for the purposes of fitting in the current development in science and technology.

Section 62 of the Malaysian legislation provides that,

Where a rule of law requires a signature or provides for certain consequences in the absence of a signature, that rule shall be satisfied by a digital signature where notwithstanding any written law to the contrary that digital signature is verified by reference to the public key listed in a valid certificate issued by a licensed certification authority.

- (a) that digital signature was affixed by the signer with the intention of signing the message; and

³⁷ Op. cit.

³⁸ See The Law of Malaysia, Digital Signatures Act 1997 (Act 562) and the Subsidiary Legislation

- (b) a document signed with a digital signature in accordance with this Act shall be as legally binding as a document signed with a handwritten signature, an affixed thumb print or any other mark; and a digital signature created in accordance with this Act shall be deemed to be a legally binding signature.

Section 64 of the Malaysian Digital Signature Act further provides that;

A message shall be as valid, enforceable and effective as if it has been written on paper if – it bears in its entirety a digital signature; and

- (i) that digital signature is verified by the public key listed in a certificate which was issued by a licensed certification authority; and
- (ii) was valid at the time the digital signature was created.³⁹

Section 65 of the Malaysia Digital Signature Act provides for copy of digital signature and it provides as follows:

A copy of a digitally signed message shall be as valid, enforceable and effective as the original of the message unless it is evident that the signer designated an instance of the digitally signed message to be a unique original, in which case only that instance constitutes the valid, enforceable and effective message.

In Malaysia there are other relevant law that carter for cyber laws that include the Malaysia Communications and Multimedia Commission Act⁴⁰, the Computer Crimes Act⁴¹, the fact that Tanzania and Malaysia shares same legal principles in the sense

³⁹ See The Malaysia Digital Signature Act of 1997

⁴⁰ See Act 1998 (Act 588)

⁴¹ See Act 1997 (Act 563)

that both countries adhere to common law principles it is high time that Tanzania should adopt relevant cyber laws that seems to be of much benefits to the people of Malaysia.

It should further be noted that, most of the above cited laws conforms very much to the provisions of the UNCITRAL and the Commonwealth Model Laws on e-commerce and e-signatures attempt to treat e-signatures and data messages as equivalent to manuscript signatures and original physical document in written form.

Another country that has never been left behind in enacting laws that are very much in line with UNCITRAL in as far as electronic or digital signature is concern is Slovenia. A good example here is the Slovenia's Electronics Commerce and Electronics Signatures Act (ESA) the same was enacted in the year 2000 and became efficacious in same year the Act provides for legal recognition of electronic documents and electronic signatures. The Electronics Commerce and Electronics Signatures Act e-commerce contract rules cover attribution, duplication, acknowledgement of receipt and time and place that a data message is sent or received.⁴²

One of the important issue here that need to be taken into account is the fact that, all type electronic signature are recognizable, however, digital signature always stands out of the crowds for it enjoys the most favored status in the sense that it utilizes the so called cryptographic methods and in so doing it has a higher degree of reliability and security. The Act in Malaysia provides for the accredited certification

⁴² See The Icfai Journal of Cyber Law Vol. VI 2005 at page 8

authorities, however, unaccredited certifications authority are also allowed to operate.⁴³

The legislation in the United Kingdom as to electronic signatures is certain the Act that regulate this is the Electronic Communication Act 2000 and provision relating to the recognition of electronic signatures are rather more simple than those found in the Electronic Signatures Directive. The Act eschews the distinction between ‘electronic’ and ‘advanced electronic signatures’⁴⁴ instead providing that:

In any legal proceeding:-

- (a) an electronic signature incorporated or logically associated with a particular electronic communication or with particular electronic data, and
- (b) the certification by any person of such a signature,

Shall each be admissible in evidence in relation to any question as to the authenticity of the communication or data or as to the integrity of the communication or data⁴⁵. It is obvious therefore that, in the United Kingdom the term ‘electronic signature’ is defined in terms similar to those found in the Directive.

For the purposes of this section an electronic signature is so much of anything in electronic form as:-

- (a) is incorporated into or otherwise logically associated with any electronic communication or electronic data; and

⁴³ Ibid

⁴⁴ See Prof. Ian Lloyd., Information Technology Law., 6th Ed. 2011., page 475

⁴⁵ See Article 3(2) of the Electronic Communication Act 2000.

- (b) purports to be so incorporated or associated for the purpose of being used in establishing the authenticity of the communication or data, the integrity of the communication or data, or both.⁴⁶
- (c) the doing of anything which under any such provisions is required to be or may be authorized by a person's signature or seal, or is required to be delivered as a deed or witnessed by electronic means⁴⁷

Tanzania being one of the world's developing economy is to keep pace with the speed of the development in science and technology and for this to happen need to amend its legislations according, and apart from the above already cited legislations that need to be amended, the country should further amend the following statutes; the Business Licensing Act⁴⁸, The Capital Markets and Securities Act⁴⁹ and the Carriage of Goods by Sea Act.⁵⁰

⁴⁶ See Section 7(2) of the Electronic Communication Act 2000

⁴⁷ See Section 8(2) of the Electronic Communication Act 2000

⁴⁸ See Act No. 25 of 1972 [CAP 273 R.E. 2002]

⁴⁹ See Act No. 5 of 1994 [CAP 79 R.E. 2002]

⁵⁰ See Act (Ordinance No. 6 of 1927 [R.L. CAP. 164]) [CAP 164 R.E. 2002]

CHAPTER THREE

3.0 MERITS AND DEMERITS OF ELECTRONIC SIGNATURE/DIGITAL SIGNATURE IF APPLIED AS A MEANS TO CONTROL DIESEL THEFT IN THE MANUFACTURING SETTINGS

3.1 Advantages

It is obvious that this part of our research paper is an important section for the same explains advantages and disadvantages as to the application of electronic signature in the manufacturing sectors for the purposes of countering theft and hence, this practice if applied will automatically have an impact of doing away with the legendary manuscript or handwritten signature that has been an order of the day in the sector for so many decades.

