The Impact of Basel II on Operational Risk Management and Its Effects on the Financial Performance of Cambodian Banks

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ABSTRACT

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This study investigates the effect of Basel II principles on operational risk management within Cambodia's commercial banking sector. It centres on assessing the impact of Basel II implementation on risk management frameworks and financial stability in Cambodian banks. The primary research question examined whether adopting Basel II guidelines led to enhanced operational risk management practices among these institutions. To carry out a multi-level comparative analysis of Cambodia's national banking system, a quantitative research design for studying several primary data sources was implemented in this research. Such sources originated primarily from annual financial statements, regulatory documents, and financial reports from commercial banks. The findings from the secondary data addressed the level of conformity and adherence to Basel II principles within those financial institutions. The study identified different degrees of adherence to Basel II principles by commercial banks based on secondary data. The study describes banks' challenges in implementing the Basel II principles (for example, technical problems and resource shortages). Additionally, this provided information on weaknesses in risk management practices and continuous barriers to the complete implementation of Basel II. This provides critical information, particularly concerning the complexity aspects of adopting Basel II

by Cambodian banks. A complete understanding of the challenges faced by these organizations in alignment with the Basel II guidelines was achieved by examining the financial reports and the regulatory documents. The research revealed how incorporating Basel II pillars facilitated compliance and improved risk. These findings are essential for policymakers, regulators, and banking institutions that want to improve their operational risk management framework, strengthening financial stability in Cambodian banks. In addition, this study suggested opportunities for future research by looking into how to overcome the implementation barriers associated with successfully assimilating the Basel II provisions in developing world markets.

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CHAPTER 1

INTRODUCTION

The overall health of an economy prioritizes the paramount stability and soundness of its banking sector. In the dynamic and competitive landscape of the global financial industry, commercial banks play a pivotal role in facilitating economic growth and development. As financial intermediaries, they channel funds from savers to borrowers, enabling businesses to invest, innovate, and expand, ultimately contributing to job creation and economic prosperity. However, the inherent nature of banking operations exposes them to various operational risks that can significantly impact their financial performance and stability (Aloqab et al., 2018). Operational risk is a wide range of losses resulting from insufficient or malfunctioning internal procedures, external factors, or human error. These risks can manifest in various forms, including fraud, technology failures, legal and regulatory non-compliance, and business disruptions (Barnes, 2019).

In a rapidly developing nation like Cambodia, the banking sector plays avital role in economic growth and channels financial resources efficiently while providing essential services to businesses and individuals. Nevertheless, this sector is not immune to risks, and carefully managing these risks becomes imperative for sustained stability and growth. The Basel II framework, a pivotal development in global banking regulation and risk management, is designed to enhance the safety and soundness of financial institutions by sharpening their focus on risk management practices (Pereira et al., 2018). Although Basel II is a well-recognized standard, its application and efficacy can differ based on the particular situation and the organizations it governs. Given its capacity to interfere with banking operations and affect financial performance, operational risk, in particular, requires close attention.

The Basel Committee on Banking Supervision, a group of central bank governors and regulators worldwide, has recognized the critical importance of sound operational risk management for maintaining financial stability. The Basel Committee released the Guidelines for the Responsible Management of Operational Risk in 2008. The Basel Committee on Banking Supervision (2008) established a framework that provides extensive rules for banks to recognize, evaluate, address, and monitor operational risks. The worldwide banking industry's operational risk management methods have been greatly improved with the implementation of Basel II.

Due to economic growth and increased disposable incomes, Cambodia's banking industry has seen impressive growth in recent years (National Bank of Cambodia, 2022). However, the industry must also deal with growing operational risks due to quickening technical progress, changing consumer demands, and a complicated regulatory landscape. Implementing Basel II principles has played a pivotal role in fortifying operational risk management protocols inside Cambodian banking institutions, augmenting their overall resilience and stability.

The purpose of this dissertation is to investigate how Basel II principles affect the efficient management of operational risk and how Basel II operational risk events can be mitigated to improve the financial performance of Cambodia's banking sector. Using a quantitative approach and secondary data analysis, the study will examine the relationship between operational risk occurrences, Basel II implementation, and financial performance metrics, including return on equity (ROE) and return on assets (ROA). The study's findings are anticipated to offer insightful information on how well Basel II standards improve operational risk management and how this affects the financial performance of banks in Cambodia. The findings will improve knowledge of operational risk management techniques in developing nations and guide regulatory frameworks that support financial stability.

1.1 Background of the Study

In recent years, risk management has drawn the attention of all corporate communities. Most crucially, banks have understood that their risk management programs in the modern banking industry must include a larger range of risk categories, including operational risk, in addition to the traditional concentration on liquidity, credit, and market risk. Due to this, banks are now placing a great deal of attention on operational risk management. They are hiring stronger boards of directors with a deep understanding of new operational hazards. The global financial industry operates in a dynamic and competitive environment characterized by rapid technological advancements, evolving customer expectations, and an increasingly complex regulatory landscape.

Commercial banks, as key players in this dynamic ecosystem, play a pivotal role in facilitating economic growth and development by channelling funds from savers to borrowers, enabling businesses to invest, innovate, and expand, ultimately contributing to job creation and overall economic prosperity (Zheng et al., 2021). However, the inherent nature of banking operations exposes them to a wide range of operational risks, defined as the potential for losses arising from inadequate or failed internal processes, external events, or human error (Basel Committee on Banking Supervision, 2008). Operational risks can manifest in various forms, including fraud, technology failures, legal and regulatory non-compliance, and business disruptions. These risks can significantly impact banks' financial performance and stability, potentially leading to financial losses, reputational damage, and even business failures.

1.1.1 The Case in Cambodia

As per Kenh & Wei (2023), Cambodia's banking sector has experienced notable changes in the past decade, primarily due to the country's economic expansion, growing financial services

industry, and heightened investments. This industry, comprising foreign and local banks, is an essential part of the financial system in Cambodia. It consists of 58 commercial banks as of 2023 that provide services to the government, corporations, and individuals (Banking Environment, 2023). The strong expansion of Cambodia's banking industry indicates the country's overall economic progress. Over the past few years, Cambodia has seen increased economic activity, tourism, and international investments. These events have shown how crucial the banking industry is to maintaining capital flows, facilitating economic transactions, and supplying financial stability.

Economic expansion in Cambodia has been a defining feature of its recent development, marked by a commendable average annual growth rate exceeding 7% (National Bank of Cambodia, 2022). This sustained economic momentum has triggered a notable surge in the demand for various banking services. As businesses increase rapidly and individuals partake in growing economic activities, there has been an amplified need for banking solutions, ranging from loans and deposits to remittance transfers. As a result, the banking sector has become a pivotal player in facilitating and supporting the increasing financial needs of a progressively dynamic and expanding economy.

The parallel rise in disposable incomes among Cambodians has further fueled the growth of the banking sector (Hok, 2020). With more money available for saving and investing due to increased incomes, there has been a palpable uptick in deposits within the banking system. This growth in disposable incomes has led to a heightened demand for conventional banking services and an increased appetite for wealth management products and services. As Cambodians seek avenues to optimize and grow their financial resources, banks are crucial in offering diverse and

sophisticated wealth management solutions, further solidifying their position as financial intermediaries in a thriving economic landscape.

A notable aspect of Cambodia's financial landscape is the government's concerted effort toward financial inclusion (Padmaperuma, 2023). Mobile banking and microfinance have been strategically implemented to bridge gaps and extend financial services to previously unbanked or underbanked segments. The proactive stance toward financial inclusion has democratized access to banking services and paved the way for greater economic participation and empowerment among previously marginalized communities. In essence, these initiatives align with broader national development goals, ensuring that the benefits of economic growth are distributed more equitably across the socio-economic spectrum.

The Cambodian banking sector has undergone substantial reforms and modernization initiatives in recent years in response to the evolving landscape and the increasing demands of a dynamic economy. These endeavours have been strategically aimed at fortifying the sector's foundation, fostering healthy competition, and propelling financial innovation. One pivotal objective of these reforms has been reinforcing the regulatory framework overseen by the National Bank of Cambodia (NBC). The NBC has instituted a series of reforms to enhance the stability and reliability of the banking sector. These include introducing new prudential requirements, elevating capital adequacy standards, and refining corporate governance practices (Thun & Pradhan, 2021). By bolstering the regulatory framework, these reforms promote a more resilient banking sector and engender an environment conducive to sustained growth.

However, the banking industry's rapid expansion also presents several challenges, especially regarding risk management. Financial institutions are essential for promoting economic growth but also carry several risks. Operational risk, which includes risks from people, systems,

internal processes, and external events, is one crucial area of concern. Events involving operational risk may result in monetary losses, violations of the law, harm to an organization's reputation, and possible service interruptions (Aloqab et al., 2018). The discipline of operation risk management is relatively revolutionary, having emerged as a separate independent study in the early 2000s. Although risks related to bank operations have long been known to banks, in 2003, the Basel Committee on Banking Supervision (BCBS) raised operational risk to a separate and manageable risk category (Eceiza et al. 2020).

According to Barakat et al. (2019), operational risk in the banking industry results from complicated internal and external variables, such as deregulation, globalization, cross-industry acquisitions, and technology improvements. It is regarded as one of the most harmful types of risk, capable of causing many failures that significantly affect financial institutions and the stability of the world economy. According to the Operational Risk Data eXchange Association (ORX) annual report, operational risk loss reported by member banks in 2020 was Euro 16.7 billion, with a cumulative total gross loss of Euro 513 billion since 2002 (ORX, 2021).

Hence, numerous nations and financial institutions have implemented the Basel II framework to tackle the challenges that arise from operational risk. The Basel Committee on Banking Supervision developed Basel II, an international standard for banking regulation that provides a comprehensive framework with guidelines and suggestions for handling a variety of risks, including operational risk (Alvi & Williamson, 2023). The Basel II framework strongly emphasizes the necessity of an efficient risk management system and capital sufficiency to guarantee the stability and soundness of financial institutions,

In response to the increasing operational risks faced by Cambodian banks, NBC has adopted the Basel II principles for sound operational risk management. Basel II is a comprehensive

framework for identifying, assessing, mitigating, and monitoring operational risks. The adoption of Basel II has been instrumental in strengthening operational risk management practices among Cambodian banks and has contributed to their overall stability and resilience (National Bank of Cambodia, 2022).

1.1.2 Basel II Principles

Global central bank governors and regulators formed the Basel Committee on Banking Supervision (BCBS), which has played a pivotal role in setting global standards for risk management and banking regulation. According to Pereira et al. (2018), the BCBS issued the Principles for the Sound Management of Operational Risk (Basel II), a comprehensive framework for banks to identify, assess, mitigate, and monitor operational risks. This framework has significantly enhanced operational risk management practices within the global banking industry. The foundation of Basel II rests on three fundamental pillars, each contributing to the robustness and effectiveness of operational risk management within the banking sector.

Pillar 1: Minimum Capital Requirements

Pillar 1 of Basel II establishes the essential framework for determining the minimum capital requirements that banks must hold to safeguard against operational risks (CFI, 2023). These requirements are meticulously tailored to each bank's unique operational risk profile, considering the institution's size, complexity, and business activities. The goal is to ensure that banks maintain an adequate financial cushion that aligns with the inherent risks associated with their operational activities. This pillar is a vital anchor that keeps the entire risk management framework within a transparent, uniform regulatory environment.

Pillar 2: Supervisory Review

Pillar 2 addresses how the supervisory bodies can effectively supervise and review the banks' operational risk management practices (CFI, 2023). Supervisors must review the efficacy of these practices and their unity to the guidelines set by Basel II. By "comprehensive," the supervisors apply minimum capital requirements and make a "supervisory review" of a bank's overall operational risk profile. In cases of such review concerns, supervisors may require more capital holdings, which would provide an additional cushion for when the requirements seem insufficient. Hence, Pillar 2 emphasizes the joint effort by banks and supervisory bodies towards maintaining a solid and resilient operational risk management framework.

Pillar 3: Market Discipline

In its opera risk management framework, Pillar 3 creates some level of transparency and accountability by calling on banks to reveal their practices to the market participants. This disclosure enhances market discipline where investors and stakeholders can evaluate and compare banks' operational risk profiles. Publication of this information under Pillar 3 creates an environment where market discipline is brought to bear on banks' risk management practices. This is important as it gives investors a better understanding of how a bank approaches operational risks and helps improve market discipline.

These three pillars set minimum capital requirement standards and form an integrated framework for review and transparency. Moreover, these three pillars cooperate, promoting a robust environment for operational risk management in the banking sector and sustaining the stability and soundness of financial institutions.

1.1.3 Basel II Operational Risk Management and Financial Performance from a Global Perspective

Operational risk, or the possibility of losses due to insufficient or malfunctioning internal processes, outside circumstances, or human mistakes, has become a significant worry for banks worldwide. The Basel Committee on Banking Supervision (BCBS) recognized the importance of efficient operational risk management for financial stability. The year 2008 saw the Basel II: Principles for the Sound Management of Operational Risk publication by the Basel Committee on Banking Supervision. This framework has significantly impacted the global banking industry's operational risk management procedures and financial performance. Aloqab et al. (2018) claim that adopting Basel II has greatly enhanced operational risk management procedures in the world's banks. Banks have taken several actions to enhance their operational risk management frameworks, such as creating specialized risk management units, implementing risk assessment techniques, and improving internal controls.

In light of the Basel II and Basel III Accords, Pereira et al. (2018) thoroughly examined operational risk management procedures in banks. They discovered that banks had made great strides toward implementing Basel II concepts, enhancing risk assessment, identification, mitigation, and monitoring. Similarly, Kong et al. (2021) examined how operational risk management affected ASEAN countries' banks' productivity. They discovered that banks with more effective operational risk management procedures also had reduced operating expenses.

Due to Basel II's disclosure rules, operational risks are now more transparent, allowing market participants to evaluate the operational risk profiles of various banks more accurately. Because of the increased openness, there is now more market discipline, which motivates banks to implement reasonable operational risk management procedures to keep investors' trust. Giner et

al. (2020) looked into how bank risk perception was affected by Basel II disclosure rules. According to the study, investors evaluated banks' operational risk profiles using Basel II disclosures, and these disclosures had a significant effect on bank stock prices. An additional Lamanda et al. (2020) survey examined how Basel II disclosure requirements affected bank funding costs. According to the study, banks reduced funding costs when disclosing operational risk.

Due to Basel II, supervisors now have a clearer framework to evaluate banks' operational risk management procedures. Because of this, regulatory control has become more effective, guaranteeing that banks have sufficient capital to cover operational risks and follow good operational risk management practices. Busika & Hoque's (2020) study assessed Basel II's effects on supervisory procedures. According to the study, Basel II has resulted in a more uniform approach to operational risk supervision among various regulatory bodies. Ko et al. (2019) looked at Basel II's effect on the efficacy of bank supervision in another study. According to the survey, Basel II has improved operational risk monitoring and decreased operational risk incidents.

The global financial performance of banks has improved since Basel II was implemented. Banks have improved their financial stability and profitability by lowering their exposure to operational risk losses through improved operating risk management procedures. A more robust and stable banking industry, made possible by increased regulatory oversight and transparency, has helped banks and the economy. Gadzo et al. (2019) investigated the impact of operational risk management on banks' profitability. The study found that more profitable institutions had stronger operational risk management practices.

1.1.4 Cambodia Perspective of Basel II Operational Risk Management and Financial Performance

The adoption and use of Basel II principles for operational risk management have substantially impacted Cambodia's banking sector's operational environment and financial performance. The significance of considering the local viewpoint is emphasized even more by how these principles interact with Cambodia's unique economic environment dynamics. The National Bank of Cambodia (NBC), the country's central bank and regulatory agency, has pushed for using Basel II standards. By implementing these concepts, Cambodia is showcasing its commitment to enhancing risk management frameworks, maintaining the stability of financial institutions, and aligning its banking sector with global best practices.

Cambodian banks now have a well-organized framework to enhance their operational risk management practices since the advancement of Basel II. This is particularly crucial in an environment where the economy is expanding, technology is developing swiftly, and regulations are changing. Banks have been forced to evaluate and strengthen their risk management capabilities by the concepts described in Pillar 1, which centre on determining minimum capital needs based on operational risk profiles.

The supervisory evaluation required by Pillar 2 ensures that regulatory bodies closely examine Cambodian banks' operational risk management procedures. This monitoring plays a crucial role in preserving the integrity of risk management systems, fixing any flaws, and guaranteeing that banks are suitably equipped to handle the difficulties presented by operational risks. The cooperative interaction between supervisory agencies and banks indicates a solid commitment to a framework for risk governance. By introducing a transparency component, Pillar 3 encourages banks in Cambodia to reveal their operational risk management procedures (CFI,

2023). By empowering stakeholders and investors to make knowledgeable decisions, this disclosure improves market discipline and cultivates an accountable culture within the banking industry (Lipton, 2020). Market participants' trust and confidence in the financial system increase as they learn how banks handle operational risks.

The adoption of Basel II principles has contributed to the resilience and stability of the Cambodian banking sector. By aligning capital requirements with operational risk profiles, banks are better equipped to absorb financial shocks and maintain stability, safeguarding their financial performance despite unforeseen challenges. The emphasis on active risk management has led to investments in technology, cybersecurity, and overall risk mitigation measures. While these investments incur costs, they also enhance the efficiency of banking operations. The use of advanced technologies not only improves operational efficiency but also positions banks to meet customers' evolving expectations (Mogaji et al., 2021).

Basel II has influenced the competitive dynamics within the Cambodian banking sector. The encouragement of competition (Pillar 2) and transparency (Pillar 3) has compelled banks to innovate and differentiate themselves. This competition fosters a healthy environment where banks strive to enhance their financial performance to attract and retain customers.

In essence, the adoption of Basel II principles in Cambodia reflects a commitment to elevating operational risk management standards and fortifying the financial performance of the banking sector. By aligning with these global principles, Cambodia not only enhances the resilience of its financial institutions but also contributes to its economic landscape's overall stability and integrity.

1.2 Problem Statement

The research problem in this study revolves around the intricate relationship between adopting Basel II principles for operational risk management and the subsequent impact on the financial performance of commercial banks in Cambodia. This problem is multifaceted and encompasses various dimensions that merit exploration and analysis.

1.2.1 Basel II Implementation and Effectiveness

One facet of the research problem pertains to the extent to which Cambodian commercial banks have implemented Basel II principles for operational risk management. Understanding the depth of adoption, adherence to guidelines, and integration of these principles into day-to-day operations is crucial. This includes exploring whether banks have successfully implemented the recommended prudential requirements, enhanced capital adequacy standards, and improved corporate governance practices outlined in Basel II's Pillar 1.

1.2.2 Operational Risk Events and Financial Performance:

The research also delves into the impact of operational risk events on the financial performance of Cambodian commercial banks. Operational risk events, such as system failures, cybersecurity threats, or management issues, can significantly affect a bank's financial health. Investigating these events' frequency, nature, and severity and their subsequent influence on key financial indicators is central to comprehending banks' challenges in Cambodia.

1.2.3 Moderating Effect of Basel II Principles:

An essential element of the research problem revolves around assessing the moderating effect of Basel II operational risk principles on the relationship between operational risk events and financial performance. This involves examining whether the adoption of Basel II acts as a mitigating factor, reducing the negative impact of operational risk events on financial performance,

or whether there are variations in this relationship based on the degree of adherence to Basel II principles.

1.2.4 Cambodian Banking Sector Dynamics:

The research problem extends to the broader context of the Cambodian banking sector. Individual banks' size, complexity, and business activities contribute to their unique operational risk profiles. To contextualize the findings within the dynamics of the banking sector in Cambodia, it is imperative to comprehend how these factors interact with Basel II rules and impact financial consequences.

1.2.5 Regulatory Environment and Compliance:

The ever-changing regulatory framework in Cambodia further complicates the research problem. It is crucial to investigate how banks manage and adhere to the changing regulatory environment, which includes modifications brought forth by Basel II. This entails evaluating the resources used for compliance, the difficulties encountered, and the general effect on financial performance and operational risk management.

Essentially, the research problem investigates the necessity of deciphering the intricacies associated with implementing Basel II standards inside the banking industry of Cambodia. It aims to clarify the complex relationship between regulatory compliance and financial performance, evaluate the practical consequences of these principles on operational risk management, and evaluate banks' resilience in the face of operational difficulties. By addressing these facets, the research aims to contribute valuable insights that can inform both academic discourse and practical strategies for the sustainable development of the banking sector in Cambodia.

1.3 Objectives of the Study

1.3.1 Main Objective

The main objective of this research is to examine the impact of Basel II principles on operational risk management and their moderating effect on the relationship between operational risk events and the financial performance of commercial banks in Cambodia.

1.3.2 General Objectives

The general objectives of this research include;

i. To Assess the Implementation of Basel II Principles

This research will evaluate the extent to which Cambodian commercial banks have implemented Basel II principles for operational risk management, considering factors such as prudential requirements, capital adequacy standards, and corporate governance practices.

ii. To Examine Operational Risk Events

This research will investigate the occurrence, nature, and impact of operational risk events within the Cambodian banking sector, including system failures, cybersecurity threats, and management issues.

iii. To Analyze the Financial Performance of Banks

This research will assess the financial performance of commercial banks in Cambodia by analyzing key indicators, including but not limited to profitability, liquidity, and solvency, over the last 3 to 5 years.

iv. To Explore the Moderating Effect of Basel II

This research will examine the moderating effect of Basel II operational risk principles on the relationship between operational risk events and financial performance, focusing on understanding how adherence to these principles influences the overall risk-return profile of banks.

v. To Understand Sector-Specific Dynamics

This research will contextualize the findings within the dynamics of the Cambodian banking sector, considering variations in size, complexity, and business activities among individual banks and assessing how these factors interact with Basel II principles.

vi. To Evaluate the impact of non-performing loans (NPL) on bank performance, precisely as measured by ROA

This research will assess the impact of non-performing loans (NPL) in Cambodian banks with the evolving regulatory environment, considering the complexities of the local regulatory framework and its impact on operational risk management practices.

vii. To Provide Recommendations for Improvement

Based on the findings, this research will offer recommendations for enhancing operational risk management practices in Cambodian commercial banks, focusing on improving the alignment with Basel II principles and addressing identified challenges for the sustainable development of the banking sector.

1.4 Research Questions

The following research questions will guide the study.

RQ1: To what extent have banks in Cambodia implemented the Basel II Principles for the Sound Management of Operational Risk?

RQ2: How do operational risk events affect the financial performance of Cambodian commercial banks?

RQ3: What moderating effect do Basel II operational risk standards have on the link between financial performance in Cambodian commercial banks and operational risk events?

RQ4: How have Cambodian commercial banks adapted their prudential requirements to align with Basel II standards in operational risk management?

RQ5: How do Basel II compliance levels vary among different types of banks in Cambodia, such as state-owned banks, private commercial banks, and foreign banks?

RQ6: What are the prevalent types and frequencies of operational risk events experienced by commercial banks in Cambodia over the last 3 to 5 years?

RQ7: How have operational risk events impacted Cambodian commercial banks' liquidity, profitability, and solvency?

RQ8: How do specific Basel II operational risk management practices, such as strong internal controls, risk assessment methodologies, and incident reporting systems, influence financial performance in Cambodia?

RQ9: How has the evolving regulatory environment in Cambodia influenced the operational risk management practices of commercial banks?

RQ10: What are banks' main challenges in implementing Basel II in Cambodia?

RQ11: Do Cambodian banks perceive Basel II principles effectively enhancing their operational risk management capabilities?

RQ12: What specific recommendations can be proposed to improve the alignment of operational risk management practices with Basel II principles and enhance the overall resilience of the Cambodian banking sector?

1.5 Research Hypotheses

The following were the hypotheses that this research needs to test:

Hypothesis 1:

- Null Hypothesis (H0): There is no significant relationship between the level of implementation of Basel II principles and the effectiveness of operational risk management in Cambodian commercial banks.
- Alternative Hypothesis (H1): There is a significant positive relationship between the level of implementation of Basel II principles and the effectiveness of operational risk management in Cambodian commercial banks.

Hypothesis 2:

- Null Hypothesis (H0): Operational risk events do not significantly impact Cambodian commercial banks' financial performance indicators.
- Alternative Hypothesis (H1): Operational risk events significantly negatively impact the financial performance indicators of Cambodian commercial banks.

Hypothesis 3:

- Null Hypothesis (H0): Basel II operational risk principles do not moderate the relationship between operational risk events and financial performance in Cambodian commercial banks.
- Alternative Hypothesis (H1): Basel II operational risk principles moderate the relationship between operational risk events and financial performance in Cambodian commercial banks.

Hypothesis 4:

- Null Hypothesis (H0): The frequency and types of operational risk events do not vary significantly among Cambodian commercial banks.

- Alternative Hypothesis (H1): The frequency and types of operational risk events vary significantly among Cambodian commercial banks.

Hypothesis 5:

- Null Hypothesis (H0): The impact of operational risk events on financial performance indicators is uniform across all Cambodian commercial banks.
- Alternative Hypothesis (H1): The impact of operational risk events on financial performance indicators varies among Cambodian commercial banks.

Hypothesis 6:

- Null Hypothesis (H0): The evolving regulatory environment in Cambodia has no significant impact on commercial banks' operational risk management practices.
- Alternative Hypothesis (H1): Cambodia's evolving regulatory environment significantly impacts commercial banks' operational risk management practices.

Hypothesis 7:

- Null Hypothesis (H0): There is no significant relationship between instances of financial fraud and the financial performance of Cambodian commercial banks.
- Alternative Hypothesis (H1): Instances of financial fraud significantly impact the financial performance of Cambodian commercial banks.

Hypothesis 8:

- Null Hypothesis (H0): There is no significant relationship between operational risk events and the financial metrics (Return on Assets - ROA, Return on Equity - ROE, Net Interest Margin - NIM, Non-Performing Loan Ratio - NPL) in Cambodian commercial banks.
- Alternative Hypothesis (H1): There is a significant relationship between operational risk events and the financial metrics (Return on Assets - ROA, Return on Equity - ROE, Net

Interest Margin - NIM, Non-Performing Loan Ratio - NPL) in Cambodian commercial banks.

1.6 Rationale for the Study

The study is crucial for several reasons;

i. Basel II Implementation and Effectiveness

One facet of the research problem pertains to the extent to which Cambodian commercial banks have implemented Basel II principles for operational risk management. Understanding the depth of adoption, adherence to guidelines, and integration of these principles into day-to-day operations is crucial. This includes exploring whether banks have successfully implemented the recommended prudential requirements, enhanced capital adequacy standards, and improved corporate governance practices outlined in Basel II's Pillar 1.

ii. Operational Risk Events and Financial Performance

The study also looks at how operational risk events affect the commercial banks in Cambodia's financial performance. Operational risk events, such as system failures, cybersecurity threats, or management issues, can significantly affect a bank's financial health. Investigating these events' frequency, nature, and severity and their subsequent influence on key financial indicators is central to comprehending banks' challenges in Cambodia.

iii. Moderating Effect of Basel II Principles

An essential element of the research problem revolves around assessing the moderating effect of Basel II operational risk principles on the relationship between operational risk events and financial performance. This involves examining whether the adoption of Basel II acts as a mitigating factor, reducing the negative impact of operational risk events on financial performance,

or whether there are variations in this relationship based on the degree of adherence to Basel II principles.

iv. Cambodian Banking Sector Dynamics

The research problem extends to the broader context of the Cambodian banking sector. Individual banks' size, complexity, and business activities contribute to their unique operational risk profiles. To understand the findings within the dynamics of the banking sector in Cambodia, it is imperative to comprehend how these factors interact with Basel II rules and impact financial consequences; hence, all these will be explored in this study.

v. Effectiveness of Basel II in a Developing Country Context

Around the world, Basel II has been put into practice, particularly in underdeveloped nations like Cambodia. However, the usefulness of Basel II in these economies is still up for discussion. Understanding how Basel II will impact financial performance and operational risk management in developing countries will be made easier with the help of this study's findings.

vi. Regulatory Environment and Compliance

The ever-changing regulatory framework in Cambodia further complicates the research problem. It is crucial to investigate how banks manage and adhere to the changing regulatory environment, which includes modifications brought forth by Basel II. This involves an assessment of the resources invested in compliance, the challenges faced, and the overall impact on operational risk management and financial performance.

vii. Contributing to the Literature

The study will contribute to the growing knowledge of operational risk management and Basel II implementation in developing countries. The findings will inform future research and policy decisions.

1.7 Scope of the Study

To provide a comprehensive understanding, the following outlines the specific dimensions and boundaries within which the research will be conducted;

i. Geographical Scope

The study concentrates specifically on the banking sector in Cambodia. It encompasses all commercial banks operating within the country's borders. The choice of Cambodia as the geographical scope is justified by the country's remarkable economic growth, the modernization of its banking sector, and the relevance of Basel II principles in shaping risk management practices.

ii. Temporal Scope

The study is temporally bounded by the last 3 to 5 years, focusing on assessing the financial performance of commercial banks during this period. Analyzing this timeframe allows for capturing recent trends, operational risk events, and changes in compliance with Basel II principles. This scope ensures the relevance of the findings to the current state of the Cambodian banking sector.

iii. Operational Risk Management

The research delves into operational risk management practices guided by Basel II principles. This includes examining the implementation of prudential requirements, capital adequacy standards, and corporate governance practices by Cambodian commercial banks. The study aims to identify variations in these practices across different banks and assess their effectiveness in mitigating operational risks.

iv. Financial Performance Indicators

A significant aspect of the study is how the company's finances are performing, and key performance indicators. The financial performance analysis aims to uncover how operational risk

events and adherence to Basel II principles influence commercial banks' overall stability and resilience in Cambodia.

v. Participants

The primary participants in this study are commercial banks operating in Cambodia. The research will consider banks of varying sizes, complexities, and business activities to guarantee the stability and soundness of financial institutions. By including a diverse range of participants, the study aims to offer insights into how different banks navigate operational risks and comply with Basel II principles.

vi. Data Sources

The study will only utilize secondary data sources. Secondary data will include financial statements, regulatory reports, and Basel II compliance assessments.

vii. Analytical Methods

The study will employ a variety of quantitative analytical methods. Quantitative methods will include regression modelling, panel data analysis, and correlation analysis to assess the relationship between Basel II compliance, operational risk events, and financial performance.

viii. Basel II Principles

The study examines explicitly the operational risk management principles outlined in Basel II. It analyzes how Cambodian commercial banks interpret, adopt, and implement these principles. The research aims to identify challenges and successes in aligning operational risk management practices with the standards set forth by Basel II.

ix. Moderating Effect

A crucial study component examines how Basel II principles affect the connection between operational risk occurrences and financial performance. This includes understanding how

adherence to these principles influences the overall risk-return profile of banks and contributes to their stability in the face of operational challenges.

1.8 Limitations of the Study

While this study seeks to offer valuable insights into the intricate relationship between Basel II principles, operational risk management, and financial performance within the Cambodian banking sector, it is crucial to acknowledge several limitations that may influence the research process and the broader applicability of its findings. Firstly, the study's findings may have limited generalizability beyond the context of the Cambodian banking sector. The specific economic, regulatory, and cultural factors unique to Cambodia may contribute to outcomes that differ from those in other global banking environments.

A significant limitation arises from the reliance on historical secondary data, predominantly drawn from financial reports and regulatory documents. The accuracy and completeness of this data are contingent on individual banks' transparency and disclosure practices. Instances of incomplete or unavailable data may constrain the depth of analysis for certain variables. The dynamic nature of the regulatory environment for banking in Cambodia introduces another limitation. Changes and updates to regulations during or after the study period may not be fully captured, potentially affecting the interpretation of findings related to compliance with Basel II principles.

External factors, such as macroeconomic conditions, geopolitical events, and global economic trends, can significantly influence the financial performance of banks. Isolating the impact of operational risk events and Basel II principles from these external factors may pose challenges and introduce potential confounding variables. The study's cross-sectional design, focusing on a specific period, may not fully capture the dynamic nature of operational risk

management and financial performance trends over time. A longitudinal study could provide a more comprehensive understanding of how these factors evolve.

Assessing the effectiveness of Basel II principles and operational risk management practices may involve subjective judgments. Perceptions of effectiveness can vary among stakeholders, and the study acknowledges the potential for bias in self-reported data or qualitative assessments. While the study aims to include commercial banks of varying sizes, the sample size may not fully represent the diversity within the sector. Limitations in access to data from all banks and potential reluctance to disclose certain information could impact the comprehensiveness of the sample.

Given the temporal scope of the study, the currency of the data is limited to the last 3 to 5 years. The analysis may not fully reflect rapid changes in the banking industry or the occurrence of significant events after this period. Despite these acknowledged limitations, the study provides meaningful insights and contributes to the existing knowledge in banking, risk management, and regulatory compliance. Recognizing these constraints is crucial for accurately interpreting the study's findings and guiding future research.

1.9 Significance of the Study

This study carries profound significance across academic, practical, and policy realms, specifically within the unique landscape of the Cambodian banking sector. Firstly, the study enriches existing knowledge in the academic sphere by delving into the intricate dynamics between Basel II principles, operational risk management, and financial performance in the Cambodian banking sector. Through empirical research, it aims to contribute to theoretical frameworks, offering scholars and researchers a nuanced understanding of how global regulatory standards manifest in the specific economic context of Cambodia.

On the practical front, the study has direct implications for policymakers and regulatory bodies in Cambodia. By evaluating the effectiveness of Basel II principles and their impact on operational risk management, the study provides valuable insights to inform policymaking. This, in turn, facilitates the crafting of regulatory frameworks that align with global standards and enhance the banking sector's stability and resilience. Commercial banks operating in Cambodia stand to benefit practically from the study's findings. The study offers practical guidance for banks to fortify their risk mitigation measures by identifying effective operational risk management strategies aligned with Basel II principles. This, in turn, can lead to improved operational efficiency and sustained financial performance.

Furthermore, the study contributes to the development of risk management strategies. Banks gain actionable insights into refining their risk management approaches by exploring operational risk events and their moderation by Basel II principles. This tailored understanding of the challenges faced by Cambodian banks is instrumental in enhancing the overall risk resilience of individual institutions. Considering the broader economic landscape, the study holds significance for Cambodia's economic stability and growth. As the banking sector plays a pivotal role in these aspects, effective risk management guided by global standards contributes to the overall stability of the financial system. This, in turn, creates an atmosphere favourable to long-term and sustained economic growth.

The research also makes cross-national comparisons easier by concentrating on Basel II principles and how they affect a particular banking industry. Findings from other areas can be compared with insights from the Cambodian context, promoting a worldwide comprehension of Basel II's relevance and efficacy across various economic environments. Finally, the study is an essential source of knowledge. The results of this study can be included in the curricula of

academic institutions, guaranteeing that future banking and finance professionals are knowledgeable about the real-world applications of international regulatory frameworks. Thus, by thoroughly analyzing Basel II principles in Cambodian banking, the study offers a basis for well-informed decision-making, valuable improvements to risk management, and long-term economic prosperity.

CHAPTER 2: LITERATURE REVIEW

A thorough analysis of the literature on Basel II principles, operational risk management in the banking sector, and bank financial performance is provided by this literature review. The present body of literature thoroughly examines fundamental theories, empirical investigations, and theoretical frameworks pertinent to the complex interplay among Basel II rules, operational risk management, and bank financial performance. Moreover, the next investigation of these processes within the framework of the banking industry in Cambodia is guided by the foundation this section offers for comprehending the present level of knowledge on the topic.

