

**'BANKING' ON ARTIFICIAL INTELLIGENCE TO ENHANCE BANK RISK
MANAGEMENT**

By

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SUMMARY

This dissertation investigates the impact of digital transformation on risk management within the banking sector, emphasizing the integration of artificial intelligence (AI) in enhancing operational risk management. It examines key research questions about how digitisation reshapes risk management practices, the extent to which South African banks align with international standards, and the role of AI in advancing these frameworks. The study finds that AI holds substantial potential to improve risk management, particularly in managing operational risks, while underscoring the indispensable role of human oversight. Ultimately, this shift toward a more AI-driven, adaptive approach marks a pivotal evolution in the financial sector, suggesting that the future of risk management can indeed rely on AI's transformative capabilities.

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CHAPTER 1: INTRODUCTION

1.1 Background and topic introduction

In recent years, there has been a remarkable surge in computing power, leading to an unprecedented accumulation of data that far surpasses previous decades.¹ The buzz surrounding the concepts of digitisation² and digital transformation has evoked both excitement and anxiety within organisations. As pointed out by Louw, the source of this excitement is rooted in the client-centric products offered by these organisations, which enhance customer interactions through personalisation and efficiency.³ However, it is imperative to acknowledge that these digital opportunities also bring forth significant threats that necessitate effective management.⁴

Recent years have witnessed the widespread adoption of digitisation by numerous banks, both locally and globally.⁵ This shift has driven down the cost of processing, sharing, accessing information and facilitating global communication.⁶ The conversion of data into digital format has unlocked opportunities for more efficient customer service by collecting valuable data for enhancing product offerings.⁷

Louw observes that digitisation has empowered banking organisations to introduce captivating innovations for customers, including mobile applications, thereby steering away from traditional brick-and-mortar⁸ branches.⁹ This trend is exemplified in our banking industry, with First National Bank launching the first banking app in 2011,¹⁰

¹ Maslej “The AI Index 2023 Annual Report” https://aiindex.stanford.edu/wp-content/uploads/2023/04/HAI_AI-Index-Report_2023.pdf (accessed 24-07-2023).

² Digitisation is the process of changing from analog to digital form, also known as digital enablement.

³ Louw et al “Digitisation strategies in a South African banking context: A consumer services analysis” 2020 *South African Journal of Information Management (SAJIM)* 1.

⁴ Louw 2020 *SAJIM* 2.

⁵ Louw 2020 *SAJIM* 1.

⁶ Louw 2020 *SAJIM* 2.

⁷ Louw 2020 *SAJIM* 2.

⁸ “Brick and mortar” refers to a physical location where customers can engage directly with employees, as well as access products and services in person – Global Banks “Brick and Mortar Means...” <https://globalbanks.com/brick-and-mortar-means/#brick> (accessed 24-07-2024).

⁹ Louw 2020 *SAJIM* 2.

¹⁰ First National Bank “FNB accolades” [FNB-SA Brandaccolades_2019.pdf](https://www.fnb.co.za/brand/accolades) (accessed 25-07-2023).

Absa Group introducing WhatsApp banking in 2018¹¹ and Standard Bank launching SnapScan in 2014.¹² These innovations underscore the industry's adoption of digitisation and the utilisation of cutting-edge technology to enrich and ease customer service and value. Nevertheless, amidst this rapid technological evolution, challenges emerge.¹³ These changes have introduced risks and given rise to new players in the industry, including Information Technology companies providing basic banking services (FinTech) in an innovative manner.¹⁴

The shift towards the digital paradigm and the Fourth Industrial Revolution¹⁵ presents substantial implications for risk management, necessitating a re-evaluation of optimal risk management strategies.¹⁶ Vijayakumar points out that digital risk has emerged as a prominent concern, introducing novel risk categories and business models, often characterised by their complexity and the challenges they pose for identification, assessment and management.¹⁷ Despite the adoption of new technology by banks, Yang points out that risk management practices have primarily relied on conventional tools like spreadsheets and web pages for capturing risk data, rather than harnessing technology to add genuine value and refine risk management processes.¹⁸

The rapid adoption and development of the internet, smartphones and smart devices have transformed how customers interact with banks, compelling traditional banks

¹¹ Business Tech “Absa launches WhatsApp banking in South Africa: Here’s how it works” [absa-launches-whatsapp-banking-in-south-africa-heres-how-it-works](#) (accessed 25-07-2023).

¹² SnapScan is an app that allows users to make payment for goods and service using their mobile device - Tech Central “Standard Bank acquires SnapScan maker” <https://techcentral.co.za/standard-bank-acquires-snapscan-maker/196782/> (accessed 25-07-2023).

¹³ Louw 2020 *SAJIM* 2.

¹⁴ Louw 2020 *SAJIM* 5.

¹⁵ The Fourth Industrial Revolution marks a fusion of technologies blending the physical, digital and biological realms. Its rapid pace, unprecedented in history, evolves exponentially rather than linearly. This era is propelled by breakthroughs like smartphones' capabilities, affordable yet powerful computers, fast communication, advanced robotics and artificial intelligence – Afoakwa “Banking in Africa: Strategies and systems for the banking industry to win in the Fourth Industrial Revolution” <http://www.bankseta.org.za/wp-content/uploads/2018/08/BA3DD51-1.pdf> (accessed 24-07-2023).

¹⁶ McKinsey & Company “The future of risk management in the digital era” <https://www.mckinsey.com/capabilities/risk-and-resilience/our-insights/the-future-of-risk-management-in-the-digital-era> (accessed 24-07-2023).

¹⁷ Vijayakumar “Internal control systems: Effectiveness of internal audit in risk management at public sector enterprises” 2012 *Open Journal of Accounting* 1.

¹⁸ Yang “Enabling effective operational risk management in a financial institution: An action research study” 2017 *Journal of Management Information Systems* 727.

who are still reliant on legacy systems,¹⁹ to adapt. This transition makes it increasingly challenging to navigate digital threats and seize opportunities in the fiercely competitive digital marketplace.²⁰

In the world of banking, Watson observes that traditional risk management has historically focused on mitigating downside risks, including market, credit and liquidity risks, all while safeguarding the bank's value for shareholders.²¹ However, the advent of the digital age has prompted banks to embrace technology, necessitating a fundamental transformation in risk management.²² To remain relevant and effective, risk management must now integrate innovative technologies and processes to address the risks introduced by digitisation, with particular emphasis on advanced tools like artificial intelligence (AI).²³ While banks embrace these technologies, international best practices emphasise the importance of adhering to prudent risk management practices to ensure safety and stability, which is a crucial aspect of their operations in this rapidly evolving financial landscape.²⁴

1.2 Rationale for study

This dissertation will explore the international standards governing risk management, South Africa's specific operational risk management requirements and the transformative potential of AI in bank risk management, shedding light on how it could revolutionise banking innovation and enhance efficiency in risk management.

The rationale for this study arises from the recognition that conventional risk management methodologies are no longer sufficient to safeguard the interests of stakeholders in today's digital era.²⁵ It is imperative for banks aspiring to flourish in this

¹⁹ Watson "Should risk management rein in digital or help accelerate it?" https://www.ey.com/en_gl/banking-capital-markets (accessed 24-07-2023).

²⁰ McKinsey & Company (accessed 24-07-2023).

²¹ Watson (accessed 24-07-2023).

²² Watson (accessed 24-07-2023).

²³ Watson (accessed 24-07-2023).

²⁴ Watson (accessed 24-07-2023).

²⁵ Yang 2017 *Journal of Management Information Systems* 731.

dynamic business environment to acquire the necessary capabilities for the effective management of risks brought about by digitisation.²⁶ It is consequently crucial to explore the essential tools that can empower banks to adeptly navigate the continually evolving landscape shaped by digitisation.²⁷

As observed by Yang, the financial services sector has been at the forefront of adopting digital innovations to enhance operational efficiency and deliver increased value to both banks and their customers.²⁸ Nevertheless, Yang points out that this heightened reliance on technology has concurrently exposed banks to a higher number and complexity of risks.²⁹

To contend with these emerging risks and to thrive in a competitive market, Wang cautions that banks must seek alternative systems and methodologies to adapt their risk management practices. Embracing advanced systems, such as AI, becomes imperative for the effective mitigation of these threats.³⁰ This research aims to explain how banks can reconfigure their risk management strategies to address the challenges posed by digitisation, and specifically, the transformative potential of AI in assisting in this effort.

1.3 Research Problem

Ensuring the safety and stability of banks in the midst of the ongoing digital transformation in the banking sector, necessitates adherence to international best practices that emphasise the implementation of robust risk management principles.³¹ Recently, AI has emerged as a valuable tool in the domain of bank risk management. The fundamental question revolves around whether banks can depend on AI to

²⁶ Ernst and Young & Institute of International Finance “Accelerating digital transformation - Four imperatives for risk management” https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/banking-and-capital-markets/ey-ninth-annual-iif-bank-risk-survey-accelerating-digital-transformation.pdf (accessed 24-07-2023).

²⁷ Ernst and Young & Institute of International Finance (accessed 24-07-2023).

²⁸ Yang 2017 *Journal of Management Information Systems* 728.

²⁹ Yang 2017 *Journal of Management Information Systems* 728.

³⁰ Wang “Generative AI in Operational Risk Management: Harnessing the Future of Finance” 2023 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4452504 (accessed 24-07-2023).

³¹ Beasley “An analysis of the maturity and strategic impact of investments in ERM” 2015 *Journal of Accounting & Public Policy* 220.

improve their adherence to risk management standards within this ever-evolving landscape, with a specific focus on operational bank risk management.

