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**MEASURING THE ADOPTION OF RISK AND  
COMPLIANCE-BASED FINTECHS IN  
COMMERCIAL BANKS IN KENYA**

**By**

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A project report submitted in partial fulfillment of the requirements for the degree of Master of Science in Information Technology Management of the University of Nairobi.

May 2022

## DECLARATION

This research project report is my original work and to the best of my knowledge, this work has not been submitted for any other award in any University.



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This research project report has been submitted for examination in partial fulfillment of the requirements of the Master of Science in Information Technology Management of the University of Nairobi with my approval as the university supervisor.



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## ABSTRACT

Kenya's Fintech industry confronts obstacles such as technological, regulatory, customer, and market systems concerns. While certain efforts have been made to foster the growth of Fintechs through regulatory sandboxes, these interventions have yet to have a significant influence on adoption, particularly for AML/CFT-focused Fintechs. Motivated by the premise that the financial sector is not adopting risk and compliance-based technology at the rate anticipated, the study aims to empirically examine and analyze the adoption of risk and compliance-based Fintech in Kenyan commercial banks using the suggested framework to establish the factors that favor fintech adoption in the management of AML/CFT. The study builds on the diffusion of innovation (DOI) theory and the technology-organization-environment (TOE) framework to analyze the parameters that impact the adoption of risk and compliance-based Fintech. A questionnaire was utilized to collect data from 37 Kenyan commercial banks. The data were examined using factorial analysis, and the hypotheses were evaluated using logistic regression. The findings demonstrated that the compatibility of risk and compliance-based financial technology, perceived barriers, and government regulations significantly impact on the adoption of this type of technology. As a limitation to the study, adopters and non-users are characterized in this study by applying the logistic regression technique. However, this just investigates one relationship between the independent and dependent variables and does not investigate the connections between the independent factors, control variables, or moderators in any depth. The findings provide a deeper insight into the factors that influence risk and compliance-related fintech adoption features for commercial banks, policymakers, and regulators.

**Keywords:** De-risking, Fintech, Adoption, TOE, DOI, Financial Technology, AML, CFT, Risk and Compliance.

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## **LIST OF ABBREVIATIONS**

**AML** - Anti-money laundering

**CBK** - Central Bank of Kenya

**CFT** - Combatting the financing of terrorism

**FATF** - Financial Action Task Force

**FSB** - Financial Services Board

**FSD Kenya** - Financial sector deepening Kenya

**GPFI**-Global Partnership for Financial Inclusion

**KNBS** - Kenya National Bureau of Statistics

**KYC** - Know your customer

**NPS** - National Payments System

## **DEFINITION OF TERMS**

**De-risking** - Financial institutions' practice of terminating or limiting commercial ties with

**Fintech** - Incorporation of technology into financial services firms' offerings to enhance their usability and delivery to consumers.

clients or segments of clients to avoid, rather than manage, risk

**Regtech** - The use of technology to manage regulatory processes in the financial industry.

# CHAPTER 1

## INTRODUCTION

### 1.1 Background

The World Bank considers formal financial services accessibility to be a critical enabler for seven of the seventeen Sustainable Development Goals where higher economic development and greater reductions in poverty and income inequality are seen in countries with more sophisticated financial systems (Demirguc-Kunt et al., 2018). The authors further argue that access to the usage of basic financial services may boost income, enhance resilience, and improve people's lives. Financial inclusion has made significant progress, with 1.2 billion adults now having access to financial services, 515 million of them doing so since 2014 (Demirguc-Kunt et al., 2018). Indeed, this is represented by 83 percent of Kenyans having access to financial services (CBK et al., 2019).

With the increase in financial inclusion, regulatory pressure on financial institutions to comply with anti-money laundering and anti-terror funding laws has also risen since 2000 (Stanley & Buckley, 2016). On the other hand, Shehu (2012) argues that such initiatives are seen to have the potential to stymie the financial integration process in the face of ineffective financial regulation, particularly the implementation of policies and procedures for anti-money laundering and counter-terrorist financing (AML/CFT). Moreover, financial exclusion can be a consequence of a risk-based strategy, followed by the imposition of stringent restrictions inside the financial system as argued by Malakoutikhah (2020). These two goals may clash, as regulations aimed at combating financial crimes may block financial transactions, particularly for individuals in developing nations (Stanley & Buckley, 2016). The guidance provided by regulators on how to handle AML/CFT risks is sometimes ambiguous and inconsistent (Clarke, 2021), therefore, some financial institutions are finding it increasingly difficult to conduct business with specific regions and clients (Stames et al., 2017) and instead of adopting technology solutions to combat these risks, financial institutions like in Kenya (Salami, 2018) choose to end relationships with money transfer organizations, correspondent banks, and a certain section of customers, a process referred to de-risking. Durner and Shetret (2015) contend that these counter-measures, rather than lowering risk in the global financial industry, increase vulnerability by driving consumers at high risk to smaller financial institutions that may not have the resources or capability to deal with AML/CFT or possibly out of the formal financial sector entirely.

In their report, GPMI (2016) highlights financial innovation enabled by technology may contribute significantly to improving integrity, increasing, traceability of financial transactions, and boosting the quantity and quality of information linked to user identification relevant for AML/CFT monitoring. To overcome systemic impediments, Arner et al. (2017) observe that Regtech and Fintech advancements provide substantial opportunities in terms of improving transparency, which strengthens regulatory and supervisory capacities while lowering compliance costs. Indeed, Stames et al. (2017) also attest that FinTech and RegTech are presenting new opportunities for regulators and local financial institutions to use innovative solutions to respond to a changing global risk landscape in many emerging economies.

With increasing regulatory monitoring and heightened expectation from financial institutions to comply to manage financial risk, fintech solutions fill in the gap to increase the effectiveness of the risk management process to ensure regulatory compliance (Kurum, 2020). There is a need to strengthen the practices and strategies for technology risk management in order to protect the financial technology ecosystem. Moturi and Ogoti (2020) have, for example, argued that unlicensed mobile money lenders in Kenya have inadequate integration of critical IT risk management components, and as a result, there is a necessity to strive toward robust and secure financial systems. Further, Vučinić (2020) states that the growth of fintech necessitates greater international collaboration, especially in information security, terrorist fundraising and financing, and AML. Globally, governmental reaction to new technologies has seen nations realizing the benefits of Fintech (Arner et al., 2017) for example, to enhance AML/CFT rules, the Kenyan NPS vision and strategy document highlights the adoption of FinTech solutions such as digital identity integration. In Kenya, financial institutions have adopted FinTech to redefine financial services delivery, improve the consumer experience, and raise customer demand for financial goods and services (Central Bank of Kenya, 2019) with a focus on payments, enabling processes and technology, and lending (Findexable, 2020). However, the implementation of financial technologies faces obstacles such as technological, regulatory, customer, and market systems concerns (Lee & Shin, 2018), and Kenya is not an isolated case (Aketch et al., 2021; Akinola, 2021; Didenko, 2017; Ferguson et al., 2019; Ryu, 2018; Sydow et al., 2020). The premise that the financial sector is not adopting risk and compliance-based technology at the rate anticipated indicates that the area of such Fintech model adoption requires additional empirical study to provide light on the ambiguity surrounding adoption decisions.

As a result, it is vital to expand the understanding of the different elements that influence organizations' use of risk and compliance-based financial technology. As a result, the focus of

the paper is to examine the factors that influence financial technology adoption for risk and compliance in commercial banks of Kenya. The results of this study will help financial institutions and regulators make suggestions for future implementations and government oversight.

## **1.2 Problem Statement**

Technology solutions help financial institutions to perform surveillance, monitoring, due diligence, and screening in relation to AML/CFT. With the emergence of these technologies, Fintechs have aided banks in meeting their obligation to prevent AML activity by enhancing KYC capabilities, identity validation, and thorough transaction monitoring (Gomber et al., 2018). Despite its apparent advantages, Kenya's Fintech industry confronts a number of obstacles such as technological, regulatory, customer, and market systems concerns (Aketch et al., 2021; Akinola, 2021; Didenko, 2017; Ferguson et al., 2019; Ryu, 2018; Sydow et al., 2020). Although certain attempts have been made to encourage Fintechs to grow in a favorable environment through regulatory sandboxes, these interventions have yet to have a substantial impact on adoption, particularly for AML/CFT-focused Fintechs (Didenko, 2017). Meanwhile, Fintech adoption in Kenya continues to grow in areas such as payments, enabling processes and technology, and lending although it continues to trail behind in terms of fintech adoption for risk and compliance reasons (Findexable, 2020). Concentrating on the experiences of commercial banks can assist in developing more robust methods for innovation implementation and precarity in Fintech uptake decisions, as well as guiding future policy objectives.

## **1.3 Objectives**

- 1 To examine the application of fintech for risk and compliance in commercial banks of Kenya.
- 2 To establish perceived barriers and drivers among commercial banks of Kenya in adopting fintech for risk and compliance.
- 3 To analyze the influence of fintech adoption on risk management in commercial banks of Kenya.
- 4 To establish the suitability of the proposed framework to measure the adoption of fintech for risk and compliance in commercial banks of Kenya.

#### **1.4 Significance of the Study**

The fintech industry has earned recognition in the academic community in recent years, and this work will contribute to the current domain of research. to guide researchers in future studies on the influence of fintech on AML/CFT and its effect on de-risking measures used by financial institutions. The study will create awareness on how fintech is supporting the reform and modernization of the Kenyan financial services sector, notably in the areas of regulatory compliance and management. While the financial institutions would stand to gain from the study's results to make future informed decisions while adopting this technology it will also be essential to regulators, policymakers, and the government to formulate policies and regulations that financial institutions adoption of fintech for AML/CFT management. The Central Bank of Kenya will also make use of this study to enhance the recently created NPS vision and strategy. The findings will also give insight to bodies like the World Bank to make policy decisions based on the current status of fintech adoption in driving financial inclusion by mitigating de-risking.

#### **1.5 Assumption and Limitation of the Study.**

When carrying out the study, the researcher made the presumption that all of the respondents were willing to cooperate and provide answers that can be trusted. The scope of the study was only pertinent to commercial banks in Kenya. Also, the research assumed that all the organizations under consideration had comparable organizational structures.

# CHAPTER 2

## LITERATURE REVIEW

### 2.1 Financial Technology

Debate over whether fintech is an application, a system component, or a business concept for disrupting a sector and promoting competition rages on. While some studies have focused on defining fintech according to many dimensions such as the degree, goal, and breadth of innovation, others have sought to agree on a fintech definition (Mention, 2019). Financial Services Board (FSB) (2017) defines Financial technology as new business models, applications, methods, or products in the financial services industry that are enabled by technological innovation. This includes activities but is not limited to, fintech credit, digital currencies, wholesale payments, AI, and robo-advisors. Additionally, Gomber et al. (2017) attempt to explain it as a financial sector initiative that disrupts existing responsibilities, business methods, and product offers through the introduction of technological advances. Due to this equivocality, Iman (2020) elucidates that fintech is a vast, multifaceted, and diverse phenomenon that can present itself in different approaches. Some scholars focus on the innovative aspects of fintech, while others concentrate on the development of new markets and products. Some are concerned with compliance and legislation, while others with technicalities and technological artifacts.

The Fourth Industrial Revolution has gained traction in the business world by significantly changing how many organizations engage with consumers. It spawned a new paradigm that aims to integrate information technology into society, with many sectors like finance leveraging the capabilities of Industry 4.0. such as using technology in their operations (Almulla & Aljughaiman, 2021). FinTech has significantly aided the growth of innovation in the financial services sector from its advent (Schueffel, 2016). Several phases of financial and technical innovation have dissolved the barriers between financial goods and services and those supplying or enabling their provision. For example, a set of services that, for a long time, were only available through regulated credit institutions, payment services, and loans have been unbundled and are now being provided independently by a considerably broader range of businesses in various countries (Mention, 2019) and with focus on convenience, and minimal cost (Almulla & Aljughaiman, 2021). In this paper, the term "financial technology" (or "fintech") refers to a type of technology that enhances compliance with anti-money laundering and combating the funding of terrorism regulations.



## **2.2 Emerging Fintech Trends**

Financial institutions are leveraging blockchain, cryptocurrency, artificial intelligence, advanced analytics and deep learning while offering their products to customers (Pant, 2020). Dubey (2019) claims that chatbots and other artificial intelligence-based technologies are becoming an integral part of banking's business innovation, with AI having a major impact on product delivery, risk management, and security. Such algorithms save firms of employee hours by automating operations like data entry, risk assessment, and loan form processing. In their paper, Ashok et al. (2019) stress that the use of robotics in financial institutions helps to improve the work of auditors and accountants when manual repetitive tasks are replaced for better precision, speed, and efficiency, which helps investors to obtain the information they want for quick decision-making. Financial technologies are also depicted by Kruppa et al. (2013) where they demonstrate how machine learning is used in credit risk assessment of consumers by automating the credit assessment and loan decision-making processes using big data, hence transforming the way traditional lending operates. Cloud computing in the financial sector is also discussed by Dimitriu and Matei (2014) and they highlight its application in solving existing financial problems in particular when they are integrated to meet the requirement for a large number of complicated accounting requests and activities. In the field of AML/CFT, Fintech capabilities such as machine learning have been studied (Jullum et al., 2020) in managing risks.