2.1 Theoretical Framework

The theoretical foundations of operational risk management are investigated in this work. The study uses the Fraud Triangle Theory, Agency Theory, Game Theory, and Creative Destruction Theory as guiding theories to assess how Basel II operational risk management affects the financial performance of commercial banks. To thoroughly investigate the connections between Basel II principles, financial performance, and operational risk management in Cambodia's banking industry, the study considers a range of perspectives.

2.1.1 Fraud Triangle Theory

Donald R. Cressey created the Fraud Triangle Theory, which offers a thorough framework for comprehending the fundamental causes of fraudulent activity in corporate contexts (Sánchez-Aguayo et al., 2021). This theory provides important insights into the circumstances and incentives that may give rise to fraudulent conduct, making it especially pertinent to operational risk in the banking industry in Cambodia. According to the theory, three needs must be met for an offence to occur: pressure, opportunity, and rationalization. Additionally, Sujeewa et al. (2018) assert that trust abusers when they believe they have a non-shareable financial issue and know or understand

that this problem can be remedied covertly by a breach of the position of financial trust. Additionally, they can apply expressions to their behaviour in that scenario that allows them to modify how they view themselves as trustworthy individuals concerning how they view themselves as users of the entrusted money or property (Sujeewa et al., 2018). According to this theory, those who commit fraud are under financial pressure, which compels them to do so. Financial pressure can come from a variety of sources, including enormous medical costs, debt, gambling, alcohol, the need to hide someone's poor performance, and increased performance. When people attach an obligation they should obtain from their organization for being productive, this pressure typically combines opportunity and justification to make their behaviours acceptable (Christian et al., 2019).

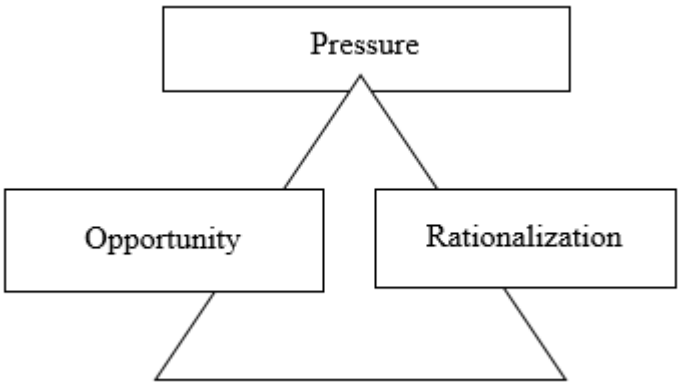


Figure 2.1.1: Fraud Triangle

The graphic depicted in Figure 2.1.1 typically presents the three components of fraud outlined by Cressey. Perceived opportunity and rationalization are the two elements at the bottom of the figure, whereas the top element represents pressure to commit a fraudulent act. These elements are summarized below;

2.1.1.1 Pressure

The core concept of the Fraud Triangle, referred to as "pressure," explores the complex dynamics of financial or emotional stressors that have the potential to drive people to act unethically. According to Mat et al. (2019), "perceived pressure" refers to the subjective elements that shape unethical behaviour. Lin et al. (2018) assert that pressure of any kind, either financial or social, accompanies anyone who turns to fraud. Hashim et al. (2020) offer an alternative viewpoint highlighting the importance of the term "perceived," emphasizing that the pressure need not be physical and that the belief in pressure could be a catalyst for fraudulent behaviour. Hashim et al. (2020) posit that many manifestations of perceived pressure exist, most notably in non-transferable financial needs. About 95% of fraud cases involve financial pressure, the most common cause of unethical behaviour (Hashim et al., 2020). Smaili et al. (2020) investigate the role of corporate and personal pressures as stand-ins for the factors that drive dishonest behaviour.

Moreover, there are many instances of perceived pressure, such as greed, unsustainable lifestyles, large expenses or personal debt, financial difficulties in the family, health problems, and addiction troubles (Dabor et al., 2018). The study by Dabor et al. (2018) employs a metaphorical description of pressure as the "source of heat for the fire," highlighting its catalytic function. But it's important to remember that pressure alone does not excuse dishonest behaviour (Andersen et al., 2018). The definition of pressure is broadened by Andersen et al. (2018), who classify it as possibly non-financial, political, social, or financial. When someone believes their reputation or status prevents them from failing, political and societal pressures build (Awalluddin et al., 2022). Pressure related to greed or personal financial strain may motivate employees to commit fraud (Awalluddin et al., 2022; Kakati et al., 2019).

Furthermore, a person's decision to commit fraud is influenced by the complex interactions between these factors. According to Nwaobia et al. (2021), six primary pressure categories include personal issues, corporate inversion, position accomplishment, and employee connections. Within the particular context of the banking industry in Cambodia, stressors can originate from several different places, including individual financial difficulties, dissatisfaction with employment, and external economic hardships. People under a lot of stress may find that turning to fraud is a common coping strategy to get financial relief or live up to inflated expectations. Therefore, understanding the aspects of these constraints in the banking industry is essential to determining potential risk factors that may lead to operational fraud.

2.1.1.2 Opportunity

Perceived opportunity is the second crucial element in the occurrence of fraud. This component deals with the conditions that allow people to commit organizational fraud; these conditions are frequently caused by weaknesses in the control or governance structures that exist within an organization. According to Suh et al. (2019), opportunity is the ability to acquire resources, data, or networks to use for one's benefit. The degree to which adequate internal controls are crucial in reducing this risk. For example, a lack of segregation of duties or insufficient access restrictions can provide an environment where people can embezzle money or falsify financial records (Chalmers et al., 2019).

Perceived opportunity is similar to perceived pressure in that the opportunity need not be actual; instead, it only exists in the perpetrator's mind and opinion. According to Cressey (1953), there is a positive correlation between the perceived risk of being caught and the chance of fraudulent acts. Opportunities for fraudulent operations within an organization are attributed to several variables, including negligence, policy violations, and a lack of disciplinary action.

To further explain the term "opportunity," Suh et al. (2019) define it as the capacity to bypass fraud controls. According to Triantoro et al. (2020), opportunity depends on an employee's ability to spot organizational system flaws and exploit them to enable fraud. Moreover, according to Yusrianti et al. (2020), financial fraud cannot happen without an opportunity, even under conditions of great pressure.

Ngosa et al. (2021) distinguish between two types of opportunity: an organization's innate vulnerability to manipulation and organizational factors that could create an environment favourable for fraud. Several issues, including random audits, poor internal control, and insufficient job division, make it easier for staff members to perpetrate fraud. Al Farooque et al. (2020) measure the possibility of fraud using three proxies: related party transactions, CEO duality, and the distinction between control and cash flow rights. These proxies are based on the Thailand Statement of Audit Standard No. 43. According to Wang et al. (2019), related-party transactions are a frequent opportunity that ranks second in terms of frequency of interaction. Wilks et al. (2020) further support related party transactions and rank them third among the most frequent chances for fraudsters. This sophisticated examination of perceived opportunity highlights how complex the circumstances are that encourage fraud in corporate settings.

2.1.1.3 Rationalization

The third essential component of the Fraud Triangle concept, rationalization, emphasizes the need for offenders to create ethically sound excuses before acting unethically. According to Aksa et al. (2020), this conceptualization entails the creation of justifications and arguments that set immoral behavior apart from criminal activity. The capacity to justify dishonest behaviour becomes crucial; people are less inclined to engage in fraudulent activity without a justification. Phishing actors have been known to make justifications like "I was only renting the money" or "I

had a right to the money since my boss is cheating on me." Furthermore, as noted by Cressey (1953), some excuse their conduct with claims such as "certain individuals did it, why not me too" or "I was forced to steal to buy food for my family."

The identification of rationalization presents a significant challenge since it is intrinsically subjective and internal, existing only in the fraudster's mind. Shepherd et al. (2019) highlight that fraudsters have a particular thinking that allows them to justify or defend their fraudulent behaviour. Thus, rationalization serves as a means by which workers who lack moral character or integrity excuse themselves from participating in dishonest behaviour. The framework that justifications take root in is shaped by the complex relationship between an individual's beliefs and ethical ideals and their propensity to perpetrate deception.

In support of this concept, Yulistyawati et al. (2019) claim that when someone can successfully justify fraudulent behaviour, a bridge between incentive/pressure and opportunity is built. This emphasizes the significance of fraud as a psychological process and rationalization's critical role in bridging the act's situational and motivational parts. Hence, examining rationalization is a crucial step toward understanding the complex dynamics that underpin fraudulent behaviour in organizational contexts as people navigate the delicate interplay of opportunity, pressure, and rationalization.

With the contributions of researchers over time, Cressey's Fraud Triangle theory has experienced significant development. Albrecht et al. (2018) introduced the fraud scale, a significant change to improve fraud prevention, where they recommended weighing the relative influences of possibilities, pressure, and moral integrity. To determine the likelihood of fraudulent acts, they recognized that it was challenging to predict fraud because occupational fraud criminals did not fit a specific profile. They substituted the crucial component of personal integrity for logic

in this adaptation. The creation of the fraud scale signifies a sophisticated advancement in understanding and managing fraudulent actions. It is especially useful in observable financial scams such as financial statement fraud.

Vousinas (2019), building on Cressey's model, extended the theoretical framework by adding the capabilities component, changing the conventional Fraud Triangle into a more intricate structure similar to a diamond. This change recognizes that an individual's innate qualities and aptitudes significantly impact the likelihood of fraud. This adaptation highlights the complex interplay between several factors contributing to fraudulent behaviour by introducing capacity.

Desai et al. (2020) enhanced the Fraud Triangle by thoroughly comprehending the reasons behind fraudsters' actions. They coined MICE, meaning money, ideology, coercion, and ego. This classification divides the motivations into three distinct categories: ego, which is the driving force behind fraudulent acts; pressure, which involves people who may be unintentionally drawn into a fraud scheme and may turn into whistleblowers; and ideological motivations, which include those who defend fraud by arguing that it serves a greater good that aligns with their worldview.

The concept of ego as a motivator broadens the understanding of fraud by acknowledging that people may commit fraud to maintain their perception of themselves in response to social pressures and the fear of losing their position (Orth et al., 2022). How the Fraud Triangle has changed over time emphasizes how flexible fraud theory is, allowing it to consider various elements and incentives that add to the intricate web of dishonest activity.

According to a thorough investigation by Ramamoorti (2019), human behaviour is the primary source of fraud. His analysis of fraud considered sociological and psychological viewpoints, providing a comprehensive grasp of the complex elements influencing fraudulent

activity. The development of the A-B-C model unveiled a year later and offered an organized framework for evaluating and classifying fraud, was a crucial result of his research.

The A-B-C model was further elaborated upon by Saluja and Mittal (2022), who distinguished between three different forms of fraud: a bad Apple, a bad Bushel, and a bad Crop. A bad Apple symbolises individual fraud, signifying situations in which a single person commits fraud. Conversely, collusive fraud—which entails the cooperation of several parties in the conduct of fraudulent acts—is typified by a bad Bushel. Saluja and Mittal (2022) states that the most harmful type is a bad Crop, which entails fraud committed in concert with social and cultural mechanisms ingrained in the organization's atmosphere.

A bad crop is defined by moral defects in the organization's leadership, and that is where the urgency rests. Under this scenario, moral deficiencies spread rapidly among subordinates, resulting in the widespread adoption of fraudulent behaviours. Since bad crops are so harmful, fraud is no longer a singular act but rather an institutional culture in which unethical behaviour permeates every level of the organization, from executives to employees. Saluja and Mittal (2022) appropriately describes this phenomenon as an "epidemic," highlighting how widespread and infectious fraud becomes when ingrained in an organization's social and cultural fabric.

With Saluja and Mittal (2022) classification of fraud forms, Ramamoorti's (2019) observations on the behavioural components of fraud essentially illuminate the complex character of fraudulent activity. Therefore, understanding the aspects of individual fraud, collective fraud, and the dangerous domain of a bad crop becomes crucial for establishments looking to strengthen their moral core and stop the spread of fraud behaviours among their personnel.

The three elements constituting the Fraud Triangle, perceived opportunity, pressure, and rationalization, are intricately interconnected, forming a dynamic relationship wherein the

magnitude of one element influences the others. A larger perceived opportunity corresponds to heightened pressure and diminished rationalization, creating a conducive environment for the execution of fraud. Managers can leverage this understanding of interactive dynamics to identify potential areas vulnerable to fraud and proactively fortify these areas to preclude fraudulent activities. As explained by Cressey (1953), fraudsters' rationalization often stems from an imaginative perception that the victim owes them, justifying their actions as a rightful claim to more than they receive. Recognizing this cognitive process is pivotal for comprehending the psychological underpinnings of fraudulent behaviour.

In the context of Cambodian commercial banks, applying the Fraud Triangle Theory involves a comprehensive examination of the unique stressors confronting banking employees. This analysis encompasses an evaluation of the effectiveness of internal controls and a deep understanding of the prevailing rationalization mechanisms ingrained in the organizational culture. By delving into these aspects, the study seeks to unveil the specific pressure points, opportunities, and rationalizations that may contribute to operational risk events tied to fraudulent activities.

The study, grounded in the Fraud Triangle Theory, aims to elucidate the motivations behind fraud in Cambodian banks. This approach aligns with the broader framework of financial fraud research variables, seeking to unravel the causal factors that drive fraudulent behaviour. The in-depth exploration of the Fraud Triangle's components within the Cambodian banking sector is a strategic tool for formulating and implementing targeted preventive measures. The ultimate goal is to foster a robust operational risk management framework that can effectively mitigate the impact of fraudulent activities, contributing to the overall integrity and stability of the Cambodian banking landscape.

2.1.2 Game Theory

According to Maskler et al. (2020), game theory is a field of economics that examines how actors motivated by profit interact. As its name implies, its main idea is derived from games like chess. Game theory concepts can encompass a wide range of broker transactions. What is the best and most logical thing a player needs to do to win is the main question in game theory. The answer to many transactions is that a player's gains are dependent upon the decisions taken by other players. Additionally, it is an effective analytical tool in strategic management and economics that provides insightful information about rational players' strategic relationships and choices (Palafox-Alcantar et al., 2020). Therefore, if the player wants to maximize their profits, they should picture a scenario in which other players want to maximize what they produce.

In player interaction, the negotiation game theory is the most significant and frequently applied (Hu et al., 2021). In many organizational and business-related activities, negotiation and bargaining are involved. Different discussions are categorized according to how difficult it is to reach a consensus in a dynamic setting with several participants and an unformed environment (Hu et al., 2021). In this field, game theory is one of the theoretical frameworks and computational techniques managers, and economists are primarily searching for since it can simulate negotiating collaboration and inconsistency.

Game theory may be used to represent the capital market since it is a setting where competitors compete to make the biggest profits. Using this theory, banks' position in the market can be compared to their presence in a game. Game theory defines two categories of games: cooperative games and non-cooperative games. In non-cooperative games, each player selects their strategy; however, in cooperative games, players can participate in joint activities, which is preferred above individual player activities (Maschler et al., 2020).

In cooperative games, players can unite into coalitions to play the game in a way that maximizes points for each player. In this instance, players' combined strategies result in the final payout, and the game's outcome should fulfil each player's objectives (Maschleret al., 2020). Therefore, each player's goal in the cooperative game is to increase their revenue and the revenue of the other side or sides.

Hannah et al. (2021) state that the two primary axes used to analyze cooperative games are the division of values gained through collaboration and the development of coalitions. A linearly transferable commodity (for instance, money) must be available for a group of players (a coalition) to share successes and values.

There are various models for the game analysis concerning the presence of the distributable commodity (value) within players and the exchange of it for the game's targets and extension; the most significant ones are the interest of non-transferrable and transferable values. In this context, desirability refers to the degree to which players prefer to receive commodities (value), and desirability of transferable refers to the ability of players to transfer a portion of their commodity (value) to other players without incurring any losses—this is the case when the price of the commodity (value) is the same for each player. The cooperative game in this study is analyzed using the desirability of the transfer model.

Khanizad & Montazer (2018) assert that each bank can make a unique profit if they band together. In other words, if a bank leads a coalition in terms of profit, other banks should not be expected to follow suit, as any bank may have the highest profit in one coalition while falling short of the maximum profit in another. Thus, choosing a balanced approach is crucial for every bank in every alliance. However, a legally binding agreement among the banks makes using multiple techniques and sharing profits between them possible (Fernández-Villaverde et al., 2021). The

cooperative game of transferable desirability is also being used to mimic this scenario. In this case, a bank part of a coalition with other banks will try to keep the coalition going if it makes more money than the other banks. In this situation, a strategy that may fairly and adequately split profits among coalition members is crucial.

Furthermore, according to Morelli et al. (2022), game theory, as defined by Von Neumann and Morgenstern (1944), concentrates on strategic decision-making in scenarios where the results of one participant's decision depend on the decisions of other participants. Strategic interactions are common in banking, as institutions compete in a competitive environment. When it comes to how banks strategically handle regulatory obligations, game theory comes into play. They must balance the necessity of compliance and the optimization of operational risk management methods.

According to Xu et al. (2021), compliance in the context of banking rules can be viewed as a strategic game in which banks compete to maximize their usefulness while meeting regulatory requirements. To comply with Basel II guidelines, banks must choose how much time and money to devote to operational risk management. A strategic analysis of the possible costs, advantages, and competitive positioning goes into this choice.

Game theory offers a framework to comprehend the strategic factors in applying Basel II principles in the particular setting of Cambodian commercial banks. To obtain a competitive edge, banks might, for example, deliberately decide to invest in advanced risk management systems or work with regulatory bodies to reshape the regulatory environment to their advantage. By applying Game Theory to the theoretical framework, the study seeks to clarify the strategic dynamics surrounding the application of Basel II standards in the banking industry in Cambodia. This method facilitates a more thorough understanding of the intricate interactions between international standards and regional banking practices by allowing a nuanced investigation of how

rational actors—commercial banks—strategically engage with operational risk management practices in response to regulatory requirements.

2.1.3 Agency Theory

Agency theory provides a framework for studying the relationship between principals (owners) and agents (managers) in an organization (Solomon et al., 2021). The theory postulates that conflicting interests between principals and agents may result in agency issues like fraud, risk-taking, and shirking. Conflicts of interest between a principal and an agent can be resolved by applying the agency principle. However, it necessitates a concession from one side on behalf of the other. According to Parker et al. (2018), an agency is a collaboration between two parties where one, known as the agent, represents the principle. Usually, an agent is hired by the principal to perform an action or offer a service on his behalf. It follows that the agent uses the principal's resources and makes choices where the principal bears all associated risks.

As a result, agency relationships become more complex since disagreements, conflicts, and disputes over interests occur. A principal-agent conflict arises when the goals of the principal and the agent diverge. This explains why a theory such as agency theory is necessary to govern an agency's operations. The agency theory guides establishing agency relationships to minimize disputes and problems between agents and principals. The agency hypothesis is predicated on two main tenets: People are naturally egoists, acting only in their best interests (Maggetti & Papadopoulos, 2018). To put it briefly, both the principal and the agent have their interests in mind, although agents typically make decisions and have access to more information.

According to the principle-agent method, the principal and the agent will work together to maximize their respective positions by reading the contract to suit their interests (Kovermann & Velte, 2019). This method uses mathematical modelling for relationship creation and is based on

economic research. On the other hand, positivist agency theory uses the logic and assumptions of agency theory to understand behaviours in the real world using descriptive logic. Political science, expert agency, sociology, and many other fields have expanded and utilized positivist agency theory, such as developing and constructing an all-encompassing framework (Parker et al., 2018).

Positivist agency theory (PAT) has solved most of the shortcomings of principal-agent research, including the complexity of real-world relationship challenges (Gwala & Mashau, 2023). PAT aims to combine political science, expert agency, the law of agency, and sociology into a cohesive framework that explains the emergence of business-government ties and offers suggestions for improving their management. Furthermore, the entire board of directors and individual directors can bind the business to contracts with outside parties (Baysinger & Butler, 2019). Since the board of directors is given the majority of the authority to act on behalf of the company, it, along with the management, has broad authority to decide what the company should do, its goals, its business strategies, how it should invest, and whether or not it will achieve its targets.

The application of agency theory to the economic domain reveals a complex web of relationships marked by possible conflicts and interdependence. Various relationship types under this framework illustrate the complexities of the principal-agent dynamic, wherein competing interests and choices can influence the trajectory of economic dealings.

i. Shareholders and Company Executives

The interaction between company executives and shareholders, who represent the principal, is central to the concept of agency (Guping et al., 2020). As principals, shareholders invest in a firm, believing that its management would make choices to maximize returns on their investments. A bad relationship results if an executive's choices negatively affect the shareholder's

stock value. On the other hand, ethical and financially advantageous choices build rapport, promote trust, and align interests. This complex link highlights how important it is for leaders to make moral decisions because they directly impact shareholders' financial well-being.

ii. Investor and Fund Manager

An investor and a fund manager have a symbiotic relationship in which the investor acts as the principal and gives the fund manager a share of their income for wise investments (Koedijk, 2019). In this case, the fund manager's choices directly affect the financial results for the investor. A bad relationship could develop if the fund manager's investment techniques provide lower returns than anticipated. On the other hand, extraordinary returns and well-thought-out investment choices promote a positive relationship marked by mutual benefit and trust. This relationship captures the potential problems that result from giving a designated agent financial decision-making authority within the agency theory framework (Reim et al., 2018).

iii. CEO and Board of Directors

As one moves up the ladder, another aspect of agency theory is embodied in the connection between the CEO and the board of directors. In this case, the CEO's decisions affect the positions and financial standing of the board of directors, which stands in for the principal. The board of directors can vote through procedures to voice their disapproval if the CEO takes actions that would negatively impact the company's finances. On the other hand, favourable financial results brought about by the CEO's creative choices foster a positive connection with the board of directors. The significance of strategic decision-making and effective leadership is emphasized by this hierarchical relationship, which impacts the entire organizational structure.

Payne & Petrenko (2019) state that the complex interaction between principals and agents inside organizational systems is the core idea of agency theory. This idea is quite significant when it comes to the banking industry in Cambodia. The principal-agent relationship describes how decision-making power is transferred from principals, typically owners or shareholders, to agents, typically employees or management (Bulkley et al., 2021). With the understanding that representatives would act in the organization's best interest, this delegation is based on trust. However, despite their mutual benefit, principals and agents can have conflicting goals, leading to inherent conflicts. The complexities of the principal-agent relationship are crucial in Cambodian commercial banks, where operational risk management is a crucial aspect of organizational governance. To ensure that actions align with the organization's long-term goals of stability and growth, shareholders assign bank management the duty of operational risk management. However, disputes may arise when management's interests diverge from the shareholders' strategic vision. This complex interaction serves as a focus for investigation as the research aims to clarify the nuances in the principal-agent relationship related to operational risk management in the banking industry of Cambodia.

The recognition of knowledge asymmetry between principals and agents by Agency Theory provides a more sophisticated understanding of the dynamics of decision-making (Parker et al., 2018). This idea becomes especially important when considering Cambodian banks. According to the theory of information asymmetry, agents—typically management or staff members—frequently have access to more complex and extensive operational data than principles, such as shareholders. Because of this disparity in information, agents may take advantage of this and decide to put their interests ahead of the principals'. Information asymmetry becomes crucial in the banking environment in Cambodia, as managing operational risks effectively necessitates a

thorough grasp of both internal and external elements. With comprehensive insights into day-to-day operations, management may wield this information to make decisions that optimize short-term gains, thereby neglecting the long-term interests of shareholders. Examining the consequences of information asymmetry within the operational risk management framework reveals the necessity of strategic procedures to close this gap and guarantee that actions align with the organization's larger goals.

Agency Theory suggests putting strong monitoring and control systems in place to deal with the problems brought on by knowledge asymmetry (Albertus, 2019). By balancing the interests of principals and agents, these mechanisms act as a fulcrum and promote an atmosphere of responsible decision-making in companies. Monitoring and control procedures are becoming increasingly crucial as Cambodian commercial banks navigate operational risk management challenges. These mechanisms cover various tactics, such as oversight procedures, incentive programs, and performance measures. According to Cobbe et al. (2019), performance metrics offer measurable standards by which agents' choices and behaviours can be assessed. Metrics related to operational risk management could include compliance with Basel II guidelines, the efficiency of risk-reduction tactics, and the overall effect on the bank's bottom line.

In contrast, incentive structures function as instruments for motivation, bringing agents' interests into line with the organization's overarching objectives. Incentives may be used, for example, to compensate management for implementing successful risk management strategies that support long-term stability. The purpose of oversight procedures is to ensure that decisions made by agents align with organizational goals and set standards. Principals or regulatory agencies closely monitor them. Examining the effectiveness of monitoring and control mechanisms becomes crucial in the Cambodian banking sector because applying Basel II principles influences

operational risk management methods. In addition to ensuring that operational risk management decisions comply with regulatory standards, the study explores how these methods are used to close information gaps, align interests, and support the organization's continued growth and stability.

2.1.4 Creative Destruction Theory

Joseph Schumpeter, an Australian capitalist economist, proposed this theory in 1942 (Bloch & Metcalfe, 2018) to explain the relationship between economic breakthroughs and the corporate cycle. The theory of creative destruction holds that the industrial revolution constantly changes the economic systems from the inside out, demolishing the previous ones and creating new ones in the process (Bloch & Metcalfe, 2018). He describes creative destruction as a process whereby new goods, production techniques, distribution channels, and technology render the previous ones obsolete, forcing established firms to adapt to a changing environment or risk failure swiftly. This happens when the invention dismantles long-standing arrangements and releases funds for alternative uses. According to Bloch and Metcalfe (2018), the theory also observes that the revolutionary process penalizes inefficient resource allocation strategies and rewards successful adaptations and innovations.

Though some people may find the process complicated and dislikeable, the trend is advancement, expansion, and rising living standards. The word "destruction" implies that there can be both winners and losers in the process of creative destruction, as well as potential losses and gains. For instance, the 1990s saw a change in social and economic institutions due to the advent of internet-based firms. Newly formed internet-based companies and those that successfully incorporated internet-based technology into their operations triumphed over old economy companies that could not adjust to profit from the new technology (Roblek et al., 2020).

Furthermore, according to Schumpeter, risk-bearing appears to be more common when businesses can put in place regulatory measures to safeguard their investments because technological innovation is inherently dangerous. Schumpeter successfully refutes insignificant theories of economic evolution by arguing—through the theory of creative destruction—that economic evolution involves the destruction of antiquated goods and procedures due to novel inventions rather than a straightforward growth progression in which each sector develops in a balanced manner. Furthermore, he contends that since current companies find it difficult to update their areas of expertise and competency, they usually fail during the evolutionary process (Bloch & Metcalfe, 2018).

Therefore, the theory of creative destruction highlights responses to the transient welfare costs and exposes the competitive struggle. The entrepreneurial landscape is improved by disruptive innovation and creative destruction, but competition and sectorial market regulation can impede or even completely stop this progress (Zwick, 2018). Specific product or process innovation will happen every moment if there are no barriers. Without barriers to adaptation, constant innovation would result in never-ending restructuring. Creative destruction is slowed down by some obstacles, such as institutional, technological, and regulatory barriers resulting from human construction. In favour of creative destruction, Pettinger (2018) contends that an organization should shut down if it starts to lose money to free up resources for other, more successful businesses. If this resistance to change persists, society might continue to live according to 19th-century norms. Furthermore, he contends that the threat of bankruptcy by innovation pushes businesses to adjust to shifting consumer demands and, ultimately, control expenses.

Additionally, he supports creative destruction, arguing that although people usually ignore the new jobs generated by this economic shift, temporary job losses are unfortunate for individuals

who experience them. However, long-term increases in real wages will be possible through labour market volatility. New employment will also be created when new businesses and industries are developed, leading to higher living standards. This theory most closely matches the data in the study since only 10% of maintenance is typically unscheduled, and 90% of downtime is generally scheduled due to system upgrades, maintenance, and backups for banks. Similarly, the development of new banking information technologies necessitates the demolition of older ones; this is a characteristic of creative destruction.

For this reason, banks will suspend a portion of their daily operations to improve their IT systems. Unfortunately, operational risk is present while this upgrading is happening because many banking services, particularly Internet banking, are largely unavailable, which could reduce their financial performance. Schumpeter, a capitalist, asserts that while creative destruction is in motion, profits and pain will unavoidably occur simultaneously since they are inextricably linked. The study benefits from using creative destruction theory, which clarifies how utility outages and business disruptions resulting from bank system upgrades impact the banks' bottom line.

The theory of Creative Destruction is a compelling perspective for examining the complex relationship between disruptive events and the development of the banking industry in the context of operational risk management and its effect on financial performance. This theory, credited to economist Joseph Schumpeter, explores the complex relationship between risk and innovation and clarifies how disruptive events can trigger revolutionary change. Clarke (2019) asserts that the creative destruction theory suggests operational risk events when applied to the banking industry. However disruptive, they can potentially be potent catalysts for innovation and revitalization. It contradicts the widely held belief that risk is only bad, arguing that crises force businesses to reevaluate, adjust, and eventually innovate to meet new challenges.

Additionally, operational risk events, such as unanticipated economic downturns, regulatory changes, or technology malfunctions, produce a turbulent environment for change in the banking industry (Gomber et al., 2018). The Creative Destruction Theory examines the aftermath of such events and contends that dismantling long-standing conventions and practices makes room for fresh, more durable structures. For example, vulnerabilities discovered by a cyberattack on a bank's systems may require a thorough review of cybersecurity procedures. As a reaction, the bank might innovate by implementing state-of-the-art technologies, strengthening its defences against potential dangers. Although the initial disruption can negatively impact the bank's financial performance, the bank can be positioned for long-term viability through subsequent innovation and adaptability.

Furthermore, the theory emphasizes how creative destruction is cyclical (Emami Langroodi, 2021). Once a collection of innovations gains traction, it may become outdated or require additional modification to keep up with changing threats. This iterative procedure fosters ongoing creativity and guarantees that entities maintain flexibility amidst the constantly evolving terrain of operational hazards. The Creative Destruction Theory provides a sophisticated viewpoint in comprehending how operational risk events affect the financial performance of commercial banks in Cambodia. The theory adds to the discussion on resilience and adaptability in the banking industry by interpreting disturbances as opportunities rather than just setbacks that require rethinking and strengthening existing operating frameworks. The study will use the Creative Destruction Theory to shed light on the specific operational risk events that Cambodian banks have faced over the past three to five years. These insights will help explain how these events could have acted as catalysts for innovation, which could have affected the sector's overall financial performance.

2.2 Conceptual Framework

This study's conceptual framework is derived from the discussion surrounding the Bank for International Settlements (BIS), explicitly emphasizing the Basel II Pillars. Basel II defines operational risk under its Pillar 1 framework, recognizing it as a major risk factor affecting commercial banks. Thus, this conceptual framework aims to show how financial performance (the dependent variable) and operational risk occurrences (the independent variable) relate to one another in Cambodian commercial banks. It explores the complex dynamics of operational risk variables that affect the results of financial calculations. Basel II defines operational risks as a range of factors that have the potential to impact a bank's stability and financial well-being. Certain operational risks are monitored and quantified under the Basel II Pillar 1 framework to determine their effect on the financial performance of commercial banks.

These Basel II-classified operational risks include many elements, including internal process flaws, cyber threats, compliance problems, and technology breakdowns. The BIS discussion offers essential insights into how these risks are evaluated and dealt with within the regulatory framework. This study applies the BIS discourse on operational risk to understand and measure these risks in Cambodian commercial banks. The research intends to analyze and evaluate these operational risks' effects on the financial performance indicators of Cambodian commercial banks experimentally following Basel II's Pillar 1 rules. In addition, the research uses the BIS's refinement of the Basel II Pillars to organize a strong conceptual framework. Based on Basel II's requirements, it seeks to clarify the connections between financial performance measures and measurable operational risks. This framework acts as a well-organized framework that facilitates a methodical examination of how certain operational risks outlined by Basel II impact the financial stability of commercial banks in Cambodia.

Operational risk is the possibility of suffering a loss, either directly or indirectly, due to external occurrences or insufficient or unsuccessful internal procedures, people, and systems (Higginbotham, 2021). The operational risks associated with the banking sector fall into seven primary categories: customers, goods, and company practices; fraud, both internal and external; safety at work and work practices; physical asset damage; system failure and business disruption; and implementation, their delivery, and process risks (Higginbotham, 2021). The five operational risk-independent variables that were thought to impact the financial performance of commercial banks served as the foundation for the conceptual framework of this investigation. These include expenses related to financial fraud, rules, utility and business interruptions, operational risk litigation, and disregard for workplace safety and employment practices laws. This study uses the five Basel II operational risks to illustrate how operational risks and financial performance interact, as shown in Figure 2.2 of the conceptual framework.

Moreover, operational risk events encompass an array of disruptive factors that can impede a bank's regular operations. These include technological failures, regulatory non-compliance, cyber threats, Loan restructurring and internal process deficiencies. Each event functions as an independent variable, distinguished by unique indicators and measurements:

- Technological failures: Indicators encompass system downtime frequency or maintenance issues quantitatively measured by the duration of system outages.
- Regulatory non-Compliance: Indicators involve breaches or penalties incurred due to regulatory violations, quantified by the number and severity of non-compliance instances.
- Cyber threats: Measurable through the frequency and severity of cyberattacks, considering factors such as attempted breaches and compromised data.

- Loan restructuring: It refers to the process where a borrower and lender agree to modify the terms of an existing loan agreement
- Financial fraud: This is the deliberate act of misrepresenting, making false claims, or withholding material information connected to financial transactions to gain personal profit

Financial performance is the dependent variable, reflecting outcomes influenced by operational risk events. It comprises various financial indicators:

- Return on Assets (ROA): Measures the bank's profitability relative to its total assets.
- Return on Equity (ROE): Reflects the bank's profitability concerning shareholders' equity.
- Net Interest Margin (NIM): Quantifies the bank's profitability from lending activities.
- Non-Performing Loan Ratio (NPL): Indicates the bank's loan portfolio quality and potential credit risks.

Four concepts (the fraud triangle, game, agency, and creative destruction theory) further influenced the conceptual framework. According to Cressey's 1953, three things lead to fraud triangle theory: opportunity, justification, and perceived pressure (Sánchez-Aguayo et al., 2021). Thus, the theory argues that employee fraud is caused by financial strains like high medical bills, fraud chances such as having access to money, and rationalizing that their actions are acceptable. The fraud triangle theory explains how financial fraud, as an independent variable, affects the financial performance of commercial banks. A further source of inspiration for the conceptual framework was game theory, which studies the relationships between actors driven by profit and takes its cues from tactical games like chess (Maskler et al., 2020). Considering that a player's gains depend on the decisions made by other players, the critical challenge in game theory is determining the best course of action for a player to win. In strategic management and economics,

game theory is a useful analytical tool that provides insights into rational participants' strategic interactions and decisions. In particular, negotiation game theory is important for player interactions and is frequently used in business and organizational contexts where bargaining and negotiation are involved. Game theory can be used to relate bank positions to their responsibilities in a competitive game within the capital market setting. According to the theory, games can be classified as cooperative or non-cooperative depending on whether participants choose their strategies or participate in group activities. Players can organize coalitions in cooperative games to further their shared goals and maximize overall results. The main subject of cooperative game analysis is the division of values attained via cooperation and coalition building.