As clearly provided above electronic signatures/digital signature are modern ways of authentication and in Tanzania they have been in practical even before an enactment by the parliament of a legislation to regulate the situation a good example is the way on how the financial institutions are transacting today, banks in the country today have introduced ATM cards and without a personalized password one cannot in any way withdraw money from an account, the owner of the card is the owner of the so called password [“electronic signature”] and it is only through him the account can be accessed, that being the bottom line if he/she becomes loose in terms of keeping the password [“electronic or digital signature”] and the same is accessed by the fraudsters then technology cannot be blamed otherwise electronic signatures are very much safe as opposed to written hand signatures.

(a) One of the known advantages of electronic signature is the fact that it is

uniquely linked to the signatory, this means that electronic signatures are unique in nature and everyone in the world can have one and they will never match at any point in time in the course of transacting, it is only through the signatory that another person can access it.

- (b) Another advantage as to electronic signature is the fact that, it is capable of identifying the signatory, this means that one who is furnished with an advanced electronic signature is the one who knows the public keys that allows him or her to access certain services, any other person can easily be identified that he is cheating for after several trials of entering signature a system can be set in such a way that it can completely deny services.
- (c) It is created using means that the signatory can maintain under his sole control and in as far as Business to Business and Business to Consumer is concerned, electronic signature can provide a greater security, reliability and of course transparency in electronic transactions, if well applied electronic signature can significantly reduce risk of dealing with frauds, and the same can expose persons who in any case attempt to escape responsibility by claiming to have been impersonated.
- (d) As mentioned above digital signatures can satisfy the need of message integrity by preventing unlicensed access to data, it is capable of detecting any message tampering and diminishing the danger of false claims that data was changed after it was sent.
- (e) Electronic signature is linked to the data to which it relates in such a manner

that any subsequent change of the data is detectable⁵¹.

- (f) Electronic signature if correctly employed in the public as well as private sectors can guarantee a high quality of security and transparency in transacting with the public as they can assure time and cost-efficiency in the bureaucratic procedures by facilitating the handle, process, storage and transmission of data.

3.2 Disadvantages

Despite the many advantages we have seen above as to the electronic signatures, the same is engulfed with disadvantages and hence these are potential dangers in the course of performing dealings that are associated with electronic signatures, accordingly:-

- (a) Hacking of servers that are used to keep data that makes uniqueness as to electronic signatures can be of detriment to persons who are uniquely linked with a certain given electronic signature, if a person access a server through hacking he can simply act as a signatory of a document and hence have access to data that are unique to a lawful holder's of an electronic signature.
- (b) Another disadvantage in applying technology and particularly on electronic signatures is the aspect of impersonification, it should be noted that phishing has become an order of the day where a person enters in a system through another person's password and in so doing performs everything that would have been performed by a person with a genuine password.

⁵¹ See Directive 99/93/EC., Article 2(1)

(c) Another disadvantage that one can face in the problem that goes hand in hand with viruses, it is well understood that the question of being denied service through attacks of viruses in a computer driven system is an order of the day in today's context. Denial of service attacks "often aimed at businesses engaging in e-commerce or at hacker 'bogey figures', such as Microsoft, the aim is to generate such a volume of spurious message that the victim site becomes clogged up and is unable to accept messages from genuine users wishing to place orders for goods or services. The technique is analogous in many respects to repeatedly dialing someone's telephone number with the intent of occupying the line so that other callers cannot get through. No damage will be caused to data or equipment but in some cases the financial losses caused to system operators can run into many thousands of pounds in terms of lost business and customer goodwill⁵²".

This kind of attack may sometimes be linked with other elements of criminal conduct. One incident has been reported in which the founder of an online payment system became the target of Russian-based gangsters who threatened to destroy his business unless he made a payment of \$10,000. To prove their capabilities, the site was bombarded with around 150MB of spurious data, which caused its computers to crash. In this particular case, cooperation with the victim's Internet Service Provider managed to block further attacks on the site.⁵³

⁵² See Prof. Ian Lloyd., *Information Technology Law.*, 6th Ed. 2011 at page 216

⁵³ These facts are available from

<http://management.silicon.com/smedirector/0,39024679,39130810,00.htm>>.

When one make a thorough analysis as to advantages and disadvantages of electronic signatures and handwritten signature will always reach to a conclusion that, electronic signatures can always be of extremely advantageous as compared to the handwritten or manuscript signatures. Electronic signatures unlike handwritten or manuscript signatures if properly applied in the manufacturing sectors can easily workout to spread liability to a proper person in case of theft and under normal context a responsible person cannot run away from a problem that seems to be of his own creation.

It should further be noted that, in the course of applying technology in the manufacturing sector one will always face difficulties and the outcome of the problems that one might face cannot in anyway be underestimated for a misuse of an electronic signature, misplacing hence accessed by fraudsters all these can lead into problems and in most cases it can also lead into causing serious losses to the manufacturers.