1.4 Research question and objectives

The research questions that will be undertaken in this study are as follows:

1.4.1 Consequences of digitisation:

To investigate the influence of digitisation on risk management within the banking sector and identify the key factors driving the transformation of risk management practices in response to digitalisation. The objectives are to explore the consequences of digitisation on risk management in financial institutions, with a specific focus on banks, and to provide a comprehensive understanding of the evolving landscape of risk management, encompassing its diverse aspects and the different types of risks at play in the context of advancing technology.

1.4.2 Assessing Digital-Era Operational Risk Management:

To examine how financial institutions are adapting operational risk management to meet the Basel Committee's evolving digital-era standards, as discussed later herein, with a focus on operational resilience, regulatory compliance and technology integration. This chapter will assess the alignment of current risk frameworks with regulatory expectations and explore the potential of artificial intelligence to enhance resilience and close any gaps in compliance.

1.4.3 Potential of AI:

To explore the potential of AI in enhancing bank risk management strategies, particularly in response to dynamic shifts within the banking industry. Additionally, it seeks to identify challenges and intricacies associated with AI integration into bank risk management processes, focusing specifically on operational risk management.

1.6 Research Methodology

This study employs critical descriptive and comparative analyses to delve into different facets of bank risk management within the context of digitisation and the potential integration of AI for assistance. The descriptive analysis is aimed at understanding the

impact of digitisation in the field of bank risk management. This entails examining how digitisation has influenced the practices associated with risk management in the banking sector.

The study utilizes a comparative analysis to understand the regulatory requirements for operational risk management within South African banks. This involves examining relevant legislative frameworks, including the Banks Act 94 of 1990 (Banks Act),³² and associated regulatory documents to gain insight into the specific mandates within South Africa. The comparative analysis extends to international best practices, particularly those established by the Basel Committee on Banking Supervision, which provides guidance on principles for robust bank risk management. Additionally, this analysis will explore the integration of artificial intelligence in bank risk management, examining its potential to enhance operational resilience and overall risk management practices.

This study draws upon both primary and secondary sources. In particular, the primary source the research is centered around is the South African Banks Act.³³ Secondary sources encompass a wide range of materials, including academic journals and scholarly articles that delve into topics like the impact of digitisation on risk management, regulatory compliance in the banking sector and the use of AI in risk management. Additionally, the study will consider reports from international bodies such as the Basel Committee, which provide valuable insights into best practices for bank risk management.³⁴

The methodology for data collection involves desk research, where policy documents, legal texts, academic articles and international reports will be collected and analysed. Content analysis will be the primary technique employed for the comparative analysis. Content analysis will be instrumental in understanding and interpreting the provisions

³² Banks Act 94 of 1990.

³³ Banks Act 94 of 1990.

³⁴ The Basel Committee serves as the primary global authority in establishing standards for the prudent regulation of banks and serves as a platform for collaboration on banking supervisory issues. Its core mission is to bolster the regulation, oversight, and operational norms of banks across the globe, aiming to reinforce financial stability – Bank for International Settlements (BIS) “History of the Basel Committee” <https://www.bis.org/press/p240229.htm#:~:text=The%20Basel%20Committee%20is%20the,purpose%20of%20enhancing%20financial%20stability> (accessed 24-07-2023).

of the Banks Act, the Basel Core Principles,³⁵ and the practical implications of incorporating AI into risk management.

In conclusion, this research methodology is designed to provide a structured and comprehensive framework for the study. It allows for a thorough investigation into the multifaceted aspects of bank risk management, including regulatory requirements, digitisation's impact and the role of AI in bank risk management.

1.7 Limitations and Delineation

This study is limited by the data derived from assessments and results obtained from previous years. Given the rapidly evolving landscape of digital banking and AI, access to current and up-to-date information is essential for achieving a comprehensive understanding.

Secondly, the study's focus on South African banks and their regulatory requisites may result in a certain degree of regional narrowness, potentially neglecting the diversity of global banking practices. Consequently, the findings may not encapsulate the unique challenges and practices present in other geographical regions, rendering the study predominantly South African-centric.

Thirdly, while content analysis serves as a robust method for examining legal documents and reports, it remains susceptible to interpretation bias. Variability in interpretation among different researchers can introduce subjectivity and affect the precision and objectivity of the findings.

Moreover, the study's concentration on operational risk management,³⁶ while valuable, neglects the broader spectrum of risks that banks encounter. Risks such as credit

³⁵ BIS "Core Principles for effective banking supervision" 2019
https://www.bis.org/basel_framework/chapter/BCP/01.htm (accessed 24-07-2023).

³⁶ Operational risk in banking and finance refers to potential losses from internal failures or external events. These risks include people, legal and model risks, distinct from market or credit risks due to their everyday presence. Banks must have robust frameworks to identify, assess and mitigate operational risks, considering their risk appetite and market conditions – BIS "Calculation of RWA for operational risk"

risk,³⁷ market risk³⁸ and liquidity risk,³⁹ which are integral to the banking sector, are not thoroughly explored.

Lastly, the study does not delve deeply into the practical implementation challenges associated with AI in risk management. The real-world integration of AI into the field of risk management can be filled with technical, cultural and operational impediments. These complexities, though critical for understanding the viability of AI in banking risk management, are beyond the scope of this research.

1.8 Structure and Outline

1.8.1 Chapter 1: Introduction

Chapter 1 introduces the theme of digitisation's impact on risk management in the banking sector and the need for adaptive responses. It also highlights the potential of AI to enhance risk management. This chapter is primarily focused on crafting the dissertation statement, which identifies the central focus and main questions to structure the study. Additionally, it outlines the rationale, research problem and objectives, methodology, and acknowledges study limitations and boundaries.

1.8.2 Chapter 2: Digitisation's Impact on Risk Management in the Banking Sector

Chapter 2 will delve into the influence of digitisation on risk management within the banking sector. It will explore how advancements in technology have reshaped the risk management landscape and provide a comprehensive understanding of the

https://www.bis.org/basel_framework/chapter/OPE/10.htm?inforce=20220101&published=20191215 (accessed 23-07-2023).

³⁷ Credit risk is the possibility that a borrower or counterparty of a bank may not fulfil its obligations as per agreed terms. The objective of credit risk management is to optimize a bank's risk-adjusted return by keeping credit risk exposure within acceptable limits – BIS “Principles for the Management of Credit Risk” <https://www.bis.org/publ/bcbssc125.pdf> (accessed 24-07-2023).

³⁸ Market risk is the potential for losses in both on and off-balance-sheet positions due to fluctuations in market prices. These fluctuations encompass changes in interest rates, exchange rates, and equity values. In essence, market risk reflects the uncertainty of financial loss resulting from adverse movements in market prices – BIS “Supervisory Treatment of Market Risks” <https://www.bis.org/publ/bcbs11a.htm> (accessed 24-07-2023).

³⁹ Liquidity refers to a bank's capability to finance asset expansions and fulfil obligations promptly, without experiencing unacceptable losses. Effective management of liquidity risk is crucial because a shortfall in liquidity at one institution can have far-reaching repercussions throughout the entire financial system – BIS “Principles for Sound Liquidity Risk Management and Supervision” <https://www.bis.org/publ/bcbs144.pdf> (24-07-2023).

evolving facets of risk management. Topics covered will include the historical evolution of risk management, the shift from traditional to digital banking, and the changing customer-centric approach in the banking industry.

1.8.3 Chapter 3: Regulatory Framework for Risk Management

Chapter 3 will examine the operational risk management regulatory requirements imposed on financial institutions in the digital era, focusing on the evolving frameworks established by the Basel Committee on Banking Supervision. This chapter will assess how these regulatory requirements align with best practices for operational resilience, particularly in light of technological advancements and emerging risks. Additionally, it will compare the operational risk management obligations of banks with global best practice standards to identify potential gaps and areas for improvement in risk management practices within the banking sector, emphasizing the role of artificial intelligence and other innovative solutions in enhancing resilience.

1.8.4 Chapter 4: AI in Bank Risk Management: Opportunities and Challenges

Chapter 4 will discuss the potential role of AI in augmenting bank risk management strategies, especially in response to the evolving banking industry. It will explore the opportunities AI offers for improving risk management processes, particularly operational risk management. The chapter will also address the challenges and complexities associated with the implementation of AI in bank risk management, providing insights into the benefits and potential pitfalls of this advanced technology in the banking sector.

1.8.5 Chapter 5: Recommendations and Conclusions

The final chapter serves as the culmination of the research. The findings and insights from previous chapters will be synthesised to offer recommendations. These recommendations will be based on the impact of digitisation, international best practices and the potential use of AI in bank risk management. The chapter will conclude by summarizing the key insights and takeaways from the entire study, offering a comprehensive perspective on the research's significance and implications, and providing recommendations.