## **2.3 The Practice of De-risking**

Durner and Shetret (2015) define de-risking as financial institutions' habit of terminating partnerships with customers or certain categories of customers to avert instead of mitigating risk by following the FATF's risk-based approach. Levi and CGD Working Group (2015) elucidate that regulatory pressure on financial institutions has recently increased and as a result, they have implemented a risk-taking strategy to decrease their exposure to regulatory and reputational ramifications. Malakoutikhah (2020) highlights three different types of de-risking; 1) Financial institutions either decide to terminate customer accounts and also deny them from opening these accounts or limit access to other types of financial services; 2) Financial institutions deny or terminate relationships with money transfer organizations, and 3) Termination of relationships with agents that facilitate wired transfers (correspondent banking relationships).

De-risking strategy is driven by six elements as mentioned by Durner and Shetret (2015). One element that financial institutions consider is the perceived or assessed risk where certain

segments of customers are considered high risks and owning an account could potentially implicate them to the operations of money laundering and terrorism funding. The second element is the issue of customer profitability and financial institutions evaluate the cost of doing business to determine if the risk is worth taking. Another element is the increased cost associated with compliance. The focus on compliance has resulted in organizations in the financial sector investing more to support programs and activities aimed at complying to set regulations. The fourth element is increasing fines and penalties imposed by regulators for accountability when the set regulations and policies are violated. Another element is where, to avoid reputational risk, financial institutions choose to de-risk customers as such the level of exposure reduces. Finally, due to the intensified individual and corporate responsibility, both institutions and employees are held accountable in case found liable to aiding money laundering or terrorist financing.

Although the intention of de-risking is to eliminate the money laundering risk, this process could result in unforeseen repercussions by pushing these customers to unregulated and unmonitored channels to perform their transactions, an act that could derail the efforts to curb money laundering (Durner & Shetret, 2015; Rose, 2019). Consequently, an increase in financial exclusion and a decline in financial support for foreign trade is also attributed to the de-risking action, hence negatively affecting the efforts toward financial inclusion and increasing trade possibilities (Durner & Shetret, 2015; Malakoutikhah, 2020). To help mitigate these de-risking effects, financial technologies provide capabilities such as machine learning, big data, biometrics, blockchain, and distributed ledger technologies (Gomber et al., 2018; Grima, Baldacchino, Abela, & Spiteri, 2020).

#### **2.4 Key Issues on Kenyan Fintechs**

Fintech implementation is organized into several categories and Lee and Shin (2018) identified payments, asset management, crowdsourcing, loans, investment management, and insurance as some of the options available for fintech business models that have been adopted by an ever-increasing number of fintech firms. Even though many scholars and practitioners believe Fintech may change the banking industry, its acceptance is still uncertain (Ryu, 2018). For instance, in Kenya, Didenko (2017) argues that, while current laws frequently encompass new Fintech solutions, the legal status of the new product or service is not always apparent, either due to a regulatory gap or conflicting rules. There is uncertainty on current regulations where Fintech businesses are governed by different financial legislation and norms that apply to all organizations, regardless of whether they are Fintech firms. In their study, Ferguson et al.

(2019) identified key issues within technology, regulation, and consumer demand that affected the adoption of fintech. The potential benefits of Fintech's rise come with technological concerns and create new liabilities such as negative effects of fraud, technological abuse, or criminal activity. Further evidence is presented in other studies as well (Aketch et al., 2021; Sydow et al., 2020). For Fintechs to thrive, governments must embrace them as a practice as much as a technology and also have a foundational and ever-improving digital infrastructure, solely for they demand a contemporary digital infrastructure (Andriole, 2019). Akinola (2021) underlines that, with these technological and infrastructural obstacles, developing countries have experienced less steady growth in fintech enabled solutions as compared to developed ones.

## **2.5 Research Gaps**

From literature, previous work has given the focus on developed nations rather than on developing nations on the perception of fintech adoption so far (Tapanainen, 2020). In their study, attention is drawn on the single perspective of adoption that researchers have given in their studies, and they propose a conclusive framework that encompasses end consumers, service providers, and policymakers. Previous studies also indicate various gaps, for instance, in their paper, Khatun and Tamanna (2020) did not conduct their study locally, while Ryu (2018) did not consider regulatory fintech services and only looked into mobile payments, remittances, P2P lending, and crowdfunding. Bhaskaran (2021) study only focused on Decision Theory, Technology Acceptance Theory, and Prospect Theory as measures of adoption and did not focus on the TOE framework which is the present study's emphasis. Additionally, Ndungu and Moturi (2020) focused on mobile fintech in their research study and not fintech solutions in risk and compliance, while Singh et al. (2019) looked at fintech adoption at the individual level using TAM, UTAUT, and WebQual 4.0 models.

## **2.6 FinTech, AML/CFT and De-risking**

The importance placed on financial technologies has seen a rise in adoption in the financial industry, especially big data analytics, artificial intelligence, and blockchain-based fintech solutions in different business models (Lee & Shin, 2018). New opportunities provided by fintech promote financial inclusion while at the same time, they may be able to fulfill risk management needs and related expenses more effectively in situations where these emergent technologies are redefining the face of the financial industry (GPFI, 2016). As FinTech has grown in prominence, financial regulators have been compelled to explore how to achieve the right balance between the conventional regulatory economic stability and consumer protection

aims and development and innovation goals as argued by Arner et al. (2017). Mention (2019) further argues that regulators can benefit from fintech as well and regulators' awareness of consumer habits, behaviors, and wishes can improve through knowledge sharing. This information can assist enhance consumer trust in fintech platforms by educating regulatory agencies. Moreover, a successful AML/CFT program involves modern technology that may help a financial institution to better identify, assess, monitor, regulate, and report on money laundering/terrorism financing threats.

Following the 2008 Global Financial Crisis, regulatory changes and technological advancements are altering the structure of the financial system, services, and organizations (Arner et al., 2015). Fintechs have aided banks in meeting their obligation to prevent AML activity by enhancing KYC capabilities, identity validation, and thorough transaction monitoring, using machine learning models and artificial intelligence, and distributed ledger technologies (FATF, 2021; Gomber et al., 2018). These technologies help with the operational challenges that financial institutions face while dealing with their legacy system by eliminating the need for human labor in conventional regulatory and compliance procedures and also using artificial intelligence and deep learning technologies to generate warnings for exception management, which is followed by a further in-depth human investigation. With the costs of complying with AML/CFT regulations rising dramatically, having robust systems and technology allows institutions to streamline and automate firm-wide operations and to assure compliance with applicable laws globally, including fraudulent financial detection and reporting (Arner et al., 2016) and these assist to reduce the negative consequences of de-risking (Grima et al., 2020)

## **2.7 Theoretical Framework**

While there are several theories utilized in information systems research, our study is concerned with technology adoption. Technology theories that have been used in adoption research include the Technology, environment, and environment (TOE) framework (Tornatzky & Fleischer, 1990), Theory of task-technology fit (TTF) (Goodhue & Thompson, 1995), unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003), technology acceptance model (TAM) (Davis, 1989), diffusion of innovation theory (DOI) (Rogers, 1995), and theory of planned behavior (TPB) (Ajzen, 1991). However, our paper will focus on TOE and DOI because other models assess individual adoption whereas our study measures business adoption.

### 2.7.1 Diffusion of Innovation Theory

Oliveira and Martins (2011) define DOI as a concept that describes how, why, and at what pace novel ideas and technologies spread across civilizations, functioning at both the personal and organizational levels. Academics have proposed the concept of diffusion of innovation and it is now widely accepted with Rogers (1995) suggesting a five-stage approach for innovation adoption encompassing; Knowledge or awareness, Persuasion, Decision, Implementation, and Confirmation or adoption. When selecting whether to embrace or reject an innovation, an individual or organization goes through these five stages. For the adoption phase, Rogers (1995) argues that there are innovation attributes that can be used to investigate why certain ideas are successful while others fail to get widespread acceptance in organizations. There are five aspects of innovation that Rogers (2003) stated might account for up to 87 percent of innovation adoption: relative advantage; compatibility; complexity; trialability; and observability. The adoption of innovation is not under the authority of users in this research but rather lies with the organization's IT, Risk, and Compliance leadership. The relative advantage, compatibility, and complexity attributes from Rogers' DOI theory were taken on for the purpose of assimilation into the theoretical framework that was used for this research project. DOI was chosen as a basic theory for this study in part because of its ability to explain innovation adoption at the individual or organizational level, its relevance to a range of technical innovations, and prior research demonstrating its validity. Figure 2.1 shows the attributes identified in DOI theory.

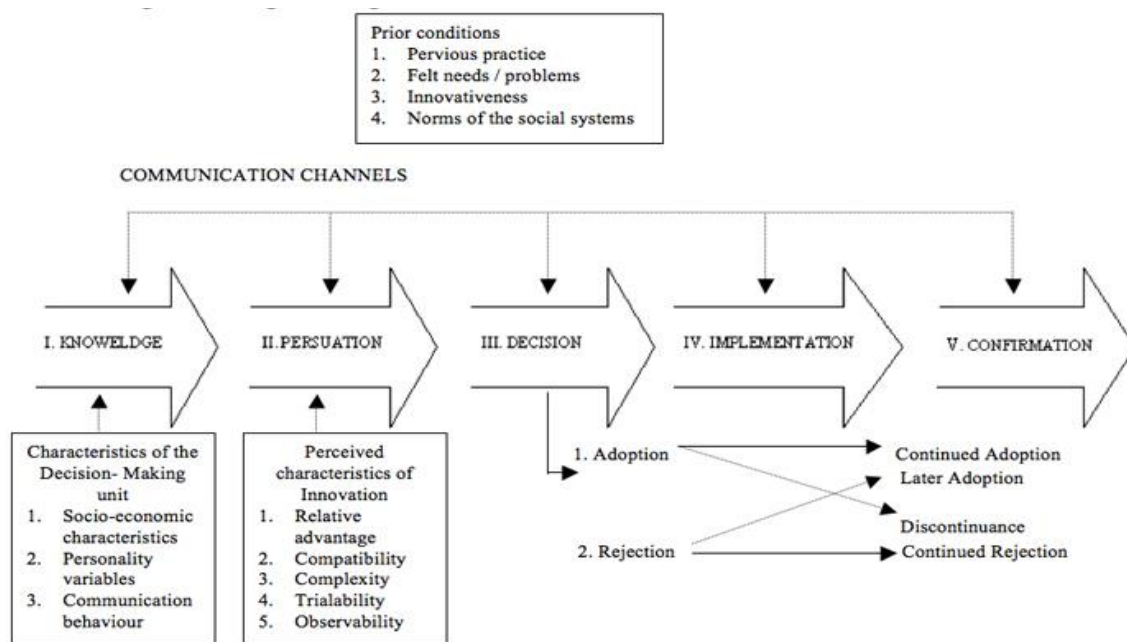


Figure 2. 1 DOI theory (Rogers, 2003)

### 2.7.2 Technology, Organization and Environmental Framework

TOE framework (Tornatzky & Fleischer, 1990) is an organization-level-based model used to test the adoption and integration of technologies in an organization as explained by Oliviera and Martins (2011). The framework presents three primary aspects for conducting an investigation into the factors that influence the rate at which an organization adopts new technology. The first factor to consider is the technological setting, which includes both the availability and characteristics of technology; Second, the organizational context includes the features of the organization that are internal to it, such as management, communication methods, and the size of the company; the third aspect is the environment that encompasses problems in the business world, often including competitors, regulators, and technology supporting infrastructure.

