



Contributions to Finance and Accounting

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Information Processing and Accounting Standards

The COVID-19 Pandemic and Its Impact
on Accounting Information Systems

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Contributions to Finance and Accounting

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Preface

In the wake of the global upheaval caused by the COVID-19 pandemic, the world of accounting and information processing has experienced unprecedented challenges and transformations. This book is a seminal work that critically examines these transformations, offering a comprehensive analysis of the pandemic's far-reaching implications for accounting practices, corporate cash holdings, investment strategies, and the overarching financial services sector.

The chapters within this book are meticulously crafted to address a broad spectrum of topics, starting from the foundational motives of holding cash by corporations to the intricate dynamics of corporate cash holdings theories and extending to the macroeconomic determinants that shape these processes. The inclusion of dedicated exploration into the impact of COVID-19 on corporate investment and cash holdings illuminates the specific challenges and strategic shifts necessitated by the pandemic.

This volume stands out for its holistic approach, integrating insights from various theoretical frameworks such as strategic alignment theory, dynamic capabilities theory, resource-based view, contingency theory, and agency theory. It delves into accounting information system development and scrutinizes the strategic alignment between business strategies and system development within a volatile pandemic environment.

One of the book's distinctive features is its in-depth analysis of integrated reporting as a mechanism for fostering corporate transparency, accountability, fairness, and, ultimately, the sustainability of financial services. The chapters navigate the complex financial services landscape, emphasizing the need for integrated reporting to bridge the information gap between corporations and investors, a necessity further underscored by the pandemic's disruption.

Moreover, the book presents a robust discussion on the role of financial infrastructure in supporting economic growth and development, especially in the context of emerging economies. It critically evaluates the resilience and adaptability of the financial services sector in response to the pandemic, highlighting the challenges and opportunities for sustainable financial services.

This volume is a beacon for academics, practitioners, policymakers, and students navigating post-pandemic accounting information and the financial landscape. It synthesizes the lessons learned during the pandemic and projects a path forward, advocating for enhanced transparency, risk management, and stakeholder engagement to achieve more sustainable and inclusive accounting information and financial reporting.

As we stand at the crossroads of recovery and transformation, this book invites readers to reflect on the pandemic's lessons and to contribute to the evolving discourse on the future of accounting standards and information systems in a post-COVID-19 world.

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The COVID-19 Pandemic and Its Impact on Accounting Information Systems: An Introduction

About the Book

The volume critically examines the challenges and adaptations required by the accounting profession in response to a pandemic. Through comprehensive analyses, it explores how COVID-19 disrupted accounting information systems (AISs) and prompted the re-evaluation of accounting standards. Key areas addressed include the shift to remote work, technological advancements, and regulatory changes. The book aims to provide actionable insights for enhancing the resilience and adaptability of AISs, contributing to the preparation of accounting standards and systems for future global crises. It serves as a pivotal resource for professionals and scholars, offering strategies to navigate and fortify accounting practices in an uncertain global environment.

Background

The COVID-19 pandemic has precipitated an unparalleled global crisis, affected all sectors of the economy, and fundamentally altered the landscape of the accounting profession. This crisis has highlighted the critical importance of robust accounting information systems (AISs) and the need for adaptable accounting standards to navigate through unprecedented challenges. The rapid shift towards digitalization, propelled by pandemic-induced constraints, has underscored the significance of efficient information processing within AISs to ensure the reliability and transparency of financial reporting.

Information processing and accounting are two sides of the same coin. The primary role of accounting is to provide financial information for the use of various firms' stakeholders as applicable. Processing financial information in accounting is guided by various accounting standards initially domesticated by countries and is now globally consolidated into what is now known as the international financial reporting standards widely adopted across the globe. The quality of financial information processed precedes the robustness of the standards set following rigorous

processes. The standards are imperfect despite the care and due diligence observed in these processes. They are impacted by various factors that cannot be captured, quantified, or envisaged in the setting processes, affecting the quality of processed financial information. One of those factors is the recent health pandemic. COVID-19 came without warning and destabilized every known aspect of human existence. Accounting consideration and financial information quality came to the fore in the COVID-19 environment (Maria Markova & Georgi Hristov, 2021). The processing of financial information was challenged as the shortcomings of various accounting standards became apparent, as practitioners, regulators, and academics alike grappled with adapting existing standards to suit the prevailing circumstances (Gurău et al., 2021). Pandemics are a part of human existence, and it is unclear when the next major one will hit and how it will manifest (Donthu & Gustafsson, 2020). The lessons learned within accounting and information processing are clear. It is essential to synthesize and document the challenges, the adaptations, and, more importantly, the impact of the pandemic on information processing and accounting standards to inform responses and the flexibility of the standard-setting process and the quality of the information in readiness for future pandemics.

This book addresses the challenges of financial reporting and information management systems caused by the COVID-19 crisis. Information access, transmission, and rapid changes in the business financial reporting environment during the COVID-19 pandemic revealed some shortcomings of international financial reporting standards. Nearly all aspects of financial information processing were affected by the quality of the information accessed. Even at the public sector level, there are concerns that COVID-19 has made it difficult to manage risks and uncertainties (Bastida et al., 2021). The situation was perhaps worse for corporate reporting, as issues of fair value measurement, value relevance, and going concern were challenging, as in a typical operating environment. For instance, the pandemic environment resulted in the suspension of certain provisions about how lessees account for leases to cope with the exigences that unfolded (Teixeira, 2021). Several accounting policies within IFRS were modified to account for financial risks associated with expected credit losses, fair value measurements, contract revenue, adjustment in equity, and debt reporting mechanisms, among others, to suit the pandemic reporting environment (Almayyahi et al., 2021; Markova and Hristov, 2021). In addition to packaging small businesses for tax incentives and stimulus packages, Wahyuni (2022) reported that IFRS played an insignificant role in small businesses' survival during the pandemic.

Despite the challenges posed by the pandemic, some opportunities were presented. According to Sidaway et al. (2022), the pandemic provided a unique chance to position decision usefulness information qualitative characteristics of reporting beyond the financial context to socio- and moral dimensions that could ensure flexibility in responding to reporting environments in similar situations. Information communication technology is pivotal in financial statement preparation and business practices. Working from home, orchestrated by the pandemic, increased the need for relevant information on social media and other similar platforms to ensure that businesses remained managed on a going-concern basis (Lesi, 2020). Industry

4.0 is a great advantage for information processing and financial reporting, ensuring that businesses can explore the potential impacts of features such as big data, artificial intelligence, and augmented reality, among others, on accounting practices for sustainability during the pandemic (Saeudy et al., 2022).

Accounting information is critical for business success (Siagian & Muda). While accounting processes financial information that is more often guided by standards, information sciences rely on having access to the right information. Hao and Pham (2022) posit that although COVID-19 information disclosure assisted in reducing investors' uncertainty, the gains were eroded due to variations in industry-wide disclosure, highlighting information comparability among firms and access to reliable information in a volatile environment. Tibiletti et al. (2021) lamented the inconsistencies in IFRS application during COVID-19 with negative consequences for future business performance.

Over time, crises have exposed the weaknesses and/or limitations of these vital business ingredients. The recent pandemic has created different challenges and revealed the inadequacies of accounting and information systems processes. The dynamics of planned business restructuring activities introduced many considerations and culminated in additional disclosure for business tax purposes. We propose combining perspectives and research from academics, practitioners, and the industry on modifying accounting systems and processes to be resilient in and out of a crisis. Therefore, empirical and theoretical submissions addressing the underlisted themes or related issues are invited for publication in this proposed book. The book will highlight recommendations for standards and information system improvement. We are inviting chapters covering the following themes and related aspects not listed.

Objectives of the Book

In confronting the extraordinary challenges presented by the COVID-19 pandemic, the accounting profession has found itself at a crossroads, necessitating a re-evaluation of accounting information systems (AISs) and the standards that govern accounting practices. This book aims to meticulously examine and elucidate the multifaceted impacts of the pandemic on these critical components of financial reporting and information management. The detailed objectives set forth aim to guide both the scholarly exploration and practical application of findings within the realms of AIS and accounting standards, ensuring relevance and applicability in the face of ongoing global challenges.

Exploring the Impact of COVID-19 on Accounting Information Systems

The onset of the COVID-19 pandemic has precipitated unprecedented disruptions across all sectors, with the accounting domain being no exception. A principal objective of this book is to delve into how these disruptions have affected the operational efficacy, resilience, and adaptability of AIS. This exploration involves analysing the shift towards remote working arrangements, the increased reliance on digital technologies, and the challenges these shifts pose to the integrity and reliability of accounting information. The book aims to uncover the strategies that have been employed to mitigate these challenges, exploring the role of innovation in sustaining the continuity and resilience of AIS in such tumultuous times.

Examining Changes in Accounting Standards in Response to the Pandemic

The economic upheaval caused by the pandemic has led to significant financial uncertainties, which, in turn, have implications for accounting standards and practices. This book seeks to scrutinize the modifications and adaptations in accounting standards prompted by the challenges of the pandemic. It will evaluate how these changes aim to address issues of financial reporting, valuation, impairment, and the fair presentation of the economic reality of businesses during the pandemic. Furthermore, the book will assess the implications of these adaptations for transparency, investor trust, and the overall integrity of financial markets.

Identifying Strategies for Resilient and Adaptive Information Systems

In light of the disruptions caused by the pandemic, it has become imperative for businesses to enhance the resilience and adaptability of their AIS. Thus, another pivotal objective of this book is to identify and propose forward-thinking strategies that can be adopted to fortify AIS against future global crises. This entails a comprehensive analysis of technological advancements, cybersecurity measures, regulatory frameworks, and best practices in data management and processing. The book aims to provide actionable insights and recommendations that organizations can implement to ensure the robustness and agility of their AIS, thereby safeguarding against potential disruptions and ensuring continuity in accounting practices.

The detailed objectives outlined in this book serve as a roadmap for navigating the complex landscape sculpted by the COVID-19 pandemic within the accounting profession. By exploring the impact of the pandemic on AIS, examining changes in

accounting standards, and identifying strategies for enhancing system resilience, this book aims to equip professionals, scholars, and policymakers with the knowledge and tools necessary to adapt to and thrive in the changing dynamics of financial reporting and management. As the world continues to grapple with the pandemic's aftermath, the insights and analyses presented in this book endeavour to contribute to a more resilient, transparent, and adaptive accounting practice, poised to meet the challenges of the future.

Overview of Contributed Chapters

In an era defined by uncertainty and rapid change, particularly accentuated by the COVID-19 pandemic, *Information Processing and Accounting Standards* emerged as a beacon for professionals and scholars in the accounting domain. This book, through its meticulously curated chapters, delves into the nuanced impacts of the pandemic on accounting practices and information systems, exploring theoretical underpinnings, empirical findings, and forward-looking strategies. Each contributed chapter represents a testament to the resilience and adaptability of the accounting profession in the face of adversity, offering insights, analyses, and recommendations that are both profound and actionable.

The synthesis of the contributed chapters in *Information Processing and Accounting Standards: The COVID-19 Pandemic and Its Impact on Accounting Information Systems* encapsulates a comprehensive examination of how the pandemic has reshaped the landscape of accounting, with a pivotal focus on accounting information systems (AISs) and the evolving nature of accounting standards. Through a series of meticulously curated contributions, the book delves into the nuanced impacts of the pandemic, exploring themes of corporate cash holdings, the theoretical underpinnings of these phenomena, and the broader implications for corporate governance and macroeconomic stability.

A central theme emerging from the chapters is the evolution of corporate cash holdings in response to the COVID-19 pandemic. These discussions provide insights into the motives behind holding cash, emphasizing the transactional, precautionary, and speculative motives that have become increasingly pronounced in the uncertain economic climate engendered by the pandemic. Through a detailed analysis, the chapters highlight how corporations have adapted their cash management strategies, weighing the imperatives of liquidity against the backdrop of unprecedented economic disruptions.

The book offers a deep dive into the theoretical frameworks that govern our understanding of corporate cash holdings and financial decision-making. By revisiting established theories such as trade-off theory, pecking order theory, and agency theory, these contributions provide a fresh perspective on how these theoretical models apply in the context of a global pandemic. The chapters argue for a re-evaluation of these frameworks, suggesting that the unique challenges posed by the pandemic necessitate a nuanced understanding of corporate finance dynamics.

A noteworthy aspect of the book is its examination of the institutional and macroeconomic determinants of corporate cash holdings. The chapters elucidate the role of institutional theory in shaping corporate behaviours and decisions, particularly in times of crisis. Furthermore, the analysis extends to the macroeconomic factors influencing corporate cash reserves, offering insights into how external economic environments impact corporate financial strategies. This comprehensive approach underscores the interconnectedness of corporate finance, institutional frameworks, and macroeconomic policies.

A critical examination of the impact of COVID-19 on corporate investment and cash holdings reveals the profound effects of the pandemic on corporate financial decision-making. The contributions delve into the immediate and enduring impacts of the pandemic, shedding light on how corporations have navigated investment strategies amidst fluctuating market conditions and economic uncertainties. This analysis is instrumental in understanding the broader implications of the pandemic for corporate governance and financial stability.

This book synthesizes these insights to outline strategies for enhancing the resilience and adaptability of accounting information systems in the face of future crises. By integrating the lessons learned from the pandemic with theoretical and empirical research, the contributions offer valuable recommendations for practitioners, policymakers, and scholars. The emphasis on forward-looking strategies underscores the imperative of preparedness and adaptability in the evolving landscape of accounting and finance.

In conclusion, *Information Processing and Accounting Standards: The COVID-19 Pandemic and Its Impact on Accounting Information Systems* provides a rich tapestry of analysis and insights into the ramifications of the pandemic for the accounting profession. Through a multidimensional exploration of corporate cash management, theoretical frameworks, institutional influences, and macroeconomic determinants, the book offers a nuanced understanding of the challenges and opportunities that have emerged. This synthesis not only contributes to academic discourse but also serves as a guide for navigating the complexities of accounting and finance in the post-pandemic world, emphasizing the critical role of resilience, transparency, and strategic foresight.

Each chapter of this book contributes to a cohesive exploration of the interplay between the COVID-19 pandemic, information processing, and accounting standards. From discussing the motives behind cash holdings in times of uncertainty to examining corporate cash holding theories and the influence of institutional theories on corporate behaviours, the book offers a comprehensive analysis. Additionally, this study provides insights into the macroeconomic determinants of corporate cash holdings and investigates the direct impact of COVID-19 on corporate investments and cash holdings.

Methodological Approaches

The book *Information Processing and Accounting Standards: The COVID-19 Pandemic and Its Impact on Accounting Information Systems* provides a diverse and comprehensive examination of the impact of the COVID-19 pandemic on the accounting field, employing various methodological approaches across its chapters to explore the nuanced changes and challenges faced by the profession. This synthesis aims to encapsulate the methodological richness that underpins the research contributions within the book, highlighting how these approaches facilitate a deeper understanding of the pandemic's effects on accounting standards and information systems.

The book's strength lies in its methodological diversity, which encompasses theoretical analyses, empirical investigations, and case studies. This multiplicity of approaches enables a holistic examination of the pandemic's impacts, ranging from changes in corporate cash management practices to shifts in accounting information systems. Theoretical frameworks provide the foundation for exploring the underpinnings of financial decision-making and the evolution of accounting standards in response to the pandemic. Simultaneously, empirical investigations offer data-driven insights into the real-world implications of these theoretical concepts, grounding the analysis of tangible outcomes and observable trends.

Several chapters employ analytical research strategies, focusing on the interpretation of existing data to draw conclusions about the pandemic's impact on accounting practices. This approach is particularly effective in examining the macroeconomic determinants of corporate cash holdings and the institutional factors influencing financial decision-making during the pandemic. By analysing secondary data from various sources, these chapters offer a comprehensive view of the economic landscape, elucidating the complex interactions between corporate finance strategies and external economic pressures.

The use of case studies and qualitative analysis in some chapters provides a detailed examination of specific instances of pandemic-induced challenges and adaptations within the accounting profession. These methodological approaches allow for an in-depth exploration of the practical applications of accounting standards and the operational realities of accounting information systems in a crisis context. Through interviews, document analysis, and observational studies, these chapters offer nuanced insights into the strategies employed by firms to navigate the uncertainties brought about by the pandemic, highlighting the importance of flexibility and innovation in accounting practices.

A key methodological theme across the chapters is the integration of theoretical insights with practical implications. This bridging of theory and practice is crucial for understanding the dynamic nature of accounting standards and information systems in the face of unprecedented global challenges. By synthesizing theoretical frameworks with empirical findings and case study analyses, this book provides a robust platform for discussing future directions in accounting research and practice, emphasizing the need for resilience and adaptability in the profession.

The methodological approaches employed in *Information Processing and Accounting Standards: The COVID-19 Pandemic and Its Impact on Accounting Information Systems* collectively offer a comprehensive and multifaceted examination of the pandemic's impact on the accounting field. Through a blend of theoretical analysis, empirical investigation, and qualitative research, the book sheds light on the myriad ways in which the pandemic has reshaped accounting practices and standards. This methodological richness not only enriches the academic discourse surrounding accounting and finance but also provides valuable insights for practitioners navigating the complexities of a post-pandemic world. The synthesis of these methodological perspectives underscores the importance of interdisciplinary approaches in addressing the challenges and opportunities that lie ahead for the accounting profession.

Conceptual Framework

The book *Information Processing and Accounting Standards: The COVID-19 Pandemic and Its Impact on Accounting Information Systems* intricately weaves through a series of conceptual frameworks that underscore the multifaceted impact of the COVID-19 pandemic on accounting practices and systems. This synthesis essay encapsulates the conceptual underpinnings that form the backbone of the research presented across the various chapters, highlighting the collective insights and forward-looking implications for the accounting profession.

At the core of the book's discourse is a set of conceptual frameworks that serve to illuminate the intricate dynamics between the COVID-19 pandemic, corporate financial management, accounting standards, and information systems. These frameworks draw upon a rich variety of theories, including strategic alignment theory, dynamic capabilities theory, the resource-based view, contingency theory, agency theory, and strategic management theories. Together, they offer a robust scaffold for examining the challenges and opportunities that have emerged in the wake of the pandemic.

A recurring theme across the chapters is the emphasis on strategic alignment and the dynamic capabilities of firms in adapting their accounting practices to the rapidly changing economic landscape. The conceptual framework posits that the alignment between business strategy and accounting information systems is crucial for navigating the uncertainties brought about by the pandemic. This alignment enables firms to leverage their dynamic capabilities, allowing them to swiftly adapt their financial management strategies and accounting practices in response to external shocks and stresses.

The resource-based view (RBV) and contingency theory further enrich the book's conceptual discourse, highlighting the importance of internal resources and the situational context in shaping firms' responses to the pandemic. According to the RBV, firms that effectively utilize their unique resources and capabilities can better withstand the economic fallout of the pandemic. Concurrently, contingency theory

suggests that optimal accounting practices and systems are contingent upon the specific challenges and opportunities presented by the pandemic, underscoring the need for flexibility and context-specific strategies.

Agency theory's insights into the relationships between principals (owners) and agents (managers) are particularly salient in the context of pandemic-induced economic uncertainties. The conceptual framework explores how the pandemic has exacerbated information asymmetries and agency conflicts, necessitating enhanced transparency and accountability in financial reporting. Moreover, the strategic management theories applied within the book advocate for a proactive and strategic approach to financial management and accounting system development, emphasizing the strategic value of information in decision-making processes.

The book integrates these conceptual frameworks, synthesizing their insights to construct a comprehensive understanding of the impact of the COVID-19 pandemic on accounting practices and systems. This integration highlights the interconnectedness of strategic alignment, dynamic capabilities, resource optimization, contextual adaptability, and the critical role of accounting information in navigating the complex economic and financial challenges posed by the pandemic.

The conceptual frameworks delineated in *Information Processing and Accounting Standards: The COVID-19 Pandemic and Its Impact on Accounting Information Systems* provide a multidimensional lens through which the pandemic's implications for the accounting profession can be examined. By drawing on a diverse array of theoretical perspectives, the book offers a nuanced understanding of the strategic, operational, and informational challenges facing the accounting field. These frameworks not only contribute to the academic discourse but also offer practical insights for practitioners striving to adapt their accounting standards and systems in a post-pandemic world, underscoring the enduring relevance and adaptability of the accounting profession amidst global crises.

Theoretical Framework

The conceptual framework underpinning this book centres on the critical interconnections between business strategies, AIS development, and the overarching influence of the COVID-19 pandemic. It examines how strategic alignment, dynamic capabilities, and resource-based considerations shape the development and effectiveness of AIS in turbulent times.

The book *Information Processing and Accounting Standards: The COVID-19 Pandemic and Its Impact on Accounting Information Systems* extensively explores the theoretical underpinnings that inform the study of the pandemic's impact on accounting practices, standards, and systems. Drawing from a diverse set of theories, the submitted chapters collectively construct a multifaceted theoretical framework that provides deep insights into how the accounting field has responded to and evolved in the wake of COVID-19. This synthesis essay aims to distil the essence of

these theoretical contributions, highlighting their interconnectedness and their implications for the future of accounting.

A significant theoretical anchor in the book is strategic alignment theory, which posits that the effectiveness of accounting information systems (AISs) is fundamentally linked to their alignment with an organization's business strategy and objectives. In the context of COVID-19, this theory underscores the necessity for AISs to rapidly adapt to changing strategic priorities, such as crisis management and remote operations, to maintain their relevance and utility.

Closely related to strategic alignment theory, dynamic capabilities theory is invoked to explain organizations' ability to respond to pandemic challenges. This theory emphasizes the role of AIS in facilitating an organization's agility and resilience, allowing for the swift reconfiguration of resources and processes in response to external shocks. Dynamic capabilities theory thus provides a lens through which the adaptational responses of organizations to the pandemic can be understood.

The resource-based view (RBV) offers another vital theoretical perspective, focusing on how organizations can leverage their unique resources and competencies to navigate the pandemic's impacts. This theory highlights the strategic value of AIS as a key organizational resource that can provide competitive advantages, such as enhanced decision-making capabilities and improved operational efficiency, during crises.

Contingency theory is applied across the chapters to explore the situational factors that influence the design and effectiveness of AIS during the pandemic. This theory suggests that there is no one-size-fits-all solution; instead, the optimal configuration of AIS is contingent upon various factors, including the nature of the pandemic's impact, regulatory changes, and the organization's specific circumstances.

Agency theory is particularly relevant in the context of pandemic-induced economic uncertainties. It examines the relationship between principals (shareholders) and agents (managers) and how AIS can mitigate information asymmetries and potential conflicts of interest. This theory underscores the importance of transparency and accountability in financial reporting during times of crisis.

Finally, strategic management theories are woven throughout the book to provide insights into how organizations can strategically navigate the challenges posed by the pandemic. These theories emphasize the importance of strategic planning, risk management, and innovation in accounting practices and systems to sustain organizational performance and resilience.

The theoretical frameworks presented in the book offer a comprehensive and nuanced understanding of the myriad ways in which the COVID-19 pandemic has reshaped the accounting landscape. By integrating these theories, the book highlights the critical role of AIS in supporting strategic decision-making, fostering organizational resilience, and ensuring transparency and accountability during unprecedented times.

The synthesis of theoretical frameworks in *Information Processing and Accounting Standards: The COVID-19 Pandemic and Its Impact on Accounting Information Systems* illuminates the complex interplay between AIS, accounting

standards, and organizational strategies in the face of a global crisis. These theoretical insights not only enrich our understanding of the pandemic's impact on the accounting field but also provide valuable guidance for practitioners and scholars navigating the evolving challenges and opportunities within the profession.

Significance of the Study

This book makes a significant contribution to the literature on AIS and accounting standards by providing an in-depth analysis of the pandemic's impacts and the resulting shifts in accounting practices. It offers practical insights for accounting professionals, guiding them through the challenges posed by the pandemic and outlining strategies for future resilience.

This volume provides an invaluable examination of the profound shifts within the accounting domain induced by the global crisis. Through a series of rigorously researched chapters, the book navigates the reader through the myriad ways in which the pandemic has altered the landscape for accounting standards, information systems, and corporate financial management. This synthesis essay aims to encapsulate the significance of the contributions made by the submitted chapters, elucidating their collective impact on both the academic and practical aspects of accounting in the context of COVID-19.

One of the book's primary contributions is its detailed exploration of the challenges and adaptations within accounting information systems (AISs) prompted by the pandemic. The chapters collectively underscore the critical role of AIS in maintaining operational continuity, supporting remote work environments, and ensuring the reliability and timeliness of financial reporting under crisis conditions. This focus illuminates the indispensability of robust and adaptable AIS in navigating unforeseen global challenges, significantly advancing our understanding of AIS's strategic value.

Another significant contribution of the book is its analysis of the pandemic's impact on accounting standards. The chapters delve into the rapid regulatory changes and adjustments within accounting practices necessitated by economic disruptions. This exploration provides critical insights into the flexibility and resilience required of accounting standards in the face of global crises, offering valuable lessons for future standard-setting processes and regulatory adaptations.

The book also offers profound insights into the strategic financial management practices adopted by corporations in response to the pandemic. Through theoretical and empirical analyses, the chapters detail the shifts in corporate cash holdings, investment strategies, and risk management practices, highlighting the strategic imperatives of liquidity management, operational resilience, and financial planning during times of crisis. These insights significantly contribute to the broader discourse on corporate finance management in volatile economic environments.

By combining diverse theoretical frameworks and practical case studies, the book bridges the gap between academic research and real-world application. This

study not only enriches the academic literature on accounting and financial management during crises but also serves as a practical guide for professionals navigating the accounting challenges posed by the pandemic. The book's comprehensive examination of AIS, accounting standards, and financial management strategies in the context of COVID-19 provides a blueprint for future resilience and adaptability in the accounting profession.

Importantly, the book also identifies gaps in the current knowledge and outlines potential avenues for future research. By highlighting the evolving nature of the challenges faced by the accounting profession and the ongoing implications of the pandemic, the chapters underscore the need for continued exploration of adaptive strategies, technological innovations, and regulatory reforms. This forward-looking perspective is crucial for preparing the accounting profession to effectively address future global disruptions.

This book makes a significant contribution to the field of accounting by providing a comprehensive analysis of the pandemic's impacts and subsequent responses within the profession. The book's exploration of AIS, accounting standards, and strategic financial management in the face of COVID-19 offers invaluable insights for academics, practitioners, and policymakers alike. Its contributions not only advance our understanding of the accounting profession's current challenges but also lay the groundwork for future resilience and innovation.

Structure of the Book

The book is structured to guide readers through a logical progression of themes and analyses, ensuring a comprehensive understanding of the complex dynamics between the COVID-19 pandemic and the accounting profession.

The book is meticulously structured to offer a holistic examination of the profound impacts of the COVID-19 pandemic on the domain of accounting. This synthesis essay aims to highlight the coherent structure across the submitted chapters, elucidating how they collectively navigate the reader through the intricate interplay between the pandemic, accounting standards, information processing, and strategic responses by organizations.

The book begins with this introductory chapter that sets the stage for the ensuing discourse, outlining the unprecedented challenges posed by the COVID-19 pandemic to the accounting profession. It seamlessly transitions into a theoretical grounding, where fundamental frameworks such as strategic alignment theory, dynamic capabilities theory, and the resource-based view are discussed. This chapter lays a robust foundation for understanding subsequent empirical explorations and case studies, emphasizing the necessity of aligning accounting information systems with broader strategic objectives in the face of crisis.

Following the theoretical framework, the book delves into the specific impacts of the pandemic on accounting information systems (AISs). This section provides an in-depth exploration of the operational challenges, technological adaptations, and

strategic innovations that organizations have implemented to ensure the continuity and reliability of accounting practices. The chapters here are structured to progressively unpack the complexities of AIS adjustments, highlighting the role of digital transformation and remote working capabilities.

The reader goes through the evolution of accounting standards amidst the pandemic. The chapters critically examine regulatory responses, the flexibility of accounting standards, and the implications for transparency and financial reporting. The focus of chapters on both the immediate adjustments and the long-term implications for accounting standards offers a comprehensive view of the shifts within the regulatory landscape and their impact on practice and theory.

In addressing corporate financial management strategies, the book adopts a focused approach to explore how organizations have navigated financial uncertainties. They provide insights into corporate cash management, investment decision-making, and risk management practices during the pandemic. Through empirical analyses and case studies, the chapters elucidate the strategic financial responses of firms, contributing to a deeper understanding of the financial implications of the pandemic.

The concluding chapter of the book synthesizes the insights garnered from the preceding chapters, drawing connections between the theoretical discussions, empirical findings, and practical implications. We integrate the diverse perspectives presented throughout the book, by offering a cohesive summary of the key take-aways. Furthermore, we outline future research directions, emphasizing the enduring questions and challenges that the accounting profession faces in the post-pandemic world.

The structure of the book and the order of chapters is thoughtfully designed to offer a progressive exploration of the pandemic's impact on the accounting field. From establishing a theoretical foundation to delving into practical adaptations and strategic responses, the book's structure facilitates a comprehensive understanding of the dynamic changes within accounting practices and standards. By combining theory, empirical evidence, and practical insights, the book not only contributes to academic discourse but also serves as a valuable resource for practitioners navigating the complexities of accounting in a transformed global landscape.

Conclusion

The materials in this book serve as essential resource for understanding the challenges and opportunities presented by the pandemic within the accounting field. It encourages readers to engage with the detailed discussions in subsequent chapters, fostering a deeper understanding of how to navigate the evolving landscape of accounting information systems and standards in the face of global crises.

