



**AN AUTHENTICATION FRAMEWORK FOR MOBILE  
DEVICE IN CORPORATE NETWORKS: The Case study of  
Eastern Uganda**

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The undersigned certify that they have read and hereby recommend for examination by Busitema University a dissertation titled: *An Authentication Framework for Mobile Device in corporate networks, the case study of Eastern Uganda*, in partial fulfillment of the requirements for the award of Masters in computer forensics of Busitema University.

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## ABSTRACT

This study was envisioned to identify the evolving mobile security challenges, and threats brought about by Mobile device authentication onto corporate networks. The researcher preferred corporate networks because mobile devices are in extensive use by corporate employees together with clients and hence the challenges, threats, and attacks would be more pronounced and frequent requiring, outstanding attention, and solution. Most corporate organizations have their branches in Eastern Uganda, the reason why it was selected a case study to give a representative sample. The challenges, threats, and attacks were found using a questionnaire administered to 10 purposively selected corporate organizations with a reasonable number of employees and improved systems. Other existing frameworks were reviewed in order to find out how they tackled mobile device threats and authentication challenges in a corporate networked environment. A number of mobile device security frameworks were examined and improved to include additional security features such as advanced device access to the corporate network using Radius server security attributes available to offer multifactor authentication, malware detection and prevention, mobile device user categorization, and access control to servers, and rogue access points by disabling Hotspots applications in mobile devices. A Common Vulnerability Scoring System (CVSS) Version 3.1 was adapted to quantify, evaluate, and assess the severity of systems' security vulnerabilities in the performance of the MDA framework. The MDA framework was tested and validated using simulation techniques (Riverbed modeler version 17.5), which involved introducing the framework to a mobile Dos assault, putting preventive measures in place to handle the attack, and then comparing the simulation results. Various aspects of network performance were tested on corporate servers that would be targeted. The study findings from corporate organizations indicated that organizations had few (i.e. software antivirus and firewall protection) or no measures to address the evolving mobile device security challenges and attacks they experienced and hence MDA framework would be very useful if physically implemented.

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## ACRONYMS AND ABBREVIATIONS

<b>BYOD</b>	Your Own Device
<b>CVSS</b>	Common Vulnerability Scoring System
<b>DHCP</b>	Dynamic Host Configuration Protocol
<b>DMZ</b>	Demilitarized Zone
<b>DNS</b>	Domain Name Service
<b>DOS</b>	Denial of Service Attack
<b>FTP</b>	File Transfer Protocol
<b>IP</b>	Internet Protocol
<b>IBM</b>	International Business Machines
<b>ISMS</b>	Information Security Management Systems
<b>MAC</b>	Media Access Control
<b>MAM</b>	Mobile Applications Management
<b>MDA</b>	Mobile Device Authentication
<b>MAUP</b>	Multi Access User Policy
<b>MDM</b>	Mobile Device Management
<b>NAC</b>	Network Access Control
<b>NITA-U</b>	National Information Technology Authority-Uganda
<b>OTP</b>	One Time Password
<b>SIM</b>	Subscriber Identity Module
<b>SPD</b>	Security Policy Database
<b>SSID</b>	Service Set Identifier
<b>VPN</b>	Virtual private Network
<b>WLAN</b>	Wireless Local Area Network

# **CHAPTER ONE: INTRODUCTION**

## **1.0 Introduction**

This chapter discusses the study's background, the problem statement, the study's purpose, the study objectives, and the research questions. It also covers the scope of the investigation, the motivation for the study, the significance of the study, the research framework, and the study's limitations.

## **1.1 Background of the Study**

It has been over 25 years since mobile phones performed the roles of personal computers. In 1992, Simon's personal communicator, the first mobile device, was unveiled by International Business Machines (IBM) and made available to consumers in 1994. A survey conducted in 2010 by Breitinger Frank and Nickel Claudia revealed that mobile phone users worldwide exceeded 4 billion for the first time; indicating that mobile phones were used by two-thirds of the world's population (Breitinger, Nickel and Darmstadt, 2010) And approximately 5 billion people around the globe are using smartphones (Taylor and Silver, 2019). Furthermore, with the current improvement in wireless telecommunications, we are expected to have their number grow from 25 to 50 billion connected devices by 2020 (Silverio-Fernández, Renukappa and Suresh, 2018). Farrell (2015) pointed out that mobile devices nowadays come with improved functionality and increased storage of different sensitive data, making them more attractive to thieves.

Androulidakis (2016) conducted a study in 17 universities in 10 European countries to assess users' levels of security feeling and awareness regarding mobile device

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