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WHAT IS A COMPUTER SYSTEM?

BEING AN ASSIGNMENT SUBMITTED

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A) WHAT IS A COMPUTER SYSTEM

A computer system is a basic, complete and functional computer, including all the hardware and software required to make it functional for a user.[1] It should have the ability to receive user input, process data, and with the processed data, create information for storage and/or output.[2]

A computer system allows users to input, manipulate and store data. Computer systems typically include a computer, monitor, keyboard, mouse and other optional components. All of these components also can be integrated into all-in-one units, such as laptop computers.[3]

During the data processing stage, instruction sets, known as programs, are provided to let the system know what to do with the entered system data. Without these programs, the computer would not know how to process data that enters the system, and the data might be discarded. Known as a stored program computer, this type of computer is the most common in use today. It is very flexible, as it can process any task by loading a program from storage. Computer systems can work by themselves or access other devices that are external or connected with other computer systems.[4]

A computer is a programmable device that can automatically perform a sequence of calculations or other operations on data once programmed for the task. It can store, retrieve, and process data according to internal instructions. A computer may be either digital, analog, or hybrid, although most in operation today are digital. Digital computers express variables as

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[1] Ian, W. (2013). Computer Science from the Bottom Up, Chapter 3. Computer Architecture (PDF). bottomupcs.com. Retrieved January 7,2015.
[2] Byrne, D. (2015). Prices for Data Storage Equipment and the State of IT Innovation. The Federal Reserve Board FEDS Notes. p. Table 2. Retrieved July 5, 2015.
[3] Arpaci-Dusseau, R. H. and Arpaci-Dusseau, A. C. (2014). Operating Systems: Three Easy Pieces, Chapter: Hard Disk Drives (PDF). Arpaci-Dusseau Books.
[4] Fontana, R., Decad, G. and Hetzler, S. (2012). Technology Roadmap Comparisons for TAPE, HDD, and NAND Flash: Implications for Data Storage Applications (PDF). digitalpreservation.gov. Washington D.C.: The Library of Congress. p. 18. Retrieved July 5, 2014. Annual Areal Density Growth Rate Scenarios: HDD 20%/yr 2012–2017

numbers, usually in the binary system. They are used for general purposes, whereas analog computers are built for specific tasks, typically scientific or technical. The term "computer" is usually synonymous with digital computer, and computers for business are exclusively digital.[5]

A system of interconnected computers that share a central storage system and various peripheral devices such as a printers, scanners, or routers. Each computer connected to the system can operate independently, but has the ability to communicate with other external devices and computers.[6]

A complete, working computer. Computer systems will include the computer along with any software and peripheral devices that are necessary to make the computer function. Every computer system, for example, requires an operating system. A computer is a collection of entities (hardware, software and liveware) that are designed to receive, process, manage and present information in a meaningful format.[7]

COMPONENTS OF COMPUTER SYSTEM

- **Computer hardware** - Are physical parts/ intangible parts of a computer. eg Input devices, output devices, central processing unit and storage devices
- **Computer software** - also known as programs or applications. They are classified into two classes namely - system software and application software
- **Liveware** - is the computer user. Also kwon as orgware or the humanware. The user commands the computer system to execute on instructions.[8]

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[5] Ian, W. (2013). Computer Science from the Bottom Up, Chapter 3. Computer Architecture (PDF). bottomupcs.com. Retrieved January 7,2015.
[6] Stevens, C. E. (2011). Advanced Format in Legacy Infrastructures: More Transparent than Disruptive (PDF). idema.org. Retrieved November 5, 2013.
[7] Liebowitz, K., Spies, M. and Rynardt, C. (2014). VMware vSphere Performance: Designing CPU, Memory, Storage, and Networking for Performance-Intensive Workloads. Wiley. p. 68. ISBN 978-1-118-00819-5.
[8] Bushra, A. and Perros, H. G. (2015). 1: Partitioning the End-to-End QoS Budget to Domains. Bandwidth Allocation for Video Under Quality of Service Constraints. Focus Series. John Wiley & Sons. p. 3. ISBN 9781848217461. Retrieved 2016-09-21. [...] in cloud computing where multiple software components run

The complete computer made up of the CPU, memory and related electronics (main cabinet), all the peripheral devices connected to it and its operating system. Computer systems fall into two categories: clients and servers.