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Integrated Reporting for Sustainable Financial Service Sector in Emerging Economies Post-COVID-19 Pandemic



Isaac Okoth Randa

Abstract The soundness and implied public trust in the financial system and the economy are built on notions of fair dealings, responsibility, and transparency among dealers and institutions. Arguably, existing gaps between the information currently reported by corporations and information investors need can be bridged by embracing integrated reporting. This chapter descriptively analyses the influence of integrated reporting as a mechanism for imbedding corporate transparency, accountability, fairness, and responsibility and hence sustainable financial services. Hence, adopting a realist research perspective, this chapter employs documentary data to explore the influence of integrated reporting on sustainable financial service delivery for emerging economies. Through a number of mechanisms, including improving transparency, enhancing risk management, aligning investment strategies, incentivising sustainability performance, and facilitating stakeholder engagement, integrated reporting contributes to sustainable financial services.

Keywords Integrated reporting · Financial services · Emerging economies · Accountability · Financial Innovation · Responsibility · Sustainability and corporate transparency

1 Introduction

A well-functioning financial infrastructure is indispensable for the smooth functioning of financial markets and the efficient allocation of resources in any economy (Krishnan, 2011; Morgan & Lamberte, 2012). Underpinned by robust policies and regulatory systems, financial systems, through effective financial intermediation, work diligently in the background, underlining economic growth and poverty reduction (World Bank, 2012). However, impaired by poor sectorial policies, unsound

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market dynamics, and imprudent institutional frameworks, financial systems potentially precipitate financial predicaments, destabilise economies, hinder economic growth, and jeopardise hard-earned progress gains among the most vulnerable in society (Beck et al., 2010). Ordinarily, financial infrastructure supports a country's financial architecture, which includes financial institutions, information technologies, regulations, and surveillance standards that enable effective financial intermediation (Miller et al., 2009). Such systems help promote financial stability, reduce the cost of financial intermediation, and increase access to financial services not only for households but also for businesses (Miller et al., 2009). However, increasing macroeconomic uncertainties in developing market economies, as well as in more industrialised economies, have precipitated severe problems in the financial sectors globally. The implied macroeconomic sacrifices imposed by financial sector challenges continue to be largely reflected in forgone economic growth, ineffective financial intermediation, and compromised public confidence in financial institutions (Draghi, 1997). Largely, the efficiency of the financial system is functionally tied to the efficient functioning of the legal system, accounting regulatory frameworks, and payment and settlement systems (Angadi, 2003; Miller et al., 2009). Hence, weaknesses in these enforcement mechanisms for financial contracts, sub-optimal standardised accounting systems, or transparency weaknesses in payment and settlement systems tend to impede the growth of the financial sector, consequently compromising economic growth and development.

A financial services sector that effectively designs and delivers financial advice and products to individuals, businesses, and governments (Koh et al., 2018; Mertzanis, 2015) supports the sustainable provision of financial services. Traditionally, financial intermediaries or bank-based establishments such as commercial banks, credit unions, and insurance companies supplied most financial services by soliciting deposits from savers, suitably pooling and lending them to firms and households. However, with the emergence of market-based institutions such as stock markets, independent bond issuers, venture capital funds, and fintechs, funding finds its way directly to those who demand it without necessarily going through intermediaries, hence changing the equation (Mertzanis, 2015). At its heart, the financial sector, through its financial services, intermediates by channelling funds from savers to borrowers, hence matching people who want to lower risk exposure with those seeking more risk (Asmundson, 2011). Its network comprises customers, investors, the financial infrastructure, the regulatory system, and the institutional environment (Coe, 2021). Despite rapid changes in the design, delivery, and provision of financial services, the core needs that financial services fulfil still arguably remain the same: payment facilitation, market provisioning, investment services, insurance products, the pooling of deposits and lending, and fund raising (Bruno et al., 2015). Furthermore, the literature on sustainability suggests that sustainable financial services refer to the provision of financial services in a manner that takes into account environmental, social, and governance (ESG) factors to promote long-term sustainability and responsible investment (Boffo & Patalano, 2020; Ziolo et al., 2019; OECD, 2020). Hence, sustainable finance (SF) integrates sustainability dimensions in the day-to-day activities of financial market actors, financial market

policy, and allied institutional and market measures to support the realisation of resilient, sustainable, stable, and inclusive economic growth (Driessen, 2021). This implies that in addition to traditional financial considerations, sustainable financial services organisations consider the effects of their operations on the immediate environment, society, and governance of companies in which they invest. Hence, the goal of sustainable financial services is not only to create long-term value for investors but also to society as a whole. A financial system that fails to address and take into consideration social and environmental imperatives is unsustainable (Ziolo et al., 2019). According to the OECD (Organisation for Economic Co-operation and Development) (2020), present environmental, social, and governance (ESG) practices remain at their nascent stages, with challenges still persisting regarding the consistency, comparability, and materiality of financial information. Arguably, important features of sustainable financial services include investments in companies and projects promoting sustainable environmental and socially responsible practices and behaviours. This includes the integration of ESG factors into investment appraisals and decision-making, the promotion of transparency and the disclosure of ESG-related information, and the continuous collaboration with stakeholders to support sustainable practices within the financial services industry (Ziolo et al., 2021). Therefore, a sustainable financial services industry is a critical component of a developed financial system contributing to financial stability, accessing financial services, supporting financial innovation, and aligning with sustainable development goals (Jones et al., 2017; Tuyon et al., 2022).

Arguably, financial markets and the financial services they offer have become more multifaceted, interrupted, and correspondingly short-termistic in nature, with financial instruments increasingly seen as paper assets held and traded regularly for short-term capital market value accretion rather than for long-term capital gains in sound businesses for inclusive value creation (Randa, 2022). Hence, the goals of this chapter are first to provide a descriptive analysis of the influence of IR as a mechanism for entrenching corporate transparency, objectivity, and accountability and therefore a sustainable financial services industry. Second, it intends to determine the key mechanisms and processes through which integrated reporting (IR) leads to the delivery of sustainable financial services as a basis for identifying an appropriate framework for entrenching sustainable financial services and thereby contributing to the ongoing demands for financial inclusivity and broad economic growth in emerging economies, using Namibia as a case example.

Subsequent to the above introduction, the second section provides the chapter's main issues, covering an overview of the chapter's background and contextual foundations, and explores relevant works on the linkages between integrated reporting and sustainable financial services. It also covers financial intermediation, sustainable financial services, and integrated corporate reporting together with its theoretical underpinnings, and subsequently, the conceptual framework connecting integrated reporting, financial intermediation, and sustainable financial services is formulated. The section ends with the chapter's methodology covering philosophic perspective, design, and material sampling strategy, including issues relating to validity and reliability. Additionally, the third section covers the study findings,

discussions, and recommendations as the product of secondary desk research relating sustainable financial services and resilient financial systems. Subsequent sections provide the chapter's conclusions and potential directions for future research on sustainable financial services in emerging economies.

2 Main Chapter's Focus

2.1 Background and Context

The COVID-19 pandemic has caused immeasurable uncertainty and volatility in both global financial and commodity markets. Globally, the financial sector has been affected the most, with the value of bank assets decreasing in virtually all financial markets around the world (KPMG, 2020). Consequently, financial institutions now face not only markets in recessions but also where the pandemic has disrupted business models, intensified digitalisation and emphasises on the impact of environmental, social, and governance factors (Sahay et al., 2020). Previous pandemics have shown that their effects are mostly felt in the tertiary sector, which comprises financial services (Turner & Akinremi, 2020; Callegari & Feder, 2022). A good example was the effect of *severe acute respiratory syndrome* (SARS) in 2003 on gross domestic product (GDP) growth in China. The effects of SARS on financial institutions were the second greatest, except for the transportation sector, which was the least affected (BakerMcKenzie, 2020). Consequently, countries have struggled to mitigate the consequences of the COVID-19 pandemic. Governments initiated several programmes, including lockdowns that shut down businesses, fiscal stimulus cash packages for households and firms, monetary policies that lowered interest rates and softened lending terms for financial institutions triggering global recessions, and financial sector policies such as debt repayment moratoria, as well as credit guarantee schemes (World Bank, 2022). Although these crisis prevention policies prevented the worst economic crises of the pandemic in the short run, they revealed and worsened a number of macroeconomic fragilities that now threaten sustainable and equitable economic recovery (World Bank, 2022).

In the past few decades, the global financial sector has weathered three major waves of industry transformations since 1970, comprising relaxed ethical reforms, social irresponsibility, and now sustainability (Tuyon et al., 2022). However, the current wave of sustainability has attracted renewed attention for the transformation to the sustainable financial services sector, inspired mainly by a series of global financial predicaments experienced between 2007 and 2009, caused mainly by the erosion of integrity in the finance industry (Schoen, 2017). Arguably, ethical-moral challenges have been partially due to inadequate transparency, ineffective financial regulations, and relaxed oversight surveillance systems (Valls Martínez et al., 2021). During this period, the banking structure changed, public cynicism increased, and confidence in the contemporary financial system decreased (Climent, 2018).

Consequently, both financial customers and investors are reinvigorating their demands for enhanced transparency, safety in operations, and ethical standards entrenched in financial products and services (Valls Martínez et al., 2021). Additionally, in the context of the 2008 financial crisis, the conventional finance paradigm failed, particularly due to its inability to stabilise the financial system, control financial risks, and reduce systemic indebtedness (Ziolo et al., 2019). Hence, in the absence of innovative response mechanisms supportive of income redistribution, pandemics within the conventional finance paradigm based on prevailing assumptions of corporate market capitalism, e.g., the centrality of profits as the purpose of business, the criticality of opportunism as a feature of managerial behaviour, and competition as the main route for reaching prosperity are deleterious. These assumptions widen income inequalities, worsen poverty traps, and highlight distributional and governance challenges related to contemporary public healthcare and social safety nets (Callegari & Feder, 2022).

Compared to its regional peers, Namibia's financial services sector is relatively large, developed, and sophisticated. Its banking sector, with a financial asset base comparable to 60% of GDP, is presently captured by four major banks, three of which have funding and ownership connections with South African banks. Similarly, the nonbanking financial subsector is even larger, with total financial assets of nearly 262% of GDP, dominated by pension institutions and partially featuring an ex ante funded Public Institutions Pension Fund. Similarly, the country also has three development finance establishments, namely, the Development Bank of Namibia, Agricultural Bank, and Namibia Housing Bank. Namibia's financial sector is sound, profitable, and satisfactorily capitalised. That notwithstanding, the composition of bank assets has recently come under pressure arising from the general global economic downturn (Africa Development Bank, 2020). However, a comprehensive appraisal of the standing of Namibia's financial system shows that the system has the following weaknesses: a thin financial market, inadequate competition and imperfect financial safety nets, an embryonic capital market, and insufficient and inadequate regulation. Additionally, restricted access to financial services, insufficient financial literacy coupled with the absence of consumer protection, a lack of effective consumer activism, inadequate financial management skills, and miniscule participation by Namibians as well as the entrenched supremacy of foreign ownership of financial establishments have been observed (Ministry of Finance, 2011–2021; Bank of Namibia, 2022).

Arguably, confidence in financial markets and the public's trust in them underpin the economic well-being of any country (Algan & Cahuc, 2014). Hence, by extension, the dependability and long-term prosperity of the financial system and economic establishments rely on notions of fair dealings, responsibility, and transparency (Wallison & Burns, 2011). Sako (2006) argues that societies with extensive social capital arising from public trust are better able to effectively pool resources—labour, capital, ideas, and innovations—to actualise economic growth and development, exhibit low levels of corruption, and support equitable playing fields. In contrast, miniscule levels of social capital precipitate lower social capital formation, less efficient financial markets and services, more institutionalised

corruption, and elevated transaction costs linked to these inefficiencies that stifle entrepreneurial activities for economic growth (OECD, 2019). In the financial services industry, in comparison to others, a good reputation resolves problems linked to information asymmetries, which is essential when financial transactions have long-term implications (Ahmed et al., 2020). Arguably, two types of trust in the finance sector are essential: first, trust between parties in financial transactions, implying that parties will strive to honour their end of the agreement, even if it means absorbing unexpected losses. Second, social trust in the financial services industry is focused on its principal role in connecting savers and investors in ways that efficiently enhance the allocation of private savings for financial investments in both physical and human capital (Government Office for Science, 2012). Arguably, anecdotal evidence maintains that a lack of trust in the reliability of accounting systems could also be blamed for triggering the Global Financial Crisis (GFC) of 2008, Muradoglu (2010) cited in Ahmed et al. (2020). Furthermore, Ahmed et al. (2020) argue that fair value accounting also aggravated the brutality of the 2008 financial system meltdown. Contributing to this debate, Manganaris et al. (2017) argue that accounting conservatism and the timeliness of accounting information reflect two major determinants of transparency deficiencies in contemporary financial reporting. Arguably, evidence from the post-2008 era continues to suggest that financial establishments are still inadequately transparent in presenting their financial reports (Bushman, 2014). Inadequate disclosure and low transparency have negative consequences for trust among users of financial information.

Adequate disclosure in financial markets accomplishes three goals (Enriques & Gilotta, 2014): protecting investors by enhancing their confidence in the financial market, addressing agency problems and asymmetric information affecting large corporations, and guaranteeing that market prices reflect publicly available value-relevant information. Similarly, according to Mahdi et al. (2022), financial information plays two important roles in market-based economies: First, it reduces information asymmetry and supports providers of capital in business and security valuation. This promotes transparency requirements for efficient capital market operations; second, it enables external capital suppliers to assess management performance, often referred to as the stewardship role of accounting information (Pinnuck, 2012). From this perspective, the conceptual framework for financial reporting provides the foundation for establishing accounting standards that support transparency by enhancing international comparability and the quality of financial information, which enables investors and other market participants to make informed economic decisions (Mondal, 2021; Abhayawansa & Adams, 2022). Regardless, the quality of reported financial information is influenced not only by the quality of accounting standards but also by other institutional factors that affect the demand for and the supply of financial information, including the nature of corporate governance, the legal system, and the existence and enforcement of laws governing investor protection and disclosure standards (Rajgopal & Venkatachalam, 2011). According to KPMG International (2012), there are gaps in information that companies currently report and in the information that investors require for assessing business forecasts and valuation. Integrated reporting fills this gap, as it provides the

grounds for companies to articulate their value creation processes more adequately to capital markets. The conventional view of financial reporting receives support from the traditional view of the firm, also referred to as the neoclassical view, whereby the primary purpose is shareholders' wealth maximisation rather than optimising the shared stakeholders' value (Bosse et al., 2009; Donaldson & Walsh, 2015). This view promotes serious corporate malpractice, including benefit-seeking individuals and short-term profit maximisation at the cost of long-term enterprise profitability (Kangas et al., 2019), encourages the unscrupulous utilisation of natural resources and destruction of the environment, and insufficiently considers the needs and expectations of various stakeholders in society. As an alternative to the traditional profit maximisation model of the firm, the stakeholder approach, which is the foundation of integrated reporting, considers how firms can create value concurrently for all stakeholders (Freeman et al., 2007) and how stakeholder relationships can support value creation (Myllykangas et al., 2010). Therefore, in this model, corporate value accrues not only to owners and investors but also to all stakeholders (Garcia-Castro & Aguilera, 2015). Thus, integrated reporting (IR) contributes to sustainable financial services through improved transparency, enhanced risk management, aligned investment strategies, incentivised sustainability performance, and the facilitation of stakeholder engagement (Pratama et al., 2019; Sciulli & Adhariani, 2023). In addition, the International Integrated Reporting Council (IIRC) argues that integrated reporting provides a more efficient and interconnected approach to corporate reporting that improves the quality of information available to financial capital providers (Cooray et al., 2020).

2.2 Literature Review

This section explores the relevant works on the linkages between integrated reporting and sustainable financial services provision. It includes financial intermediation, sustainable financial services, and integrated corporate reporting together with its theoretical underpinnings and culminates with the conceptual framework.

2.2.1 Theory of Financial Intermediation

The significance of the financial sector to the overall economic growth of a nation is well understood (Asafo-Adjei et al., 2021; Nguyen, 2022), especially through the intermediation channel. Hence, through effective financial intermediation, financial services can be supplied more broadly, efficiently, and effectively, thus accelerating economic growth by increasing the efficiency of resource allocation and improving the distribution of wealth (Nguyen, 2022). A growing body of evidence indicates that financial establishments and markets constantly exert powerful impacts on economic development, poverty alleviation, and the stability of economies around the world (World Bank, 2012; Mlachila et al., 2016; Sehrawat & Giri, 2016; Krishnan,

2011); hence, their significance in emerging market economies (EMEs) cannot be overestimated. Current financial intermediation theory is founded on the idea that financial intermediaries reduce transaction costs and ameliorate informational asymmetries (Scholtens & Van Wensveen, 2003). Principally, the existence of financial intermediaries is premised on the existence of the following grouping of factors: *high cost of transactions*, *lack of adequate and readily available complete information*, and *inadequate methods of regulation and institutional control* (Andrieş, 2009). Fundamentally, two frames of reference or perspectives have been used in understanding financial intermediation (Merton, 1995). One perspective, the institutional perspective, arguably takes as given the extant institutional structure of financial intermediaries and articulates the objective of public policy for enabling current institutions to survive and flourish. Alternatively, the functional perspective takes as given the economic tasks performed by financial intermediaries and asks what would be the best institutional arrangements for executing existing and emerging financial functions. The functional perspective itself rests on two basic tenets: first, ordinarily, financial functions are more stable than financial institutions over time and change less across geopolitical boundaries; second, rivalry causes changes in institutional arrangements to develop towards greater efficiency in the overall performance of the financial system (Crouhy et al., 2021; Grassi et al., 2022). Functional theories arguably focus on the economic functions of financial intermediaries: reducing information asymmetry, managing risk, and providing liquidity. Hence, they emphasise the role of financial intermediaries in facilitating economic growth and development by providing financial services that reduce the costs of financial transactions and hence allocating capital to their most productive uses. Thus, in line with functional orientation analysis, Allen and Santomero (1998) stress the role of financial intermediation in risk trading and participation costs. They argue that while there is a marked trend in the reduction of market frictions, financial intermediation still plays a role in transferring and managing financial risk and in lowering participation costs for both individuals and businesses (Lin et al., 2001). In contrast, institutional theories tend to emphasise the social and political institutions that shape the behaviour of financial intermediaries. They focus on the legal and regulatory frameworks that govern financial systems and the social norms and practices that influence financial intermediaries' behaviours. Hence, institutional theories view financial intermediaries as embedded within a broader social and political context that shapes their behaviour and incentives.

Arguably, modern theory of financial intermediation tends to focus primarily on the functions of financial intermediation; it emphasises how financial intermediation interacts with the economy as a whole as well as the impacts of government policies on financial intermediaries (Andrieş, 2009). The theoretical modules explaining the role of financial intermediaries within functional perspectives are based on doctrines underpinning the theory of financial intermediation. Basically, three lines of reasoning explain the *raison d'être* of financial intermediaries: the existence of *information problems*, *embedded transaction costs*, and *regulatory challenges* (Scholtens & van Wensveen, 2003). First, concerning information problems theory is the informational asymmetry argument. Information asymmetry can

be of an *ex ante* nature, producing adverse selection; it can also be *interim* in nature, leading to moral hazards; similarly, it can be *ex post* in nature, requiring auditing or costly state verification and enforcement. Informational asymmetry generates market imperfections that lead to certain forms of transaction costs. In this context, the function of financial intermediaries appears to at least partially overcome these costs (Gaffeo & Molinari, 2018). The second theoretical module is the transaction costs approach, which contrasts with information asymmetry theory; it does not contradict the assumption of complete markets. Instead, it is premised on nonconvexities in transaction technologies. Here, the financial intermediaries act as alliances of individual lenders or borrowers who exploit economies of scale or scope presented by the transaction technology to maximise their benefits (Molnár, 2018). In this context, the function of the financial intermediary is to change specific financial claims into other forms of claims referred to as qualitative asset alterations offering liquidity, solvency, and diversification opportunities. The third theoretical module assessing the *raison d'être* of financial intermediaries is premised on the control of money production and savings in funding the economy. Hence, financial regulation and control appear to affect solvency and liquidity within financial institutions (Molnár, 2018). Hence, by combining the functional and institutional perspectives of financial intermediation, we can gain a more comprehensive understanding of the role of financial intermediaries in the economy. Functional theories help in understanding the economic functions of financial intermediaries, while institutional theories help in understanding the broader social and political setting where they operate (Levine, 2005). Hence, an integrated approach to the study of financial intermediation is indispensable for obtaining a comprehensive understanding of the connections between financial infrastructure and economic development (Clark, 2017).

Financial establishments, as intermediaries between financiers and borrowers, collect savings and strive for their efficient allocation and usage among competing economic activities (Angadi, 2003). Such efficient financial intermediation positively affects economic growth and development. The ensuing higher level of economic growth, in turn, necessitates the establishment of sound and advanced financial institutions with horizontal or vertical integration, instruments, and markets. In addition, the smooth integration and development of financial architecture require an efficient superstructure that includes legal, accounting, and payment and settlement service systems (Angadi, 2003).

2.2.2 Integrated Financial Reporting

Business sustainability obliges business establishments to extend their missions to not only increase profits and create shareholder value but also generate shared value for all stakeholders (Rezaee, 2021). This conceptualisation questions the dominant way organisations currently think about profits, planet, people, charity, sustainability, development, and corporate reporting. The quality of information contained in annual reports often affects corporate accountability (Dewi et al., 2019) and expands

corporate transparency (Camilleri, 2019); hence, corporate reporting has recently evolved steadily towards different corporate reporting models, each aimed at providing more succinct and better information on transparency, accountability, and sustainability to investors' groups and other stakeholders. The latest development among the emerging corporate reporting models is the integrated reflecting the sustainable reporting (SR) model (Bernardi, 2020). Due to the complexity of the integrated reporting phenomenon, there is no distinct theory that fully explains either IR or SR; consequently, a number of theoretical perspectives have developed over the years for exploring this phenomenon. For example, Ioana and Adriana (2014) argue that there are three major theoretical circles that explain integrated reporting activities: (1) the stakeholder theory versus shareholder theory, (2) the new institutionalism and legitimacy theory, and (3) the innovation diffusion theory. Similarly, Sun et al. (2022) and Lakhani and Herbert (2022) offer a theoretical framework integrating five modules of mainstream organisational theories: institutional, agency, signalling, legitimacy, and stakeholder theories. Taken together, these theories tend to identify three drivers compelling corporations to adopt IR, namely, mitigation of information asymmetry; signalling superior quality, legitimacy, and conformity to all stakeholders' requirements; and finally, discharge of responsibility to all stakeholders (Sun et al., 2022). Hence, this study will adopt five theories of integrated reporting to explain the processes, mechanisms, and channels through which integrated reporting leads to sustainable financial services delivery. Arguably, integrated reporting contributes to sustainable financial services through a number of processes, including improving transparency, enhancing risk management, aligning investment strategies, incentivising sustainability performance, and facilitating stakeholder engagement (Van Zijl et al., 2017; IIRC, 2013).

2.2.3 Conceptual Framework

In integrated reporting, the IIRC has established a framework that outlines fundamental concepts and principle guidelines for integrated reporting (Adams, 2015). The framework underscores integrated reporting as providing a full view of a business' value creation processes over time supported by a clear articulation of the organisation's business model, risks, and opportunities, as well as stakeholder relationships. The theories of integrated reporting, including stakeholder, agency, signalling, legitimacy, and institutional theories (Menicucci & Paolucci, 2018; Lakhani & Herbert, 2022), provide an integrated understanding of integrated reporting and how its practices can lead to a sustainable financial services industry (Adhariani & De Villiers, 2019). These five disclosure theories at the macroperspective level can be classified into two groups: economic theories, which include agency and signalling theories, and sociopolitical theories, which include legitimacy, stakeholder, and institutional theories (Fernando & Lawrence, 2014). Taken together, these disclosure theories can facilitate the financial market in its role as a mechanism for efficient capital allocation (Menicucci & Paolucci, 2018). Arguably from signalling and information asymmetry theories, any development and improvement in

disclosures potentially reduces stock price uncertainty, reduces risk premiums, and upgrades a company's capacity to attract extra capital.

Hence, an integrated theoretical framework for understanding how integrated reporting supports the supply of sustainable financial services would feature the functionality of institutional, agency, signalling, legitimacy, and stakeholder theories. For example, in the case of stakeholder theory, businesses are responsible for considering the multiple interests of stakeholders, including investors, employees, customers, and communities at large (Freeman & Dmytriiev, 2017). Hence, by facilitating stakeholder engagement, incentivising sustainability performance, and incorporating ESG factors into reporting, IR recognises the importance of engaging with stakeholders and incorporating their perspectives into corporate reporting and decision-making. In addition, integrated reporting incentivises companies to improve their sustainability practices to meet stakeholder expectations, including those of financial service providers. Hence, through *facilitating stakeholder engagement* and *incentivising sustainability performance*, IR embeds trust, improves decision-making, and supports the development of sustainable financial services. This enables financial services firms to allocate capital to companies that prioritise *sustainable practices*, thus fostering the growth of sustainable financial services industries (Busch et al., 2021).

Moreover, agency theory highlights the resolution of potential conflicts of interest among shareholders and managers (Cuevas-Rodríguez et al., 2012). Hence, IR potentially bridges the implied information gap between investors and companies by providing a comprehensive overview of a company's sustainable practices. This practice improves risk management by reducing information asymmetry between shareholders and managers. Hence, through the provision of comprehensive information, including information on ESG risks and opportunities, integrated reporting helps in aligning the interests of shareholders and managers, thus mitigating sustainability-related risks (Boffo & Patalano, 2020).

Alternatively, signalling theory suggests that corporations use signals to convey insider information to external stakeholders, including financial service providers (Cuevas-Rodríguez et al., 2012). Thus, by adopting IR and disclosing relevant ESG information, companies can send signals that they prioritise sustainability and hence responsible business practices (Carnini-Pulino et al., 2022). Integrated reporting supports the alignment of investment strategies by serving as a signal to financial service providers. Companies that adopt integrated reporting and disclose relevant ESG information signal their commitments to sustainability. This allows financial services firms to *align their investment strategies* with investors' preferences for sustainable investments (De Lucia et al., 2020), which in turn supports the growth of the sustainable financial services industry.

Furthermore, both legitimacy and institutional theories emphasise the importance of organisations maintaining social legitimacy by adhering to societal expectations. Hence, through integrated reporting, companies can demonstrate their commitment to sustainable practices, contributing to their legitimacy (Silva, 2021). Financial services providers also play a crucial role in promoting sustainability by integrating ESG factors into their investment processes. Hence, by incorporating

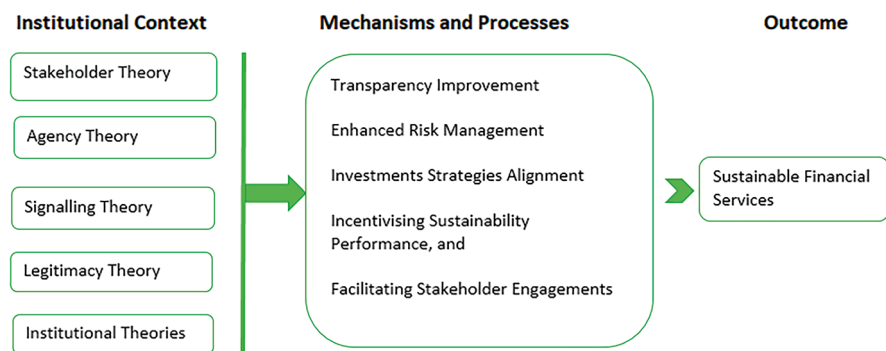


Fig. 1 Study's conceptual framework. Source: Author

information from IR, financial services firms can assess the sustainability performance of companies and include sustainable investments in their portfolios (Hu et al., 2020). Institutional theory arguably incorporates both legitimacy and stakeholder theories in understanding how organisations distinguish and address changing social and institutional forces and expectations for sustaining legitimacy (Benvenuto et al., 2023). It highlights how organisations conform to institutional norms and pressures. Consequently, financial services providers are influenced by these institutional pressures to incorporate sustainability criteria into their investment decisions. Hence, integrated reporting offers the necessary information for financial services firms to identify companies with strong sustainability practices and incorporate them into their investment strategies. Thus, *transparency enhancement* through integrated reporting aligns with legitimacy and institutional theories by helping companies maintain social legitimacy and meet societal expectations. Furthermore, it helps companies respond to institutional theory by conforming to emerging reporting norms and institutional pressures for increased transparency.

Overall, these theories jointly explain how integrated reporting leads to the advancement of a sustainable financial services industry through the facilitation of stakeholder engagement, the alignment of stakeholders' interests, the provision of signals of sustainability commitment, the enhancement of legitimacy, and the response to institutional pressures for sustainability; see Fig. 1 for the conceptual framework of this study.

2.3 Methodology

This chapter is underpinned by an analytical research strategy, aiming to achieve analytical generalizability (Smith, 2018) by reflecting on connections between IR and sustainable financial services in emerging economies. Arguably, the proposed study's approach supports these two goals, which include first descriptively exploring the influence of IR as a mechanism for entrenching corporate transparency,

accountability, objectivity, and responsibility in the financial system. Second, the chapter proposes in determining the key mechanisms and processes through which integrated reporting leads to the support and maintenance of a sustainable financial service industry.