CHAPTER 2: DIGITALISATION'S IMPACT ON RISK MANAGEMENT IN THE BANKING SECTOR

2.1 Introduction

The banking sector is undergoing a profound transformation as it adapts to the digital age also known as the Fourth Industrial Revolution.⁴⁰ This transformation is not only reshaping the way banks interact with their customers but also revolutionising the way banks manage risks.⁴¹ In this evolving landscape, it is crucial to explore the impact of digitisation on risk management practices in the banking sector.⁴²

In this chapter, we delve into the historical transformation of banking, highlighting the shift from traditional brick-and-mortar branches to the modern digital era. We investigate how banks are proactively responding to new competitive challenges and the transitioning from a siloed, individual risk management approach to a more integrated model. This shift has been notably influenced by significant global events such as the Enron⁴³ and WorldCom scandals⁴⁴ and the 2008 Global Financial Crisis.⁴⁵

⁴⁰ The Fourth Industrial Revolution represents a profound transformation driven by the integration of advanced technologies such as artificial intelligence (AI), robotics, the Internet of Things (IoT), 3D printing and genetic engineering. Unlike previous revolutions, it is distinguished by its speed, scale and complexity, merging the physical, digital and biological spheres. This revolution impacts all aspects of life, including how we live, work and interact. It introduces innovative opportunities like improving productivity, enhancing the quality of life, and creating new jobs and markets. However, it also presents significant challenges, such as income inequality, labour market disruptions, cybersecurity threats and ethical dilemmas concerning automation and AI. The Fourth Industrial Revolution fundamentally alters industries by fostering collaborative innovation, reshaping consumer expectations and redefining organisational structures. Its implications emphasize the need for comprehensive strategies to harness its benefits while addressing its challenges effectively – Min Xu and others “The Fourth Industrial Revolution: Opportunities and Challenges” (2018) 9 *International Journal of Financial Research* 91-94

⁴¹ Bessis *Risk Management in Banking* (2002) Chapters 2.

⁴² Matthews *The Economics of Banking* (2008) Chapter 13.

⁴³ Enron Corporation was a major American energy company celebrated for its rapid growth and innovative business practices. However, it collapsed in 2001 due to extensive financial fraud and unethical conduct by its executives, including hiding debt and inflating profits. The scandal exposed failures in corporate governance, auditing and regulatory oversight – A Catanach ‘Enron: A Financial Reporting Failure’ (2003) 48 *Villanova University Charles Widger School of Law* 1057.

⁴⁴ WorldCom was a telecommunications company that initially gained prominence under the leadership of CEO Bernie Ebbers. However, it later became implicated in one of the largest accounting scandals in history. Despite presenting itself as a thriving business, WorldCom was in fact engaged in fraudulent reporting, overstating profits by billions of dollars. This revelation led to significant financial losses and tarnished the company's reputation – Ashraf *The accounting fraud at WorldCom the causes, the characteristics, the consequences and the lessons learnt* (Honours thesis, University of Central Florida, 2011) 1.

⁴⁵ The global financial crisis, originating in the United States and Europe in 2007 and spreading to other economies in 2008, was characterized by unsustainable growth in real estate markets and easy access to credit, culminating in the collapse of the financial system. Emerging markets suffered the most,

The chapter also provides insights into the diverse spectrum of risks banks now face, such as credit,⁴⁶ country and transfer,⁴⁷ market,⁴⁸ interest rate risk,⁴⁹ liquidity⁵⁰ and operational risk.⁵¹

2.2 The Evolution of Banking in the Digital Age

As pointed out by Adalarasu, historically, banking was characterised by a physical bank branch where customers could only engage with the bank within specific working hours.⁵² This traditional banking model revolved around in-person interactions at the branch, where bank staff assisted customers with simple tasks such as processing

particularly through high leverage and short-term debt, exacerbated by fixed exchange rates. Consequently, the crisis prompted shifts in countries' saving behaviours – Derian *Impact of the Global Financial Crisis on Developing and Advanced Countries' Reserves Holdings* (Honours thesis, University of New York, 2019) 2.

⁴⁶ Credit risk management in banking ensures that banks make good returns while keeping the risk of borrowers not paying back in check. It involves watching over risks in the entire portfolio as well as individual credit transactions, while also considering the effect on other risks. Good credit risk management is key for the wellbeing and survival of a bank – BIS “Principles for the Management of Credit Risk” <https://www.bis.org/publ/bcbs75.htm> (accessed 24-07-2023).

⁴⁷ Regulators need to ensure that banks have sufficient policies and procedures in place to recognize, measure, oversee, and manage the risks associated with lending and investing internationally, specifically related to country-specific risks and transfer risks. Additionally, banks must maintain appropriate provisions and reserves to mitigate these risks effectively – SARB “Chapter 2 Current issues in banking supervision” <http://surl.li/tccfl> (accessed 24-07-2023).

⁴⁸Market risk refers to the potential for losses in the value of financial instruments or investments due to changes in market conditions such as interest rates, exchange rates, commodity prices, and stock prices. It encompasses the uncertainty associated with fluctuations in these market variables, which can adversely affect the value of a bank's portfolio or investments. Market risk is inherent in almost all financial activities and is a key consideration for banks, investors, and regulators when assessing the overall risk exposure of an institution – SARB “Chapter 2 Current Issues in banking supervision” <http://surl.li/tccfl> (accessed 24-07-2023).

⁴⁹ Interest rate risk is the potential of negative effects on a bank's finances due to changes in interest rates. Banks must have effective systems to identify, measure, monitor and control this risk by developing strategies approved by the board and implemented by senior management, tailored to the size and complexity of the risk – SARB “Chapter 2 Current Issues in banking supervision” <http://surl.li/tccfl> (accessed 24-07-2024).

⁵⁰ Liquidity risk involves the possibility of a bank being unable to meet its financial obligations promptly without significant losses. Effective management requires careful policies and processes to identify, measure, monitor, and control this risk. Banks must maintain enough liquid assets and funding sources to handle potential challenges, with contingency plans in place for emergencies - SARB “Chapter 2 Current Issues in banking supervision” <http://surl.li/tccfl> (accessed 24-07-2024).

⁵¹ Operational risk encompasses the potential for financial losses resulting from various internal and external factors within a bank's operations. Operational risk events can arise from a range of sources such as internal fraud, external fraud, employment practices, client interactions, damage to assets, system failures, and process inefficiencies. Effective management and control of operational risk require banks to have a clear understanding of potential risks and to adopt comprehensive strategies to mitigate them – BIS “Sound Practices for the Management and Supervision of Operational Risk” <https://www.bis.org/publ/bcbs96.pdf> (accessed 24-07-2023).

⁵² Adalarasu “The Next Generation Banking: Cyber Transformation” 2015 *International Journal of Marketing Management* 88.

payments, checking account balances and making withdrawals. The term 'traditional banking' was coined and described as the approach that was centred on brick-and-mortar branches and face-to-face customer interactions.⁵³ The traditional key banking distribution channels were in-branch bank tellers and Automated Teller Machines (ATMs).⁵⁴ Zimmerman observes that the foundation of traditional banking relied on cheque accounts and long-term customer relationships which predominantly revolved around the product available to the customer.⁵⁵

However, the banking industry has experienced a substantial transformation due to the emergence of technology and the introduction of digital banking. This evolution has prioritised the customer's role in banking operations. Consequently, customers are no longer restricted to fixed branch hours for their banking requirements but rather can now engage with the bank around the clock through various electronic platforms. In this contemporary banking landscape, the focus is on crafting products that are customised to meet customer needs, utilising digital platforms to provide products and services with greater simplicity, efficiency and speed.⁵⁶

As observed by Westerman, the advent of digital banking has unquestionably reshaped the dynamic between banks and their customers.⁵⁷ Banks have embraced this shift, harnessing the power of social media and predictive analytics to enhance their offerings. As technology continues to advance and banks fully embrace digitisation, customer preferences and expectations undergo a profound transformation, with an ever-growing demand for a personalised banking experience. This signifies a transition from focusing on 'products centric offering' to a more 'customer-centric approach'.⁵⁸ Watson states that in this context, digitisation - the

⁵³ Adalarasu 2015 *International Journal of Marketing Management* 89.

⁵⁴ Zimmermann "Emerging industrial structures in the digital economy: The case of the financial industry" 1999 <https://aisel.aisnet.org/amcis1999/> (accessed 24-07-2023).

⁵⁵ Zimmermann (accessed 24-07-2023).

⁵⁶ Adalarasu 2015 *International Journal of Marketing Management* 89.

⁵⁷ Westerman "The digital advantage: How digital leaders outperform their peers in every Industry" 2012 <https://www.capgemini.com/wp-content/uploads/2017/07/The-Digital-Advantage-How-Digital-Leaders-Outperform-their-Peers-in-Every-Industry.pdf> (accessed 24-07-2023).

⁵⁸ Sia "How DBS Bank Pursued a Digital Business Strategy" 2016 <https://doi.org/10.1108/00251741111183852> (accessed 24-07-2023).

conversion of physical or paper-based information into electronic formats, plays a pivotal role in the future of the banking world.⁵⁹

2.3 Digital Transformation in the Banking Sector

Digitisation can be better described as the conversion of analogue data, particularly images, videos and text into digital form.⁶⁰ In recent years, digitalisation is a key component for numerous organisations across various sectors, including the banking industry. While digitisation has long been a part of the banking landscape, the acceleration of internet and mobile applications for conducting financial transactions has ushered in a rapid transformation in the banking sector.⁶¹ Today, millions of individuals rely on their mobile devices for their daily banking needs, marking a significant departure from past practices when such usage was uncommon. This shift mirrors the evolving demands of customers over the years and the corresponding adaptations in banking services.⁶²

Digitalisation holds critical importance for banks in their efforts to maintain competitiveness, relevance and to drive growth.⁶³ By adopting a customer-centric approach to digital transformation, banks can ensure ongoing customer loyalty and drive sustainable growth within the banking sector.⁶⁴

Digitalisation knows no bounds and is a fundamental component embraced by organisations globally. However this trend is particularly prominent in the African banking sector. According to a report by Mutsa Chironga, Luis Cunha, Hilary De Grandis and Mayowa Kuyoro in 2018, there is a noticeable rise in the preference for

⁵⁹ Watson (accessed 24-07-2023).