Clients are the user's laptop and desktop computers, tablets and smartphones, while servers share their data and applications with multiple users. Servers range from entry-level rack mounts to mainframes. A computer system is sized for the number of users it handles simultaneously, the type of work performed (office, engineering, etc.) and the volume of data that must be stored.[9]

B) DIFFERENCE BETWEEN HARD DISK AND CENTRAL PROCESSING UNIT (CPU)

Hard Disk

A hard disk drive (HDD), hard disk, hard drive, or fixed disk, is an electro-mechanical data storage device that uses magnetic storage to store and retrieve digital information using one or more rigid rapidly rotating disks (platters) coated with magnetic material.[10] The platters are paired with magnetic heads, usually arranged on a moving actuator arm, which read and write data to the platter surfaces. Data is accessed in a random-access manner, meaning that individual blocks of data can be stored or retrieved in any order and not only sequentially. HDDs are a type of non-volatile storage, retaining stored data even when powered off.[11]

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in a virtual environment on the same blade, one component per virtual machine (VM). Each VM is allocated a virtual central processing unit [...] which is a fraction of the blade's CPU.

[9] Willhalm, T., Dementiev, R. and Fay, P. (2014). Intel Performance Counter Monitor – A better way to measure CPU utilization. software.intel.com. Retrieved February 17, 2015.

*[10] Vogler, C., Claas, A., Bruckner, F., Suess, D. and Praetorius, D. (2015). Areal density optimizations for heat-assisted-magnetic recording of high density bit-patterned media. Journal of Applied Physics, **119** (22): 223903.*

[11] Hough, J. (2018). Why Western Digital Can Gain 45% Despite Declining HDD Business. Barron's. Retrieved May 15, 2018.

A hard disk is a magnetic disk on which you can store computer data. The term hard is used to distinguish it from a soft, or floppy, disk. Hard disks hold more data and are faster than floppy disks.

A hard disk is part of a unit – often called a disk drive, hard drive or hard disk drive – that stores and provides relatively quick access to large amounts of data on an electromagnetically charged surface or set of surfaces. Today's computers typically come with a hard disk that can contain anywhere from billions to trillions of bytes of storage. A hard disk is actually a set of stacked disks, like phonograph records. Each disk has data recorded electromagnetically in concentric circles, or tracks, on the disk. A head, similar to a phonograph arm but in a relatively fixed position, writes or reads the information on the tracks. Two heads, one on each side of a disk, read or write the data as the disk spins. Each read or write operation requires that data be located, an operation called a seek. Data already in a disk cache, however, will be located more quickly.[12]

A hard disk/drive unit comes with a set rotation speed varying from 4,200 revolutions per minute to 15,000 rpm. Most laptop and desktop PCs use hard disks that fall between 5,400 rpm and 7,200 rpm, while hard disks at higher rpm can be found in high-end workstations and enterprise servers.[13] Disk access time is measured in milliseconds. Although the physical location of data can be identified with cylinder, track and sector locations, these are actually mapped to a logical block address (LBA) that works with the larger address range on hard disks.[14]

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[12] Fontana, R., Decad, G. and Hetzler, S. (2012). Technology Roadmap Comparisons for TAPE, HDD, and NAND Flash: Implications for Data Storage Applications (PDF). digitalpreservation.gov. Washington D.C.: The Library of Congress. p. 18. Retrieved July 5, 2014. Annual Areal Density Growth Rate Scenarios: HDD 20%/yr 2012–2017
[13] Fullerton, E. (2018). 5th Non-Volatile Memories Workshop (NVMW 2018) (PDF). IEEE. Retrieved April 23, 2018.
[14] Shilov, A. (2016). Hard Drive Shipments Drop by Nearly 17% in 2015. Retrieved July 5, 2016.