Tanzania just like other developing nations of the world, needs to enact legislations to carter for e-laws/cyber laws for the reasons of taking care of the followings goals:-

- i. To try and remove uncertainties that currently seem to exist over the issue of writing and signature requirements under today's e-commerce contexts.
- ii. To try and do away with all sorts of bureaucracy in the running of government affairs by enabling electronic filing within public agencies, this to the largest extent will reduce burden to the citizenry.

Electronic signature will always promote public confidence in electronic records and electronic commerce and lastly, electronic signatures if legally allowed will enable citizens to freely access and govern information electronically, this for sure will raise the level of good governance and rule of law through electronic governance and electronic democracy, the western countries are very much at forefront on, a good example to be cited is the just ended America elections a big amount of money was accumulated online by the Barack Obama as well as the Mitch Romney teams of campaign, this is why it is stressed that electronic signatures if well applied has more merits as opposed to demerits.

CHAPTER FOUR

4.0 THE ROLE OF ELECTRONIC SIGNATURES IN COUNTERING

DIESEL THEFT IN THE MANUFACTURING SECTOR – A CASE

STUDY OF TPC LIMITED

The drive of this topic is to assess the role of electronic signatures in countering diesel theft in the manufacturing sector – case study of TPC Limited. It should be understood from the very beginning that Tanzania as a country does not have a legislation that regulate electronic signatures and the only available legislation that covers albeit in a nut shell the issue of electronic evidence is the Tanzania Evidence Act that was amended in the year 2007.

In the course of doing this intriguing analysis, the main issues will be that: whether the existing criminal and civil legislations in Tanzania are adequate to accommodate electronic signatures transactions.

Regarding electronic signatures and the way on how the same can counter theft in the manufacturing setting the question would be which type of electronic signature will fit in the bill is it normal electronic signatures or the manufacturers should opt for advanced electronic signatures and secondly the question; whether the existing criminal and civil legislations in Tanzania provide a clear distribution of liabilities to the key players in electronic signatures transactions.

Thirdly the question would be whether introduction of electronic signatures will counter theft in the manufacturing setting in the country looking at TPC Limited as a

case study. These being the questions surrounding electronic signatures transactions, there will always be challenges around and these are the question of integrity, authenticity and security of electronic signatures. Deficiency of well calculates answers to these questions will always shun people from using well and secure electronic signatures in the course of exercising various important transactions.

Other challenges as to electronic signatures includes among other things, how can the requirement of writing and electronic signatures can be contended? How would an electronic record be authenticated and attributed? Also for how an electronic signatures can be retained?

Our research also will have a look into the legislative initiative that have been taken into account by the Parliament in the course of amending the Tanzania Evidence Act and our position will be to criticize the amendment in a view that, the amendment seems to be very much inadequate in as far as electronic transaction in the country is concerned. Our research shall finally conclude and recommend by cementing out some possible solutions to the problem that have been discussed above.

4.1 Whether the Existing Criminal and Civil Legislations in Tanzania are Adequate to Accommodate Electronic Signatures Transactions

As it have been pinpointed earlier, the legislation in the country before the amendment of the Tanzania Evidence Act were very much silent in as far as electronic transactions are concerned, in short before this amendment electronic records as far as admissibility before the courts of law were not admissible as

evidence. One will note therefore that before this amendment were the Act clearly stipulated principles over the way on how evidence can be adduced before the court. Under the Tanzania Evidence Act there were mainly two approaches of adducing evidence in Court, the same are by oral and documentary evidence.

Going-over of the Tanzania Evidence Act, it is obvious that the whole statute before the 2007 amendment was very much inclined to paper documents and nothing was mentioned in as far as electronic signatures and or documents how admissible will they be if adduced before the court as evidence. As mentioned earlier the courts did not keep quite with the development in science and technology a good example that clearly shows the way on how courts have been proactive and moving with time in terms of technological advancement the decision in Tanzania Cotton Marketing Board V Corgecot Cotton Co. SA⁵⁴ the court of Appeal stated affirmatively as follows and I quote:

“While it is undisputable fact that under Rule 4 of the Arbitration Rules, 1957, the award is to be forwarded to the Registrar of the High Court by registered post, the words ‘registered post’ should be interpreted widely enough to take into account the current development in communication technology that has taken place....”

It should be noted that, further to that observation the court did went on into extending the definition as to registered post to include postage through DHL⁵⁵.

⁵⁴ Ibid

⁵⁵ Ibid

The court did went on into making strides in line with the development of science and technology following the realization that, there were no legislation to carter for electronic transactions, Nsekela J, (as he then was) did put weight for a need in a statute that will regulate electronic transaction when he was quoted as saying⁵⁶

“The court have to take due cognizance of the technological revolution that has engulfed the world. Generally speaking as of now, record keeping in our banks is to a large extent, ‘old fashioned’ but changes are taking place. The law can ill afford to shut its eyes to what is happening around the world in the banking fraternity. It is in this spirit that I am prepared to extend the definition of banker’s book to include evidence emanating from computers subject of cause to the same safeguards applicable to other bankers books under section 78 and 79 of the Evidence Act”.

It should be noted that Hon. Nsekela while making this decision was of the position that the it could have been better if the parliament had taken up the matter and enact a legislation to that effect. Similar position was taken by Bridge, LJ in the case of Barker Wilson⁵⁷ where he was quoted stating affirmatively that:

“The Bankers’ Book Evidence Act 1879 was enacted with the practice of Bankers in 1879 in mind. It must be constructed in 1980 in relation to the practice of bankers as we now understand it. So constructing the definition of banker’s books and the phrase on entry in a bankers’ book, it seems to me that clearly both phrases are apt to include any form of permanent record

⁵⁶ See the decision in Trust Bank Tanzania Limited V Le marsh Enterprises Ltd and Others H.C, (Com. Div) at DSM, C.C No. 4 2000, (unreported).