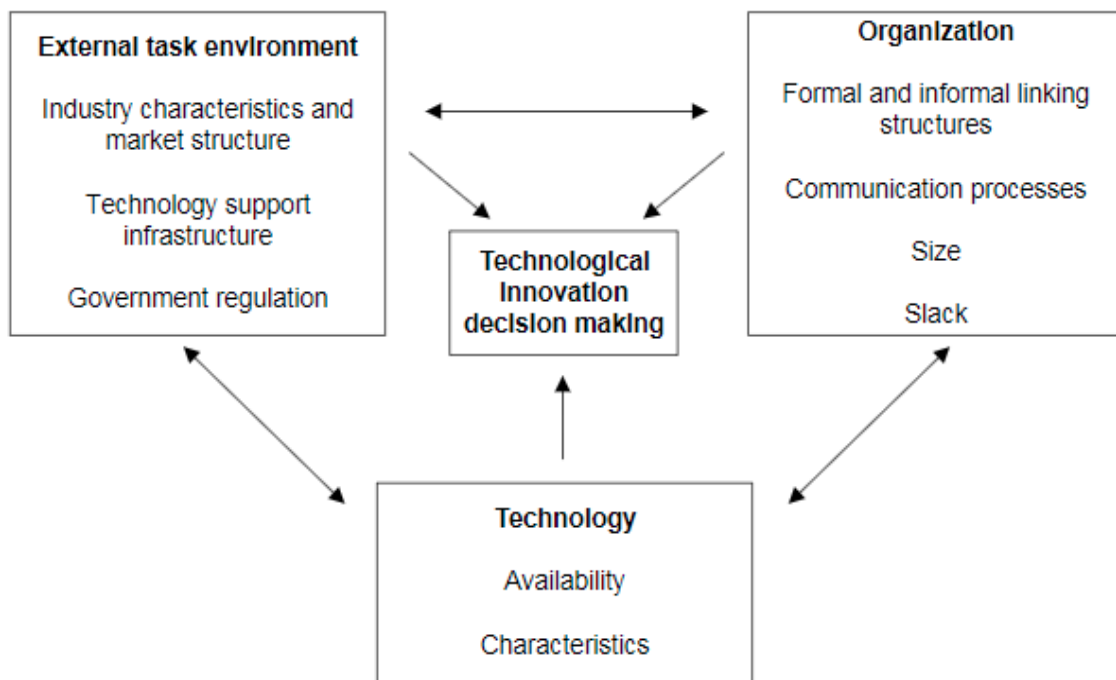


Figure 2. 2 TOE framework (Tornatzky & Fleischer, 1990)

From Literature, studies within the banking sector (Kulkarni & Patil, 2020; Malkawi & Mansour, 2015; Opoku et al., 2016) and different contexts seeking to evaluate adoption factors have adopted the TOE framework including ERP (Awa & Ojiabo, 2016), e-commerce (Duan et al., 2012), and cloud computing (Alshamaila et al., 2013). It has been established via past research that the TOE framework is extensively utilized in the study of the adoption of many new technologies and that it has been reliably demonstrated.

Oliviera and Martins (2011) elucidate that this model is compatible with Rogers's (1995) DOI theory, which highlighted personal traits as well as organization-wide internal and external factors as determinants of organizational innovativeness. Both are identical to the TOE framework's technological and organizational contexts, but the TOE framework additionally contains an additional and critical component called environment context.

Hoti (2015) combines the DOI and TOE models to create the elements in Figure 2.3 for a more comprehensive approach to examining the adoption factors.

<i>Technological</i>	
<b>1. Relative advantage</b>	Degree to which an innovation is perceived as being better than the idea it supersedes
<b>2. Compatibility</b>	Degree to which an innovation is perceived as consistent with existing values, past experiences and adopter needs
<b>3. Complexity</b>	Degree to which an innovation is perceived as relatively difficult to understand and use
<i>Organizational</i>	
<b>1. Top management support</b>	Support of the top management (CEO) to the IS adoption initiative
<b>2. Organizational readiness (size) cost/financial and technical resources)</b>	Comparing to large businesses small businesses face resource poverty and thus difficulties in innovation adaptation. Resource poverty manifests itself also in financial constraints and lack of professional expertise.
<b>3. Information intensity and product characteristics</b>	Degree to which information is present in the product or service of a business, reflects the level of information intensity of that product or service
<b>4. Managerial time</b>	Time required to plan and implement the new IS.
<i>Environmental</i>	
<b>1. Industry pressure (competition)</b>	Competition and high rivalry increases the likelihood of innovation adaptation for the purpose of gaining competitive advantage
<b>2. Government pressure/support</b>	Government strategies or initiatives that encourage SMEs to adopt new IS.
<b>3. Consumer readiness</b>	Lack of customer readiness influences the adoption process and is an inhibitor towards IS use

Figure 2. 3 Components of TOE framework (Hoti, 2015)

## 2.8 Conceptual Framework

The findings of a review of the literature and a phenomenological investigation were utilized to guide the development of the theoretical model that was employed in the research. The study adopted the DOI-TOE framework to develop and measure the relationship between variables by presenting the conceptualization of the link between fintech and its adoption for risk and compliance among commercial banks of Kenya. Since TOE takes into account technological, organizational, and environmental factors, it surpasses other adoption frameworks whenever it comes to studying the adoption of technology, the patterns, and value creation facilitated by technology (Gangwar et al., 2015). The DOI theory does not accommodate the environmental context in the adoption of technology, as such, the TOE framework can explain firm-level

innovation uptake better (Oliveira & Martins, 2011); hence, it is considered that this model is more comprehensive in this study. Additionally, The TOE paradigm is theoretically sound, empirically consistent, and has the potential to be used to study risk and compliant based fintech uptake. Hence the model is exhaustive, allowing for a holistic examination of the adoption phenomena and its effect on value chain operations (Gangwar et al., 2015).

This study included DOI to assess technological characteristics of fintech adoption due to the TOE's inability to give specificity to technological determinants connected to advances in ICT, as a result, it does not constitute a well-developed theoretical foundation (Gangwar et al., 2014). Additionally, TOE constructs, as argued by Awa and Ojiabo (2016), are suitable for large enterprises hence the TOE framework should be strengthened by incorporating it with other frameworks. Numerous studies have utilized this combined technique of \nd DOI and demonstrated a better degree of dependability and validity (Oliveira & Martins, 2011). Further, the researchers suggest that it is critical to incorporate more than one theoretical model to have a deeper understanding of the IT adoption phenomena, particularly for increasingly complicated new technologies. In this study, financial technologies that are examined involve emerging concepts, especially in the risk and compliance realm. In this study, the DOI-TOE framework is utilized in order to construct and validate an adoption model for risk and compliance-based financial technology in Kenya's banking industry. The study identified the variables as presented in Figure 2.4 to be used for the evaluation of fintech adoption.

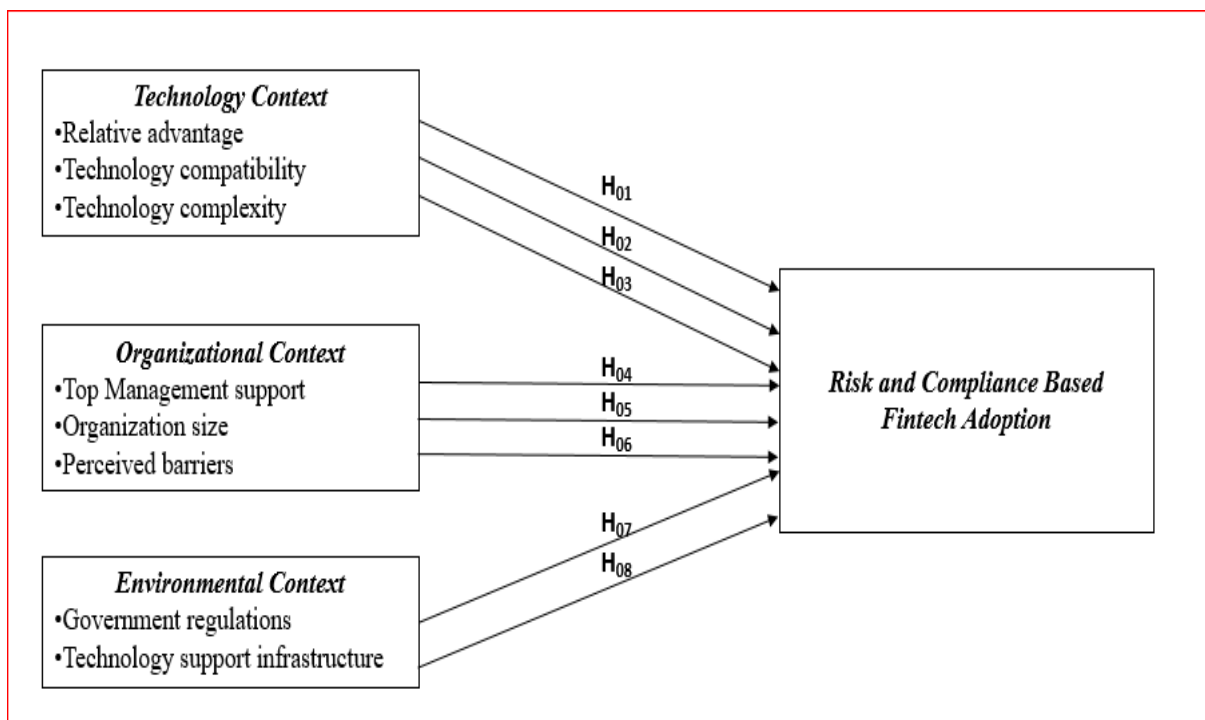


Figure 2. 4 Conceptual Model



## 2.9 Hypotheses

From the above model, the following null hypotheses are created.

*H<sub>01</sub> – The relative advantage has no significant effect on risk and compliance-based fintech adoption.*

*H<sub>02</sub> – Technology compatibility has no significant effect on risk and compliance-based fintech adoption.*

*H<sub>03</sub> – Technology complexity has no significant effect on risk and compliance-based fintech adoption.*

*H<sub>04</sub> – Top management support has no significant effect on risk and compliance-based fintech adoption.*

*H<sub>05</sub> – The organization size has no significant effect on risk and compliance-based fintech adoption.*

*H<sub>06</sub> – The perceived barriers have no significant effect on risk and compliance-based fintech adoption*

*H<sub>07</sub> – Government regulations have no significant effect on risk and compliance-based fintech adoption.*

*H<sub>08</sub> – Technology support infrastructure has no significant effect on risk and compliance-based fintech adoption.*

# CHAPTER 3

## RESEARCH METHODOLOGY

### 3.1 Research Philosophy

Saunders et al. (2009) elucidate that, the philosophy of research includes the basic premises on how the researcher perceives the external environment. For this study, the research philosophy to be used is positivism. Using the scientific approach, one may iteratively shape one's awareness. Positivist research involves formulating theories, generating hypotheses, putting those hypotheses to the test, documenting the outcomes, and then accepting, revising, or rejecting those theories based on the findings. The scientific method is a product of positivism. It is assumed that the world is structured and predictable and that it can be studied objectively using the scientific method (Oates et al., 2022).

### 3.2 Research Design

In their paper, Saunders et al. (2009) elucidate that when it comes to answering the research questions, the research design is the overarching approach that encompasses the process of obtaining and assessing the required data. It was necessary to select a research strategy and design that were in sync with the study's stated goals, objective, and research question. Research designs were evaluated to determine the best appropriate quantitative research design. Quantitative researchers can choose from three different types of study designs: relational or correlational, (a) descriptive, and (b) experimental (Haegele & Hodge, 2015). The chosen design should be able to fit in with the study's setting and address the research question and hypothesis. Therefore, for the investigation of the relationship between the study's dependent and independent variables, a quantitative correlational technique was found to be more suited for this study.

A quantitative technique was therefore best suited for this investigation, which had the goal of statistically analyzing numerical data obtained from Likert-scale replies to survey questions and drawing conclusions about financial institutions that have implemented risk and compliance-based fintech. A questionnaire instrument was used to provide statistical data for further investigation by sharing online with departmental heads of commercial banks. Using SPSS and SmartPLS 3, the researcher was able to conduct tests on these variables to establish whether there are any relationships.

### 3.3 Data Source

The population assisted in deciding whether the study's sampled cases are eligible or ineligible. The top management of the Information Technology, Risk, and Compliance Departments formed the sample for this study.

The study targeted commercial banks in Kenyan and the data sources were based on quantitative research methods through the application of quantitative techniques to collect primary data using questionnaires via surveys. The questionnaires employed online google forms due to the usability and efficiency in data collection. An assessment of agreement with several statements about the usage of risk and compliance-based fintech was given to those who responded. The questions were graded on a five-point Likert scale, with 1 denoting 'strongly disagree' and 5 denoting 'strongly agree'. The questionnaire was divided into two, with section one comprising of the organization details and respondents' understanding of the risk and compliance-based fintech while the other section comprised elements that influence the adoption of these financial technologies founded on the defined theoretical framework. Before administering the questionnaires, a pilot study was done to fine-tune the research tool. The questionnaire used for this study can be found in appendix 3.

### 3.4 Sample Size

Clustered sampling was used for the investigation, in which respondents were separated into sections or clusters; the first group consisted of the Head of ICT while the second group consisted of the Risk and Compliance Head. To arrive at reasonable sample size, the researcher used the slovins1960 formula with a 3% margin of error.

The following is how the researcher applied the below formula to obtain a feasible sample size for the purposes of conducting the research.

$$n = N / (1 + Ne^2).$$

Where;

- i. n = Number of samples
- ii. N = Study population
- iii. e = Error tolerance

$$n = 80 / (1 + 80(3/100)^2) = 74$$

Table 3. 1 Respondents

<b>Target Population</b>	<b>Institution</b>	<b>Total</b>
<b>ICT HOD</b>	Commercial Banks of Kenya	37
<b>Risk &amp; Compliance HOD</b>	Commercial Banks of Kenya	37
<b>Total</b>		74

### **3.5 Data Analysis**

This is defined as the process of generating conclusions from raw data (Wahyuni, 2012). For the purpose of this study, the researcher utilized binary logistic regression analysis to model the connection between the factors that were taken into consideration. The study's research model integrated technological, organizational, and environmental settings as essential factors in risk and compliance-based Fintech adoption. Adoption was treated as a binary variable, with non-adopter banks receiving a value of 1 and adopter banks receiving a value of 2. This inclusion of the three settings proposed eight predictors for risk and compliance-based Fintech adoption within Kenyan commercial banks.