Hard disks remain a popular data storage option for consumers and enterprises, in spite of the growing popularity and rapidly lowering cost of nonvolatile solid-state flash memory in the form of solid-state drives (SSDs). SSDs fit into the same external and internal drive bays as their HDD counterparts. SSDs may be much faster, more durable and draw less power than hard disks, but they are also more expensive. SSDs are considered a better fit for applications that demand high performance, while HDDs are more often used for high-capacity use cases.[15]

Central Processing Unit (CPU)

A central processing unit (CPU), also called a central processor or main processor, is the electronic circuitry within a computer that carries out the instructions of a computer program by performing the basic arithmetic, logic, controlling, and input/output (I/O) operations specified by the instructions.[16] The computer industry has used the term "central processing unit" at least since the early 1960s. Traditionally, the term "CPU" refers to a processor, more specifically to its processing unit and control unit (CU), distinguishing these core elements of a computer from external components such as main memory and I/O circuitry.[17]

The Central Processing Unit is the primary component of a computer that processes instructions. The CPU contains at least one processor, which is the actual chip inside the CPU that performs calculations.

Alternately referred to as a processor, central processor, or microprocessor, the CPU (pronounced sea-pea-you) is the central processing unit of the computer. A computer's CPU handles all instructions it receives from hardware and software running on the computer.

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[15] Coughlin, T. and Grochowski, E. (2012). Years of Destiny: HDD Capital Spending and Technology Developments from 2012–2016 (PDF). IEEE Santa Clara Valley Magnetics Society. Retrieved October 9, 2012.
[16] Birkby, R. (2015). A Brief History of the Microprocessor. computermuseum.li. Archived from the original on September 23, 2015. Retrieved October 13, 2015.
[17] Willhalm, T., Dementiev, R. and Fay, P. (2014). Intel Performance Counter Monitor – A better way to measure CPU utilization. software.intel.com. Retrieved February 17, 2015.

The CPU's main function is to take input from a peripheral (keyboard, mouse, printer, etc) or computer program, and interpret what it needs. The CPU then either outputs information to your monitor or performs the peripheral's requested task

The central processing unit (CPU) is the unit which performs most of the processing inside a computer. To control instructions and data flow to and from other parts of the computer, the CPU relies heavily on a chipset, which is a group of microchips located on the motherboard.

Intel and AMD are the two most popular CPU manufacturers for desktops, laptops, and servers, while Apple, NVIDIA, and Qualcomm are big smartphone and tablet CPU makers.

The CPU has two components:

- Control Unit: extracts instructions from memory and decodes and executes them
- Arithmetic Logic Unit (ALU): handles arithmetic and logical operations

To function properly, the CPU relies on the system clock, memory, secondary storage, and data and address buses.

This term is also known as a central processor, microprocessor or chip.

A central processor, or CPU, is arguably the most important component of any computing device. It handles basic instructions and allocates the more complicated tasks to other specific chips to get them to do what they do best. It’s the core of your PC, smartphone, or tablet. and it’s what makes the whole device run as it should.[18]

The CPU itself is a core component of what makes a computer a computer, but it isn’t the computer itself — it’s just the brains of the operation. It’s a small computer chip that sits atop the main circuit board (motherboard) of a computer, whether that’s a desktop PC, laptop, or tablet.[19]

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[18] *Shilov, A. (2018). Unlimited 5 Year Endurance: The 100TB SSD from Nimbus Data. AnandTech. Retrieved December 24, 2018.*

[19] *Liebowitz, K., Spies, M. and Rynardt, C. (2014). VMware vSphere Performance: Designing CPU, Memory, Storage, and Networking for Performance-Intensive Workloads. Wiley. p. 68. ISBN 978-1-118-00819-5.*

It's distinctly separate from the memory, which is where information is stored, and the graphics card or graphics chip, which handles all rendering of video and 3D graphics to your monitor or screen.[20]

In conclusion, the hard disk is where the computer stores information for long-term, while the central processing unit (CPU) is where the computer receives instructions and commands. The computer relies on the processor to be the brain and leader of all actions and the hard disk to store such processed instructions and command/information.