Since the goal is to discover and capture a deeper comprehension and clarity of requisite public policy strategies for businesses and institutions in developing economies for supporting sustainable financial services, a constructive conceptual analysis matching the qualitative research approach is arguably sufficient (Baldwin & Rose, 2009). In addition, since the study aims to determine a suitable framework for supporting the delivery of sustainable financial services, a theoretical sampling strategy is considered adequate. Theoretical sampling is a variant of purposive sampling associated with grounded theory tradition based on analytic induction (Emmel, 2013). As a sampling strategy, it is a procedure of data gathering for producing theory whereby the researcher simultaneously collects, codes, and interprets data and decides what data to collect next and where to find them to support an emerging theory (Glaser & Strauss, 2017; Guetterman, 2015). In addition, because the researcher's intention was not to generalise from the sample to a population but rather to explain, describe, and interpret the collected information (Maxwell, 2013; Miles et al., 2014) on the phenomenon, this sampling strategy was sufficient. Consequently, the qualitative sampling strategy adopted did not aim for opinion representation but rather for information richness, appropriateness, and adequacy (Guetterman, 2015).

Knafl and Howard (1984) discuss four aims of qualitative research: instrumentation, results illustration, case description, and study conceptualisation. Similarly, Maxwell (2008) outlines five intellectual goals for which qualitative studies appear suitable. These include understanding the interpretation participants attach to a particular phenomenon, understanding the context within which participants act, exploring unforeseen phenomena and deriving new "grounded" theories about it, understanding the mechanisms through which actions and events occur, and hence developing causal explanations. While quantitative research involves describing current conditions, investigating relationships, and studying cause-effect relationships, qualitative research, in contrast, promotes a deep understanding of social settings viewed from the perspective of research participants. This implies an emphasis on exploration, discovery, and description (Bloomberg, 2022). Hence, from a realist research perspective, developing causal explanations requires thinking of causality in terms of processes and mechanisms rather than simply demonstrating regular, variance-oriented interpretations of causality in relationships between variables (Maxwell, 2004, 2013; Haverland & Blatter, 2012). According to Glaser and Laudel (2019), causal channels are a sequence of causally connected actions that occur repeatedly in reality and are subject to certain conditions linking specified initial conditions to a certain outcome.

The chapter therefore adopts a realist research orientation using mainly an analytical research strategy with secondary documentary evidence in exploring the connections between integrated reporting and sustainable financial services in developing countries aimed at determining suitable strategies for implementation.

Hence, by employing scholarly databases such as ABI Information Complete (ProQuest), Business Source Complete (EBSCO), Scopus and other related sources, resources on sustainable financial services were downloaded, and the three terminologies of integrated reporting, sustainable financial services, and emerging market economies were comprehensively analysed, compared, and interpreted.

2.4 Findings and Recommendations

The study revealed that a number of mechanisms can be used to understand and therefore process how IR may support the evolution of financial services industries to deliver sustainable financial services. These mechanisms and processes, as already alluded to above, include enhanced risk management, improved transparency, alignment of investment strategies, incentivising sustainability performance, and facilitating stakeholder engagement.

2.4.1 Enhanced Risk Management

One of the channels through which integrated reporting supports the provision of sustainable financial services is through enhanced risk management tools for facilitating the identification, measurement, mitigation, and reporting of risk management activities (García-Benau et al., 2021). Hence, from agency and new institutionalism theoretical perspectives, IR helps institutions identify and manage sustainability-related risks and opportunities. Through risk management, organisations reduce potential financial risks and improve long-term financial performance, thus supporting investors in making informed decisions about the risks associated with their investments. According to Allen and Santomero (1998), the functional perspective for understanding financial systems emphasises the function of financial intermediation in risk trading and contractual cost management. Proponents argue that while the function of financial intermediation in reducing market frictions seems to be declining at present, financial intermediation still plays a role in transferring and managing risks and thereby lowering contractual costs for both individuals and businesses (Lin et al., 2001). For example, Krause and Tse (2016) posit that by using satisfactory hedging instruments, firms execute active hedging strategies for maximising firm value but are not compelled to hedge 100% of every firm's exposure. Given the inherent risks in domestic and international banking, there is a need for banking institutions to allocate significant attention to supervisory standards that enable banks, depositors, and investors to protect themselves from risks, which arguably is an integral element of the banking business (Županović, 2014).

2.4.2 Improved Transparency

Investment decision-making presupposes the availability of comprehensive information regarding investment options and risks, necessitating that investors obtain complete and better information. Recently, due to institutional pressure for transparency and accountability, the proportion of businesses reporting nonfinancial information has been growing to fill this gap (Aluchna et al., 2022). In this scenario, integrated reporting has emerged to support investors and other stakeholders with a more inclusive and transparent view of a company's ESG performance, strategy, and risks (Sofian & Dumitru, 2017). Based on institutional legitimacy and stakeholder theories, nonfinancial reporting (NFR) in terms of ESG is viewed as a major step for realising organisational transparency and accountability (Aluchna et al., 2022). According to the IIRC, the integrated reporting framework leads to an expanded explanation of organisational performance and therefore improved transparency in comparison to traditional corporate reporting by describing, and gauging where feasible, the material elements and sources of value creation and their relationships (Quattrone et al., 2013). The IIRC demonstrated that after the 2008 global financial meltdown, investors lost their confidence in traditional reporting and began analysing the linkages between financial performance and sustainable development (Sofian & Dumitru, 2017). For example, according to Chenari and Banimahd (2019), corporate sustainability has evolved from an emphasis on corporate social responsibility (CSR) to a focus on environmental, social, and governance (ESG) performance, underlining sustainability initiatives that drive both revenue growth and high-quality financial performance under IR. This increased transparency under the IR supports investors in making more informed decisions regarding the sustainability of their investments and encourages companies to improve their sustainability performance, which is needed for the provision of sustainable financial services.

2.4.3 Alignment of Investment Strategies

Market participants, including companies, investors, capital markets, and the wider economy, are dependent upon the delivery of high-quality information. The delivery of high-quality value-relevant information from corporations ensures efficient and effective allocation of resources, supports an enabling climate for investments, and facilitates transparent, ethical, and sustainable business practices (Zhou et al., 2017). Hence, associated with full disclosure requirements, IR suggests that markets receive adequate information; investors are able to forecast market outcomes more perfectly and hence arrive at more accurate business valuations (Slack & Campbell, 2016). Integrated reporting supports the alignment of organisational investment strategies with sustainability objectives by providing investors with information on a company's sustainability performance and goals (Eccles & Krzus, 2010). This helps in directing investments towards companies that are making positive impacts on sustainability. In terms of agency theory, the separation of ownership and management in publicly listed companies precipitates information asymmetries between

managers and owners because managers generally have superior information on the firm's current and future performance in comparison to outside investors (Alves et al., 2015). The disclosure literature suggests that high-quality public disclosures of both financial and nonfinancial information reduce information asymmetry, resulting in increased stock market liquidity and efficiency by countering moral hazard and adverse selection. In pursuit of sustainable financial services, regulators and other market constituents activate a number of mandatory and voluntary strategies for helping investors align their investments with sustainability goals (Verougstraete et al., 2022). These strategies include setting definitions, taxonomies, standards, ratings, and verification procedures. These strategies aim to ensure that sustainable investment products and accompanying strategies do not misinform investors and achieve desired market impacts.

2.4.4 Incentivising Sustainability Performance

To maintain legitimacy, organisations seek compliance and application of the desired corporate reporting practices, such as integrated reporting. In this manner, organisations strive to convince stakeholders that they are maintaining good corporate reporting practices. Integrated reporting has emerged as a tool for communicating organisations' legitimate actions and activities (Velte & Stawinoga, 2017), and as a reporting strategy, it is recognised as an instrument for managing corporate legitimacy (Lai et al., 2016). In addition, when organisations adopt IR, they are certainly following the International Integrated Reporting Framework (IIRF), which provides a passive path for institutional legitimisation (Camilleri, 2019). Initially, developed for explaining information asymmetry in the labour market (Spence, 1973), signalling theory is also useful for explaining the voluntary disclosure embedded in corporate reporting (Ross, 1977). Integrated reporting is useful for signalling specific information to stakeholders, thus serving as an effective signalling instrument for decreasing information asymmetry (Abeywardana et al., 2021). Hence, using both institutional legitimacy and signalling theories, integrated reporting creates incentives for businesses to improve their sustainability performance by providing recognition and visibility for companies that are leading in sustainability practices. This can be instrumental in attracting investment from investors who prioritise sustainability, hence lowering the cost of capital, improving capital market efficiency, and hence driving sustainable financial services.

2.4.5 Facilitating Stakeholder Engagement

Primarily, an integrated report strives to clarify to providers of financial capital the processes an organisation uses to create, preserve, or erode value over time. Hence, an integrated report offers a vision regarding the nature and quality of the organisation's interactions with its stakeholders, as well as how and in what ways the organisation understands, takes into account, and responds to its genuine requirements

and interests (Tweedie, 2022). Waddock (2002) argues that there are three levels of stakeholder involvement within organisations. The first is stakeholder mapping, in which the company maps its stakeholders to distinguish between primary and secondary stakeholders. Second, stakeholder management, which depicts the company's efforts to manage stakeholder prospects and balance diverse positions, and stakeholder engagement, which involves the company's engagement with its stakeholders in decision-making processes, share information, establish discourses, and create mutual responsibility models (Manetti, 2011; Rinaldi, 2013). Arguably, a high-level responsibility concerning stakeholders is achievable if an organisation is inclined to engage with stakeholders (Silvestri et al., 2017). Hence, using stakeholder and legitimacy theories as explanatory mechanisms, integrated reporting facilitates engagement with stakeholders, including investors, customers, employees, and communities (Sun et al., 2022). This supports companies in better understanding stakeholder needs and expectations, which informs their sustainability strategies and therefore builds trust with stakeholders, leading to sustainable financial services.

2.4.6 A Framework for a Sustainable Financial Services Industry

In response to the second research objective, leveraging knowledge of processes and mechanisms associated with integrated reporting (IR), an interventional programme or framework for realising a sustainable financial services industry requires enhancing transparency, improving risk management, aligning investment strategies, incentivising sustainability performance, and facilitating stakeholder engagement (Van Zijl et al., 2017; Stubbs & Higgins, 2014).

The transparency enhancement mechanism requires the development of guidelines and standards for companies to adopt integrated reporting practices, the provision of training and support to businesses on integrated reporting practices, and the inspiration of regulatory bodies and stock exchanges to mandate integrated reporting (Quattrone et al., 2013). The risk management improvement process requires the establishment of frameworks and tools for assessing and integrating ESG risks and opportunities into investment decision-making, training and capacity-building programs for financial services professionals, and collaboration with industry associations and regulatory bodies (Krause & Tse, 2016). The alignment of investment strategies requires the development of sustainability investment frameworks and the provision of indices that incorporate ESG considerations, the education of investors and financial advisors about the benefits and importance of sustainable investments, and the facilitation of information sharing platforms that provide access to companies' integrated reports (Eccles & Krzus, 2010). Incentivising sustainability performance mechanisms would require the introduction of sustainability-related incentives, such as tax benefits, grants, or subsidies, collaboration with rating agencies to develop comprehensive sustainability ratings and rankings, and engagement with organised investors and asset managers to incorporate sustainability metrics and targets (Velte & Stawinoga, 2017). Finally, stakeholder engagement facilitation

requires the establishment of platforms for stakeholder dialogue and collaboration among companies, investors, regulators, and civil society organisations, the encouragement of companies to involve stakeholders in the development and review of their integrated reports (Sun et al., 2022), and the support of initiatives that promote investor stewardship and engagement in sustainability practices.

Overall, the proposed sustainable financial services intervention programme focuses on creating an enabling financial environment through the establishment of policy frameworks, capacity building, awareness campaigns, and collaborative platforms. Hence, in addressing barriers to the adoption of sustainable financial services, the framework should provide not only resources and tools but also incentives for companies and financial services providers to embrace sustainable financial practices.

2.5 Recommendations

In view of the knowledge of the mechanisms and processes through which integrated reporting leads to sustainable finance services, which includes enhancing transparency, improving risk management, aligning investment strategies, incentivising sustainability performance, and facilitating stakeholder engagement (Van Zijl et al., 2017; Stubbs & Higgins, 2014), the following recommendations may be adopted to improve the financial services industry:

1. Embracing integrated reporting practices by encouraging businesses in the financial services industry to adopt IR as a comprehensive reporting framework that integrates ESG factors into financial reporting.
2. Transparency can be enhanced by encouraging financial institutions to report their sustainability, which simultaneously includes financial and nonfinancial performance, together with their ESG risk management practices and consequent impacts on stakeholders.
3. ESG should be integrated into risk management practices by developing tools and methodologies for assessing and managing ESG risks as well as mechanisms for integrating them into financial services operations and investment decisions.
4. Embrace a greater alignment of investment strategies with sustainability through the integration of ESG factors into investment strategies across the financial services industry, the development and adoption of sustainable investment products and services, and knowledge sharing and capacity building on sustainable investment practices.
5. Incentivising sustainability performance by embedding incentive mechanisms, such as tax incentives or subsidies, rewards financial institutions that prioritise sustainability and encourages the use of sustainability-linked financial products and instruments for aligning financial returns with sustainability performance.

6. Stakeholder engagement can be nurtured by inspiring the establishment of platforms and initiatives that facilitate dialogue and collaboration among stakeholders aimed at promoting responsible and sustainable financial services practices.
7. Encouraging collaboration and instituting industry standards that promote collaboration among financial institutions, regulatory bodies, industry associations, and standard-setting organisations in developing common frameworks, guidelines, and standards for embracing sustainable finance.
8. Regulatory frameworks should be strengthened by advocating for the development and enforcement of regulations that require financial establishments to integrate sustainability considerations into their operations and investment practices.

Hence, it is envisaged that by implementing these recommendations, the financial services industry can achieve enhanced transparency, risk management practices, alignment with sustainability goals, stakeholder engagement, and overall support for sustainable development. Arguably, these activities have the potential to initiate and accelerate the change towards a more sustainable and responsible financial services sector.

2.6 Future Direction of Research

This study was primarily based on a descriptive exploration and assessment of the mechanisms through which integrated reporting can facilitate the shift to a more sustainable post-COVID-19 financial services sector in emerging economies. Consequently, an archival research strategy was adopted to achieve an analytical generalizability that reflects the extant connections among integrated reporting and the inclusive sustainable financial services industry. Using this research strategy, the investigation identifies enhanced risk management, improved transparency, alignment of investment strategies, incentivising sustainability performance, and facilitating stakeholder engagement as mechanisms by which integrated reporting potentially links with sustainable financial services. However, further investigation using empirical data across a number of emerging economies is still needed to determine which of these five transmission mechanisms and processes offers superior policy intervention and hence leads to the economic use of resources.

Similarly, this study addresses the issue of achieving sustainable financial services from an integrated reporting perspective. Arguably, while integrated reporting provides a comprehensive approach for achieving sustainable financial systems, there are alternatives such as impact investing, green bonds and sustainable finance instruments, sustainability reporting, ESG integration, ESG ratings and indices, stewardship, and engagement, which can be used as standalone or combined strategies. Evidently, more research is still required to provide businesses and regulators with more clear-cut interventions.

3 Conclusion

This chapter aimed to descriptively identify and analyse key mechanisms and processes through which integrated reporting leads to sustainable financial services as a basis for establishing a suitable framework for implementing a sustainable financial services industry and thus contributing to the continuing demands for financial inclusivity and economic growth in emerging economies. Consequently, this study used an analytical research approach aimed at realising analytical generalisability by reflecting on connections among integrated reporting and sustainable financial services in emerging economies. The study revealed that a number of mechanisms can be used to understand and therefore process how IR may support the evolution of financial services industries to deliver sustainable financial services. These mechanisms and processes, as already alluded to above, include enhanced risk management, improved transparency, alignment of investment strategies, incentivising sustainability performance, and facilitating stakeholder engagement.

The transparency enhancement mechanism requires the development of guidelines and standards for companies to adopt integrated reporting practices, the provision of training and support to businesses on integrated reporting practices, and the use of inspiring regulatory bodies and stock exchanges to mandate integrated reporting. Similarly, the risk management improvement process requires the establishment of frameworks and tools for assessing and integrating ESG risks and opportunities into investment decision-making, training and capacity-building programs for financial services professionals, and collaboration with industry associations and regulatory bodies. Additionally, the alignment of investment strategies requires the development of sustainability investment frameworks and indices that incorporate ESG considerations, the education of investors and financial advisors about the benefits and importance of sustainable investments, and the facilitation of information sharing platforms that provide access to companies' integrated reports. Incentivising sustainability performance mechanisms would require the introduction of sustainability-related incentives, such as tax benefits, grants, or subsidies, collaboration with rating agencies to develop comprehensive sustainability ratings and rankings, and engagement with organised investor groups and asset managers to incorporate sustainability metrics and targets. Finally, stakeholder engagement facilitation requires the establishment of platforms for stakeholder dialogue and collaboration among companies, investors, regulators, and civil society organisations, the encouragement of companies to involve stakeholders in the development and review of their integrated reports, and support of initiatives that promote investor stewardship and engagement for sustainability practices.

Hence, it is envisaged that by implementing the study recommendations, the financial services industry can achieve enhanced transparency, enhanced risk management practices, alignment with sustainability goals, stakeholder engagement, and overall support for sustainable development. Arguably, these activities have the potential to initiate and accelerate the change needed for a more sustainable and responsible financial services sector.

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Lessons from Technology Infusion in Accounting During COVID-19 in the African Context



Varaidzo Denhere and Herrison Matsongoni

Abstract The coronavirus disease (COVID-19) pandemic has altered the status quo of every aspect of life globally. Its most impactful effect was the drastic acceleration of the adoption of emerging technologies by most economic sectors globally, with businesses moving online. This drastic shift also affected the accountancy profession globally. However, accounting firms in the majority of African economies have always lagged behind in terms of adopting digital technologies for various reasons. The pandemic introduced a new normal that saw a transformation of the way accountants conducted their work after adopting technology. The new status quo was a unique global experience that warranted new research to be conducted to identify lessons from the accelerated infusion of technology in accounting practices during the pandemic crisis. Therefore, this chapter sought to present key lessons drawn from the infusion of accounting technology during the COVID-19 pandemic from the African context. This study contributes to the scarce literature on the impact of technology adoption by accountants during a pandemic crisis. A critical review complemented with content analysis was employed to achieve the study goal. The study identified three categories of lessons, namely, tactics that worked for accountants in coping with the pandemic, opportunities arising from technology infusion in accounting, and wider ramifications for the future of accounting. The study concluded that the accountancy profession in Africa benefited more from the COVID-19 global crisis, as it always lagged behind the profession in developed economies in terms of adopting technology for practice. Furthermore, the silver

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lining of the accelerated adoption of technology in the accountancy profession in Africa not only provided opportunities but also underscored wider ramifications for the future of the accountancy profession on the African continent. This would speed up the changing of roles of accountants from mere generators of passive information only to having an additional aspect of the control function of management, as repetitive accounting tasks would be automated, thereby freeing more time to accountants for management tasks.

Keywords Accounting · African context · Cloud accounting · COVID-19 pandemic · Digital skills · Digital transformation framework · Emerging digital technologies · Lessons · New normal · Technology adoption · Technology infusion · Accountant skillset · Remote working · Countrywide lockdowns · Offline business · Skills modification · Financial accounts · Management accountants · Accounting firms · Digitalisation · Digital strategy

1 Introduction

COVID-19 has created an imbalance in the status quo of every aspect of life globally and ushered in a new normal. It has decimated people's livelihoods and changed ways of conducting business (World Health Organisation, 2020). The unparalleled and devastating pandemic accelerated the adoption of emerging technologies by business organisations and academic institutions as well as individuals in their daily lives (De' et al., 2020). McKinsey and Company (2020, p. 1) also indicated "In just a few months' time, the COVID-19 crisis had brought about years of change in the way companies in all sectors and regions do business". This transformed the traditional offline businesses and operations to online platforms mainly due to imposed COVID-19 restrictions, including social distancing and recursive countrywide lockdowns across the globe (Mhlanga et al., 2022). Furthermore, in global surveys of executives conducted by KPMG (2020) and McKinsey and Company (2020), executives indicated that the pandemic caused their companies to accelerate digitalisation of their business operations by 3–4 years, consequently resulting in a large increase.

The lockdowns involved partial and complete shutting down of all activities that required human physical interactions and gatherings (Harangi-Rákos et al., 2022). Consequently, shutting down increased the use of digital technologies, together with usage patterns (De' et al., 2020). Employees had to adjust to the new normal coupled with new working patterns. These changes were sudden, and business organisations had limited time to adapt and adjust to the drastic shift by integrating emerging digital technologies into business operations (Leoni et al., 2022; De' et al., 2020).

Accounting services are crucial for any business. Despite all the changes spawned by the pandemic, accountants needed to continue preparing accounts and reports for internal and external information for various businesses. This also meant that they had to adopt the available technologies relevant for their work to be able to continue operating in the new normal. However, Drew (2020) highlighted that some accounting firms had been resisting the shift of any of their critical data and information and technology (IT) systems to the cloud for years, and they also did not support all their employees in working remotely at the same time prior to COVID-19. Unfortunately, at the dawn of COVID-19, they had to determine how to work remotely all of a sudden. This meant that accounting firms that used to resist technology needed to adopt it urgently.

All these abrupt changes saw a substantial impact of technology on the accounting field since the digitalisation of business operations accelerated by 3–4 years (McKinsey & Company, 2020; KPMG, 2020). The extant literature shows that prior to COVID-19, emerging technologies were already transforming the daily work of accountants, thereby impacting the professional life of millions of accountants globally (Kroon et al., 2021). However, with the challenges accountants faced in the new normal, they were compelled to quickly embrace emerging technologies to enable them to continue operating. This required the integration of technology with their work. Against this backdrop, this chapter sought to identify lessons drawn from the infusion of emerging technologies in accounting during the pandemic in an African context.

Some research has been conducted on the adoption of emerging technologies by accountants before (Kroon et al., 2021), but the COVID-19 pandemic was a new and unique global historic experience; hence, new research had to be conducted to identify lessons from the infusion of technology in accounting during a crisis such as this pandemic. This study contributes to the existing body of knowledge regarding technology infusion in accounting during a crisis in the African context. The study also underscores the silver lining within the crisis, that is, the acceleration of the adoption of emerging technologies by African accountants. According to this study, the accountancy profession should appreciate the need to revisit the skills set of accountants to suit the new normal. The accelerated use of technology during COVID-19 required accountants to acquire technological skills and other relevant soft skills. The study also provides guidance to accounting firms' leaders in applying digital transformation frameworks for the formulation of their digital transformation strategies.

The rest of the chapter is arranged in the following sections: Methods and Materials, Distribution of Accountancy Professions in Africa, Roles and Responsibilities of Accountants, Impact of COVID-19 on the Accounting Profession in the African Context, Emerging Technologies Used During the COVID-19 Period by Accountants, Digital Transformation Frameworks, Lessons from Technology Infusion in Accounting During COVID-19, and Conclusion.

2 Methods and Materials

This study conducted a critical review on the impact of the COVID-19 pandemic on the accountancy profession, the roles and responsibilities of accountants, digital transformation networks, and digital technologies adopted by accountants in the African context during the COVID-19 pandemic. According to Paré et al. (2015), critical review provides a critical evaluation and interpretive analysis of literature on a particular topic of interest to show, among other things, issues regarding results and can apply various analysis methods such as content analysis and critical interpretive synthesis. For this study, the critical review was complemented with qualitative content analysis. Shava et al. (2021, p. 554) defined qualitative content analysis as “a research method for the subjective interpretation of the content of data through the systematic classification process of coding and identifying themes or patterns”. This methodological approach focuses on the study of content relating to meanings, contexts, and intents embedded in messages and may be effectively employed in data such as text, visual, and audio (Mhlanga et al., 2022). It is from the critical review and content analysis that lessons from the infusion of accounting technology during the COVID-19 pandemic in the African context were derived.

The review used four basic steps, namely, framing the research question and the search criteria for articles to be reviewed, searching for relevant articles using the search criteria, assessing the articles for relevance to the study in line with the inclusion and exclusion criteria, and summarising the outcomes from the review and interpreting the findings.

The Research Question How did the infusion of technology in accounting during the COVID-19 pandemic impact the accountancy profession in Africa, and what lessons were learnt from this?

Identifying Relevant Literature This was achieved by analysing existing data from the Scopus database. Scopus is known as the largest abstract and citation database that indexes a large number of high-quality journals across various disciplines. The search period covered 2020 because COVID-19 began in 2020. Figure 1 summarises the literature review process undertaken.

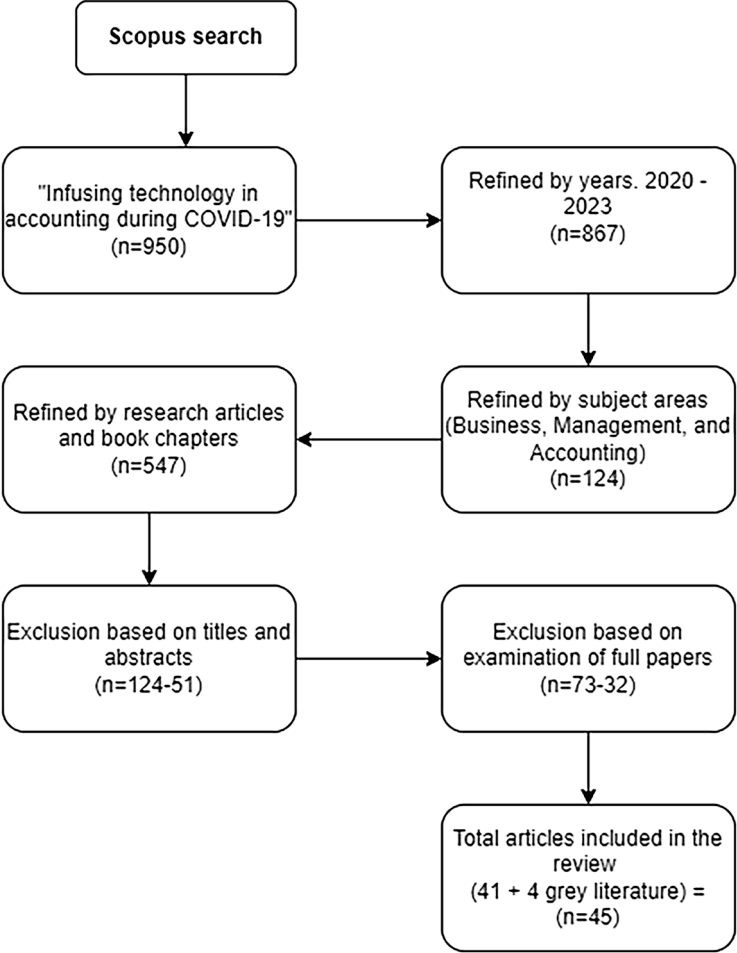


Fig. 1 Literature review process. Source: Authors’ compilation

3 Literature Review

This section reviews the literature on the distribution of the accountancy profession in Africa, the roles and responsibilities of accountants, the impact of COVID-19 on the accountancy profession in Africa, emerging technologies deployed during the COVID-19 period by accountants in the African context, and digital transformation frameworks.

3.1 The Distribution of Accountancy Professions in Africa

In Africa, professional accountants make up 0.012% of the continent's population. Consistent with past IFAC's (International Federation of Accountants) reports, there is a correlation between gross domestic product (GDP) growth and the number of professional accountants in each of the five African regions (ACCA, 2022). The correlation between GDP growth and the concentration of professional accountants in a region emanates from the significant contribution of accountancy professionals to economic development at all levels locally, nationally, and globally. A higher concentration of professional accountants has a positive correlation with the growth in GDP. However, according to the statistics given by ACCA (2022), this applies to the rest of the African regions (Central Africa, Northern Africa, Western Africa, and East Africa and the Horn), except for Southern Africa, which has a relatively higher concentration of professional accountants but surprisingly has the lowest GDP growth. This could also be due to the impact of COVID-19 lockdowns, which are more severe in Southern Africa (Teachout & Zipfel, 2020).

3.2 Roles and Responsibilities of Accountants

Extant literature acknowledges that the role of accounting departments varies from one business organisation to another. However, in any business organisation, accountants are privileged to hold critical information regarding economic and financial situations, which enables them to take part in improving economic activity by predicting problems and creating value (Robalo & Costa, 2017). The extant literature acknowledges an ongoing shift in the role of accountants from being generators of passive information only to having an additional aspect of the control function of management. This additional function, among other things, requires them to make decisions, hence working as agents of organisational change (Robalo & Costa, 2017; Mujiono, 2021).

Generally, accountants further the financial health and prospects of any business organisation. Accountants also ensure that all documents and statements generated by a business organisation are accurate. The accountants' tasks range from day-to-day handling of accounts and operations to advising management and the board. Basically, accountants are responsible for accurate, up-to-date, and consistent financial details that are necessary for all business actions and activities. The roles of accountants are listed in Table 1.