It was hypothesized that these elements would have a direct impact on the adoption of risk and compliance-based Fintech technology by the banks. Data Cleansing was used to eliminate unclear components from collected data. Additionally, content analysis was also used to extract data from open-ended questions (items) that were quantified in a quantitative study while data coding was done to the quantitative data.

Using statistical programs, SPSS and SmartPILS 3, the researcher conducted tests on these variables to establish whether there are any relationships. For the presentation of the study's findings, both tables and figures containing an in-depth analysis of the data were offered.

### **3.6 Validity and Reliability**

For an instrument to be considered dependable, it must be capable of measuring a variable correctly and producing the same results over an extended period (Brown, 2001). Pilot tests were used by the researcher to assess the dependability of research tools by delivering them to an independent sample before the instruments were administered to the actual study sample and Cronbach's alpha was applied. The results indicated values above 0.7 which is the acceptable threshold for the reliability of the data.

Table 3. 2 Cronbach’s Alpha Analysis

<b>Variables</b>	<b>Cronbach’s Alpha</b>
Technology Context	0.810766046
Organization Context	0.758267985
Environment Context	0.927643785

Additionally, Cooper and Schindler (2014) emphasize the fact that the validity of the research instrument is what decides whether or not the instrument measures what it is designed to measure. To guarantee validity, the researcher made certain that the questionnaire's content supported the study's aims and that it assessed the actual variable that was supposed to be examined by the study. During the pilot testing phase, six respondents were utilized, and the questionnaire design was judged to be adequate for collecting data that would be beneficial in attaining the study aims.

### **3.7 Ethical Issues**

While conducting research, there are ethical issues when collecting and collecting data that were taken into consideration. Clearance for research instruments to be used was sought from relevant bodies before the data collection exercise commenced. During data cleaning, considering ethical considerations about anonymity and confidentiality, all material that may be used to identify practitioners or the case institutions they represent were removed. Participants' rights were protected in this study. The researcher ensured that the principle of voluntary participation was followed. The participants' informed consent was ensured by explaining the study's purpose and procedures and guaranteeing that only academic goals were pursued with the data collected.

## **CHAPTER 4**

### **RESULTS AND DISCUSSION**

#### **4.1 Response Rate**

The research examined 40 commercial banks in Kenya. The researcher sent questionnaires to bank respondents and out of the 74 surveys submitted to the targeted banks, 52 were submitted back, resulting in a response percentage of 70 percent, while 22 did not attempt to fill the questionnaire, resulting in a 30 percent non-response rate.

#### **4.2 Descriptive Statistics**

The results of the data analysis are shown in the following section.

##### **4.2.1 Participants Information**

71% of the bank respondents had a good knowledge of risk and compliance-based fintech, 13% knew all about risk and compliance-based fintech, 8% had some knowledge about it while the remaining 8% had only heard about it thus indicating a reliable sample of the respondents provided relevant responses. The respondents have also been involved in projects that implemented the financial technologies indicating experience in interacting with the study variable. Figure 4.1 indicates that 46% of the IT and Risk & Compliance Managers had been involved in these projects for between 1-3 years, 33% had 3-5 years' experience, 8% had greater than 5 years of experience while 13% had no experience on implementation of the technology.

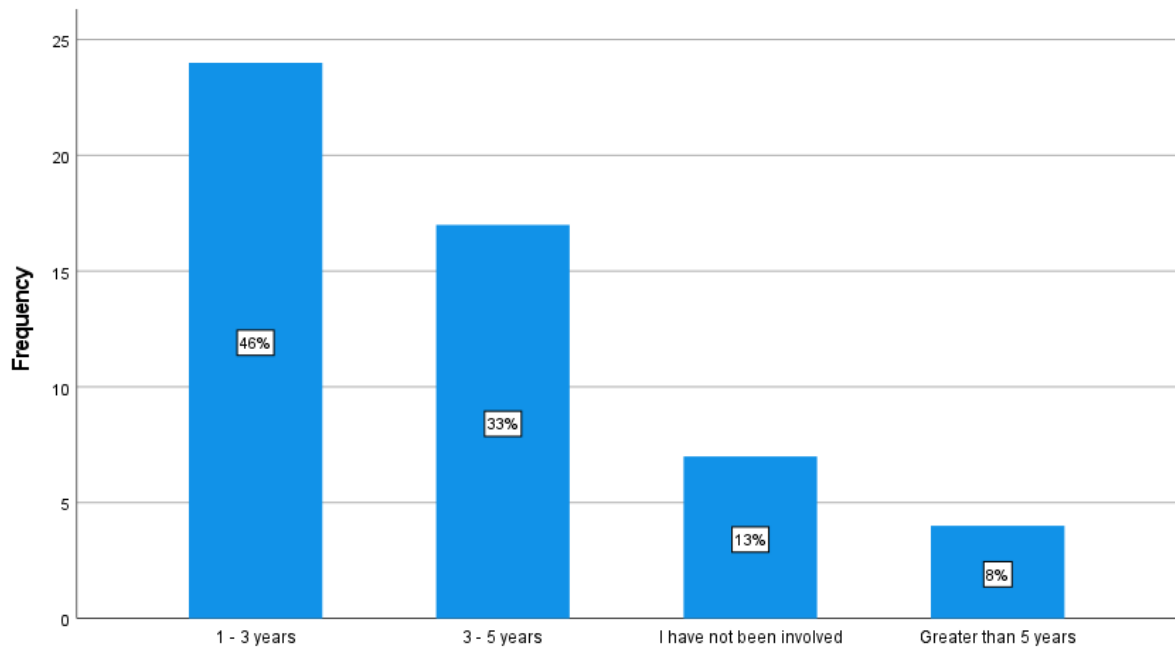


Figure 4. 1 Respondents Experience on Risk and Compliance-Based Fintech Projects

#### 4.2.2 Size of the Organization

Figure 4.4 shows the distribution of the size of the organization for the participants that responded to the survey. Analysis of the organization size indicated the highest percentage of organization size was between 1001-5000 employees (44%).

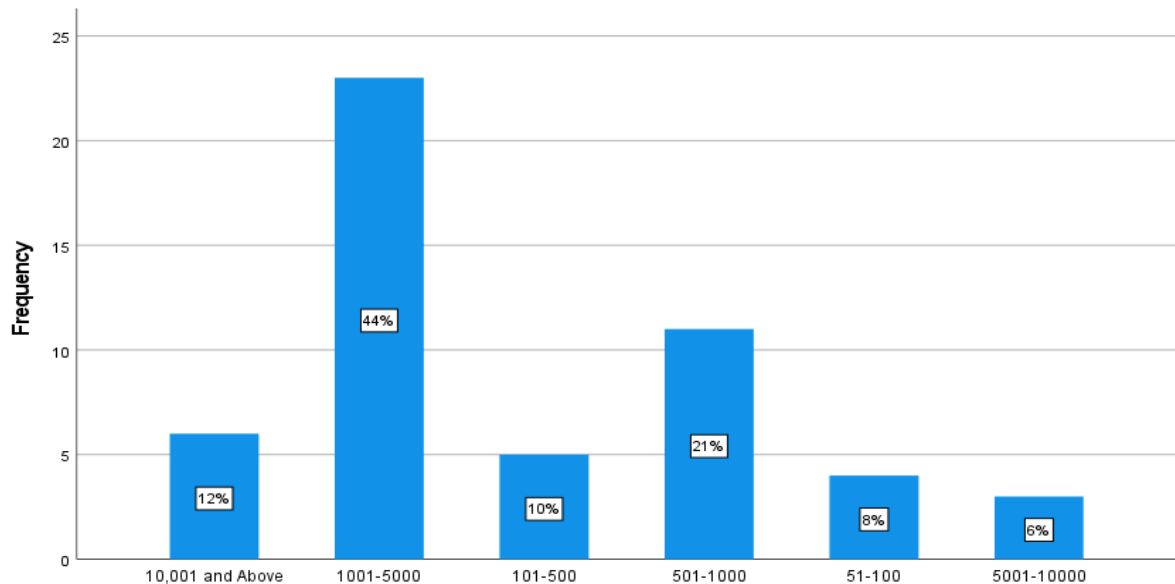


Figure 4. 2 Size of Organization

### 4.2.3 Risk and Compliance-based Fintech Adoption.

Moreover, these organizations have already implemented one or more financial technology to manage AML and CFT. Where 73.08 percent of the respondents indicated that they have it. Further, the spread of the type of technology the banks have implemented is shown in Table 4.1. Technologies such as artificial intelligence and machine learning, Client screening and matching, and big data have been widely adopted indicating the progress made in data science within the country and digital identity verification possibly due to government initiatives such as e-KYC. Blockchain has not been adopted to curb money laundering and terrorism financing and this supports the arguments of Suryono et al. (2020) that technological difficulties in blockchain adoption are security, scalability, and adaptability. Additionally, there are organizational challenges to adoption such as the acceptance and the requirement for new governance models. Finally, lack of legal and regulatory assistance is also cited as an environmental hurdle.

Table 4. 1 Technologies in FinTech implemented by banks for AML/CFT

<b>Big data</b>	<b>Count</b>	<b>16</b>
	Row Valid N %	30.8%
<b>Artificial intelligence and machine learning</b>	Count	29
	Row Valid N %	55.8%
<b>Robotics</b>	Count	4
	Row Valid N %	7.7%
<b>Digital identity verification</b>	Count	13
	Row Valid N %	25.0%
<b>Client screening and matching</b>	Count	17
	Row Valid N %	32.7%
<b>Blockchain</b>	Count	0
	Row Valid N %	0.0%

For the institutions that have not implemented any form of financial technology for the management of AML/CFT, Table 4.2 illustrates that the highest percentage of respondents indicated that there is an intention to adopt such technologies in the future (53.3%) representing eight institutions. Consequently, 46.7% of the respondent indicated that there is no intention to implement risk and compliance-based Fintech in their organization and this is due to lack of awareness and their organizations are too rigid and risk-averse to onboard fintechs to manage risk and compliance. The necessity for more public knowledge of Risk and Compliance-Based Fintech, as well as government, policy institutions, and regulator engagement to stimulate the adoption of Risk and Compliance-Based Fintech, is emphasized by this.



Table 4. 2 Intention to Adopt in the Future

		<b>N</b>	<b>Percent</b>
<b>Intention to adopt Fintech in the future</b>	Yes	8	53.3%
	No	7	46.7%
	Total	15	100.0%

Additionally, the institution that intends to adopt one form of Fintech for risk and compliance in the future will take more than 6 months for the majority of the institutions (66.7%) while the rest will take between 1 month - 3 months (22.2%) and 4 months - 6 months (11.1%) as illustrated in Table 4.3.

Table 4. 3 Timelines for Future Adoption

	<b>N</b>	<b>Percent</b>
1 month - 3 months	2	22.2%
4 months - 6 months	1	11.1%
More than 6 months	6	66.7%
<b>Total</b>	9	100.0%

#### **4.2.4 Influence of Risk and Compliance-based Adoption on AML/CFT.**

Figures presented in the Table 4.4 show that internal bank business operations have become more efficient because of the use of risk and compliance-based Fintech. The largest number of respondents (67.3%) had a positive conviction where they indicated that implementation of risk and compliance-based Fintech has enabled them to manage risks and comply with AML/CFT regulations. Similarly, 67.3% of the respondents agreed that risk and compliance-based Fintech has enabled them to onboard and manage high risk individuals and institutions. This signifies the importance that the institutions are placing on risk and compliance-based Fintech to increase identification and authentication when onboarding and performing transactions, thus increasing financial inclusion and combatting money laundering and other illegal financing activities.

Table 4. 4 Influence of Risk and Compliance-based Adoption

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>More-or-less agree</b>	<b>Agree</b>	<b>Strongly agree</b>
This risk and compliance-based Fintech model has enabled us to manage risks and comply with AML/CFT regulations.	1.9%	3.8%	26.9%	23.1%	44.2%
This risk and compliance-based Fintech has enabled us to onboard and manage high risk individuals and institutions. e.g. PEP Accounts, Forex Bureaus', Non-Residents	3.8%	7.7%	21.2%	28.8%	38.5%

### **4.3 Conceptual Framework**

Eight factors from the related literature were found in this analysis. Moreover, in this paper, a conceptual model was created. This model looked at risk and compliance-based fintech adoption at the company level. The study structure was based on a theoretical framework of Tornatzky and Fleischer's technology-organization-environment (TOE) (1990) and Oliveira and Martin's diffusion of innovation (DOI) (2011). The Likert scale was reduced to a three scale during analysis by grouping all the 'positive' and 'negative' answers together.