C) THE EVIDENCE ACT

The minute sections of the Evidence Act is not my concern neither is **it** part of my task, however, a brief sketch aimed at supplying a background must suffice. This background will not detain us.

The Nigerian Law of Evidence is substantially part of the received laws of Nigeria via section 45 of the Miscellaneous Provision Act of 1945(3).

The Evidence Ordinance was passed as Ordinance No, 27 *of* 1943. It did not take effect till the 1st of June, 1945 by virtue of Number 618 of Gazette Number 33 of 1945. Since the 1st of June, 1945, the Evidence Act has consistently retained its character 1951, 1960, 1963, 1976, 1990 amendments notwithstanding. Today, it is referred to as the Evidence Act Cap 112, 1990, Laws of the Federation. The Evidence Act remains the reference point on the Law of evidence in Nigeria. However, section 5 of the Evidence Act provides for the reception of evidence not specifically provided for by the act.

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[20] *Stevens, C. E. (2011). Advanced Format in Legacy Infrastructures: More Transparent than Disruptive (PDF). idema.org. Retrieved November 5, 2013.*

It is elementary law that facts are established in court by credible evidence. Facts must be proved *unless* they are admitted, presumed or judicially noticed. The facts could be established through oral testimonies, document and real evidence (i.e. physical object).

Whether a fact is capable of being proved is purely an issue of law not logic. The basis of any judgment is not necessarily the truth but the credibility of the evidence placed before the court. The truth in any given case may never be known. It is also an established principle of law that facts must be proved through three different burdens. In a crime, it is established beyond reasonable doubt, in civil cases, it is on the balance of probability. In some instances, it must be proved to the satisfaction of the court e.g. matrimonial causes'. In my humble opinion, the above encapsulates the fundamental principles of the law of evidence. I will not bore you with the rules of admissibility, relevancy, presumptions etc. These issues are pedestrian and are at the fingertips of your worships.

Electronic or Digital Document

It is pertinent, at this juncture, to take a closer look at the meaning of the word document. So many articles (including judicial pronouncements) have been written with respect to the definition of document as provided by the Evidence Act CAP. 112, Laws of the Federation of Nigeria, 1990. Section 2(1) provides that; "document includes books, maps, plans, drawings, photographs and also includes any matter expressed or described upon any substance by means of letters, figures, or marks or by more than one of these means, intended to be used or which may be used for the purpose of recording that matter.

Document is also defined in the New Oxford dictionary of English (6^{th} edition) as: “a piece of written, printed or electronic matter that provides information or evidence that serves as an official record”.

The question that must be asked is: what is the status of electronically generated documentary evidence? Our courts and scholars have divided themselves into two broad camps. There are those who hold that view that digital evidence can never be equated with documents while another school of thought has stretched the word document to cover digital printouts.

For now, Nigerian courts have continued to hold that print-out are inadmissible. A case in point is the on-going trial of former Minister of Aviation, Chief Femi Fani Kayode, on money-laundering charges. In a recent ruling at the Federal High Court in Lagos, Justice Ahmed Ramat Mohammed rejected a computer-print-out of the defendant's statement of account as evidence. He opined that such a print-out was secondary evidence which was not authenticated and was, therefore, inadmissible under sections 97(l)(a) and (2)(e) of the Evidence Act even if the print-out was relevant to the proceedings. His Lordship relied on UBA PLC *v* S.A.F.P.U (2004) 3NWLR part 861 page 516 at 543 paragraph A-Z, and the Supreme Court's decision in Yesufu *v* ACB Ltd (1976) ANLR PART 1, PAGE 328.[21] In that case, the apex court ruled in emphatic terms that a computer printout cannot be admissible as an entry in a bankers' book.