Table 1 The roles of accountants

Roles of financial accountants	Roles of management accountants
Monthly financial reporting	Analysing budgetary deviations
Accounting classification and recording of transactions, balances, and documents	Applying routine control management practices
Advising the board in terms of the financial impact of strategic decisions under analysis	Analysing resources and attainment of targets and set objectives
Availing accounts information to the management accounting department and to the board	Redefining sales prices in collaboration with senior management and the sales department
Preparing internal and external financial reports	Providing information determinant for taking decisions
Producing standardised accounting and tax information	Defining new production strategies in collaboration with the board
Control of compliance with statutory requirements	Producing, analysing, and discussing financial information availed by the financial accounting department
Analysing and managing periodical cash movements	

Source: Adopted from Robalo and Costa (2017)

3.3 *Impact of COVID-19 on Accounting Professions in the African Context*

Like employees in any other sector, accountants had to work remotely, which shifted their focus towards crisis management (Hossain, 2021; BDO, 2020). The fundamental challenges for remote work identified by Mutlu and Açıkgöz (2022) were interference when working from home, procrastination, loneliness, and ineffective communication, which were affected by virtual work characteristics, namely, job autonomy, workload, monitoring, and social support. These virtual work features had an impact on employees’ well-being and performance. The major challenges that accountants faced during this period were a greater workload, greater volumes of emails, increased numbers of meetings, seclusion from team members, blind spot communication with clients, more stress, and obliviousness of what other team members were working on (KARBON, 2020). The other challenge was time-constrained decision-making. This was because the collection of information, especially from clients that had to be used in decision making, had become marred by efficiency problems during the COVID-19 period. Moreover, the business environment created by COVID-19 required frequent decision-making by accountants, a situation in which accountants made decisions without due consideration of risk and ethical issues due to challenges in the collection of information (Hossain, 2021; Pickard, 2020).

Another issue that required attention from accountants was reporting according to accounting standards. The new normal also meant that accountants had to change

the way they considered those standards in treating, for example, impairment, valuation of inventories, provision of expected credit loss, measuring fair value, going concern, conditions of breach of contract, and tax issues. According to Zulu and Kabwe (2023, p. 1706), “challenges that were faced by accountants in Zambia include shift in work culture; inventory valuation, remote working; poor IT knowledge; cyber security concerns; job security; inventory valuation problems; and difficulties in financial and sustainability reporting”. However, the major impacts on accountants’ work were alternative performance measures, technological evolution, and modification of their skills (Hossain, 2021). ACCA (2022) also highlighted that skills shortages are major challenges for the accountancy profession, a situation that worsened during the pandemic. According to Nzorubara (2023), the accelerated use of technology by accountants underscores the need to revisit the skills set of accountants to suit the digital technology era. This has implications for the reskilling and upskilling of accountants in Africa, unlike their counterparts in developed economies. Nzorubara (2023) further argued that despite recent progress in the use of technology by accountants in general, COVID-19 widened the global digital divide.

3.4 Emerging Technologies Used During the COVID-19 Period by Accountants in Africa

With little or no warning of the transition from physical to remote operations, technology enabled many businesses to continue operating (Marcello, 2023). Accounting firms had to decide on technologies to use for communication internally and with clients, remote collaboration, integration across multiple systems, and visibility across work and tasks (Marcello, 2023). A survey was conducted in June 2020 to establish how accounting firms worldwide had adapted to COVID-19 (KARBON, 2020). From this survey, the respondents indicated the major technological tools used for communication within individual firms and with their clients. The major tools used for communication within the firms included email, phone, Karbon, Zoom, Microsoft Teams, Slack, Google Hangouts, GoToMeeting, and Webex. For communication with clients, respondents indicated that they were using email, Phone, Zoom, Karbon Client Tasks, Microsoft Teams, Sharefile, Google Hangouts, Slack, and GoToMeeting.

However, in addition to communication purposes, accountants also used technologies for remote collaboration, integration across multiple systems, and visibility across work and tasks during the pandemic. According to Epstein (2023), a 2020 Finance Online Review for Business’ report revealed that 83% of accounting professionals believed that they needed to keep abreast of technology adoption to be competitive. They therefore invested in the following emerging technologies to infuse them into their accounting services: cloud computing, 5G, advanced and predictive analytics, robotic process automation, artificial intelligence, the Internet of Things, human augmentation, natural language processing, and blockchain. These

technologies provided various tools that were used by accounting professionals during the COVID-19 period.

3.4.1 Cloud Computing

During the COVID-19 pandemic, accounting firms have increased their need to adopt cloud computing, an information technology that promotes collaboration, cost efficiency, availability, and flexibility while minimising environmental impact (Hasnawati et al., 2021). Cloud accounting is a variant of this technology that also has numerous benefits. The cloud enabled communication across remote teams as well as convenient and secure data management for accounting firms. Furthermore, both accounting and financial reporting can be performed using various cloud-based accounting tools. According to Wright (2020), cloud accounting software is easily integrated with numerous business applications, including point-of-sale software, inventory management, payment management, receipt management, and document collection and management. Some of the benefits of cloud accounting technology include easy invoicing, accessibility anywhere and anytime, keeping track of cash flow, online filing, and digital submissions of VAT returns. Hasnawati et al. (2021) posited that cloud accounting technology also enables the building, reconfiguration, and integration of internal and external competencies to cope with an inconstant environment.

However, the major challenge with cloud accounting is cybersecurity threats. The cloud is vulnerable to this threat due to its numerous contact points. It has been observed that rushing through cloud migration without proper and adequate training for protocols and procedures increases the exposure of networks to possible cybersecurity (Marcello, 2023).

Other technologies that were also adopted by the accounting profession during the COVID-19 pandemic are summarised in Table 2.

3.5 Digital Transformation Frameworks

The term digital transformation lacks a unified definition and is also known as digitalisation. It is defined by Liu et al. (2011, p. 1728) as “the integration of digital technologies into business processes”. The term is also defined by Nadkarni and Prügl (2021, p. 234) as “concerned with the changes digital technologies can bring about in a company’s business model, products or organisational structures”. Digital transformation ultimately leads to organisational change as a result of the infusion of technologies into business processes. According to Simplilearn (2023), digital transformation employs the latest technologies to revamp existing processes and deliver improved products and services, thus creating value in the business and delivering value to clients. It shifts the business culture.

Table 2 Other technologies adopted during the pandemic

Technology	Description
5G Accounting	Provided speedy, affordable, and secure online accounting services. It also allowed access to QuickBooks and all accounting data anywhere and at any time with continuous backup as well as an integrated disaster recovery plan during the pandemic (Hassan, 2021).
Advanced and Predictive Analytics	This was used to enable accounting firms to forecast future financial performance as well as to identify potential risks and opportunities.
Robotic Process Automation (RPA)	This is labelled the topmost used digital transformation tool in accounting. It was used to automate repetitive, mundane, and time-consuming tasks. The software bots were used to run reports, data entry and extraction, bank reconciliations, and many other administrative tasks.
Artificial Intelligence (AI)	AI tools enabled quick data analysis making AI effective for predicting and identifying trends. It assisted accounting firms to efficiently manage financial data by analysing transactions, cash flow, budget, and accounting data to identify trends, suspicious or unusual patterns, and areas of improvement. Cognitive AI was also used in accounting practices that involved the reading of documents.
Internet of Things (IoT)	Integration of IoT enabled the management of accounting firms from a distance. The use of IoT tools helped improve the management of human resources as they were working remotely, assets, and risks, as well as enabling better forecast of future performance for better decisions.
Natural Language Processing (NLP)	This was used to automatically extract financial data from balance sheets, income statements, and cash flow statements, thereby cutting down on time and reducing error. Furthermore, NLP could also pick up insights from financial reports and enormous financial data sets. This improved efficiency for accounting firms during the pandemic.
Mobile Technology	This involved the use of portable smart devices such as tablets and smartphones. It facilitated communication and collaboration among team members as they could access and share information while on the go during the crisis.
Blockchain	During the pandemic, blockchain was used to securely record and trace financial transactions, while providing a secure and transparent record of financial data.

Simplilearn (2023) describes the digital transformation framework as “a system of rules, and a long-term strategy used by organisational leaders and consultants to guide businesses through the digital transformation landscape”. This means that the digital transformation framework is a frame of reference or a go-to resource that will protect businesses from digital disruption (Devon Software Team, 2023). The framework consists of checklists, benchmarks, and procedures to assist a business in transforming into a digitally friendly firm that continuously grows and evolves. Basically, a digital transformation framework provides a strategy that helps a business organisation survive the ascent of external developments that threaten to alter the way the organisation works. There are quite a few digital frameworks that a business organisation might adopt. Examples include AI Multiple, Gartner, Cognizant, BCG, Accenture, McKinsey, and CapGemini (Simplilearn, 2023;

Dilmegani, 2023; Conn, 2023). For the purpose of drawing lessons from the infusion of technology in accounting during COVID-19, this study discusses the digital transformation framework from AI Multiple and from Gartner.

3.5.1 The AI Multiple Digital Transformation Framework

The five steps of the digital transformation framework from AI Multiple are outlined in Fig. 2.

Step 1. Identifying digital transformation objectives

When an accounting firm decides to embark on a digital transformation, the first step it should take is to identify its digital objectives. According to Marcello (2023), some of the things they would have to think about in setting objectives are communication internally and with clients, the modus operandi of repetitive processes, remote collaboration, integration across multiple systems, and visibility across work and tasks. The set objectives would be used to inform the firm which technologies to invest in.

Step 2. Formulating a digital transformation strategy

After identifying the objectives, the next step is to formulate a strategy to achieve the objectives. At this stage, the digital maturity of the accounting firm becomes crucial. Dilmegani (2023) argued that digital transformation projects should target end-to-end transformation; hence, the digital maturity of the firm determines the next step in the digital transformation process.

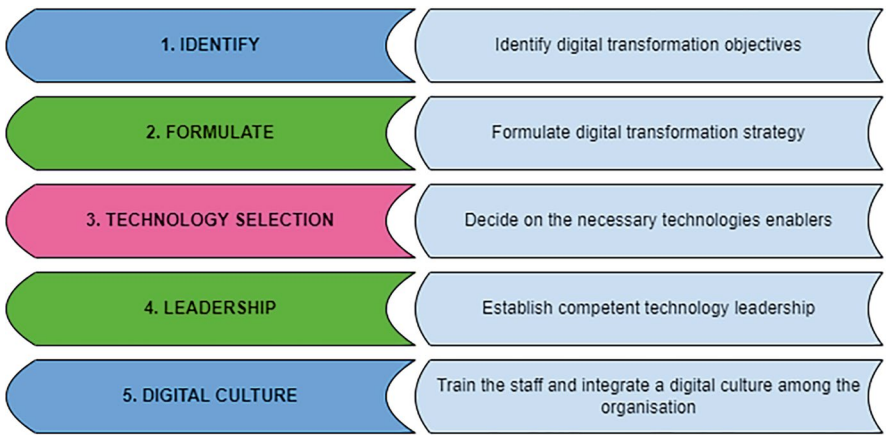


Fig. 2 AI multiple digital transformation framework. Source: Adopted from Dilmegani (2023, p. 1)

Step 3. Deciding on the necessary technologies' enablers

After formulating the strategy, the accounting department needs to decide which technologies would best achieve its digital transformation objectives. This requires knowledge about the relevant trending technologies on the market that would specifically apply to the strategic path taken.

Step 4. Establishing competent technology leadership

A survey by Dilmegani (2023) established that as many as 87% of businesses believed that digital technologies would disrupt their work, and the same percentage acknowledged that success in digital transformation depends on both the right leadership and technological capabilities. Hence, accounting departments need the right transformational leadership to ease the infusion of digital culture into their organisations as well as technological capabilities among their members.

Step 5. Training the staff and integrating a digital culture among the organisations

The right leadership would be expected to inculcate a digital culture in the organisation. This has to do with the working environment that promotes digital transformation within the accounting firm through open communication and discussion between leaders and employees about taking risks and learning how to use digital technologies in their work. Basically, digital transformation entails employee's involvement, training, collaboration, and experimentation. Dilmegani (2023) noted that it is easier to train employees than to inculcate digital culture because technology vendors usually provide some training in their products to clients.

3.5.2 The Gartner Digital Transformation Framework

The Gartner digital transformation framework has six steps outlined in Fig. 3.

Step 1: Creating the right mindset and shared understanding

First, accounting firms' leaders must view technology as a source of innovation as well as an opportunity for improving their business. Furthermore, these leaders must understand that digital transformation should be taken more as a proactive model that focuses on creative disruption and new ways of doing business to obtain competitive advantage.

Step 2: Putting the right leaders in place

Technology is evolving at an unprecedented pace and in the process of revealing gaps in digital leadership. This is so apparent in front offices and head offices. Consequently, accounting firms must consider having three types of digital business leaders, namely, digital strategists, digital marketing leaders, and digital business unit leaders, depending on the nature of their business. These individuals have been identified as three discrete digital business leaders, but one person could perform multiple tasks in these roles.

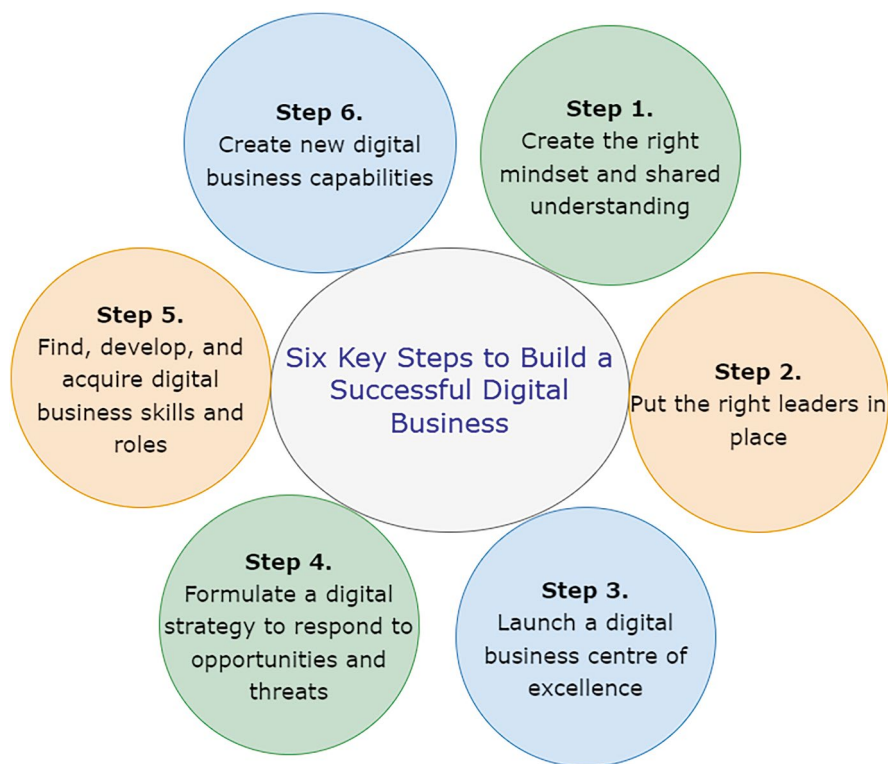


Fig. 3 The Gartner digital transformation framework. Source: Authors' compilation

Step 3: Launching a digital business centre of excellence

The digital business centre of excellence provides “input, advice and opportunities that enable the collaborative formation of a digital strategy as well as collaborative advice, capabilities and innovations required for execution”. To set this up, accounting firms’ leaders must perform a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis and then identify emerging technologies and establish how they might be a threat to the firm.

Step 4: Formulating a digital strategy to respond to opportunities and threats

In formulating a digital strategy, the following five elements must be taken into consideration: a new digitally enabled business, a product and service portfolio, information as an asset, technology, and content, media, and channels.

Step 5: Finding, developing, and acquiring digital business skills and roles

A digital business is a combination of skills, expertise, and roles across the accounting firm; hence, there is a need to acquire these skills. There is competition for talent in the business world, and this competition will either make or break the firm’s success.

Step 6: Creating new digital business capabilities

Leadership should identify the digital technology and digital skills required to steer digital accounting initiatives and conduct necessary training across all the firm units to build and acquire digital business capabilities.

The two digital transformation frameworks have many commonalities. For example, in both frameworks, step 1 involves understanding the technological needs of the firm and setting objectives. Both frameworks discuss formulating a strategy, which is addressed in step 2 from the AI Multiple and step 4 from the Gartner frameworks. Step 3 in the AI Multiple also corresponds with step 3 in the Gartner framework. Both frameworks also address the leadership issue in step 2 from Gartner and step 4 from AI Multiple. The issue of digital culture is also addressed by both frameworks, in step 5 from AI Multiple and in steps 5 and 6 from Gartner. The order of issues does not matter, but both frameworks address key issues. It is from the described digital transformation frameworks and extant literature that the chapter draws lessons from technology infusion in accounting during the COVID-19 pandemic.

4 Findings

The findings of this study present lessons from the use of infusing technology in accounting during the COVID-19 pandemic in the African context. The COVID-19 period was characterised by rapid changes that required accounting firms' management to quickly adapt and embrace the emerging technologies that would enable them to continue performing their day-to-day tasks. The identified lessons were classified into three categories, namely, tactics that worked for accountants in coping with the pandemic, opportunities arising from technology infusion in accounting, and wider ramifications for the future of accounting.

4.1 Tactics That Worked for Accountancy in Coping with the Pandemic

4.1.1 Professional Accountants Displayed the Agility and Flexibility to Adapt to Fast-Changing Circumstances

The COVID-19 global crisis was sudden and required some critical decisions to be made and some steps to be taken overnight. Professional accountants had to face this reality during the COVID-19 period. IFAC (2020) highlighted that the crisis inevitably demanded the making of difficult decisions under unusual conditions such as a lack of time to deliberate and a lack of focus. Despite these challenges, at a time where there was no semblance of certainty, the International Federation of Accountants argued that professional accountants were trusted advisors to small

businesses, CEOs, and government leaders (IFAC, 2020). This shows the agility and flexibility of professional accountants in adapting to fast-changing circumstances. The agility and resilience displayed by professional accountants enabled them to manage unanticipated change. Like any other profession that went through this unprecedented global crisis, accountancy would emerge changed from this. The profession embraced the digital transformation that was thought impossible before COVID-19. Furthermore, this global crisis tested accountants' capabilities as business drivers, and these capabilities fortunately met expectations (IFAC, 2020). Consequently, professional accountants are highly strategic and collaborative and hence assisted businesses and governments in moving forward during crises (Harding, 2021; IFAC, 2020).

4.1.2 Tactics Around Specific Challenges

Mutlu and Açıkgöz (2022) spelt out the tactics that worked for specific challenges for accountants. To work around the increased workload, accountants worked remotely as much as possible. To manage the stress and burnout that had to do with finishing the job on time, accountants worked overtime to remain within their work delivery dates. To address health issues, accountants practised social distancing to avoid physical contact with infected clients or workmates. To address disruptions from the pandemic, accountants resorted to requesting postponements in work delivery dates through available social media platforms and emails. To address the challenge of obtaining and processing necessary work documents from clients, accountants increased the turnaround time for document processing as well as the document collection time.

4.1.3 Intervention by Regulatory Bodies

Various stakeholders, including accounting firms, International Federation of Accountants (IFAC) member organisations, and other regulators, advised and provided guidance on the financial and reporting requirements that needed to be considered in handling the financial effects of COVID-19 for preparing financial statements (Zainuddin et al., 2021).

4.2 Opportunities Arising from Technology Infusion in Accounting

4.2.1 Opportunity for Digital Transformation in the Accounting Sector

Technology is considered one of the most notable factors influencing the accountancy profession in Africa (ACCA, 2022). Furthermore, accountants in Africa believe that the digital transformation of accounting practices will have the greatest influence in the coming decade. For years, some accounting firms have been reluctant to shift any of their critical data and IT systems to the cloud (Drew, 2020). This was attributed to fear of cyberattacks on the cloud due to its numerous contact points. However, when COVID-19 struck, they were left with no option except to migrate their operations to the cloud. After migrating to the cloud, accounting firms started enjoying the benefits of more cost-effective scalability, easy invoicing, accessibility anywhere and anytime, keeping track of cashflow, online filing, and digital submissions of VAT returns, among other things. Furthermore, cloud accounting technology also enables the building, reconfiguration, and integration of internal and external competencies to cope with the inconstant environment (Hasnawati et al., 2021).

The accounting firms adopted not only the cloud but also other technological tools, particularly for communication both within the organisations and with clients. For some accounting professionals, using tools for online meetings was their first time, and they had to quickly learn how to use these tools. For example, many accounting professionals were inexperienced in the use of videoconferencing and had no confidence in switching their cameras on during meetings (Harding, 2021).

Drew (2020) indicated that in addition to adopting emerging technologies during COVID-19, accounting firms were forced to further explore technologies that they already had to manage their already strained cash flow. Had it not been for the global emergency, which is COVID-19, most likely the majority of accounting firms would still be lagging in terms of digital transformation. Therefore, COVID-19 created an opportunity for the digital transformation of accounting firms. Relating this to the digital transformation frameworks, all the steps were covered in one go, as there was total digital transformation as a result of the global crises. When COVID-19 struck, the accounting firms' leaders did not have to struggle to create the right mindset and shared understanding among the staff, formulating a digital transformation strategy, establishing competent technology leadership, deciding on the necessary technologies' enablers, integrating a digital culture among the organisations, and training their staff. In most cases, training is not a challenge because technology vendors usually provide training for their clients. Almost every employee saw the need for digital transformation for the firms to remain in business. As a result, digital transformation ended up being more voluntary since both the leaders and employees saw and appreciated the need to embrace it. Furthermore, the benefits of digital transformation during COVID-19 could be used to drive the advancement of organisational digital culture.

4.2.2 Bridging the Technological Gap Between Large and Small Accounting Firms

The extant literature shows that large accounting firms had already adopted emerging digital technologies ahead of small accounting firms prior to the COVID-19 pandemic because they could afford the costs involved. The accelerated adoption of emerging technologies during the pandemic was a rapid increase for small accounting firms, which were lagging in terms of technology adoption. Therefore, accelerated technology adoption has become an advantage for small accounting firms because it reduces the technological gap between large and small accounting firms (Jemine et al., 2023).

4.2.3 Remote Working Offered Opportunities to Recruit from a Broader Talent Pool

Remote working, which became the new normal during COVID-19, introduced an opportunity for business organisations to attract and recruit talent beyond their geographic boundaries. Kier (2020) highlighted that for remote working, companies were able to recruit candidates outside their commuting distance and could now connect with potential candidates based on merit and suitability for their roles. Hiring for remote work gives businesses access to high-quality talent and promotes a more diverse and inclusive workforce (Kier, 2020). Therefore, accounting firms could also recruit staff from within and outside their countries, similar to any other business organisation, as they embrace opportunities introduced by the virtual working environment (IFAC, 2020).

4.2.4 The COVID-19 Crisis Highlighted Efficiency Opportunities That Could Help Drive Profitability

Moving away from the traditional way of doing business, accounting operations became more efficient. The use of technology in accounting reduces human error and improves accuracy. The use of technology in accounting processes also promoted the linking of different business organisation operational systems with the accounting system, which allows the creation of real-time profit and loss for every process. This therefore enables the business to conduct a quick analysis of business performance and make informed decisions (Quinto II, 2022). Capturing real-time information in a business helps drive profitability for the business. Furthermore, the use of digital tools to conduct meetings and run workshops drives efficiency, as it reduces travel costs and saves employees' time. Remote working has also seen accounting firms, similar to any other business firm, scaling down their real estate footprint, hence increasing profitability in their businesses (Abrams, 2022).

4.3 *Wider Ramifications for the Future of Accounting*

4.3.1 The Rising Demand for Digital Talent

Zainuddin et al. (2021) highlighted the increasing demand for digital talent as well as critical thinking skills required for decision-making by accountants. Examples of the digital skills that accountants need after the pandemic include information digital skills, communication digital skills, digital collaboration skills, critical thinking digital skills, creative digital skills, and problem-solving digital skills (Helsper et al., 2020). This has been necessitated by the accelerated adoption of digital technologies during the COVID-19 pandemic. Another compounding factor is that the economic effects of the pandemic resulted in a greater demand for high-quality information from investors and stakeholders than before.

4.3.2 COVID-19 Intensified the Redefinition of an Accountant's Skill Set

Accounting professionals have always viewed digital transformation as a threat since they perceived that the automation that comes with it was taking over some of their tasks (Gonçalves et al., 2022). However, automation provides an opportunity for accountants to save time from performing repetitive tasks that can be performed by a machine and reserve that time for other more value-creating tasks. Consequently, there is a growing shift in the role of accountants from being generators of passive information only to having an additional aspect of the control function of management, which, among other things, requires them to make decisions (Mujiono, 2021; Robalo & Costa, 2017). The dawn of COVID-19 accelerated this shift since more technological tools were adopted by accounting professionals to perform tasks that would be performed manually by humans before the pandemic. Since more of the tasks that used to be performed by human beings were taken over by machines, accountants would be expected to perform higher-order tasks that require a different set of skills. The International Federation of Accountants (IFAC) stated that it was forced to reconsider the role of professional accountants due to COVID-19-accelerated digital changes (IFAC, 2020).

According to Tan (2020a), with the accelerated adoption of technology during COVID-19, “there was need for accounting professionals to adapt skill sets, knowledge, and understanding in data analytics, synthesis, AI, robotics, intelligent processes automation, and other similar technology”. The extant literature has indicated that accounting jobs that involve leadership and people management have high chances of surviving the robot revolution simply because they require human skills such as decision-making, connecting, strategic management and analysis, leadership, coaching, planning, and creative work (Tan, 2020b). With the accelerated use of technology during COVID-19, it is anticipated that there will be greater calls for skills upgrades for accounting professionals as their role shifts to that of business advisors (Tan, 2020b). Zainuddin et al. (2021) posited that accountants need to

endow themselves with digital and critical thinking skills to remain relevant, especially in the post-COVID-19 era. This lesson is addressed by step 5 from the Gartner digital transformation framework, that is, finding, developing, and acquiring digital business skills and roles. This step indicates that a digital business is a combination of skills, expertise, and roles across the business organisation, and these need to be acquired.

4.3.3 Need for Upskilling and/or Reskilling of Accountants

The changes in business practices that emanated from the COVID-19 pandemic also came with the changing demands and expectations of some accountancy professionals. Consequently, accountancy professionals should have access to regular upskilling opportunities as well as continuing professional development (CPD) programmes in technology, information systems, and data analytics. This confirms the changing roles of accountants observed over time from traditional bookkeeping roles to more creative and strategic roles when they collaborate with technology and leave it to repetitive tasks.

4.3.4 Need for Alignment of the Higher Education Accounting Curriculum with the Work Environment

The COVID-19 pandemic brought to the fore a significant gap between higher education institution (HEI) graduates' skills and the work environment. This is evidenced by newly hired accounting graduates' lack of emotional intelligence, soft skills, and failure to apply their knowledge in practice (ACCA, 2022). Therefore, there is a need for collaboration between HEIs and industry regarding the alignment of the accounting curriculum and the work requirements. Redefinition of accountants' skills might require those institutions that offer accounting certification to revise their curriculum and inculcate content that addresses emerging technological skills in the field (Bagley et al., 2021). Furthermore, Bagley et al. (2021) argued that higher education must remain abreast of technological developments to instruct and qualify appropriately skilled people to fit into the new employment environment.

5 Conclusion

The COVID-19 pandemic ushered in a new normal with sudden changes in ways of life and in the world of work. The major change observed was an accelerated rate of technology uptake by accounting firms, among other business sectors. Decisions on the course of action to allow accounting firms to continue operating had to be quickly made on the go. Lessons could be drawn from all the new experiences, particularly the sudden adoption of technology in day-to-day operations by

accounting firms. This chapter sought to identify lessons drawn from the integration of emerging technologies and accounting during the COVID-19 pandemic in the African context. The study identified three categories of lessons, namely, tactics that worked for accountants in coping with the pandemic, opportunities arising from technology infusion in accounting, and wider ramifications for the future of accounting. These three categories yielded a total of 11 lessons, with 3 from tactics that worked, 4 from opportunities, and 4 from wider future ramifications of the profession. It can be concluded that the accountancy profession in Africa benefited more from the COVID-19 global crisis, as it has always lagged behind the profession in the Western world in terms of adopting technology for practice. Furthermore, the silver lining of the accelerated adoption of technology in the accountancy profession in Africa not only provided opportunities but also underscored wider ramifications for the future of the accountancy profession on the African continent. Consequently, accelerated technology adoption would speed up the change in the roles of accountants from mere bookkeeping to strategic management roles, as repetitive accounting tasks would be automated and free more time to accountants for management tasks.

Limitations of the Study

The limitation of the study is that it relied on secondary sources of data, some of which could be old and need updating. The study recommends an empirical study that involves collecting primary data through interviews with human participants to establish what accountants think were the lessons drawn from the infusion of technology with accounting during the COVID-19 pandemic.

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A Case Study of Business Process Modelling, Continuous Auditing and Reporting in Gwanda District



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Abstract Emerging economies are gradually drifting towards reliance on small- to medium-sized enterprises (SMEs) for their growth and competitiveness. In their bid to attain excellence, they need to adopt sound financial information processing systems in a rapidly changing business financial reporting environment. The sudden emergence of the COVID-19 pandemic exposed SMEs to a new form of pure risk in their business processes and financial reporting systems. The survival of these SMEs depended on their ability to develop and implement risk management models most suitable for the pandemic's cyclical nature and the irregularities it caused to the traditional time series of business process operations. This chapter presents a case study of the business process modelling, continuous auditing and reporting approaches adopted by SMEs during the COVID-19 pandemic. This chapter explores the challenges posed to SMEs by the COVID-19 pandemic. Furthermore, it considers the business process models adopted for auditing and financial reporting from the perspective of their contribution to averting threats to the survival and effective growth of SMEs in volatile and pandemic-based business environments. This chapter briefly explains continuous auditing (CA) and financial reporting, as well as assessing the extent and effectiveness of its use among SMEs during and after the COVID-19 pandemic in the context of new technologies and business processes. By modelling business processes in the presence of continuous auditing and financial reporting during the COVID-19 pandemic, this chapter provides businesses, policymakers and future researchers with a contingent time series analysis

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model to predict the behaviour of financial reporting and information management systems in the case of future pandemics.