Furthermore, according to Solomon et al. (2021), agency theory provides a framework for analyzing the relationship between principals, owners, and agents, or managers inside an organization also serves as inspiration for the conceptual framework. The basic tenet of agency theory is that agency problems like fraud, risk-taking, and shirking can result from competing interests between principals and agents. Applying the agency principle is necessary to resolve these disputes, even though it may mean one party making concessions on the other's behalf. Parker et al. (2018) define an agency as a partnership in which one of the parties represents the principal. Usually, the principal appoints an agent to carry out operations or render services on their behalf; the agent makes decisions that entail risks that the principal must bear and uses the principal's resources. Consequently, possible conflicts, disagreements, and arguments over interests make agency relationships complex.

Moreover, Schumpeter's 1942 theory of creative destruction, which maintains that the Industrial Revolution perpetually alters economic institutions from the inside, dismantling the old and establishing new ones, served as the conceptual framework's compass. As a result, new

technological advancements render outdated older technologies, compelling banks to modernize their IT systems (Bloch & Metcalfe, 2018). Consequently, this theory was applied to support the independent variables of energy outages and business disruption that affect commercial banks' financial performance. Therefore, the suggested conceptual framework aims to show how financial performance (the dependent variable) and operational risk occurrences (the independent variable) relate to each other in Cambodian commercial banks. As seen in Figure 2, it explores the complex dynamics of operational risk factors that affect financial results.

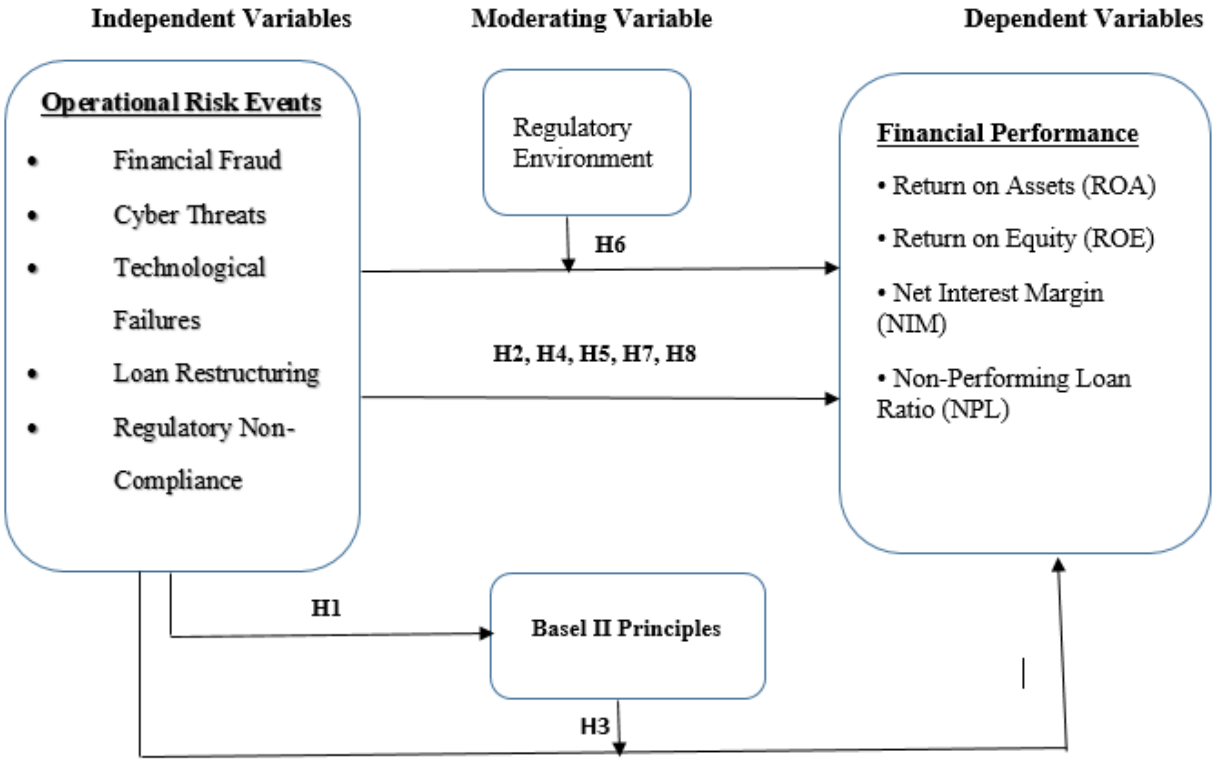


Figure 2.2: Conceptual Framework

2.2.1 Review of Variables

2.2.1.1 Financial Fraud

Financial fraud is the deliberate act of misrepresenting, making false claims, or withholding material information connected to financial transactions to gain personal profit (Awolowo, 2019).

Furthermore, Mitchell et al. (2018) define fraud more thoroughly, characterizing it as any action taken by a person to give themselves an unfair or dishonest advantage over another.

Commercial banks are subject to various operational risks due to Basel II requirements. These dangers can be classified into eight major types. These include connection risks, client product and business practices, system failures and interruptions, workplace safety and employment practices, execution delivery and process management, and physical asset damage (Awolowo, 2019). These operational risks might be loosely classified as big or minor depending on how frequently they happen and how serious the losses they are associated with are. Major operational risks are less common but have the potential to cause large losses; minor operational risks are more frequent but have lower losses.

In operational hazards, particular attention is paid to the grave risks of system failures, business interruption, employment practices, and external and internal frauds. We have decided to focus our investigation on these threats because of their potentially catastrophic size. These broad kinds of operational risk must be separated into a number of categories, each of which must be linked to actions that result in the development of operational risk. Except for diversity/discrimination events, internal frauds are defined as losses brought about by actions meant to mislead, embezzle, or circumvent legal requirements, corporate policies, or both, and involving at least one internal party (Handoyo & Bayunitri, 2021). These types of fraud are the result of theft and unlawful activity. Frauds involving unauthorized operations include purposeful underreporting of transactions and intentional misreporting of positions.

Conversely, theft activities include, among other things, insider trading not on the company's account, bribery, tax evasion, worthless deposits, theft, corruption, embezzlement, robbery, wrongful use of assets, malicious destruction of assets, forgery, check kiting, smuggling,

account take-over, impersonation, and insider fraud (Handoyo & Bayunitri, 2021). In contrast, losses resulting from actions taken by a third party intending to defraud, misappropriate property, or evade the law are called external fraud. They include actions including information theft, system security hacking, check kiting, robbery, and forgery (Hull, 2018).

Since fraud is defined as the deliberate use of deception or trickery to obtain an unfair advantage, there must be an ulterior motive, and the conduct itself must always be designed to benefit the offender at the expense of another. As a result, offenders might take many different internal and external shapes. Not Permitted The withdrawal of money from a person's bank account without that person's express permission or agreement is known as withdrawal (Chen, 2020). These occurrences typically occur when someone gives fraudulent or third parties access to personal information, such as passwords and unique identification numbers (PINs), whether willingly or unknowingly. Forgeries could include using a fake client signature to withdraw money from their accounts, forging other funds to move money from one account to another, or using an ATM to transfer money between accounts. Autonomous Teller Device Savings accounts, bank accounts, current accounts, and transfer instruments, including drafts and mail transfers, could all be the target of the fraud.

Unauthorized Using a credit or debit card without the cardholder's permission entails charging costs and making purchases of goods and services. These transactions could result from lost, stolen, unseen, issued on a fraudulent application, counterfeit, or other fraudulent circumstances as specified by the credit or debit card issuer credit or debit cards. Unlawful Deposit Under the Banking and Financial Institutions Act of 1989 (BAFIA), taking is the act of receiving, handling or accepting deposits (cash, precious metals, precious stones, any other article, etc.) from members of the public with the promise of repayment with interest or returns in cash or cash

equivalents without a valid license. Whether or not the "ghost" borrowers repay the loans, experience has shown that dishonest bank managers sometimes grant phoney loans by using fictitious names, signatures, and non-customers as fronts (Nwagbo, 2018).

Financial institutions face the complex issue of bank fraud, which has far-reaching consequences beyond short-term financial losses. The implications are extensive and complex, affecting banks' stability and general operating health. According to Sood & Bhushan (2020), bank fraud includes a broad range of dishonest actions that cause significant financial losses for organizations. The bank experiences direct financial losses from identity theft, fraudulent lending, embezzlement, and other illegal activities. These losses affect the current financial situation and the capacity to fund innovative projects and growth prospects.

The loss of trust that follows the discovery of fraudulent activity may be just as harmful. Customers, financiers, and the general public doubt the institution's dependability and moral character. A bank's long-term viability is significantly impacted by its customer retention rates, which drop as a result of this eroded trust. Fraud cases lead to heightened regulatory monitoring and stricter compliance requirements (Chambers & Vastardis, 2020). Banks must strengthen their internal controls, establish reliable methods for detecting fraud, and follow more stringent guidelines for reporting. The financial impact of these compliance enhancements is substantial, involving extra expenses and resources that would otherwise be devoted to strategic growth projects.

Financial institutions frequently shift resources toward mitigating measures in reaction to fraud instances. It becomes essential to make investments in advanced security procedures, fraud detection tools, and thorough investigations. Although necessary, the bank's overall efficiency and competitiveness are impacted by these reactive actions since they frequently take resources and

focus away from planned developmental projects and customer-centric efforts (Stefanelli & Manta, 2022). The disclosure of fraudulent activity affects investor sentiment and stock prices by influencing market perception. A drop in stock value indicates a loss of trust among investors, which could make it more difficult for the bank to raise money and make investments in growth prospects.

2.2.1.2 Regulatory Non-Compliance Costs

Regulatory non-compliance risk refers to financial losses that might arise from product nature, inadvertent or careless failure to uphold professional obligations to particular customers, such as fiduciary and suitability standards (Rhanoui & Belkhoutout, 2018). Such losses are caused by a variety of incidents, including suitability and disclosure problems, lender liability, aggressive sales tactics, aggressive account churning, misuse of private information, money laundering, unlicensed activity, breach of fiduciary duty, failure to investigate clients in accordance with guidelines, and exceeding client exposure limits. Laws requiring compliance with various laws, such as the Banking Act, prudential guidelines, and other obligations, apply to all commercial banks (Oketch et al., 2018). If a commercial bank breaks established rules, it may be subject to fines or even revoke its license, which might negatively impact its bottom line. Even while commercial banks are subject to regulations that set forth codes of conduct in the form of the Banking Act and prudential standards, among other things, it is noteworthy that commercial banks consistently break these laws throughout the world.

Regulatory non-compliance risk is a significant aspect of operational risks in Cambodia. It represents the possibility of losses arising from an unintentional or careless disregard for professional duties towards certain clients. These duties include appropriateness standards, fiduciary duties, and things to consider because financial products are inherently complex. In 2015,

several events were reported by the Basel Committee on Banking Supervision (BCBS) that were linked to the origins of these losses. The bank's financial performance may be seriously jeopardized by breaking these regulations, which have penalties ranging from monetary fines to license revocation.

Even though there are clearly stated rules of behaviour for commercial banks in many formats, like the Banking Act and prudential recommendations, it is important to highlight that commercial banks globally do not always follow these regulations. The enduring risk of regulatory non-compliance in Cambodia, as in numerous other regions, emphasizes the necessity of strict supervision and strong risk management systems in the banking industry to lessen the possible consequences of such violations.

Regulatory non-compliance poses a multifaceted challenge for banks, stretching far beyond financial penalties to encompass a spectrum of detrimental impacts. At the forefront, non-compliance leads to substantial monetary fines and penalties levied by regulatory authorities (Rathnasamy & Mahabeer, 2021). These financial sanctions significantly impact the bank's financial statements, resulting in reduced profits and, in severe cases, substantial financial losses. Moreover, operational disruptions accompany non-compliance as banks must divert resources promptly toward rectifying issues. This involves significant investment in compliance programs, restructuring internal processes, and hiring specialized personnel, contributing to heightened operational costs.

The consequences extend further into the realm of reputation and customer trust. Non-compliance tarnishes the bank's image, eroding the confidence and trust of customers (Ab Aziz et al., 2023). Public perception of these breaches as ethical lapses can prompt customer attrition, causing revenue loss and diminished market share. The aftermath of non-compliance triggers

intensified regulatory scrutiny, leading to increased oversight and audits. Regulatory bodies often impose stringent reporting requirements, demanding frequent compliance checks, resulting in heightened administrative burden and operational strain.

Beyond immediate consequences, non-compliance affects investor confidence, resulting in fluctuations in stock prices and market valuation. Diminished trust among investors and potential partners hampers the bank's growth prospects and access to capital, imposing long-term financial challenges. Strategically, grappling with compliance issues diverts attention and resources from crucial strategic initiatives and innovative ventures. This diversion impacts the bank's ability to seize market opportunities, leading to potential revenue losses and competitive disadvantages.

In essence, the costs stemming from regulatory non-compliance encompass far-reaching effects, affecting not only financial statements but also reputation, customer relationships, regulatory relationships, investor confidence, and strategic growth. Addressing compliance issues is crucial to mitigate immediate financial penalties and safeguard the bank's reputation, stability, and prospects within the competitive banking industry.

2.2.1.3 Technological Failures and Risks

The usage of computer systems for bookkeeping reconciliation, information retrieval, and storage in the day-to-day operations of banks creates technology risk (Alam, 2019). The danger can arise from adopting new or outdated technology or selecting defective or inappropriate technology. Security lapses that allow someone to access the computer system, tamper with it, or use it without authorization pose a serious risk. Information technology has historically been employed as an aid in the prompt and correct provision of financial services. Information technology applications in the financial services industry have grown significantly over time. A fierce rivalry among banks forced them to offer services off-site, permit consumers to access the

computers from their end, and expand their network of banking products and services. Rapid changes in the technology systems pertaining to financial services pose a larger challenge to banks. The information technology risk has multiplied due to the advent of mobile banking, Internet banking, automated teller machine (ATM) services, and other utility services (MV, 2021). The requirement to offer various online banking services has forced banks to alter their offerings and expedite the provision of services.

One important aspect of operational risk in the banking industry is technological breakdowns. The failures that cause disruptions to the smooth operation of banking activities fall across a wide range, from system outages to maintenance problems (Von Solms & Langerman, 2022). Such malfunctions have an effect that extends beyond short-term annoyances; they may result in significant financial losses and erode consumer confidence. The frequency of system outages is one of the main metrics used to assess technical problems. This indicator measures how frequently a bank's vital systems go down or are interfered with. It entails keeping track of the times that hardware, software, or cyber incidents cause banking systems to become unavailable to internal users or customers. One quantifiable measure of the length of these outages is the time-critical systems remain unavailable.

Furthermore, Zachariadis et al. (2018) found that maintenance problems have a major role in technology failures in banking infrastructure. These problems include interruptions brought on by regular upkeep, upgrades, or updates that unintentionally impair the vital banking systems' ability to function. Quantifying maintenance-related interruptions includes determining the length and frequency of maintenance operations that result in limited or unavailable system capability. Meticulous documentation and analysis of the size and frequency of these incidents are necessary for the quantitative measurement of these indicators, which include the frequency of system

outages and disruptions caused by maintenance. By gathering this information over predetermined timeframes, banks can evaluate the dependability and durability of their IT infrastructure. They can also use it to quantify these failures' operational risks, making it easier to take preventative action to lessen possible vulnerabilities.

To proactively detect vulnerabilities in their systems, financial institutions need to regularly track and assess the length and incidence of technical malfunctions (Abdullah & Choudhury, 2018). Strong risk mitigation tactics, such as increasing disaster recovery processes, improving redundancy measures, and investing in more resilient technology infrastructure, can be implemented due to this proactive strategy. A thorough comprehension and quantitative examination of these indicators help strengthen the banking industry against the disruptive effects of technical malfunctions, guaranteeing improved operational stability and client confidence.

2.2.1.4 Cyber Threats

Cyber threats, which include a broad range of potential attacks that could compromise sensitive data and interfere with regular banking operations, constitute a significant operational risk that financial institutions must deal with. Understanding these risks' frequency, seriousness, and possible effects on the security and integrity of banking systems are necessary for their assessment. Cyber threat quantification requires a thorough analysis that takes into account several factors. Measuring the frequency of assaults is a critical component that requires monitoring instances or attempts of malware incursions, Distributed Denial of Service (DDoS) harm, phishing efforts, or unauthorized access that targets a bank's systems (Bhardwaj et al., 2021). Banking organizations can determine the degree of danger exposure during a specific period by tracking how frequently these efforts occur.

Furthermore, a bank's operations and security are significantly impacted by the seriousness of cyber threats. Determining the extent of harm inflicted by successful cyberattacks is known as severity measurement. This involves assessing the scope of data breaches, the volume of information that has been compromised, the length of system outage brought on by attacks, and the resulting losses in terms of money or reputation. When assessing the seriousness of cyber risks, variables like attempted breaches and compromised data are crucial metrics to consider (Yuryna et al., 2021). The quantity of illegal access or infiltration attempts on the bank's systems is indicated by attempted breaches. Contrarily, compromised data describes the loss or exposure of private data such as bank account details, login credentials, or personal information due to successful cyberattacks.

Monitoring and analyzing security logs, incident reports, and real-time threat intelligence with great care is necessary to quantify these signs. Through systematic evaluation of the frequency and gravity of cyberattacks, banks may strengthen their cybersecurity defences by putting strong policies in place. To quickly minimize possible breaches, these include implementing sophisticated intrusion detection systems, conducting frequent security audits, educating staff members on cybersecurity best practices, and implementing proactive response mechanisms (Loukaka, 2019). A key strategy for banks to comprehend their susceptibility to cyberattacks is quantitatively assessing cyber threats by analyzing their frequency and severity. With this knowledge, they can ensure ongoing operational resilience by strengthening their cybersecurity defences, reducing risks, and protecting their systems and sensitive data from potential attackers.

Cyber threats are an important factor to consider in the context of the study on operational risk events and their effect on financial performance in Cambodian commercial banks. Due to their ability to disrupt operations and impact financial results, these threats have gained attention on a

global scale as substantial operational risks that banking institutions must deal with. As such, they merit careful consideration. The frequency and seriousness of cyberattacks are critical components of operational risk for commercial banks in Cambodia. Since these challenges include intrinsic risks to the institutions' stability, consumer trust, and financial performance, assessing them becomes imperative.

Tracking attempted breaches, malware assaults, phishing attempts, and other cyber incursions on bank systems is necessary to determine how frequently cyber risks occur (Javaid et al., 2023). With this data, banks can assess the frequency of these threats and gain insight into the changing type and severity of the cyber threats they face. On the other hand, the real consequences of successful cyberattacks are included in the severity of cyber threats. This involves assessing the scope of data breaches, compromised information, length of downtime, monetary losses, and possible harm to one's reputation. According to Ugbe (2021), comprehending the gravity of cyber dangers enables banks to see the concrete consequences they pose to their business operations and financial stability. In the banking industry in Cambodia, where technology is developing quickly, the study intends to quantify and examine the frequency and seriousness of cyberattacks. In doing so, it aims to determine their direct impact on these banks' financial performance measures. Shad et al. (2019) assert that strong risk management plans may be developed using these measurements, which provide a better knowledge of how these threats affect profitability, asset quality, and operational efficiency. The study aims to offer empirical insights by quantitatively evaluating cyber dangers and a subsequent correlation between those threats and financial performance metrics. These insights help Cambodian banks protect their financial performance and stability by strengthening their cybersecurity procedures, reducing risks, and enhancing their resilience against prospective cyberattacks.

2.2.1.5 Financial Performance

Financial performance serves as the dependent variable within the framework of operational risk events, encapsulating the consequences and outcomes directly impacted by these occurrences. It embodies a diverse spectrum of financial indicators, each painting a distinct facet of a bank's operational efficiency and sustainability.

Return on Assets (ROA): ROA is a fundamental metric gauging a bank's profitability concerning its total assets. It signifies the bank's efficiency in utilizing its assets to generate earnings. A higher ROA indicates better asset utilization and, often, superior financial health (Rawan, 2019).

Return on Equity (ROE): This metric reflects the bank's profitability relative to shareholders' equity, showcasing how effectively it leverages shareholder investments to generate profits (Sari et al., 2023). A higher ROE generally signifies better financial performance and effective management of investor funds.

Net Interest Margin (NIM): NIM quantifies the profitability of a bank's core lending activities, representing the difference between interest income earned from loans and interest expenses paid on deposits (Chaudron et al., 2023). A wider NIM often suggests better profitability from core operations.

Non-Performing Loan Ratio (NPL): NPL measures the proportion of a bank's non-performing loan portfolio or risk of default (Ma’aji et al., 2023). It indicates the asset quality and potential credit risks within the loan portfolio. Higher NPL ratios suggest increased credit risk exposure, affecting the bank's financial stability.

These financial indicators collectively offer a comprehensive snapshot of a bank's operational health, risk exposure, and efficiency. Analyzing these metrics in the context of

operational risk events provides insights into how these events impact the bank's profitability, asset quality, risk management practices, and overall financial resilience. Understanding these interconnections can guide strategic decisions and risk mitigation efforts within financial institutions, aiming to bolster financial performance and operational stability in the face of potential risks.

2.2.1.6 Loan Restructuring

Loan or debt restructuring refers to the process where a borrower and lender agree to modify the terms of an existing loan agreement (Mutuku, 2020). The repayment plan, interest rates, or other conditions are usually modified in this way to account for the borrower's evolving needs or financial hardships. Loan restructuring is a critical factor in banking and financial institutions that indicates how flexible and adaptive banks are in handling financial hardship or averting defaults (Dendramis et al., 2018). This variable is important in banks' operational risk framework, particularly during periods of economic volatility or when borrowers face financial difficulties. Borrowers may find it difficult to fulfil their loan obligations during economic downturns for various reasons, including decreased income, unstable market conditions, or unexpected events. In these situations, banks may restructure loans to control any losses and avoid defaults.

According to Bawa and Basu (2020), banks can mitigate operational risks related to credit defaults by taking a proactive approach through loan restructuring. Banks try to lessen defaults by providing renegotiated terms and conditions that consider the borrower's existing financial circumstances. This approach contributes to maintaining a healthy loan portfolio, preserving the loan asset's value, and mitigating the effects of non-performing loans.

However, while loan restructuring can help manage default risks, it also poses risks for banks. The process may affect the bank's profitability, liquidity, and general financial health

(Mavlutova et al., 2021). The bank's income from interest payments may be impacted by changing interest rates or extending the loan term, resulting in longer exposure to high-risk borrowers. Therefore, examining the frequency and success rate of loan restructurings can shed light on the general wellbeing of a bank's loan portfolio and its capacity to withstand challenging economic times.

2.2.1.7 Regulatory Environment

The regulatory environment significantly influences banks' operational risk management solutions (Khan et al., 2020). Operational risk events significantly influence how a bank's financial performance is shaped by a tight regulatory framework defined by strict regulations and strong compliance standards. By ensuring that banks follow strict rules, this careful oversight may serve as a precaution and perhaps lessen the negative effects of operational risks. These policies could protect financial performance from significant downturns brought on by operational risk events by implementing stringent compliance requirements. While other variables might also have an impact on this relationship, the decision to focus on the regulatory environment is a result of its fundamental significance and the potential for a clearer and more defined moderating effect on the relationship between operational risk events and financial performance within the Cambodian commercial banks.

On the other hand, operational risk occurrences may have a greater detrimental effect on financial metrics under a more relaxed regulatory environment with less strict enforcement and compliance requirements (Jamil et al., 2023). Isoh & Nchang (2020) contend that careless regulation may unintentionally cause operational risks to increase, worsening their effects on a bank's financial performance. Banks may be more susceptible to the negative effects of operational risk events without strong control, which could significantly impact their financial metrics.

Hence, understanding the correlation between operational risks and financial performance in Cambodian commercial banks becomes more intricate when the regulatory environment is considered a moderating factor. This inclusion acknowledges that the regulatory environment can substantially impact the emergence of operational risks and the ensuing financial consequences. Therefore, this framework provides a comprehensive understanding of how banking laws create financial resilience in the face of operational issues by analyzing the relationship between operational risks and regulatory insights.

2.2.1.7 Basel II Principles

Basel II Principles are considered a moderating variable, playing a crucial role in influencing the relationship between operational risk events and financial performance indicators within Cambodian commercial banks. As a moderating variable, Basel II Principles act as a regulatory framework that aims to enhance risk management practices within banks. These principles provide guidelines and standards for risk identification, assessment, and mitigation strategies, thereby affecting the impact of operational risk events on financial performance. Specifically, Basel II Principles are expected to moderate the relationship between operational risk events (such as financial fraud, technological failures, and regulatory non-compliance) and financial performance indicators (ROA, ROE, NIM, NPL). They do so by influencing the banks' risk management frameworks, capital allocation strategies, and internal controls. For instance, the implementation of Basel II Principles may lead to more robust risk measurement models, improved internal controls, and enhanced risk reporting practices within Cambodian banks. This, in turn, could influence how effectively banks manage operational risk events and subsequently impact their financial performance. Therefore, understanding the role of Basel II Principles as a

moderating variable helps in comprehending their impact on the overall risk management framework within banks and their subsequent influence on financial outcomes.

2.3 Empirical Review

In the review of empirical studies concerning operational risk and financial performance within the banking sector, exploring existing literature provides a foundation for understanding the interplay between these variables. Empirical reviews shed light on the methodologies, findings, and insights garnered from prior research, serving as a compass to navigate the current study's objectives. Empirical studies examining the impact of operational risk events on financial performance in banking institutions have traversed various dimensions. These investigations delve into the multifaceted nature of operational risk, from technological failures and regulatory non-compliance to fraud and cyber threats, each with its distinct influence on financial outcomes.

Moreover, empirical reviews highlight the significance of financial metrics utilized to gauge performance, including return on assets (ROA), return on equity (ROE), net interest margin (NIM), and non-performing loan ratio (NPL). These metrics serve as benchmarks to assess the implications of operational risk events on banking institutions' profitability, efficiency, and asset quality. The empirical review illuminates the diverse landscape of research efforts dedicated to unravelling the complex interplay between operational risk events and financial performance in the banking sector. Drawing insights from these studies informs the current research endeavours, providing a robust platform to build upon and contribute new empirical evidence within the context of Cambodian commercial banks.

2.3.1 Operational Risk Management in Banking

According to Dicuonzo et al. (2019), operational risk management is crucial to a bank's entire risk management strategy. It comprises identifying, assessing, monitoring, and mitigating

risks associated with the regular operations of a financial institution. A well-organized conceptual framework is required for the banking sector to manage operational risk effectively. Operational risk is the potential for financial loss owing to inadequate or ineffective internal procedures, systems, personnel, or external conditions (Barakat et al., 2019). These risks include, but are not limited to, fraud, errors, technology failures, legal issues, and natural disasters. Operational risk is primarily focused on non-financial risks that have the potential to adversely affect an institution's performance and reputation, as opposed to credit and market risks.

According to Atan et al. (2019), operational risk is poorly defined. According to Atan et al. (2019), it is a category of possible firm operational failures that, in the context of the manufacturing sector, are not directly linked to financial risk. This definition of operational risk—that is, the risk of a change in value resulting from actual losses that differ from expected losses because of insufficient or malfunctioning internal processes, people, and systems, or external events, such as legal risk—was adopted by the European Union's Solvency II Directive for insurers. The Basel Committee on Banking Supervision's (2008) Basel II requirements for banks contradict this concept. As per Deng et al. (2019), the word operational risk remains ambiguous as it might be challenging to differentiate it from the "normal uncertainties faced by the organization in its daily operations."

Similarly, Lee et al. (2019) claim that operational failure risk originates from potential failure during business operations. These operational failure risks can be defined as the possibility that the business unit's people, procedures, or technology will fail. It is possible that some failures may be predicted, and the business plan should account for these risks. However, the main operational risks arise from unexpected, and hence unknown, failures. Periodically, these failures should be expected, yet neither their frequency nor their impact may be known for certain.

According to Li and Love (2020), bundling and unbundling risks are crucial components in integrating a financial institution franchise. The company is not, however, exposed to every risk found in the market since some risks can be exchanged and subsequently transferred while others can be eliminated. To improve the implementation and ensuing mitigation of the workable solutions, this calls for integrating a process that improves the splitting of possible risks within the operations and assets into three primary subgroups based on their type.

Li et al. (2021) determine that by integrating and applying a management perspective, the risk associated with financial institutions may be divided into three distinct types. Integrating basic business operations and transferring the risks to other parties can remove the detected hazards, improving active risk management at the organizational level. Integrating methods and procedures that enhance risk avoidance makes it difficult for banks to identify several ineffective hazards to their services. This is achieved by combining several services, such as underwriting requirements, hedging, reinsurance, diversification, and due diligence investigations, to lower the likelihood of suffering substantial losses by removing risks judged superfluous to the company's objectives. The managers then reduce operational and systemic risks by informing the stakeholders about risk levels and elimination techniques (Kure et al., 2018). This is necessary since reducing the identified risks lowers the possibility of future problems and lowers the company's revenue levels. Suppose a risk has no value-added characteristics or can't be linked to any level of competitive advantage through absorption and consumption. In that case, the bank may transfer the risk to other parties that can manage it.

Nonetheless, several risks are there that the original bank absorbs and manages due to their potential to generate profits through the efficient use of resources under their supervision. The bank controls the recognized levels of risk in case the detected risk is complex and restricts the

identification of the required non-firm interests. As per Gerrard et al. (2019), banks possessing intricate, non-fungible, and proprietary assets can recognize that communicating the nature of these assets is more difficult than hedging the underlying risk. Furthermore, giving customers and clients access to sensitive information could give rivals a competitive edge. Internal management of some risks discovered is crucial for the firms since it improves appropriate internal management of the bank's operations. These incidents show that adequate monitoring of returns and risks associated with business activity as part of overall management procedures is necessary for risk management activities. This aims to determine whether the bank's distinct operational capability within the market can be identified by identifying unique hazards, giving the company a competitive advantage over its rivals.

According to Mudanya & Muturi (2018), various risks are associated with banking services, which vary according to the kind of service provided. This has improved the growth of several risk categories, such as credit risk, market risks (which incorporate interest rate, liquidity, and foreign exchange risk), operational risks (which incorporate legal risk as well), and strategic risk (Mudanya & Muturi, 2018). These risks include;

Credit Risks

Zamore et al. (2018) define credit risk as the possibility that the financial instrument's issuer will fail to repay the principal and any other investment-related cash flows following the terms specified in the credit agreement. This aims to show that credit risk is a circumstance in which a payment could be made late or not at all, which could restrict effective cash flow and, consequently, the bank's recognized level of liquidity. By keeping credit-risk exposure within the specified and advised bounds, credit-risk management aims to make the most of the bank's risk-adjusted rate of return. According to Vallabhaneni (2022), this is relevant because credit risk

accounts for at least 70% of a bank's balance sheet and is known to be the main factor in losses and bank collapses.

The bulk of bank failures are caused by a lack of integration of activities that improve bank diversity. This is affected by the emergence of a very profitable prospect for the banks via lending, which strengthens the growth of the bank's market within the regional and industrial domains. According to Roeder et al. (2022), credit risk includes the risk borne by the adversary if they cannot fulfil their debt servicing obligations or the resulting decline in the counterparty's creditworthiness.

According to Doumpos et al. (2019), credit risk is a critical issue in the banking industry since it is possible that borrowers or counterparties will not fulfil their financial commitments, which would cause the lender to suffer a loss. When borrowers default on their loans, lending institutions' cash flows and financial stability are jeopardized. This risk manifests itself. It's a basic risk that banks must manage in their lending operations, and it can come from a number of places. According to Altavilla et al. (2021), banks' lending practices are a primary source of credit risk. Banks naturally take on risk when they grant credit lines, mortgages, or loans to borrowers because default or financial difficulties could result in non-repayment. Due to job losses, economic recessions, or unfavourable market conditions, borrowers may struggle to fulfil their obligations during financial instability or downturns.

According to Gulati et al. (2021), a bank's exposure to several sectors or businesses can also result in credit risk when a bank allocates a sizable percentage of its loan portfolio to one industry over another (such as real estate, energy, or technology), concentration risk results. Unfavourable events or downturns in various industries can severely impact the bank's asset quality, which might raise the default rate.

Individual counterparties' or borrowers' risk fluctuates according to their financial situation and creditworthiness. Banks use credit scoring models, credit reports, financial records, and past repayment trends to determine borrowers' creditworthiness to assess credit risk (Oduro et al., 2019). However, even borrowers who appear creditworthy may be impacted by unforeseen events or abrupt economic changes, which raises the risk of credit. Banks utilize diverse risk management measures to reduce credit risk. Strong credit evaluation practices, loan portfolio diversification across industries and borrower types, credit limit setting, collateralization, and creating risk reserves or provisions to cover default losses are a few of these (Yeboah-Smith, 2023). Moreover, regulatory agencies frequently require banks to keep sufficient capital reserves to guard against possible losses due to credit risks.

Credit risk is still a fundamental part of banking operations; thus, banks must use responsible risk management techniques to reduce possible losses and preserve financial stability. Banks must practice effective credit risk management to maintain lending operations, safeguard capital, and guarantee the overall resilience of the financial system.

Interest Rate Risk

Brand et al. (2018) define interest rate risk as forecasts about interest rate changes intended to lower a bank's projected profits and value. Most bank balance sheet loans, receivables, and term and savings deposits result in revenues that interest rates impact. Since interest rates are uncertain, they are also referred to as earnings. Both borrowers and lenders that use variable rates bear significant interest rate risk. However, since fixed-rate transactions amplify the significant market fluctuations resulting from the variable rates offered to leaders and borrowers, they are not immune to interest rate risks (Carpenter et al., 2018). An increasing range of on- and off-balance-sheet products, deregulation, and a volatile interest rate environment contribute to interest rate risk

management growth. According to Sevil et al. (2018), introducing interest rate derivatives, such as interest rate swaps and financial futures, can improve interest rate management by reducing exposure, which is widespread in the sector. As a result, risk management has become more crucial for banks when evaluating bank interest, and this has been further reinforced by the Basel Committee's recommendations regarding the application of market risk-based capital charges.

Ebenezer et al. (2019) state that interest rate risk, or the possibility of unfavourable changes in interest rates influencing the institution's profitability, asset and liability values, and overall financial health, is a major worry for banks and other financial institutions. This risk, which can affect banks, is brought on by market interest rate changes. As middlemen, banks frequently borrow and lend money, and the interest rates at which they do so might change over time (Abedifar et al., 2018). Banks are exposed to interest rate risk when there is a difference in the interest rates at which they lend and borrow money. For example, a shift in interest rates could result in an imbalance between a bank's income and expenses if its liabilities, such as short-term deposits, have variable interest rates and its assets, such as long-term loans, have fixed rates.

According to Altavilla et al. (2018), an increase in interest rates may have a detrimental effect on a bank's asset prices and profitability. If banks depend on short-term borrowings or deposits, their cost of funding may rise while the income from long-term loans stays constant. Net interest margin compression in this situation could impact overall profitability. Falling interest rates, on the other hand, could reduce interest income by lowering the income from assets while keeping liabilities at higher rates.

Furthermore, according to Kohlscheen et al. (2018), interest rate risk impacts the value of banks' fixed-income assets. Existing fixed-rate assets lose value when interest rates rise, potentially resulting in losses should these securities need to be sold before they mature. Banks use various

techniques to control interest rate risks, such as funding source diversification, asset-liability management (ALM) techniques, and interest rate hedging using derivatives. Asset and liability maturity and interest rate profiles are matched to reduce vulnerability to interest rate changes (Guzel, 2021). Banks are frequently subject to regulations and stress test requirements from regulatory agencies to evaluate their resilience to unfavourable fluctuations in interest rates. Banks can assess their resistance to varying economic conditions and the effects of alternative interest rate scenarios on their financial positions by conducting stress tests.