⁶⁰ Parviainen "Tackling the digitalization challenge: how to benefit from digitalization in practice" 2016 *International Journal of Information Systems and Project Management* 63.

⁶¹ Barty "Digital disruption: UK banking report. Independent Banker" 2015 <https://www.finextra.com/finextra-downloads/newsdocs/digitaldisruption.pdf> (accessed 25-07-2023).

⁶² Bandara "Digital banking: Enhancing customer value" 2016 http://www.apbsrilanka.org/2016_convention_articles/# (accessed 25-07-2023).

⁶³ Kohli "Digital transformation in latecomer industries: CIO and CEO leadership lessons from Encana Oil & Gas" 2011 https://www.researchgate.net/publication/220500653_Digital_transformation_in_latecomer_industries_CIO_and_CEO_leadership_lessons_from_Encana_Oil_Gas_USA_Inc (accessed 25-07-2023).

⁶⁴ Ganguly "Optimization of IT and Digital Transformation: Strategic Imperative for Creating a New Value Delivery Mechanism and a Sustainable Future in Organization" 2015 *European Journal of Business and Innovation Research* 10.

digital banking in Africa, where 40% of surveyed customers clearly favour digital banking. Additionally, banks are proactively harnessing technology to cut down operational costs and improve efficiency.⁶⁵

While banks take different approaches to digital transformation, it is suggested that there are three primary phases namely: responding to new competition, technological adaptation and strategic positioning.

2.3.1 Responding to New Competition

The rapid evolution of technology has brought forth new entrants in the banking sector like Financial Technology (FinTech) companies, posing as formidable rivals, particularly in payment services.⁶⁶ Banks are responding by developing digital payment solutions and, in some cases, forming partnerships or acquiring FinTech firms. This is evident in the acquisition of SpanScan⁶⁷ by Standard Bank in South Africa, a mobile payment solution enabling electronic payments without traditional bank methods.⁶⁸

2.3.2 Adapting Technologically

Traditional banking has often been reliant on extensive, complex and isolated technology infrastructure.⁶⁹ In order to fully embrace digitalisation, there's a need for integrated and flexible technologies that facilitate quicker product development.⁷⁰ Cuesta indicates that digitising processes at all levels within the bank is crucial for enhancing efficiency and employing algorithms and analytics to offer personalised and customer-centric products and services.⁷¹

⁶⁵ McKinsey & Company "Roaring to life: Growth and innovation in African retail banking" 2018 <https://www.mckinsey.com/industries/financial-services/our-insights/african-retail-bankings-next-growth-frontier> (accessed 25-07-2023).

⁶⁶ Omarini "The digital transformation in banking and the role of FinTechs in the new financial intermediation scenario: The wave of digitalisation in banks" *International Journal of Finance, Economics and Trade* 5.

⁶⁷ n 16 above.

⁶⁸ Tech Central "Standard Bank acquires SnapScan maker" 2016 <https://techcentral.co.za/standard-bank-acquires-snapscan-maker/196782/> (accessed 25-07-2023).

⁶⁹ Cuesta "The digital transformation of the banking industry" 2015 https://www.researchgate.net/publication/291357544_The_digital_transformation_of_the_banking_industry (accessed 22-05-2023).

⁷⁰ Adalarasu 2015 *International Journal of Marketing Management* 89.

⁷¹ Cuesta (accessed 22-05-2023).

2.3.3. Strategic Positioning

Banks must strategically position themselves to explore external opportunities introduced by digitisation while also maximising internal opportunities to enhance efficiency, productivity and ultimately customer service, while reducing costs.⁷² Digitalisation or digital transformation, encompasses changes in work methods, roles and business offerings across four different levels namely: process, organisation, business and society, all achieved through the adaptation of digital technologies within the operational environment of the organisation.⁷³

As indicated by Yang, the digital transformation within the banking sector presents a dual landscape of opportunities and challenges for traditional financial institutions, encompassing the potential risks and threats that these opportunities may entail. While the financial industry has widely adopted digital technology to enhance operational efficiency and improve the overall customer experience, it is imperative to acknowledge that the utilisation of technology introduces risks.⁷⁴ Consequently, risk management is assuming increasing importance to effectively address and mitigate these potential threats.

The advantages of the digital realm are manifested in the ease and speed with which organisations can access and disseminate information. This, in turn, empowers organisations to evaluate market performance, product effectiveness and customer feedback with greater efficiency.⁷⁵ Responsibility for the implementation of suitable and robust processes to identify, assess, monitor, manage and report various types of

⁷² Cuesta (accessed 22-05-2023).

⁷³ Parviainen 2016 *International Journal of Information Systems and Project Management* 63.

⁷⁴ Yang “Enabling effective operational risk management in a financial institution: An action research study 2017 “*Journal of Management Information Systems* 727.

⁷⁵ Bennis “Leadership in a digital world: Embracing transparency and adaptive capacity” 2017 https://www.researchgate.net/publication/262251276_Leadership_in_a_digital_world_Embracing_transparency_and_adaptive_capacity (accessed 22-05-2023).

risks falls upon the board of directors and senior management within these institutions, as provided in the Banks Act⁷⁶ and the Basel Committee on Banking Supervision.⁷⁷

It is of paramount importance to gain a comprehensive understanding of how digitisation affects risk management within financial institutions, to not only ensure the success of the organisation in the financial industry, but also stability within the industry itself. This entails acknowledging the evolving technological landscape and identifying the necessary enhancements in risk management capabilities to adeptly address the dynamic challenges that arise.

2.4 The Evolution of Risk Management in a Changing Landscape

2.4.1 Transition in Risk Management

Risk is commonly defined as the effect of uncertainty on an organisation's objectives, which can either yield positive or negative consequences in the future. Risk management, in turn, is described as the coordinated activities to direct and control an organisation with regard to risk.⁷⁸ Aebi observes that the practice of risk management has undergone a notable transformation over the years. Initially, the focus was on individual risk types, however, over time there has been a shift towards a more integrated perspective.⁷⁹

Hoyt points out that in the past, organisations dealt with risk management in isolation, only placing focus on risks such as credit and market risk.⁸⁰ Following this approach,

⁷⁶ Key provisions in relation to risk management include: Section 6(2), which empowers the Prudential Authority to prescribe prudential requirements, including capital adequacy and liquidity measures; Section 72, allowing the Minister of Finance to issue regulations for risk governance, credit and operational risk provisions and stress testing; Sections 46–50, mandating governance practices such as risk committees; and Regulation 39, outlining frameworks for managing credit, market, liquidity and operational risks and aligning with Basel standards.

⁷⁷ Principle 1,2 and 6 emphasise the responsibility of senior management and the board of directors in establishing a robust operational risk framework, including risk identification, assessment, monitoring, reporting, supervisory authority's power and preventing undermining soundness and stability of the financial institution.

⁷⁸ The International Organization for Standardization "Risk management: Guidelines: 2018" <https://www.iso.org/obp/ui/#iso:std:iso:31000:ed-2:v1:en> (accessed 22-05-2023).

⁷⁹ Aebi "Risk management, corporate governance and bank performance in the financial crisis" 2012 *Journal of Banking & Finance* 321.

⁸⁰ Hoyt "Evidence of the value of enterprise risk management" 2015 *Journal of Applied Corporate Finance* 41.

specific players within organisations dealt with distinct types of risk, such as, the treasury function addressed liquidity and financial risks, the operations function was concerned with operational risks and the information technology department focused on security and systems risks.⁸¹

However, due to the digital disruption which has turned the banking world on its head, organisations are now compelled to address emerging risks that pose a threat to their operations.⁸² The isolated approach to risk management is no longer effective in responding to the swift changes in the business world. Consequently, this shift, among other factors, paved the way for the emergence of enterprise risk management.⁸³ This move toward integrated risk management has gained support from the Basel Committee on Banking Standards, which argues that managing risks in isolation is no longer appropriate in today's dynamic business environment. According to the Basel Committee there is a growing need for business units to share information, especially related to risks and risk mitigation. The risk management process should encompass not only traditional risks such as credit,⁸⁴ market⁸⁵ and liquidity risks⁸⁶ but also newer risks like concentration,⁸⁷ interest rate,⁸⁸ country and transfer⁸⁹ and operational risk.⁹⁰

From as far back as the early 2000s, with catastrophic events like the Enron⁹¹ and WorldCom scandals,⁹² mentioned earlier, that resulted in the downfall of global

⁸¹ Hoyt 2015 *Journal of Applied Corporate Finance* 41.

⁸² Hoyt 2015 *Journal of Applied Corporate Finance* 41.

⁸³ Enterprise Risk Management (ERM) enables companies to concentrate their analysis and reporting efforts on a select few risks most likely to affect their strategic goals. By prioritising these key risks, organisations can allocate resources efficiently and make well-informed decisions about risk management. This approach ultimately improves decision-making, transparency, and stakeholder confidence. In essence, ERM emphasises the strategic selection of risks for a more effective and holistic risk management strategy.

⁸⁴ n 46 above.

⁸⁵ n 48 above.

⁸⁶ n 50 above.

⁸⁷ Concentration risk refers to the potential for financial loss resulting from overexposure to a single counterparty, sector or geographic region. This risk increases a portfolio's vulnerability to market fluctuations and economic downturns, making it a critical concern for investors, financial institutions and regulators. Managing this risk is essential for maintaining financial stability and resilience - Tamplin "Concentration Risk" 2023

<https://www.financestrategists.com/wealth-management/investment-risk/concentration-risk/#what-is-concentration-risk> (accessed 24-07-2023).