Keywords Pure risk · Cyclical nature · COVID-19 · Risk management · Time series analysis · Small to medium enterprises · Speculative risk · Irregular component · Retrospective · Lockdown restrictions · Forecasting · Financial information · Emerging demands · Information and Communication Technology · Adverse economic events · Assurance · Clinical audit cycle · Financial stability · Monitoring · Pandemic · Omission errors · Contingent

1 Introduction

Business process models provide a standard description of the major operations of an organisation. The models help to prevent chaos in the organisation by providing a brief definition of key business processes as well as creating common knowledge of operations. Effective adherence to well-defined models and the ability to adapt to the dynamic operational environment keeps the business afloat. With the constantly changing business environment due to external and internal forces, new standards evolve and serve as excellent indicators of the direction for the organisation (Beechem, 2021). This calls for new business process models and the continuous improvement of existing models to meet emerging demands.

The sudden dawn of the COVID-19 pandemic introduced a new era of challenges in testing the resilience of established systems of financial information processing and reporting. All businesses in all sectors need to ensure that they can anticipate, prepare for, respond and adapt to change and sudden disruptions to continue their operations (Greaves, 2022). The COVID-19 pandemic caused an increase in the level of uncertainty for business enterprises. This has created many difficulties and challenges for managing these enterprises and preparing financial reports to evaluate the current and potential material effects of the COVID-19 outbreak on financial reports (Mahmoud & Al-Tahan, 2020). The pandemic resembled the characteristics of a cyclical component of the time series analysis. In business and economic time series, the cyclical component is so irregular that it is very difficult to identify (Zimbabwe Open University, 2004). To avert these unpredictable irregularities in business information processing and reporting, there is a need for organisations to adopt continuous financial risk management models, which allows for flexibility in times of such irregularities.

Due to the exceptional circumstances and conditions brought to the field of financial information processing and reporting, studies have shown that there is an increased risk of electronic information systems being hacked (Asmaa, 2022). Research suggests the need to use modern methods of auditing, such as continuous auditing (CA), to address the challenges facing the present-day financial information processing and reporting field. KPMG (2009) defined CA as the collection of audit evidence and indicators by an auditor using information technology (IT)

systems, processes, transactions and controls on a frequent or continuous basis throughout a period. The use of IT in financial information processing and reporting is therefore a useful tool for businesses during difficult times such as the COVID-19 pandemic. The sudden emergence of the COVID-19 pandemic exposed SMEs to a new form of pure risk in their business processes and financial reporting systems. The dawn of this new normal was a problem not only for the SMEs but also for the researchers in a bid to find answers on how the SMEs' survival was spelled in such uncertain moments. The survival of these SMEs depended on their ability to develop and implement risk management models most suitable for the pandemic's cyclical nature and the irregularities it caused to the traditional time series of business process operations. For this reason, the study sought to determine how the SMEs in Gwanda District mapped their way to the other side of the pandemic.

2 Theoretical Perspectives

The rapid development of information and communication technology (ICT) in the business field seemed to provide small- to medium-sized enterprises (SMEs) with a surmountable task to bear due to their limited financial disposition. However, Yeh and Shen (2020) view this rapid technological advancement as a good platform for organisations to gradually and steadily integrate internal information processing in such a way that the bulk of large corporate transactions can be handled efficiently. Thus, while the real-time demand for financial information has become a critical challenge for auditors, rapid ICT advancements have led to the development of sound control models to resolve complex auditing and financial reporting demands. Moreover, ICT has proven to be efficient in providing control models for financial information processing and reporting since the advent of the COVID-19 pandemic. Among the control models are the continuous auditing (CA) system, which this chapter describes.

3 Continuous Auditing

Continuous auditing is a software-based model used to automatically perform financial information controls and risk assessments on a highly frequent and accurate basis (Tank, 2011). According to Yeh and Shen (2020), the American Institute of Certified Public Accountants (CICA/AICPA) (1999) defines CA as a methodology that enables independent auditors to provide written assurance on a subject matter using a series of auditors' reports issued simultaneously with, or a short period after, the occurrence of events underlying the subject matter. According to the definition, CA is a retrospective approach performed soon after the occurrence of events underlying the subject matter. This retrospective nature of the CA gives it the ability to lay a learning foundation for the future activities of the organisation. CA involves the

transformation of internal and external auditing processes by infusing modern information technology to enhance speed and accuracy in dealing with large volumes of data (Asmaa, 2022). The American Institute of Certified Public Accountants (AICPA, 2015) took CA to be an organised process of collecting and evaluating electronic data to express a neutral technical position of information and financial reports obtained through an immediate and paperless accounting information system. Studies show that CA is an effective and efficient modern model of auditing financial information that has great potential to enable improved financial information processing and reporting during uncertainty, as in the COVID-19 era.

4 Literature Review and Hypothesis Development

4.1 Effects of COVID-19 Lockdown Restrictions on Continuous Auditing

The COVID-19 pandemic has become an unprecedented global crisis, and its effects have affected human health and economic welfare across the globe (International Trade Centre, 2020). One of the key requirements for setting up a continuous audit system is that the auditor must have a reliable means of obtaining the necessary audit evidence (Groomer, 2006). This requirement became impossible during the COVID-19 lockdowns since the imposed travel restrictions hindered free movement for auditors to access the relevant information.

An assessment of the impact of the COVID-19 pandemic on Chinese enterprises revealed a shift in the adoption of new strategies and countermeasures. The shift aimed at using flexible work schedules, as well as product and service improvements, which reduced costs in line with the new norm set by the pandemic (UNDP, 2020). The report, however, acknowledged that most SMEs faced a challenge in determining their operations through short-term market behaviour instead of long-term forecasting. This approach used by the SMEs exposed them to various limitations in fully operating and implementing sound internal and external control systems such as continuous auditing. One of the major hurdles to SMEs was financial constraints related to their short-term planning, as much of their financial resources were trapped by the COVID-19 pandemic, which frequently presented diverse threats to business operations.

The COVID-19 lockdown restrictions resulted in great shifts from the normal working environment and approach. Many organisations introduced remote working processes whereby employees had to adapt to the e-working platforms and administer their duties from home. Some auditors believe that the lockdown restrictions caused by the pandemic resulting in new working models requiring them to offer their audit services from home were detrimental to their work-life balance (Beechem, 2021). This indicates that the resulting COVID-19 lockdown restrictions had both negative and positive effects on continuous auditing. Thus, SMEs are

provided with positive lockdown restrictions, which they can incorporate in their operations, and they have negative lockdown restrictions, from which they can provide a basis for improving and strategising the future application of CA in the presence of such pandemics.

Based on the literature and these studies by other scholars, the following hypothesis is proposed:

H1: COVID-19 lockdown restrictions significantly affect continuous auditing.

4.2 Effects of the Health Crisis on Financial Reporting

Financial reporting (FR) refers to business activities involving the accounting recording of different business transactions in an organisation's financial statements in line with prescribed accounting assumptions and reporting standards (Sultana, 2021). FR has great value to business entities because it helps to reveal real-time business issues, relative risks involved, continuous macroeconomic developments and vital information used in the preparation of financial statements. The information from effective FR is useful in business forecasting and preempting the likelihood of adverse economic events that may alter the normal business time series. Such adverse economic events include the outbreak of global pandemics and worldwide economic disruptions, such as noise and COVID-19 (Sultana, 2021).

The World Bank described the effects of the COVID-19 pandemic on businesses as "the economic shock", which had an "unprecedented impact on public finances" (World Bank, 2020). A study on the impact of the COVID-19 pandemic on financial reporting and disclosure practices in Bangladesh noted global economic deterioration due to the COVID-19 pandemic. The study revealed that reactive measures in response to the pandemic, such as the cessation of business operations, social distancing and lockdowns and travel restrictions, have had serious negative impacts on business operations (Sultana, 2021; World Bank, 2020). These findings indicate that the health crisis caused by the COVID-19 pandemic had a significant effect on businesses' financial reporting.

The relevance of the budgets and forecasts used by management of businesses to base their going concern assessments became questionable (KPMG, 2020). The ever-changing economic environment due to the uncertainties brought about by the COVID-19 pandemic caused this doubt.

H2: The health crisis significantly affects financial reporting.

4.3 Continuous Auditing After COVID-19 Lockdown Restrictions

The advent of the COVID-19 pandemic brought many risks related to increasingly complex pandemic-driven arrangements, disruptive technologies, events and regulatory environments (KPMG, 2022). These complexities called for the use of internal auditing and internal control functions to identify, assess and monitor the related uncertainties efficiently at lower costs under nonformal working conditions. Under such irregularities, the ideology of continuous auditing (CA) to collect audit evidence and indicators on information technology (IT) systems, processes, transactions and controls on a frequent repeatable and sustainable basis becomes very useful. CA provides the organisation with real-time authentic information from which performance forecasting and possible risk indicators are tracked; hence, CA is potentially important after the COVID-19 lockdown restrictions.

Rapid technological developments and improvements support the use of CA to efficiently and effectively address the swift needs of information processing and reporting. Continuous auditing system conditions require the inclusion of real-time basis system conditions, internal control management and computer technology, support-automated audit procedures and rapid execution in the client enterprise (Yen & Shen, 2020). It is not clear whether the uncertain conditions caused by the COVID-19 pandemic were eliminated after the lockdown restrictions; hence, it is necessary to take advantage of CA system conditions for easy continuity in information processing and reporting after the pandemic.

H3: Continuous auditing may be useful after COVID-19 lockdown restrictions.

5 Methodology

5.1 Sample Size

A sample size of 80 participants, 57 males and 23 females, was chosen. A 95% confidence interval and a $\pm 5\%$ margin of error indicate high sample credibility. For this study, a sample size was calculated based on the expectation of a proportion of 20% of the respondents participating in SMEs. This formula was used to calculate the sample:

$$n = \left(\frac{1.96}{\Delta} \right)^2 p(1-p)$$

where n is the required sample size to achieve a 95% confidence interval (CI) of width $\pm 10\%$,

1.96 is the 95% CI table value, Δ is the width of the CI and p represents the expected proportion of respondents participating in SMEs one way or the other in Gwanda district.

$$\text{Thus, } n = \left(\frac{1.96}{0.1} \right)^2 0.2(1-0.2)$$

$$= 61.4656$$

$$\approx 62.$$

Adjusting for an expected 80% response rate gives

$$76.832$$

$$\approx 80 \text{ participants.}$$

A large sample size was selected to ensure that the results are generalizable, as a sample size of $n = 30$ is considered to be statistically large. An adjustment of the calculated sample of 62 participants was performed at 0.08 to ensure that we attained a response rate of 80%, which then gave a sample size of 80 participants to achieve a 95% confidence interval of width $\pm 10\%$.

A sample size of 80 participants was ultimately selected at the researcher's discretion, as shown in Table 1.

5.2 Sampling Procedures

The participants of this study were purposively sampled. Purposive information was used because the study sought information on financial reporting and continuous auditing; therefore, the participants were people with adequate knowledge about the topic under study. Additionally, purposive sampling is sometimes judgemental, so people who are actually doing financial reporting and auditing were selected. Additionally, business owners who experienced the effects of COVID-19 on their companies' financial reports and audits were also recruited so that valid information could be collected. Therefore, the sample included business owners, auditors, investors and managers or directors of the company.

5.3 Instruments

Semistructured interviews were used to collect data from the participants using an open-ended questionnaire as an interview guide. The interviews were chosen as the best instrument for obtaining a deep understanding of the effects of COVID-19 on financial reporting and continuous auditing. The questionnaire was divided into two sections, namely, Part A, seeking biodemographic data from respondents (gender,

Table 1 Sociodemographic profile of participants ($n = 80$)

Gender distribution		
Subgroup	Number	Percentage
Male	57	71.25
Female	23	28.75
<i>Position/category</i>		
SME owners	45	56.25
Investors	15	18.75
Managers/directors	10	12.5
Auditors	10	12.5
Total	80	100
<i>Age distribution</i>		
25–34 years	17	21.25
35–44 years	35	43.75
45–54 years	11	13.75
55–64 years	13	16.25
>65 years	4	5
Total	80	100
<i>Highest academic qualifications</i>		
Secondary level	11	13.75
College level	43	53.75
University level	26	32.5
Total	80	100
<i>Working experience of respondents</i>		
<5 years	5	6.25
6–10 years	23	28.75
11–20 years	37	46.25
20 years+	15	18.75
Total	80	100

Source: Authors' own construct

highest qualification, position at work and working experience), and Part B, seeking to explore the effects of COVID-19 on financial reporting and continuous auditing.

6 Data Analysis

6.1 Measurement of Variables

This five-factor study focused on measuring the effects of COVID-19 lockdown restrictions on continuous auditing (ECLRCA), which is presented as an independent variable with eight measurement items (ECLRCAs 1–8). The effect of health crisis on financial reporting (EHCFRD) is the independent variable with three

measurement items (EHCFRDs 1–3), and continuous auditing after COVID-19 lockdown restrictions (CAACLR) with eight measurement items (CAACLRs 1–8), with continuous auditing and financial reporting, is regarded as the dependent variable.

6.2 Descriptive Analysis

The following section focused on the statistical analysis (e.g. central tendencies) and respondents' demographic characteristics.

6.3 Demographic Characteristics

Table 1 shows that 71.25% of the participants were males and 28.75% were females. These small businesses are male dominated since the study was carried out in Gwanda (a mining town); therefore, mining is a male-dominated sector. The distribution of participants by their working positions shows that 56.25% were business owners, 18.75% were investors and 12.5% were managers/directors and auditors each. This means that the sample selected has the capability to provide correct and true information for the study. Approximately 43.75% were between 35 and 44 years, 21.25% were between 25 and 34 years, 16.25% were between 55 and 64 years, 13.75% were between 45 and 54 years and 5% were over 65 years of age. These age ranges revealed that no minor was recruited for the study; only adults and mature people who could make informed decisions on whether to participate in the study were included. At the highest qualification, 53.75% were college graduates, 32.5% were university graduates and 13.75% had secondary education level certificates. The majority of the participants were educated enough and had full knowledge of financial reporting and auditing. Approximately, 46.25% had 11–20 years of service, 28.75% had 6–10 years of experience, 18.75% had more than 20 years of experience and 6.25% had 1–5 years of experience (Table 1). This means that more experienced people who participated in this study were knowledgeable and experienced enough to provide true information on how COVID-19 affected financial reporting and continuous auditing.

7 Measurement of Central Tendencies

The measures of central tendencies, the means and the standard deviations obtained from all 80 sampled participants are presented in this section. The findings in Table 2 indicate that the mean and standard deviation (SD) for all the measurement items range from 1.93 to 4.39 and from 0.651 to 1.169, respectively (Table 2). These

Table 2 Measures of central tendencies

Construct	Items	Mean	Standard deviation (SD)
ECLRCA	ECLRCA1: Existence	3.84	1.084
	ECLRCA2: Completeness	4.03	1.158
	ECLRCA3: Accuracy	1.99	.987
	ECLRCA4: Timeliness	4.01	.893
	ECLRCA5: Posting and summarisation	4.26	.651
	ECLRCA6: Comprehensive assurance	4.39	.864
EHCFRD	ECLRCA7: Makes financial information useful for decisions	4.23	.968
	ECLRCA8: Improves risks and opportunity management	4.23	.886
	EHCFRD1: Require special attention	4.29	.830
	EHCFRD2: Accounting prudence	4.26	.951
	EHCFRD3: Financial statements require more disclosure	3.53	1.169
CAACLR	CAACLR1: Post-COVID-19 CA and the clinical audit cycle	3.54	1.147
	CAACLR2: Post-COVID-19 CA and the PDSA cycle	4.39	.893
	CAACLR3: Post-COVID-19 CA and the contingent time series analysis model	4.34	.899
	CAACLR4: Lack of knowledge and experience	4.20	.920
	CAACLR5: Lack of staff to support CA	4.35	.731
	CAACLR6: Limited management commitment to CA	4.16	.961
	CAACLR7: Lack of CA infrastructure	4.30	.960
	CAACLR8: Financial cost of implementation	3.93	.987

Source: *Authors' own construct*

ranges depict positive responses among the participants and that their responses move from disagreement to agreement for almost all measuring items.

8 Exploratory Factor Analysis

The highlighted variable, accuracy, in Table 3 had a Cronbach's alpha greater than the overall alpha of .821 (Table 3). The variable was consequently deleted to increase the reliability of the measures. Two other variables—post-COVID-19 CA and the clinical audit cycle—and financial statements requiring more disclosure were also deleted to increase the Cronbach's alpha statistics. The revised reliability statistics are shown in Table 6.

Table 4 reveals the proportion of variance of each variable that is explained by the factors in the initial and extraction stages.

The communalities table indicates that the extracted factors explained approximately 22.2–80.0% of the variance contained in the working variables (Table 4).

Table 3 Variable selection statistics

Item	Scale mean if item deleted	Scale variance if item deleted	Corrected item total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
Existence	72.40	69.939	.427	.346	.811
Completeness	71.53	71.537	.306	.366	.819
Timeliness	72.23	68.227	.667	.590	.799
Accuracy	74.25	83.962	.336	.334	.850
Posting and summarisation	71.98	74.961	.309	.353	.817
Comprehensive assurance	71.85	70.838	.501	.574	.808
Makes financial information useful for decisions	72.01	68.139	.613	.611	.801
Improves risks and opportunity management	72.01	69.304	.595	.669	.803
Require special attention	71.95	72.656	.390	.398	.814
Accounting prudence	71.98	70.784	.448	.377	.810
Financial statements require more disclosure	72.71	71.068	.326	.557	.818
Post-COVID-19 CA and the clinical audit Cycle	72.70	73.251	.219	.535	.753
Lack of knowledge and experience	72.04	69.049	.587	.638	.803
Lack of staff to support CA	71.89	73.899	.353	.423	.815
Limited management commitment to CA	72.08	69.412	.533	.601	.806
Lack of CA infrastructure	71.94	69.629	.519	.528	.806
Financial cost of implementation	72.31	69.635	.431	.416	.811

Source: *Authors' own construct*

Table 4 Communalities

Variable	Initial	Extraction
Existence	.307	.249
Completeness	.299	.630
Timeliness	.534	.511
Posting and summarisation	.350	.457
FRD require special attention	.312	.355
FRD accounting prudence	.361	.366
Post-COVID-19 CA and the PDSA cycle	.287	.222
Post-COVID-19 CA and the contingent time series analysis model	.608	.750
Comprehensive assurance	.507	.699
Makes financial information useful for decisions	.577	.602
Improves risks and opportunity management	.570	.677
Lack of knowledge and experience	.587	.604
Lack of staff to support CA	.419	.534
Limited management commitment to CA	.583	.860
Lack of CA infrastructure	.486	.515
Financial cost of implementation	.361	.429

Source: *Authors' own construct*

Post-COVID-19 CA and the PDSA cycle (22.2%) had the lowest variance, and limited management commitment to CA (74.6%) had the highest variance explained.

Table 5 reveals that five factors were extracted (indicated in bold). Factor 1 had an eigenvalue >1, explaining 33.55% of the variance, while Factor 2, Factor 3, Factor 4 and Factor 5 explained 9.53%, 8.46%, 8.01% and 6.78% of the variance, respectively (Table 5). This accounted for 66.34% of the total variation explained by the four factors.

9 Model Validity and Reliability

An overall Cronbach's alpha of 0.859 was obtained for all the remaining 16 items (Table 6). This indicated high reliability for us to proceed with factor analysis using the 16 variables. Each of the 16 variables had a high Cronbach's alpha ($\alpha \geq 0.8$), which indicates high reliability (Table 7).

Table 5 Total variance explained

Factor	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	5.368	33.551	33.551	4.771	29.820	29.820	2.220	13.872	13.872
2	1.525	9.534	43.085	1.208	7.548	37.368	1.906	11.913	25.785
3	1.354	8.460	51.545	1.013	6.333	43.701	1.863	11.647	37.432
4	1.282	8.012	59.556	.685	4.284	47.985	1.487	9.294	46.726
5	1.085	6.778	66.335	.783	4.892	52.877	.984	6.151	52.877
6	.928	5.801	72.136						
7	.725	4.532	76.667						
8	.639	3.992	80.659						
9	.604	3.288	84.433						
10	.526	3.288	87.720						
11	.459	2.869	90.590						
12	.401	2.507	93.096						
13	.324	2.028	95.124						
14	.298	1.865	96.989						
15	.256	1.600	98.589						
16	.226	1.411	100.000						

Source: Authors' own construct

Table 6 Reliability statistics

Cronbach's alpha	Cronbach's alpha based on standardised items	No. of items
.859	.861	16

Table 7 Validity and reliability

Construct	Items	Cronbach's alpha	Item loadings
ECLRCA	ECLRCA1	.850	5.368
	ECLRCA2	.855	1.525
	ECLRCA4	.839	1.354
	ECLRCA5	.853	1.282
	ECLRCA6	.849	1.085
	ECLRCA7	.849	.928
	ECLRCA8	.859	.725
EHCFRD	EHCFRD1	.841	.639
	EHCFRD2	.848	.604
CAACLR	CAACLR2	.840	.526
	CAACLR3	.840	.459
	CAACLR4	.841	.401
	CAACLR5	.852	.324
	CAACLR6	.844	.298
	CAACLR7	.845	.256
	CAACLR8	.848	.226

Source: *Authors' own construct*

10 Results and Discussion

10.1 *Effects of COVID-19 Lockdown Restrictions on Continuous Auditing*

The results obtained from the study show that the COVID-19 lockdown restrictions had a severe impact on the application of CA among SMEs. The responses from the participants indicated that most of the goals of CA tested using sales transactions were negatively impacted by the COVID-19 pandemic. The participants agreed that the imposed lockdown restrictions and travel bans negatively affected the goals of CA, which include but are not limited to the existence, completeness, timeliness and posting and summarisation goals. The goal of ensuring that the recorded sales transaction is correct succumbed to the limited permitted movement; hence, the auditing process relied only on remotely available information.

The completeness goal emphasises that all sales transactions that occurred were entered into the accounting ledger, while the timeliness goal ensures the recording of all sales transactions at the correct time to avoid omission errors. However, these

requirements were altered to suit the COVID-19 pandemic regulations; thus, timeliness feasibility depended on the flexibility of restrictions. Only authorised movements at certain times and days could be used to ensure that these transactions were recorded and posted into the ledger regardless of the correct time required for entry. The participants also agreed that the number of sales transactions properly recorded in the main file of accounts receivable correct summarisations was greatly negatively affected by the pandemic. Thus, the posting and summarisation goals of the CA were violated due to the lockdown restrictions.

The accuracy goal of CA seeks to ensure that the sales transaction amount entered should be accurate. The pandemic restrictions had fewer effects on the accuracy goal. This finding implies that restrictions had more negative effects on accessibility issues than did accuracy. Therefore, the COVID-19 lockdown restrictions significantly affected continuous auditing. Hence, an accessible approach to CA is of great importance in times of such pandemics.

10.2 Effects of the Health Crisis on Financial Reporting

The study revealed that financial reporting and disclosure were negatively affected by the health crises caused by the pandemic. It was noted that financial reporting requires special attention to adjust for the effects of the pandemic. The exercise of this special attention could not have been possible due to much time and organisational resources being channelled towards the health and well-being of their employees. Most SMEs in the district depended upon imports for their normal functioning, which implies that cross-border health restrictions altered their course of operation. Due to poor health services, the number of personnel was reduced, thereby affecting the extent and effectiveness of their financial reporting. Accounting estimates and policies were required to be prudent during the COVID-19 pandemic (Feghali et al., 2022). However, due to the uncertain conditions resulting from the nature of COVID-19, the principle of prudence was more negatively affected by overestimation and underestimation. Thus, largely, the health crisis significantly affected financial reporting.

10.3 Continuous Auditing After COVID-19 Lockdown Restrictions

The future of CA after the COVID-19 lockdown restrictions relies on knowledge of the benefits of CA. The greater the awareness that SMEs have of the inherent benefits of using CA, the greater the likelihood of its implementation after the pandemic. Participants in the study in Gwanda District revealed that they were acquainted with the benefits of CA. They strongly agreed that CA provides

comprehensive assurance as well as greater coverage across the organisation. They also concurred that CA gives an organisation the ability to enhance its financial information to be of great usefulness in decision-making among the SME's stakeholders.

Risk management is a rapidly evolving aspect of the importance faced by SMEs. Speculative risk increases the likelihood of profitability for the organisation, while pure risk is unwanted. It is with CA that the participants hoped that many SMEs could reap the full benefits of their speculations. Thus, they argued that CA improves the ability of organisations to manage risks and opportunities existing in the market.

However, the full benefits of CA can only be realised if the SMEs properly manage the challenges or barriers to the implementation of a sound continuous auditing and monitoring system. Some of the barriers to successful CA implementation were identified as follows:

- There is a lack of knowledge and experience concerning CA tools.
- There is a lack of staff to support the implementation of CA.
- There are limited commitment and awareness by senior management.
- There is an absence of suitable infrastructure for applying CA.
- There is high financial cost required for the implementation of CA.

The ability of SMEs to address these challenges determines their future success in using CA; hence, they can enjoy its full benefits in their auditing and financial reporting.

Varieties of models have been suggested for the future success of CA, including the clinical audit cycle, the Plan-Do-Study-Act (PDSA) and the Contingent Time Series Analysis Model (CTSAM). According to these proposed models, the participants agreed that the PDSA and CTSAM are more likely to enhance the future of CA.

11 The Plan-Do-Study-Act

According to Gillam (2013), the plan stage involves setting out clear objectives of the audit system, followed by the implementation of the plan (do). The study stage analyses the data obtained in the do stage and provides a summary of the learned information. The act stage closes the previous cycle and opens a new cycle, depending on whether any modifications or improvements are needed. This cyclical approach is deemed effective in ensuring the continuous nature of the CA (Fig. 1).

12 Contingent Time Series Analysis Model

A contingent time series analysis model is proposed to ensure the effective implementation of CA in the presence of uncertainty and pandemic risk. The model takes after the four-stage PDCA cycle adopted by ISO 45001 to achieve continual

Fig. 1 The plan-do-study-act cycle (Source: Gillam (2013))

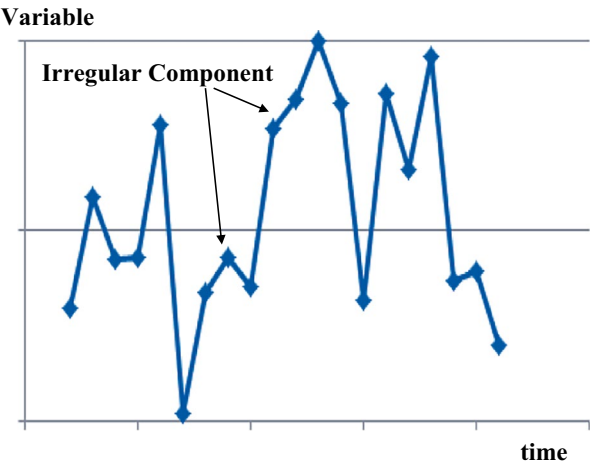
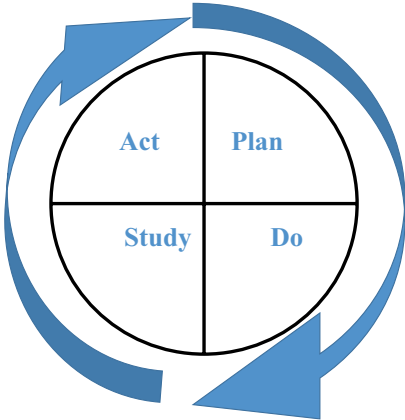


Fig. 2 The irregular time series component (Adopted from ZOU (2004))

improvement in risk management (Constantine, 2018). The model assumes an irregular transaction time series component due to pandemic uncertainties. The time series is deemed to have no specific directional trend but behaves according to the effects of the shock exerted by the uncertain events (Fig. 2).

The contingent time series analysis combines the PDCA approach with an audit stage in place of the check stage, resulting in the Plan-Do-Audit-Act (PDAA) cycle (see Fig. 3) for irregular time series behaviour (Fig. 3). The PDAA cycle will, however, depend on the directional behaviour of the transaction time series instead of the planned audit system.

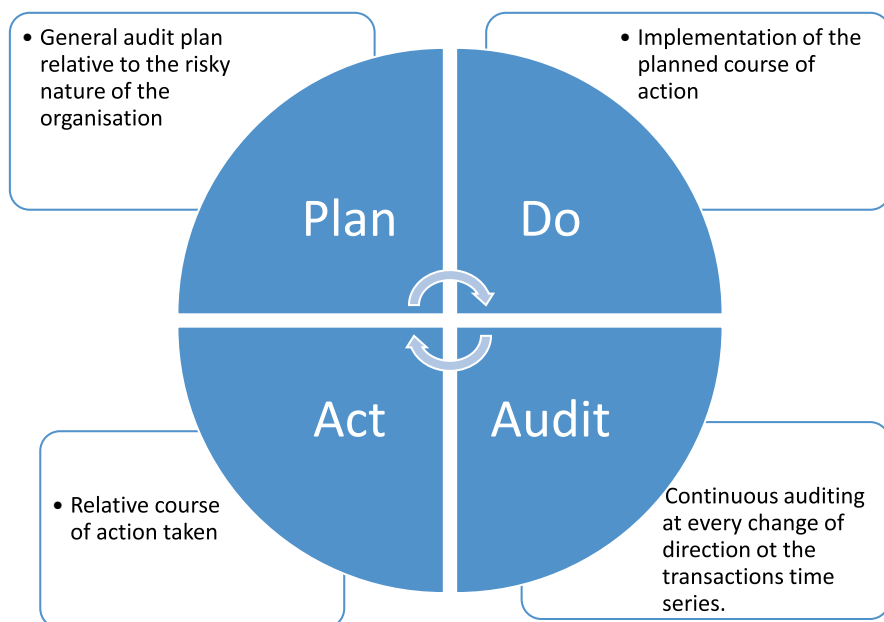


Fig. 3 The Plan-Do-Audit-Act (PDAA) cycle. Source: *Authors' own construct*

The planned audit system will be implemented at every stage where the time series changes direction so that the underlying risks can be identified and action taken. Since the direction of the time series is irregular (Fig. 2), contingent auditing will be adopted to ascertain whether the change is positive or negative. A negative change will imply pure risk to the SME; hence, a corrective measure will be implemented to avert the harm, while a positive change will imply a speculative risk, which the SME can capitalise on. For example, the study noted that COVID-19 lockdown restrictions increased business for food outlets, while for nonessential services and the transport sector, business nosedived. With these considerations and adaptive financial models, continuous auditing may be very useful for SMEs after the COVID-19 lockdown restrictions.