⁵⁷ See All ER (1980) 2 at page 82

kept by the bank of transactions relating to the banks business made by any of the methods which modern technology makes available...”

It should be noted that with the above position the court was making, the legislature tried to make efforts to see to it that necessary Acts were amended to keep paces with the development in science and technology. To facilitate this Tanzania for first time prepared a Bill in January 2007 to amend the Evidence Act ever since it was enacted in 1967, the motive behind the Bill was to introduce new types of evidence which would be admissible before the courts of law. Consequently the Tanzania Evidence Act⁵⁸ was amended, only to extent of giving partial recognition to evidence generated electronically⁵⁹. In the amended Act Part IX proposes to amend the Evidence Act, (Cap. 6 of the Principal Act) and it reads:-

“33. The principal Act is amended by adding immediately after section 40 the following section. 40A in any criminal proceedings:-

- (a) an information retrieved from computer systems, networks or services; or
- (b) the records obtained through surveillance of means of preservation of information including facsimile machines, electronic transmission and communication facilities; or
- (c) the audio or the video recording of acts behaviors or conversation of persons charged shall be admissible in evidence. The marginal note is ‘Evidence obtained under-cover operations’.

34. The principal Act is amended by adding immediately after the definition of

⁵⁸ See The written laws (miscellaneous Amendments) (No. 15) Act of 2007 Op. cit

⁵⁹ Ibid

the word 'bank'. Appearing in section 76, the following new definition:-

'Banker's book' include ledgers, cash books, account books and any other records used in the ordinary business of the bank or financial institution, whether the records are in written or data message or kept on an information system including, but not limited to computers and storage devices, magnetic tape, micro-film, video or computer display screen or any other form of mechanical or electronic data retrieval mechanism.

35. The principal Act is amended by adding immediately after section 78 the following new section:-

78A (1) A print out of any entry in the books of a bank on micro-film, computer, information system, magnetic tape or any other form of mechanical or electronic data retrieval mechanism obtained by a mechanical or other process which in itself ensures the accuracy of such print out, and when such print out is supported by a proof stipulated under subsection (2) of section 78 that it was made in the usual and ordinary course of business, and that the book is in the custody of the bank it shall be received in evidence under this Act.

(2) Any entry in any banker's book shall be deemed to be primary evidence of such entry and any such banker's book shall be deemed to be a 'document' for the purposes of subsection (1) of section 64.

It should be noted therefore that, the above cited were the main amendment made to the Tanzania Evidence Act and the same reflects the way on how, the country has

recognized the development in science and technology that is currently taking the world like a wild fire and hence very much unstoppable. These changes however, did not very much acknowledge the importance of electronic signature in today's context the legislation was therefore required to be amended in such a way that to accommodate the admissibility of electronic signature as evidence in the courts of law as is the case in the United Kingdom under the Electronic Communication Act 2000 the same clearly stipulate that and I quote:-

In any legal proceeding:-

- (a) an electronic signature incorporated or logically associated with a particular electronic communication or with particular electronic data, and
- (b) the certification by any person of such a signature.

Shall each be admissible in evidence in relation to any question as to the authenticity of the communication or data or as to the integrity of the communication or data.⁶⁰

These are kind of amendment that we would have expected to be made in the Tanzania Evidence Act for the purposes of recognizing the significance of electronic signature as the same seems to be an order of the day in the course of doing business not only in the country but also the world over. As discussed above the recognition of electronic signatures is not a new phenomenon in other jurisdictions in country like Malaysia the law on Digital Signatures is very much clear and Tanzania in amending its legislations, it will be better that some of the good provisions in the Malaysian Act can be borrowed and transposed into our statutes, the provisions of

⁶⁰ See section 7(1) of the Electronic Communication Act 2000

section 62, 63, 64 and 65 of the Malaysian Digital Signatures Act can be of significance importance if transposed to our statutes these sections provides as follows:-

Section 62 where a rule of law requires a signature or provides for certain consequences in the absence of a signature, that the rule shall be satisfied by a digital signature where notwithstanding any written law to the contrary that digital signature is verified by reference to the public key listed in a valid certificate issued by a licensed certification authority.

- (a) that digital signature was affixed by the signer with the intention of signing the message; and
- (b) a document signed with a digital signature in accordance with this Act shall be as legally binding as a document signed with a handwritten signature, an affixed thumb-print or any other mark; a digital signature created in accordance with this Act be deemed to be a legally binding signature.

Section 64 of the Malaysian Digital Signature Act provides that; a message shall be as valid, enforceable and effective as if it has been written on paper if it bears in its entirety a digital signature; and

- (i) that digital signature is verified by the public key listed in a certificate which was issued by a licensed certification authority; and
- (ii) was valid at the time the digital signature was created⁶¹

⁶¹ See The Malaysian Digital Signature Act of 1997 Op. ct

Section 65 of the Malaysia Digital Signature Act provides that, a copy of a digitally signed message shall be as valid, enforceable and effective as the original of the message unless it is evident that the signer designated an instance of the digitally signed message to be a unique original, in which case only that instance constitutes the valid, enforceable and effective message.