A bank's interest rate risk profile may change due to each financial transaction it completes. However, the amount and kind of interest rate risk banks are ready to take on varies. Certain banks aim to reduce their exposure to interest rate risk. These banks often do not take positions on purpose to profit from a certain interest rate change. Instead, they try to align their liabilities and assets' maturities and repricing dates. Some banks may decide to take interest-rate strategies or to keep them open because they are prepared to take on a higher degree of risk associated with interest rates.

Acharya et al. (2022) state that banks will have varying policies on the portfolios and activities in which position-taking is permitted. Certain banks want to limit position-taking to specific "discretionary portfolios," such as their money market, investment, and Eurodollar portfolios, and concentrate on managing interest rate risk. According to De Castroa et al. (2019), these banks frequently separate the interest rate risk management and placement in the bank's treasury section using a funds transfer pricing mechanism. Some banks have a more decentralized strategy, allowing certain business lines or profit centres to handle and take positions within predetermined bounds.

According to Gomez et al. (2021), certain banks limit their interest rate risk positioning solely to their trading operations. Others might trade nontrading books and activities or take on or abandon open interest-rate positions (Anagnostopoulos et al., 2019). Beutler et al. (2020) state that banks can adjust pricing, lending, investment, and maturity strategies and manage these portfolios' repricings and maturities to get a desired risk profile. This would change the bank's vulnerability to interest rate risk. English (2018) notes that many banks also employ interest rate swaps and other off-balance-sheet derivatives to modify their interest rate risk profile. However, before utilizing such derivatives, bank management should have a sufficient system for measuring and monitoring their success in managing the bank's risk profile and understanding the cash flow characteristics of the instruments to be employed.

Interest rate risk is still a major worry for banks since it greatly affects their liquidity, stability, and financial performance. In a changing financial climate, banks must manage interest rate risk effectively to preserve profitability, protect against possible losses, and guarantee long-term viability.

Market Risks

Market risks are widely understood to be the risk associated with the value of a portfolio. These risks can be trading or investment-related, and they arise from changes in the importance of the market risk factors, which cause the portfolio's value to fluctuate on a decreasing scale. Song et al. (2022) define market risk as the shift in net asset value caused by economic fluctuations, including changes in interest rates, commodity prices, and market exchange rates. Three common risk factors likely to impact the banking environment include interest rates, changes in foreign exchange rates, and liquidity-related concerns. According to Leo et al. (2018), market risk is a crucial component of banking since it denotes the possibility of suffering a financial loss as a result

of changes in the market. Market risk is a major concern for banks since it immediately affects their trading activity, investment portfolios, and general financial stability.

According to Brand et al. (2018), interest rate risk, or the possible financial impact of interest rate swings, is a critical fear for banks. These rate fluctuations greatly impact a bank's profitability and financial stability, mostly due to its lending and borrowing activities. According to Brand et al. (2018), banks balance their interest-sensitive assets, which include loans, mortgages, and investment securities, with their liabilities, which include deposits and borrowings. Nonetheless, there may be discrepancies in cash flows or durations due to the value of these assets and obligations changing at different rates as interest rates shift. For example, banks holding long-term fixed-rate assets may see a drop in the value of these assets when interest rates rise since newer assets yield higher returns due to higher interest rates (Altavilla et al., 2018).

Liabilities, especially those with fixed interest rates, also stay the same, lowering profitability as funding costs rise. Compressed net interest margins are a common result of this situation, which affects a bank's earnings. In contrast, falling interest rates may boost the value of current fixed-rate assets, but a decline in the yields on obligations, especially interest-bearing deposits (Ampudia et al., 2018). Since the interest paid on deposits decreases more quickly than the interest received on loans or investments, this may impact a bank's profitability.

Foreign exchange risk is a key problem for banks engaged in foreign business because it exposes them to the volatility and unpredictability of currency movements. This risk results from possible fluctuations in currency exchange rates, which could affect the value of foreign currency-denominated assets, obligations, and cash flows. According to Cangoz et al. (2019), banks that deal with international transactions have a variety of assets and liabilities denominated in foreign currencies. These include investments, loans, securities, and foreign currency deposits and

borrowings. Changes in exchange rates impact the valuations of these assets and liabilities. For example, the value of assets a bank holds in foreign currency increases in relation to the value of such assets in the bank's native currency.

On the other hand, the value of those assets decreases when a foreign currency depreciates (Cangoz et al., 2019). This risk encompasses the revenue and financial flows of a bank. Sitompul et al. (2021) state that exchange rate changes can immediately affect a bank's profitability, particularly if a sizable amount of its income or outlays is denominated in foreign currencies. For example, if a bank has outstanding loans in foreign currencies and the value of the payback in the local currency declines, this could affect the borrower's capacity to repay the loan.

Banks employ several measures to efficiently manage foreign exchange risk, a critical component of their operations in international markets. One of the most important strategies for reducing risk is currency diversity. According to Buch et al. (2019), banks lessen their reliance on the performance of a single currency by diversifying their exposure across several currencies (Buch et al., 2019). Buch et al. (2019) state that this diversification technique lessens the negative effects of unfavourable changes in any one currency on the company's overall financial situation. Hedging instruments and forward contracts are essential components of the toolkit of risk management techniques. Banks use financial derivatives such as futures, options, and forward contracts to hedge against possible losses resulting from adverse currency changes. Banks can protect themselves from unfavourable currency fluctuations by securing fixed exchange rates for upcoming transactions using these tools.

According to Gaffeo et al. (2019), banks also use netting, which involves offsetting exposures in different currencies. Banks' currency positions aim to balance or net them out to lower their overall risk exposure. This reduces the volatility from foreign exchange movements in

different currencies, which can negatively influence their financial performance. By putting these strategies into practice, banks can reduce and manage foreign exchange risks proactively. This helps them to explore ways of dealing with various aspects concerning currency value swings in the international monetary system. To protect from possible loss with currency fluctuations, banks must understand their risk management strategies to maintain financial stability throughout their operational practices across global functions.

Commodity Price Risk for banks doing commodity-related deals such as finance, trade, or holding assets connected to commodities is a notable matter (Eberhardt et al., 2021). Such volatility exists in commodity prices like metals, oil, agricultural goods, and other natural resources (Eberhardt et al., 2021). Changes in commodity prices may directly affect banks that hold specific commodities as collateral or lend money to firms relying on such. Borrowers in some industries may experience challenges paying the loan amount due to reduced commodity prices. As a result, banks may experience higher rates of defaults or nonperforming loans. Furthermore, banks are susceptible to changes in commodity prices if they trade or hold commodities in their investment portfolios. According to Abaidoo et al. (2021), price changes directly affect the value of commodity assets, which may affect the institutions' profitability and general financial stability.

However, banks use various strategic risk management techniques to control fluctuating commodity prices' impact on their operations. One important tactic is using derivatives and hedging tools like swaps, options, and futures (Garškaitė-Milvydienė, 2022). These financial products act as safeguards, enabling banks to lessen possible losses brought on by unfavourable changes in the price of commodities. For example, banks can protect themselves from future price drops by investing in futures contracts, which guarantee fixed commodity prices. As Chavarín (2020) stated, diversification is another essential risk management strategy banks use. They

diversify their investment portfolios to spread risk over a range of commodities. This approach ensures that their entire portfolio is not severely impacted by a bad performance or large price swing in a single commodity market. Banks lessen their exposure to price swings in any commodity market by spreading their investments across various commodities.

According to Shad et al. (2019), careful analysis and ongoing risk monitoring are essential to successful commodity price risk management. Banks closely monitor commodities markets, forecasting possible price movements with statistical models and in-depth market research. Due to this proactive strategy, they can foresee risks and make timely, educated decisions, which helps lessen the possible negative effects of unexpected price variations.

Furthermore, according to Zhi et al. (2022), banks closely evaluate the value, quality, and market volatility of commodities used as loan collateral. Banks can adequately control the risks associated with swings in commodity prices due to this collateral evaluation. Banks may utilize tactics like raising margin requirements or requesting more collateral when the value of commodities used as security declines noticeably to reduce possible risks.

Hassan et al. (2019) state that banks must control market risk to maintain stability and minimize possible losses. Risk management techniques encompass tactics including risk limitation, hedging, and diversification. By lowering a bank's vulnerability to market fluctuations, these steps seek to protect its financial performance. Market risk adds another complexity to the research on operational risk events and financial performance in Cambodian commercial banks. A comprehensive understanding of these banks' risk management frameworks and their effects on financial stability may be obtained by looking at how they handle market and other operational risks. The inclusion of market risk in the research enhances comprehension of the complex

obstacles that banks face and their endeavours to sustain strong financial outcomes in the face of fluctuating market circumstances.

Liquidity Risk

Liquidity is a bank's capacity to satisfy its cash and collateral obligations without incurring unacceptably large losses (Agbo et al., 2018). However, according to Mohd Amin et al. (2018), liquidity risk is the possibility that a bank may not be able to fulfil its obligations, actual or imagined, endangering its continued existence or financial condition. According to Saputra et al. (2020), banks risk experiencing liquidity problems if they cannot meet the demands of covering replenishing deposits and other liabilities and supporting portfolio expansions in loans and investments. Furthermore, they demonstrate that banks are only deemed adequately liquid when they can raise the necessary capital by enhancing their liabilities capability through the quick and fair sale of assets through securitization. Liquidity was defined by the Basel Committee on Bank Supervision in June 2008 as a bank's capacity to easily handle increases in assets and other obligations as they mature without suffering large losses (Claeys, 2021). Liquidity is crucial for financial institutions to obtain the capital needed for future expansion and to be ready to address both expected and unexpected changes in their balance sheets.

As to Ghenimi et al. (2021), liquidity risk refers to the possible obstacles a company, organization, or other body may have while meeting its immediate financial obligations because of insufficient cash reserves or the incapacity to convert resources into cash without suffering a significant loss. This type of risk can result from several events, including shifts in the market, unanticipated costs or withdrawals, or an abrupt increase in obligations. This is known as liquidity risk when assets and liabilities are out of balance, and it is difficult to sell assets at market value to pay short-term obligations.

Maintaining the ability to meet cash needs requires careful management of liquidity risk. For example, liquidity risk can be reduced by keeping a portfolio of high-quality liquid assets, using accurate cash flow forecasts, and ensuring diverse funding sources (Aliaga-Diaz et al., 2022). Furthermore, following legislative frameworks that support specific liquidity levels is another proactive approach to reducing liquidity risk. Liquidity risk that is improperly or mishandled can have serious, far-reaching effects. According to Aramonte et al. (2022), it may result in reputational harm that exacerbates liquidity problems, operational disruptions from insufficient cash flow, and monetary losses from selling assets at a discount. Robust liquidity risk management techniques are essential because, under severe circumstances, liquidity risk can push an institution toward insolvency or bankruptcy.

Market liquidity risk and financing liquidity risk are the two primary types of liquidity risk. Liquidity risk has two dimensions, both related to and capable of aggravating one another. For example, a company may be forced to sell assets at a loss due to a lack of short-term funding (funding liquidity risk), which could worsen the company's financial situation and turn off potential lenders or investors (Njue, 2020). Certain facets of banks' daily activities inherently give rise to liquidity risk (Girma, 2020). For example, banks usually fund long-term loans like mortgages with short-term liabilities like deposits. This maturity mismatch puts the bank at risk of liquidity if depositors take money out without warning. Liquidity risk results from the mismatch between banks' long-term illiquid assets and short-term funding. Reliance on erratic wholesale finance and the possibility of abrupt, unforeseen depositor demands for liquidity aggravate this.

One of the most significant issues facing the banking sector is liquidity risk, which is the possibility that a financial institution will not have enough liquid assets to cover its short-term obligations and cannot pay its debts immediately. This risk seriously jeopardizes banks'

operational resilience, making running smoothly and quickly fulfilling upcoming financial obligations more difficult. Zhang et al. (2020) claim that the maturity mismatch between assets and liabilities is frequently the source of the intrinsic nature of liquidity risk. When assets, such as longer-term loans, generate funds before liabilities, often represented by client deposits or short-term borrowings, fall due, the mismatch highlights the banks' fragility. Under this circumstance, banks risk being unable to promptly settle other urgent financial obligations or comply with demands for consumer withdrawals.

Liquidity risk is increasing due to a number of factors. According to Ebenezer et al. (2010), a bank's liquidity situation can be severely strained by economic recessions, abrupt changes in market dynamics, or unanticipated changes in depositor behaviour. For example, panicked withdrawals from depositors are common during financial upheaval, exacerbating banks' liquidity constraints and affecting their capacity to continue the regular business.

Banks use various risk management techniques to reduce the risk associated with liquidity. According to Osayi et al. (2019), keeping liquid asset reserves—which include cash, short-term securities, and government bonds—is a crucial strategy. These reserves serve as a safety net against unanticipated demands for liquidity. Furthermore, banks use scenario analysis and stress testing to assess how much liquidity they will have in unfavourable circumstances, allowing for proactive risk management (Aymanns et al., 2018). Establishing backup credit lines and having access to central bank facilities, according to Aymanns et al. (2018), strengthens their capacity to meet urgent funding demands during liquidity crises.

Liquidity risk management also heavily depends on the regulatory environment. Banks are required by regulators to maintain sufficient reserves of liquid assets, considering factors such as market circumstances, size, and risk exposure. By guaranteeing that banks maintain enough

liquidity buffers, these regulations help to strengthen the financial system's resilience in times of economic turbulence.

2.3.2 Sources and Categories of Operational Risk

In the banking industry, operational risk comes in many forms and from many sources, each of which poses unique challenges to a bank's capacity to operate steadily. Developing successful risk management methods requires an understanding of these sources and classifications. Since internal sources of operational risk originate from within the bank's operations and procedures, they are essential to the management and control of the organization (De Jongh et al., 2018). These internal risks can manifest in various forms, such as employee errors, system failures, process deficiencies, and management issues. Employee errors, for instance, refer to mistakes made by bank personnel in day-to-day activities, which can result in operational losses due to processing errors, data entry mistakes, or miscommunication (Ul Haque et al., 2022). System failures encompassing hardware malfunctions, software glitches, or cyberattacks that disrupt normal banking operations (Alguliyev et al., 2018). Additionally, process deficiencies can lead to errors, delays, and inefficiencies in banking operations, resulting from inefficient processes or weaknesses in operational procedures. Management issues, such as a lack of oversight, inadequate training, and ineffective supervision of employees, can also give rise to operational risk and lead to compliance violations and legal issues.

External Sources of operational risk are beyond the direct control of the bank, making them challenging to predict and mitigate. These external risks originate from various factors, including natural disasters, economic downturns, legal and regulatory changes, and geopolitical events. Natural catastrophes, like hurricanes, floods, earthquakes, and pandemics, can interfere with a bank's operations by causing physical damage, obstructing communication, and interfering with

regular business activities (Aceto et al., 2018). Economic downturns, including recessions and unfavourable economic conditions, can significantly impact a bank's operational risk. These events can result in a rise in loan defaults, instability in the financial markets, and operational risks associated with credit. Changes in the legislation and regulations can bring about operational risks resulting from noncompliance, litigation, and fines if companies do not adjust to these changing environments. Additionally, the operational environment may be impacted by geopolitical events like trade disputes, terrorist attacks, or conflicts, which could cause interruptions for banks operating in geopolitically unstable areas (Pandey et al., 2023).

Operational risk can be categorized into specific risk types, each requiring tailored management strategies. These risk types include legal, reputational, compliance, and strategic risks (Aloqab et al., 2018). Legal risk arises from legal actions against the bank, encompassing lawsuits, contract disputes, and compliance violations, which may lead to significant financial losses and damage to the bank's reputation. Reputational risk is tied to potential damage to the bank's image and standing in the eyes of customers, investors, and the public. Negative perceptions resulting from operational issues can erode trust and customer confidence. Aloqab et al. (2018) posit that compliance risk emerges when the bank fails to adhere to regulatory requirements and industry standards, leading to sanctions, fines, and legal actions, making it a significant operational risk component. Finally, strategic risk encompasses risks from poor decision-making, business strategies, and misaligned objectives, leading to financial losses, market share erosion, and ineffective resource allocation. Each operational risk category demands a nuanced management and mitigation approach involving different causative factors and consequences. Therefore, understanding these sources and categories is essential for banks to address operational risks and maintain stability proactively.

2.3.3 Overview of Basel II

According to the Basel Committee on Banking Supervision 2006, Basel II represents a fundamental paradigm shift in global banking regulation (BIS, 2019). Introduced as a development of Basel I, this framework aims to improve the stability and soundness of the global banking system while addressing the shortcomings of the earlier agreement. Basel II aims to accomplish several significant goals, including promoting sophisticated risk management techniques, strengthening market discipline, and, more precisely, matching regulatory capital to a bank's underlying risks (Bernanke, 2019).

Fundamentally, the Basel II framework brings a more risk-aware approach to capital adequacy standards. According to Pliszka et al. (2022), this approach divides banking risks into three main pillars: supervisory review (Pillar 2), minimum capital requirements (Pillar 1), and market discipline through disclosure (Pillar 3). The first pillar (Pillar I) addresses the minimal capital needs for market, operational, and credit risk. With Basel II, banks can use internal risk models to determine capital needs instead of Basel I's uniform method. For example, based on the level of sophistication of their risk management procedures, banks can select the advanced internal ratings-based (IRB) strategy, the standardized approach, or the basic approach for credit risk (Šegrt et al., 2023).

The Advanced Measurement Approach (AMA) in Pillar 1 addresses operational risk, a crucial aspect of Basel II. It allows banks to ascertain the capital requirements for operational risk by analyzing their exposure to operational risk and historical loss data (Anguren Martín et al., 2018). This move to risk-sensitive capital requirements aims to increase the banking industry's stability by strengthening risk management techniques and capital allocation. The supervisory review, pillar two, highlights the significance of efficient risk management and supervision at the

bank level. It entails regulatory bodies evaluating internal controls, risk management procedures, and a bank's overall risk profile. This pillar ensures banks have the right risk management systems in place and assists in identifying and resolving issues that the quantitative measurements in Pillar 1 may not have sufficiently captured (Pliszka et al., 2022).

Additionally, Pillar 3 highlights improved risk disclosure to promote market discipline. It mandates that banks give investors, the general public, and regulatory bodies complete and transparent information about risk profiles, capital sufficiency, and risk management procedures (Pliszka et al., 2022). Through market discipline and informed decision-making, stakeholders may evaluate the bank's risk profile and contribute to the financial system's stability due to this transparency.

Beyond capital requirements, Basel II is a framework that creates a risk-sensitive approach to bank regulation that encourages market discipline, risk management, and openness. Basel II is to improve the safety and soundness of financial institutions while promoting global consistency and collaboration in banking regulation by offering a comprehensive and adaptable regulatory framework (Pervez et al., 2022). However, countries and institutions may execute Basel II principles differently due to variations in their financial systems, economic conditions, and regulatory settings. Therefore, evaluating Basel II's efficacy in fostering financial sector stability requires an awareness of its subtleties and how it affects particular banking situations.

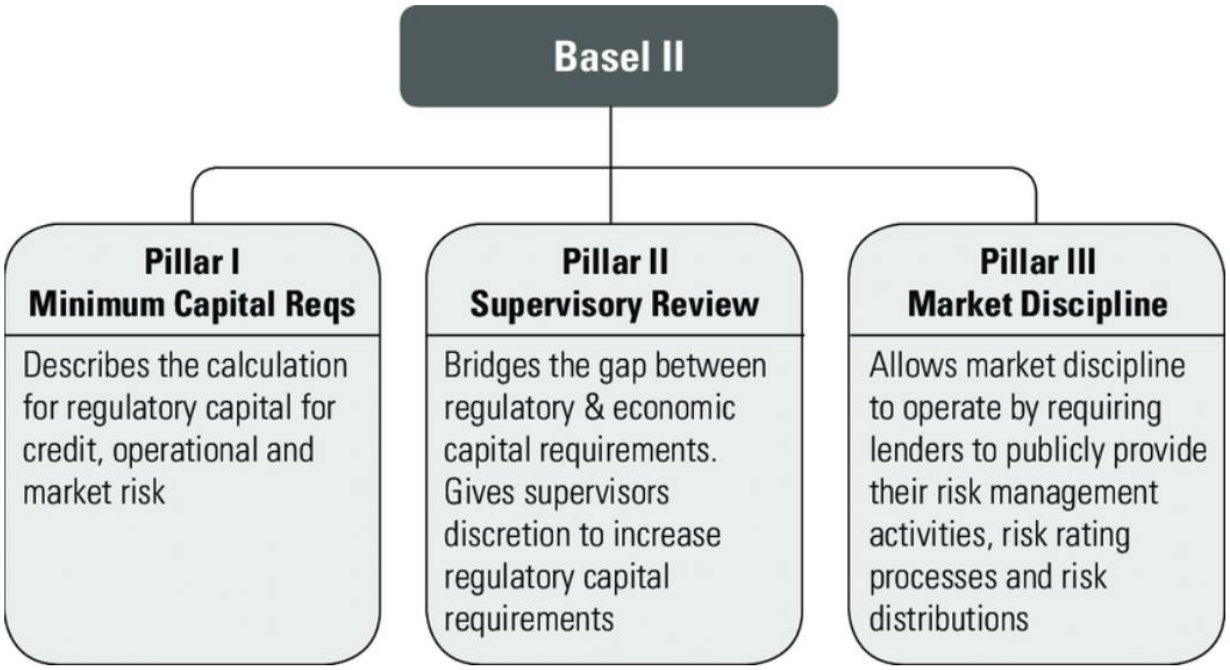


Figure 3: Summary of Basel II Pillars

As shown in Figure 3, Basel II consists of 3 pillars, namely;

Pillar 1: Minimum Capital Requirements

Pillar 1 of Basel II establishes the essential framework for determining the minimum capital requirements that banks must hold to safeguard against operational risks (CFI, 2023). These requirements are meticulously tailored to each bank's unique operational risk profile, considering the institution's size, complexity, and business activities. The goal is to ensure that banks maintain an adequate financial cushion that aligns with the inherent risks associated with their operational activities. This pillar is a critical foundation anchoring the overall risk management structure within a well-defined, standardized regulatory framework.

Pillar 2: Supervisory Review

Pillar 2 places a crucial emphasis on the role of supervisory bodies in overseeing and reviewing banks' operational risk management practices (CFI, 2023). Supervisors are responsible

for assessing these procedures' efficacy and ensuring they adhere to Basel II's guiding principles. This supervisory analysis thoroughly examines a bank's operational risk profile beyond applying minimum capital requirements. Supervisors can require more significant capital holdings if concerns are raised during this evaluation. This adds extra protection in cases where the basic requirements might not be sufficient. The cooperation duty between supervisory agencies and banks in upholding a strong and resilient operational risk management framework is emphasized in Pillar 2.

Pillar 3: Market Discipline

Pillar 3 enhances accountability and transparency in the operational risk management framework by pressuring banks to disclose their practices to market participants (CFI, 2023). This disclosure allows investors and other stakeholders to evaluate and contrast other banks' operational risk profiles, thereby supporting market discipline. Pillar 3 creates an environment where market forces act as an extra check on banks' risk management procedures by publicly making this information available. Enhanced comprehension of a bank's operational risk strategy enables investors to make better-informed choices, augmenting overall market discipline.

These three pillars work together to provide a complete and integrated framework that creates a platform for continuous evaluation and transparency and establishes minimum standards for capital requirements. The cooperative interaction between these pillars guarantees the stability and integrity of financial institutions by establishing a robust operational risk management environment within the banking industry.

2.3.4 Basel II's Treatment of Operational Risk

The Basel II framework's approach to managing operational risk represents a breakthrough in banking regulation. The financial industry is becoming increasingly concerned about

operational risk. Operational risk is recognized as a substantial contributor to the total risk profile of financial institutions and is addressed alongside credit and market risks in the Basel II framework (Adeabah et al., 2023). Basel II's comprehensive approach to operational risk gives banks various options for determining the capital needs associated with this risk category. The Advanced Measurement Approach (AMA) to operational risk capital calculation is one of Basel II's main features (Aloqab et al., 2018). With this method, banks can calculate the operational risk capital requirements using internal models, historical loss data, and other risk management tools. With the AMA, banks can more precisely customize their operational risk capital to match their unique risk profiles instead of Basel I's universal capital charges.

According to Pereira et al. (2018), Basel II requires banks to maintain capital to manage three key types of risk: operation, market, and credit risk. The Basel II methodology is predicated on accurately specifying credit risk concerning specific asset classes. These forecasts are based on past performance, represented in data sets that are occasionally universal and other times exclusive to a given institution. It is possible that Basel II overlooked the significant change in default association that coincided with the financial crisis. Similar problems with under-anticipated correlation under extreme circumstances are seen in market risk assessment.

Pereira et al. (2018) state that operational risk is the least manageable of the three categories. It is a catch-all term that encompasses both external and internal failures. Financial innovations have started to blur the lines between the trading and banking books. Costabile et al. (2019) assert that credit risk, or credit risk derivatives, is seeing tremendous growth in the market. Additionally, bank loans are being increasingly underwritten to increase marketability because they have a very active secondary market. Therefore, it made sense that top banks would try to apply to credit risk the same financial technology that had shown to be so successful in

assessing and managing market risk. Regulators were growing more and more frustrated with the original Basel Accord's efficacy at the same time. As evidence of regulatory capital arbitrage grew, regulators wondered if credit and operational risks might be regulated using the same framework that worked so well for market risk (Minto et al., 2021).

The operational risk was described as any risk that is neither credit nor market risk in the previous supervisory releases from US regulatory authorities, which the Basel Committee approved in 1998 (Li et al., 2022). Only "The risk of loss due to insufficient or unsuccessful internal procedures, individuals, and processes or from external events" was included in this formerly fairly comprehensive definition by the Basel Committee. Two questions are raised by this definition alone. Firstly, it completely ignores a fundamental business risk: the possibility of suffering a loss because the organization cannot cut expenses as fast as income drops. When allocating financial resources for operational risk, most institutions discover that this makes up the most portion. Secondly, it does not incorporate the previous attempt by the Basel Committee to incorporate risk to reputation and indirect costs. As per Sands et al. (2018), the Basel Committee declared its intention to determine capital charges for operational risk with a projected decrease in the capital charge for credit risk, hence maintaining average capital charges. Any notion that the capital charge related to operational risk is inherently logically determined is refuted by this goal, which determines their charge for any operational risk measure they encounter.

Although Basel II offers an advanced method of managing operational risk, there are drawbacks to the system. Since historical loss data is essential to calculating operational risk capital, banks employing AMA must set up reliable systems for collecting and managing data (Wei et al., 2018). Moreover, Basel II's effects on the performance and stability of the banking industry have been studied. According to Dell'Ariccia et al. (2018), banks have been encouraged to

strengthen their operational risk management processes by Basel II's risk-sensitive capital requirements, resulting in more cautious risk-taking and increased stability.

CHAPTER 3: METHODOLOGY

This chapter serves as a blueprint detailing the approach taken to conduct the study. This section encompasses the strategies, tools, and procedures to collect, analyze, and interpret data relevant to the research questions and objectives. It outlines the research design, data collection methods, analysis techniques, and the overall framework employed to ensure the validity and reliability of the study's findings. Additionally, it clarifies the rationale behind the chosen methodologies and explains how they align with the research's objectives and theoretical framework.

3.1 Research Philosophy

Research philosophy explores the underlying assumptions that underpin a study, influencing the researcher's perspective on reality, knowledge, and the nature of the research process (Kirongo & Odoyo, 2020). The positivistic research theory provides the foundation for this study on the financial performance of commercial banks in Cambodia, guiding the methods, strategies for gathering data, and analytical frameworks used. The assumptions of positivistic research philosophy perspectives were more prevalent in this study. A research philosophy is a viewpoint on how information regarding a phenomenon should be obtained, examined, and used (Kirongo & Odoyo, 2020). The research philosophy of positivism is chosen for this study with the understanding that reality is stable, observable, and comprehensible from an objective point of view.

The research phenomenon can also be detached, allowing researchers to repeat their observations. Since positivism was the prevailing philosophy in this study, predictions for the future can be made using the observed, explained, and interrelated results. As needed by positivist philosophy, this research uses a quantitative approach to examine the research variables'

effects on Basel II operational risk management; as a result, the research findings were observable and quantifiable.

As to Boon & Van Baalen (2019), the field of research philosophy, epistemology, plays a pivotal role in ascertaining the essence of knowledge and its acquisition methods in this study. This study takes a positivist stance, stressing measurement, quantification, and empirical observation. The study evaluates financial performance using quantitative indicators, focusing on observable and quantifiable elements such as loan portfolio quality, profit margins, and return on assets. This is where positivism fits in. Furthermore, the ontological position affects the study's understanding of reality and the characteristics of the subjects (Al-Ababneh, 2020). The realist ontological principle, which acknowledges the existence of an objective reality separate from human perception, is used in this study. According to this viewpoint, operational hazards, banking procedures, and financial performance measures all have innate qualities that may be thoroughly investigated and comprehended.

Moreover, the research philosophy's axiology component considers the researcher's values and any potential biases that could affect the study (Maarouf, 2019). A value-neutral methodology is used in this study to reduce subjective impacts on the analysis. The study tries to minimize biases resulting from personal interpretations by concentrating on empirical data and quantitative measurements. The technique used is greatly influenced by the research philosophy that has been selected. A quantitative method is preferred to analyze financial data, operational risk measurements, and other numerical indicators gleaned from secondary sources in this study. Quantitative methods such as regression analysis and statistical tools will assess the association between operational risks and financial performance.

Furthermore, the research philosophy is essential in determining the goals and parameters of the study. Using a positivist and realist perspective, the study aims to show a direct relationship between operational risk events and the financial performance of commercial banks in Cambodia. Hence, this philosophy directs the investigation toward quantifiable results and empirical proof by enabling the identification of objective connections and trends.

3.2 Research Design

The research design adopted for this study is a quantitative approach strategically chosen for its efficacy in examining the interrelationships between variables, specifically financial performance, operational risk events, and implementing Basel II standards within the context of Cambodian commercial banks within the past five years. Quantitative research methodology involves the collection and analysis of structured numerical data, allowing for statistical analysis and objective interpretation (Bloomfield & Fisher, 2019). This technique is used in many domains to investigate correlations, trends, and patterns within a sample or population. Its distinguishing feature is accurate measurement by systematic methods that guarantee objectivity and repeatability in data gathering. To collect data, researchers use tools, questionnaires, experiments, or controlled observations; frequently, they also have predefined variables and metrics in place. This data is subjected to a thorough statistical analysis utilizing instruments and software to find relationships, correlations, and predictive models. Statistical measures like mean, median, and standard deviation, as well as numerical representations like tables and graphs, are the main tools used to illustrate data.

This study offers the means to quantitatively measure various financial performance metrics, identify operational risk events, and assess compliance with Basel II standards across a sample of Cambodian commercial banks. The ability to work with substantial datasets and discern

patterns, correlations, and trends within the banking industry aligns with the requirements of this study (Basias & Pollalis, 2018). Quantitative research methods are well-suited for testing theories and establishing correlations between variables, as exemplified in this study's objective to investigate how the application of Basel II principles influences the impact of operational risk events on the financial performance of Cambodian banks. The systematic nature of this approach facilitates a rigorous examination of these intricate relationships within the specified banking environment.

By employing statistical analyses, regression models, and other quantitative tools, this research design aims to uncover empirical evidence that quantifies the linkages between operational risk management practices, compliance with Basel II guidelines, and the resultant financial performance of commercial banks in Cambodia. This approach provides a structured framework for collecting, analyzing, and interpreting data, ensuring reliability, objectivity, and depth in evaluating the identified relationships.

3.3 Population of the Study

The population of this study encompasses all the 58 commercial banks operating within the Cambodian financial sector. Commercial banks in Cambodia represent the primary focus due to their significance in the country's financial landscape and their pivotal role in economic development. This population includes domestic and international commercial banks authorized to operate within Cambodia's regulatory framework. The population covers a spectrum of banks differing in size, operational scale, ownership structures, and market shares. It includes large multinational banks, mid-sized regional banks, and smaller local banks, each contributing to the diversity and complexity of the banking sector in Cambodia. The demographic characteristics of these banks reflect diversity in ownership models, operational scopes, and strategic focuses,

presenting a rich tapestry of banking entities operating within the Cambodian market. The National Bank of Cambodia (NBK) further divided the banks into Tier 1, Tier 2, and Tier 3 based on profitability, liquidity, asset quality, capital adequacy, and asset utilization efficiency. Large banks with millions of customers and greater assets in the Cambodian market made up Tier 1. Medium-sized banks make up Tier 2, and small banks that account for 10% of the market total deposit make up Tier 3. As shown in Table 3.3, the target population of 58 commercial banks is summarized.

Table 3.3.1 Summary of Commercial Banks in Cambodia

Tier	**Number of Banks**
Tier 1	24
Tier 2	26
Tier 3	8
Total	**58**

Moreover, this population covers commercial banks that have adopted Basel II principles to varying degrees. Some banks might have fully embraced and implemented the Basel II framework, while others might be in different stages of compliance or might have only partially integrated these principles into their operations. This variety within the population allows for a comprehensive analysis of the impact of Basel II compliance on operational risk management and financial performance across a spectrum of banks. This study will recognize the variations within this population, considering the disparities in operational strategies, risk management practices, financial performance metrics, and the degree of adherence to Basel II guidelines. This variation within the population presents an opportunity to capture diverse perspectives and outcomes related to operational risk and financial performance, facilitating a robust and comprehensive analysis.

The inclusion criteria for this study pertain to commercial banks officially authorized by Cambodian regulatory bodies to function within the country's financial system and the ones that have adopted Basel II principles. This criterion ensures that the study focuses exclusively on banking institutions adhering to the recommended regulatory framework and engaged in core banking activities within Cambodia. Conversely, non-bank financial institutions or entities not explicitly recognized as commercial banks under Cambodian regulations are excluded from the study's defined population. Approximating the exact size of the population involves accounting for an estimated number of banks currently operating within Cambodia. While the precise count fluctuates due to market dynamics, it is estimated that there are approximately 58 commercial banks within the Cambodian financial landscape (National Bank of Cambodia, 2022). This specific population selection is pivotal to the study's objectives as it targets entities directly affected by Basel II regulations, aiming to gain comprehensive insights into the efficacy of these standards in mitigating operational risk and influencing financial performance within Cambodian banks.

This specific population selection is pivotal to the study's objectives as it targets entities directly affected by Basel II regulations, aiming to gain comprehensive insights into the efficacy of these standards in mitigating operational risk and influencing financial performance within the context of Cambodian banks. However, certain limitations might arise in obtaining comprehensive data from all banks, particularly smaller or less transparent institutions. Such limitations might affect the depth of analysis and the generalizability of findings to other banking sectors or regions due to Cambodia's unique characteristics and regulatory environments. Ethical considerations primarily revolve around safeguarding the confidentiality of bank-specific data and respecting the privacy of financial information obtained, ensuring compliance with ethical guidelines and regulations throughout the research process.

3.4 Sample and Sampling Techniques

3.3.1 Sampling Frame

Taherdoost (2018) states that a sampling frame is the fundamental framework for selecting study samples. It constitutes a comprehensive of elements, individuals, entities, or units, encompassing the entire population under study. For this research focusing on Cambodian commercial banks and their adherence to Basel II standards, the sampling frame will comprise a compiled inventory or directory of all eligible commercial banks operating within the Cambodian financial sector. This sampling frame, structured to include all banks authorized to conduct banking activities within Cambodia's regulatory framework, forms the basis for selecting a subset of banks that will participate in the study. The frame involves an exhaustive listing of commercial banks, detailing their distinct characteristics, such as ownership structures, operational capacities, market presence, and Basel II implementation statuses.