⁸⁸ n 49 above.

⁸⁹ n 47 above.

⁹⁰ BIS (accessed 24-07-2023), (n 51 above).

⁹¹ A Catanach (n 43 above).

⁹² n 44 above.

corporate giants, to just a few years later with the 2008 Global Financial Crisis, these incidents played a pivotal role in advancing the concept of enterprise-wide risk management.⁹³ As pointed out by Rae, these events served as a catalyst for the development of global corporate governance guidelines and standards, underscoring the imperative nature of comprehensive enterprise-wide risk management.⁹⁴

The evolution of enterprise risk management has resulted in the inclusion of a more extensive array of risk categories. This transformation signifies a departure from the initial emphasis on credit and the traditional core risks⁹⁵ that banks face.⁹⁶ Consequently, this progression has given rise to the current landscape of risks, encompassing credit, concentration, country and transfer, market, interest rate risk, liquidity and operational risk as discussed in more detail below

2.4.2 Types of risk

2.4.2.1 Credit Risk

Credit Risk arises from the potential of losses resulting from borrowers or counterparties failing to meet their debt obligations, thereby impacting the profitability of the bank.⁹⁷

2.4.2.2 Concentration Risk

Concentration risk refers to the risk of financial loss stemming from an excessive focus on a single counterparty, sector or geographic area. This risk is a vital consideration for investors, financial institutions and regulators in maintaining a stable financial

⁹³ Zulauf "Enron: The Good, The Bad, The Lessons" 2011

https://www.researchgate.net/publication/267715799_Enron_The_Good_The_Bad_The_Lessons (accessed 24-07-2023).

⁹⁴ Rae "Risk management and ethical environment: effects on internal audit and accounting control Procedures" 2018 *Journal of Applied Management Accounting Research* 11.

⁹⁵ The traditional main risks for banks are credit risk, market risk, liquidity risk, and operational risk. Credit risk arises from uncertainty about borrowers repaying debts. Market risk involves potential losses due to unexpected changes in asset values like commodities or interest rates. Liquidity risk stems from a mismatch between long-term assets and short-term liabilities. Operational risk relates to losses from internal process failures, system breakdowns, or human error – Kearns "Evolving Bank and Systemic Risk" <https://www.rba.gov.au/speeches/2021/sp-so-2021-12-16.html> (accessed 24-07-2023).

⁹⁶ Eckles "The impact of enterprise risk management on the marginal cost of reducing risk" 2014 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2425904 (accessed 24-07-2023).

⁹⁷ BIS "Supervisory review process" https://www.bis.org/basel_framework/chapter/SRP/32.htm (accessed 24-07-2023).

system. Its presence heightens a portfolio's susceptibility to market fluctuations and economic downturns. It is crucial for investors to understand the various forms of concentration risk and how they can affect their investments.⁹⁸

2.4.2.3 Country and Transfer Risk

Country and transfer risk is the key distinguishing factor between international lending and domestic lending. This concept encompasses all the uncertainties stemming from a country's economic, social and political circumstances that could potentially lead borrowers within that country to either be incapable or reluctant to meet their external financial commitments.⁹⁹

2.4.2.4 Market Risk

Market risk encompasses the threats to banks' financial well-being as capital markets fluctuate. Market factors that may influence consumer activities include geopolitical unrest, global health pandemics and economic recessions.¹⁰⁰

2.4.2.5 Interest Rate Risk

Interest rate risk refers to the exposure of a bank's current or future earnings and capital to adverse changes in market rates.¹⁰¹

2.4.2.6 Liquidity Risk

Liquidity risk refers to the potential challenge where a bank may be unable to meet its financial obligations or fulfil customer demands for funds, leading to the forced sale of assets at a loss. This risk arises due to the imbalance between short-term deposits and long-term loans (the so-called “maturity mismatch” caused by “borrowing short

⁹⁸ n 85 above.

⁹⁹ Monetary Authority “Statement of Guidance on Country and Transfer Risk Management by Banks” https://www.cima.ky/upimages/regulatorymeasures/SOG-CountryAndTransferRiskManagementbyBanks_1515701200_1599562148.pdf (accessed 24-07-2023).

¹⁰⁰ BIS “Revised market risk framework” https://www.bis.org/bcbs/publ/d457_inbrief.pdf (accessed 24-07-2023).

¹⁰¹ BIS “Interest rate risk in the banking book” https://www.bis.org/basel_framework/chapter/SRP/31.htm (accessed 24-07-2024).

and lending long”), resulting in a liquidity gap that banks must manage within acceptable limits.¹⁰²

2.4.2.7 Operational Risk

Operational risk encompasses financial losses stemming from human errors, inadequate internal systems, flawed processes, system breaches or service interruptions. An instance of human error includes granting a loan that surpasses the approved amount for the applicant.¹⁰³

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The evolution of risk management has expanded its focus beyond the traditional emphasis on credit and hard risks to encompass a broader spectrum of risks. Each of these risks presents distinct challenges and requires proactive management to ensure the resilience and long-term viability of financial institutions in today's dynamic and digitised banking environment. The focus of the discussion will shift in Chapter 4 towards operational risk and the potential role of AI in enhancing future viability and efficient risk management.

2.5 Conclusion

In conclusion, this chapter has delved into the profound impact of digitisation on risk management within the banking sector, examining the evolution of both the banking industry and risk management practices. The shift from traditional, in-person banking to a digitally empowered landscape has redefined the relationship between banks and their customers, emphasising a customer-centric approach. As financial institutions strive to stay competitive in the digital age, they have had to adapt to new competition, adopt technological advancements and strategically position themselves to navigate the evolving banking environment effectively.

Moreover, the transformation brought about by digitisation has necessitated a corresponding evolution in risk management. The traditional, siloed approach to risk

¹⁰² Saunders *Financial Institutions Management: A Risk Management Approach* (2006) Chapter 7.

¹⁰³ BIS “Revisions to the Principles for the Sound Management of Operational Risk” <https://www.bis.org/bcbs/publ/d515.pdf> (accessed 24-07-2023).

management is no longer effective in addressing the dynamic challenges presented by the digital era. The emergence of enterprise risk management, which encompasses a broader spectrum of risks is a testament to the evolution of risk management. Regulatory bodies, such as the Basel Committee, have recognized the importance of adopting a more integrated approach to risk management to ensure improved operational resilience and long-term viability of financial organisations in the face of digital disruptions.¹⁰⁴

In the ever-changing landscape of banking and risk management, it is clear that the digitisation of financial services brings both opportunities and challenges. The following chapter will focus on the specific guidance offered by regulatory authorities and the international standards established by the Basel Core Principles in Risk Management. This examination will illuminate the regulatory landscape, and the expectations placed on financial institutions as they navigate digital transformation while adhering to the requirements and principles set forth by these governing bodies. Grasping and effectively implementing these regulations is essential for building a robust risk management framework capable of enduring the challenges and leveraging the opportunities presented by the rapidly evolving digital landscape.

¹⁰⁴ BIS “Principles for Operational Resilience” <https://www.bis.org/bcbs/publ/d516.pdf> (accessed 24-07-2023).

CHAPTER 3: NAVIGATING OPERATIONAL RISK IN THE DIGITAL ERA

3.1 Introduction

Operational risk has become an increasingly significant concern in the financial sector, especially as digitisation reshapes the banking industry.¹⁰⁵ With the growing reliance on technology, the need for effective operational risk management has become crucial for the stability and resilience of financial institutions.¹⁰⁶ Regulatory frameworks governing operational risk have evolved significantly over the years to address these emerging challenges, particularly those related to information and communication technology (ICT), cybersecurity and operational disruptions.¹⁰⁷

While digitisation has necessitated a more customer-centric and integrated approach to banking, it has also transformed how financial institutions manage risks, moving from traditional, siloed models to more comprehensive enterprise risk systems. The role of regulatory bodies, such as the Basel Committee on Banking Supervision, has been central in guiding banks through this transition, ensuring they are equipped to handle the new risks posed by technological advancements and global disruptions.¹⁰⁸

This chapter explores the evolution of operational risk management and its influence on risk management practices, emphasizing the significant progress made over the years to build a more resilient banking sector in the face of digital transformation. By understanding the evolution of operational risk management, we gain clearer insights into the guidance and initiatives regulatory bodies plan to introduce in the coming years. This also opens the door to exploring alternative approaches, such as using artificial intelligence, to enhance risk management in banks. Evolving regulation¹⁰⁹ and

¹⁰⁵ BIS “Principles for the Sound Management of Operational Risk” <https://www.bis.org/bcbs/publ/d515.pdf> (accessed 22-08-2024).

¹⁰⁶ South African Reserve Bank “Statement of the need for, expected impact and intended operation of the proposed amendments to the Regulations relating to Banks (Regulations)” <https://www.resbank.co.za/content/dam/sarb/publications/prudential-authority/pa-documents-issued-for-consultation/2024/proposed-directive--proposed-amendments-to-regulations-relating-to-banks/Annexure%203%20Statement%20of%20the%20need%20and%20impact%20-%20Draft%20amended%20Regulations%20Sep%202024.pdf> (accessed 22-08-2024).

¹⁰⁷ BIS “Revisions to the Principles for the Sound Management of Operational Risk” <https://www.bis.org/bcbs/publ/d515.pdf> (accessed 22-08-2024).

¹⁰⁸ BIS “Revisions to the Principles for the Sound Management of Operational Risk” (accessed 22-08-2024).