It is clear that the above provisions of the Malaysia Digital Signature Act are very important provisions in as far as digital signature or electronic signature enactment is concerned, Tanzania will very much benefit if the above cited provisions will be borrowed in the course of either doing further amendment to the Tanzania Evidence Act or enacting a separate legislation to cater for electronic signatures transactions. The Tanzania Penal Code as well is very much silent as to the offence on electronic transactions, it is vital therefore that the same is amended to cater for all the offences that are committed electronically, if offences committed through electronic signatures can well be stipulated in the Tanzanian Penal Code there will be no immune for those who commit those kind of offence as they will be liable for prosecutions and ultimately if found guilty he/she will end up being sentenced according to the minimum sentence Act so that in *R v. Minor*⁶² where it was observed that, if computer outputs cannot be relatively used as evidence in criminal cases, much of the crimes will in practice be immune from prosecution. The outcome of this decision was geared toward ensuring mechanism are put in place for the authentication of electronically generated evidence.

⁶² (1982) 2 All ER 208 at page 210

It goes without saying therefore that and to answer again with an affirmative NO the issue that whether the existing criminal and civil legislations in Tanzania are adequate to accommodate electronic signatures transactions. We have seen clearly that the law of evidence as well as criminal statutes in Tanzania the way on how they are inadequate in as far as accommodation of electronic signatures transaction is concerned, it is without doubt that it is high time that the country should enact legislations that are geared toward the current trend when the policy makers think of drafting policy that will have to go in line with the development of science and technology.

4.2. Whether the Existing Criminal and Civil Legislations in Tanzania Provide A Clear Distribution of Liabilities to the Key Players in Electronic Signatures Transactions

We have already observed through our research that, in Tanzania there are no legislation to cater for electronic signature despite the fact that in the year 2007 a bill was tabled in the parliament for the purposes of amending the Tanzania Evidence Act, the amendment made in the Act did not in any way cater for distributions of liabilities to those would be involved in electronic signatures transactions. For instance the amendment made in the Tanzania Evidence Act provides for the followings:-

33. The principal Act is amended by adding immediately after section 40 the following new section.

40A. In any criminal proceedings:-

(a) an information retrieved from computer systems, networks or servers; or

- (b) the records obtained through surveillance of means of preservation of information including facsimile machines, electronic transmission and communication facilities;
- (c) the audio or video recording of acts or behaviors or conversation of persons charged shall be admissible in evidence.

It is clear from the wordings of the cited statute above that, there are no clear lines of demarcations that clearly explain or give a true picture as to the distributions of liabilities when it comes to commission of offence that emanate from electronic signatures, this is why it is submitted in this research that, a clear legislation need to be enacted to try and counter offences that are more or less electronic related, without which the country and or manufacturers who have invested a lot in the country with expectations that their investment shall pay will end up been very much disillusioned.

It should be noted that the Act [Tanzania Evidence Act] does not in any way mention the existence of electronic signatures, one wonders as to why the legislation does not touch on the area of electronic signatures and its associated transactions taking into account the fact tha, at the time of tabling the bill for amending the Tanzania Evidence Act it was fortunate that, the pace of science and technology in the country was at its best shape, in other words accommodation of the current trend in electronic signature and digital signature development would have been easy to take them on board considering the development of the law in the neighboring jurisdiction such as, South Africa, Mauritius etc, being good neighbors having in place good legislations that carter for electronic transactions.

4.3 Whether Introduction of Electronic Signatures will Counter theft in the Manufacturing Setting in the Country Looking at TPC Limited as a Case Study

TPC Limited is the sugar manufacturing company that is located on the southern part of Kilimanjaro, the company has been in the business of sugar production since 1920's, since its establishment there have been change of ownership of the company from state owned to private, the company was privatized in the year 2000. The company faces a lot of challenges in production but the big one being theft, there are different incidences of theft that are occurring in the estate taking into account the fact that the estates is surrounded by several villages.

As pointed out the company is surrounded by several villages hence, this has always been an issue over the way on how the company should be doing in terms of security not only of the movable property but also the immovable ones. For the past five years from the date of privatization the company had had encountered serious problem of diesel theft and this problem has been causing serious losses in terms of diesel that has been stolen through dubious means but, most notable ones has been through siphoning of the allocated portion of diesel done by the operator of a machinery (mainly tractor(s)), this practice has caused big loss to the company but also those involved in this malpractice have ended up being terminated from the employment services of the company.

This facts in as far diesel theft is concerned has been clearly expounded by the company's Garage and Transport Executive Officer [GX], the GX is the head of the garage and transport department of the company and hence he is well vested with the operations of a big numbers of machineries that the company owns for the purposes

of its day to day activities. In his testimony to the researcher the GX who actually was of the view that he cannot explain exactly as to the actual numbers' of liters of diesel that the company has been losing through theft as he had no established figures that differentiate the way on how the company loses fuels through over consumptions and the figure that explains loses due to theft.

However, the GX did went on into saying that, for the past three if not four years the company has been losing up to USD 300,000 per season and when the GX speaks of a season in the context of TPC Limited as sugar manufacturing company he mean a period of nine months (9 months) that is maximum. For a period of nine months (9 months) for a company that is privately owned to loss such a big chunk of money which is equaled to Tanzania shillings four hundred and eighty six million as per today's exchange rate which is 1 USD to 1623 TZS [486,000,000/=] is not a joke the amount is that huge and in any case a serious investor cannot keep quiet and witness such a big amount disappears in thin air.

Various means have been tried by the company to try and counter the situation, among them have been the strict construction of the company disciplinary procedure when it comes to incidences of theft [when it comes to relevant clauses that deter theft and incidence of the sort], this means that the company have been terminating employees who have been caught stealing diesel without mercy as a result the company has been losing even the best human capital around that have been trained using big company resources, will briefly look into this when going through the impact this has created on the side of Human Resource.