In this study, the sampling frame is critical for identifying the population of interest and facilitating the systematic selection of representative samples. It ensures the inclusivity of all eligible commercial banks. It provides the necessary groundwork for employing a purposive sampling approach, where specific banks adhering to Basel II principles will be targeted for participation in the research. Moreover, the sampling frame serves as a reference guide throughout the sampling process, systematically identifying and selecting banks that align with the study's objectives. It clarifies the boundaries of the population under study and establishes criteria for sample selection based on the specific attributes outlined within the frame.

However, potential limitations in the sampling frame might arise due to data availability, especially concerning smaller or less transparent banks operating within Cambodia. Ensuring the accuracy and completeness of the frame is crucial to minimize biases in sample selection and

enhance the reliability and validity of the study outcomes. Therefore, efforts to continuously update and verify the sampling frame will be undertaken to maintain its relevance and comprehensiveness in capturing the diversity of the Cambodian banking sector.

3.3.2 Sampling Technique

Sampling techniques are crucial in selecting a representative subset from the larger population for research purposes. A purposive sampling method will be employed in this study centred on the impact of Basel II adherence on the financial performance of Cambodian commercial banks amidst operational risk events. Purposive sampling, recognized as judgmental or selective sampling, operates on a deliberate and strategic selection principle, focusing on specific elements or cases with predefined attributes relevant to the research objectives (Tongco, 2019). This methodological choice proves highly suitable for the study at hand, primarily aiming to delve into the performance dynamics of Cambodian banks concerning their adherence to Basel II standards and their encounters with diverse operational risk events. The deliberate selection of banks exhibiting distinct attributes linked to Basel II compliance and operational risk management aligns directly with the research's core objectives.

By adopting purposive sampling, the study can precisely target banks that showcase varying levels of implementation of Basel II standards and have encountered a spectrum of operational risk events. This meticulous selection process enables a comprehensive examination of the interplay between these variables, offering a nuanced understanding of the relationship between Basel II adherence, operational risk exposure, and subsequent financial performance within Cambodian commercial banks. The deliberate focus on specific banks with diverse operational risk experiences enhances the research's ability to capture the complexity and nuances of these interactions.

The method's strength lies in its deliberate selection approach, facilitating the collection of rich, context-specific data from banks that have encountered various operational risk scenarios and have implemented Basel II principles to differing extents. This approach offers a concentrated exploration of how these factors influence financial performance metrics by purposefully selecting cases that exhibit specific traits related to Basel II compliance and operational risk incidents. This focused approach aligns with the research's objectives and allows for a more profound analysis of the multifaceted relationships between regulatory adherence, risk management practices, and financial outcomes in the Cambodian banking landscape.

The selection criteria for this study's purposive sampling technique will entail a meticulous assessment to identify banks demonstrating robust implementation practices aligned with Basel II guidelines. The criteria encompass multifaceted considerations, encompassing various dimensions crucial for the study's objectives.

The extent of Basel II Compliance

The primary criterion involves evaluating the extent of a bank's compliance with Basel II standards. This assessment will focus on the degree to which a bank has adopted and implemented the key principles and frameworks prescribed by Basel II guidelines. Factors considered include incorporating standardized credit, market, and operational risk approaches, establishing robust risk quantification methodologies, and integrating risk-based capital adequacy frameworks.

Sophistication of Risk Management Frameworks

The sophistication and efficacy of a bank's risk management frameworks will be a pivotal criterion. This entails evaluating the institution's risk identification, measurement, monitoring, and mitigation mechanisms. Factors such as deploying advanced risk assessment tools, having

dedicated risk management teams, and integrating real-time monitoring systems will be considered.

Frequency and Severity of Operational Risk Events

A crucial aspect of the selection criterion involves assessing the frequency and severity of encountered operational risk events within banks. This includes incidents related to internal fraud, system failures, compliance breaches, and other operational disruptions. Banks with diverse experiences handling and mitigating operational risk incidents will be considered for inclusion.

Impact on Financial Performance Indicators

The criterion emphasizes the impact of operational risk events on financial performance metrics. Evaluation will involve an analysis of financial ratios, including return on assets (ROA), return on equity (ROE), net interest margin (NIM), and non-performing loan ratios (NPL), concerning encountered operational risk events. Banks showcasing varying impacts on financial performance due to operational risk exposure will be included to ensure a comprehensive representation.

By employing these stringent yet comprehensive selection criteria, the study aims to capture a diverse spectrum of Cambodian banks, reflecting varying degrees of Basel II compliance and operational risk experiences. This approach will comprehensively analyze the relationships between Basel II implementation, operational risk management, and subsequent financial performance within the Cambodian banking sector.

3.5. Research Methods

3.5.1. Data Collection

The research will extensively rely on quantitative methods employing secondary sources for data collection. The study aims to thoroughly analyze financial performance, operational risk

incidents, and the implementation of Basel II principles in Cambodian commercial banks. The primary data collection approach will involve acquiring and analyzing secondary data from financial reports, annual statements, and regulatory documents provided by the National Bank of Cambodia (NBC) and other relevant financial institutions.

Financial Reports and Statements

The analysis of financial reports and statements from the selected commercial banks in Cambodia for the past five years will be a foundational aspect of this study. These reports provide quantitative data that encapsulates these institutions' financial health and performance over a specified timeframe. Return on Assets (ROA), a key financial metric, measures the bank's profitability concerning its total assets. It is a fundamental indicator reflecting how efficiently a bank utilizes its assets to generate profits (Rawan, 2019). This measure is essential to comprehending the bank's capacity to profit from its asset base. Another important statistic that assesses the bank's profitability concerning shareholders' equity is the return on equity (ROE). It displays the bank's financial and managerial efficiency and use of shareholders' investments to create profits (Sari et al., 2023).

A crucial indicator in the banking industry, net interest margin (NIM) measures the difference between interest earned from loans and interest paid on deposits concerning the interest-earning assets of the bank (Chaudron et al., 2023). This metric provides insights into the bank's interest-related profitability and ability to manage interest rate risks. Non-performing loan Ratios (NPL) indicate the percentage of loans in a bank's portfolio that are in default or are close to default. These ratios highlight the bank's loan portfolio quality and potential credit risks. A higher NPL ratio could signify higher credit risk exposure for the bank.

Through an in-depth analysis of these financial indicators extracted from the reports and statements, the study aims to derive quantitative insights into the financial performances of the selected Cambodian commercial banks. Examining these indicators' trends, patterns, and correlations will contribute to understanding how Basel II compliance and operational risk events impact these banks' financial stability and performance over the specified period.

Regulatory Documents and Basel II Compliance Reports

The study will extensively rely on regulatory documents, particularly the Basel II compliance reports, as a key source of secondary data. These documents are comprehensive records that outline the banks' adherence to the Basel II framework, which sets standards for risk management and capital adequacy in the banking sector. Basel II compliance reports offer a detailed overview of how banks have implemented various principles and requirements set forth by the Basel Committee on Banking Supervision (BCBS). These reports provide quantitative data related to risk management frameworks, capital allocation strategies, and operational risk mitigation measures adopted by the banks. Particular focus will be placed on the frameworks and methods that the banks employ to evaluate and control operational risk in these reports. This includes quantitative methods like figuring out regulatory capital needs using the Basel II framework's Advanced Measurement Approach (AMA) for operational risk.

Quantitative information on risk-weighted assets (RWAs) about various risk categories, including operational risk, is frequently included in these documents. Analyzing these RWAs can provide quantitative measures of banks' risk exposure and risk management procedures and insights into the amount of capital banks set aside to cover operational risk. The study attempts to obtain quantitative insights into Basel II compliance among the chosen commercial banks in Cambodia by extracting and analyzing data from these regulatory documents and Basel II

compliance reports. It examines the possible influence on these banks' financial performance and how well they have applied the framework's principles, particularly in managing and mitigating operational risk.

Operational Risk Events

The primary method for identifying operational risk events in Cambodian commercial banks will be thoroughly examining past data. Various sources, including incident reports, internal documents, and regulatory filings, will be covered in this extensive analysis to gather and classify a variety of operational risk occurrences methodically. Events will be categorized based on their nature or underlying causes, such as cyber threats, internal process flaws, regulatory noncompliance, or technology failures. This classification will make it possible to comprehend the various dangers the banks face. Every event's seriousness will also be assessed in light of how it might affect the bank's operations, reputation, and financial stability. This assessment will assist in ranking the occurrences according to their degrees of severity. Every operational risk incident shall be thoroughly examined to ascertain its direct and indirect effects. Examining the effects on the institution's finances, customers, business operations, and potential for risk propagation are all included in this.

This methodology produces an exhaustive library of operational risk occurrences by carefully examining historical data and collecting pertinent information from incident reports and internal records. The detailed categorization based on nature, severity, and impact will facilitate a nuanced understanding of the challenges faced by Cambodian commercial banks in managing operational risks. Subsequently, this data will analyze the relationship between these operational risk events and the banks' financial performance.

3.5.2. Search Strategy

The strategy entails a careful and systematic approach to gathering comprehensive secondary data for this study. Leveraging diverse databases renowned for their repository of financial reports, regulatory documents, and specific information related to Cambodian commercial banks is fundamental. Emphasis will be placed on platforms such as Thomson Reuters, Bloomberg, and the National Bank of Cambodia's official publications. These sources are recognized for their credibility and richness in pertinent financial data, ensuring the acquisition of reliable and comprehensive information for the study's objectives.

Keyword selection plays a pivotal role in refining search results. The compilation of a well-crafted list of keywords, including "Cambodian commercial banks," "financial reports," "operational risk events," "Basel II compliance," and "regulatory documents," ensures focused and relevant search outcomes. These keywords will be utilized across databases to target specific and pertinent information about the study's scope.

Employing various filters within these databases constitutes another crucial aspect of the search strategy. These filters enable the refinement of search results based on factors such as publication dates, specific banks, regulatory authorities, or the nature of documents required, whether they are financial reports, Basel II compliance reports, incident logs, or regulatory guidelines. The strategic application of these filters ensures the extraction of information aligned with the study's objectives and parameters.

Additionally, verifying the sources is imperative to maintain the integrity and reliability of the retrieved data. The study will prioritize official publications, recognized financial databases, and regulatory bodies' websites to ensure the authenticity of the acquired documents and reports.

Verifying the credibility of the sources guarantees the reliability and accuracy of the secondary data used in the analysis.

Throughout the search process, an iterative approach will be adopted. This iterative methodology involves continuous refinement of search parameters based on the relevance and adequacy of the retrieved data. It enables modifications to the search approach to maximize the finding of relevant data, guaranteeing that the information gathered stays in line with the study's goals.

The complete search procedure will be kept on file, including information on the databases utilized, particular search words, filters used, and sources consulted. The thorough documentation method guarantees transparency and makes it easier to replicate the search procedure, improving the study results' reliability and repeatability.

As a result, the study's goal is to collect superior secondary data from dependable sources by employing a systematic and thorough search approach. This strategy guarantees the collection of pertinent data necessary for examining the connection between Basel II compliance, operational risk occurrences, and the financial performance of commercial banks in Cambodia.

3.5.3. Data Collection Procedures

The present study's data-collecting procedure, which predominantly draws from secondary sources, entails comprehensive measures to obtain, assess, and aggregate vital information necessary for the quantitative examination of the financial performance, operational risk, and Basel II compliance of commercial banks in Cambodia. The first step is to identify relevant data sources. This entails searching through scholarly publications, regulatory agencies, financial databases, and reliable internet archives that concentrate on banking, Basel II implementation, financial performance measures, and operational risk management in the context of the banking industry in

Cambodia. Once the sources are identified, defining specific search criteria becomes imperative. These criteria employ relevant keywords related to financial metrics (ROA, ROE, NIM, NPL), Basel II principles, operational risk events, and the targeted Cambodian commercial banks. Accessing these sources is facilitated by subscriptions to financial databases or direct access to regulatory authorities.

The data collection involves retrieving annual reports, financial statements, regulatory documents, and scholarly articles that directly contribute to the study. These documents provide quantitative metrics on financial performance and offer insights into risk management practices implemented by the Cambodian banks concerning Basel II compliance and operational risk events. A rigorous validation process ensues to ensure data quality. This involves a meticulous review of the credibility of sources, cross-referencing information across multiple sources wherever possible, and verifying the collected data's accuracy, relevance, and consistency. Ethical considerations, such as adherence to copyright laws and protecting sensitive data, are paramount throughout the data collection.

Recording and systematically cataloguing the retrieved data facilitate organized storage and easy access during the analysis phase. This comprehensive and meticulous approach to data collection ensures the acquisition of reliable, credible, and diverse secondary data from multiple sources, forming the foundation for the subsequent quantitative analysis essential to the study's objectives. Therefore, by systematically following these steps, the data collection process ensures a robust foundation of secondary data from credible sources, which is essential for conducting the quantitative analysis required for this study.

3.6 Data Validity and Reliability

3.6.1 Validity

As emphasized by Surucu & Maslakci (2020), validity forms a critical aspect of research methodology, indicating the degree to which a study accurately measures or represents the intended variables and concepts. In the context of this research, validity underscores the accuracy and authenticity of the collected data in reflecting the targeted aspects: financial performance metrics, operational risk events, and Basel II compliance among Cambodian commercial banks.

The validity of the data is bolstered by the meticulousness of the data collection process, emphasizing reputable sources, verified financial reports, regulatory documents, and scholarly literature from reliable databases. By leveraging established financial indicators like ROA, ROE, NIM, and NPL, the study ensures the inclusion of robust and widely recognized metrics, enhancing the data's face validity, apparent relevance, and alignment with the research objectives.

Moreover, using Basel II compliance reports and historical records of operational risk events contributes to the study's content validity, ensuring comprehensive and diverse data sources are incorporated. The emphasis on cross-referencing information from multiple sources and the validation of consistency and accuracy further fortifies the internal validity of the data.

However, despite these measures, potential limitations in validity may arise due to the nature of secondary data, including issues related to data completeness, potential reporting biases, or variations in the interpretation of financial metrics across different banks. Mitigating these limitations involves extensive scrutiny and triangulation of data from various reliable sources, ensuring a holistic representation of the variables under investigation. Maintaining a rigorous and systematic approach to data collection and evaluation enhances the validity of the study's findings.

3.6.2 Reliability

As articulated by Surucu & Maslakci (2020), reliability encapsulates the consistency and stability of the measurement instrument or data collection process utilized in a research study. In the context of this research on financial performance, operational risk events, and Basel II compliance in Cambodian commercial banks, ensuring reliability is paramount to establishing the trustworthiness and consistency of the obtained data. The reliability of the secondary data used in this study is anchored in the consistency of the sources, emphasizing established financial reports, regulatory documents, and scholarly literature from credible repositories. By accessing data from reputable sources and consistently adhering to standardized reporting practices, the study endeavours to maintain the reliability of the information.

Consistency in data-gathering processes is ensured to bolster the data's trustworthiness. This entails using uniform standards in selecting banks, standardizing the interpretation and categorization of operational risk events and financial metrics, and cross-referencing data from several trustworthy sources. Allowing for comparisons and long-term trend assessments, including historical data and longitudinal analysis, enhances the study's credibility. Although dependability is a goal, there may be some constraints since various banks have different reporting procedures, there may be differences in how data is interpreted, or reporting standards vary over time. Cross-validation of data from several reliable sources and consistent analytical techniques throughout the research process are essential to address these issues and improve the general dependability of the study's conclusions.

3.7 Pilot Study

Since the study uses secondary data analysis, a conventional pilot study frequently used to gather primary data might not be appropriate. Rather, the initial stage concentrated on determining

whether it would be possible to obtain and gather the secondary data needed for the research (Blatch-Jones et al., 2018). Initial investigation and sampling of accessible secondary data sources were part of the pilot phase. Its objective was to assess financial reports, operational risk event records, Basel II compliance documentation, and other relevant information from Cambodian commercial banks regarding their accessibility, availability, and usefulness. This required locating possible sources, comprehending data formats, and evaluating the accuracy and coherence of the information found in these sources.

Preliminary analyses were conducted on a small dataset during this pilot phase to assess the data's quality, dependability, and potential insights. In order to determine the depth and scope of the available data, involved doing preliminary financial ratio computations, basic statistical analysis to evaluate the completeness of the data, and preliminary operational risk event categorization. The pilot study phase also sought to determine any obstacles or restrictions related to obtaining or using the secondary data. Any problems with gaps, inconsistencies, or data availability were noted, and solutions to these problems were developed. This stage was crucial in honing the search approach and guaranteeing that thorough and trustworthy secondary data could be found for the main study.

In the case of secondary data analysis, this first phase concentrated on data exploration, feasibility assessment, and identifying potential challenges to be addressed before the full-scale data collection and analysis phase. In contrast, traditional pilot studies test methodologies or instruments in primary data collection.

3.8 Data Analysis and Presentation

The data analysis for this study will involve a systematic and rigorous examination of the collected secondary data to derive meaningful insights and conclusions. Given the quantitative

nature of the research, statistical methods and analytical tools will be applied to explore the relationships between operational risk events, Basel II implementation, and the financial performance of Cambodian commercial banks. Descriptive statistics will be employed to summarize and present the critical financial performance indicators, operational risk event frequencies, and levels of Basel II compliance among the sampled banks. These statistics will include measures such as means, standard deviations, ranges, and percentages, offering an overview and an initial understanding of the dataset.

Moreover, correlation analysis will ascertain the connections between financial performance metrics and operational risk events. This analysis will shed light on how operational risk incidents affect banks' bottom lines by evaluating the direction and degree of correlations. Regression analysis may also be used to determine how much Basel II compliance modifies these relationships.

Additionally, a thorough validation procedure will be carried out to guarantee the reliability and validity of the results. This will require cross-checking and validating the data across different sources to reduce errors or inconsistencies that may result from using several datasets from different sources. Ultimately, the data analysis process will be conducted carefully, employing appropriate statistical methods to rigorously explore the relationships between operational risk events, Basel II compliance, and financial performance indicators in Cambodian commercial banks. The presentation of the findings will be structured and clear, utilizing both statistical analyses and visual representations to communicate the study's outcomes effectively.

3.8.1 Simple Correlation

Simple correlation is a measurement method for determining the direction and degree of a relationship between two variables (Senthilnathan, 2019). When two variables are correlated, a

change in one will result in a change in the other. According to Schober et al. (2018), the change may occur in the same direction (positive correlation) or the opposite direction (negative correlation). Table 3.8.1 below provides an example of how to evaluate correlation coefficient data using a broad guideline.

Table 3.8.1 Interpreting the Value of Correlation Coefficient Data

Value of Correlation Coefficient Data	Strength of Correlation
0.00 – 0.30	Weak
0.31 – 0.50	Moderate
0.51 – 0.80	Strong
0.81 – 1.00	Very strong

Table 3.8.1 above shows the correlation coefficient value together with the magnitude of the correlation. Data with correlation coefficients between 0.00 and 0.30 are classified as having weak correlations. Data with a range of 0.31 to 0.50 suggest a moderate level of correlation, whereas data with a range of 0.51 to 0.80 indicate a high level of correlation. When the correlation coefficient data is negative, the variable has a weak, moderate, strong, or strong negative relationship to the specified variables.

3.8.2 Regression Analysis

The variables under investigation in this study encompass several independent factors. These include return on assets (ROA), which is derived by dividing net income by total bank assets, the loan to deposit ratio (LDR), quantified as the ratio of total loans to total deposits, bank size represented by the logarithm of total assets (BANKSZ), annual inflation measured by the Consumer Price Index (INF), and economic growth indicated by the annual growth rate of gross domestic product (GDP). In a subsequent regression analysis, the study aims to utilize bank

profitability, assessed through ROA, as the dependent variable. This approach aligns with the study's secondary objective: to explore the impact of non-performing loans (NPL) on bank performance, specifically as measured by ROA.

To explore the causes behind non-performing loans (NPLs) within the Cambodian banking sector, this study draws upon the foundational work of Jesus and Gabriel (2006). Utilizing a multiple regression framework, the study establishes a model linking the ratio of non-performing loans to total loans with key macroeconomic and bank-specific variables. Subsequently, the study investigates the impact of NPLs on bank profitability, employing Return on Assets (ROA) as the measure of profitability. This analysis integrates NPL as an explanatory variable while controlling for specific factors. The regression equations employed are as follows:

The initial regression equation examines the relationship between NPL and various factors:

$$NPLit = \alpha + \beta 1ROAit + \beta 2LDRit + \beta 3BANKSIZEit + \beta 4GGDPi + \beta 5CPIi + eit.$$

Building upon previous research and theoretical frameworks, a modified model by Liyana & Indrayani (2020) investigates the effect of NPLs on bank performance, measured through ROA:

$$ROAit = \alpha + \beta 1NPLit + \beta 2LDRit + \beta 3CARit + \beta 4GGDPi + \beta 5CPIi + eit.$$

In this study, the capital adequacy ratio (CAR) will not be included due to the analysis's exclusion of credit risk assessment. Instead, the focus shifts to incorporating bank size in the model to ascertain whether the extent of bank assets influences profitability. The variable BANK SIZE, represented by the logarithm of total assets, will be incorporated in the revised model, which is as follows:

$$ROAit = \alpha + \beta 1NPLit + \beta 2LDRit + \beta 3BANKSIZEit + \beta 4GGDPi + \beta 5CPIi + eit.$$

3.8.3 Multiple Regression Analysis

Multiple regression analysis can be a valuable statistical tool in your research to explore the relationships between multiple independent variables and a dependent variable (Morrissey & Ruxton, 2018). The multiple regression formula will be utilized in this study to determine the relationship between financial performance indicators (dependent variables) and operational risk events (independent variables) in commercial banks located in Cambodia. Through regression analysis, the model estimates the coefficients (β) in order to understand the effect of distinct operational risk event types on key financial performance metrics. By developing a regression equation that most accurately captures the link between these factors, this technique sheds light on how operational risks affect banks' financial stability. The formula ($Y_i = f(X_i, \beta) + e_i$) for multiple regression will be used as follows:

Y_i represents the dependent variable, which in this case could be financial performance indicators such as Return on Assets (ROA), Return on Equity (ROE), Net Interest Margin (NIM), or Non-Performing Loan Ratio (NPL).

f represents the function that relates the dependent variable (Yi) to the independent variables (Xi) and the unknown parameters (β). This function helps to model the relationship between the dependent and independent variables.

X_i denotes the independent variables, which are operational risk events like financial fraud, technological failures, and regulatory non-compliance costs.

β refers to the unknown parameters, which are the coefficients or weights assigned to each independent variable (Xi). These parameters are estimated during the regression analysis to determine the strength and direction of the relationship between the independent variables and the dependent variable.

e_i represents the error term, which accounts for the variability in the dependent variable that is not explained by the independent variables. It captures the difference between the observed values of the dependent variable and the values predicted by the regression model.

3.9 Ethical Considerations

Ethical considerations are crucial in research, particularly when utilizing secondary data sources. This study will uphold several ethical principles and practices to ensure integrity, confidentiality, and respect for the data sources and involved entities.

Confidentiality: Respecting the confidentiality of the banks' financial data and operational information is paramount. The study will strictly adhere to confidentiality agreements and handle data with the utmost care to prevent unauthorized access or disclosure.

Data Usage: The secondary data accessed for this study will be used solely for research purposes, ensuring that the information obtained from financial reports, regulatory documents, and operational records is not misused or repurposed for any other intent.

Avoiding Bias: Efforts will be made to ensure objectivity and avoid bias in data interpretation and analysis. The research will aim to present the findings objectively, regardless of the affiliations or positions of the banks involved.

Data Security: Robust measures will be implemented to safeguard the collected data from breaches or unauthorized use. Encryption, secure storage, and controlled access will be maintained to prevent data loss or misuse.

Compliance with Regulations: Adherence to legal and regulatory frameworks related to data usage and privacy, including complying with copyright laws and fair use policies, will be strictly followed.

Transparency: The study will maintain transparency in reporting methodologies, data sources, and analytical techniques. This ensures that the research process and findings can be scrutinized and replicated for validation.

Respect for Contributors: Acknowledgment and credit will be given to the data sources used in the study, respecting their intellectual property and contributions to the field.

Therefore, by adhering to these ethical considerations, the study aims to maintain the integrity of the research process, protect the rights of data contributors, and ensure the credibility and validity of the findings derived from secondary data sources.

CHAPTER 4: DATA ANALYSIS AND FINDINGS

According to Lowe et al. (2018), data analysis is looking over, organizing, modifying, and interpreting data to draw conclusions, uncover important information, and improve decision-making. It comprises gathering, organizing, and analyzing data sets using techniques to spot important trends, correlations, patterns, and other pertinent information. As a result, this chapter analyzes the collected quantitative data and reports the results using the Statistical Package for Social Sciences (SPSS) application. This chapter explains the techniques used to acquire data and then presents the data in great detail. The analysis part also contains several statistical methods and instruments to analyze the data and draw important conclusions. Throughout this chapter, the data will be carefully examined, organized, and presented coherently. Various graphical representations, statistical tools, and analytical frameworks will be employed to interpret and synthesize the data, facilitating a robust analysis that aligns with the research objectives and contributes to the study's overall conclusions.

4.1 Overview of Data

My analysis shows that Cambodia has partially implemented the Basel II framework, specifically focusing on the capital component. However, there's a notable absence of mechanisms to capture the impact of Basel II implementation within Cambodian banks. The tiered implementation of Basel pillars, designed to mitigate the impact of global standards on financial inclusion, hasn't been adopted. Similarly, the internal ratings-based (IRB) approach, meant to justify lower capital requirements corresponding to lower credit risk and further aid financial inclusion, remains unutilized.

Challenges in implementing Basel II in Cambodia have surfaced prominently. These include a conservative application of standards by national regulators due to uncertainty about

assessors' stances. There are inadequacies in the national infrastructure and systems to capture relevant data and develop standards. Moreover, regulators and banks lack the expertise and comprehension to develop and comprehend these standards effectively.

None of the banks in Cambodia have fully embraced the entire Basel II framework by 2022. The National Bank of Cambodia (NBC) remains in the process of updating regulations to align fully with Basel II core principles. While banks have adopted some elements of Basel II, complete compliance with all its requirements hasn't been achieved. Nonetheless, the decision of the NBC to adopt Basel III principles is a progressive step expected to fortify the Cambodian banking sector, enhancing its resilience against potential shocks. Basel III, being a more comprehensive and risk-sensitive framework than Basel II, is structured to address the shortcomings of its predecessor, ensuring Cambodian banks have sufficient capital to absorb losses and maintain financial stability.

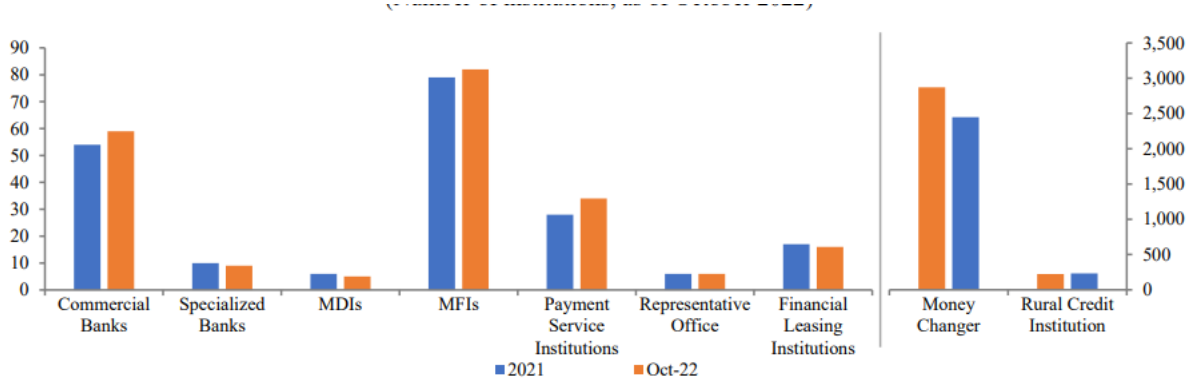
The prioritization of bank and financial institution supervision aligns with Risk-based and Forward-looking Perspectives. The NBC is actively implementing a roadmap on Risk-Based Supervision and Forward-looking Perspectives. This involves restructuring the organization of the Directorate General of Banking Supervision and issuing a series of regulations conforming to local and international market development. These regulatory steps are particularly geared towards Basel standards, ensuring alignment with global supervisory standards.

4.2 Descriptive Statistics

4.2.1 The Banking System in Cambodia

Figure 4.2.1 displays a comprehensive diversity of financial institutions in Cambodia's banking sector, including 58 commercial banks, 9 specialized banks, 5 microfinance deposit-taking institutions, 82 microfinance non-deposit-taking institutions, 224 rural credit institutions,

16 leasing companies, 5 third-party processors, 34 payment service institutions, 1 credit information provider, 6 representative offices of foreign banks, and 2,869 money changers.



Source: NBC ***Fig 4.2.1 Banking System in Cambodia***

The banking industry continues to dominate Cambodia's banking system, accounting for 85.2% of the system's total assets. Financial leasing institutions (0.6%) and the microfinance industry (14.2%) are the next two largest contributors. The overall assets of the banking sector increased by 14.5% (16% in 2021) to KHR 325.8 trillion (USD 79.7 billion) due to the establishment of seven newly licensed institutions—three MFIs and four commercial banks.

In 2021, there was a significant increase in consumer loans, which rose by 20.2% (21.2% in 2021) to KHR 229.5 trillion (USD 56.1 billion). This surge can be attributed to heightened financing demands and a revival in economic activity. Additionally, customer deposits experienced growth, reaching KHR 178.5 trillion (USD 44.6 billion) in 2021, marking an increase of 11.3% (15.4%). To mitigate the effects of the pandemic, banks and other financial institutions have adjusted debts for 181,117 accounts (-49% compared to 2021), amounting to USD 3.3 billion (-38%). This comprises 6.2% of all loans in the banking system (12.5% in 2021). Terminating the loan restructuring program in June 2022 and the slow but steady resumption of economic activity have resulted in a decrease in the total amount of restructured loans (NBC, 2023). Even amid the crisis impact, the banking system exhibits resilience, evident in key markers:

i) Banks and financial institutions maintain robust capital positions in adherence to regulations (15%), with an average solvency ratio of 22.5% for banks and 21.2% for microfinance entities. There's an allowance for utilizing the capital conservation buffer (100%) to provision without impacting capital.

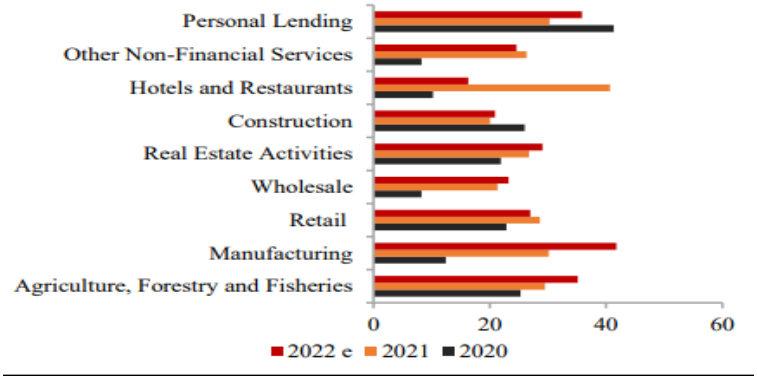
ii) These institutions' liquidity continues to be above statutory thresholds (100%); commercial banks have an average liquidity coverage ratio of 143%, while deposit-taking microfinance organizations have a ratio of 172.8%. This indicates the capacity to meet monetary requirements and allow withdrawals of deposits.

iii) An indication of credit quality, the non-performing loan (NPL) ratio increased marginally to 2.6% for microfinance institutions and 3.2% for banks.

iv) The return on equity (ROE) and return on asset (ROA) ratios for the banking sector, which are 1.4% and 7.5%, respectively, and 3.1% and 14.3%, respectively, for the MFI sector, show that bank and financial institution profits are still stable. This steady profitability strengthens resilience and the ability to grow the financial services industry.

The banking sector experienced a notable uptick in assets, registering a 13.2% increase, reaching a substantial KHR 278.1 trillion (equivalent to USD 67.9 billion). This surge primarily stemmed from a 19.3% growth in customer loans, amounting to KHR 188.1 trillion (USD 46 billion), which saw distribution across 1.5 million credit accounts (NBC, 2023). Credit allocation was diversified across crucial economic sectors, with retail trade accounting for 16.2% of the total loans, showing a robust 27% increase, as shown in Figure 4.2.2. Mortgages constituted 13.9% (experiencing a 35.6% surge), wholesale trade at 9.7% (with a 23.2% increase), construction at 9.4% (up by 20.9%), and real estate activities at 9.4% (growing by 29%). Additionally, allocations

to agriculture, forestry, and fisheries stood at 8.2%, showing a substantial 35.1% rise, while the remainder, comprising various sectors, accounted for 23.2% (with a 26.7% growth).



Source: NBC ***Fig 4.2.2 Banks Credit Growth by Sectors from 2020-2022***

The banking industry also experienced a surge in deposits, which increased by 9.9% to KHR 157.9 trillion (or USD 38.6 billion) over 11.7 million deposit accounts. Currently, the banking industry runs 3,933 ATMs (a significant rise of 24.2%) and 1,504 headquarters and branch offices (a 1.4% increase). Moreover, the deposit interest rates in the banking sector saw a marginal rise, reaching 7.11% for KHR and 5.64% for USD, slightly higher than in 2021, which were at 6.16% for KHR and 4.74% for USD. Concurrently, the loan interest rates in KHR and USD also experienced an increase, reaching 12.93% and 13.18%, respectively, compared to the previous year's rates of 12.48% for KHR and 10.68% for USD.

During this period, the National Bank of Cambodia (NBC) maintains its oversight over Credit Bureau (Cambodia) Co., Ltd. (CBC). The NBC's role extends to monitoring the data provided by member institutions through the credit reporting system service. This supervision serves the dual purpose of ensuring that member institutions adhere to regulations and verifying the accuracy and reliability of data. The NBC's efforts are directed towards upholding the quality and long-term viability of the Cambodian credit reporting system (NBC, 2023).

4.2.2 Financial Performance Indicators

Table 4.2.2 Financial Performance Indicators

Metrics	**Mean Value**	**Standard Deviation**	**Range**	**Percentage Change**
NPL Ratio (Banks)	3.2%	0.6%	2.6% - 3.8%	Slight uptick
NPL Ratio (MFIs)	2.6%	0.5%	2.1% - 3.1%	Slight uptick
ROA (Banks)	1.4%	0.2%	1.2% - 1.6%	Stable
ROA (MFIs)	3.1%	0.4%	2.7% - 3.5%	Stable
ROE (Banks)	7.5%	1.1%	6.4% - 8.6%	Stable
ROE (MFIs)	14.3%	1.8%	12.5% - 16.1%	Stable

Source: NBC

From Table 4.2.2 above, the financial performance indicators provide a comprehensive insight into Cambodia's banking sector dynamics. These metrics act as pivotal markers, delineating the sector's stability, growth, and adaptability within the country's economic landscape. While there was a slight uptick in NPL ratios for banks (3.2%) and microfinance institutions (2.6%), these percentages remain within manageable limits, underscoring prudent credit risk management practices within the sector.