#### **4.3.1 Technology Factors and Risk and Compliance-based Fintech Adoption**

This section will focus on the study and discussion of technological variables that are related to the implementation of risk and compliance-based financial technology.

##### **4.3.1.1 Relative Advantage**

Adoption of risk and compliance-based Fintech was influenced by relative advantage the technology provided over other systems or controls. From Table 4.3, 61.6% of the respondents agreed that the risk and compliance-based fintech has enabled them to effectively detect and handle risks pertaining to money laundering and terrorist financing (ML & TF). The benefit of information accuracy offered by this fintech has enabled financial institutions to make use of a meaningful risk-based strategy in decision-making and collaboration for purposes of AML/CFT as indicated by the agreement of 61.5% of the respondents. The respondents (82.7%) further agreed that improved visibility for transaction monitoring has been enabled by risk and compliance-based Fintech. Moreover, it has assisted in making AML/CFT initiatives more efficient and successful as agreed by respondents (61.5%), and improved risk management capabilities (61.6%)

Table 4. 5 Relative Advantage

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>More-or-less agree</b>	<b>Agree</b>	<b>Strongly agree</b>
Risk and compliance-based fintech allows for AML/CFT management	15.4%	7.7%	15.4%	46.2%	15.4%
Risk and compliance-based fintech provides better information accuracy for better decision making and collaboration	7.7%	15.4%	15.4%	25.0%	36.5%
Risk and compliance-based fintech provides improved visibility of transactions that need to be monitored	11.5%	1.9%	3.8%	38.5%	44.2%
Risk and compliance-based fintech provides improved operational efficiency	7.7%	7.7%	23.1%	53.8%	7.7%
Risk and compliance-based fintech provides improved risk management against anti-money laundering (AML) and combating the financing of terrorism (CFT)	15.4%	7.7%	15.4%	38.5%	23.1%

#### 4.3.1.2 Technology Complexity

As highlighted in Table 4.4, respondents (50%) were in disagreement when asked about the risk and compliance-based fintech underlying technology was complex for employees, indicating the existence of skilled employees to take up implementation and management of this financial technology. Additionally, the respondents (53.8%, 63.5%, and 73%) disagreed with the complexity of integrating their current workforce to adopt this financial technology in their work practices, the inability to integrate with existing systems, and the inability to manage large data sets generated. As such, the organizations indicate the existence of a flexible workforce that can shift quickly to adopt the financial technology, the existence of skills to integrate to existing systems and the ability to process the data to give meaningful output concluding that technology complexity within banks does not obstruct adoption of risk and compliance-based Fintech.

Table 4. 6 Technology Complexity

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>More-or-less agree</b>	<b>Agree</b>	<b>Strongly agree</b>
The skills required to use risk and compliance-based fintech technology are too complex for employees	7.7%	42.3%	34.6%	11.5%	3.8%
Integrating risk and compliance-based fintech technology in current banking work practices is very difficult	25.0%	28.8%	23.1%	13.5%	9.6%
Integrating risk and compliance-based fintech systems with existing IT systems is very complex	11.5%	51.9%	21.2%	9.6%	5.8%
Massive amounts of data generated by risk and compliance-based fintech is very difficult to manage	19.2%	53.8%	5.8%	19.2%	1.9%

#### 4.3.1.3 Technology Compatibility

The highest number of respondents (61.5%) disagreed with the statement that their existing systems were not compatible with the risk and compliance-based Fintech and this was also supported by 63.5% of the respondents indicating the banks' previous experience with similar technology, did not pose a problem to adopt risk and compliance-based Fintech. This indicates the progress made because for many financial organizations, the integration of numerous disparate systems, such as legacy technology is one of the most challenging hurdles to overcome.

Table 4. 7 Technology Compatibility

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>More-or-less agree</b>	<b>Agree</b>	<b>Strongly agree</b>
Implementing the changes caused by risk and compliance-based fintech adoption is not compatible with most banking business approaches and objectives	17.3%	44.2%	7.7%	28.8%	1.9%
Risk and compliance-based fintech is not compatible with bank's experience with similar risk and compliance technology	15.4%	48.1%	21.2%	11.5%	3.8%

### 4.3.2 Organizational Factors and Risk and Compliance-based Fintech Adoption

This section will focus on the study and discussion of organizational variables that are related to the implementation of risk and compliance-based financial technology.

#### 4.3.2.1 Management Support

The respondents (67.3%) affirmed that their organization’s management supported the adoption of risk and compliance-based Fintech and also provided adequate resources for the financial technology (51.9%). Subsequently, the top management in these organizations was aware of the benefits provided by the implementation of this technology based on the affirmation from the respondents (59.6%). Conversely, the highest percentage of respondents (51.9%) were in agreement with their top management encouraging their employees to use this technology. This indicated that most organizations’ top management were supporting the implementation of risk and compliance-based Fintech in the management of AML/CFT for employees' daily tasks. Without the full backing of senior management, adopting technology is not in the best interest of a company.

Table 4. 8 Management Support

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>More-or-less agree</b>	<b>Agree</b>	<b>Strongly agree</b>
Top management enthusiastically supports the adoption of risk and compliance-based fintech	9.6%	1.9%	21.2%	53.8%	13.5%
Top management allocates adequate resources to adoption of risk and compliance-based fintech	5.8%	3.8%	38.5%	50.0%	1.9%
Top management is aware of the benefits from risk and compliance-based fintech	1.9%	15.4%	23.1%	15.4%	44.2%
Top management actively encourages employees to use risk and compliance-based fintech technology in their daily tasks	7.7%	7.7%	32.7%	28.8%	23.1%

#### 4.3.2.2 Organization Size

From Table 4.7, the highest percentage of respondents (51.9%) were in agreement that the size of the organization drives it to adopt risk and compliance-based Fintech. Additionally, 7.7% disagreed and 40.4% were neutral on the effect of this factor. Conversely, the largest number of adopters from the study indicate that size did not determine the adoption of risk and

compliance-based Fintech in the management of AML/CFT. Thereby, the size of the organization is less likely to inform whether an organization will adopt this financial technology.

Table 4. 9 Organization Size

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>More-or-less agree</b>	<b>Agree</b>	<b>Strongly agree</b>
Organization size positively influences risk and compliance-based fintech adoption in banking	1.9%	5.8%	40.4%	28.8%	23.1%

#### 4.3.2.3 Perceived Barriers

Respondents indicated that the uncertainty in the possible negative consequences of implementing this financial technology did not influence their adoption (38.5%) while the uncertainty in value derived did not also influence their decision to adopt this technology (53.8%). This indicated the awareness within these organizations on the risk and compliance-based Fintech. However, 59.6% of the respondents highlighted the existence of sophisticated database and transaction facilities in their organizations and this could be a blocker to adopting the technology.

Table 4. 10 Perceived Barriers

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>More-or-less agree</b>	<b>Agree</b>	<b>Strongly agree</b>
Uncertainty of possible negative consequence negatively influences risk and compliance-based fintech adoption in banking	5.8%	32.7%	28.8%	28.8%	3.8%
Uncertainty of value derived on investment in these technologies negatively influences risk and compliance-based fintech adoption in banking	7.7%	15.4%	53.8%	15.4%	7.7%
Most banks have a sophisticated database and transaction facility	1.9%	15.4%	23.1%	36.5%	23.1%

#### 4.3.3 Environmental Factors and Risk and Compliance-based Fintech Adoption

This section will focus on the study and discussion of technological variables that are related to the implementation of risk and compliance-based financial technology.

### 4.3.3.1 Government Regulations

The respondents with the highest percentage (61.5%) indicated that they disagreed with the statement that the government did not promote risk and compliance-based Fintech through a specific mandate. A good indication that the government was keen on promoting the adoption of this financial technology to improve risk management, improve monitoring and reduce possible errors due to human mistakes. The prevailing legal and regulatory framework has not been highlighted as the most significant impediment to the implementation of regulatory technology (40.4%). However, a lack of uniform regulatory requirements to govern Fintechs may constitute a barrier to the widespread adoption of risk and compliance-based Fintech as highlighted by the respondents (44.2%).

Table 4. 11 Government Regulations

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>More-or-less agree</b>	<b>Agree</b>	<b>Strongly agree</b>
Government legislations do not promote risk and compliance-based fintech adoption by banks through specific mandates	28.8%	32.7%	3.8%	23.1%	11.5%
Lack of an overarching FinTech-specific legal framework negatively influences risk and compliance-based fintech adoption in banking	11.5%	19.2%	28.8%	36.5%	3.8%
Government demonstrates commitment in promoting adoption of risk and compliance based fintech	15.4%	23.1%	17.3%	36.5%	7.7%

### 4.3.3.2 Technology Support

The majority of the respondents (67.3%) affirmed that having third-party providers to assist with technical support for effective use of risk and compliance-based Fintech promotes its adoption. Similarly, this is supported by agencies that provide training on how to use the technology and access to quality consultants (53.8% and 51.9% respectively)

Table 4. 12 Technology Support

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>More-or-less agree</b>	<b>Agree</b>	<b>Strongly agree</b>
There are third party service providers that provide technical support for effective use of risk and compliance-based fintech technology	15.4%	1.9%	15.4%	53.8%	13.5%
There are agencies who provide training for effective use of risk and compliance-based fintech	1.9%	21.2%	23.1%	38.5%	15.4%
Access to quality ICT consultants positively influences risk and compliance-based fintech adoption in banking	3.8%	13.5%	30.8%	38.5%	13.5%

#### **4.4 Inferential Statistics**

Inferential analysis was used to establish a link between the independent and dependent variables. Specifically, the focus of this paper concerns the link between the DOI-TOE characteristics and commercial banks' adoption of risk and compliance-based fintech solutions in Kenya. The study of binary logistic regression was carried out to better understand the relationship between the independent variables (a) relative advantage, (b) technology compatibility, (c) technology complexity, (d) management support, (e) organization size, (f) perceived barriers, (g) government regulations, (h) technology support, and dependent variable adoption of risk and compliance-based FinTech.

##### **4.4.1 Validity and Reliability Assessment**

The goal of quantitative research is to provide trustworthy and credible knowledge and evidence that can be used to make informed decisions. The procedures used to assure the study's validity and reliability are detailed in the following paragraphs.

###### **4.4.1.1 Reliability Analysis**

While reliability cannot be precisely calculated, it may be approximated using a variety of metrics (Roberts & Priest, 2006). To determine the internal consistency of the instrument, Cronbach's alpha coefficient was computed for each independent variable. A dependability score of 0.7 or above is considered to be acceptable for Cronbach's alpha coefficients. George and Mallery (2016), proposed rules for evaluating the dependability of an instrument. They proposed measures where >.9 indicates excellent, >.8 indicates good, >.7 indicates acceptable, >.6 indicates questionable, >.5 indicates poor, and .5 indicates unacceptable, the Cronbach's



alpha coefficient was computed and assessed. As a result, it was determined that all of the independent variables were adequately reliable.

Table 4. 13 Cronbach’s Alphas

<b>Research variable</b>	<b>No. of items</b>	<b>Cronbach’s alpha (<math>\alpha</math>)</b>
Technology Context	11	0.76
Organization Context	8	0.67
Environment Context	6	0.61
<b>Overall Reliability</b>	<b>25</b>	<b>0.81</b>

#### 4.4.1.2 Validity Analysis

The scales used in this study have measures of content validity connected with them because they were well-researched and created in the literature. A factor analysis was carried out to identify suitable drivers within each dimension, as well as to assess the applicability of the identified framework for risk and compliance-based fintech adoption in Kenyan commercial banks. Convergent validity was proven in Table 4.14 for two reasons: the AVE was more than 0.5 for every statement item and the CR values were above 0.7 for a dependable construct.

Table 4. 14 Data Set Convergent Validity

	<b>Composite Reliability</b>	<b>Average Variance Extracted (AVE)</b>
Relative Advantage	0.965	0.845
Technology Complexity	0.899	0.691
Technology Compatibility	0.955	0.913
Top Management Support	0.961	0.861
Organization Size	0.896	0.511
Perceived Barriers	0.907	0.830
Government Regulations	0.858	0.752
Technology Support	0.928	0.810

The square root of a construct's AVE must be greater than the square root of the inter-construct correlations in order for a construct to be considered discriminantly valid. As seen in Table 4.15, the diagonal elements indicate the square root of AVE, whereas the off-diagonal elements reflect the absolute correlations between constructs. The diagonal elements must be bigger than the off-diagonal elements in the corresponding rows and columns as an indication of adequate discriminant validity as presented by the results.