Another means of countering this has been changes over the way on how employees enters into their shift, there have been those entering early in the morning say as from 04:00am and finish up their shift after eight hours, this kind of shift have been so introduced for the purposes of intervening to the plan of those employees who are very active in stealing. Another way have been to put seal every after refueling this have been partly positive and of course it got some negative response as well, for some of the employee have been very smart in tempering with seal, and once a driver obtain a smart way of going around the seal he will always be stealing without being noticed and even when he is noticed to have been behind the move of diesel stealing he will come up with the strong argument in the hearing that, look at the seal that has been installed at the time I was starting my shift the same is very much tight and hence his submissions will be to the effect that, a genuine theft should be looked somewhere as he is not behind such an incidence a kind of running away from the liabilities.

Upon asked as to whether the idea of introducing electronic signature or digital signature to try and arrest the situation, the GX was very positive on this saying that the company has already started thinking going that way, believing that technology might be a lasting solution to the loss that the company has been encountering due to theft. He further went on saying that, we might have good technology installed into our system to try and counter this alarming situation but the problem here is that the technology will be of help to our internal dealings the same cannot be taken into normal courts of law as evidence for you cannot be relying on this kind of evidence to try and prosecute the would be criminal as there are no legislations that will

recognize these sort of evidence and admit the same as evidence.

The GX went on into making further submissions that, had it been that electronic signature is recognized in the Tanzania Evidence Act, the Penal Code, the Civil Procedure Code, the Employment and Labour Relations Act and the Banking and Financial Institutions Act life would have been easy in a number of ways. The GX in supporting the idea of having in place electronic signature further contented that, the idea should go hand in hand with amending the legislations that are in place today, so that they are can accommodate the changes in technology that is taking the world like wild fire, he went on into saying that without doing so the technology will not be of beneficial to the company for the aim here is to see to it that bad people who are found guilty of committing offenses are jailed according to the law as it is clear the purposes of jailing someone is rectify him so as when he/she out of jail is a good citizen as well as punishing the offenders so as others can learn that when you commit offense you will not be allowed to go unpunished, cement the GX.

To clarify on other Human Resource related matter the researcher was to conduct a face to face interview with the Head of Department for TPC Limited namely the Corporate Services Executive Officer [CSEO] who at the very first point had this to say regarding the topic:

That the company is one of the biggest employer in the northern zone and to be fair, in the country at large, said the CSEO, he went on saying that currently the company is employing 3,067 employees on its payroll, made up of 1956 permanent and 1,100 who are employed on contract basis. In addition TPC Limited provides about 800 jobs through contractors operating in the estate mainly for cane harvesting but also

other field operations, guarding, construction work etc. This brings the total number of people working at TPC during the crashing season close to 3,900.

In answering the issue that have been raised in the interview in line to the question that holds the thrust of this research paper the CSEO pointed out that, theft within and outside the estate is one of the serious problem that has affected the operations of the company for so long, he agrees that diesel theft is rated high among the reasons that terminate a big number of employees annually and this has got a tremendous effect over the way on how the best human capital within the setting can be retained.

The CSEO was of the view that, the strict construction of the provisions of the company disciplinary codes has helped to deter the incidences of theft, however, the fact remains that theft is the biggest concern within the estate, for under normal context it is not easy for a reputable investor like TPC Limited to incur a loss of over Tanzania shillings 400,000,000/= through diesel misappropriation and remain in operations, other reputable investor(s) would say enough is enough and a decision would have been to close up the chapter and move on somewhere to open up a new venture where he can see the return of his investment in a very smooth way. The head of Human Resource further said that, there have been a big number of employees who have been terminated from their employment services from the company and the main reason have been theft, theft can be a wide terminology for even the stealing sugar which is the main commodity produced here is still theft but the stealing of diesel is well beyond control within this setting. Asked as to whether

electronic signature or digital signature will help to counter the situation, the answer to the question was to the affirmative yes, and the CSEO who is the head of the company's Human Resource Department narrated some benefits or advantages that electronic signature or digital signature might come with, he went on mentioning them as follows:

- (i) That electronic signature if implemented in the manufacturing setting can offer such a greater security, reliability and transparency in the way on how activities are being conducted at work place.
- (ii) That electronic signature or digital signature will minimize to the greatest extent the risk of dealing with fraudsters or those person who always try at their best to escape responsibility by claiming to have been impersonated.
- (iii) The CSEO went on into saying that in actual fact electronic signature or digital signatures can easily prevent unauthorized access to data or area that are restricted entry but only allowed upon a proper electronic or digital signature.
- (iv) Electronic signatures or digital signatures to the largest extent will easily detect tampering and diminish the danger of false claims that, it was not me who issued such a big amount of fuel to truck x, ask the guy who was on duty before I get into the shift.
- (v) The CSEO further contended that, electronic signatures or digital signatures are unique in nature and hence very much linked to the signatory, digital and or electronic signatures are very much capable of identifying the

signatory, he further contend that the same are created using means that only the signatory can always put at his control.

The only concern by the CSEO like that of the GX is the fact that, there are no laws and or regulations to carter for electronic signatures, he pinpoint that one might have very good means to try and counter this kind of vice within his setting but, if you don't have in place legislation that will provide serious penalty to the offenders it will be like wastage of time and resources.