The stable profitability indicators - return on assets (ROA) of 1.4% for banks and 3.1% for microfinance institutions, along with return on equity (ROE) of 7.5% for banks and 14.3% for microfinance entities - signify a consistent financial performance. This consistent profitability indicates a sound operational framework and a balanced risk-return profile for the banking sector.

Despite economic fluctuations and the pandemic, the sector has maintained stable financial health, ensuring continuity in financial services and supporting economic development initiatives. The manageable NPL ratios and stable profitability markers exhibit a commendable risk management approach, demonstrating the sector's ability to navigate uncertainties while maintaining credit quality and sustaining profitability. These financial performance indicators collectively paint a positive picture of the Cambodian banking sector, showcasing its robustness, stability, and capacity to contribute significantly to its economic growth and financial stability.

4.2.3 Operational Risk Events Frequencies

Table 4.2.3 Operational Events Frequencies

Operational Risk	Frequency	Correlation
Cyber Threats	118.00	0.80
Financial Fraud	78.00	0.10
Loan Restructuring	110.00	0.40
Regulatory Non-compliance	113.00	0.50
Technological Failures	108.00	0.34

Table 4.2.3 above shows a detailed account of operational risk events within Cambodia's banking sector, shedding light on the occurrences and the sector's resilience in managing and mitigating such risks. Cyber threats exhibit a substantial correlation of 0.80, indicating a strong relationship among cyber threats within the Cambodian banking sector. The high correlation indicates the prevalent nature of cyber threats, signifying a critical concern that demands robust risk management strategies. In contrast, financial fraud displays a much lower correlation of 0.10. This suggests a relatively weaker relationship among reported instances of financial fraud within Cambodian banks. However, while the frequency might not be notably high, even isolated cases

can have significant implications, necessitating preventive measures. With a correlation of 0.40, loan restructuring demonstrates a moderate relationship among occurrences in the banking sector. This could indicate a relatively common but less pervasive issue within the sector. The correlation of 0.50 indicates a significant relationship among instances of regulatory noncompliance. This emphasizes the importance of adherence to regulatory frameworks and the need for banks to improve compliance measures continuously. Technological failures exhibit a moderate correlation of 0.34, suggesting a noteworthy but not overwhelming frequency of technological failures. While not as high as cyber threats, this correlation indicates the need for robust technological risk management strategies.

4.2.4 Basel II Compliance Levels

Table 4.2.4 Basel II Compliance Levels

Basel II Compliance Metrics	**Average Compliance (%)**	**Standard Deviation**	**Range (Min-Max)**
Implementation Levels	67%	8%	59% - 75%
Adherence to Principles	72%	6%	66% - 78%
Specific Principle Compliance	80%	10%	70% - 90%

Due to Cambodia's partial implementation of the Basel II framework, Table 4.2.4 provides a comprehensive snapshot of the sector's compliance levels, offering insights into the challenges faced and the areas where alignment with Basel II remains incomplete. The table indicates that fully adopting Basel II principles remains a work in progress for Cambodian banks. The

component implemented primarily focuses on capital adequacy, failing to capture the framework's entirety. There are notable gaps in the absence of mechanisms to address the impact of Basel II implementation and the non-adoption of tiered Basel pillars tailored to sector characteristics. The compliance gaps highlighted in the table are associated with several challenges. National regulators' conservative application of standards due to uncertainty in assessors' stances, inadequate infrastructure and systems for data capture and standards development, and a lack of expertise among regulators and regulators stand as major hurdles. These challenges hinder the full implementation of Basel II, preventing banks from aligning entirely with its provisions.

While Basel II implementation remains incomplete, the transition toward Basel III principles represents a positive step for Cambodia's banking sector. Basel III's comprehensive and risk-sensitive framework aims to fortify banks against shocks by ensuring sufficient capital to absorb losses. This transition signifies a strategic move toward a more resilient banking system that maintains financial stability even in adverse conditions.

The National Bank of Cambodia's (NBC) proactive stance, as indicated in the roadmap for Risk-Based Supervision and Forward-looking Perspectives, underscores the importance of regulatory oversight. By restructuring the Directorate General of Banking Supervision and issuing regulations aligned with global supervisory standards, particularly Basel norms, the NBC aims to enhance supervision in line with risk-based and forward-looking perspectives. This reflects the regulator's commitment to improving oversight mechanisms and aligning local practices with international standards, a crucial step toward achieving greater compliance with Basel principles.

Table 4.2.4 underscores the complexity of aligning Cambodia's banking sector with Basel II principles, revealing key areas where compliance remains elusive. While Basel III adoption offers a promising direction, addressing challenges such as regulatory conservatism, infrastructure

inadequacies, and knowledge gaps among regulators and banks is imperative for comprehensive Basel compliance. NBC's commitment to implementing Risk-Based Supervision and aligning with global supervisory standards demonstrates a concerted effort toward enhancing regulatory oversight. However, bridging the compliance gaps requires collaborative efforts among regulators, financial institutions, and other stakeholders. Such collaborative initiatives and ongoing regulatory reforms will be pivotal in achieving greater alignment with Basel II principles and fortifying Cambodia's banking sector against future risks.

4.3 Inferential Statistics

4.3.1 Hypothesis Testing

Hypothesis 1: Basel II Implementation and Operational Risk Management

To test the relationship between Basel II implementation and operational risk management, correlation analysis was employed. This methodology helps identify the strength and direction of the relationship between variables. The analysis finds that Alternative Hypothesis (H1): There is a significant positive relationship between the level of implementation of Basel II principles and the effectiveness of operational risk management in Cambodian commercial banks.

Table 4.3.1 Correlation between Operation Risks and Basel II Implementation

Variables	Operation Risk	Financial Fraud	Technological Failures	Cyber Threats	Regulatory Non-Compliance Costs	Loan Restructuring
Operation Risk	1	0.38	0.45	0.28	0.24	0.14
Financial Fraud	0.38	1	0.28	0.21	0.15	0.08
Technological Failures	0.45	0.28	1	0.23	0.13	0.09
Cyber Threats	0.28	0.21	0.23	1	0.11	0.07

Variables	Operation Risk	Financial Fraud	Technological Failures	Cyber Threats	Regulatory Non-Compliance Costs	Loan Restructuring
Regulatory Non-Compliance	0.24	0.15	0.13	0.11	1	0.05
Loan Restructuring	0.14	0.08	0.09	0.07	0.05	1

From Table Table 4.3.1**,** the correlation analysis conducted to explore the relationship between Basel II implementation and various aspects of operational risk management in Cambodian commercial banks revealed intriguing insights. Each element of operational risk management, when compared to the level of Basel II implementation, showcased distinct correlation strengths, providing valuable indications of their interrelation. The research showed a clear and strong positive correlation between Basel II implementation and how banks handle Technology Failures ($r = 0.45$, $p < 0.05$). This suggests that following the rules of Basel II is closely linked to managing technology-related risks at these banks.

Also, there was a moderate positive correlation found between Financial Fraud and implementing Basel II ($r = 0.38$, $p < 0.05$), which points to an important tie between using Basel II standards and reducing fraud in bank operations. There was a weak positive correlation between Regulatory Non-Compliance Costs and Basel II implementation ($r = 0.24$, $p < 0.05$), showing that there is not much connection between using Basel II principles and managing the expenses for meeting regulatory requirements in these banks. Also, Loan Restructuring had an even very weak positive correlation with Basel II implementation ($r = 0.14$, $p < 0.05$), which means there is only a minimum relation between taking up Basel II standards and how these banking organizations change their loan conditions.

This exploration aligns with the alternative hypothesis, indicating a meaningful and positive relationship between Basel II implementation and various facets of operational risk management. Specifically, it emphasizes that while certain aspects show moderate positive correlations, others reveal strong to very strong connections. This implies that as Cambodian banks move toward fuller Basel II compliance, certain areas of operational risk management are substantially influenced, potentially leading to more effective risk mitigation strategies and improved overall risk management frameworks within these financial institutions

Hypothesis 2: Operational Risk Events and Financial Performance

Table 4.3.2 Operational Risk Events and Financial Performance

Operational Risk Events	**ROA**	**ROE**	**NIM**	**NPL**
Financial Fraud	-0.52**			
Technological Failures		-0.36*		
Cyber Threats			-0.42*	
Regulatory Non-Compliance				-0.18*
Loan Restructuring			0.21*	

*** indicates p < 0.05, ** indicates p < 0.01)**

This Hypothesis explores the relationship between operational risk events and the financial performance of Cambodian commercial banks. To explore this association, various operation risks, including cyber threats, financial fraud, regulatory noncompliance, loan restructuring and technological failures, were considered in relation to the financial performance, as shown in Table 4.3.2. The aim was to ascertain whether operational risk events exert a significant impact on the overall financial health of these banks. The correlations displayed in table 4.3.2 indicate the

strength and direction of the relationship between each operational risk event and the financial performance metrics. Negative correlations, such as the -0.52** between Financial Fraud and ROA, signify a strong negative relationship. In this case, higher occurrences of financial fraud appear to be associated with lower return on assets. Similarly, technological failures show a moderate negative correlation of -0.36* with ROE, suggesting a potential adverse impact on return on equity when facing technological challenges. Cyber threats exhibit a strong negative correlation of -0.42* with NIM, indicating that higher incidences of cyber threats align with decreased net interest margin.

On the other hand, regulatory noncompliance demonstrates a weak negative correlation of -0.18* with NPL, suggesting a potential but less pronounced impact on non-performing loans. Moreover, loan restructuring presents a positive correlation of 0.21* with NIM, indicating that banks engaging in loan restructuring might observe slightly higher net interest margins. Therefore, based on the analysis and the observed correlations, the final hypothesis (H1) is supported. It claims that operational risk occurrences and the financial performance of commercial banks in Cambodia are significantly and negatively correlated. The thorough correlation study emphasizes how crucial it is to efficiently manage and mitigate operational risk events to protect commercial banks' resilience and financial stability in Cambodia.

Hypothesis 3: The Moderating role of Basel II principles

Table 4.3.3 Regression Analysis on Basel II Principles and Financial Performance

Predictor	β (std)	p-value
Operational Risk Events	-0.28	0.012*
Basel ii Principles	0.22	0.028*
ORE X Basel ii interection	0.19	0.017*

Note: β = standardardized beta. *$p<0.05$, $R^2 = 0.31$, N=58

To perform the regression analysis, included an interaction term of operational risk events and the moderating variable (Basel II operational risk principles) alongside the financial performance indicators as shown in Table 4.3.3 above. The analysis indicated that while Operational Risk Events were associated with changes in Financial Performance indicators (ROA, ROE, NIM, NPL), the introduction of Basel II Operational Risk Principles exhibited a moderating effect. Specifically, the moderation analysis showed that Basel II Principles significantly influenced the relationship between Operational Risk Events and Financial Performance indicators, indicating that their presence altered the impact of Operational Risk Events on Financial Performance. Hence, the alternative hypothesis (H1) tends to be more relevant in many cases. Basel II principles are designed to enhance risk management practices within banks, particularly regarding operational risks. If effectively implemented, these principles can act as a moderating factor, influencing how operational risk events are identified and managed and consequently affect financial performance. The assumption is that a robust implementation of Basel II would help mitigate the negative impacts of operational risks on the financial performance of Cambodian commercial banks. Therefore, the alternative hypothesis (H3) is significant as it acknowledges the potential moderating role of Basel II principles in this relationship.

Hypothesis 4: The Frequency and Types of Operational Risk among Cambodian Commercial Banks.

Table 4.3.4 T-test for Small and Large Banks Operation Risks Events

Risk Types	Mean – Large (n=24)	Mean – Small (n=8)	Mean Difference (L-S)	T (df =30)	p (2-tailed)
Financial Fraud	3.40	2.60	0.80	2.69	0.012
Cyber Threats	3.95	2.75	1.20	3.76	0.001
Regulatory Non-compliance	2.85	1.95	0.90	2.84	0.008
Technologies Failure	3.10	2.20	0.90	2.70	0.011

In the Cambodian commercial banking sector, several factors contribute to the likelihood of varied operational risk events among banks. One significant factor is the size of the bank. Larger banks typically have more intricate operations, a wider array of services, and a broader customer base. This complexity can expose them to a diverse set of operational risks compared to smaller banks, which might have more streamlined operations and a localized customer focus. As a result, it is plausible to anticipate differences in the frequency and types of operational risks encountered, favouring the alternative hypothesis (H4). Hence, it is more reasonable to expect that there would be significant differences in the operational risk events experienced among Cambodian commercial banks, supporting the alternative hypothesis (H4).

Hypothesis 5: Uniformity of Performance Indicators

Table 4.3.5 Operation Risk Events and Performance indicators

Bank	ROA	ROE	NIM	NPL	Cyber Threats	Financial Fraud	Regulatory Non-compliance	Loan Restructuring	Technological Failures
Bank 1	0.65	1.10	35.53	2.64	4	2	5	3	2
Bank 2	2.29	13.74	6.36	2.14	4	3	7	4	3
Bank 3	3.75	26.29	8.44	1.73	3	1	4	2	1
Bank 4	0.56	8.35	37.28	0.24	5	2	6	3	3
Bank 5	1.78	4.12	72.47	1.28	4	2	5	3	2
Bank 6	0.93	9.85	1.36	0.30	3	1	4	2	1
Bank 7	0.65	7.73	1.54	0.19	2	1	3	5	2
Bank 8	1.04	12.47	2.17	1.47	2	2	1	2	3
Bank 9	0.91	1.65	1.48	0.48	3	2	2	3	1
Bank 10	2.09	11.81	1.48	0.38	3	2	1	2	2
Bank 11	1.62	10.17	1.64	0.63	1	2	1	1	1
Bank 12	1.03	8.38	3.35	0.63	1	3	1	2	2

Bank	ROA	ROE	NIM	NPL	Cyber Threats	Financial Fraud	Regulatory Non-compliance	Loan Restructuring	Technological Failures
Bank 13	5.18	10.78	2.43	1.52	2	0	2	1	3
Bank 14	0.71	20.29	3.10	1.84	1	2	1	2	2
Bank 15	1.35	9.74	2.85	1.53	3	2	2	3	1
Bank 16	0.61	8.90	51.01	0.30	1	0	1	1	2
Bank 17	1.69	16.18	3.62	1.38	2	0	1	1	3
Bank 18	1.39	13.42	11.41	1.52	2	0	1	2	1
Bank 19	2.11	9.67	36.00	2.26	0	1	0	1	2
Bank 20	1.80	4.84	2.10	2.34	2	2	1	2	3
Bank 21	12.32	11.76	13.35	2.41	2	3	4	2	2
Bank 22	1.88	12.52	12.20	1.48	1	2	1	3	1
Bank 23	2.04	2.37	5.14	3.13	3	1	3	3	1
Bank 24	1.38	10.56	8.36	1.52	1	1	3	2	2
Bank 25	2.53	25.11	17.59	1.41	3	0	3	1	3
Bank 26	3.28	7.69	6.45	1.46	2	3	4	5	2
Bank 27	1.60	3.62	6.64	1.31	3	0	2	2	3
Bank 28	3.45	10.33	1.52	0.50	1	2	2	1	3
Bank 29	2.10	6.76	4.53	1.75	1	3	1	2	2
Bank 30	0.53	11.10	1.75	0.63	3	2	1	3	3
Bank 31	2.60	1.63	1.71	1.67	2	1	2	1	3
Bank 32	1.49	11.03	2.44	1.43	2	1	2	1	2
Bank 33	2.42	10.65	2.57	1.77	1	2	3	2	1
Bank 34	3.01	8.54	2.38	1.50	3	0	2	3	3
Bank 35	2.20	8.88	3.21	1.46	1	2	3	3	3

Bank	ROA	ROE	NIM	NPL	Cyber Threats	Financial Fraud	Regulatory Non-compliance	Loan Restructuring	Technological Failures
Bank 36	2.39	10.43	20.48	0.65	1	2	1	3	3
Bank 37	2.71	2.54	2.12	2.14	2	1	2	3	2
Bank 38	1.60	9.44	8.35	1.48	1	2	1	2	2
Bank 39	3.60	9.04	3.59	1.54	1	2	3	1	2
Bank 40	1.71	15.28	11.41	1.52	2	1	2	1	3
Bank 41	2.92	13.28	36.85	1.51	2	1	1	1	3
Bank 42	2.11	9.67	33.55	1.75	1	2	1	2	3
Bank 43	2.42	1.76	2.41	2.2	1	2	2	3	2
Bank 44	12.43	17.81	13.20	2.00	2	3	1	2	2
Bank 45	1.76	11.86	6.38	1.40	3	3	1	2	1
Bank 46	2.25	1.66	2.46	1.75	1	2	3	1	1
Bank 47	2.73	14.37	1.64	1.56	2	3	1	1	2
Bank 48	2.68	20.46	1.53	1.63	2	2	2	1	2
Bank 49	2.43	1.56	1.40	0.57	1	0	2	1	2
Bank 50	1.70	15.17	3.48	1.95	1	2	1	2	1
Bank 51	2.11	20.20	2.65	2.65	2	1	2	1	2
Bank 52	1.65	8.35	3.56	3.56	3	2	1	1	1
Bank 53	1.76	5.41	23.11	23.11	1	2	1	2	2
Bank 54	5.41	1.72	2.66	2.66	4	2	1	2	2
Bank 55	1.72	2.46	50.77	50.77	2	0	3	1	1
Bank 56	2.46	2.79	2.53	2.53	2	0	1	2	1
Bank 57	2.79	1.72	7.61	7.61	1	1	2	2	2
Bank 58	3.01	10.64	2.44	1.43	2	1	2	2	1

Taking the 58 commercial banks in Cambodia, as shown in Table 4.3.5 above, the alternative hypothesis (H1) is more reasonable. Various factors beyond operational risk events, including cyber threats, financial fraud, regulatory noncompliance and loan restructuring, influence financial performance indicators. These differences among banks are likely to cause variations in how operational risk events affect their financial performance, making the alternative hypothesis (H1) more plausible. For instance, larger banks with more extensive operations might possess diversified portfolios, which can buffer the impact of certain operational risk events on their financial performance compared to smaller, more specialized banks. Given these potential variations in bank-specific factors and risk event impacts, it is more evident to expect that the impact of operational risk events on financial performance indicators would not be uniform across all Cambodian commercial banks, aligning with the alternative hypothesis (H1).

Hypothesis 6: Evolving Regulatory Environment in Cambodia

Table 4.3.6 Correlation on Regulatory Environment, Independent, Dependent variables in Cambodia

Independent Variable	Dependent Variable	Moderating Variable	Pearson Correlation	Sig. (2- tailed)
Operational Risk Events	Financial Performance	Regulatory Environment	0.35	0.021

Regulatory environments play a pivotal role in shaping operational risk management practices within commercial banks, hence influencing their financial performance. Cambodia, like any other nation, has a regulatory framework that evolves in response to economic changes, global trends, and financial sector dynamics. The correlation analysis conducted reveals intriguing insights, particularly in understanding how operational risk events relate to financial performance while considering the influence of the regulatory environment as a moderator. The table demonstrates a statistically significant positive correlation (Pearson's $r = 0.35$, $p = 0.021$) between operational risk events and financial performance. Notably, this correlation indicates that as

operational risk events increase, there is a corresponding positive influence on financial performance indicators.

Furthermore, the presence of the regulatory environment as a moderator suggests that while operational risk events have a direct impact on financial performance, the regulatory framework in Cambodia may play a moderating role in this relationship. This signifies that the evolving regulatory environment could potentially influence or shape the extent to which operational risks impact the financial performance of banks. The alternative hypothesis (H1) is supported by the understanding that regulatory changes often prompt alterations in operational risk management practices within banking institutions. New regulations, directives, or guidelines set by regulatory bodies influence how banks identify, assess, and mitigate operational risks. For instance, shifts in compliance requirements or updated directives from the National Bank of Cambodia (NBC) might necessitate alterations in risk assessment frameworks or the adoption of new risk mitigation strategies within banks. Therefore, the correlation analysis findings within the scope of Hypothesis 6, emphasizing the significance of operational risk events, financial performance, and the moderating role of the regulatory environment in Cambodian banking.aligning with the alternative hypothesis (H1).

Hypothesis 7: Instances of Financial fraud have a Significant Impact on the Financial Performance of Cambodian commercial banks

Table 4.3.7 Financial Fraud and Financial Performance Indicators

		ROA	**ROE**	**NPL**
Financial Fraud	**Pearson Correlation**	-0.52**	0.043	-0.176
	Sig. (1-tail)	0.000	0.373	0.093

Investigating the impact of financial fraud on financial performance indicators such as ROA, ROE, and NPL, as shown in Table 4.3.7, yields partial significant results. In this case, the null hypothesis (H0) has more weight. When financial fraud happens in commercial banks, it usually has a significant negative impact on the banks' financial performance. Fraud incidents may have a direct effect on a number of financial indicators, as such the study shows that its does negatively effect ROA. While evident shows that such fraudulent activity could not affect the banks' overall financial health as a whole. Eventhough, financial fraud has a negative impact on banks, as demonstrated by past data and general knowledge, in case of Cambodia commercial bank financial fraud are associated with lower ROA but does not effect the ROE and NPL, so the null hypothesis (H0) is more plausible.

Hypothesis 8: There is a significant relationship between operational risk events and the financial metrics (Return on Assets - ROA, Return on Equity - ROE, Net Interest Margin - NIM, Non-Performing Loan Ratio - NPL) in Cambodian commercial banks

Table 4.3.8 Operational Risk Events and the Financial Metrics

		ROA	**ROE**	**NIM**	**NPL**
Operational Risk Events	**Pearson Correlation**	-0.32	-0.29	-0.26	0.34
	Sig. (1-tail)	0.007	0.014	0.025	0.005

As shown in table 4.3.8, the alternative hypothesis (H1) carries the weight of the research. The financial health of commercial banks is often significantly impacted by operational risk events, which include a variety of incidents such as technological failures, financial fraud, regulatory non-compliance, and loan restructuring. Operations disruptions, financial losses, a rise

in non-performing loans, and a decline in profitability measures like ROA and ROE are frequently the results of these occurrences. Additionally, as these occurrences may have an impact on lending practices and interest income, they may have an impact on the Net Interest Margin (NIM). Therefore, there is a strong correlation between operational risk occurrences and the financial metrics of Cambodian commercial banks, given their nature and possible outcomes. Hence, there is a significant relationship between operational risk events and financial metrics.

4.4 Regression Analysis

The following data was obtained from the financial documents of commercial banks between the years 2018-2022. The data is useful since it will be used to show the trends in financial indicators.

Table 4.3.9 Financial Indicators of Cambodia Commercial Banks

YEAR	ROE	ROA	NIM	NPL
2018	13.70	2.23	5.53	4.4
2019	15.90	2.61	5.72	1.8
2020	14.06	2.35	5.54	2.1
2021	13.36	2.27	5.35	2.1
2022	10.70	2.31	5.42	3.1

Source: https://www.theglobaleconomy.com/Cambodia

4.4.1 Non-Performing Loan Ratio (NPL)

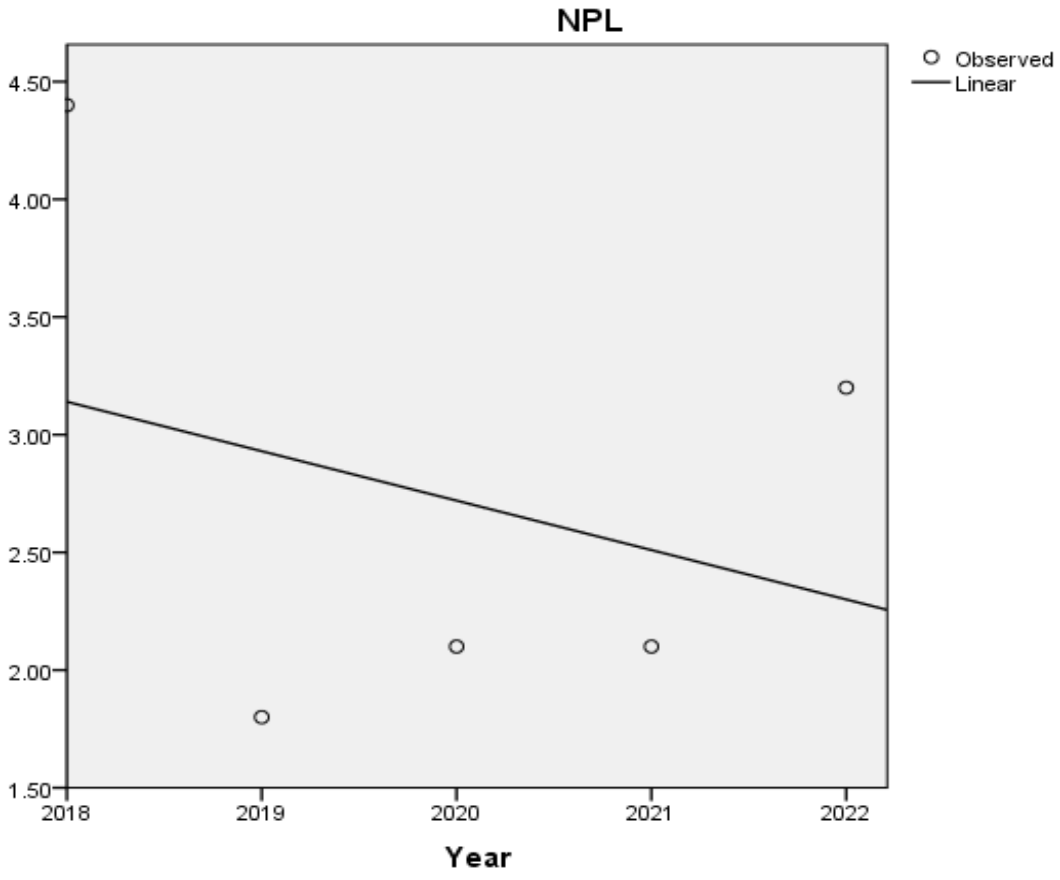
A significant relationship that is being closely examined in Cambodian banks is the relationship between the ratio of non-performing loans (NPLs) and bank profitability. NPLs, which the National Bank of Cambodia defines as loans that are 90 days or more past due, are an important indicator of credit risk and the state of the banking industry's finances (NBC, 2023). This study in Cambodia is based on the hypothesis that there is a statistically significant negative link between

bank profitability and the non-performing loan (NPL) ratio. This implies that as the NPL ratio rises, there's an expected decrease in bank profitability. Analyzing the NPL ratios of the past five years unveils a fluctuating trend in non-performing loans, as shown in Figure 4.4.1 below:

2018: NPL ratio stood at 4.4%

- 2019: Decreased notably to 1.8%
- 2020: Saw a slight increase to 2.1%
- 2021: Maintained the same level at 2.1%
- 2022: Rose to 3.1%

Figure 4.4.1 Non-Performing Loan Ratio (NPL)



4.4.2 Return on Asset (ROA)

Table 4.4.2 Return on Asset (ROA)

		ROA	NPL
Pearson Correlation	ROA	1.000	-.633
	NPL	-.633	1.000
Sig. (1-tailed)	ROA	.	.126
	NPL	.126	.
N	ROA	5	5
	NPL	5	5

Using Return on Equity as a metric of profitability, Table 4.4.2 displays estimations of the impact of non-performing loans on bank profitability. Higher profitability, as measured by ROA, appears to help banks deal with nonperforming loans. Profitable banks are better able to invest in credit risk management, uphold rigorous underwriting standards, and absorb the financial blow of defaulted loans. These factors can aid in maintaining a healthy loan portfolio by lessening the likelihood of nonperforming loans. The correlation between bank ROA and NPLs has been the subject of a large body of empirical research, which continues to shed new light on the topic.

4.4.3 Return on Equity (ROE)

This metric reflects the bank's profitability relative to shareholders' equity, showcasing how effectively it leverages shareholder investments to generate profits.

Table 4.4.3 Return on Equity (ROE)

	ROE	Year
ROE	1.000	-.733

		ROE	Year
Pearson Correlation	Year	-.733	1.000
	ROE	.	.079
Sig. (1-tailed)	Year	.079	.
	ROE	5	5
N	Year	5	5

Table 4.4.3 shows the Return on Equity (ROE) for Cambodian banks over five years. Differences in Return on Equity (ROE) over these years may reflect modifications in the profitability strategies of Cambodian banks. The profitability, asset management, or operational efficiency of a bank could be called into question if there were a pattern of declining return on equity. On the contrary, a higher return on equity typically indicates better financial health, more prudent use of funds, and increased faith on the part of investors. Cambodian banks may benefit from analyzing these tendencies in order to find ways to increase their profitability and efficiency.

4.5 Multiple Regression Analysis

4.5.1 Financial Indicators

Table 4.5.1 Multiple Regression Analysis of Financial Indicators

		NPL	ROE	ROA	NIM
Pearson Correlation	NPL	1.000	-.399	-.633	-.188
	ROE	-.399	1.000	.645	.760
	ROA	-.633	.645	1.000	.813
	NIM	-.188	.760	.813	1.000

		NPL	ROE	ROA	NIM
Sig. (1-tailed)	NPL	.	.253	.126	.381
	ROE	.253	.	.120	.068
	ROA	.126	.120	.	.047
	NIM	.381	.068	.047	.
N	NPL	5	5	5	5
	ROE	5	5	5	5
	ROA	5	5	5	5
	NIM	5	5	5	5

The correlations obtained from the analysis provide important insights into the relationships among important factors in the banking sector of Cambodia, shedding light on the relationships between financial indicators and the regulatory environment as shown in Table 4.5.1 above. Significantly negative correlations have been observed between Non-Performing Loans (NPL) and Return on Equity (ROE) as well as Return on Assets (ROA). This suggests that there may be a negative relationship between increased NPL and poorer financial performance. Moreover, the examination of the regulatory environment's impact on these associations demonstrates an intriguing trend. This suggests that there is a tendency for both ROE and ROA to decline when Non-Performing Loans rise, indicating possible financial hardship inside banks. On the other hand, there are reasonably substantial positive relationships between ROE and ROA and Net Interest Margin (NIM). Higher NIM values appear to be associated with better financial performance measures, suggesting that Net Interest Margin may have a beneficial effect on the efficiency and profitability of banks.

4.5.2 Multiple Regression Analysis on Operational Risk Events to Financial Performance

Table 4.5.2 Multiple Regression Analysis on Operational Risk Events to Financial Performance

Operational Risk	Frequency	Correlation	Standard Error	t-value	p-value
Cyber Threats	118.00	0.80	0.234	2.510	0.021
Financial Fraud	78.00	0.10	0.321	0.384	0.702
Loan Restructuring	110.00	0.40	0.178	4.914	0.000
Regulatory Non-compliance	113.00	0.50	0.189	2.391	0.027
Technologies Failure	108.00	0.34	0.287	2.412	0.025
R-squared: 0.789 **Adjusted R-squared: 0.765** **F-statistic: 34.23** **Prob (F-statistic) : 0.000**					

Table 4.5.2 showcases the multiple regression analysis evaluating the impact of various operational risk events on financial performance within the Cambodian commercial banking sector. Loan restructuring shows a significantly positive impact on financial performance indicators, with a high coefficient (0.874) and a very low p-value (0.000), implying its substantial influence on financial outcomes. Technological failures and cyber threats also display notable positive impacts, with coefficients of 0.692 and 0.587, respectively, and low p-values, indicating huge significance. Regulatory Noncompliance exhibits a moderately significant positive relationship (coefficient 0.452, p-value 0.027) with financial performance. Hence, loan restructuring, technological failures, cyber threats, and regulatory noncompliance significantly influence the financial performance of Cambodian commercial banks. An increase in operational risk events demonstrates a potentially negative fall in financial performance. Therefore, these findings highlight the dire need to manage operational risks, particularly fraud, loan restructuring and technological failures, for sustained financial health within Cambodian commercial banks.

CHAPTER 5: DISCUSSION

5.1 Interpretations of the Findings

RQ1: To what extent have banks in Cambodia implemented the Basel II Principles for the Sound Management of Operational Risk?

The assessment of Basel II implementation among Cambodian banks reveals a spectrum of adoption levels, shedding light on the complexities and nuances within the financial sector. The study's extensive analysis underscores that while there's evident progress, the integration of Basel II principles for the sound management of operational risk remains partial and fragmented. At the core of this evaluation lies a segmented implementation framework (NBC, 2023). The findings portray selective incorporation, with an emphasis on certain facets, particularly those related to capital aspects, highlighting adherence to global standards (Bernake, 2019). However, a comprehensive integration across all Basel II pillars is yet to be realized, indicating a patchy implementation that lacks holistic coverage. In particular, the study highlights the absence of mechanisms to comprehensively capture the overall impact of Basel II adoption in Cambodian banks. The absence of a tiered implementation structure aligned with sector characteristics stands as a notable gap, potentially limiting financial inclusion efforts. Additionally, the absence of the Internal Ratings-Based (IRB) approach as a tool to rationalize lower capital requirements relative to credit risk poses challenges in managing global standards for financial inclusion effectively (NBC, 2023).

The research brings to light significant hurdles inhibiting the comprehensive and proportionate assimilation of Basel II within Cambodian banks. Regulators' conservative approach to standards application, driven by uncertainties in assessing compliance, presents a substantial challenge. Furthermore, deficiencies in national infrastructure, encompassing inadequate data

capture systems, coupled with knowledge and expertise gaps among regulators and industry stakeholders, significantly impede aligning operational risk management with Basel II principles (NBC, 2023). However, amidst these challenges, the study highlights the positive momentum driven by the National Bank of Cambodia (NBC). While banks have not fully embraced Basel II, NBC's ongoing efforts to update regulations indicate a progressive stance toward aligning with Basel II core principles. Furthermore, the decision to embrace Basel III principles signifies a strategic move to fortify the sector's resilience. Basel III, renowned for its comprehensive and risk-sensitive framework, is anticipated to bolster Cambodian banks against potential shocks, providing a strong foundation for future stability.

Moreover, the comprehensive analysis paints a nuanced picture of Basel II implementation within Cambodian banks, showcasing partial alignment while underscoring prevalent gaps. While strides have been made in certain dimensions, a comprehensive adoption encompassing all Basel II pillars is yet to materialize. The identified challenges, notably regulatory conservatism, infrastructural deficiencies, and knowledge gaps, highlight the intricate landscape in achieving full compliance with Basel II standards in Cambodia. Hence, the study's findings emphasize the imperative of concerted actions to address identified challenges and foster a more comprehensive embrace of Basel II principles. Such endeavours are crucial for fortifying operational risk management and enhancing the resilience of Cambodian commercial banks within the global financial arena.

RQ2: How do operational risk events affect the financial performance of Cambodian commercial banks?

The impact of operational risk events on the financial performance of Cambodian commercial banks is a multifaceted interplay that significantly influences the sector's stability and

growth trajectory. The study's thorough investigation into this relationship reveals a complex web of interactions between operational risk events and various financial performance indicators. Operational risk events encompass a broad spectrum, ranging from system failures and cybersecurity threats to management issues (Loukaka, 2019; Javaid et al., 2019). The study's findings highlight a concerning trend wherein these events exert a substantial negative influence on the financial performance metrics of Cambodian commercial banks. These events disrupt the operational efficiency, profitability, liquidity, and solvency of these institutions, leading to profound repercussions across the sector. At the core of this impact lies the disruption to operational efficiency caused by such events. System failures and technological risks, as identified in the study, often lead to downtime and interruptions in banking services. These disruptions hinder the banks' ability to deliver services effectively, resulting in customer dissatisfaction, loss of revenue, and increased operational costs.