Table 4. 15 Date Set Discriminant Validity

	<b>Adoption</b>	<b>PB</b>	<b>TCX</b>	<b>GR</b>	<b>RA</b>	<b>TS</b>	<b>TMS</b>	<b>TC</b>	<b>OS</b>
<b>Adoption</b>	0.925								
<b>Perceived Barriers (PB)</b>	-0.377	0.911							
<b>Technology Complexity (TCX)</b>	-0.260	0.564	0.831						
<b>Government Regulations (GR)</b>	-0.300	0.436	0.611	0.867					
<b>Relative Advantage (RA)</b>	-0.018	-0.022	-0.296	0.124	0.919				
<b>Technology Support (TS)</b>	-0.223	0.173	0.534	0.372	-0.253	0.900			
<b>Top Management Support (TMS)</b>	0.063	-0.477	-0.125	-0.280	-0.063	0.419	0.928		
<b>Technology Compatibility (TC)</b>	-0.215	0.568	0.817	0.606	-0.279	0.300	-0.237	0.956	
<b>Organization Size (OS)</b>	-0.248	0.184	0.130	0.265	-0.007	-0.098	-0.277	0.227	0.715

#### 4.4.2 Assumptions of the model

To determine multicollinearity for the regression methodology, the composite scores for each of the eight components were determined, and the following two methods were used to do so:

- i. We recognized all condition indices (C.I.) greater than the 30 criteria.
- ii. After calculating the variance inflation factor (VIF), the results showed that it ranged from a low of 1.248 to a high of 6.239, with all values falling below the threshold of 10.

From Table 4.10, the results clearly showed that no severe problem of multicollinearity existed between the predictor factors (Hair et al., 1998).

Table 4. 16 Multicollinearity

	Collinearity Statistics		
	Tolerance	VIF	CI
<b>(Constant)</b>			1.000
<b>Relative Advantage</b>	0.801	1.248	5.061
<b>Technology Complexity</b>	0.262	3.823	7.674
<b>Technology Compatibility</b>	0.16	6.239	10.129
<b>Top Management Support</b>	0.552	1.813	11.128
<b>Organization Size</b>	0.398	2.515	15.848
<b>Perceived Barriers</b>	0.547	1.827	18.493
<b>Government Regulations</b>	0.455	2.2	21.268
<b>Technology Support</b>	0.342	2.923	25.505

a. Dependent Variable: Risk and Compliance-based Fintech Adoption

#### 4.4.3 The research model's goodness-of-fit.

Using Nagelkerke R Square, a pseudo-Pearson's coefficient of correlation, the researchers were able to assess the strength of the logistic regression model that incorporated factors like Technological, Organizational, and Environmental that influence the adoption of risk and compliance-based Fintech adoption. Table 4.11 shows the results.

Nagelkerke's  $R^2$  was 0.399, which indicates that the independent variables (technological, organizational, and environmental factors) can explain 40% of the dependent variable (risk and compliance-based Fintech adoption). Some variances are not explained by the model in 60% of the instances. This implies that risk and compliance-based Fintech adoption in commercial banks in Kenya are not solely driven by the DOI and TOE model, but by additional factors that have not been accounted for in the model. This provides a foundation for further investigation. Additionally, this study was a descriptive survey, and the ideas utilized to investigate the association between the DOI, and TOE characteristics and risk and compliance-based Fintech adoption were based on a theoretical framework.

Table 4. 17 Model Summary

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
<b>1</b>	50.317a	.292	.399

#### 4.4.4 Goodness of Fit using Hosmer & Lemeshow Test

To test the hypothesis that the model's predictions are completely compatible with observed group memberships, the researcher utilized this method. To compare the observed and expected frequencies, a chi-square statistic must be computed. No statistical significance in the chi-square indicates a good model fit for such dataset.

We can infer that the null hypothesis was not rejected since the Chi-square value of 0.968 with a degree of freedom of 8 has a significance value of .998, which is significantly greater than the 5 percent significance level (Table 4.14). As a consequence, there is no disparity between observed and model-predicted values, indicating that the model's projections are accurate. However, this does not suggest that the model accounts for a big percentage of the variance in the dependent variable; rather, it demonstrates that the model's contribution to the variance, regardless of how little or large, is statistically significant.

Table 4. 18 Hosmer & Lemeshow Test

Hosmer and Lemeshow Test			
Step	Chi-square	df	Sig.
1	.968	8	.998

#### 4.4.5 Hypothesis Testing

To evaluate the study's hypotheses, binary logistic regression analysis was applied. The significance level (alpha-level) was set at 0.05 in this study. Also, it is generally agreed that the probability value (p-value) from the inferential statistical tests is the deciding factor in invalidating the null hypothesis (Creswell, 2009). An alpha level p-value of less than 0.05 suggests that the null hypothesis should be rejected in favor of the alternative hypothesis. An alternate interpretation is that the alternative hypothesis was not accepted, but the null hypothesis was not rejected by a p-value larger than alpha.

The study hypothesized that.

Null Hypothesis: *The relative advantage has no significant effect on risk and compliance-based fintech adoption.*

Alternative Hypothesis: *The relative advantage has a significant effect on risk and compliance-based fintech adoption.*

Null Hypothesis: *Technology compatibility has no significant effect on risk and compliance-based fintech adoption.*

Alternative Hypothesis: *Technology compatibility has a significant effect on risk and compliance-based fintech adoption.*

Null Hypothesis: *Technology complexity has no significant effect on risk and compliance-based fintech adoption.*

Alternative Hypothesis: *Technology complexity has a significant effect on risk and compliance-based fintech adoption.*

Null Hypothesis: *Top management support has no significant effect on risk and compliance-based fintech adoption.*

Alternative Hypothesis: *Top management support has a significant effect on risk and compliance-based fintech adoption.*

Null Hypothesis: *The organization size has no significant effect on risk and compliance-based fintech adoption.*

Alternative Hypothesis: *The organization size has a significant effect on risk and compliance-based fintech adoption.*

Null Hypothesis: *The perceived barriers have no significant effect on risk and compliance-based fintech adoption.*

Alternative Hypothesis: *The perceived barriers have a significant effect on risk and compliance-based fintech adoption.*

Null Hypothesis: *Government regulations have no significant effect on risk and compliance-based fintech adoption.*

Alternative Hypothesis: *Government regulations have a significant effect on risk and compliance-based fintech adoption.*

Null Hypothesis: *Technology support infrastructure has no significant effect on risk and compliance-based fintech adoption.*

Alternative Hypothesis: *Technology support infrastructure has a significant effect on risk and compliance-based fintech adoption.*

With a 95% confidence level, the aforementioned hypotheses about technology, environment, and organizational context and the adoption of risk and compliance-based Fintech were

assessed using a binary logistic regression model. To assess the link between predictor parameters and the adoption of risk and compliance-based financial technology, this test was conducted. In terms of overall discriminating power, the results of the study also demonstrate that the logistic regression model has a prediction accuracy of 71.2 percent (Table 4.16). Table 4.15 displays the findings obtained from the application of the logistic regression analysis to this research project. The study's hypotheses were evaluated with the Wald test, and the sample's characteristics were inferred using the results of a Logistic Regression. The researcher failed to reject the null hypothesis if the p-value was more than 0.05, according to the rejection criterion.

For the Technology variables, the findings of the study failed to reject the null hypotheses for relative advantage and technology complexity with p-values of  $0.458 > 0.05$  and  $0.078 > 0.05$  respectively, indicating that these two variables do not significantly impact the adoption of risk and compliance-based Fintech. Conversely, technology compatibility had a p-value of  $0.034 < 0.05$ , indicating they significantly impact the adoption of risk and compliance-based Fintech in commercial banks for Kenya. Organizational factors (top management support, organization size) had p-values of  $0.364 > 0.05$  and  $0.486 > 0.05$ , because it failed to show a significant influence on adoption of risk and compliance-based Fintech in Kenyan commercial banks, this study failed to reject the null hypothesis for both variables. Perceived barriers, however, had p-values of  $0.013 < 0.05$  thus implying the effect on adoption of risk and compliance-based Fintech was significant.

Also, government regulations had a p-value of  $0.033 < 0.05$ , indicating the study rejected the null hypothesis since it significantly influences the adoption of risk and compliance-based Fintech. Contrariwise, with a p-value of  $0.367 > 0.05$ , the study failed to reject the null hypothesis for technology support, hence the conclusion that this factor does not significantly impact the adoption of risk and compliance-based Fintech in commercial banks of Kenya.

Table 4. 19 Binary Logistic Regression Analysis Results

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for		Result
							EXP(B)		
							Lower	Upper	
<b>Relative Advantage</b>	0.394	0.53	0.552	1	0.458	1.483	0.525	4.191	Fail to Reject
<b>Technology Complexity</b>	-2.06	1.167	3.116	1	0.078	0.127	0.013	1.255	Fail to Reject
<b>Technology Compatibility</b>	3.535	1.669	4.486	1	0.034	34.296	1.302	903.33	Reject
<b>Top Management Support</b>	-0.885	0.975	0.825	1	0.364	0.413	0.061	2.788	Fail to Reject
<b>Organization Size</b>	-0.562	0.807	0.485	1	0.486	0.57	0.117	2.773	Fail to Reject
<b>Perceived Barriers</b>	-2.54	1.027	6.117	1	0.013	0.079	0.011	0.59	Reject
<b>Government Regulations</b>	-2.528	1.184	4.557	1	0.033	0.08	0.008	0.813	Reject
<b>Technology Support</b>	0.958	1.062	0.814	1	0.367	2.607	0.325	20.902	Fail to Reject
<b>Constant</b>	9.769	4.56	4.589	1	0.032	17486			

Table 4. 20 Model Classification

<b>Classification Table</b>					
		<b>Predicted</b>			<b>Percentage Correct</b>
		<b>Adoption</b>			
<b>Observed</b>		<b>No</b>	<b>Yes</b>		
<b>Step 1</b>	<b>Adoption</b>	<b>No</b>	10	9	52.6
		<b>Yes</b>	6	27	81.8
<b>Overall Percentage</b>					71.2

**a. The cut value is .500**

Table 4.15 further shows the beta values for (a) relative advantage, (b) technology complexity, (c) technology compatibility, (d) top management support, (e) organization size, (f) perceived barriers, (g) government regulations, (h) technology support. Risk and compliance-based Fintech adoption is positively or negatively influenced by the sign of the regression coefficient (β).

Hence, the results can claim that:

- i. Relative advantage, technology compatibility, and technology support were positively related to the bank’s likelihood to adopt risk and compliance-based Fintech; and

- ii. Technology complexity, top management support, organization size, perceived barriers, and government regulations were negatively related to the bank's adoption of risk and compliance-based Fintech.

Using the odds-based interpretation of a logistic function the results indicate that:

- i. A marginal change in relative advantage leads to a change in odds of adopting risk and compliance-based Fintech by a factor of 1.483 keeping other variables constant.
- ii. A marginal change in technology complexity leads to a change in odds of adopting risk and compliance-based Fintech by a factor of 0.127 keeping other variables constant.
- iii. A marginal change in technology compatibility leads to a change in odds of adopting risk and compliance-based Fintech by a factor of 34.296 keeping other variables constant.
- iv. A marginal change in top management support leads to a change in odds of adopting risk and compliance-based Fintech by a factor of 0.413 keeping other variables constant.
- v. A marginal change in organization size leads to a change in odds of adopting risk and compliance-based Fintech by a factor of 0.57 keeping other variables constant.
- vi. A marginal change in perceived barriers leads to a change in odds of adopting risk and compliance-based Fintech by a factor of 0.079 keeping other variables constant.
- vii. A marginal change in government regulations leads to a change in odds of adopting risk and compliance-based Fintech by a factor of 0.08 keeping other variables constant.
- viii. A marginal change in technology support leads to a change in odds of adopting risk and compliance-based Fintech by a factor of 2.607 keeping other variables constant.

p-values were utilized to assess the statistical significance of the correlation between the study variables. P-values less than 0.05 were recommended since they demonstrate strong confidence in the findings. It is conceivable to draw the conclusion that these tests are inconsistent with our hypotheses and that there is no statistically significant association between any of the five variables and the adoption of risk and compliance-based Fintech in commercial banks of Kenya because the p-values for relative advantage, technology complexity, top management support, organization size, and technology support were all greater than 0.05. However, technology compatibility, perceived barriers, and government regulations had p-values less than 0.05 hence presenting a statistically significant association between the 3 variables and adoption of risk and compliance-based Fintech.



A one-unit increment in relative advantage would result in a 0.394 percent increase in the adoption of risk and compliance-based Fintech in selected hospitals in commercial banks of Kenya, assuming all other factors remain constant. On the contrary, a unit increment in technology complexity would lead to a 2.06 percent decrease in the adoption of risk and compliance-based Fintech, while a unit increment in technology compatibility, would lead to a 3.535 increase in the adoption of risk and compliance-based Fintech when holding other factors constant. Top management support, organization size, perceived barriers, and government regulations unit increment would lead to a 0.885, 0.562, 2.54, and 2.528 percent respectively decrease in the adoption of risk and compliance-based Fintech if other factors remain constant. Lastly, a unit increment in technology support would result in a 0.958 percent increase in the adoption of risk and compliance-based Fintech in commercial banks of Kenya, assuming all other factors remain constant.