¹⁰⁹ BIS “Revisions to the Principles for the Sound Management of Operational Risk” (accessed 22-08-2024).

new approaches to risk management might be the key to building a resilient risk management framework, one that can thrive in the digital age both now and in the future.

3.2 Early Frameworks for Operational Risk Management

The Basel Committee on Banking Supervision (BCBS) has been instrumental in shaping the regulatory landscape for operational risk management. In 2003, BCBS introduced its 'Principles for the Sound Management of Operational Risk' (the Principles), which laid the foundation for managing operational risk across financial institutions.¹¹⁰ Initially, the focus was on establishing a structured risk management environment, governance practices, and the identification and control of risks.¹¹¹ However, this early framework did not fully address the newer risks that would emerge in later years, particularly those attributed to technological advancements.¹¹²

3.3 Impact of the 2007-2009 Financial Crisis

The Global Financial Crisis (GFC) of 2007-2009 exposed significant gaps in the management of operational risks, prompting regulatory bodies to revisit and revise existing frameworks.¹¹³ In response, the BCBS updated the Principles in 2011, incorporating lessons learned from the crisis.¹¹⁴ The revised guidelines emphasized enhanced governance, more robust risk identification and control systems, and the necessity of change management programs to cope with evolving risk landscapes.¹¹⁵ Notably, the revisions also introduced the concept of the "three lines of defence,"

¹¹⁰ BIS "Principles for the Sound Management of Operational Risk" (accessed 22-08-2024).

¹¹¹ BIS "Revisions to the Principles for the Sound Management of Operational Risk" (accessed 22-08-2024).

¹¹² BIS "Revisions to the Principles for the Sound Management of Operational Risk" (accessed 22-08-2024).

¹¹³ BIS "Revisions to the Principles for the Sound Management of Operational Risk" (accessed 22-08-2024).

¹¹⁴ South African Reserve Bank "Directive issued in terms of section 6(6) of the Banks Act 94 of 1990: Principles for the Sound Management of Operational Risk" <https://www.resbank.co.za/content/dam/sarb/publications/prudential-authority/pa-deposit-takers/banks-directives/2018/8825/Directive-4-of-2018.pdf> (accessed 22-08-2024).

¹¹⁵ BIS "Principles for the Sound Management of Operational Risk" (accessed 22-08-2024).

delineating responsibilities among business unit management, independent risk management functions, and independent assurance providers.¹¹⁶

3.4 Evolution Post-Crisis: ICT and Cybersecurity

As financial institutions became increasingly reliant on technology, the scope of operational risk broadened to include risks associated with ICT.¹¹⁷ By 2014, the BCBS recognised that ICT-related risks, such as cybersecurity threats and technology failures, were not sufficiently covered under the 2011 Principles.¹¹⁸ This led to the inclusion of specific guidelines for ICT risk management in subsequent revisions.¹¹⁹ The recognition of ICT as a critical operational risk highlighted the need for financial institutions to develop sophisticated risk management frameworks capable of addressing both traditional operational risks and emerging technological risks.¹²⁰

3.5 Basel Reforms and the Integration of Operational Resilience

The Basel reforms, finalised in 2017, further integrated operational management into broader risk management frameworks. A key aspect of the reforms was the emphasis on operational resilience—the ability of financial institutions to withstand and recover from severe operational disruptions.¹²¹ The BCBS introduced the concept of operational resilience to ensure banks could continue delivering critical operations despite disruptions caused by natural disasters, pandemics or cyberattacks.¹²² This shift in focus marked a significant evolution in regulatory thinking, moving beyond mere risk mitigation to encompass an institution’s ability to adapt and recover.

3.6 Governance and the Role of Senior Management

Regulatory frameworks have increasingly stressed the importance of governance in managing operational risk. According to the revised Principles, both the board of

¹¹⁶ BIS “Principles for the Sound Management of Operational Risk” (accessed 22-08-2024).

¹¹⁷ BIS “Principles for the Sound Management of Operational Risk” (accessed 22-08-2024).

¹¹⁸ BIS “Principles for the Sound Management of Operational Risk” (accessed 22-08-2024).

¹¹⁹ BIS “Principles for the Sound Management of Operational Risk” (accessed 22-08-2024).

¹²⁰ BIS “Principles for the Sound Management of Operational Risk” (accessed 22-08-2024).

¹²¹ BIS “Principles for the Sound Management of Operational Risk” (accessed 22-08-2024).

¹²² BIS “Principles for operational resilience” www.bis.org/bcbs/publ/d516.htm (accessed 22-08-2024).

directors and senior management are expected to play a proactive role in fostering a strong risk management culture.¹²³ Senior management is responsible for creating and maintaining an operational risk management framework (ORMF) that is fully integrated into the bank's broader risk management practices.¹²⁴ Additionally, the board is tasked with approving and regularly reviewing the bank's risk appetite and tolerance for operational risk, ensuring alignment with the institution's strategic goals.¹²⁵

3.7 The Three Lines of Defence

One of the key regulatory developments in operational risk management has been the formal adoption of the three lines of defence model.¹²⁶ The first line of defence involves business unit management, which is responsible for identifying and managing risks within their respective areas.¹²⁷ The second line of defence, an independent operational risk management function, provides oversight and challenges the effectiveness of risk controls.¹²⁸ The third line, typically internal or external auditors, provides independent assurance that the ORMF is functioning as intended.¹²⁹ This model has been widely adopted by banks to ensure a clear delineation of responsibilities and the effectiveness of risk management practices.¹³⁰

3.8 Future Continuous Evolution and Challenges

Operational risk management is an ever-evolving field, shaped by the dynamic nature of global financial systems and technological advancements. Moving forward, regulators will likely place even greater emphasis on operational resilience, particularly in light of recent global events such as the COVID-19 pandemic and the increasing frequency of cyberattacks.¹³¹ As financial institutions continue to innovate and adopt new technologies, regulatory frameworks will need to evolve to address emerging risks and ensure the continued stability of the global financial system.

¹²³ BIS "Principles for the Sound Management of Operational Risk" (accessed 22-08-2024).

¹²⁴ BIS "Principles for the Sound Management of Operational Risk" (accessed 22-08-2024).

¹²⁵ BIS "Principles for the Sound Management of Operational Risk" (accessed 22-08-2024).

¹²⁶ BIS "Principles for the Sound Management of Operational Risk" (accessed 22-08-2024).

¹²⁷ BIS "Principles for the Sound Management of Operational Risk" (accessed 22-08-2024).

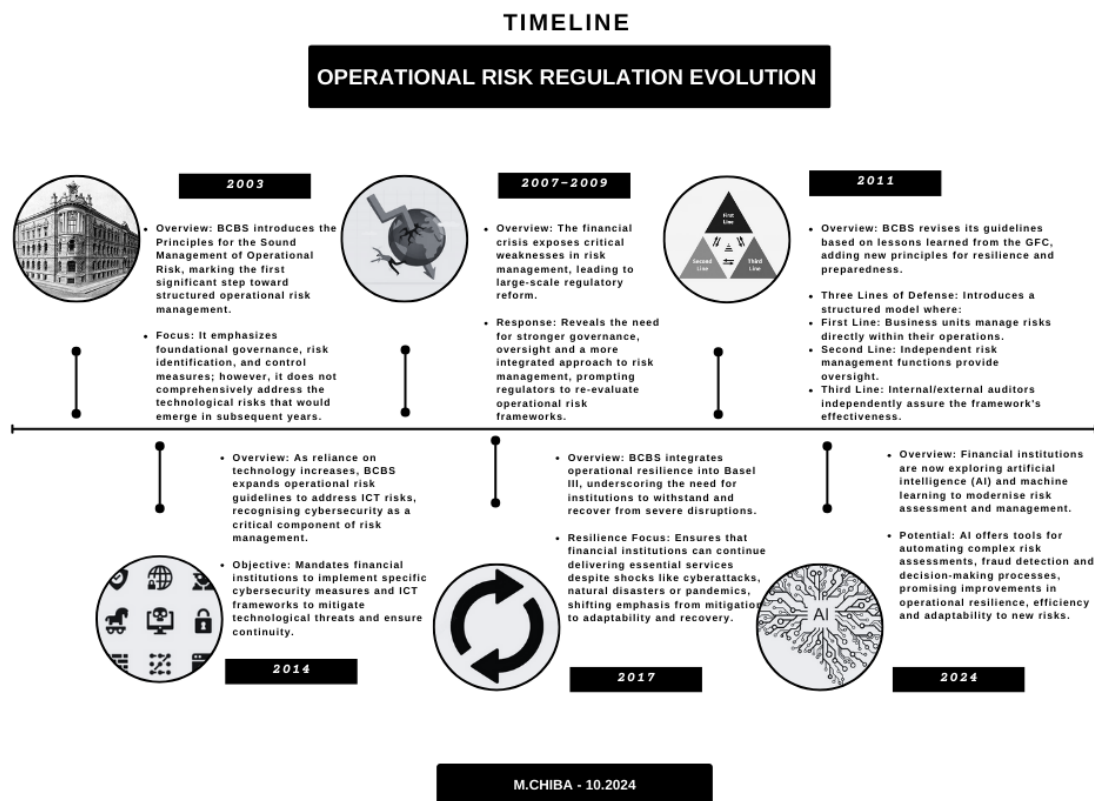
¹²⁸ BIS "Principles for the Sound Management of Operational Risk" (accessed 22-08-2024).

¹²⁹ BIS "Principles for the Sound Management of Operational Risk" (accessed 22-08-2024).

¹³⁰ BIS "Principles for the Sound Management of Operational Risk" (accessed 22-08-2024).