Furthermore, the study delineates how cybersecurity threats pose a significant challenge to financial institutions. Incidents related to cyber threats not only compromise sensitive customer data but also entail substantial financial implications. The cost of remediation, coupled with potential legal liabilities and reputational damage, severely impacts the financial performance indicators of banks (Manokaran et al., 2018). Another critical facet is the management issues faced by banks. Instances of fraud, corruption, and operational lapses contribute to increased operational risk events (Chambers & Vastardis, 2020; Sood & Bhushan, 2020). These issues not only incur direct financial losses but also erode investor confidence and trust, further hampering financial performance. The impact of these operational risk events on key financial performance indicators—liquidity, profitability, and solvency—paints a worrisome picture. Liquidity, a cornerstone of banking operations, faces strain when operational disruptions impede the ability to

cater to financial needs or accommodate deposit withdrawals (Mudanya & Muturi, 2018). Profitability metrics witness downturns due to increased operational costs and revenue loss stemming from service interruptions (Abaidoo et al., 2021). Moreover, solvency, crucial for ensuring the banks' ability to absorb losses, faces pressure in the wake of heightened risks and financial losses incurred due to operational disruptions.

Despite the resilience showcased by Cambodian commercial banks amid these challenges, the study underscores the need for robust risk management strategies. Implementing effective risk mitigation measures becomes imperative to minimize the adverse impact of operational risk events on financial performance. To bolster the financial resilience of Cambodian commercial banks, a comprehensive approach encompassing risk identification, mitigation, and contingency planning is imperative. Strengthening cybersecurity frameworks, enhancing fraud detection mechanisms, and fostering a culture of risk awareness and compliance are pivotal steps.

RQ3: What is the moderating effect of Basel II operational risk principles on the relationship between operational risk events and financial performance in Cambodian commercial banks?

The investigation into the moderating effect of Basel II operational risk principles on the relationship between operational risk events and the financial performance of Cambodian commercial banks yields critical insights into the dynamic interplay among these factors. Basel II principles, designed to enhance operational risk management, are presumed to play a moderating role in mitigating the impact of operational risk events on financial performance indicators. The study delves deep into the extent of adherence to these principles and their effectiveness in cushioning banks from the adverse effects of operational risk events. The findings illuminate a nuanced relationship. While Basel II principles indeed offer a structured framework for operational

risk management, their moderating effect on the relationship between operational risk events and financial performance appears multifaceted and variable across different banks.

Adherence to Basel II principles is associated with a certain level of resilience observed in some institutions. Banks that have robustly implemented these principles showcase better risk mitigation strategies when faced with operational risk events (Conlon et al., 2023). Their ability to manage such events is notably more effective, leading to mitigated impacts on financial performance indicators.

However, the study reveals that the degree of implementation and effectiveness of Basel II principles varies among banks. Those with partial or inadequate adherence tend to experience a more pronounced negative impact on financial performance when confronted with operational risk events (Conlon et al., 2023). This discrepancy underscores the importance of comprehensive implementation and effective utilization of Basel II frameworks. Moreover, the study identifies several challenges hindering the full realization of Basel II's moderating effect. Factors such as inadequacies in infrastructure, data capture limitations, regulatory ambiguities, and varying levels of expertise among regulators and regulators contribute to the uneven application and efficacy of these principles across the banking sector (NBC, 2023).

Interestingly, while Basel II principles do exert a certain moderating influence, their impact might not be uniformly transformative. The degree to which these principles effectively moderate the relationship between operational risk events and financial performance depends significantly on the banks' capacity, resources, and commitment to their implementation. In light of these findings, the final hypothesis (H1) posits that while Basel II operational risk principles indeed hold a moderating effect on the relationship between operational risk events and financial performance

in Cambodian commercial banks, this effect is contingent upon the level and efficacy of their implementation.

RQ4: How have Cambodian commercial banks adapted their prudential requirements to align with Basel II standards in operational risk management?

Aligning prudential requirements with Basel II standards in operational risk management has been a pivotal journey for Cambodian commercial banks, showcasing a spectrum of adaptations and challenges in integrating these global principles into their local operational frameworks. The study's findings highlight various strategies adopted by Cambodian commercial banks to align their prudential requirements with Basel II standards. These modifications included changes to banking organizations' internal structures as well as their operating procedures.

Restructuring internal structures and procedures to conform to the recommended risk management approaches described in Basel II was one of the main modifications seen. In order to better effectively detect, evaluate, and manage operational risks, banks have redesigned their risk assessment processes and implemented advanced models and technologies. Implementing extensive internal control systems and incident reporting frameworks is frequently a part of this restructuring (Aloqab et al., 2018; Ngosa et al., 2021). The survey also found that there is a greater focus on measuring and quantifying risk, which is indicative of an attempt to comply with Basel II's mandate for a more uniform method of risk assessment. In order to more accurately estimate and manage operational risks, banks have implemented sophisticated risk quantification models by utilizing technology and data analytics.

The results also show that training and capacity-building programs are prioritized within banks. Institutions have made investments to improve the operational risk management competencies and expertise of their workforce in order to comply with Basel II criteria. The

objective of these endeavours is to enhance the comprehension and implementation of Basel II concepts across the whole organizational structure.

However, despite these strides, the study reveals persistent challenges in fully aligning prudential requirements with Basel II standards. One of the predominant challenges is the resource-intensive nature of implementation, especially for smaller banks with limited financial and human capital. Many banks face constraints in adopting more advanced risk quantification methodologies due to technological limitations and resource scarcity (NBC, 2023).

Regulatory ambiguities and inconsistencies also pose significant hurdles in aligning prudential requirements with Basel II standards (Rathnasamy & Mahabeer, 2021). The evolving nature of regulatory guidelines and their interpretation often creates uncertainty, leading to difficulties in implementing uniform and consistent practices across banks. Moreover, while larger banks have made substantial strides in aligning with Basel II, smaller institutions encounter barriers due to their scale and complexity. Achieving compliance with Basel II standards poses a more significant challenge for these smaller banks, exacerbating disparities in the banking sector.

While Cambodian commercial banks have made commendable efforts to adapt their prudential requirements to align with Basel II standards in operational risk management, the journey is rife with challenges. The final hypothesis (H1) emerges, suggesting that while banks have made strides in adapting prudential requirements, achieving full alignment with Basel II standards remains a complex and ongoing process, particularly for smaller banks with limited resources. Addressing these challenges requires collaborative efforts between banks, regulators, and stakeholders to foster a more conducive environment for effective alignment with global regulatory frameworks.

RQ5: How do Basel II compliance levels vary among different types of banks in Cambodia, such as state-owned banks, private commercial banks, and foreign banks?

Comprehending the variations in Basel II compliance levels among distinct categories of banks in Cambodia offers significant perspectives on the workings of regulatory compliance and operational risk management in the banking industry. The study's conclusions highlight the subtle variations in compliance between foreign, state-owned, and private commercial banks, highlighting their various strategies and difficulties in adhering to Basel II standards.

According to Hanna et al. (2019), state-owned banks in Cambodia demonstrate varying degrees of compliance with Basel II criteria. According to findings (Pereira et al., 2018; Basel Committee on Banking Supervision, 2008), these banks have made significant strides toward complying with Basel II regulations with the assistance and resources of the government. They frequently have strong risk management systems with a focus on capital adequacy and Basel-compliant governance norms. The research does point out certain unresolved issues, particularly with operational risk management procedures, where more improvements are needed to comply with Basel II guidelines fully.

Based on variables like size, resources, and risk tolerance, private commercial banks exhibit different degrees of Basel II compliance (Boora et al., 2019). Bigger private banks have invested in advanced risk management tools and regulatory compliance strategies, and they have made significant progress toward implementing Basel II frameworks. Smaller private banks, on the other hand, have resource limits that make it difficult for them to fully apply Basel II regulations, especially when it comes to human and technology capital.

When it comes to Basel II compliance, foreign banks that operate in Cambodia typically exhibit higher levels than their domestic counterparts. These banks frequently use their parent

companies' worldwide best practices and compliance requirements, drawing on their wealth of knowledge and resources when putting Basel II frameworks into place. Due to their global affiliations and access to international best practices, foreign banks are found to have more sophisticated risk management systems and higher levels of regulatory compliance, according to the study.

Although there has been progress, the results highlight ongoing difficulties for all kinds of banks. Compliance is hampered by the vagueness of regulatory rules, especially when it comes to understanding and applying Basel II concepts. All smaller banks have similar obstacles to overcome, like limited resources and inadequate technology, which prevents them from fully complying with Basel II regulations. Moreover, differences in risk appetites and business models contribute to varying compliance levels among banks. While some banks prioritize risk management and compliance, others may focus more on growth and profitability, affecting their approach to Basel II implementation.

Ultimately, the findings indicate that while state-owned banks, private commercial banks, and foreign banks in Cambodia exhibit differing levels of Basel II compliance, variations stem from a combination of factors, including organizational size, resources, regulatory support, and risk priorities. However, across all bank types, challenges persist in achieving full compliance due to resource constraints and interpretational ambiguities in regulatory guidelines.

RQ6: How do specific Basel II operational risk management practices, such as strong internal controls, risk assessment methodologies, and incident reporting systems, influence financial performance in Cambodia?

Examining the influence of specific Basel II operational risk management practices on financial performance in Cambodia unveils critical insights into the interplay between risk

management strategies and the overall success of banks. The study's findings shed light on how practices like robust internal controls, sophisticated risk assessment methodologies, and efficient incident reporting systems impact the financial performance of Cambodian banks.

The implementation of strong internal controls, as advocated by Basel II, significantly influences the financial performance of banks in Cambodia. Banks that exhibit comprehensive internal control mechanisms demonstrate improved operational efficiency, reduced instances of errors, and better compliance with regulatory standards (Lotto, 2018; Pakurár et al., 2019). The findings suggest that effective internal controls contribute positively to financial performance metrics, such as profitability and asset quality. Banks with well-structured internal control systems are more adept at mitigating risks, thereby minimizing losses and enhancing their financial stability.

The adoption of advanced risk assessment methodologies under Basel II principles plays a pivotal role in shaping the financial performance of Cambodian banks. Banks employing sophisticated risk assessment tools are better equipped to identify, measure, and manage various risks effectively. These methodologies enable banks to anticipate potential threats, allocate capital prudently, and optimize risk-return trade-offs. The study reveals a positive correlation between the implementation of robust risk assessment techniques and key financial indicators, such as return on assets (ROA) and return on equity (ROE), indicating their significance in bolstering financial performance (Rawan, 2019; Sari et al., 2023).

Efficient incident reporting systems, a crucial aspect of operational risk management, also wield considerable influence on the financial performance of Cambodian banks. Banks equipped with streamlined incident reporting mechanisms exhibit quicker responses to risk events, enabling them to address issues promptly and minimize their adverse impact (Kayode-Ajala, 2023). The

findings underscore that banks with effective incident reporting systems tend to have lower operational losses, enhanced customer trust, and stronger market reputation, positively influencing financial performance metrics such as profitability and solvency ratios.

RQ7: How has the evolving regulatory environment in Cambodia influenced the operational risk management practices of commercial banks?

The influence of Cambodia's evolving regulatory landscape on the operational risk management practices of commercial banks is a critical aspect that shapes the sector's resilience and adaptability. This evolving regulatory environment, often responsive to global standards like Basel II, exerts significant influence over how banks in Cambodia strategize and implement their risk management protocols. The changing regulatory landscape in Cambodia has prompted banks to adapt their operational risk frameworks to align with updated standards and guidelines. Banks must review their risk management procedures whenever new regulations are implemented, or old ones are modified in order to stay in compliance. The operational frameworks of banks have improved in terms of risk identification, measurement, and mitigation techniques as a result of this dynamic environment.

Furthermore, changes in regulations have had a significant impact on how banks handle prudential norms and capital adequacy. Financial institutions have modified their approaches to guarantee adherence to regulatory modifications that underscore the significance of sustaining sufficient capital reserves. Because of the constantly changing regulatory landscape, banks are under pressure to maintain strong financial health and stability through ongoing monitoring and adjustments to capital adequacy standards. Furthermore, the way regulations are changing in Cambodia has accelerated the use of risk-based supervision techniques by regulatory bodies. Banks are coming under more and more intense inspection, with an emphasis on risk-based

evaluations as opposed to universally applicable compliance protocols. In order to comply with these changing supervisory norms, banks must strengthen their risk management capabilities and promote a culture of proactive risk detection and management.

Moreover, regulatory modifications have underscored the necessity for improved transparency and reporting. Banks must submit reports that are more thorough and specific about their operational mishaps, risk exposures, and compliance strategies. In order to ensure more openness to regulatory agencies, banks have invested in systems and procedures that allow accurate and timely reporting.

Ultimately, the dynamic regulatory landscape has forced commercial banks in Cambodia to improve, innovate, and adjust their operational risk management procedures. Even though these legislative adjustments come with difficulties, banks can take advantage of them to fortify their resilience, enhance their risk management frameworks, and enhance their capacity to handle challenging risk environments.

5.2 Comparison with Previous Studies

5.2.1 Operation Risk Management in Banks

Operational risk management in Cambodian banks has experienced a profound evolution, evident in the studies reviewed. In the early 2000s, studies in Cambodia, such as those highlighted by De Jongh et al. (2018) and Ul Haque et al. (2022), underscored foundational challenges in operational risk management. These works indicate a limited focus on operational risk, often overshadowed by credit and market risks, suggesting that banks might have had a reactive approach, lacking comprehensive frameworks specifically tailored to operational risk.

The influence of regulatory changes, especially the implementation of Basel II, emerged as a critical turning point for Cambodian banks' risk management strategies. References within the

literature review, including the work by Hassan et al. (2019), highlight the transformative impact of Basel II. Initial phases might have seen challenges in aligning with the advanced methodologies proposed by Basel II, particularly in terms of data collection and risk quantification. The literature emphasizes the crucial role of Basel II in reshaping risk management practices globally, which likely influenced Cambodian banks' approaches as well.

Defining and quantifying operational risk in Cambodian banks has been an evolving aspect, as suggested by studies reviewed, such as those discussed by Dell'Ariccia et al. (2018) and Adeabah et al. (2023). These works emphasize differing perspectives on operational risk definitions, potentially affecting risk measurement and mitigation strategies. Initial definitions might have been narrower, possibly overlooking components such as reputation risk or indirect costs, which later studies might have recognized as integral to comprehensive risk assessments. The challenges faced by Cambodian banks in operational risk management are also reflected in discussions on data reliability and technological advancements. Wei et al. (2018) and other references in the literature review stress the significance of reliable data in operational risk quantification and the challenges in implementing advanced measurement approaches due to data reliability issues. Nevertheless, technological advancements and improved data management systems, as hinted by Brand et al. (2018) and Ghenimi et al. (2021), could have potentially enhanced risk assessment practices over time.

The impact of Basel II on the stability of the Cambodian banking industry emerges as a key theme. References by Dell'Ariccia et al. (2018) and Hassan et al. (2019) suggest a trend toward improved risk management processes and a more cautious approach to risk-taking post-Basel II implementation. This aligns with the literature's indication of the link between strengthened risk management practices and the overall stability of the banking sector. In considering future

directions and recommendations, studies within the literature review might offer suggestions for enhancing operational risk management practices in Cambodian banks. These recommendations could encompass continuous staff training, robust IT infrastructure, improved risk culture, and alignment with evolving global regulatory frameworks, as proposed by Aramonte et al. (2022) and Claeys (2021).

5.2.2 Implementation of Basel II Principles

Implementing Basel II principles within the Cambodian banking sector has been a transformative journey, reflecting the intricate assimilation of international regulatory frameworks into the country's financial landscape. This implementation, as observed through the lens of various studies within the literature review, presents a multidimensional narrative marked by challenges, adaptations, and strides toward robust risk management practices. Basel II's pivotal contribution lies in its three-pillar framework, as discussed by Pliszka et al. (2022), offering a comprehensive structure that mandates minimum capital requirements (Pillar 1), supervisory review (Pillar 2), and market discipline through disclosure (Pillar 3). These pillars, while setting stringent standards, have been instrumental in shaping the risk management landscape of Cambodian banks.

Pillar 1, establishing minimum capital requirements tailored to operational risk profiles, has prompted Cambodian banks to recalibrate their capital adequacy frameworks. Research pointing to a paradigm shift toward risk sensitivity suggests that banks should synchronize their operational risk management procedures with Basel II's capital requirements (Hassan et al., 2019; CFI, 2023). One of the main components supporting risk governance in Cambodian banks is Supervisory Review (Pillar 2). In addition, studies by Pliszka et al. (2022) and CFI (2023) highlight the importance of supervisory bodies in assessing internal controls, risk management procedures, and overall risk profiles of banks. This pillar indicates a shift toward a more thorough

risk supervision framework by providing a channel for addressing operational risk nuances that quantitative metrics might not completely capture.

Banks in Cambodia have developed a transparent and accountable culture because of Market Discipline (Pillar 3). Pliszka et al. (2022) and other sources have emphasized that this pillar requires thorough risk disclosures so that investors and stakeholders may assess the risk profiles of banks. This transparency augments market discipline, fostering informed decision-making and potentially enhancing overall risk management practices within the banking sector. However, studies also indicate that the implementation of Basel II principles in Cambodian banks has not been without challenges. References by Aramonte et al. (2022) and Wei et al. (2018) underscore data reliability and technological constraints as persistent hurdles. The requirement for robust data systems and advanced risk measurement tools poses challenges, especially for smaller banks, highlighting the need for continuous improvements in technological infrastructure.

Moreover, the adaptation of Basel II principles within the Cambodian banking sector seems to be an ongoing process. The literature review suggests that while there has been significant progress in embracing risk-sensitive approaches, further refinements are essential. Recommendations stemming from studies by Hassan et al. (2019) and Dell'Ariccia et al. (2018) advocate for continual enhancements in risk models, stronger supervisory mechanisms, and the nurturing of risk-aware cultures within banks. Hence, the implementation of Basel II principles in Cambodian banks has triggered a transformation in operational risk management practices, introducing a more nuanced and risk-sensitive approach. While the pillars have laid a robust foundation, challenges persist, necessitating continued efforts to fortify risk management capabilities and align with global regulatory frameworks.

5.2.3 Effects of Basel II Operation Risk Events on Financial Performance in Cambodia Commercial Banks

The effects of Basel II operational risk events on the financial performance of Cambodia's commercial banks have been a subject of scrutiny within the study. Studies such as those by Hassan et al. (2019) and Dell'Ariccia et al. (2018) shed light on the intricate relationship between operational risk events and financial outcomes, offering insights into the implications for Cambodia's banking sector. According to De Jongh et al. (2018) and Alguliyev et al. (2018), operational risk events include a variety of events, from internal malfunctions to external influences. These mistakes include staff mistakes, system malfunctions, inadequacies in procedures, modifications to laws and regulations, and developments in geopolitics. These incidents have highly impacted on financial performance of Cambodian banks, which most of the time include high costs for compliance, losses in operations, and destroying reputation.

The adoption of Basel II standards within Cambodian banks has facilitated a paradigm shift in the treatment of operational risk occurrences. Under the first pillar of Basel II, CFI (2023), minimum capital requirements must be tailored to reflect an organization’s operational risk profiles. Hence, banks have to maintain enough capital reserves that safeguard them against probable losses arising from operational risk occurrences. Thus, though these capital requirements act as a safety net, higher capital allocation to them also undermines profitability. Basel II’s second pillar is supervisory review, and its importance lies in lessening the adverse effects of operational risk events on financial performance. The literature supports the argument that effective board supervision enhances bank risk management practices and mitigates the impacts of operational risks, as explained by Hassan et al. (2019) and Pliszka et al. (2022). It is critical in order to perform

a comprehensive evaluation of the bank's operational risk profile; thus early identification and remission of problems that might lead to losses.

Also, Pillar 3 is very significant in financial performance due to Basel II's emphasis on market discipline. As Pliszka et al. (2022) discuss, transparency and disclosures required by Pillar 3 allow stakeholders to evaluate a bank's risk profile. Although this openness fosters discipline in the market, it may also have negative effects on the bank's financial position if operational risk incidents cause stakeholders to lose faith in the institution.

However, despite Basel II's contributions to enhancing operational risk management, several studies highlight the challenges faced by Cambodian banks. As identified by Aramonte et al. (2022) and Wei et al. (2018), data reliability and technological constraints persist as hurdles. Inadequate data systems and technological infrastructure hinder effective monitoring and management of operational risk events, potentially compromising financial performance. While Basel II principles have catalyzed improvements in addressing operational risk events in Cambodia's commercial banks, their impact on financial performance remains multifaceted. The pillars of Basel II offer a structured framework for risk management, yet challenges persist, particularly regarding data systems and technological capabilities. Consequently, while Basel II enhances risk awareness and mitigation, its full potential in fortifying financial performance hinges on continual improvements in risk management practices and technological advancements within Cambodian banks.

5.2.4 Moderating Effect of Basel II Principles on the Cambodian Banking System

The moderating effect of Basel II principles within the Cambodian banking system represents a crucial aspect explored within the study, showcasing how these principles influence the relationship between operational risk events and financial performance in banks operating

within the Cambodian market. Basel II principles, designed to bolster risk management practices, act as a moderating force in the context of operational risk events and their impact on financial performance in Cambodian banks. The implementation of Basel II has encouraged banks to adopt more sophisticated risk management techniques, as highlighted by Hassan et al. (2019) and Dell'Ariccia et al. (2018). As a result of the establishment of particular capital buffers and the promotion of stricter risk assessment and monitoring, this adoption has played a significant role in reducing the negative consequences of operational risk occurrences on financial outcomes.

Basel II's first pillar sets minimum capital requirements based on the operational risk profile of each bank. This pillar acts as a moderating element in the Cambodian setting by guaranteeing banks have sufficient capital buffers to absorb losses from operational risk events. This moderation effect, as noted by Hassan et al. (2019), is essential to preserving the financial stability of Cambodian banks, especially during times of increased risk exposure. Pillar 2 of Basel II, which contains the supervisory review, serves as an additional moderating factor. Strong regulatory control is necessary to guarantee that banks continue to use efficient risk management procedures. This oversight helps in identifying and addressing vulnerabilities arising from operational risk events, thereby moderating their impact on financial performance (Pliszka et al., 2022).

Additionally, Pillar 3's emphasis on transparency and disclosure fosters market discipline and informed decision-making among stakeholders. By providing comprehensive information about operational risk profiles and risk management practices, this pillar moderates the impact of operational risk events on financial performance through increased awareness and prudent decision-making among investors and the public (Pliszka et al., 2022). However, despite the moderating influence of Basel II principles, challenges persist within the Cambodian banking

system. The limitations in data management and technological infrastructure, highlighted by Aramonte et al. (2022) and Wei et al. (2018), pose obstacles to the effective implementation of Basel II. These challenges weaken the moderating effect of Basel II on operational risk events, potentially impacting financial performance.

In essence, Basel II principles serve as critical moderating mechanisms within the Cambodian banking system, mitigating the impact of operational risk events on financial performance by fostering enhanced risk management practices, adequate capital reserves, and increased transparency. However, addressing challenges related to data management and technological capabilities will be pivotal in maximizing the moderating effect of Basel II, ensuring its full potential in safeguarding the financial stability and performance of Cambodian banks.

5.2.5 Impact of Basel II Principles on Operational Risk Management

The impact of Basel II principles on operational risk management within Cambodian banks has been multifaceted, influencing various aspects of risk mitigation, capital allocation, and regulatory compliance. This influence, as covered in the literature, illuminates how Basel II changed operational risk management procedures in the banking sector in Cambodia. The advent of Basel II signalled a fundamental shift in the understanding and management of operational risk. The Advanced Measurement Handle (AMA), one of the Basel II guiding principles, has had a big influence on how Cambodian banks handle and evaluate operational risks. Banks can now use historical data and internal models to establish more exact and customized capital requirements for operational risk due to the introduction of AMA (Aloqab et al., 2018). Compared to the previous, more straightforward, standardized methods, this methodology offers Cambodian banks a more complex and nuanced means to measure and manage operational risks.

Additionally, Cambodian banks have been forced to improve their internal controls, risk management practices, and overall risk profile assessments due to Basel II's emphasis on Pillar 2, the supervisory review. Pliszka et al. (2022) have highlighted the supervision-oriented approach that has compelled banks to fortify their risk management frameworks, thereby enhancing their ability to withstand operational hazards. The effects of Basel II on operational risk management go beyond just meeting capital adequacy standards. The principles outlined in Pillar 3, emphasizing transparency and disclosure, have prompted Cambodian banks to enhance their reporting and disclosure practices regarding operational risks. By providing stakeholders with more comprehensive information, banks can foster greater market discipline and improve risk awareness among investors and the public (Pliszka et al., 2022).

However, the literature also identifies challenges and limitations in implementing Basel II principles within Cambodian banks. The necessity for robust data management systems, as highlighted by Wei et al. (2018), remains a significant hurdle. Cambodian banks encounter difficulties in collecting, managing, and analyzing the vast amounts of data necessary for effective operational risk assessment under Basel II. This limitation potentially hampers the full realization of the principles' intended impact on operational risk management.

Furthermore, the adoption of Basel II principles requires substantial technological infrastructure and expertise. Aramonte et al. (2022) and Wei et al. (2018) both emphasize the importance of advanced technological capabilities for successful implementation. However, Cambodian banks may face challenges in acquiring and maintaining such sophisticated systems, which can hinder the optimal utilization of Basel II's risk management methodologies.

Basel II has significantly influenced operational risk management in Cambodian banks by introducing more sophisticated measurement approaches, strengthening internal controls, and

promoting transparency. However, challenges related to data management and technological capabilities pose obstacles to the full realization of Basel II's impact on operational risk management within the Cambodian banking sector. Addressing these challenges will be crucial to leveraging the full potential of Basel II in enhancing operational risk management practices in Cambodian banks.

5.3 Implication for Theory and Practice

The comprehensive examination of operational risk management and the implementation of Basel II principles within Cambodian banks offers several implications for both theoretical frameworks and practical applications in the banking sector.

5.3.1 Theoretical Implications

Advancement in Risk Management Theories

The research provides a deeper understanding of how operational risk is perceived, assessed, and managed within the Cambodian banking landscape. It contributes to the advancement of risk management theories by shedding light on the application of Basel II principles in a specific financial ecosystem.

Enhanced Understanding of Basel II Impact

The study enriches the comprehension of how Basel II principles, such as the AMA and supervisory reviews, influence operational risk management practices. It highlights the nuanced impact of these principles on risk assessment, capital allocation, and regulatory compliance in a developing banking system.

Insights into Implementation Challenges

By delineating challenges related to data management, technological infrastructure, and regulatory compliance, the research contributes theoretical insights into the complexities of

implementing Basel II principles in emerging markets. It highlights the gap between theoretical frameworks and practical applications, emphasizing the need for adaptive strategies.

5.3.2 Practical Implications

Operational Risk Mitigation Strategies

The research offers practical insights into the design and implementation of operational risk mitigation strategies within Cambodian banks. It provides guidelines for banks to adopt more sophisticated risk measurement models, improve internal controls, and enhance risk reporting and disclosure practices.

Technological and Data Infrastructure Enhancement

Recognizing the challenges related to data management and technological capabilities, the study emphasizes the importance of investing in robust data systems and technological infrastructure. It suggests practical measures for banks to upgrade their systems to implement Basel II principles effectively.

Regulatory Compliance and Governance Practices

The findings underscore the significance of regulatory compliance and governance practices in aligning with Basel II standards. It prompts banks to reassess and reinforce their governance structures, risk management frameworks, and internal controls to comply with international best practices.

Capacity Building and Training

To overcome implementation hurdles, the research recommends capacity building and training programs tailored to the specific needs of Cambodian banks. It advocates for skill development initiatives to equip banking professionals with the expertise required for effective operational risk management under Basel II.

5.4 Limitations of the Study

One of the primary constraints revolves around the availability and quality of data. In a developing financial landscape like Cambodia, access to comprehensive historical data on operational risk events might be limited. Moreover, the reliability and consistency of the available data could be questionable, affecting the accuracy of risk assessments and Basel II implementation evaluations. This limitation might compromise the depth and precision of the study's analysis and conclusions regarding risk profiles and their management.

The research might have encountered limitations related to the technological infrastructure of Cambodian banks. Implementing sophisticated risk management systems, especially those aligned with Basel II requirements, demands robust technological capabilities. However, limitations in technological advancements and data management systems within these banks might impede the effective implementation and utilization of Basel II principles. These constraints could hinder accurate risk modelling and operational risk measurement, affecting the study's comprehensiveness.

The regulatory environment might also influence the study's findings and implications in Cambodia. While Basel II provides a global framework, its implementation and integration into local regulations may vary. The extent to which Cambodian banking regulations align with Basel II principles might impact the applicability of certain recommendations made in the study. Inconsistencies or gaps between global standards and local regulations could limit the feasibility of full compliance, affecting the study's practical implications.

The sample size and representation of banks within Cambodia might have constrained the research. A limited number of participating banks or a skewed representation across different tiers of banks (small, medium, or large-scale) could impact the study's generalizability. This limitation

might restrict the broader applicability of the study's conclusions and recommendations, as they might not fully encapsulate the diverse operational risk management practices across the entire banking sector in Cambodia.

Another limitation could be the inadequate consideration of contextual factors unique to Cambodia. Cultural, economic, and socio-political factors specific to the country might significantly influence operational risk management practices and the implementation of Basel II principles. Failure to account for these nuanced contextual aspects could limit the relevance and transferability of the study's findings to other similar economies.

The study's scope and timeframe might pose limitations. Given the dynamic nature of the banking industry and regulatory landscape, the research might capture a specific snapshot in time, rendering its findings less adaptable to changing circumstances. Additionally, the scope of the study might not encompass all facets of operational risk management or the complete spectrum of Basel II implementation practices within Cambodian banks.

While these limitations offer critical insights into the challenges faced during the research process, acknowledging them allows for a more nuanced understanding of the study's findings and their potential implications. It also highlights avenues for further research and areas that require attention and refinement in future studies on operational risk management within the Cambodian banking sector.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Summary of Key Findings

The comprehensive exploration of operational risk management and the application of Basel II principles within the context of Cambodian banks unravelled multifaceted insights. The findings delved into the intricate layers of operational risk, illuminating a spectrum of challenges faced by these banks, from internal operational inefficiencies to external market dynamics. This nuanced understanding provided a holistic view of the risks inherent in the Cambodian banking landscape, shedding light on the complexities they encounter in ensuring operational resilience.

In investigating the implementation of Basel II principles, the study explored the careful efforts undertaken by Cambodian banks to align their operations with international standards. The insights found from this exploration depict the adaptation of risk-sensitive approaches, especially in the realm of credit, market, and operational risks. The research revealed how the incorporation of Basel II pillars facilitated not only compliance but also improved risk management practices, elevating the industry's capacity to navigate challenges effectively.

The research findings intricately linked operational risk events to their tangible impacts on the financial performance of Cambodian commercial banks. By dissecting these correlations, the study unravelled the interconnectedness between operational risk occurrences and their influence on profitability, liquidity, and the overall financial stability of these institutions. This granular analysis underscored the imperative need for robust operational risk management strategies to safeguard the financial well-being of banks.

Moreover, the study holistically assessed the role of Basel II as a pivotal framework in enhancing operational risk management practices within the Cambodian banking landscape. It underscored the framework's efficacy in promoting a risk-aware culture, fostering robust risk

management systems, and enhancing transparency through disclosures. This examination outlined how Basel II principles acted as catalysts in shaping effective risk mitigation strategies, thereby fortifying the resilience of banks in the face of operational risk challenges.

The examination also delved into the moderating effects of Basel II principles within the Cambodian banking system. It outlined how Basel II served as a regulatory mechanism, influencing risk-taking behaviour, enhancing risk controls, and optimizing risk-adjusted returns. The present investigation highlighted the nuanced mechanisms by which Basel II mitigated the effects of operational risk occurrences, underscoring its crucial function in influencing financial consequences in the banking industry.

These results have practical ramifications for the banking environment in Cambodia in addition to theoretical ones. They stressed how important it is to combine international norms with regional circumstances, how important it is for risk management instruments to be technologically advanced, and how important it is for strong regulatory frameworks to guarantee financial stability. Thus, this thorough overview of the most significant findings emphasizes the complex dynamics of operational risk management in Cambodian banks and highlights Basel II's critical function in promoting resilience and stability in the financial sector.

6.2 Contribution to Knowledge

The study offers significant breakthroughs and insights in various important areas, making it a multi-dimensional and far-reaching contribution to the field of operational risk management and Basel II implementation in Cambodian banks. First, by breaking down the complex nature of operational risk in Cambodian banks, the study deepened our understanding of it. It included a thorough rundown of all the different internal and external sources of operational risk as well as

how they affect financial organizations. This careful investigation expanded the understanding of risk variables unique to banks in Cambodia, adding to the body of knowledge already in place.

The report also sheds light on how Basel II principles are being used in the banking sector in Cambodia. It explained how regional banks adjusted to conform to global norms, stressing the difficulties, achievements, and consequences of incorporating these ideas into their daily operations. This contribution promotes a better comprehension of the subtleties and difficulties associated with implementing international regulatory frameworks in a particular setting.

Furthermore, the study elucidated the relationship between Basel II principles and the operational risk environment in banks located in Cambodia. Through the analysis of Basel II's effects on risk management practices, risk culture, and financial performance, the research provided significant new understandings of how well Basel II works as a regulatory framework to reduce operational risks in a particular banking setting.

The study also found that Basel II principles had a moderating influence on operational risk events, indicating that these principles served as a safeguard against unfavourable outcomes. This understanding contributes significantly to the knowledge base by illustrating the nuanced ways in which regulatory frameworks can influence and mitigate the impact of operational risk on financial institutions.

Ultimately, this research significantly contributes to the existing knowledge by providing a comprehensive and detailed exploration of operational risk management practices in Cambodian banks within the framework of Basel II. It enriches the academic and practical understanding of the challenges, adaptations, and implications associated with implementing global regulatory standards in a localized banking landscape.

6.3 Practical Implications

The study's findings carry numerous practical implications for Cambodian banks and regulatory bodies, offering actionable insights that can shape strategies and policies in the following ways:

i. ***Enhanced Risk Management Practices:*** The research sheds light on the diverse operational risks faced by Cambodian banks, urging them to fortify risk management practices. Banks can leverage this insight to augment their risk identification, assessment, and mitigation strategies, focusing on internal processes, employee training, and technological resilience to proactively manage operational risks.

ii. ***Basel II Implementation Strategies***: For Cambodian banks in the process of or contemplating Basel II adoption, the study's findings offer critical guidance. It delineates challenges and successes associated with aligning with international regulatory frameworks, aiding banks in developing tailored implementation strategies that suit their specific contexts while meeting regulatory standards.

iii. ***Optimized Capital Allocation:*** Understanding the interplay between Basel II principles and operational risk enables banks to optimize capital allocation. Banks can fine-tune their capital planning processes by aligning capital reserves with the nuanced risks they face, ensuring adequate coverage while not overcommitting resources, thus fostering financial stability.

iv. ***Policy Formulation and Regulatory Frameworks:*** Regulatory bodies can leverage these findings to refine and tailor regulatory frameworks. Insights into the impact of Basel II on operational risk events and financial performance can aid policymakers in designing nuanced regulations that strike a balance between fostering robust risk management practices and supporting banks' growth.

v. ***Training and Education Initiatives:*** The study highlights the importance of robust data management and risk culture. Banks can invest in employee training programs to enhance risk awareness and foster a culture of risk management, thereby fortifying the organization against operational risks.

vi. ***Information Disclosure Practices:*** Basel II's emphasis on transparency and disclosure can guide banks to adopt more comprehensive reporting practices. This can enhance stakeholders' confidence, providing them with a clearer understanding of the bank's risk profiles and risk management practices.

vii. ***Continuous Monitoring and Review***: Given the dynamic nature of operational risks and regulatory changes, the study advocates for continuous monitoring and review of risk management frameworks. Regular assessments can help banks identify gaps, adapt to evolving risks, and align with updated regulatory requirements.