The reasons for these conclusions are obvious. Electronic evidence and their mode of generation considerably strain the traditional rules of evidence. The distinguishing characteristic of paper based transaction is that they are products of the human mind, they are authenticated by a signature. Most importantly, paper based transactions are in permanent form and can therefore not be easily altered without the alteration in the face of the document.

By contrast, signatures in transactions through e-payment, computers and diskettes etc are replaced by an electronic key designed to authenticate the message. Such messages may be altered even without the fact being discovered from examination of the medium.

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[21] *UBA PLC v S.A.F.P.U (2004) 3NWLR part 861 page 516*

It has also be argued that a computer print-out or other forms of E-evidence cannot be accurately described as written in strict sense and of course are certainly not verbal. Where for example a bank letter keys in information remains stored in. the computer's memory bank such information cannot be described as written. In the bank teller example, it is dear that the Information stored cannot be said to have be written by him. It should however, be quickly added that where a computer is used for typing and it is authenticated, it remains a document within the context of the Evidence Act. It is entirely different from a computer generated output.

It has also been contended that the information keyed-in by data entry clerks are products of several instructions, some in a chain of command. These instructions run into tens of thousands, the operators do not have the slightest knowledge of these printouts. In some cases, the computers have a brain of their own e.g. Computer e-records which automatically records telephone calls received. These calls can be captured in printouts. What is more, superior courts of records have consistently held that it is desirable to call the makers of documents even in criminal cases.[22]

From the foregoing, it is glaring that the position of our courts is fairly consistent on electronically generated evidence even though the Court of Appeal in Ogofo *v* IMB (1995) 9 NWIR (pt 419) page 314 at 324 almost deepened the confusion when it held that computer printouts could be admitted by way of judicial notice as products of science.[23]

The Supreme Court in Anyaeboi *v* R.T. Briscoe Nig. Ltd (1987) 3NWLR part 59 at page 87 Ratio 7 has finally put this matter to rest. Listen to Mohamadu Lawan Uwais JSC (as he then was)[24]

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[22] *Okoro v State LRCN vol 64 page 5234.*
[23] *Court of Appeal in Ogofo v IMB (1995) 9 NWIR (pt 419) page 314*
[24] *The Supreme Court in Anyaeboi v R.T. Briscoe Nig. Ltd (1987) 3NWLR part 59 at page 87*

> "The computer statement of account does not fall into the category of evidence absolutely in admissible by law as it is admissible as secondary evidence under section 96(l)(d) and 96(2) of the Evidence Act".

In this case, the computerized statement of account which was dully certified by a Senior Accountant was admitted in evidence by the trial court. The Court of Appeal and the Supreme Court sustained the ruling of the trial court.

What can be gleaned from this decision by the Appeal Court is that once the document is authenticated or certified then it is valid and could be admitted even if a computer printout. This is glaringly a distinguishing fact from the cases of Yesufu *v* ACB (supra) and UBA PLC *v* S.A.F.P.U. (2004) 3 NWLR part 861 page 516.[25]

The operative words/phrases for the purpose of this paper are: books, maps, plans, drawings, photographs ... includes any matter (whatsoever) expressed or described upon any substance (whatsoever) ... used for the purpose of recording that matter, (emphasis in brackets, mine). Before attempting the exposition of the effect of the word "includes" one may attempt to give relevant definitions of some of the words/phrases highlighted.[26]

Books:

1. A set of printed pages that are fastened inside a cover so that you can turn them and read them.
2. A written work published in printed or electronic form,
3. The written records of the financial affairs of a business - Synonym: Accounts.

Record:

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[25] *Yesufu v ACB (supra) (2004) 3 NWLR part 861 pg 516*
[26] *Admissibility of electronic evidence in criminal trials: How practicable? Hon. Justice Akhihiero*

Verb (keep account) 1. to keep a permanent account of facts or events by writing them down, filming them, storing them in a computer etc.