¹³¹ BIS "Principles for the Sound Management of Operational Risk" (accessed 22-08-2024).

3.9 Timeline – Operational Risk Regulation Evolution



3.10 Conclusion

In conclusion, the shift from traditional, in-person banking to a digitally empowered landscape has redefined the relationship between banks and their customers, emphasizing a customer-centric approach. As financial institutions strive to stay competitive in the digital age, they have had to adapt to new competition, adopt technological advancements and strategically position themselves to navigate the evolving banking environment effectively.

Moreover, the transformation brought about by digitisation has necessitated a corresponding evolution in risk management. The traditional siloed approach to risk management is no longer effective in addressing the dynamic challenges presented by the digital era. The emergence of enterprise risk management, encompassing a broader spectrum of risks, is a testament to the evolution of risk management. Regulatory bodies, such as the Basel Committee, have recognized the importance of

adopting a more integrated approach to risk management to ensure improved operational resilience and the long-term viability of financial organizations in the face of digital disruptions.

As financial institutions look to the future, they must increasingly turn to innovative solutions to strengthen their risk management practices. The incorporation of artificial intelligence (AI) and machine learning techniques presents a new frontier for managing risks and, more specifically, operational risks. These AI-driven solutions promise to revolutionise various aspects of risk assessment and mitigation. In the evolving landscape of banking, the potential for AI to enhance operational risk management strategies is significant. The next chapter will explore this emerging field in greater detail, this technological advancement offers immense potential for the future, promising to bolster the stability and resilience of financial institutions as they navigate an increasingly complex risk environment.

CHAPTER 4: LEVERAGING AI TO ADVANCE BANK RISK MANAGEMENT

4.1 Introduction

AI and the underlying machine learning techniques are currently reshaping and have the potential to revolutionise our approach to financial risk management. As observed by Aziz, AI driven solutions are set to redefine various aspects of risk assessment, from determining the appropriate lending limits for bank customers, offering timely risk alerts to traders in financial markets, to identifying instances of customer and insider fraud.¹³²

In today's dynamic financial environment, operational risk is gaining recognition as a predominant threat to the stability of banking institutions and more broadly, to financial stability.¹³³ Effectively managing operational risk demands a comprehensive strategy that encompasses the identification, evaluation and mitigation of risks arising from both internal and external origins. Wang states that the incorporation of AI into these financial institutions' practices represents a promising advancement, offering the potential to improve their effectiveness and contribute substantial value to banking business models and strategies.¹³⁴

Arunkumar is also of the view that the prospective integration of generative AI into operational risk management carries significant potential.¹³⁵ He indicates that leveraging these models could enhance a bank's capacity to discern potential risks within extensive textual data, simplify the generation of concise summaries for intricate documents to aid decision-making, and enhance the tools for overseeing and mitigating risks.¹³⁶ This, in turn, has the potential to increase the efficiency of communication and collaboration within risk-management teams, thereby fortifying operational risk management strategies.

¹³² Aziz "AI and Machine Learning for Risk Management " 2019

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3201337 (accessed 24-07-2023).

¹³³ McKinsey "The future of operational risk management in financial services" 2020
<https://www.mckinsey.com/capabilities/risk-and-resilience/our-insights/the-future-of-operational-risk-management-in-financial-services#/> (accessed 24-07-2023).

¹³⁴ Wang "Generative AI in Operational Risk Management: Harnessing the Future of Finance 2023
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4452504 (accessed 24-07-2023).

¹³⁵ Arunkumar "Risk Management in Commercial Banks" 2006
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=877812 (accessed 24-07-2023).

¹³⁶ Arunkumar (accessed 24-07-2023).

4.2 Background on operational risk management

As pointed out by Ebnother, operational risk as a longstanding concern in the banking sector, has gained increased prominence in the last two decades due to heightened regulatory scrutiny on non-financial risk management.¹³⁷ Notably, Ebnother states that the Basel Committee has mandated banks to allocate capital for managing operational risks. These operational risks encompass losses stemming from deficient or failed internal processes, people, systems or external events.¹³⁸ They encompass various sub-risks, including people risk, legal risk and model risk, differentiating from market or credit risk due to their inherent presence in daily organisational operations.¹³⁹ As alluded to by Ebnother, the primary objective of operational risk management is to identify, assess, monitor and mitigate these operational risks, minimising potential losses and ensuring business resilience. While operational risk management has progressed over the years, Ebnother is nevertheless of the view that the evolving nature of operational risks and rapid technological advancements necessitate innovative approaches to effectively address emerging challenges.¹⁴⁰

In this evolving landscape, the introduction of generative AI¹⁴¹ presents a promising avenue for banks. As explained by Wang, generative AI comprises a category of AI models capable of creating new data samples that mimic existing data patterns and structures. An example would be a transformer-based language model that can generate human-like text by learning from extensive textual data.¹⁴² By leveraging the capabilities of AI, Wang argues that banks can more effectively tackle challenges related to risk identification, assessment and mitigation, hereby strengthening their operational resilience.¹⁴³

¹³⁷ Ebnother “Modelling Operational Risk” 2001 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=293179 (accessed 24-07-2023).

¹³⁸ Ebnother (accessed 24-07-2023).

¹³⁹ Ebnother (accessed 24-07-2023).

¹⁴⁰ Ebnother (accessed 24-07-2023).

¹⁴¹ The term ‘generative AI’ refers to computational techniques that are capable of generating seemingly new, meaningful content such as text, images, or audio from training data – McKinsey “What is generative AI” <https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-generative-ai> (accessed 4-04-2024).

¹⁴² Wang (accessed 24-07-2023).

¹⁴³ Wang (accessed 24-07-2023).

Wang states that conventional operational risk management strategies, while effective to a certain extent, often prove inadequate when confronted with the evolving landscape of emerging threats and the management of the escalating volume and diversity of data.¹⁴⁴ He further observes that this has prompted the exploration of pioneering techniques to manage operational risk management, rendering generative AI an increasingly attractive and viable solution.¹⁴⁵

4.3 Utilising AI Solutions to Enhance Operational Risk Management

4.3.1 Amplified Operational Risk Detection

Wang points out that, Generative AI models possess the capacity to analyse substantial volumes of unstructured textual data from a diverse array of sources. By discerning underlying patterns and relationships within this data, generative AI proves adept at identifying emerging risks that might challenge traditional methodologies.¹⁴⁶

4.3.2 Enhanced Operational Risk Evaluation

Further, Wang indicates that generative AI can significantly contribute to the process of risk assessment by generating potential risk scenarios grounded in real-world data. This facilitates the execution of thorough and comprehensive scenario analyses, yielding deeper insights into potential vulnerabilities within the operational landscape.¹⁴⁷

4.3.3 Dynamic Risk Monitoring

Wang emphasises that the continual learning capabilities of generative AI models empower organisations to engage in real-time risk monitoring. This ability enables the swift detection of fluctuations in risk exposure, thereby allowing for the timely deployment of pre-emptive risk-mitigation strategies.¹⁴⁸

¹⁴⁴ Wang (accessed 24-07-2023).

¹⁴⁵ Wang (accessed 24-07-2023).

¹⁴⁶ Wang (accessed 24-07-2023).

¹⁴⁷ Wang (accessed 24-07-2023).

¹⁴⁸ Wang (accessed 24-07-2023).

4.3.4 Effective Risk Mitigation

Generative AI, as alluded to by Wang, plays a pivotal role in assisting the formulation and execution of effective risk-mitigation strategies. It offers invaluable insights into potential process enhancements, identifies control deficiencies and recommends tailored training programs.¹⁴⁹

4.3.5 Efficiency and Cost-Effectiveness

Wang also states that, incorporating generative AI models into operational risk management can automate labour-intensive tasks, leading to heightened operational efficiency and significant cost reductions.¹⁵⁰

4.3.6 Adaptability and Responsiveness

Generative AI models exhibit the capability to swiftly adapt to evolving business landscapes and changing regulatory requirements. According to Wang, this ensures that operational risk management practices remain both pertinent and effective in addressing emerging risks.¹⁵¹

Wang suggests that incorporating generative AI into operational risk management presents a promising avenue for enhancing risk assessment, monitoring and mitigation.¹⁵² The discussed AI solutions¹⁵³ demonstrate the potential to significantly strengthen operational risk management practices.¹⁵⁴ Despite the substantial advantages of integrating generative AI within operational risk management, the transition is not without complexities and potential pitfalls, which warrant consideration.¹⁵⁵

¹⁴⁹ Wang (accessed 24-07-2023).

¹⁵⁰ Wang (accessed 24-07-2023).

¹⁵¹ Wang (accessed 24-07-2023).

¹⁵² Wang (accessed 24-07-2023).

¹⁵³ Par 4.3.1 – 4.3.6.

¹⁵⁴ Wang (accessed 24-07-2023).

¹⁵⁵ Wang (accessed 24-07-2023).

4.4 Complexities of integrating Generative AI

4.4.1 Ensuring Data Quality and Volume

The efficacy of generative AI models, as elaborated by Wang, hinges on the quality and quantity of the training data. He thus observes that acquiring precise, comprehensive and up-to-date data can present a formidable challenge.¹⁵⁶

4.4.2 Deciphering Model Interpretability

As generative AI models often exhibit complexity and opacity, rendering their interpretation a challenging endeavour, Wang emphasizes that it is imperative for stakeholders to grasp the underlying logic that governs the models' outputs and decision-making processes.¹⁵⁷

4.4.3 Validating Model Reliability

Similarly, Wang remarks that the validation of generative AI models' performance and reliability within the realm of operational risk management can be intricate. The establishment of robust validation techniques and performance metrics is therefore indispensable for ensuring the dependability and credibility of these models.¹⁵⁸

4.4.4 Navigating Ethical and Privacy Implications

The utilisation of generative AI models in operational risk management raises substantial ethical and privacy considerations, particularly when handling sensitive data.¹⁵⁹ AI systems frequently depend on extensive user data, prompting apprehension regarding data privacy and possible misuse. Potter suggests that to address these concerns, developers should integrate robust privacy measures, such as data anonymization,¹⁶⁰ consent mechanisms and secure storage. AI systems

¹⁵⁶ Wang (accessed 24-07-2023).