He went on saying that the law of evidence does not recognize electronic signature, the country's penal code does not recognizes those offences committed using today's technology, the Interpretation of Laws Act, does not in any way defines what is electronic signature the same however, defines what it means by a manuscript signature the Bank of Tanzania Act and the Banking and Financial Institutions Act all these legislations in the country does not provide a single provisions to carter for electronic signatures, this is a serious problem taking into account the development in science and technology that is taking shape every single day.

It is without doubt that the laws need to be amended accordingly to meet today's circumstances if the country is to take a step ahead in countering all these kind of theft, that have been seriously affecting the manufacturing sectors TPC Limited being a good example. The researcher did went on asking the operators of the machines as to the way on how they handle their daily activities and challenges that faces them on a daily basis. The operators of the fuel delivery bowsers were of the opinion that, the work their doing was full of challenges that needs a joint effort to

try and arrest the situation. They went on giving their testimony that, it is normal while on duty to receive calls from unanimous persons asking as to whether you can furnish them with diesel from the bowser and the calling guys are very relaxed and they will always promise good money for the transaction while insisting that no one can detect the deal for it is done in very smart way.

These new operators who have been recently employed by the company to a level of foreman says that, the language that these people uses is very tempting and if a person is not strong enough can always be entering into this ridiculous trap and at the end of the day you lose your precious job. The foreman further contend that, the fact that their business is to distribute this precious liquid (fuel) and despite the fact that they are being paid well for the purposes of seeing to it that they are eschewed from stealing one of their fellow foreman was tempted in their early days of working and he agreed to steal about 100 liters of diesel and the fact that the bowsers are being closely traced.

He did not manage to run away from the trap and unfortunately the company in case of theft constructions of the disciplinary procedures code is very much strict in cases of theft, the poor guy ended up being terminated without notice and in actual fact the company does not have mercy on any guy when it comes to theft. Asked as to whether electronic or digital signatures if installed could have been of any help in the course of their work, the foremen were of the view that introduction of that kind of technology within the company is overdue saying that the same was supposed to be introduced in the very early years on the dates of privatization, they contend that digital or electronic signatures are very unique and control of the same is on the hand

of the signatory any disposal of the same is in the hand of signatory, with this technology no one can try to temper with the diesel issuing system for any tempering of the same is easily detected they concluded by saying that, electronic or digital signatures despite some challenges that normally comes with technology today is the best and lasting solutions.

CHAPTER FIVE

5.0 LUSION AND RECOMMENDATIONS

5.1 Conclusion

This research paper was aimed at scrutinizing challenges associated with the role of electronic signatures in countering diesel theft in the manufacturing sector; the focus of the research was mainly to TPC Limited a sugar manufacturing company located in Kilimanjaro in the mainland Tanzania.

We have discovered that that there are several issues that need to be addressed carefully in as far as electronic or digital signature is concerned. These consist the status of our criminal and civil legislations and the way on how the same need to be amended to suit the context that is prevailing today focusing on the development of science and technology, we also have had a look into our legislations and the way on how the same distributes liabilities to all the players in the electronic signatures setting, again it was our finding that the statutes that are in operation today are very much silent in as far as the distributions of liabilities is concerned for the only meaning provisions that have got to do with recognition of the electronic transactions is provided in the Tanzania Evidence Act, other legislation are very silent or in short does not recognize the current development in science and technology that the world is moving into again in speed of the light.

The research paper did went on into asking as to whether the introduction of electronic or digital signature will have any impact in the course of countering diesel theft and the answer was to the affirmative yes for electronic or digital signatures revolves around the aspect of integrity, authenticity and security in the course of

transaction. Arguments have been centered on the aspect of the regulations of the same for, there are no clear or proper laws that govern the same despite the fact that this technology is very update and the speed in within which the same is taking shape is that high and soon the whole world is going to be digital, hence our legislations need to take that into account.

We noted, however, that technology is without challenges and this paper looked at the challenges and find out that, denial of services through virus attack is very common in the system that uses computer driven system hence they are prone to virus attack another challenge was in the aspect of hackers and those person who can easily impersonate themselves and in so doing, have accesses into various servers of various institutions and in so doing jeopardizes the essence of using technology not only in the country but also within the manufacturing sector.

Our research also did went on into assessing the amendment that has been effected in the Tanzania Evidence Act by the parliament of the United Republic of Tanzania, these amendment were effected for the purposes of allowing admissibility of electronic transaction, in the course of examining these amendment the conclusion was to the effect that the same were not adequate for, the provision of the amended section of the Tanzania Evidence Act did not in any way touch as to the admissibility of electronic signatures or digital signature hence, these amendment cannot be cited as addressing the issue of electronic signatures or digital signatures as reflected in other jurisdictions. It should further be noted that the amendment made in the Evidence Act, does not cover all necessary aspects that comes with the development

of science and technology, the aspect of electronic commerce and the now very popular internet transaction, we have noted that people are not very much certain when it comes to those aspects as to legality of these transactions.

In our research the main question was to do with the aspect of electronic signatures and the way on how the same can counter diesel theft in manufacturing sector a case study of TPC Limited so apart from the cited main issue there were other issues that have been discussed in this paper that includes definition of signatures, function of the signatures, forms of signatures and particularly electronic signatures, advantages and disadvantages of electronic signatures, the research further went on into looking to other jurisdictions and the way on how these jurisdictions have benefitted with the enactment of legislations to cater for electronic signatures and the paper further proposed as to the best way possible Tanzania as a country can borrow from the cited jurisdictions and make necessary enactment through our parliament that will suit into our context and hence allows legitimacy operations of electronic and or digital signatures in the country.