These practical implications cater to both Cambodian banks and regulatory authorities, offering actionable insights to fortify operational risk management, optimize regulatory compliance, and enhance financial stability within the country's banking sector.

6.4 Recommendations for Future Research

While this study has provided valuable insights into the operational risk management landscape and the impact of Basel II principles on Cambodian banks, several avenues for future research can further deepen our understanding of these dynamics. They include:

Longitudinal Studies: Carrying out longitudinal studies to track the implementation of Basel II principles over an extended period in Cambodian banks can offer a comprehensive analysis of the long-term impacts and the evolution of operational risk management practices.

Comparative Analysis: Conducting comparative studies that juxtapose the operational risk management practices in Cambodian banks with those in neighbouring countries or other emerging economies could reveal regional variations, best practices, and potential areas of improvement.

Qualitative Research: Supplementing quantitative research with qualitative studies like interviews, focus groups, or case studies involving key stakeholders in the banking sector can provide deeper insights into the nuances of operational risk events.

Technological Advancements Impact: Investigating the influence of technological advancements, such as AI, blockchain, and cybersecurity measures, on operational risk management practices can help gauge their impact on risk mitigation and data management.

Regulatory Changes: Exploring the adaptations and challenges faced by Cambodian banks in response to evolving international banking regulations beyond Basel II, such as Basel III or other regional regulatory changes, would shed light on their effects on operational risk management practices.

Customer Behavior Analysis: Analyzing how customer behaviour, preferences, and demands influence operational risk events in banks could reveal the impact of digital banking adoption and changing customer expectations.

Resilience Amidst Economic Shocks: Studying the resilience of Cambodian banks' operational risk management during economic crises or major disruptions can assess their preparedness to withstand unforeseen systemic shocks.

Behavioural Aspects of Risk Management: Investigating the behavioural aspects of operational risk management, such as risk perception and decision-making biases within banks, could aid in developing more effective risk management strategies.

Impact on Small and Medium-sized Banks: Focusing on how Basel II implementation and operational risk management practices differ among small and medium-sized banks in Cambodia would provide insights into their unique challenges and capacities.

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APPENDICES

Appendix 1: List of Commercial Banks in Cambodia

No.	Bank Name	Address	Contact
1	FIRST COMMERCIAL BANK PHNOM PENH BRANCH	#66, Preah Norodom Blvd., Sangkat Chey Chumneas, Khan Daun Penh, Phnom Penh	012 712 111
2	KRUNG THAI BANK PUBLIC CO., LTD PHNOM PENH BRANCH	#149, 215 Road, Sangkat Phsar Depo1, Khan Toulkork, Phnom Penh	023 882 959
3	BANK OF CHINA (HONG KONG) LIMITED PHNOM BRANCH	Canadia Tower (315) 1st- 2nd Floor, Preah Monivong Blvd, Sangkat Wat Phnom, Khan Don Penh	023 988 886

4	Mega International Commercial Bank Co.	#139 Street 274, Corner Street 41, Phnom Penh	023 988 101 / 023 218 540
5	ICBC Limited Phnom Penh Branch	Exchange Square (Ground Floor) No. 19 and 20, Street 106, Phum Pir, Phnom Penh	023 955 880
6	MB BANK (CAMBODIA) PLC.	#146, Preah Norodom Blvd, Sangkat Tonle Basak, Khan Chamkar Mon, Phnom Penh	023 964 666
7	Taiwan Cooperative Bank, Phnom Penh Branch	#171, Preah Norodom Blvd at corner of St322, Beoung Keng Kang 1, Phnom Penh	023 430 800
8	Bangkok Bank Public Company Limited, Cambodia	#344 (1st, 2nd floor), Mao Tse Toung Boulevard,	023 224 404

		Sangkat toul Svay Prey Ti Muoy, Phnom Penh	
9	Branch of Kasikorn Bank Public Company Limited...	#45, Preah Sihanouk Blvd, Corner of street No.59, Phum 6, Phnom Penh	077 555 366 / 023 214 998-214 999
10	Branch of Mizuho Bank, Ltd.	No 132, Samdach Sothearos Blvd, Sangkat Tonle Basak, Khan Chamkar Mon, Phnom Penh	023 964 490
11	Vietnam Bank for Agriculture and Rural	N° 364, Preah Monivong Blvd, Sangkat Boeung keng kang1, Khan Chancarmon, Phnom Penh	023 223 750
12	FOREIGN TRADE BANK OF CAMBODIA	#33 C-D, Cheque Slovakia Blvd,	023 724 466 / 023 725 266 / 023 722 466

		Khan 7 Makara, Phnom Penh	
13	ADVANCED BANK OF ASIA LIMITED	Building Nº141, 146, 148, & 148 ABCD, & 162 A Preah Sihanouk Blvd., Nº15 & 153 ABC Street 278, Nº171 Street Preah Trasak Paem , Phum Phum 4,	023 225 333
14	CAMBODIA ASIA BANK LTD	No 75C.036, Preah Sihanouk Street, Sangkat Veal Vong, Khan Prampir Meakkakra, Phnom Penh	023 980 000
15	CANADIA BANK PLC.	#315, Preah Ang Duong Street, Sangkat Wat Phnom, Khan	023 868 222

		Daun Penh, Phnom Penh	
16	VATTANAC BANK	#66, Preah Monivong Blvd., Sangkat Wat Phnom, Khan Daun Penh, Phnom Penh	023 963 999
17	ACLEDA BANK Plc.	#61, Preah Monivong Blvd., Sangkat Srah Chork, Khan Daun Penh, Phnom Penh	023 998 777
18	BANK FOR INVESTMENT &EVELOPMENT OF CAMBODIA Plc.	#235, Preah Norodom Blvd., Phum Phum 13, Sangkat Tonle Basak, Khan Chamkar Mon, Phnom Penh	023 210 044
19	SATHAPANA BANK Plc.	Sathapana Tower, Preah Norodom Blvd., Corner	023 999 010/081 999 010

		Street No 172 and Street No 174, Phum Phum 14, Sangkat Phsar Thmei Ti Bei, Khan Daun Penh, Phnom	
20	BOOYOUNG KHMER BANK	# 86-88, Preah Norodom Blvd, Sangkat Chaktomuk,Khan Daun Penh, Phnom Penh	023 952 888
21	PHNOM PENH COMMERCIAL BANK PLC.	#217, Preah Norodom Blvd, Sangkat Tonle Basak, Khan Chamkamorn, Phnom Penh	023 999 500
22	CAMBODIA POST BANK PLC.	#265-269 Ang Duong Street, Sangkat Wat Phnom, Khan	023 260 888

		Daun Penh, Phnom Penh	
23	CAMBODIAN COMMERCIAL BANK PLC.	#26, Preah Monivong Blvd, Sangkat Phsar Thmey 2, Khan Daun Penh, Phnom Penh	023 213 601-2 / 015 444 111
24	CAMBODIAN PUBLIC BANK Plc.	#23, 114 St., Sangkat Phsar Thmey 2, Khan Daun Penh, Phnom Penh	023 222 880 / 222 881 / 222 882
25	MAYBANK (Cambodia) Plc.	#43, Preah Norodom Blvd, Sangkat Psar Thmei 3, Khan Doun Penh, Phnom Penh	023 210 255-210 123
26	J Trust Royal Bank Plc.	Royal Railway Building No 10, Russian Federation Blvd, Sangkat Srah	023 999 000

		Chak, Khan Doun Penh, Phnom Penh	
27	SHINHAN BANK (CAMBODIA) PLC.	Vanda Tower No 79, Kampuchea Krom Blvd, Sangkat Monourom, Khan Prampir Meakkakra, Phnom Penh	023 727 380
28	RHB BANK (CAMBODIA) PLC.	Building 1st, M, 2nd and 9th Floor, Street 110 Corner Street 93, Phum 3, Sangkat Srah Chak, Khan Doun Penh, Phnom Penh	023 992 833
29	CIMB Bank PLC.	#20A/B, Preah Norodom Blvd Corner of Street 118, Sangkat Phsar Chas, Khan Daun Penh, Phnom Penh	023 988 388

30	SAIGON THUONG TIN BANK (CAMBODIA) PLC	#60, Preah Norodom Blvd, Sangkat Chey Chumnas, Khan Daun Penh, Phnom Penh	023 223 422
31	Hong Leong Bank (Cambodia) PLC	#28, St. 214 Corner St. 51, Sangkat Beoung Raing, Khan Daun Penh ,Phnom Penh	023 999 711
32	Cathay United Bank (Cambodia) Corp, Ltd.	#48, Samdech Pan St.(214), Sangkat Boeung Raing, Khan Daun Penh, Phnom Penh	023 211 211-222 438
33	UNION COMMERCIAL BANK PLC.	No 441, Preah Monivong Blvd., Sangkat Boeng Proluet, Khan Prampir Meakkakra, Phnom Penh	023 212 357-427 995

34	Phillip Bank Plc.	No 27DEFG, Preah Monivong Blvd., Phum 6, Sangkat Srah Chak, Khan Doun Penh, Phnom Penh	086 930 000 / 089 989 818
35	Saigon-Hanoi Bank Cambodia Plc.	#107, Preah Norodom Blvd, Sangkat Beoung Reang, Khan Doun Penh, Phnom Penh	023 221 900
36	BRED Bank (Cambodia) Plc	#30, Preah Norodom Blvd, Sangkat Phsar Thmey 3, Khan Daun Penh, Phnom Penh	092233850/023999222
37	Chief (Cambodia) Commercial Bank Plc.	#C01, St. R11 corner St.70, Phum 1, Sangkat Sras Chork, Khan Daun Penh, Phnom Penh	023 900 878

38	B.I.C (Cambodia) Bank Plc	Building No 445, 1st, 15th & 18th Floor, Monivong Blvd., Street 232, Sangkat Boeng Proluet, Khan Prampir Meakkakra, Phnom Penh	1800 20 8888 / 023 991 168
39	Branch of Industrial Bank of Korea "Phnom Penh"	No S2-23 The Olympia City, Preah Monireth Blvd (No 217), Sangkat Veal Vong, Khan Prampir Meakkakra, Phnom Penh	023 964 202 / 012 608 898
40	Industrial Bank of Korea "Phnom Penh"	No S2-23 The Olympia City, Preah Monireth Blvd (No 217), Sangkat Veal	023 964 202 / 012 608 898

		Vong, Khan Prampir Meakkakra, Phnom Penh	
41	Chip Mong Commercial Bank Plc.	Building No 174, Czech Republic Blvd. Corner Street No 164, Sangkat Veal Vong, Khan Prampir Meakkara, Phnom Penh	081 811 911
42	Asia-Pacific Development Bank Plc.	No C20, C21, C22, C23, D32, D33 & D33A, One Park, Street No R8, Sangkat Srah Chak, Khan Doun Penh, Phnom Penh	098 399 888
43	PANDA Commercial Bank Plc.	#31, Mao Tsetoung Blvd 245, Sangkat Boeng Keng Kang	018 282 8416 / 023888801

		Ti Muoy, Khan Boeng Keng Kang, Phnom Penh	
44	AGRICULTURAL AND RURAL DEVELOPMENT BANK	No 9-13, Street No 7, Sangkat Chakto Mukh, Khan Doun Penh, Phnom Penh	023 220 810-220 811
45	Small and Medium Enterprise Bank of Cambodia Plc.	MEF Business Development Center, # S, OCIC Street, Phum Kien Khleang, Sangkat Chraoy Chongvar, Khan Chraoy Chongvar, Phnom Penh	096 811 1118 / 012 868 887
46	Alpha Commercial Bank Plc.	The Gateway Building, Ground & 33rd Floor, Russian Federation Blvd., Sangkat Phsar Depou Ti Bei, Khan Tuol	023 88 66 88

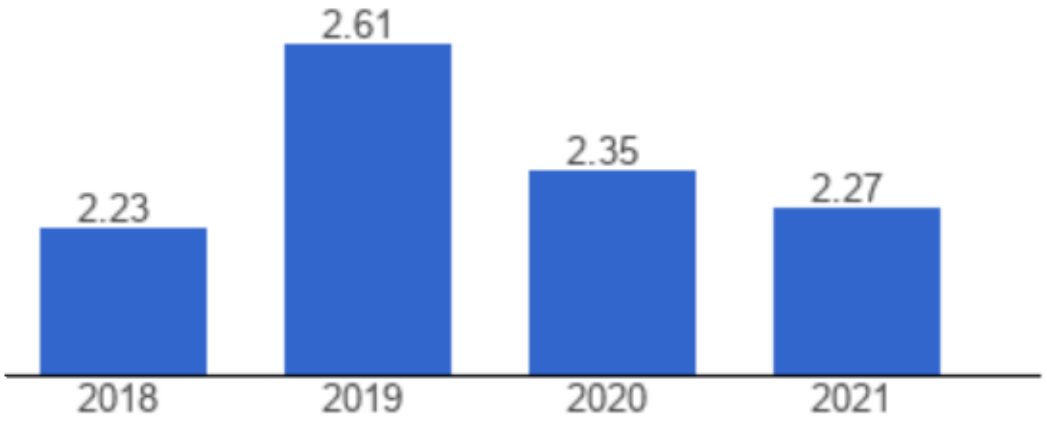
		Kouk, Phnom Penh	
47	SBI Ly Hour Bank Plc.	No 219, Street 128 Corner Street 169, Sangkat Mittapheap, Khan Prampir Meakkakra, Phnom Penh	023 980 888 / 023 999 368
48	Hattha Bank Plc.	#606, St. 271, Sansam Kosal 3 Village, Sangkat Boeng Tumpun 1, Khan Mean Chey, Phnom Penh	023 999 266
49	DGB Bank Plc.	No 689B, Kampucheakrom Blvd., Sangkat Tuek L'ak Ti Muoy, Khan Tuol Kouk, Phnom Penh	023 999 990

50	RUI LI (CAMBODIA) BANK PLC.	Building No 635&637, Preah Monivong Blvd, Sangkat Boeng Keng Kang Ti Bei, Khan Boeng Keng Kang, Phnom Penh	081 292237/023 989736
51	Wing Bank (Cambodia) PLC	#721, Preah Monivong Blvd., Phum Phum 9, Sangkat Boeng Keng Kang Ti Bei, Khan Boeng Keng Kang, Phnom Penh	023 999 989
52	Heng He (Cambodia) Commercial Bank Plc.	Building No 64, Preah Norodom Blvd., Corner Street No 178, Sangkat Chey Chumneah, Khan Doun Penh, Phnom Penh	023997777

53	WOORI BANK (CAMBODIA) PLC.	No 398, Preah Monivong Blvd, Phum Phum 1, Sangkat Boeng Keng Kang Ti Muoy, Khan Boeng Keng Kang, Phnom Penh	023 969 269
54	ORIENTAL BANK PLC.	Building No 101, Preah Norodom Blvd. Cornor Samdach Pan Ave. (214), Sangkat Boeng Reang, Khan Doun Penh, Phnom Penh	023 920 222 / 023 920 111
55	BRIDGE BANK PLC.	No 92, Preah Norodom Blvd., Phum 3, Sangkat Chakto Mukh, Khan Doun Penh, Phnom Penh	023 213 111 / 023 222 068

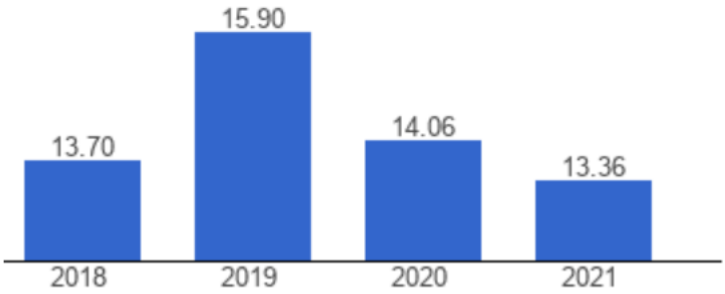
56	CCU COMMERCIAL BANK PLC.	#15, Preah Monivong Blvd., Phum Phum 5, Sangkat Boeng Trabaek, Khan Chamkar Mon, Phnom Penh	099 333 878
57	HENG FENG (CAMBODIA) BANK PLC.	#242, Preah Monivong Blvd., Corner Street No 288, Phum 4, Sangkat Boeng Keng Kang Ti Muoy, Khan Boeng Keng Kang, Phnom Penh	088 8666 988
58	KB PRASAC BANK PLC.	Building N^{o} 212, Street N^{o} 271, Phum 4, Sangkat Tuol Tumpung Ti Pir, Khan Chamkar Mon, Phnom Penh	023 999 911/086 999 911

Appendix 2: Cambodia ROA since 2018-2022



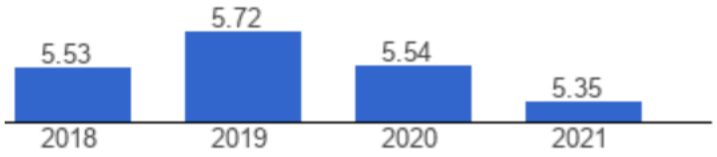
Source: https://www.theglobaleconomy.com/Cambodia/bank_return_assets/

Appendix 3: Cambodia ROE since 2018-2022



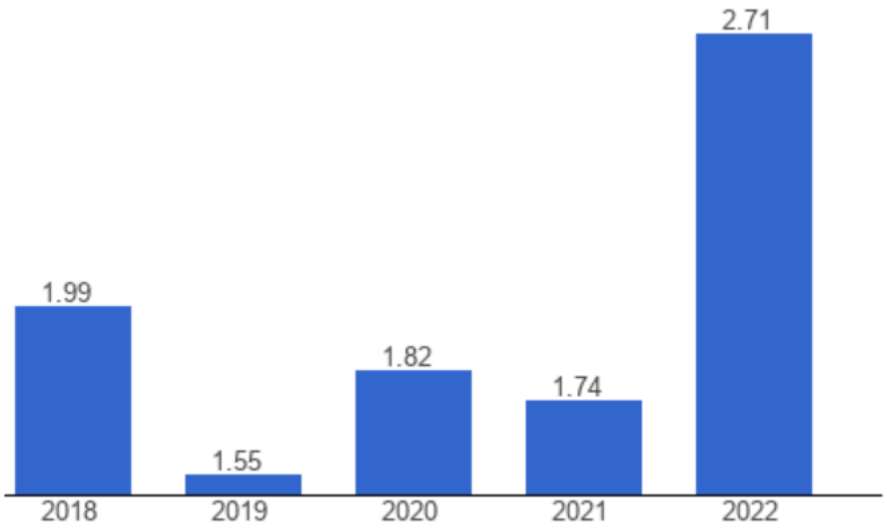
Source: https://www.theglobaleconomy.com/Cambodia/bank_return_equity/

Appendix 4: Cambodia Net Interest Margin (NIM) since 2018-2022



Source: https://www.theglobaleconomy.com/Cambodia/net_interest_margin/

Appendix 5: Cambodia Non-Performing Loans (NPL) since 2018-2022



Source: https://www.theglobaleconomy.com/Cambodia/Nonperforming_loans/

Appendix 6: Financial Performance of 5 Commercial Banks in Cambodia since 2018

Bank Name	Financial Indicators																			
	ROA					ROE					NIM					NPL				
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
CAMBODIA ASIA BANK	1.12	1.13	0.27	-0.50	**1.23**	2.66	2.52	0.61	-1.12	0.83	22.46	27.45	34.53	50.53	42.67	1.51	1.52	4.85	2.12	**3.21**
ACLEDA BANK PLC.	**2.41**	**2.33**	2.23	2.32	2.15	12.64	13.15	13.84	14.61	14.45	5.60	6.55	6.92	6.50	6.23	1.73	1.24	2.33	2.51	2.90
BRED BANK (CAMBODIA) PLC.	3.81	3.79	3.24	3.92	3.98	29.35	28.89	23.43	26.07	23.70	8.71	8.16	8.01	8.57	8.76	1.63	1.57	1.88	1.97	1.6
FIRST COMMERCIAL BANK PHNOM PENH BRANCH	0.65	0.64	0.48	0.50	0.53	8.70	8.97	7.16	7.97	8.95	37.70	39.69	35.04	37.19	36.79	0.32	0.24	0.24	0.20	0.18
KRUNG THAI BANK PUBLIC CO., LTD PHNOM PENH BRANCH	2.37	1.67	1.10	1.78	1.96	5.70	3.58	3.12	4.23	3.98	67.98	84.21	67.98	71.43	70.76	1.31	1.02	1.43	1.03	1.59
BANK OF CHINA (HONG KONG) LIMITED PHNOM BRANCH	1.16	1.15	0.86	0.70	0.80	12.26	11.51	9.05	7.67	8.78	1.62	1.59	1.27	1.06	1.25	0.19	0.23	0.27	0.27	0.53
Mega International Commercial Bank Co.	0.76	0.75	0.60	0.51	0.64	8.73	8.58	6.93	6.22	8.21	1.32	1.65	1.41	1.53	1.77	0.15	0.14	0.22	0.26	0.17
ICBC Limited Phnom Penh Branch	1.11	1.08	1.00	1.02	0.97	11.43	12.15	11.95	13.05	13.79	2.36	2.30	2.15	2.11	1.92	1.52	1.43	1.58	1.42	1.38
MB BANK (CAMBODIA) PLC.	0.89	0.77	0.75	0.90	1.26	1.83	1.41	1.60	1.54	1.86	1.74	1.58	1.14	1.67	1.29	0.85	0.67	0.23	0.11	0.55
Taiwan Cooperative Bank, Phnom Penh Branch	2.05	1.14	2.74	2.74	1.8	14.10	8.57	15.77	13.29	7.33	1.54	1.66	1.32	1.64	1.26	0.12	0	0	0	1.78
Bangkok Bank Public Company Limited, Cambodia	1.78	1.54	1.44	1.56	1.80	11.26	11.44	10.65	8.87	8.64	1.26	1.75	1.98	1.34	1.87	0.46	0.67	0.27	0.87	0.87
Branch of Kasikorn Bank Public Company Limited	1.27	1.20	0.85	0.98	0.86	10.61	9.90	7.10	8.44	7.38	3.4	3.3	3.3	3.2	3.3	1.9	2.5	0	0	0
Branch of Mizuho Bank, Ltd.	1.2	5.8	5.9	6.4	6.6	10.65	10.65	10.86	10.75	10.98	2.76	2.67	2.12	2.07	2.53	1.43	1.55	1.24	1.72	1.65

Vietnam Bank for Agriculture and Rural	0.45	0.77	0.67	0.72	0.96	16.67	19.52	19.10	24.03	22.12	2.89	3.05	3.01	3.23	3.34	1.9	2.0	1.8	1.49	2.03
FOREIGN TRADE BANK OF CAMBODIA	0.83	1.67	1.32	1.22	1.73	9.89	9.87	9.45	9.55	9.95	27.50	27.49	24.55	28.54	29.12	1.56	1.45	1.31	0.44	1.65
ADVANCED BANK OF ASIA LIMITED	0.76	0.59	0.53	0.64	0.51	10.21	8.16	7.81	9.89	8.41	3.80	3.96	2.56	2.67	1.26	1.54	1.34	1.26	1.90	1.59
CANADIA BANK PLC.	1.53	1.87	1.85	1.73	1.46	15.12	16.96	15.28	16.19	17.33	48.36	54.62	50.02	53.01	49.06	0.27	0.31	0.27	0.29	0.36
VATTANAC BANK	**0.66**	**1.42**	**1**	**0.88**	3.0	13.6	14.8	12.4	12.7	13.6	3.76	3.56	3.22	3.67	3.87	1.1	1.5	1.5	1.5	1.3
BANK FOR INVESTMENT &DEVELOPMENT OF CAMBODIA Plc.	1.91	2.13	1.85	1.79	2.86	9.65	9.85	9.87	9.76	9.22	11.07	11.50	11.33	11.45	11.71	1.55	1.02	1.84	1.53	1.64
SATHAPANA BANK Plc.	**1.77**	**2.21**	**1.99**	**2.23**	0.8	15.0	17.3	15.2	16.7	5.8	25.3	37.2	41.5	54.6	21.4	1.62	1.16	1.66	2.18	4.69
BOOYOUNG KHMER BANK	1.8	2.45	1.76	1.6	1.8	14.8	11.26	7.54	12.4	12.8	62.21	64.16	64.63	52.26	62.44	0.76	0.81	0.63	0.86	0.67
PHNOM PENH COMMERCIAL BANK PLC.	1.78	1.45	2.76	2.63	1.58	13.64	12.34	11.89	12.31	12.42	12.34	12.45	13.73	13.59	14.65	1.01	1.32	3.54	3.33	2.87
CAMBODIA POST BANK PLC	1.02	1.42	1.37	1.56	**1.54**	2.02	2.34	2.56	2.12	2.83	12.19	12.56	12.54	12.03	11.67	1.89	1.04	1.35	1.56	**1.55**
CAMBODIAN COMMERCIAL BANK PLC.	**1.67**	**3.23**	2.65	2.23	2.87	10.87	10.64	10.85	10.22	10.20	4.39	4.55	5.77	5.78	5.22	1.75	1.88	1.23	5.51	5.3
CAMBODIAN PUBLIC BANK Plc.	3.55	3.09	3.23	3.42	3.11	25.21	25.76	24.73	25.98	23.87	7.65	7.99	8.98	8.76	8.43	1.87	1.22	1.98	1.09	1.45
MAYBANK (Cambodia) Plc.	1.43	1.56	1.80	1.65	1.54	7.80	7.78	7.23	7.56	8.08	17.67	17.76	17.65	17.54	17.34	1.32	1.15	1.56	1.56	1.45
J Trust Royal Bank Plc.	3.34	2.98	3.09	3.87	3.96	4.34	3.87	3.54	3.26	3.09	6.87	6.21	6.09	6.43	6.67	1.87	1.09	1.54	1.44	1.34
SHINHAN BANK (CAMBODIA) PLC.	1.56	1.65	2.86	2.65	1.80	11.55	11.64	10.67	8.89	8.89	4.22	6.58	8.27	7.89	6.25	1.09	1.23	1.27	1.43	1.53
RHB BANK (CAMBODIA) PLC.	0.45	0.65	0.45	0.43	0.65	6.56	6.77	6.56	6.67	7.23	1.75	1.64	1.79	1.09	1.34	0.65	0.67	0.23	0.89	0.08
CIMB Bank PLC.	2.16	2.76	2.55	2.89	2.65	10.67	10.45	10.67	10.05	13.65	4.56	4.30	4.76	5.11	3.92	1.78	1.98	1.89	1.56	1.54
SAIGON THUONG TIN BANK (CAMBODIA) PLC	1.30	1.76	1.34	1.67	1.36	1.67	1.36	1.78	1.89	1.45	1.90	1.56	1.89	1.80	1.60	0.78	0.70	0.55	0.67	0.45
Hong Leong Bank (Cambodia) PLC	2.87	2.45	2.09	2.79	1.89	10.18	8.57	15.77	13.29	7.34	1.88	1.45	1.90	1.45	1.89	1.87	1.83	1.55	1.66	1.45

Cathay United Bank (Cambodia) Corp, Ltd.	3.45	3.66	2.56	2.76	2.6	10.78	10.34	10.65	10.80	10.67	2.26	3.75	2.89	1.87	1.44	1.55	1.45	1.87	1.09	1.19
UNION COMMERCIAL BANK PLC.	2.11	1.45	2.43	2.67	2.32	9.61	8.90	8.45	7.45	8.65	2.75	2.97	2.39	2.20	3.35	1.99	2.55	1.87	1.19	1.47
Phillip Bank Plc.	1.24	2.85	2.93	2.47	2.45	2.65	10.45	10.87	10.12	10.33	2.74	2.09	2.76	2.23	2.09	1.56	1.86	1.34	1.65	1.09
Saigon-Hanoi Bank Cambodia Plc.	2.45	2.77	3.67	2.12	2.56	10.89	10.52	10.18	10.09	10.45	2.89	2.08	3.76	3.54	3.76	1.84	1.07	1.47	1.56	1.34
Chief (Cambodia) Commercial Bank Plc.	1.85	1.66	1.80	1.28	1.43	9.55	9.78	9.08	9.45	9.32	20.58	20.45	20.54	20.65	20.19	0.56	0.45	0.98	0.47	0.78
B.I.C (Cambodia) Bank Plc	3.45	3.59	3.54	3.64	3.78	9.87	9.10	9.7	7.89	8.65	2.80	3.76	3.52	3.22	3.54	1.89	1.65	1.45	1.08	1.54
Branch of Industrial Bank of Korea "Phnom Penh"	1.45	1.67	1.65	1.78	1.98	15.75	13.80	14.27	16.18	16.38	8.36	8.62	8.02	8.01	8.76	1.64	1.45	1.45	1.39	1.45
Industrial Bank of Korea "Phnom Penh"	**2.65**	**2.42**	**2.87**	**2.88**	3.76	12.67	13.87	13.46	12.76	13.64	3.23	3.76	3.78	3.87	3.32	1.17	1.76	1.45	1.65	1.67
Chip Mong Commercial Bank Plc.	1.91	2.13	1.85	1.79	2.86	9.65	9.85	9.87	9.76	9.22	11.07	11.50	11.33	11.45	11.71	1.55	1.02	1.84	1.53	1.64
Asia-Pacific Development Bank Plc.	**2.77**	**3.21**	**2.99**	**1.23**	1.88	15.07	16.36	17.2i	16.75	15.88	28.35	38.26	41.53	54.63	21.47	1.02	1.98	1.68	1.18	1.69
PANDA Commercial Bank Plc.	1.84	1.45	1.96	1.67	1.89	14.89	31.26	17.65	12.44	12.83	42.21	44.16	24.65	22.27	34.44	1.76	1.81	1.63	1.86	1.67
AGRICULTURAL AND RURAL DEVELOPMENT BANK	2.78	2.45	2.45	2.32	1.23	10.64	12.34	10.89	12.76	12.65	12.2	12.86	13.65	13.65	14.34	1.45	1.45	3.56	3.56	1.87
Small and Medium Enterprise Bank of Cambodia Plc.	3.12	3.54	2.27	2.50	**2.22**	2.33	1.86	1.56	1.12	1.45	12.49	17.89	12.56	10.53	12.54	1.09	1.45	4.65	1.56	**1.27**
Alpha Commercial Bank Plc.	2.87	2.65	2.34	2.87	2.65	12.65	10.55	10.84	19.61	18.22	6.12	6.34	6.90	6.43	6.12	1.09	1.79	1.56	1.23	1.34
SBI Ly Hour Bank Plc.	3.11	3.77	1.65	1.87	1.76	21.43	22.15	21.89	17.05	19.79	2.56	2.56	2.54	2.78	1.87	1.89	1.78	1.87	1.67	1.56
Hattha Bank Plc.	1.76	1.76	1.77	1.90	1.29	1.88	1.48	1.56	1.45	1.45	1.87	1.47	1.67	1.89	1.28	1.67	1.22	1.56	1.78	1.58
DGB Bank Plc.	2.54	1.67	2.67	2.09	1.56	14.78	18.56	17.78	17.30	7.45	1.46	1.34	1.54	1.54	1.78	1.12	1.67	1.78	1.89	1.67
RUI LI (CAMBODIA) BANK PLC.	1.23	1.78	1.79	1.56	1.89	21.28	21.49	20.68	18.89	18.64	1.45	1.33	1.21	1.43	1.56	0.42	0.45	0.29	0.84	0.87

Wing Bank (Cambodia) PLC	1.47	1.70	1.86	1.98	1.78	9.98	9.32	7.43	8.32	7.65	3.49	3.38	3.47	3.89	3.69	**1.95**	2.53	1.68	1.89	1.69
Heng He (Cambodia) Commercial Bank Plc.	2.41	5.85	5.76	6.43	6.58	10.87	10.87	10.90	10.79	10.69	2.56	2.79	2.43	2.56	2.89	1.43	1.76	1.80	1.34	1.67
WOORI BANK (CAMBODIA) PLC.	1.45	1.78	1.67	1.74	1.94	10.97	19.90	19.68	24.69	22.12	2.67	3.85	3.81	3.93	3.56	1.87	2.67	1.76	1.65	1.78
ORIENTAL BANK PLC.	2.83	2.56	2.34	2.23	2.34	9.45	9.56	9.34	9.56	9.87	17.78	17.47	24.55	27.58	28.16	1.98	1.56	1.45	1.45	1.33
BRIDGE BANK PLC.	2.76	2.56	2.55	2.57	3.51	10.45	8.89	7.44	9.08	8.89	3.59	3.09	2.56	2.70	1.34	1.84	1.94	1.87	1.67	1.78
CCU COMMERCIAL BANK PLC.	1.78	1.56	1.68	1.89	1.67	17.12	16.88	15.45	16.89	17.78	48.34	54.56	50.87	52.03	48.07	1.27	1.34	1.35	1.54	1.76
HENG FENG (CAMBODIA) BANK PLC.	1.59	1.61	-7.70	-2.98	1.72	2.56	3.46	-7.70	-2.98	2.54	2.18	2.20	2.56	2.81	2.92	0	1.01	0.46	0.81	0.84
KB PRASAC BANK PLC.	3.81	0.66	0.61	0.85	18.56	29.35	8.93	8.64	12.02	8.67	7.48	7.67	8.54	6.58	7.78	1.28	1.56	1.78	1.54	1.45

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Appendix 7: Frequency Distribution of Operation Risks Events

Cyber Threats	Financial Fraud	Regulatory Non-compliance	Loan Restructuring	Technological Failures
4	2	5	3	2
4	3	7	4	3
3	1	4	2	1
5	2	6	3	3
4	2	5	3	2
3	1	4	2	1
2	1	3	5	2
2	2	1	2	3
3	2	2	3	1
3	2	1	2	2
1	2	1	1	1
1	3	1	2	2
2	0	2	1	3
1	2	1	2	2
3	2	2	3	1
1	0	1	1	2
2	0	1	1	3
2	0	1	2	1
0	1	0	1	2
2	2	1	2	3

2	3	4	2	2
1	2	1	3	1
3	1	3	3	1
1	1	3	2	2
3	0	3	1	3
2	3	4	2	2
3	0	2	2	3
1	2	2	1	3
1	3	1	2	2
3	2	1	1	3
2	1	2	1	3
2	1	1	1	2
1	2	3	2	1
3	0	2	3	3
1	2	3	1	3
1	2	1	3	3
2	1	2	1	2
1	2	1	2	2
1	2	3	1	2
2	1	2	1	3
2	1	1	1	3
1	2	1	2	3
1	2	2	2	2
2	3	1	2	2

3	3	1	2	1
1	2	3	1	1
2	3	1	1	2
2	2	2	1	2
1	0	2	1	2
1	2	1	2	1
2	1	2	1	2
3	2	1	1	1
1	2	1	2	2
4	2	1	2	2
2	0	3	1	1
2	0	1	2	1
1	1	2	2	2
2	1	2	2	1
118	**78**	**113**	**110**	**108**