¹⁵⁷ Wang (accessed 24-07-2023).

¹⁵⁸ Wang (accessed 24-07-2023).

¹⁵⁹ Wang (accessed 24-07-2023).

¹⁶⁰ Dividing product data into related parts to create a detailed product record, enhancing capabilities for filtering, search and merchandising – Deloitte “Privacy by Design” <http://surl.li/tfebr> (accessed 04-04-2024).

should additionally prioritize minimizing the collection and retention of personal data wherever feasible, embracing privacy-by-design¹⁶¹ principles.¹⁶²

4.4.5 Cultivating Organisational Readiness

Wang warns that the seamless integration of generative AI into operational risk management necessitates the presence of suitable infrastructure and technical expertise. According to him, an organisational culture that is receptive to innovation and change also stands as a pivotal requirement.¹⁶³

In summary, Wang concludes that the integration of generative AI into the domain of operational risk management represents a complex and multifaceted challenge. While these challenges may seem formidable, they are not insurmountable. It is however submitted that to achieve successful integration, it is imperative to adopt a deliberate and comprehensive strategy.

4.5 Key Strategies for Effective Integration

4.5.1 Investment in Data-Quality Enhancement

These initiatives should focus on enhancing the quality and quantity of data used for training generative AI models. Wang suggests that it is essential to ensure there is data precision, comprehensiveness and timeliness to improve the operational effectiveness of these models.¹⁶⁴

4.5.2 Development of Transparent Guidelines for Model Interpretation and Validation

Wang emphasises how crucial it is to establish easily understandable guidelines that enable stakeholders to grasp the underlying rationale behind the models' outputs and

¹⁶¹ Privacy by Design is a proactive framework that integrates privacy considerations into the development and operation of technologies and business practices from the outset. It emphasizes user-centric, transparent practices, ensuring that privacy is automatically protected, embedded within systems and maintained throughout the entire data lifecycle – Drata “Privacy by Design Is Crucial to the Future of AI” <https://drata.com/blog/defining-privacy-design> (accessed 23-07-2024).

¹⁶² Potter “Ethical Considerations in the Development and Deployment of Artificial Intelligence Systems” https://www.researchgate.net/publication/378435804_Ethical_Considerations_in_the_Development_and_Deployment_of_Artificial_Intelligence_Systems (accessed 04-04-2024).

¹⁶³ Wang (accessed 24-07-2023).

¹⁶⁴ Wang (accessed 24-07-2023).

decision-making processes. Furthermore, robust validation methods and performance metrics must be implemented to ensure the dependability and credibility of generative AI models.¹⁶⁵

4.5.3 Implementation of Strong Data Protection Measures

When dealing with sensitive data, Wang highlights the importance of organisations strictly adhering to data protection regulations and ethical standards by implementing robust data protection measures is essential to maintain stakeholder trust and prevent potential legal complications.¹⁶⁶

4.5.4 Cultivating an Organisational Culture that Embraces Innovation and Change

Wang explains that it is in overcoming resistance to change which will foster a culture of innovation within the organisation. Investments in training and development are necessary to ensure that the organisation possesses the technical expertise required for the successful integration of generative AI into operational risk management.¹⁶⁷

By adeptly addressing these challenges and risks, organisations can effectively integrate generative AI into their operational risk management practices, empowering them to better recognise, assess and mitigate operational risks in an increasingly intricate and dynamic environment.

4.6 Conclusion

In conclusion, the integration of generative AI into operational risk management presents a compelling opportunity for financial institutions to enhance their resilience in the face of evolving threats. As we navigate an increasingly complex and data-rich financial landscape, traditional risk management methods have proven to be inadequate in addressing the dynamic nature of operational risks. Generative AI, with its capacity to analyse vast volumes of unstructured data, generate potential risk scenarios and facilitate real-time monitoring, offers a powerful set of tools to fortify operational risk management strategies.

¹⁶⁵ Wang (accessed 24-07-2023).

¹⁶⁶ Wang (accessed 24-07-2023).

¹⁶⁷ Wang (accessed 24-07-2023).

However, this transformation is not without its complexities and challenges. Issues such as data quality, model interpretability and ethical considerations require careful consideration. The success of this integration depends on a deliberate and comprehensive strategy that includes investments in data quality enhancement, transparent guidelines for model interpretation, strong data protection measures and a cultural shift toward embracing innovation. I submit that while these challenges may appear daunting, they are not insurmountable, and organisations that navigate them successfully stand to benefit significantly from the capabilities of generative AI.

In the ever-changing landscape of financial risk management, the synergy of human expertise and generative AI's analytical power has the potential to revolutionise the way we understand, assess and mitigate operational risks. As financial institutions move forward, they must seize the opportunities offered by generative AI while remaining vigilant in addressing the complexities involved. This journey represents a pivotal step towards fortifying operational risk management practices, ensuring the resilience and adaptability of financial institutions in an era of unprecedented change.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

It is submitted that the transformative power of digitisation and the integration of artificial intelligence, particularly generative AI is reshaping the banking industry and its approach to risk management. This shift away from traditional, isolated risk management practices to digitally enhanced frameworks reflect the banking sector's response to an increasingly complex and competitive environment. What becomes very apparent from Chapter 2 of this dissertation is that customer demands for security, efficiency and personalisation¹⁶⁸ are necessitating banks to adopt technology at an unprecedented pace, fundamentally changing risk management from a focus on individual risks to a more comprehensive, enterprise-wide approach.¹⁶⁹

This shift has compelled banks to address a broader spectrum of risks, encompassing operational, technology and cyber risks, which we can conclude were not as prominent in prior traditional frameworks.¹⁷⁰ The expansion of enterprise risk management (ERM) to include the impact of digitisation is a response to both regulatory requirements and practical needs. This shift is essential as banks face new challenges from rapid technological change and rising digital threats in the Fourth Industrial Revolution.¹⁷¹

It is submitted that the evolution of operational risk management in the banking sector reflects the increasing complexity of a digital and interconnected world. Driven by regulatory advances and the need for resilience, banks are adopting comprehensive frameworks that incorporate proactive governance, robust cybersecurity and adaptable operational resilience strategies. Generative AI offers substantial advantages for operational risk management by enabling real-time data analysis, predictive capabilities and advanced scenario simulations.¹⁷² These AI-driven capabilities equip financial institutions with an unprecedented toolkit for anticipating and managing complex and data-intensive challenges.

¹⁶⁸ n 3 above.

¹⁶⁹ n 84 above.

¹⁷⁰ n 76 above.

¹⁷¹ n 94 above

¹⁷² n 131 above.

However, despite AI's transformative potential, human expertise remains indispensable. To integrate AI responsibly requires a strong focus on data integrity, model transparency and ethical standards to ensure that AI complements rather than replaces human oversight. As the banking industry navigates these challenges, a balanced approach to innovation, regulatory alignment and adaptability will be essential for sustaining stability and building trust in a rapidly changing environment.

The findings in this dissertation affirm that, while generative AI can significantly enhance risk detection, evaluation and monitoring, it is the synergy between technological tools and human judgment that will ultimately improve and enhance risk management.¹⁷³ For effective AI integration, banks must adopt a holistic strategy that incorporates rigorous data protection measures, transparent governance protocols, and frequent model validations. A cultural shift within banks to embrace innovation and ensure continuous skill-building in AI literacy is essential for these models to deliver their intended value sustainably.¹⁷⁴ These steps not only facilitate the practical adoption of AI but also reinforce customer trust and regulatory confidence in an increasingly digitised financial ecosystem.

Integrating AI into risk frameworks positions banks to adopt a more resilient and proactive approach to risk management. However, the effective deployment of AI is a complex process that requires not only ongoing regulatory alignment but also significant investment in human capital and a firm commitment to ethical standards. In today's fast-paced digital landscape, AI has become a vital tool, offering financial institutions a competitive edge in adapting to the rapid changes in the banking environment.

5.2 Recommendations

For successful adoption of AI in banking, it is recommended that banks establish clear, cross-functional AI governance frameworks that ensure accountability at every stage of AI deployment. This framework should mandate ongoing training programs to upskill

¹⁷³ n 154 above.

¹⁷⁴ n 157 above.

personnel in AI literacy, fostering a workforce that can work effectively alongside advanced technologies.

Banks should create dedicated roles for AI ethics and data stewardship to monitor data integrity and ethical compliance actively. Collaboration with regulatory bodies to establish industry-wide AI standards would provide a foundation for innovation within a consistent regulatory framework, helping banks meet both operational and ethical expectations. This comprehensive approach will enable banks to leverage AI fully while maintaining the stability, trust and resilience essential to the modern banking environment.

5.3 Conclusion

This dissertation concludes that the future of banking and risk management lies in a strategic blend of human expertise with advanced AI technologies, empowering banks to navigate risks and fully harness the potential of the digital age. Ultimately, one can indeed 'bank' on AI as a transformative force in the future of bank risk management.

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