13 Conclusion

The sudden emergence of the COVID-19 pandemic exposed SMEs to a new form of pure risk in their business processes and financial reporting systems. The dawn of this new normal was a problem not only for the SMEs but also for the researchers in a bid to find answers on how the SMEs' survival was spelled in such uncertain moments. The survival of these SMEs depended on their ability to develop and implement risk management models most suitable for the pandemic's cyclical

nature and the irregularities it caused to the traditional time series of business process operations. This chapter assessed the survival strategies employed by the SMEs in Gwanda District to survive the pandemic.

Effective continuous auditing and sound financial reporting are of great value to the successful operations of SMEs and any other business at large. CA has many associated benefits that SMEs can take advantage of. These include the provision of comprehensive assurance, enhancing the decision usefulness of financial information and improving the ability of organisations to manage their relative risks and opportunities. Thus, SMEs should capitalise on these benefits to ensure that they attain their full potential.

The advent of the COVID-19 pandemic threatened the existence and success of CA among SMEs. A lack of knowledge, experience and financial stability made it more challenging for SMEs to implement CA during the COVID-19 pandemic. The travel restrictions imposed due to the health crisis made it more difficult for SMEs to achieve the intended goals of CA and financial reporting. Therefore, the COVID-19 lockdown restrictions and health crisis significantly affected continuous auditing and financial reporting among the SMEs in Gwanda District.

Nevertheless, the use of business process risk models provides hope for the usefulness of CA after the COVID-19 lockdown restrictions. The proposed PDSA and the contingent time series analysis model (CTSAM) provide SMEs with effective tools to continuously monitor and manage their business transactions and suggest cases in which CA and correction are necessary. The CTSAM further offers SMEs a unique aspect of identifying both business risks and opportunities during and after the pandemic. Therefore, continuous auditing and financial reporting remain very important continuous financial monitoring and management tools upon which SMEs can build their successful future. SMEs, therefore, need considerable flexibility in their financial monitoring and reporting to remain sound and relevant in times of uncertainty. The rigidity and resistance to adopting emerging technologies in audit systems will render SMEs irrelevant due to their dependence on obsolete systems of financial information processing and reporting. Thus, resilience will become a great survival strategy for SMEs during future pandemics.

By modelling business processes in the presence of continuous auditing and financial reporting during the COVID-19 pandemic, this chapter provides businesses, policymakers and future researchers with a contingent time series analysis model (CTSAM) to predict the behaviour of financial reporting and information management systems in the case of future pandemics. However, future studies can focus on using actual financial accounting transaction data to formulate statistical CTSAM parameters, which would have greater predictive power. The use of probability sampling techniques for similar studies to improve the study validity and reliability, thereby enhancing the generalizability of the findings, is recommended.

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Accounting Information Systems Implementation Determinants: A Survey of South African Manufacturing Firms



Thomas Nyahuna and Mishelle Doorasamy

Abstract This study analyses the factors influencing the application of accounting information systems in South African manufacturing companies post-COVID-19. Accounting information quality is quantified by a multidimensional scale that includes system quality, information quality and usefulness. A survey of 412 accountants and auditors was selected to collect data to test the study's hypotheses. The study tested hypotheses using SPSS version 24. The main results indicate that both management commitments and company resources significantly influence the implementation of accounting information systems. In addition, user training and data quality also significantly impact the implementation of accounting information systems. COVID-19 offered no drive for companies to implement accounting information systems. This study provides empirical evidence on how poor management commitment, limited company resources and user training influence management decision-making from the viewpoint of accounting information quality. Therefore, this provides evidence-based information for managers to improve their commitment to and perceptions of accounting information systems. Based on the findings, the study recommends wide-ranging training programmes to attain adequate knowledge of the implementation of accounting information systems and the significance of data quality. This paper contributes theoretically to nonfinancial metrics for quantifying variables hindering accounting information system implementation in South Africa.

Keywords Accounting information system · Management commitment · User training · Accountants · Auditors · Survey

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1 Introduction

In an extremely brief period, COVID-19 had the most important effect across the corporate sector. As a result of this uncertainty, companies had to proactively evaluate their strategic approach to COVID-19 to ensure sustainability. This includes the value of their assets. This highlights the importance of the accounting information system (AIS) as a survival tool for businesses to employ in their day-to-day operations. This is important because COVID-19 exerted remarkable pressure on industry and business players.

Recently, AIS has increasingly gained a solid ground to demand corporate attention, particularly since the emergence of COVID-19. A system for corporate managers and decision-makers is to make informed decisions linked to issues in organizations. This implies that if the accounting information system is inaccurate, concerned users will arrive at ill-informed decisions that have the potential to cripple business operations. As such, failure to adopt effective accounting information systems will culminate in adverse implications for corporations' growth and well-being. This is particularly important considering the devastating implications of COVID-19 on business performance globally.

The extant empirical evidence has stressed the importance of AIS in corporate governance. This approach ensures that the internal controls are efficiently implemented with the assistance of a well-designed accounting information system. This demonstrates the importance of accounting information systems for attaining sustainable business success (Azhar, 2015). Hence, Rani and Kidane (2012) argue that the accounting information system remains a central determinant of a successful organization, as it helps organizations develop long-term plans. More specifically, Laudon and Laudon (2013) disclosed that accounting information systems function as a coordinating tool that converts resources into skills. In other words, the use of accounting information systems empowers organizations to attain improved performance (Loan, 2020). Thus, the accounting information system is a core element of the wider business sustainability agenda. As stated by Rommey and Steibart (2017), AIS is defined as "tool which, when incorporated into the field of Information and Technology systems (IT), were designed to help in the management and control of topics related to firms' economic-financial area". AIS encompasses human objects and equipment, namely, "hardware, software, databases and network communication" (Salehi, 2011). In other words, AIS can best be described as a system for gathering, evaluating and formulating financial data for the use of policy shapers.

Despite the importance of accounting information systems for organizational performance being well documented (Ali et al., 2019; Ha, 2020; Loan, 2020), it remains vital to scientifically comprehend the factors that push businesses to adopt accounting information systems, particularly after COVID-19. Has COVID-19 played a critical role in motivating the corporate sector to adopt accounting information systems? Additionally, even though various factors affect the use of AIS systems (Fitrios, 2016; Hazar & Mohamed, 2013; Harash et al., 2014), studies investigating these factors remain scarce in emerging markets (Mulyani & Arum,

2016), such as South Africa. In other words, prior studies largely concentrate on studies outside South Africa. This is problematic because the global world has advanced in technology, resulting in an increase in factors affecting the implementation of accounting information systems, particularly in the case of companies in developing countries. To narrow this gap in the literature, this paper empirically investigates the factors affecting the use of AIS and internal control quality in South African manufacturing firms. In turn, this is likely to assist in offsetting such impediments and, in the long run, motivate various stakeholders to eliminate research-identified factors limiting the use of AIS.

2 Literature Background

In the prior literature, the factors influencing AIS adoption and internal control quality have failed to yield conclusive results. Many studies have focused on human resources (Ali et al., 2019), management commitment (Kanakriyah, 2016) and data quality (Ali, 2016) in contexts diverse from South Africa. This is important because different countries have different information technology standards and levels (Srivastava & Lognathan, 2016). Therefore, when identifying the factors influencing AIS adoption in an organization, it is necessary and important to distinguish the national outlook. This emphasizes the fact that AIS is a context-dependent subject (Nguyen & Ho, 2021).

Various variables related to human resources have been identified as key to an effective AIS. Scholars contend that human resources are a strategic element of AIS. Furthermore, human resources have been posited to be a source of sustained competitive advantage. Contemporary research by Nguyen and Ho (2021) provides scientific evidence that human resources are vital for ensuring the success of a corporation's AIS. According to Ha (2020), in a Vietnamese study, the human resources department ensures that employees are properly trained to use AIS, which is an important indicator for assessing the effectiveness of AIS. In a similar context, Salehi (2011) also observes that human resources are a pivotal factor in having quality internal controls. One key element of human resources is user training. Training is viewed as a process through which employees obtain the skills to attain organizational goals (Romney & Steibart, 2017). Training is important for increasing the knowledge and skills of staff for a specific purpose. This means making available new skills for staff. Consequently, Loan (2020) acknowledges that training is a vital activity in the adoption of AIS. This is hinged on the view that a trained workforce is more likely to easily endorse the company's information technology assignments.

As stated by Romney and Steibart (2017), management commitment is "engaging in and maintaining behaviors that help others achieve the goals". Laudon and Laudon (2013) proposed that top management commitment amplifies the application of AIS. This is because the absence of management commitment deters employees from building confidence in using AIS. In this context, Wisna (2015) noted that low management commitment also suggests limited information system resources

available to management for information systems projects. For instance, management may avoid funding staff training because they are not in sync with the information systems projects at hand. A recent study in Indonesia by Meiryani et al. (2019) revealed that low management commitment adversely affects both AIS adoption and the quality of internal controls. The authors further argue that this emanates from management's lack of appetite to make available resources for human development. Despite its attractiveness, management commitment has been an issue of theoretical controversy; it remains empirically unclear why managers are less interested in adopting AIS as a source of innovation strategy in emerging markets (Qader et al., 2021). This controversy has been somewhat explained by theoretical arguments that some managers want to be in a corporate environment that empowers looting and corruption (Sorguli & Al-Kake, 2020). In another study in Mexico, Mulyani et al. (2016) reported that management commitment has no significant effect on AIS implementation. This provides further evidence that there is no consensus on the effect of management commitment on AIS implementation. This is a result of the dearth of scientific evidence grounded in firm-level and cross-sector studies in developing countries, particularly in Southern Africa.

3 Research Methodology

3.1 Data Collection

An online personal questionnaire was adopted as an instrument to collect the data. This approach has been applied to 412 auditors and accountants in manufacturing companies in South Africa. Specifically, 412 emails were sent to the auditors, and accountants received a total of 119 valid questionnaires, for a response rate of 36.9%. The assessments were achieved by applying seven-point Likert scales (1, strongly disagree, and 7, strongly agree). The scales were revised from prior studies to ensure content validity. To assess the reliability of the questionnaire, Cronbach's alpha was calculated to determine the reliability and internal consistency of the questionnaire. A commonly quoted least threshold for the Cronbach's alpha is 0.70 (Hair et al., 2010). However, this paper's Cronbach's alpha reached 91.6%, which supports the internal reliability of the scale.

The dimensions of the AIS were quantified on a scale of four proxies grounded on the items proposed by Sorguli and Al-Kake (2020).

4 Results and Discussion

This section aims to investigate the information that was gathered through the survey with the end goal of comprehending the factors affecting the use of AIS and the quality of internal control in South African manufacturing companies.

5 Social Demography

This section describes the social demographics of the respondents with the aim of identifying the factors affecting the use of AIS and internal control quality in South African manufacturing companies. Table 1 shows that 53% of the respondents were male. This implies that the manufacturing sector in South Africa depends more on men than women. According to the results, 64% of the respondents were aged 20–40 years. The questionnaires were answered more often by younger generations. This finding resonates with a greater number of respondents, 52.2%, who only possessed a first degree. This shows a significant trend of 81.1% of respondents having less than five years of experience in their jobs. This illustrates that the sampled companies do not maintain a large percentage of employees with experience.

The main results indicate that both management commitments and accountant resources significantly influence accounting information implementation and the internal control quality system through mediating variables. In addition, user training has a significant impact on the implementation of accounting information systems.

Table 1 Social demographics of the respondents (*n* = 119)

		Percentage
Gender	Male	53
	Female	47
Job title	Accountants	56
	Auditors	44
Age group	20–40	64
	41–65	36
Education	Bachelor	52.2
	Master	37.4
	PHD	10.4
Experience	1–5 years	81.1
	6–10 years	11.6
	More than 10 years	7.3

Source: Author’s own construct

6 Accounting Information Systems

First, as indicated in Table 2, 65.6% of the respondents confirm that management commitment plays a vital role in influencing the adoption of AIS in South African manufacturing firms. This provides empirical evidence that without management support, AIS can be of no relevance in a company. These findings concur with those of Al-Hiyari et al. (2013), who studied the factors affecting the implementation of AIS in a Malaysian university. Therefore, the absence of commitment remains a critical variable obstructing manufacturing companies from effectively implementing AIS. This study's findings support the idea that managers in some cases employ subjective perceptions that can adversely affect the corporation.

Second, user training was identified by the respondents as one of the chief determinants of using AIS. This highlights the importance of human resources in organizations to ensure that employees are appropriately trained to meet the theoretical and practical needs of the job at hand. In this study, 53.8% of the respondents agreed that user training is important for determining AIS implementation. In contrast, without user training, AIS adoption is not relevant. Therefore, our findings provide additional evidence related to the determinants of AIS application to other countries (Al-Hiyari et al., 2013; Azhar, 2015; Ha, 2020), despite the diversity of the operating environment.

Third, we find that the availability of resources is key to AIS adoption. In that sense, the extant literature has proven that the availability of resources is an antecedent of the AIS of use in various contexts. Therefore, we contribute to the contemporary literature by showing the importance of the availability of resources in AIS applications, particularly from an emerging market perspective. Moreover, the availability of resources is a crucial indicator of the cognitive development underlying the resource allocation decision of an organization.

Regarding the quality of the data, we found that this is of paramount importance in determining AIS use. Our empirical evidence indicates that respondents acknowledge the absence of high-quality data in their mainstream operations, which has a

Table 2 Factors influencing the use of accounting information systems

Indicator		Frequency	%	Mean	SD
Management commitment	Strongly agree	78	65.6	1.43	0.433
	Strongly disagree	41	34.4		
User training	Strongly agree	64	53.8	3.12	0.764
	Strongly disagree	55	46.2		
Availability of resources	Strongly agree	62	52.1	2.75	0.649
	Strongly disagree	57	47.9		
Data quality	Strongly agree	60	50.4	2.74	0.556
	Somewhat agree	59	49.6		
Organizational culture	Strongly agree	56	47.1	2.93	0.364
	Strongly disagree	63	52.9		

Source: Author's own construct

direct effect on AIS use. This means that low-quality data lead to low AIS adoption. This provides a scientific basis for ensuring optimal data quality for the manufacturing sector in South Africa. In the same vein, this provides evidence that the manufacturing sector in South Africa is not assigning an enormous value to the fact that data are of a quality nature for sound decision-making. In summary, the attained outcome validates the view of accountants and auditors that poor data quality has an adverse effect on their AIS application. Therefore, a better focus on data quality culminates in a greater value of trust in decisions related to data quality (Nguyen & Ho, 2021).

Finally, the respondents viewed organizational culture as having no material influence on AIS implementation. In this case, 52.9% of the respondents confirm that organizational culture leads to low influence or effect on AIS. The current findings support Trigo et al.'s (2016) findings that organizational culture remains a central element of AIS application.

7 Hypothesis Testing

After the survey results were obtained, the study developed and tested a hypothesis. This was necessary to assess whether there was a relationship between AIS implementation and the variables (management commitment and user training) identified in the study.

According to the above theoretical framework in Fig. 1, the following hypothesis is proposed:

H1: Management commitment and user training significantly determine AIS use.

The study employed ordinal scale data. To transform the data to regression analysis, ordinal scale data are converted by the method of successive intervals into an interval scale. The statistical program SPSS (Statistical Package for the Social Sciences) was used to test the hypotheses. The regression equation used in this study is described in the second structural equation as follows:

The Statistical Package for the Social Sciences (SPSS) version 24 was used to evaluate the hypotheses. Additionally, the regression equation is the following:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + e$$

X_1 = top management commitment

x_2 = user training

Y = accounting information system

H1: Management commitment and user training significantly determine AIS use.

Using SPSS version 24, the following equation was used for data processing:

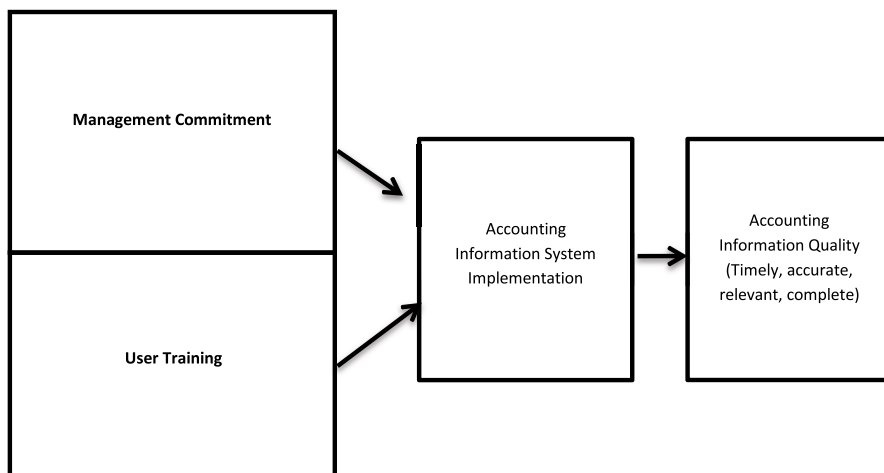


Fig. 1 Hypothesis formulation. Source: Author's own construct

Table 3 Accounting information systems—model summary

Model summary									
Model	<i>R</i>	<i>R</i> square	Adjusted <i>R</i> square	Std. error of the estimate	<i>R</i> square change	Change statistics			Sig. <i>F</i> change
						<i>F</i> change	df1	df2	
1	.882 ^a	.778	.778	.02763	.778	—	—	—	—

Source: Author's own construct

^aPredictors: top management and user training

$$Y = 0.653 + 0.172^* \text{Top management} + 0.612^* \text{User training}$$

The regression equation proves that every upswing in the level of top management's commitment and user training will augment AIS implementation by 0.172 and 0.612, respectively. The adjusted *R* square as depicted in Table 3 indicates a value of 0.778, which demonstrates that top management and user training have 77.8% capacity to explain AIS adoption. This explains 43.9% of the variance explained by the other indicators.

The findings, as depicted in Table 4, indicate that the commitment of top management and user training concurrently impact AIS adoption significantly, with a material value of less than 0.01. Therefore, top management commitment and user training have a direct significant influence on the quality of information used for corporate decision-making. According to Trigo et al. (2016), this stems from the fact that an AIS is directly responsible for providing information for a firm's decision-making.

Table 4 ANOVA for AIS

ANOVA					
Model	Sum of squares	Df	Mean square	<i>F</i>	Sig.
Regression	371.89	0	.002	0	.000
Residual	12.17	535	.000		
Total	384.06	535			

Source: Author’s own construct

8 Conclusions

This study empirically investigates the factors that determine AIS implementation in the South African manufacturing sector. Additionally, it quantitatively tests the relationship between AIS adoption and two other variables identified from the survey results, namely, top management commitment and user training. We collected novel data on accountants’ and auditors’ views of the factors that deter AIS adoption using an online questionnaire. The study results indicate that COVID-19 did not play a significant role in inspiring companies to apply accounting information systems.

From a theoretical standpoint, we arrive at two major observations and results. First, top management commitment, user training, the availability of resources and data quality play direct roles in determining AIS. This result provides a prime view of the professional significance of making management aware of the effect of being noncommitted on AIS use from an emerging market perspective. Not all managers perceive AIS to be important for the survival of the organization. Additionally, other factors, such as low user training and resource availability, are directly linked to top management’s commitment to AIS adoption. This shows that top management’s commitment to AIS implementation once addressed improves many other variables that obstruct AIS adoption by South African companies. In this way, we concur with prior research reports that top management commitment is a key factor in ensuring the successful use of AIS within the corporate sector (Srivastava & Lognathan, 2016; Ali, 2016; Kanakriyah, 2016). In this case, we demonstrate the relevance of top management commitment in ensuring that AIS plays a fundamental role in organizational growth by ensuring high-quality AIS. In that way, our findings provide additional evidence for the effect of user training and top management commitment as determinants of AIS implementation in other developed countries.

Second, we also demonstrate that organizational culture is not important for AIS adoption from an emerging market perspective, although it is important for AIS use. However, this was not mathematically tested. This provides fertile ground for future research.

Overall, the current research largely suggests that top management commitment plays a larger role in determining AIS in South African manufacturing companies. On the other hand, other factors need to be regularly evaluated, and their effects should be ascertained to determine the amount of attention they require. Furthermore, our study proposes a clear call for better consideration of some of the governance

provisions in South Africa that are in sync with decreasing the quantity and increasing the quality of information that companies need to provide and submit to stakeholders. This may encourage companies to invest and ensure that an effective AIS is in place. For instance, a lower quality of information can be used as a basis of problems for companies when trying to access financing, hence leading to reduced competitiveness of those companies.

Finally, it should be noted that the physical scope of the research is restricted to South Africa and that we objectively focused on one industrial sector—the manufacturing sector. In this sense, South Africa has comparable features to other South African countries in terms of AIS relevance.

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Data Security in Accounting and Information Management During the COVID-19 Pandemic



Oluwayemi IbukunOluwa Odularu

Abstract This chapter discusses the significance of data security in accounting and information management during the COVID-19 pandemic. With the widespread adoption of remote work and information management, maintaining data security has become increasingly critical. The Information Security Management Framework (ISMF) is the theoretical framework adopted for the study. It provides a structured approach to comprehensively manage, protect, and secure information assets, aligning seamlessly with the evolving landscape of technology, remote work, and increased cyber threats. A systematic literature review was the methodology adopted for the study, while an inclusion and exclusion research design was adopted for the chapter. Furthermore, six databases were utilized for the chapter, namely, Google Scholar, EBSCOhost, Oracle Financials, Springer Link, QuickBooks, and Web of Science. While there is literature on data security in general, there is a notable absence of research explicitly reviewing the contributions of accounting and information management interventions in addressing data security concerns during the COVID-19 pandemic. Future research will focus on the effectiveness of various cybersecurity measures, protocols, and frameworks implemented by information professionals to protect sensitive financial data during the pandemic.

Keywords Data security · COVID-19 · Remote work · Information management · Cloud services · Cybersecurity · Encryption · Multifactor authentication (MFA) · Compliance · Information Security Management Framework (ISMF) · Endpoint security · Data breaches · Phishing attacks · Virtual private networks (VPNs) · Security awareness training · Financial data · Cloud computing · Access control · Data encryption · Cyberattacks · Risk management · Secure cloud solutions · Data integrity · Security protocols · Organizational control · Sensitive information · Data privacy · User education · Cyber threats · Security measures

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1 Introduction

The emergence of the COVID-19 pandemic, attributed to the novel coronavirus SARS-CoV-2, has become apparent. It one of the most profound global challenges in recent history (Javanmardian et al., 2020; Aljawarneh & Al-Najjar, 2021). This crisis began in late 2019 and has sent shock waves through societies, economies, and institutions worldwide, fundamentally altering how individuals and organizations operate. Understanding the pandemic's influence on critical sectors such as accounting and information management is essential for comprehending the challenges, transformations, and imperatives these domains face in these turbulent times (Al-Hajj & Shubita, 2020). The World Health Organization (WHO, 2020) officially declared the COVID-19 pandemic on March 11, 2020. This declaration signalled the gravity of the situation and set in motion a series of unprecedented responses from governments, businesses, and organizations across the globe. Information management professionals have expertise in managing and securing information resources, and their skills are particularly relevant in ensuring data security during remote work and digital communication. According to Arunprasad et al. (2022), the COVID-19 pandemic has accelerated the adoption of remote work practices, increasing reliance on digital platforms and communication tools. This shift has created new vulnerability risks, making implementing robust data security measures essential. Information centres have historically been guardians of information security. They have played a crucial role in safeguarding sensitive data by developing and implementing security protocols, user education programmes, and access control mechanisms (Amankwah-Amoah et al., 2021). In the context of the COVID-19 pandemic, information management professionals can leverage their expertise to adapt existing security frameworks and practices to the unique challenges of remote work and digital collaboration. Furthermore, information management professionals can support accounting professionals by granting access to pertinent resources and information for effective data security practices (Wang et al., 1998). They can curate and disseminate up-to-date information on emerging threats, best practices, and legal requirements related to data security during the pandemic (Arunprasad et al., 2022). Baker et al. (2020) emphasized the need for continuous professional development and training for information management professionals to keep pace with evolving data security threats and technologies. Continual learning and staying abreast of emerging trends in cybersecurity are essential for information management professionals to effectively contribute to data protection efforts in accounting and information management during the pandemic (Baker et al., 2020). Their expertise in managing information resources, implementing security protocols, providing user education, and staying informed about emerging threats make them valuable contributors to maintaining data security in these challenging times. The pandemic has disrupted traditional accounting practices in the accounting sector, such as face-to-face meetings and paper-based documentation. Many accounting firms have had to switch to virtual meetings and electronic document management systems to maintain business continuity (DeLone and

McLean, 2003). The pandemic has also increased the demand for financial forecasting and risk management services (Amankwah-Amoah et al., 2021). The pandemic has highlighted the importance of data analytics and digital transformation in the information management sector (McLean et al., 2020). The pandemic has also accelerated the adoption of cloud-based storage and collaboration tools.

2 The Importance of Data Security in Accounting and Information Management

The importance of data security in accounting and information management cannot be overstated, particularly in the contemporary digital age, where organizations handle vast amounts of sensitive financial and personal data (Wang & Emurian, 2005; Smith, 2020). Data security is not only a legal and ethical imperative but also critical for the smooth functioning of businesses and for safeguarding the trust of stakeholders (Belleflamme et al., 2020). Data security plays a fundamental role in upholding the confidentiality, integrity, and availability of financial information (DeLone and McLean, 2003). This is crucial for maintaining the integrity of financial transactions and preventing unauthorized access, alteration, or disclosure of sensitive data (Wang & Emurian, 2005). The loss or compromise of financial data, including sensitive accounting information, can have severe consequences (Belleflamme et al., 2020). This can result in financial fraud, identity theft, regulatory violations, and reputational damage. Consequently, organizations must implement robust security measures to protect financial data and comply with data protection regulations such as the General Data Protection Regulation (GDPR) in Europe or the Health Insurance Portability and Accountability Act (HIPAA) in the healthcare industry (Smith, 2020). Moreover, data are pivotal in building and maintaining trust with customers, clients, and stakeholders. Individuals and organizations are increasingly concerned about the safety of their financial and personal information (Brown & White, 2021). A data breach has the potential to undermine trust and harm an organization's reputation, resulting in financial losses and customer attrition (Davis, 1997; Wang & Emurian, 2005). In accounting and information management, where accuracy, reliability, and integrity are paramount, data security is vital for ensuring the veracity of financial reports and decision-making processes (Romney & Steinbart, 2018). Data breaches or unauthorized access can compromise the reliability of financial statements, leading to financial misstatements and legal repercussions (DeLone & McLean, 2003). Therefore, data security is a technical concern and a critical component of risk management, corporate governance, and business continuity planning in accounting and information management (Brown & White, 2021).

2.1 *Research Aim*

The research aim of this study is to assess the influence of data security on accounting and information management during the COVID-19 pandemic.

2.2 *Research Question*

What is the influence of data security on accounting and information management during the COVID-19 pandemic?

2.3 *The Research Problem*

As organizations worldwide rapidly transitioned to remote work setups to sustain operations during the pandemic, the need to ensure robust data security measures became more critical than ever before (Li et al., 2020). However, despite the growing recognition of the importance of data security, there remains a notable gap in research specifically examining the contributions of accounting practices and interventions in information management to mitigating data security risks in the context of the COVID-19 pandemic (Smith et al., 2020). While the literature offers insights into data security in general, inadequate studies have focused on the unique challenges and strategies employed within the accounting and information management domains during the ongoing global health crisis. Therefore, this study seeks to address this research gap by investigating the effectiveness of various data security measures, protocols, and frameworks implemented to safeguard sensitive financial data during the COVID-19 pandemic. Thus, this research aims to provide valuable insights into the evolving landscape of data security in accounting and information management during times of crisis to enhance organizational resilience and mitigate cybersecurity risks in the face of future challenges.