## **4.5 Discussion**

### **4.5.1 Technology Context**

Unexpectedly, the study found that the adoption of risk and compliance-based Fintech in commercial banks of Kenya was not significantly influenced by relative advantage and technology complexity elements. The technology compatibility factor was, however, a significant element in influencing the adoption of risk and compliance-based Fintech. This suggests that the deployment of risk and compliance-based Fintech was affected by technology compatibility. Fintech adoption in Kenya's commercial banks is positively correlated with relative advantage, per the study findings. That is, as the value of relative advantage grows, the use of risk and compliance-based Fintechs increases, and the reverse is true.

Innovation technology acceptance and expansion is encouraged when employees understand the new system's relative benefits in improving job efficiency, which can lead to improved motivation for innovation technology adoption and growth. Relative advantage tends to be a significant factor to support the adoption of technology-based on other DOI-TOE studies done on different participants for varied information systems and varying business sizes (Ilin et al., 2017; Oliveira et al., 2014; Wang & Wang, 2016). This is inconsistent with our findings where our tests are inconsistent with our hypothesis. It did, however, corroborate the findings of Puklavec, Oliveira, and Popovič (2018), who concluded that there was no association between the predictor variable relative advantage and the intention to adopt technological innovations. It is possible that the respondents in this survey were already aware of the value of risk and compliance-based Fintech, such as improved monitoring and sampling capabilities, a reduction

in human error and improved risk management. As a result, the apparent proportional advantage that the risk and compliance-based Fintech provides to commercial banks of Kenya may have been diminished. We may presume that non-adopting banks' prospective adoption of risk and compliance-based Fintech is hampered by other constraints since they realize its benefits. The results for relative advantage are equivocal based on previous studies, therefore, further research is required before reaching more certain conclusions.

Similarly, the study results established that technology complexity does not significantly influence the adoption of risk and compliance-based Fintech in commercial banks of Kenya which is contrary to past research (AlBar & Hoque, 2017; Wang & Wang, 2016). Additionally, technology complexity exhibits a negative correlation with the adoption of risk and compliance-based Fintech. Due to complexity, some people have reservations about the execution of new technology, and as a result, the likelihood of acceptance is reduced.

When new technology is recognized as being compatible with work application systems, businesses are more inclined to explore using it. Following that, our findings typically corroborate those of the previous study, that there exists a significant positive correlation between technology compatibility and adoption of technology-related systems (Alkhalil et al., 2017; Wang & Wang, 2016). This is in contrast to earlier studies on information technology adoption, which revealed that complexity did not have a substantial impact on technology adoption (AlBar & Hoque, 2017; Oliveira et al., 2014). Because the results for compatibility are inconsistent when compared to other studies, further study is required before more certain conclusions can be reached.

#### **4.5.2 Organizational Context**

Prior research indicates that organizational factors or firm characteristics are critical in driving the adoption of technology adoption (Chiu et al., 2017; Ilin et al., 2017; Oliveira et al., 2014; Puklavec et al., 2018). In this study, the results indicate an insignificant relation between top management support and adoption of risk and compliance-based Fintech within commercial banks of Kenya. This contradicts the arguments of the mentioned studies that showed evidence of top management support as a significant factor. One probable factor might be a lack of knowledge of the risk and compliance-based Fintech for management of AML/CFT at the top levels of management. To determine how successful this technology develops and provides critical advantages to their organizations, the majority of bank executives choose to "wait and watch."

New technology are likely to be adopted more quickly by larger organizations since they have more resources. Organization size has no significant impact on Fintech adoption based on the findings of this study, which is unexpected. Chiu et al. (2017) and Ilin et al. (2017), discovered that an organization's size was not a significant driver of technology adoption hence corroborating the findings of this study. This discovery conflicts with the findings of earlier investigations (Oliveira et al., 2014). Results show that perceived barriers were the least negatively influential factors of adoption. Figure 4.2 indicates that 44 percent of participants worked for companies with 1001 to 5000 employees. Additionally, the study results on the variations on the adoption of risk and compliance-based Fintech between different organization sizes show that it does significantly differ as a function of adoption. One probable reason for the findings of this study is that commercial banks in Kenya, regardless of their size, have sufficient expertise and resources in place to deploy risk and compliance-based Fintech for the management of AML/CFT. The results for organization size are equivocal based on previous studies, therefore, further research is required before reaching more certain conclusions.

From the study findings, although perceived barriers had a negative effect on adoption, there exists a statistically significant association between perceived barriers and the adoption of risk and compliance-based Fintech. From study results, respondents indicated that uncertainty about the potential negative consequences of implementing this financial technology did not influence their decision to adopt it, and that uncertainty about the value derived from implementing this financial technology did not influence their decision to adopt it either. This demonstrated that these firms were aware of the value and potential disadvantages associated with risk and compliance-based Fintech.

### **4.5.3 Environmental Context**

Government regulation has the potential to either encourage or impede the adoption of new technologies. The respondents indicated that a lack of uniform regulatory requirements to govern fintechs may constitute a barrier to the widespread adoption of risk and compliance-based Fintech. The results from the study also show that government regulations influenced the adoption of risk and compliance-based Fintech significantly. AlBar and Hoque (2017) and Alkhalil et al. (2017) reported similar findings. The findings are inconsistent with those of studies conducted by Haberli Jr et al. (2017), who discovered that government regulations was an insignificant factor in the adoption of IS. Respondents also cited government policies such as Proceeds of Crime and Anti-Money Laundering Regulations that do not actively promote fintech used for AML and CFT management. They however confirmed the importance of the

National Payments System (NPS) Vision and Strategy in its role to support risk and compliance-based Fintech. More active support for new technologies from supervisors and the FATF would aid in addressing the lingering risk and trust issues voiced by regulated businesses.

Finally, technology support was found to be insignificant in influencing the adoption of risk and compliance-based Fintech by commercial banks in Kenya. There however exists a positive correlation between the two. The findings of this study are congruent with those of Puklavec et al. (2018). The study results are, however, inconsistent with other previous studies by Chen et al. (2021) where they found technology support by vendors to be a significant factor to influence technology adoption. Further, they emphasize that companies should collaborate with technology providers and partners to adopt the technology.

## CHAPTER 5

### CONCLUSION AND RECOMMENDATIONS

#### 5.1 Summary of Findings

Conclusions are offered in this chapter considering the hypotheses and the overall goal of the study. A quantitative, correlational study was done to explore the link between the Bank's leadership opinion on (a) relative advantage, (b) technology compatibility, (c) technology complexity, (d) management support, (e) organization size, (f) perceived barriers, (g) government regulations, (h) technology support on the adoption of risk and compliance-based Fintech. To test the hypotheses generated in this study, SPSS was used to perform descriptive statistics and binary logistics regression while SmartPLS 3 was used to determine the validity of the model. Risk and compliance-based Fintech adoption were determined by the Hosmer and Lemeshow test to be adequately explained by the model's strength in describing the dependent variable. A total of 40% of the dependent variable was found to be explained by the independent variables, according to the findings.

***Objective 1: To examine the application of fintech for risk and compliance in commercial banks of Kenya.***

The study findings indicate that Kenyan banks have leveraged various types of risk and compliance-based Fintech to manage AML and CFT. From Table 4.1, the respondents' feedback shows that artificial intelligence and machine learning, Client screening and matching, Digital identity verification, and big data have been widely adopted with robotics being the least adopted. This demonstrates dedication, readiness, and support for the adoption of risk and compliance-based Fintech and new technologies. The findings, however, indicate the use of blockchain technologies for the management of financial crimes is still not accepted within the industry.

***Objective 2: To establish perceived barriers and drivers to adopting fintech for risk and compliance among commercial banks of Kenya.***

Technology, organization, and environment each had a factor that influenced the adoption of risk and compliance-based fintech with technology compatibility driving the adoption while government regulations and internally perceived barriers negatively affected the adoption. The lack of government support in developing regulations around fintech to promote its role in the financial industry is an impediment that the respondents highlighted.

**Objective 3: To analyze the influence of fintech adoption on risk management in commercial banks of Kenya.**

The respondents confirmed that the application of risk and compliance-based Fintech has resulted in increased efficiency in internal bank business processes. They expressed positive conviction, indicating that the application of risk and compliance-based Fintech has helped them to manage risks and comply with anti-money laundering and counter-terrorist financing requirements. Similarly, the respondents stated that risk and compliance-based Fintech has made it possible for them to enroll and manage high-risk persons and organizations. This demonstrates the importance that financial institutions place on risk and compliance-based Fintech to increase identification and authentication when onboarding and performing transactions, thereby increasing financial inclusion and combating money laundering and other illegal financing activities. This ultimately translates to fewer de-risking measures since the banks can efficiently manage high-risk individuals and institutions without compromising financial inclusion.

**Objective 4: To establish the suitability of the proposed framework to measure the adoption of fintech for risk and compliance in commercial banks of Kenya.**

Three factors were found to significantly influence the decision to adopt risk and compliance-based Fintech. Hence, this study's measurement model proved the necessary sturdiness to examine the link between the dependent variable and the independent variables. The adoption of risk and compliance-based Fintech is driven by technology, organization and environmental factors and the resulting model is represented in Figure 5.1.

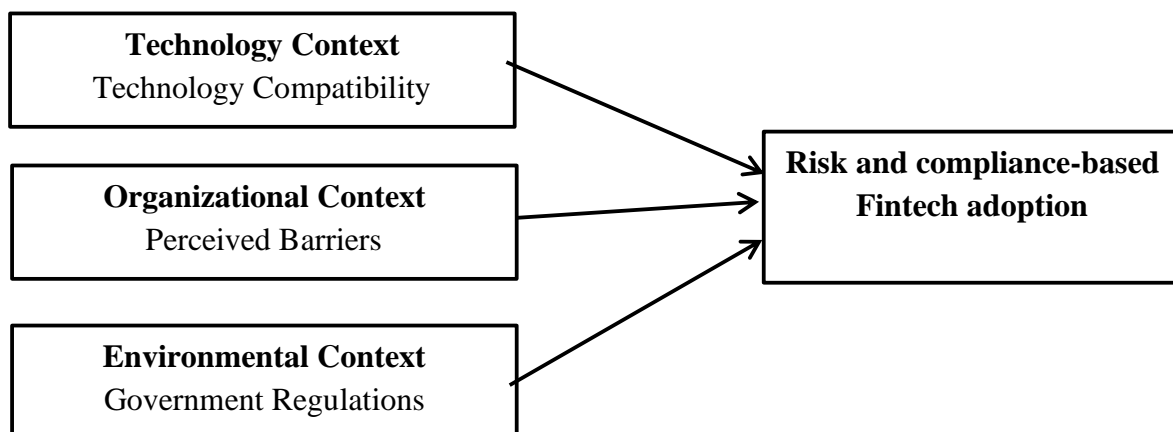


Figure 5.1 Adoption Model for Risk and Compliance-Based Fintech

## **5.2 Conclusion**

The perpetual evolution of new technologies and techniques of technological adaptation necessitates the continual need to better comprehend the organizational adoption of technological innovation. Several financial technologies have been used to manage risk and compliance inside banks, with the findings indicating that artificial intelligence and machine learning are the most extensively used technology in this sector. In the case of institutions that have not yet implemented any type of financial technology for the management of anti-money laundering and counter-terrorist financing, express a readiness to deploy such innovations in the next months. Adoption was influenced by increased compatibility of the financial technologies for AML and CFT management with existing business systems and processes whereas else lack of clear regulatory guidelines and government support coupled with perceived barriers negatively influenced adoption. Researchers, ICT managers, risk and compliance managers, policymakers, regulatory authorities, and other governing bodies may find the results presented in this study useful in illustrating the current state of research in this area as well as developing better strategies and frameworks for the adoption of new risk- and compliance-based fintech in financial institutions.

While this study contributes to the growing body of knowledge in the scientific subject of risk- and compliance-based fintech in financial institutions, several limitations should be acknowledged. Adopters and non-users are defined by using the logistic regression approach in this study. Only one relationship between the independent and dependent variables is considered in this strategy. As a result, this study did not examine the link between the independent factors, control variables, or moderators. Studies in the future will be able to look at a variety of different impacts and connections at once. Fintech adoption risk and compliance could not be adequately assessed using the framework in this study. As a solution to this constraint, future studies should consider that, for more complicated new technology adoption, a different theoretical model should be used.

## **5.3 Study Contribution**

The findings of this study have made significant contributions to both research and practice, as well as to policy. This research contributes to the existing body of literature on risk and compliance-based fintech by validating and analyzing the DOI-TOE framework in the context of a developing nation. This study helps professionals in the field by pointing out important things about risk and compliance-based fintech adoption. Organizations who use technology that helps them manage risks and meet regulations have a basic understanding of the

determinants, which may not have been available to organizations in developing countries before. There are factors that must be taken into consideration when companies want to use risk and compliance-based technologies in emerging nations. These are Technology Compatibility, Perceived Barriers, and Government Regulations. Additionally, it draws the importance of the financial technology in managing AML and CFT hence resulting to reduced de-risking measures applied by financial institutions. On policy contribution, fintech adoption is expected to be boosted by policies that support the use of risk and compliance-based financial technology. Fintech's risk and compliance-based agenda will be promoted by the enabling environment, which includes laws, ICT infrastructure, and regulations.