5.2 Recommendations

It should be noted and as it has been repeatedly mentioned in this paper that Tanzania does not have a legislation that recognizes electronic commerce transactions. This is well known in the country and through the recognized body in the Law Reform Commission it is mentioned that:-

While some countries have adopted the new laws to cover this area, Tanzania is far behind this area. Most of her pieces of legislation are offline oriented hence to be changed to focus online. The rationale behind is to protect consumer and boost our

economy⁶³.

To reaffirm the above position the Tanzania Law Reform Commission did went on stating that:

Though Electronic Commerce started roughly 10 years ago, in Tanzania there is no law to regulate this area. Therefore, the importance of having an effective legal framework to cut across this area cannot be over-emphasized⁶⁴. It should be noted that the rough period of 10 year since the start of Electronic Commerce was at the time of the Draft Discussion on the Introduction of a Legal Framework for Electronic Commerce a paper presented by the Tanzania Law Reform Commission. Emphasis mine.

As for the above expounding we are therefore recommending that it is crucial that Tanzania as one of the growing economy in the world should effectively enact a legal framework that will cut across and in its entirety the area of electronic transactions. Several countries and particularly in Europe have either transposed the provisions of the Directive that carter for electronic signature or have opted to transpose *mutatis mutandis* the provisions of the UNCITRAL Model Law on Electronic Signatures to try and go with the ever changing circumstances that is facing the world today.

⁶³ See the Law Reform Commission of Tanzania position paper on electronic commerce, available at www.irt.tz

⁶⁴ See A Draft Discussion paper on the Introduction of a Legal Framework for Electronic Commerce in Tanzania by the Law Reform Commission of Tanzania, 2004.

One of the good example is an enactment in Malaysia of the Malaysia Digital Signature Act, the Indian Information Technology Act of 2006, this legislation in India amends significantly the provisions of the Indian Evidence Act, 1872 for the purposes of responding to the speedier within which technology is taking place not only in India but all over the world. It should be noted not only Malaysia and India are the countries that have recognized electronic signatures and hence amended their evidence Act but, other countries as well have done so that include among others, Singapore, The United States of America, South Africa, Mauritius, Canada, The United Kingdom and Australia mentioning a few of them. Notably is the facts that, the above mentioned countries in the course of making their electronic evidence they were responding to the call as provided in the UNCITRAL Model Law on electronic commerce as well as the model law on electronic signatures. In the preamble to the UNCITRAL Model Law countries are required to harmonize their laws so as to give recognition to electronic transactions the reasons being to promote electronic commerce.

In light of the above cited it is contended that under normal circumstances computer technologies is really pushing aside the traditional ways of doing business mainly through paper works and things of the sort, it is obvious therefore that the world is currently moving toward total electronic commerce, and for this to be achieved it is the duties of those key players of the game to fully implement or to be precise borrow the provisions of the UNCITRAL Model Laws on electronic signatures and enact legislations that will suit their traditional ways of doing business and hence the enacted law will goes parallel to the requirement of the borrowing jurisdiction.

The fact that without a legal framework to cater for electronic signatures is lacking in the country, this acts as a big hindrance to the growth of electronic commerce in Tanzania, serious investors will always be skeptical to conclude big deals in electronic forms believe that they are not very much protected in terms of laws and regulations that regulate transactions that are being done electronically. Tanzania as a country should therefore urgently enact a comprehensive legal framework that take on board the essence of electronic or digital evidence and make sure that, electronic or digital signatures is given similar treatment in terms of admissibility as evidence like the traditional manuscript signatures.

It is further recommended that, for the purposes of seriously countering diesel theft apart from introducing electronic signatures, big companies like TPC Limited should be thinking outside of the silo even more, by making sure that DNA of all the purchased diesel is well established and kept so that a person who has committed theft cannot run away with the product as it is easy to trace and found him by providing good DNA evidence that the fuel belongs to TPC Limited and nobody else. This again will have to be facilitated with the presence of good laws to cater for DNA testing not only for human being but also for other things.

It is our strong recommendation further that, in amending the law so as the same can cater for electronic and or digital signatures two core approaches should be taken on board. These are lawmaking and judicial interventions. Lawmaking intervention will automatically lead into having a legal framework that recognizes electronic and or digital signatures as admissible evidence just like it for the handwritten signatures. It is further contended that it is high time that the Tanzania Evidence Act is

synchronized to enable electronic transactions, including electronic commerce; it is obvious that the synchronization process has been long overdue for; technology is taking its shape in a speedier way and in so doing Tanzania as one of the country affected by the development in science and technology is very much left behind, the minor amendments that have been made in the Tanzania Evidence Act are inadequate so to call, Tanzania need a comprehensive new legislation to carter for electronic transactions.

As for judicial intervention, it is contended that the current position in terms of principles of law of evidence when it comes to production of evidence is not problematic. It should, however, be noted that problems surfaces when it comes to admissibility as evidence in the court proceedings of electronic and or digital signatures that are not tangible as compared to the traditional signatures that can easily be seen and proved forensically if so needed. It is proposed in our work that courts of law in our country should consider a document signed with a digital signature be as legally binding as a document signed with handwritten signature, an affixed thumb print or any other mark that acts as a signature of an individual.

It is further recommended that, courts of law in the country should take on board copy of a digitally signed message as valid, enforceable and efficacious as the original of the message unless it is proved that the signatory has designated an instance of the digitally signed message to be a unique original, in that case it is only that instance will make up for valid, enforceable and efficacious message.

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