

**A FRAMEWORK FOR CYBERCRIME DIGITAL EVIDENCE
ACQUISITION**

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**A RESEARCH REPORT SUBMITTED TO THE DIRECTORATE OF GRADUATE
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THE REQUIREMENTS FOR THE AWARD OF A MASTER'S DEGREE IN
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DECLARATION

I, OPOLOT FRANCIS, declare that this research report is my original work, except where due acknowledgement has been made. I declare that this work has never been submitted to any other university or institution of higher learning for any award.

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A handwritten signature in black ink, appearing to read 'Francis', enclosed within a rectangular box with decorative flourishes on the sides.

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This research report titled “*A Framework for Cybercrime Digital Evidence Acquisition*” is submitted for examination with the approval of the following academic supervisor(s);

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DEDICATION

I dedicate this research to my Lord and Savior, Jesus, to whom I have walked and triumphed through all seasons, and to my parents, Mrs. Akol Hellen and Mr. Osauro John, for their unwavering support and belief in me. I also dedicate this with much affection. And to my devoted wife Wanjala Nafula Teresa and siblings, who put up with their hectic schedules and missed me while I was conducting the study: not forgetting my friend ASP Wehire Lamech, your unwavering love, support, and encouragement served as a soft foundation for me in the midst of trying challenging circumstances. You are the reason this research has such strong foundations; I am incredibly grateful and will always be beholden to you.

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ABBREVIATIONS

ICT:	Information communication technology
CVs:	Commercial Victimization Survey
NCSI:	Network Connectivity Status Indicator
SMBs:	Small and Medium Size Businesses
GPS:	Global Positioning System
CD/CDR:	Compact Disc / Compact Disc Recordable
DSRM:	Design Science Research Methodology
DSRP:	Design Science Research Process
BCFL:	Block Chain Cloud Forensic Logging
DLT:	Distributed Ledger Technology
GDPR:	General Data Protection Regulation
IaaS:	Infrastructure as a Service
PaaS:	Platform as a Service
SaaS:	Software as a Service
ADAM:	Advanced Data Acquisition Model
UML:	Unified Modeling Language
FTK:	Forensic Toolkit
FAT32:	File Allocation Table32
NTFS:	New Technology File System
ISO:	International Organization for Standardization
CRT:	Telnet Client and Terminal Emulator
VPN:	Virtual Private Network
NITA:	National Information Technology Uganda
URA:	Uganda Revenue Authority
SPSS:	Statistical Package for Social Sciences
RAM:	Random Access Memory
DGAL:	Directorate of Government Analytical Lab

ABSTRACT

Over the years, the field of digital forensics has grown significantly, and courts have seen an increase in cases pertaining to it. In today's technologically advanced culture, the prevalence of computer/cyber-connected criminal attacks has increased the demand for digital evidence in court. It is vital to successfully prosecute those who commit such crimes and hold them accountable. Digital forensics is the procedure used to obtain the evidence presented in these court cases.

The main aim of the research was to design a framework for cybercrime digital evidence acquisition that would be adopted for use during the digital crime evidence acquisition process with the following specific objectives, i) to establish requirements for the framework adopted by private organizations and law enforcement agencies for Uganda in cybercrime evidence acquisition; ii) to develop a framework that adopts the use of digital evidence acquisition processes by computer forensics practitioners in Uganda; and iii) to evaluate the performance of the framework that adopts the use of digital evidence acquisition processes by computer forensics practitioners in Uganda. Research results from the survey indicate that there is a need to establish requirements for the framework adopted by private organizations and law enforcement agencies in Uganda, and the results of the entire framework were tested and evaluated by the simulation using data and tools like Autopsy and FTK Imager.

It was concluded that achieving proficiency in digital forensics involves a holistic understanding of evidence encounters, effective handling, and adept presentation for it to be admissible to courts of law. The dynamic nature of the field necessitates adaptability to emerging tools, techniques, and best practices. Also, continuous professional development and collaboration with legal experts are crucial for maintaining high standards in digital evidence analysis and its admissibility to the court.

CHAPTER ONE: INTRODUCTION

1.0 Background of the study

Information and communication technology (ICT) is a broad word that encompasses all advanced computer-based technologies for managing and transferring information, according to [1]. ICT is a broad term that encompasses all forms of communication, such as videoconferencing and distance learning, as well as the associated services and technologies, such as radio, television, cellular phones, computer and network hardware, and satellite systems. This increased reliance on and usage of ICT opens up new opportunities for criminals and other bad actors to target ICT and or use it to perpetrate crimes.

Technology improvements are causing firms to swiftly evolve regardless of industry vertical. Industry 4.0 refers to this stage. With Industry 4.0, businesses are attempting to use information technology to boost production and profitability [3]. Companies are now required to display their presence on social media due to the rise in its use [2]. This has improved efficiency and streamlined operations but has also broadened the attack surface. An organization's vulnerability to outside attacks due to advances in information technology and an increase in computer-related crimes has given rise to new types of digital evidence known as an attack surface. Given the damage, various reforms are urgently required, and delayed adoption is preferred.

Digital forensics is crucial for incident response and compliance audits in a business setting. The investigators establish the security criteria rather than employing them directly [4]. The responsibility of a good business suggests assembling verifiable proof and defining the perimeters of a scene's security. Computer crime scenes can be controlled and serve as secondary sources of evidence [1]. Thanks to a fingerprint scan of the keyboards, the accessories offer palpable evidence. The study applies to crime scenes that unintentionally or intentionally change their environment. Consider, for instance, that you are a digital investigator for a local police force. One of the nearby schools is the target of a bomb threat that your department manager gets via anonymous email. In [5] since the anonymous email was sent from a home in the school's area, you are instructed to conduct the investigation with the help of information from a subpoena about the last known ISP where the message originated. To ensure the preservation of computer evidence when the warrant is executed, investigators create a list of components that must be included in an initial-reaction field kit in response to the victim.

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