### **5.1 Recommendations and Further Work**

The anti-money laundering and countering the financing of terrorism (AML/CFT) protocols utilized by Kenya's commercial banks have the potential to be significantly strengthened by the technologies described in this research. It is important for policymakers and regulators to evaluate how they might engage with the financial institutions and support the use of these technologies. This study also emphasizes the significance of proper regulatory oversight in the form of regulations that promote risk and compliance-based fintech, as present laws are perceived as falling behind technical advancements. Common risk and compliance-based Fintech solutions, such as shared utilities, should be developed by central banks in conjunction with other regulators within the same jurisdiction to speed data collection and storage, standardize solutions, and spread high up-front costs. External bodies such as the World Bank should be at the forefront of advising the government bodies that regulate the financial sector on proper and efficient ways to adopt AML and CFT detection and management techniques using modern and complex technologies. Additionally, they should partner with local banks to offer their extensive experience from other jurisdictions on how these technologies have been implemented, what worked and the lessons learned while implementing them. This would support the local financial institutions to overcome the problem of perceived barriers and find better ways of approaching the implementation of such risk-based financial technologies while at the same time promoting financial inclusion. Data pooling from different financial institutions is a key enabler of data sharing for machine learning and data analytics and to ensure resources are optimized instead of relying on a single source of data to perform screening while onboarding customers. To centralize and handle data at scale, this solution should take advantage of cloud capabilities hence financial regulations should review and include ways to adopt cloud technology as a means to support the financial technologies,



especially with the advent of cloud companies setting up local data centers in Kenya. This should be approached while ensuring data integrity. To encourage innovation around regulations, the Central Bank of Kenya should interact with the public and academia through events such as hackathons to promote ideation and pilot programs for innovative AML and CFT approaches. Lastly, the ability to integrate the AML and CFT detection and management financial technologies with existing platforms in financial institutions should be a key consideration while procuring their internal systems to provide a seamless experience when a new technology is introduced. Also, it creates an opportunity for the financial regulatory and governing bodies to easily plug in their systems for live monitoring and quick action in case of non-compliance

Future empirical studies can be directed at strengthening the generalizability of the study findings by exploring the current research framework in a larger population spread over a broader geographical region. Cross-country comparisons might further confirm the overall findings of this study or possibly point to some novel occurrences.

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# APPENDICES

## APPENDIX 1: NCST RESEARCH AUTHORIZATION

 REPUBLIC OF KENYA	 <b>NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY &amp; INNOVATION</b>
Ref No: <b>611775</b>	Date of Issue: <b>01/October/2021</b>
<b>RESEARCH LICENSE</b>	
	
<b>This is to Certify that Mr. Carlos Maundu of University of Nairobi, has been licensed to conduct research in Nairobi on the topic: A Conceptual Framework on the Risk and Compliance Based Fintechs Adoption Among Commercial Banks of Kenya for the period ending : 01/October/2022.</b>	
License No: <b>NACOSTI/P/21/13251</b>	
611775	
Applicant Identification Number	Director General <b>NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY &amp; INNOVATION</b>
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## APPENDIX 2: INTRODUCTION LETTER TO BANKS



**UNIVERSITY OF NAIROBI  
FACULTY OF SCIENCE AND TECHNOLOGY  
DEPARTMENT OF COMPUTING AND INFORMATICS**

Telephone: 4446543 or 4442014/15/16 Ext. 2007  
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Email: [moturi@uonbi.ac.ke](mailto:moturi@uonbi.ac.ke)

P. O. Box 30197  
Nairobi, Kenya  
Date: September 20, 2021

### THE BANKING SECTOR

CARLOS MAUNDU – P54/37683/2020

The above named is a student in the MSc in Information Technology Management of the University of Nairobi. As part of the requirements of the programme, the student is required to undertake a research project and write a dissertation. The project title for the student is: **Measuring the Adoption of Risk and Compliance-Based Fintechs among Commercial Banks in Kenya.**

The student requires to collect data that will assist in analyzing insights into the chosen topic. This data will be used purely for academic purposes. Any assistance regarding data collection accorded to the student, who is under my supervision, will be highly appreciated.

A handwritten signature in blue ink, appearing to read 'Chris A. Moturi'.

CHRISTOPHER A. MOTURI

SENIOR LECTURER

DEPARTMENT OF COMPUTING AND INFORMATICS



## APPENDIX 3: QUESTIONNAIRE

Section 1 of 7

### Measuring the Adoption of Risk and Compliance-Based Fintechs among Commercial Banks in Kenya

My name is Carlos Maundu. I am a master's student undertaking this research study under the supervision of Christopher A. Moturi at the Department of Computing and Informatics, University of Nairobi. It should take approximately 10-20 minutes to complete this survey.

The purpose of this study is to expand the understanding of the different elements that influence organizations' use of risk and compliance-based financial technology to manage anti-money laundering and counter-terrorist financing (AML/CFT). The study's findings will be utilized to offer practical recommendations to policymakers, regulators, and banks on measures that will result in more effective adoption of Risk and Compliance Based Fintech.

The study requires the bank employees in ICT and Compliance & Risk departments to fill the questionnaire. To ensure the study's success, please ensure that you complete each and every question in the questionnaire according to the instructions provided.

Your participation in this survey is voluntary and you are free to decline to answer any particular question you do not wish to answer for any reason. There are no risks or discomfort involved in participating in this study. The survey does not collect identifying information such as your name, email address, or IP address. Therefore, your responses will remain anonymous and treated with confidentiality. Data collected will only be used for the purpose of this study only.

Please contact Carlos Maundu with questions or concerns about this study using [carlos.maundu@students.uonbi.ac.ke](mailto:carlos.maundu@students.uonbi.ac.ke)

By clicking YES below, I am indicating my understanding that (a) I am participating in a research study; (b) my participation is completely voluntary and that I can withdraw my consent at any time without penalty; and (c) I do not have to answer any questions I do not want to answer. If you do not wish to participate, please click NO. \*

Yes

No

## Participant and Organization Information



Description (optional)



Please select the item that best describes your field of business association.

- Banking
- Consulting
- Third party service providers
- Policy or regulatory body
- Other...

Please indicate what best describes your position

- Risk and Compliance management
- ICT management
- Subject Matter Expert in Fintech
- Other...

☺☺☺

Are you familiar with risk and compliance-based fintech and its uses e.g., Regtech?

- I know all about risk and compliance-based fintech
- I have good knowledge about risk and compliance-based fintech
- I have some knowledge of what it is
- I have only heard about it
- I am not familiar with it at all
- Other...

How long have you been involved with risk and compliance-based fintech projects?

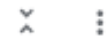
- I have not been involved
- 0 months - 1 year
- 1 - 3 years
- 3 - 5 years
- Greater than 5 years

☺☺☺

What is the size of your organization (No. of Employees)?

- 0-50
- 51-100
- 101-500
- 501-1000
- 1001-5000
- 5000 – 10,000
- 10,000 and Above

## Organization Intent to Adopt Risk and Compliance-based Fintech



Description (optional)

My organization has already implemented risk and compliance-based fintech

- Yes
- No

If you indicated yes above, which of the following financial technologies your organization has been involved with for risk and compliance management? (you can select more than one if your organization has implemented several technologies)

- Big data
- Artificial intelligence and machine learning
- Robotics
- Digital identity verification
- Client screening and matching
- Blockchain
- Other...

If you indicated No above, could you give a reason why?

Long answer text

---

If your Organization has not yet adopted risk and compliance-based fintech, does it intend to in the future?

- Yes
- No

...

If you indicated Yes above, what are the timelines?

- 1 month - 3 months
- 4 months - 6 months
- More than 6 months

After section 3 Continue to next section

### Technology Adoption Factors

Please think about financial technologies capabilities such as machine learning, big data, biometrics, blockchain, and distributed ledger technologies that could be tagged by risk and compliance-based fintech when you express your opinions. Essentially, how Fintechs have aided banks in meeting their obligation to prevent anti-money laundering (AML) and combating the financing of terrorism (CFT) activity by enhancing KYC capabilities, identity validation, and thorough transaction monitoring. Based on your individual perception along with industry or professional experience please answer the following questions.

Does relative advantage influence risk and compliance-based fintech adoption in banking? To what extent do you agree with the statements below?

	Strongly disagree	Disagree	More-or-less agree	Agree	Strongly agree
Risk and compliance-based fintech allows for AML/CFT management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Risk and compliance-based fintech provides better information accuracy for better decision making and collaboration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Risk and compliance-based fintech provides improved visibility of transactions that need to be monitored	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Risk and compliance-based fintech provides improved operational efficiency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Risk and compliance-based fintech provides improved risk management against anti-money laundering (AML) and combating the financing of terrorism (CFT)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Does technology complexity influence risk and compliance-based fintech adoption in banking? To what extent do you agree with the statements below?

	Strongly disagree	Disagree	More-or-less agree	Agree	Strongly agree
The skills required to use risk and compliance-based fintech technology are too complex for employees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Integrating risk and compliance-based fintech technology in current banking work practices is very difficult	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Integrating risk and compliance-based fintech systems with existing IT systems is very complex	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Massive amounts of data generated by risk and compliance-based fintech is very difficult to manage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Does technology compatibility influence risk and compliance-based fintech adoption in banking? To what extent do you agree with the statements below

	Strongly disagree	Disagree	More-or-less agree	Agree	Strongly agree
Implementing the changes caused by risk and compliance-based fintech adoption is not compatible with most banking business approaches and objectives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Risk and compliance-based fintech is not compatible with bank's experience with similar risk and compliance technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Organizational Adoption Factors

Does top management support influence risk and compliance-based fintech adoption in banking? To what extent do you agree with the statements below?

	Strongly disagree	Disagree	More-or-less agree	Agree	Strongly agree
Top management enthusiastically supports the adoption of risk and compliance-based fintech	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Top management allocates adequate resources to adoption of risk and compliance-based fintech	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Top management is aware of the benefits from risk and compliance-based fintech	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Top management actively encourages employees to use risk and compliance-based fintech technology in their daily tasks

Does organizational size influence risk and compliance-based fintech adoption in banking?

Strongly disagree    Disagree    More-or-less agree    Agree    Strongly agree

Organization size positively influences risk and compliance-based fintech adoption in banking

Do perceived barriers influence risk and compliance-based fintech adoption in banking? To what extent do you agree with the statements below?

Strongly disagree    Disagree    More-or-less agree    Agree    Strongly agree

Uncertainty of possible negative consequence negatively influences risk and compliance-based fintech adoption in banking



Uncertainty of value derived on investment in these technologies negatively influences risk and compliance-based fintech adoption in banking

Most banks have a sophisticated database and transaction facility

### Environmental Adoption Factors

Do government regulations influence risk and compliance-based fintech adoption in banking? To what extent do you agree with the statements below?

Strongly disagree    Disagree    More-or-less agree    Agree    Strongly agree

Government legislations do not promote risk and compliance-based fintech adoption by banks through specific mandates

Lack of an overarching FinTech-specific legal framework negatively influences risk and compliance-based fintech adoption in banking

Government demonstrates commitment in promoting adoption of risk and compliance based fintech

Does technology support infrastructure influence risk and compliance-based fintech adoption in banking? To what extent do you agree with the statements below?

	Strongly disagree	Disagree	More-or-less agree	Agree	Strongly agree
There are third party service providers that provide technical support for effective use of risk and compliance-based fintech technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are agencies who provide training for effective use of risk and compliance-based fintech	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to quality ICT consultants positively influences risk and compliance-based fintech adoption in banking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What government regulations would mainly affect the adoption of risk and compliance-based fintech technology

- Prevention of Terrorism Regulations (2013)
- Proceeds of Crime and Anti-Money Laundering Regulations (2013)
- Science, Technology and Innovation Act, 2013
- Other: \_\_\_\_\_

What government regulations would mainly promote the adoption of risk and compliance-based fintech technology

- Regulatory Sandboxes that promote growth in favorable environment.
- National Payments System (NPS) Vision and Strategy
- Kenya Digital Economy Blueprint 2019
- Kenya Bankers Association - strategic plan 2019-2023
- National ICT Policy 2019
- Other: \_\_\_\_\_

## Risk and Compliance-based Fintech Adoption

### AML/CFT Management

To what extent do you agree with the statements below?

Strongly disagree    Disagree    More-or-less agree    Agree    Strongly agree.

This risk and compliance-based Fintech Model has enabled us to manage risks and comply with AML/CFT regulations.

To what extent do you agree with the statements below?

Strongly disagree    Disagree    More-or-less agree    Agree    Strongly agree.

This risk and compliance-based Fintech has enabled us to onboard and manage high risk individuals and institutions. e.g. PEP Accounts, Forex Bureaus', Non-Residents

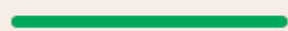
In your opinion, what is the ideal recommendation on improvement by both banks and regulators to promote the uptake of risk and compliance based Fintech?

Your answer \_\_\_\_\_

**Thank you for participating in this Survey.**  
Please submit to complete.

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