3 *The Significance of the Chapter*

According to Smith et al. (2020), data security has always been a critical topic of discussion in accounting and information management. However, the advent of the COVID-19 pandemic has brought these concerns to the forefront, amplifying their importance and adding new dimensions to organizations' challenges (Li et al., 2020). This study, therefore, holds relevance for various stakeholders. Furthermore, Johnson and Davis (2021) stated that the COVID-19 pandemic forced a sudden and unprecedented shift towards remote work and digital solutions, and accounting/

information management organizations had to adapt quickly to this new operational landscape. As a result, the chapter offers valuable insights to organizations seeking to navigate the complexities of data security during and beyond the pandemic. Hence, organizations can enhance their resilience in the face of future disruptions (Pandey et al., 2020; Krishnan et al., 2005). This study can guide best practices and technologies to help individuals adapt to changing work environments while maintaining data integrity and confidentiality. As Brown stated, from an academic perspective, this research contributes to studies on the pandemic's influence on established data management practices and offers a foundation for further scholarly investigation. Researchers and scholars can build upon this work to delve deeper into specific aspects of data security during crises and remote work scenarios (Li et al., 2020). The study also aligns with the academic interest in information security, ethical considerations, and digital transformation, which have recently gained prominence. It addresses the intersection of these fields in the context of the pandemic, providing fertile ground for academic exploration strategies (Krishnan et al., 2005). The importance of personal, financial, and sensitive information security in today's data-driven world, highlighted by Johnson and Davis (2021), has been further underscored by the accelerated digitalization of the COVID-19 pandemic. This study aims to deepen the understanding of the data protection strategies and ethical considerations surrounding data management, emphasizing the potential consequences of security lapses for organizations and communities (Li et al., 2020). These findings have significant policy implications, informing government and regulatory bodies on the challenges exposed during the pandemic and guiding the development of data security regulations (Li et al., 2020). Moreover, organizations can bolster their resilience by investing in robust data security strategies, potentially mitigating the financial impact of breaches and disruptions (Krishnan et al., 2005). Ethically, this study sheds light on decision-making processes in data management, stressing the importance of upholding ethical standards and legal safeguards in light of potential liabilities (Johnson & Davis, 2021). Education and training providers can integrate these insights into their curricula to better prepare students and professionals for the evolving landscape of data security in the postpandemic world (Brynjolfsson & Horton, 2020). Overall, the COVID-19 pandemic has profoundly influenced various sectors, including accounting and information management, underscoring the urgency of addressing data security concerns in today's rapidly evolving digital environment (Brynjolfsson & Horton, 2020).

4 Theoretical Framework

4.1 Information Security Management Framework

According to Tajammul and Parveen (2017), the Information Security Management Framework (ISMF) is a comprehensive and widely utilized theoretical model for addressing data security challenges in accounting and information management, particularly in the context of the COVID-19 pandemic. It offers a structured approach to managing, protecting, and securing information assets, aligning effectively with the evolving landscape of technology, remote work, and heightened cyberthreats. The key components of the ISMF include rigorous risk assessment and management, clear information security policies and procedures, robust access control mechanisms, security awareness and training initiatives, and a well-defined incident response and recovery protocol. During the pandemic, when remote work introduces additional vulnerabilities, thorough risk analysis becomes essential for identifying and mitigating potential security breaches. Clear guidelines on data access, transmission, and storage are crucial, as are access control measures and multifactor authentication to prevent unauthorized access. Cultivating a security-aware culture through continuous training programmes is vital, as is implementing appropriate technological measures such as encryption tools, firewalls, and antivirus software. By integrating these elements, the ISMF equips organizations with a strategic framework to navigate the evolving threat landscape and safeguard sensitive data, ensuring confidentiality, integrity, and availability (Fig. 1). In summary,

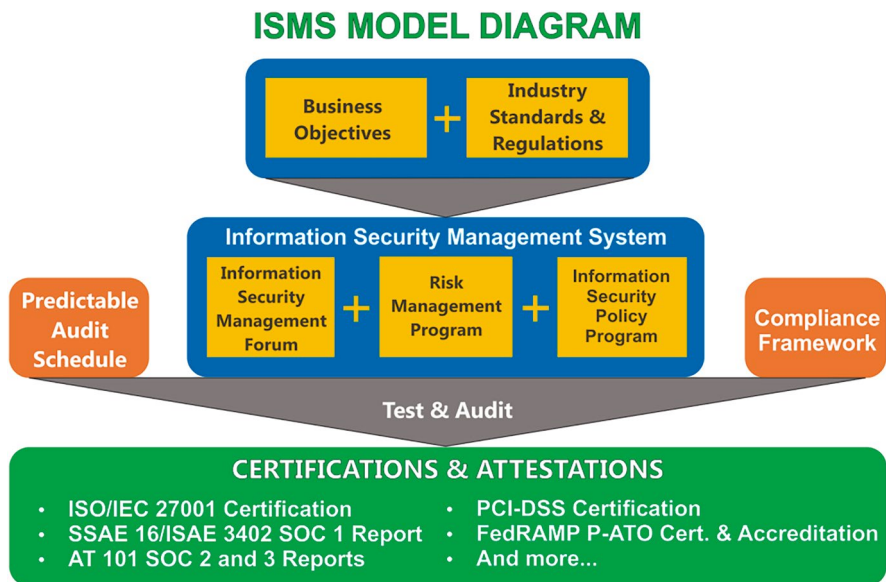


Fig. 1 ISMS for Microsoft’s cloud infrastructure (Source: Tajammul and Parveen (2017))

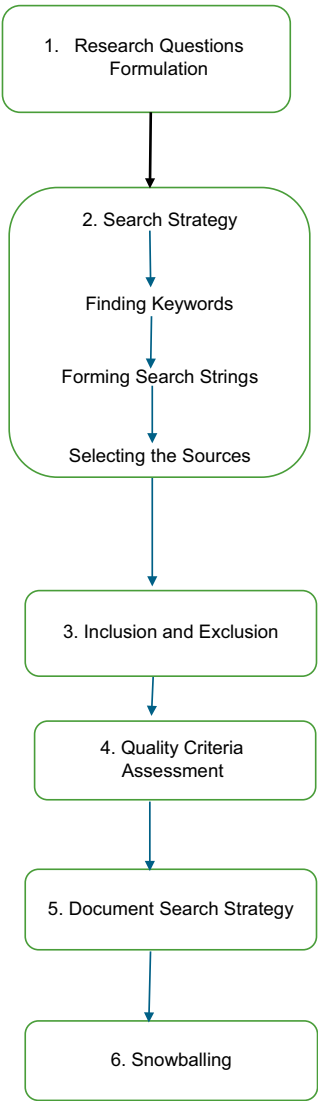
the ISMF model in Fig. 1 serves as a guiding framework for organizations seeking to bolster their information security posture amidst the dynamic challenges posed by the ongoing pandemic.

Combining the programme elements of multiple regulations and compliance obligations into this singular ISMS programme can improve the organizational accounting and information management focus (Goff, 2003). The results include more coordinated executive decision-making, policy analysis and revision with clear accountability for the acceptance of exceptions, and rigorous compliance testing that ensures the effectiveness of the controls in use (Goff, 2003). This level of maturity in information security management helps in meeting certification and attestation obligations for cloud infrastructure. Earning and maintaining such credentials proves that organizations adopting this theory can run an effective information security programme.

5 Research Methodology

A systematic approach is essential for addressing data security concerns in accounting and information management during the COVID-19 pandemic. This methodology ensures that organizations can effectively protect sensitive financial data and maintain the integrity of their information systems despite unprecedented challenges. This study adopts a systematic literature review methodology to comprehensively synthesize the literature, enabling an exploratory and interpretive analysis of the topic. Employing exclusion and inclusion criteria within a narrative systematic approach allows for a deeper understanding of professionals' experiences and organizations' strategies in safeguarding sensitive data during the pandemic. By focusing on individual experiences, this design captures the human aspect, making the research more relatable and applicable. The research question guides the review process, identifying the role of data security in accounting and information management during the pandemic. The inclusion criteria specify recent studies conducted amid the pandemic focusing explicitly on data security in this context. Data extraction and analysis involved organizing relevant information from selected studies and synthesizing common themes and insights related to the role of data security in accounting and information management. The findings are logically reported, incorporating identified themes and subthemes to explore connections and implications for data security practices. The methodology illustrated by Fig. 2 ensures the accuracy and rigor of the systematic literature review results, which were adapted and modified from the methodology proposed by Liao et al. (2020).

Fig. 2 The research process (Source: Liao et al. (2020))



5.1 Research Questions

What is the role of data security in accounting and information management during the COVID-19 pandemic?

5.2 Search Strategy

The search strategy consists of three steps, as defined below:

Finding keywords: To find keywords related to the topic, the author chose the words that were deemed to be the most relevant to the systematic literary review topic and those most accurate from among the search words.

Forming search strings: From the selected words, two strings were used in the search process:

“Data security and privacy” AND (“accounting” OR “information management”) AND (“COVID-19” OR “COVID-19” OR “COVID-19 virus” OR “COVID-19 pandemic”).

“Privacy” AND (“mobile application” OR “apps”) AND (“COVID-19” OR “COVID-19” OR “COVID-19virus” OR “COVID-19 pandemic”) AND (“contact-tracing” OR “data” OR “data protection” OR “privacy protection”). This systematic literary review focuses on three subjects: “COVID-19” and “data security” in “accounting” and “information management”. To ensure coverage of all papers across the field, we chose synonyms for each term. In the first string, the results will be general, including any papers mentioning the three main subjects. In the second string, we narrowed the results to papers related to “contact tracing” and combined them with keywords related to this term.

Selection sources: For the research process, the author selected six (6) databases. They are the most reliable and provide the highest quality of research: Google Scholar, EBSCOhost, Oracle Financials, Springer Link, QuickBooks, and Web of Science.

5.3 Inclusion and Exclusion Criteria

After exploring all the databases, we obtained 98 papers, which decreased to 72 papers after duplication removal. The authors further filtered the papers by reading titles, keywords, and abstracts, and four more papers were removed. This process yielded 68 papers.

5.4 Quality Assessment Criteria

The 68 papers from the previous step were read thoroughly and checked against quality assessment questions. The author evaluated the research questions, which were weighted to 1 point for yes, 0 points for no and 0.5 points for partial. Papers that scored two points or more were included in the final collection. Papers scoring less than two points were reviewed by a team member and rescored. Papers still scoring less than 2 were excluded.

5.5 Document Search Strategy

After assembling the final collection of papers, the author assigned each paper to its databases.

5.6 Snowballing

Snowballing, in the context of academic research, refers to a method used to expand a literature review or gather additional references by following citations or references from already identified sources. It involves starting with a few key articles or sources relevant to the research topic and then examining their reference lists or citations to identify additional sources that may also be pertinent to the research. This process continues iteratively, with each newly identified source potentially leading to the discovery of further relevant literature. Snowballing is particularly useful in uncovering less well-known or recent studies, as well as in exploring niche or specialized topics where the literature may not be extensive (Chen et al., 2021). For better comprehensiveness of this paper, the author conducted forward snowballing to cover all the papers related to the topic. After reading the titles of the papers' references, we obtained 98 papers in the first stage. After reading the abstracts, the number decreased to 72 papers, with the exclusion of 16 papers. The authors read the papers in their entirety and performed quality assessment. This process was repeated until no more studies were excluded, resulting in 68 papers.

6 Literature Review

6.1 Data Security Accounting and Information Management Pre-COVID-19

The exploration of data security practices in accounting and information management reveals its deep-rooted significance, with the rise of computerized systems marking a significant turning point in the late twentieth century. Regulatory frameworks such as the GLBA and GDPR impose rigorous data protection requirements, emphasizing compliance as crucial for maintaining trust. Despite technological advancements enhancing data protection, the proliferation of mobile devices and cloud computing has introduced new risks. Persistent data breaches led organizations to invest in breach detection, response mechanisms, and employee training. Balancing digital convenience with security imperatives requires robust risk assessments and technologies such as firewalls and access controls. Data classification and access control became foundational principles, ensuring that only authorized personnel could access sensitive information. Rigorous due diligence and incident

response planning were essential, recognizing breaches as inevitable. The pre-pandemic landscape emphasized regulatory compliance, technological advancements, employee training, and incident response planning as central elements. However, the COVID-19 pandemic later introduced new challenges, redefining data security priorities in these sectors.

6.2 Implications of COVID-19 for Organization

Organizations effectively addressing data security challenges during remote work have demonstrated adaptability and resilience (Shrivastava et al., 2016). They showed that they could maintain security under challenging circumstances. Additionally, the shift to remote work accelerated the adoption of innovative technologies. Organizations invested in new security solutions and tools, fostering technological innovation in data security. Additionally, many organizations maintained remote work options even as the pandemic subsided. This decision has lasting implications for data security, as organizations need to ensure that security measures remain effective and adaptable. The influence of remote work on accounting and information management data security during the COVID-19 pandemic was substantial. It brought new challenges, required innovative strategies, and had lasting implications for organizations. This experience underscores the importance of data security in an ever-growing digital and remote work-centric environment. As organizations adapt to evolving work environments, data security remains critical for protecting sensitive information and maintaining business continuity (Shrivastava et al., 2016).

6.3 The Influence of COVID-19 Pandemic on Accounting

The pandemic had several notable influences on accounting, such as economic uncertainty, remote work, and operational challenges (Amankwah-Amoah et al., 2021). The pandemic created unprecedented economic uncertainty because financial markets experienced extreme volatility, and many businesses faced significant revenue losses or closures. Accountants and financial professionals had to adapt to rapidly changing economic conditions. The International Financial Reporting Standards (IFRS) guided the addressing of financial reporting challenges during the pandemic. Similarly, many accounting professionals have transitioned to remote work despite lockdowns and social distancing measures (Sarker et al., 2020). This transition created operational challenges related to secure data access, collaboration, and maintaining data security (Sarker et al., 2020). Professional organizations such as the American Institute of CPAs (AICPA) issued guidance on remote work security and compliance.

6.4 *The Influence of COVID-19 Pandemic on Information Management*

The pandemic disrupted information management, necessitating solutions for remote work, data access, and heightened data security challenges. Organizations swiftly adopted technologies such as VPNs and cloud services to ensure secure data access for remote employees. Accelerated digital transformation efforts led to increased reliance on digital platforms, prompting greater spending on cloud services and collaboration tools. However, the transition to remote work introduced vulnerabilities, with personal devices and home networks posing risks for potential data breaches. The pandemic's impact on global systems emphasized the importance of resilient and secure data management practices in accounting and information management. This study extends beyond the immediate crisis, offers implications for various stakeholders, and aims to enhance the understanding of data security challenges during crises and remote work to bolster organizational and individual resilience.

7 Information Security Frameworks and Compliance Measures in Accounting and Information Management

According to Oppenheim et al. (2004), in today's digitally driven world, protecting sensitive data and information has become a top priority for organizations across various industries. This is particularly true in accounting and information management, where the confidentiality and integrity of financial data, personal records, and proprietary information are paramount. As organizations strive to safeguard their data from evolving cyberthreats, it is essential to establish robust information security frameworks and adhere to compliance measures to mitigate risks effectively. This chapter offers a comprehensive overview of information security frameworks, standards, and compliance measures relevant to accounting and information management. It focuses on their significance, key components, and role in ensuring data security (Oppenheim et al., 2004).

8 Significance of Information Security Frameworks

Information security frameworks play a crucial role in organizations, particularly in accounting and information management, where safeguarding sensitive financial data is paramount. These frameworks aid in managing risks, ensuring compliance, maintaining data confidentiality and integrity, and ensuring business continuity. They are designed to identify, assess, and mitigate risks associated with data breaches and cyberattacks, enabling organizations to proactively protect their

information assets (Yan et al., 2020). Moreover, many frameworks align with regulatory and industry-specific compliance requirements, ensuring adherence to data protection laws and standards. By following established frameworks, organizations can secure sensitive information, maintain data integrity, and quickly recover from data breaches or disasters through disaster recovery and business continuity.

8.1 Critical Components of Information Security Frameworks

Information security frameworks guide organizations to implement effective security measures, consisting of key components such as policies and procedures, risk assessment, and access control. Policies and procedures establish rules and guidelines for managing access, handling data, and responding to security incidents. Risk assessment involves identifying vulnerabilities and threats to prioritize security measures. Access control is emphasized to mitigate human errors and control data access, supported by security awareness training for employees (Yan et al., 2020). Continuous monitoring of networks and systems is recommended for the prompt detection of security incidents. Incident response protocols ensure swift and effective responses to minimize damage in the case of breaches. Encryption plays a crucial role in maintaining data confidentiality, both in transit and at rest. Moreover, frameworks address compliance requirements, offering guidelines for audits and assessments to meet legal and regulatory obligations.

9 Relevant Information Security Frameworks

According to Shetty et al. (2021), several information security frameworks are relevant to accounting and information management, each with guidelines and principles. Some of the most notable frameworks include the ISO 27001, NIST Cybersecurity Framework, COBIT, and PCI DSS. The International Organization for Standardization (ISO) 27001 provides a globally recognized standard for information security management systems (ISMS). It offers a comprehensive approach to managing information security risks. NIST Cybersecurity Framework: Developed by the US National Institute of Standards and Technology (NIST), this framework focuses on improving critical infrastructure cybersecurity, making it suitable for organizations handling sensitive financial data. COBIT, which stands for Control Objectives for Information and Related Technologies, is a framework crafted by ISACA (Information Systems Audit and Control Association), offering guidance on the governance and management of IT and information security (Smith, 2020). Additionally, the PCI DSS (Payment Card Industry Data Security Standard) is specifically applicable to organizations handling payment card data, and the PCI DSS outlines security requirements for safeguarding sensitive financial information. Furthermore, HIPAA (Health Insurance Portability and Accountability Act): While

designed for the healthcare industry, HIPAA includes data security requirements relevant to organizations handling personal health information, which may be a component of accounting and information management (Yan et al., 2020).

9.1 Role of Compliance Measures

In addition to information security frameworks, compliance measures are vital for ensuring data security in accounting and information management (Yan et al., 2020). Compliance measures are established to align with relevant laws, regulations, and industry standards. They ensure that organizations adhere to specific requirements to protect data and maintain the trust of stakeholders (Smith & Johnson, 2019). Compliance measures offer the following benefits: legal adherence, trust and reputation, and reputation (Shetty et al., 2021). Compliance measures ensure that organizations follow data protection laws and regulations to diminish the likelihood of legal risks and consequences due to noncompliance. Compliance measures often include protecting personal data and reinforcing and reducing the risk of unauthorized access (Smith & Johnson, 2019). Organizations that demonstrate compliance with data protection regulations build trust with clients and stakeholders, enhancing their reputation. Compliance measures frequently encompass security best practices, reinforcing data security and minimizing the risk of data breaches. Many compliance measures define data retention and destruction policies, helping organizations manage data throughout their life cycle. It is also important to note that information security frameworks and compliance measures are integral to maintaining data security in accounting and information management (Shetty et al., 2021). These guidelines and standards provide organizations with a structured approach to mitigating risks, protecting sensitive information, and confirming compliance with legal and regulatory requirements. By implementing robust information security frameworks and adhering to relevant compliance measures, organizations can effectively safeguard their data assets, maintain stakeholder trust, and adapt to the evolving landscape of cybersecurity threats. In the digital age, where data are a valuable currency, the significance of these frameworks and compliance measures cannot be overstated.

10 Assessment of the Efficiency of Data Security Measures During the COVID-19 Pandemic

The COVID-19 pandemic has brought data security to the forefront of organizational concerns, with many businesses rapidly transitioning to remote work arrangements (Gentry, 2009). This shift has increased pressure on existing data security practices and necessitated the implementation of new measures. In this context,

assessing the effectiveness of these measures in addressing the challenges posed by the pandemic is crucial. The widespread use of remote work has been expedited by the COVID-19 pandemic revolutionizing how organizations manage financial data and sensitive information. While remote work offers flexibility and continuity during challenging times, it also presents significant challenges concerning data security in accounting and information management. This section will explore the influence of remote work on data security and discuss strategies to ensure secure information management during the pandemic, supported by relevant in-text references.

10.1 Influence of Remote Work on Data Security

The transition to remote work has significantly expanded the attack surface for cybercriminals. Employees now access financial data and sensitive information from various locations and devices, increasing the risk of security breaches (Mehra, 2020). Many remote employees use personal devices and home networks, which may lack the same security measures as corporate environments. This shift has raised concerns about data security (Aljawarneh & Al-Najjar, 2021). It is also imperative to state that secure data transmission and storage are critical because remote work relies heavily on digital communication. Unsecured connections and cloud services can compromise data security (Baker et al., 2020). The COVID-19 pandemic has revolutionized the work environment, making remote work an integral part of daily operations. However, expanding remote work has raised critical challenges related to data security in accounting and information management. To ensure the secure management of financial data and sensitive information during remote work, organizations must adopt a multifaceted approach that combines robust endpoint security, employee training, secure cloud solutions, encryption technologies, and multifactor authentication. These strategies are essential for promoting data security and preventing security breaches in the ever-evolving digital landscape.

10.2 Remote Work on Data Security in Accounting and Information Management During the COVID-19 Pandemic

The COVID-19 pandemic has improved the adoption of remote work, fundamentally transforming how organizations manage financial data and sensitive information. This shift brings new challenges and concerns related to data security in accounting and information management. This section will explore the influence of remote work on data security and strategies to ensure secure information

management during the pandemic. The influence of remote work on data security includes expanded attack surfaces, personal device usage, data transmission, and storage. Remote work has significantly expanded the attack surface for cybercriminals. Employees manage personal devices and home networks, which may not have the same level of security as corporate networks, making them more vulnerable to cyberattacks (Aljawarneh & Al-Najjar, 2021). Using personal devices for work introduces security issues, as sensitive work data may intermingle with personal information. This raises the risk of unauthorized access to corporate data or inadvertent data exposure (Cavoukian, 2020). Furthermore, remote work necessitates data transmission over the Internet and storage on personal or cloud-based platforms. This poses a risk if proper encryption and security measures are not in place, potentially leading to data leaks or breaches (Baker et al., 2020). Additionally, remote employees may lack the same security training and awareness level as when working in a controlled office environment. This knowledge gap can result in lapses in security practices (Cavelty, 2020). Regarding cloud solutions, the choice of reputable cloud service providers prioritizes data security. These providers often have robust security measures, including data encryption, access controls, and regular security audits (Khalil et al., 2020). Remote work has introduced new challenges to accounting and information management data security during the COVID-19 pandemic. To address these challenges, organizations must implement a combination of technical solutions, security training, and best practices. By focusing on endpoint security, encryption, MFA, and secure cloud solutions, organizations can mitigate the risks associated with remote work and protect sensitive financial data.

10.3 Challenges in Remote Work and Data Security Strategies

The shift to remote work, accelerated by events such as the COVID-19 pandemic, introduced significant challenges to data security. Due to the decentralized nature of remote work, organizations face vulnerabilities such as data breaches, cyberthreats, and lapses in information security. Understanding these challenges and implementing strategic measures to fortify data security became crucial as work dynamics evolved in a digital landscape. Challenges included device and network security, data access and sharing, increased phishing attacks, and compliance issues. Employees using personal devices and home networks have raised concerns about security vulnerabilities. Data access and sharing through personal cloud storage solutions pose the risk of data being stored outside organizational control. The surge in phishing attacks exploited uncertainties surrounding the pandemic, leading to data breaches. Compliance with data protection regulations became more complex with remote work practices. Strategies to enhance data security include multifactor authentication (MFA), virtual private networks (VPNs), security awareness training, and endpoint security. MFA strengthened user authentication by requiring multiple verification forms, VPN-encrypted Internet traffic for secure remote connections, security awareness training educated employees about remote work

risks, and endpoint security solutions to protect all devices connected to corporate networks from malware and unauthorized access.

10.4 Cloud Services and Data Security

The digital age has revolutionized how organizations conduct business and manage their operations. With the rise of cloud computing and increasing reliance on cloud services, organizations can enhance their flexibility, scalability, and efficiency (Pavlatos & Kostakis, 2015). However, this shift towards the cloud introduces new challenges and considerations, particularly in terms of data security. This chapter analyses the increased reliance on cloud services for remote work and their influence on data security. It highlights vital factors, risks, and strategies for ensuring data security in a cloud-centric environment. Cloud services encompass many offerings that allow organizations to store, access, and supervise their data and applications via the Internet rather than relying on local servers and infrastructure. Cloud services have recently gained significant traction, and the COVID-19 pandemic has magnified their importance (Waymire & Basu, 2011). Cloud services facilitated remote operations as organizations rapidly transitioned to remote work arrangements to ensure business continuity. This shift brought about the following advantages: remote access, scalability, cost efficiency, and collaboration. Cloud services support employees in accessing data and functions from anywhere with an Internet connection, promoting remote work capabilities. Organizations can easily scale their IT sources up or down based on demand, which is particularly beneficial during remote work scenarios (Pavlatos & Kostakis, 2015). Cloud services often follow a pay-as-you-go model, eliminating the need for extensive organization investment and maintenance. Many cloud-based tools and platforms facilitate collaboration among remote teams, fostering productivity (Al-Delawi & Ramo, 2020).

10.5 Challenges and Risks in the Cloud

While cloud services offer numerous benefits for remote work, they also introduce new challenges and risks to data security (Pavlatos & Kostakis, 2015). For example, cloud service providers can experience outages or data loss, affecting an organization's ability to access critical data and applications (Al-Delawi & Ramo, 2020). Additionally, cyberattacks on cloud services can lead to data breaches. Misconfigured cloud security settings can also provide sensitive information. Furthermore, it is essential to state that managing user identities and access privileges within cloud environments requires careful control to prevent unauthorized access. Additionally, data stored in the cloud should be adequately encrypted to protect it from potential breaches or unauthorized access (Al-Delawi & Ramo, 2020).

10.6 Data Security Strategies in a Cloud-Centric Environment

Organizations must adopt robust data security strategies to address the encounters and risks associated with an increased reliance on cloud services (Pavlatos & Kostakis, 2015). Organizations must stay updated with data protection regulations and ensure compliance with relevant laws (Ershadi & Forouzandeh, 2019). This includes understanding where data reside, who has access, and what security measures are in place. Furthermore, it is essential to implement a data classification system to categorize data based on its sensitivity (Waymire & Basu, 2011). This enables organizations to allocate appropriate security measures based on the data's classification (Al-Delawi & Ramo, 2020).

Additionally, data should be encrypted both in transit and at rest (Waymire & Basu, 2011). Cloud service providers often offer encryption features to protect data during transmission and while stored in the cloud (Ershadi & Forouzandeh, 2019). Regarding access control, strong access control measures should be implemented to restrict access to sensitive data. User authentication, authorization, and the principle of least privilege are crucial. It is also important to elucidate that continuous monitoring of cloud environments allows organizations to detect unusual activities and potential security incidents in real time (Al-Delawi & Ramo, 2020). Furthermore, it is essential to regularly back up data to prevent data loss in cloud service disruptions or other issues. The increased reliance on cloud services for remote work has become a hallmark of the digital era, offering unmatched flexibility and efficiency for organizations (Waymire & Basu, 2011). However, this transition necessitates a strong focus on data security to mitigate the challenges and risks of cloud-based operations. By adopting the right strategies and security measures, organizations can capitalize on the benefits of cloud services while safeguarding their data and ensuring business continuity. The transition to cloud storage solutions has significantly influenced how organizations store, access, and manage their data (Ershadi & Forouzandeh, 2019). While the cloud offers undeniable advantages, it also introduces new challenges and complexities in securing sensitive information. This article evaluates the best practices and challenges associated with ensuring that data security is stored in the cloud (Al-Delawi & Ramo, 2020).

10.7 Strategies for Enhancement of Data Security in Accounting and Information Management During the COVID-19 Pandemic

The COVID-19 pandemic has accelerated the adoption of remote work and digital communication, posing new challenges for data security in accounting and information management. Effective strategies are essential to address these challenges and protect sensitive information. Key strategies include implementing robust cybersecurity measures, providing comprehensive employee training and awareness, and

adopting cloud-based accounting solutions by design. Robust cybersecurity measures involve deploying firewalls, intrusion detection systems, and encryption technologies, along with regular security audits and access testing. Comprehensive employee training ensures that staff are knowledgeable in recognizing and thwarting phishing attempts and maintaining secure remote work practices. Transitioning to secure cloud-based accounting software enhances data security, as reputable providers invest heavily in data centre security (Lewis & Adams, 2021). A security-by-design approach integrates data security into technology and workflows from the outset, emphasizing data encryption in transit and at rest using secure communication protocols (Smith & Johnson, 2019). Continuous monitoring of systems and networks, along with well-defined incident response plans, is crucial for promptly detecting and responding to security incidents. Enhanced strategies are necessary to ensure data security in accounting and information management during the pandemic, encompassing robust cybersecurity measures, employee training, cloud-based solutions, data encryption, continuous monitoring, and incident response planning. By implementing these measures, organizations can mitigate the risk of security breaches and better protect financial data and sensitive information in these challenging times.

11 Research Findings

A literature review on data security in accounting and information management during the COVID-19 pandemic has yielded key findings and valuable insights. The significant findings summarize increased cybersecurity threats, data sharing challenges, and device security concerns. It is essential to state that the pandemic forced a rapid transition to remote work, providing cybercriminals with new attack opportunities. Organizations have witnessed a surge in phishing attempts, malware, and other threats (Smith et al., 2020). This emphasizes the need for robust cybersecurity procedures to keep sensitive data in a remote work environment, policy adaptations, etc. With the rise in remote collaboration and data sharing, organizations have faced challenges related to data leaks, accidental sharing, and the exposure of sensitive information (Johnson & Davis, 2021). Adequate data access controls and secure collaboration tools became imperative to address these concerns. Managing the security of various devices used for remote work, including personal computers and mobile devices, has emerged as a significant challenge. Ensuring the security of these endpoints has become a top priority (Srivastava et al., 2020). Organizations must focus on securing corporate and personal devices to maintain data integrity. Furthermore, it is essential to state that many organizations have had to adapt their policies to accommodate remote work requirements. Evaluating the effectiveness of these policy changes in mitigating data security risks was critical. Ensuring that employees adhere to updated policies has also become a focus area (Kaur et al., 2020).