It is pertinent to mention that with the advancement in technology most of our traditional ideas of how books, maps, plans etc are created largely by physical manual labour have been taken over by electronic input and the finished product as output.[4] (Even then, we relied on printed pictures; maps, graphs etc as primary evidence without averting our minds to the possibility that perhaps they are secondary if we go by the argument that printed matters from the computer are secondary).

"Includes" means not limited to. Includes means items listed do not encompass the entirety of the possible scope of meanings attributed to the term; that exterior defining statements may be compiled elsewhere and combined with the statement to complete the scope of the term's meanings.

It is trite that words are imperfect symbols to communicate intent. They are ambiguous and change in meaning over time. One obvious error of the Evidence Act is its descriptive use of words to define documents. In contrast, the English Civil Evidence Act of 1995, defines document thus:[27]

> "means anything in which Information of any description is recorded, and
>
> "copy", in relation to a document, means anything onto which information recorded in the document has been copied, by whatever means and whether directly or indirectly".

The preposition that could be deduced from the above is that despite the definition of the word "document" by Section 2 (1) of the Evidence ACT, a proactive and purposive judicial

[27] *English Civil Evidence Act of 1995*

interpretation of it could, and in fact, should make it sufficient to keep pace with societal realities pending any amendments that may be made to the present law.

Apart from the fact that words are incapable of capturing the whole gamut of its intended meaning there is also the problem of our erroneous, traditional definition of abstract concepts within the narrow confines of our experience which sometimes at best have the effect of limiting these concepts rather than expanding them.

One limitation apparent in most interpretations of the definition of documents, as provided, is the unconscious (and maybe conscious) interposition of our idea of document as something expressed on paper or some other form of it. Professor Taiwo Osipitan stated that By virtue of Section 2 (1) of the Evidence Act, documents are not restricted to pen and paper writings. The scope of document is wide enough to accommodate computerised statements of account and writings produced through electronic/mechanical device.

We should be reminded that law is not an end in itself but a means to an end, which according to Roscoe Pound, is a tool of social engineering. This view has been given support by pats-Acholonu, JSC, when His Lordship held in Muhammadu Buhari *& 2* ors *v* Chief Olusegun Obasanjo & 266 ors (2004) NWLR Pt 191, 1487, 1532 B – C that "The beauty of the law In a civilized society is that...[28]

> "It should be progressive and act as a catalyst to social engineering. Where it relies on mere technicality or out-moded or in-comprehensible procedures and immerses itself in a jacket of hotchpotch legalism that is not in tune with the times, it becomes anachronistic and it destroys or desecrates the temple of justice it stands on".

[28] *Muhammadu Buhari & 2 ors v Chief Olusegun Obasanjo & 266 ors (2004) NWLR Pt 191*

A legal commentator Andrew I. Chukwuemerie in his article titled 'Affidavit Evidence and Electronically-generated materials published in LASU LAW JOURNAL Vol. 13 of June 2006 at *page* 177-178, has expressed reservations that

> "statutory law in Nigeria has hardly kept pace with social realities, This is despite the fact that between such realities and the law there should ordinarily be a mutually beneficial interpretation ... whatever the arguments may be in theoretical jurisprudence on whether or not the Courts should make law, in developing legal cultures, they should and actually do make law".

One may state here briefly the various methods of the canons of interpretation. It suffices, for the purpose of this paper to mention the Literal; Golden and Mischief Rules of interpretation. For the literal rule judges are required to consider what the legislation actually says rather than considering what it might mean. They are to give the words in the legislation its literal meaning, that Is, in its plain, ordinary, everyday meaning, even if the effect is to produce what might be considered unjust, absurd or undesirable outcome.

The golden rule may be used when the application of the literal rule would result in what appears to the court to be absurd.[7]

The mischief rule allows the court to go beyond the actual wording of a statute in- order to consider the problem or mischief that the particular statute was aimed at remedying.

There is a fourth category worth mentioning, the purposive approach, It is theory of statutory interpretation that holds that courts should interpret legislation in light of the purpose behind the legislation. It is pertinent here to emphasise the purposive method of interpretation.

As earlier pointed out the Evidence Act uses the word "includes" rather than “means” to define document, One may be bold to say that depending on the generics of the words/expression used after “includes” the listed items may be either “ejusdem generic” (i.e. having a circumscribed ambit) or generally expressive (i.e. any other thing that could come within the description).

Professor Osipitan stated that, “... the Evidence Act makes no specific mention of computerized statement of account, documents produced through typewriters and other mechanical and electronic devices”.

The act is, however, generally not silent on documentary evidence. A computerized statement of account is a document and, therefore, admissible as documentary evidence the same way that typewriter documents and printed books have been and are being admitted as documents by the courts. By virtue of Section 2 (1) of the Evidence Act, documents are not restricted to pen and paper writings. The scope of document is wide enough to accommodate computerized statements of account and writings produced through electronic/mechanical devices...

The Evidence Act does not pretend to be an exhaustive legislation. It evidently does not cover the whole field of the law of evidence. The Act frankly admits its limitation and inexhaustiveness in section 5A, which states: nothing in this ACT shall prejudice the admissibility of any evidence which would apart from the provision of this Act be admissible’.

In addition to the words of the above learned professor, the Evidence Act in Section 121 recognised some form of document produced by an electrical device when it provides: “The court may presume that a message, forwarded from a telegraph office to the person to whom such message purports to be addressed, corresponds with a message delivered for transmission at

the office from which the message purports to be sent; but the court shall not make any presumption as to the person by whom such message was delivered for transmission".

The Oxford Advanced Learner's Dictionary, 6th edition defines "telegraph" as "a method of sending messages over long distances, using wires that carry electrical signals" (emphases mine).

All the above expository prepositions notwithstanding, it is gratifying to observe that courts In Nigeria have been proactive in the admissibility of documents under the Evidence Act despite its perceived shortcomings.

In the case of Esso West Africa INC *v* Oyegbola as reported in (1969) NSCC at page 354-355, the Supreme Court held, "Besides Section 37 of the Evidence Act does not require the production of "books" of account but makes en.tr/ in such books relevant for purposes of admissibility …".[29] The law cannot be and is not ignorant of modern business methods and must not shut its eyes to the mysteries of the computer.

In modern times, reproduction or inscriptions on ledgers or other documents by mechanical process are common place and section 37 cannot, therefore, only apply to books of account so bound and the pages not easily replaced." This was equally the position of the court in the case of Anyaebosi *v* RT Briscoe Ltd as reported in (1987) 3 NWLR PL 59, pg 108 and trade bank Pic *v* Chami (2003) 13 NWLR PL 836, pg. 216.

Borrowing further from Professor Osipitan "The list of the negative impact of exclusion of computer generated evidence is endless. Admittedly, a-specific evidence law is desirable. However, the existence of a specific legislation/ provisions is not a necessary condition for the admissibility of computerized statements of account and other electronically-generated evidence in Nigeria".

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[29] *Supreme Court in Esso West Africa INC v Oyegbola (1969) NSCC at pp 354-355*

Obviously, there are undoubted challenges bedeviling computer generated documents other than their admissibility like categorization i.e. primary or secondary; authenticity; integrity; confidentiality etc which would affect the weight attachable to the evidence and not their admissibility. However, the courts cannot because of these challenges stick its head in the sand like an ostrich. It would not only be absurd but a perpetuation of injustice to disregard technological advance, an end which is clearly not what law seeks to achieve.[30]

CONCLUSION

We live in an electronic age where everyday transactions are conducted on the electronic platform. The digital technology has compressed the world into a global village. The masses have embraced information technology. The use of electronic devices like GSM mobile phones is no longer the preserve of the elites or the wealthy.

The illiterate rural famer can now place order for fertilizer from his farm with the aid of his cell phone. The market women now transact their business on electronic platforms like ATMS and other e-payment arrangements.

The volume of electronic data is on the increase. Most of these transactions are captured by electronic devices. In the event of dispute, parties are bound to rely on electronic evidence. In essence, electronic evidence has come to stay.

I, urge you to note the principle enunciated in the case of Yesufu *v* ACB (supra) Anyaebosi *v* RT Briscoe Ltd (supra) and trade bank Pic *v* Chami (2003) 13 NWLR part 836 page 216.

In the course of this presentation we have come to appreciate the fact that the emergence of electronic evidence has presented new challenges. In the area of criminal law, there is an alarming increase in the wave of cybercrimes. The crimes range from advance fee fraud, credit

[30] *Akhihiero P.A. Adminissibility of electronic evidence in criminal trials. How practicable?*

card frauds, online prostitution, illegal gambling, child pornography, blackmail, cyber stalking, even culminating in murder as we can see in the recent case of Cynthia Osokogu. The young lady was raped and murdered by her face book friends.

In the light of these developments, the recent enactment of the 2011 Evidence Act to guarantee the admissibility of electronic evidence is a step in the right direction. In the prosecution of many of these crimes electronic evidence will feature very prominently.

Take for example the Cynthia Osokogu case where a post graduate student residing in Nasarawa State was lured online *via* face book interactions to her untimely death in the hand of some hoodlums in Lagos. The trial of the suspects in bound to be a hi-tech trail where electronic evidence will be downloaded from the face book website to prove the premeditated actions of the suspects. One wonders how the trial would look like if the Evidence Act has not been updated.

It is in this vein that we must emphasis the need for computer literacy for all the members of the legal profession. It is quite unfortunate that in this dispensation we still have some lawyers and even judicial officers who cannot boot a computer. Some cannot even use their GSM to send text messages. They cannot send or receive e-mails. Some do not even have an e-mail address. They have a morbid fear of anything relating to the computer – CYBERPHOBIA. Since we are now talking about electronic evidence, we all must be computer literate. In a paper which I delivered in the law week of the Benin Branch of the NBA in 2009, I opined that "*Very soon, the concept of literacy will be redefined in consonance with the dictates of the digital age. The ability to read and write can no longer be the sine qua non for classifying a person as either literate or illiterate.*

Computer literacy will be the determining factor"[31]

[31] *P.A. Akhihiero: LEGAL RESEARCH IN A DIGITAL AGE, 2009, www.nigerianlawguru.com*

Furthermore, there must be continuous IT training for all those involved in the administration of justice. This leads us to a more crucial aspect. Our courts need to be fully updated with IT facilities. The system should be upgraded to meet the current exigencies. The court procedures should be fully automated for optimum performance. Courts should be equipped with digital recording facilities and should be on line real time. Otherwise, our manual system of operation may pose a threat to this new regime of electronic evidence.

Take for instance where the court needs to access a website to view a piece of electronic evidence?

Suppose the court is not internet ready, what happens? That becomes a clog in the wheel of justice. We must be prepared! On the whole, we have examined the modalities for the admissibility of electronic evidence in criminal trials. We have examined the legal framework introduced by the Evidence Act of 2011.

All things considered, the provisions of section 84 are quite laudable. If the proper foundation is laid electronic evidence can be admitted in evidence in criminal trials. We have considered some authorities from some more advanced jurisdictions. The foreign decisions have shed some light on some grey areas.

It is left for us to take up the challenge. Even if we do not have the benefit of foreign decisions, we can break new grounds. There must be a starting point. I close with the immortal words of my mentor Lord Denning **(**Master of the Rolls**)**:

> "*What is the argument on the other side? Only this, that no case has been found in which it has been done before. That argument does not appeal to me in the least. If we never do anything which has not been done before,*

we shall never get anywhere. The law will stand still whilst the rest of the world goes on: and that will be bad for both".[32]

[32] *Packer V Packer (1953) 2 AER 127 at 12*