Additionally, the importance of employee training cannot be overemphasized. Employee training programmes related to data security have gained importance (Mirtsch et al., 2020). The effectiveness of these programmes in ensuring that employees understand best practices and apply them has become a key consideration (Gupta et al., 2018). Proper training is essential to create a human firewall against cybersecurity threats. Organizations have relied on various cybersecurity tools for threat detection and prevention. Evaluating the effectiveness of these tools in safeguarding organizational data is crucial (Brown & White, 2021). The choice of tools and configuration plays a significant role in data security. Furthermore, with the increased use of video conferencing and collaboration tools, the security of communication channels has become a concern (Velmurugan et al., 2021). Ensuring secure communication is vital, especially when discussing sensitive financial or personal information, and assessing the implementation and effectiveness of access controls is vital (Mirtsch et al., 2020). Controlling who can access sensitive data and ensuring restricted access is essential to maintaining data security (Lewis & Adams, 2021). Regarding policy adherence, ensuring that employees adhere to updated policies and comply with monitoring and enforcing policy adherence is an ongoing challenge (Raj et al., 2020). These findings emphasize that data security has become even more critical during the pandemic, especially with the accelerated shift to remote work. Organizations must adopt a multifaceted approach, including robust cybersecurity tools, employee training, strict policy enforcement, and secure communication practices. The insights from the literature review will guide further research and inform practical strategies for enhancing data security in the postpandemic world (Xiao et al., 2020).

11.1 Data Security in Accounting and Information Management During the COVID-19 Pandemic: Future Trends and Technologies

According to Xiao et al. (2020), the COVID-19 pandemic has accelerated the digital transformation of accounting and information management, leading to new trends and technologies shaping the future of data security in this field (Mirtsch et al., 2020). This section will discuss the anticipated trends and technologies expected to play a significant role in ensuring data security in accounting and information management during and after the COVID-19 pandemic (Mirtsch et al., 2020). A primary future strategy is the zero-trust approach, which is gaining traction. It assumes that no entity, inside or outside the organization, should be trusted by default. ZTA verifies identities and continuously assesses trust levels before granting access to data and resources, enhancing data security (Manso, 2020). Furthermore, the PbD concept, which involves embedding security into systems and processes from the outset, is expected to become a standard practice. Organizations proactively address data security, reducing the risk of data breaches and noncompliance with policies

(Cavoukian, 2020). It is also essential to state that blockchain technology is being explored to ensure data integrity. By providing an absolute and transparent ledger, blockchain can securely record and verify financial transactions and other sensitive data (De Filippi et al., 2020). Additionally, the influence of homomorphic encryption cannot be downplayed. This emerging technology allows data to be processed while still being encrypted (Mirtsch et al., 2020). It enables secure data analytics and computations without exposing the raw data to anyone, even the cloud service provider (Gentry, 2009). Additionally, artificial intelligence, that is, AI-driven cybersecurity tools, is becoming increasingly sophisticated in identifying and responding to security threats. Machine learning algorithms can detect abnormal patterns and potential breaches in real time (Yan et al., 2020). It is also pertinent to state that multiparty computation (MPC) enables multiple parties to equally process functions over their contributions while keeping those inputs private. It can be analysed securely without sharing sensitive data (Goldwasser et al., 2017).

This technology adds noise or randomization to data to protect differential security while allowing valuable insights to be derived (Mirtsch et al., 2020). Differential security is becoming relevant for secure data sharing and analytics (Dwork, 2006). Quantum-safe cryptography is another security strategy that can be adopted, potentially threatening current encryption methods. Quantum-safe cryptography ensures that data remain secure in a postquantum computing world (Chen & Ji, 2021). Furthermore, collaborative tools prioritizing data security are emerging (Mirtsch et al., 2020). These platforms offer end-to-end encryption, secure file sharing, and access control to protect sensitive information during remote work (Kaspersky, 2020). Regulatory technology (RegTech) solutions are evolving to help organizations comply with data protection regulations more effectively. These technologies assist in managing and automating compliance processes, reducing the risk of non-compliance (Rijks, 2020). As organizations adapt to the challenges brought about by the COVID-19 pandemic, integrating these trends and technologies will be pivotal in securing data and maintaining security in accounting and information management (Mirtsch et al., 2020). Organizations should consider implementing a combination of these strategies, depending on their specific needs and regulatory requirements, to ensure robust data security in increasingly digital and remote environments (Belleflamme et al., 2020).

11.2 Limitation of the Study

The studies did not cover all classifications of data security, accounting, information management, or COVID-19 research keywords. Moreover, the studies did not consider the differences in the values and cultural and political aspects of any country. During epidemics, it has been suggested that it is prudent to allow for some loss of privacy and place trust in smart technologies to help fight deadly, invisible creatures echoed by Lee and Lee (2020). Additionally, the paucity of literature discussing accounting and information management during the COVID-19 pandemic added to

the limitation of relevant literature in this review paper. Hence, there is a need for future research to develop and improve the efficiency and effectiveness of data security in accounting and information management for deployment in future pandemics by organizations, and monitoring people's safety and privacy is essential.

12 Conclusion

The COVID-19 pandemic has reshaped the data security landscape in accounting and information management. The rapid transition to remote work, increased reliance on digital communication, and the need to safeguard sensitive financial data have presented challenges and opportunities for organizations. In conclusion, we reflect on the key takeaways and considerations related to data security during the pandemic. The key takeaways from the chapter include the importance of data security, compliance, remote work challenges, and emerging technologies. The pandemic has underscored the threatening importance of data security in accounting and information management. With the increased use of remote work and digital communication, organizations must prioritize the protection of financial data and sensitive information. It is also imperative to note that data protection regulations, such as the GDPR and HIPAA, remain in force even during the pandemic. Noncompliance can result in severe consequences, emphasizing the need for organizations to maintain security compliance. Additionally, the shift to remote work introduced new challenges, including expanded attack surfaces, personal device usage, and the need for robust security measures. Organizations have had to adapt quickly to address these challenges and mitigate security risks. Furthermore, future trends and emerging technologies, such as zero trust architecture, blockchain, and homomorphic encryption, offer promising solutions for enhancing data security. These technologies will be crucial in securing financial data in the postpandemic world. Thus, embedding security into systems and processes from the beginning will be integral in preventing security breaches. Organizations are encouraged to adopt this approach to minimize risks and vulnerabilities.

13 Recommendations

The COVID-19 pandemic has shown that the ability to adapt to changing circumstances is vital. Organizations must remain flexible and evolve their data security strategies to address future challenges. It is germane to emphasize data security awareness, and training on data security should remain a top priority. Well-informed employees are the first line of defence against data breaches. Regarding technological advancements: As technology advances, organizations should embrace innovative solutions to protect sensitive financial data. This includes the adoption of secure collaborative platforms and quantum-safe cryptography. Additionally, staying up to

date with evolving data protection regulations is essential. Organizations must be prepared to adapt their practices to comply with changing legal requirements. Hence, the COVID-19 pandemic has reshaped how organizations approach data security in accounting and information management. While the challenges have been significant, they have also accelerated the adoption of advanced technologies and practices to secure financial data. Organizations prioritizing data security, remaining compliant, and staying abreast of emerging technologies will be better equipped to protect sensitive information in the evolving digital landscape. Data security is no longer optional; it is fundamental to business continuity and trust in the postpandemic world.

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The Influence of Crisis and External Events on Financial Reporting



Bomi Nomlala and Bronson Mutanda

Abstract This chapter offers a comprehensive overview of the influence of crises and adverse events on firm financial reporting. The operations of corporations were disrupted globally by adverse events such as COVID-19, with accounting departments experiencing shock waves. An adverse event is defined as the emergence or escalation of any incident that has a negative impact on companies, alters how firms function, or weakens the entire economy. A COVID-19 pandemic flare-up from 2019 to the middle of 2022 was considered a negative event since it resulted in a worldwide economic slowdown and significantly impacted enterprises' day-to-day operations. The COVID-19 pandemic had a negative impact on businesses, education, the economy, transportation, and public health, prompting companies to change the way they typically present their financial data. Through corroboration of various literature sources, this chapter will reveal the influence of crises and external events on financial reporting. These actions helped companies take crucial steps in addressing the negative impacts of the COVID-19 epidemic. This chapter discusses how external events such as COVID-19 affected financial reporting. The first section of the chapter examines the COVID-19 epidemic and corporate financial reporting in general.

Keywords Financial reporting · Standards · Financial statements · Business · COVID-19 · External events · Influence · Crisis · Accounting · Impact

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1 Introduction and Background

Firms are usually harmed by negative external events, with firms in underdeveloped countries being more affected. Coronavirus (COVID-19) was a bizarre external event that had an impact on firms' accounting (financial) reporting throughout the 2019–2022 time frame. Not only did it change the reporting dates, but it also doubted the overall accuracy of accounting (Turishcheva & Kirillova, 2020). The pandemic's damaging impacts changed the way in which reporting and disclosure were performed. Accounting and auditing were not exempt from the global disruption caused by COVID-19 (Association of Chartered Certified Accountants (ACCA), 2020). This pandemic had the strongest influence on financial reporting by shifting the deadlines of the reports, breaking one of the key accounting principles, the sustainability principle, and exacerbating the postreporting events disclosure problem (Turishcheva & Kirillova, 2020). Accounting consideration and financial information quality came to the fore in the COVID-19 environment (Markova & Hristov, 2021).

Governments enacted mandatory lockdown measures to stop the spread of the virus, requiring people to work from home whenever feasible (ACCA, 2020). This meant that auditors had to conduct their audits online and were no longer permitted to visit the locations of the entities they were auditing or even their own offices. Undoubtedly, COVID-19 increased obstacles for organizations everywhere, regardless of size and location, with all company divisions needing to find solutions to the challenge (Engidaw, 2022). The spread of the pandemic left entities dealing with issues that are frequently related to general economic downturns, such as financial market volatility and the erosion of market value, declining credit, liquidity issues, further increases in government intervention, rising unemployment, significant declines in consumer discretionary spending, rising inventory levels and reductions in production due to decreased demand and supply constraints. This adverse event severely harms certain enterprises, putting their continued operation in danger (KPMG, 2021; Accountancy Europe, 2020; Institute of Chartered Accountants of Bangladesh, 2020). Global accounting groups advised businesses to perform sensitivity analyses to assess their ability to continue as a growing concern and to make proper disclosures in the event of substantial uncertainty (KPMG, 2021; Accountancy Europe, 2020). The focus of this chapter is to reveal the influence of external events on financial reporting. It must be understood that financial reports are very important not only to the company concerned but also to its stakeholders. This chapter is organized in such a way that there are a theoretical framework, conceptual framework, methodology, and findings. The next section will discuss theories that will be used as lenses through which financial reporting will be viewed at the societal and stakeholder levels.

2 Theoretical Framework

To better understand financial reporting, the authors used legitimacy theory, stakeholder theory, and agency theory. These theories act as lenses through which authors view and understand financial reporting.

2.1 Stakeholder Theory

According to stakeholder theory, one of the numerous groups that a company or organization must serve is its shareholders, usually referred to as financial investors. According to stakeholder theory, everyone who is impacted by an organization or how it operates is a stakeholder, including staff members, clients, vendors, local communities, environmental organizations, governmental organizations, and more. Its emphasis promotes the idea that no particular group of interests is considered to be superior to all others (Friedman & Miles, 2006; Lawton et al., 2014; Schwartz, 2017). Stakeholder theory holds that organizations and corporations should strive to do right for all these stakeholders and that, in doing so, the organization will achieve true, lasting success. Overall, stakeholder theory views all stakeholders as shareholders who are interested in the success of the firm. As indicated in Fig. 1, a firm has many stakeholders who may need financial statements for decision-making.

Annual financial statements must be made public so that a firm can account for its stakeholders. Disclosure should be used as a mechanism to establish a positive image for stakeholders. Any potential risk associated with an unknown occurrence should be disclosed by business organizations so that interested parties are aware of

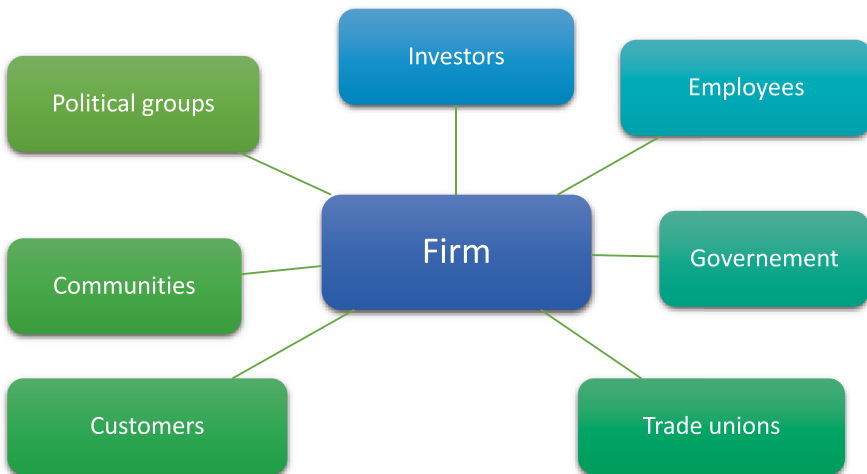


Fig. 1 Stakeholder model (Source: Freeman, 1984)

it and may make the best judgements possible (Sultana et al., 2021). A lack of proper disclosure leads to several corporate scandals. In this regard, financial statements must provide a fair view of the financial position of the firm, which may be a challenge when external events such as the COVID-19 pandemic are in place. The organization's management must serve a network of connections in the value chain by providing financial statements that give fair value to the organization (Behl, 2018).

2.2 Agency Theory

According to this view, the company's owners engage agents in performing tasks (Kopp, 2020). The three major tenets of agency theory are (1) the existence of goal incongruence between parties, which necessitates the separation of ownership and control, (2) the existence of agents and principals as self-interested utility maximizers, and (3) information asymmetry between parties (De Villiers et al., 2011; Hasan, 2020; Kargi & Zakariya, 2021; Squires & Elnahla, 2020). The owners of the company entrust the management of the company to the directors, who act as delegated agents. Agency theory describes how a company is owned by a group of people known as shareholders who invest money in the hope of profiting from the company's future activities (Gedajlovic & Shapiro, 2002). Jensen and Meckling (2019) advocate that agency theory gives rise to a relationship where there is a separation of ownership (ownership by the principal) and control (ownership by the agent) (Bergh et al., 2019; Delreux & Adriaensen, 2017; Ekanayake & Kuruppuge, 2017). Asymmetric knowledge arises as a result of shareholders' inability to consistently oversee every decision made by company leaders, creating ethical dilemmas and a lack of consensus. Extensive research has focused on the moral hazard conflict between outside shareholders and managers (Kim & Nguyen, 2019; Leyva-de la Hiz et al., 2019). Berle and Means (1968) argue that when monitoring agents are costly and actions are partly unobservable, managers may put forth less effort, which may result in moral hazard. In light of this argument, managers (agents) have a duty to provide their principal (shareholders) with financial information. Managers may opt to fabricate financial statements due to information asymmetry, making it harder for shareholders to obtain a true picture of the company's performance. The management of the company must be trustworthy representatives and disclose any information that shareholders may request.

2.3 Legitimacy Theory

The organization's activities in creating, putting into practice, and presenting its social responsibility policies are made easier to comprehend using legitimacy theory (Zyznarska-Dworczak, 2018). Businesses, especially those that are publicly traded, have a social duty to honestly depict their financial status in their

performance reports. According to Suchman (1995), legitimacy is a generalized view in which an entity acts in a way that is desirable and suitable given the socially established definitions, values, beliefs, and standards. The concept of legitimacy theory is founded on the social contract. The term “social contract” refers to society’s implicit and explicit expectations of how firms conduct their businesses in a societal setting (Sultana et al., 2021). According to legitimacy theory, organizations work to guarantee that their operations are legitimate by operating within the constraints and norms of their particular cultures (Degaan & Blomquist, 2006). This idea contends that an organization’s behaviour is not what gives it legitimacy; rather, it is how the public perceives the organization’s behaviour. If a group violates social standards or fails to live up to society’s expectations, its existence is in jeopardy (Sultana et al., 2021). Business organizations must engage with a variety of stakeholders, including shareholders, workers, the general public, lenders, the government, and others (Sultana et al., 2021). The phrase “legitimacy gap” describes the discrepancy between the principles upheld by the business and those of the society in which it operates and places it in danger. A legitimacy gap will appear if the business is simply focused on making the greatest profit possible and is not attentive to the effects of its operations or community expectations (Ang & Masella, 2015).

The legitimacy hypothesis functions in a well-established setting where various stakeholders consistently exert pressure on organizations to justify their commercial activities. Hence, to demonstrate such company legitimacy, accounting information must be disclosed (Degaan & Blomquist, 2006). Accounting disclosures serve as a means of reporting and communicating business activities. As a result, accounting transparency plays a significant role in stakeholders’ decision-making. Stakeholders should establish a favourable reputation through disclosure (Sultana et al., 2021). For stakeholders to be informed of the situation and make the best decisions possible, business organizations should also communicate any potential risk resulting from any unknown occurrence (Sultana et al., 2021).

3 Financial Reporting

According to Nnamani et al. (2017), financial reporting is concerned with how financial statements are presented so that users of financial information may understand them. Stakeholders, including investors, creditors, and potential partners, require a thorough and transparent perspective of a company’s financial condition to assess its performance and take action to help it develop, innovate, and compete effectively (Tibiletti et al., 2021; Tokar & Kumar, 2020). The insights required to make strategic and informed business choices must be provided by accurate records of a company’s income and costs, working capital/cash flow, and profitability (Deloitte, 2020). Inherently, it is the sole channel through which managers of businesses, both public and private, may account for their stewardship to owners and other stakeholders (International Federation of Accountants (IFAC), 2012). In a different context, financial reporting serves as a channel for disseminating information

about the financial affairs of both for-profit and nonprofit organizations, and it is a crucial function that the accounting profession offers to societies with diverse economic and social structures (Deloitte, 2020; KPMG, 2020). Additionally, companies must use these records to prepare income statements and other financial information, as well as to document the company's operating activities, in accordance with financial reporting standards such as the Generally Accepted Accounting Principles, or GAAP (in the USA), and the International Financial Reporting Standards, or IFRS (worldwide) (Financial Reporting Council, 2020).

3.1 Importance of Financial Reporting

Because many people and corporations base their economic decisions on their relationships with and understanding of business entities, they may be interested in the data presented in financial reports. To present a complete view of financial events, financial reports are intended to communicate pertinent, intelligible, dependable, and thorough information (Robert et al., 2020). This chapter will first highlight the significance of financial information to a certain set of individuals before going into more depth on how external events affect financial reporting. This explains the need for accurate financial reporting so that decision-makers may make the best decisions. Potential users of financial information include the following:

1. Equity Investors

Shareholders are the owners of the company, so they require financial statements to check the profitability of the business and the company's overall financial position so that they can analyse the return that they are receiving on their investment in the company. Because their choices are based on the quantities, timing, and uncertainties of future cash flows, risk capital providers and their advisers are interested in a company's capacity to provide positive cash flows (Mihaela, 2008). When making lending and investment decisions, financial institutions and investors rely on the integrity of independently audited financial accounts (Osadchy et al., 2018). A company is a source of profit for an equity investor in the form of dividends as well as rising market prices. Equity investors are particularly interested in a company's potential to produce positive cash flows as well as how the market perceives that ability in relation to the relative values of its securities. When adverse events affect accurate financial reporting, this will be a great blow to equity investors. In this regard, the impact of COVID-19 was not only a blow to accountants but also a blow to equity investors since financial disclosures were not only based on judgements but also delayed (Markova & Hristov, 2021).

2. Lenders

Lenders, including investors in debt securities, also provide capital to a business entity. Lenders, thus, are also interested in the entity's ability to generate favourable cash flows because their decisions are related to the amounts, timing, and

uncertainties of future cash flows (Thakur, 2023). Lenders analyse the financial position of the company before giving funds to that company to see whether the company is in a position to repay the funds and finance costs on time (Thakur, 2023). To a lender, a business entity is a source of cash in the form of interest, repayments of borrowings, and perhaps also appreciated market prices of debt securities. The accuracy of financial reports helps lenders decide whether to buy securities. Challenges encountered by accountants in financial reporting during the pandemic heavily impacted lenders' decisions of whether to lend or not.

3. Suppliers and Other Trade Creditors

Trade creditors deliver goods or services as opposed to money. According to Elliott and Elliott (2009), trade creditors are interested in financial data that enables them to determine the possibility that the money they are owed will be paid when it is due. Creditors rely on financial statements to evaluate whether a company or organization will be able to pay back a debt. On the balance sheet of a company, the debt is shown as a current liability, while on the balance sheet of the trade creditor, it is shown as a current asset (Kagan, 2022). If the debt level is higher than that of other companies in the same industry, the company is considered to be overleveraged. Analysing these statements will help them decide if they want to continue dealing with the company (Srivastav, 2022).

4. Employees

Employees and their representatives are interested in evaluating the stability and profitability of their employers. According to Thakur (2023), employees are interested in knowing the financial position of the business to check if their future is secured in the company and the company's ability to pay off salaries on time with bonuses and the amount of performance appraisal.

5. Customers

When choosing a supplier for a significant contract, a customer will want to first study their financial accounts to assess the supplier's financial viability to provide goods or services specified in the contract. Customers are interested in accounting information for assessing the financial position of a business, especially when they have long-term involvement, as it enables them to maintain a steady source of business. Wholesale customers are interested in doing business with parties who can supply goods for a long period of time, so before entering into contracts, they analyse the stability of the company. In addition, wholesale customers go for companies that can give them a credit period, which they also analyse from financial statements (Thakur, 2023).

6. Governments and Their Agencies

Governments and their agencies are interested in the activities of a business entity because they are responsible for the efficient allocation of economic resources in various ways (Elliot & Elliot, 2009). They also need information to regulate

business entities' activities, determine and apply taxation policies, and prepare national income and similar statistics (Srivastav, 2022).

7. *Members of the Public*

A corporate entity may have a range of effects on the general population. For instance, a company may significantly boost the local economy by creating job opportunities, supporting local businesses, paying taxes, and engaging in philanthropic activities (Mihaela, 2008; Elliot & Elliot, 2009). The public and its representatives may benefit from financial reporting by learning about the patterns and most recent changes in the entity's prosperity and the scope of its operations.

8. *Management and the Directors*

According to Srivastav (2022), management can better comprehend a company's performance in relation to that of other companies and the industry. Giving management reliable financial information allows them to create appropriate business policies and make wise judgements. The effectiveness of management is observed through an assessment of the company's financial statements. Financial statements will aid management in defending their actions to all stakeholders concerned with the firm.

The conceptual framework in Fig. 2 indicates factors influencing the quality of financial reports. External events such as the COVID-19 pandemic have a great influence on the quality of financial reports. This is a dilemma for nonadjusting and adjusting events. Second, the motive of those preparing financial statements also compromises the quality of financial statements. Management motivation has a significant impact on the quality of financial reporting at the firm level (Tang et al., 2016). According to Malihi et al. (2013), financial reporting objectives vary from one organization to another depending on the nature of the activities. The quality of the report that is produced depends on the possibility for the preparer of the financial report to omit or include specific information in the financial report to achieve their intended goals. The report's intended users will, therefore, influence what

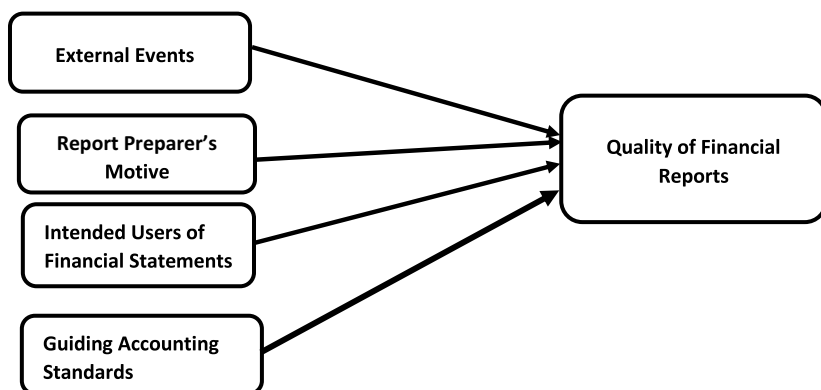


Fig. 2 Conceptual framework diagram. Source: Author (2023)

constitutes a quality financial report. Finally, guiding accounting standards also influences the quality of financial reports prepared by a company. The coming book section provides the methodology used to synthesize ideas in the book.

4 Methodology

This chapter synthesizes ideas obtained from various sources of literature on the Internet. This section explains the scheme used to capture and analyse insights from studies published in peer-reviewed accounting journals from 2019 to 2023. The authors used search engines such as Google Scholar and Research Gate platforms to locate papers for the study. The journals, public reports, and books of practitioners also provide insights to help develop academic scholarships in this area. To access research papers on the impact of COVID-19 on financial reporting, the author used various search techniques, which included the following: Boolean operators and asterisks (*) were used to truncate the search strings, and the author also used the word 'and' to link financial reporting and external events. Published material from Research Gate, Springer, the Wiley Online Library, SAGE Publications, JSTOR, Emerald Insight, and JSTOR were among the online databases that were accessed. The author also considered information from the publications of ACCA, Deloitte, KPMG, and International Accounting Standards. Only research relevant to the subject of the impact of external events on financial reporting was considered.

5 Study Findings and Discussions

5.1 *International Accounting Standards (IAS) 10: Events After the Reporting Period*

The COVID-19 pandemic resulted in what are called events after the reporting period. Management and accountants have difficulty determining things to disclose and things not to disclose (KPMG, 2020). The same arguments come from Gambhir (2021), who argues that the COVID-19 pandemic brought many challenges regarding things to disclose and those not to disclose. According to Gambhir (2021), the dilemma was whether to disclose quantitatively or qualitatively. It is always better to disclose the quantitative impact, but if it is not practical, then justification and qualitative disclosure are required (Gambhir, 2021). International Accounting Standard 10 requires financial statements to reflect the conditions that existed at the end of the period. There is a period of perhaps two months (it may vary with companies) before directors and auditors sign accounts, and information that becomes available during that period should be appraised to determine whether accounts need to be adjusted (KPMG, 2020; Deloitte, 2020; IFRS, 2020). During this period,

the COVID-19 pandemic occurred, creating the dilemma of whether to include them. Events after the reporting period can be favourable or unfavourable events that occur between the end of the reporting period and the date on which the financial statements are authorized for issue (KMPG, 2020; Deloitte, 2020). It is highly important to distinguish between adjustable and nonadjustable events after the reporting period. The main question and problem that occurred was how to determine which events occurred after the end of the reporting period that were to be reflected in the financial statements as adjustment events and for nonadjusting events, as well as what additional disclosures should be provided (KMPG, 2020).

5.1.1 Adjusting Events

Adjusting events are events after the reporting period that provide further evidence of conditions that existed at the end of the reporting period, including an event that indicates that the going concern assumption concerning the whole or part of the enterprise is not appropriate (IAS 10.3). Suppose that information becomes available during this period, which provides further evidence of the conditions that existed at the period's end date. In that case, it is described as an adjusting event and, if it is material, will require changes in the amounts to be included in the financial statements (Elliott & Elliott, 2009). In its set of instructions for auditors on the coronavirus pandemic (2020), the IFRS states that what matters is whether the prerequisite for an event existed at the time of the balance sheet date or December 31, 2019, in the case of COVID-19. Accordingly, the 2019 financial statements had to be adjusted if a condition existed on or before the balance sheet date (i.e. an adjusting event), but the events had to be disclosed in the notes to the financial statements if they did not exist until the new year (i.e. a nonadjusting event) (Ehioghien et al., 2020). Management and the accountants were left wondering what exactly was to be included in the adjusting events. According to the Deller from the Association of Chartered Certified Accountants (ACCA, 2020), COVID-19 can be viewed as an adjusting event as of the beginning of 2020, and affected businesses were to consider how COVID-19 affected them according to IAS 10 events after the reporting period. Companies had to determine whether COVID-19 should be considered an adjusting or nonadjusting event, and even if they concluded that it was a substantial nonadjusting event, they still had to provide more information about it. KMPG Sri Lanka (2020) also identified the challenge of determining adjusting and nonadjusting events as the key problem encountered by accountants during the pandemic. Examples of adjusting events are as follows:

- Events that indicate that the going concern assumption in relation to the whole or part of the entity is not appropriate
- Settlements after the reporting date of court cases that confirmed that the entity had a present obligation at the reporting date.
- Receipt of information after the reporting date indicating that an asset was impaired at the reporting date.

- Bankruptcy of a customer that occurs after the reporting date that confirms a loss existed at the reporting date on trade receivables.
- Sales of inventory after the reporting date that provide evidence about their net realisable value at the reporting date.
- Discovery of fraud or errors that show that the financial statements are incorrect (IAS 10).

5.1.2 Nonadjusting Events

Nonadjusting events are poststatements of financial position events that concern conditions that did not exist at the financial position date but that are so material that nondisclosure would affect the ability of the users of financial statements to reach a proper understanding of the financial position (KPMG, 2020; Deloitte, 2020; Elliott & Elliott, 2009). A condition that developed after the reporting period's conclusion is indicated by an event that occurred beyond the reporting period (IAS 10.3). Some of the nonadjusting events must be disclosed in accordance with International Accounting Standard 10. Nonadjusting events need to be revealed if they are significant enough to prevent users from making accurate assessments and choices if they are not (KPMG, 2020; IFRS, 2020; Josh, 2020). The required disclosure is (a) the nature of the event and (b) an estimate of its financial effect or a statement that a reasonable estimate of the effect cannot be made (Deloitte, 2023).

Because of the COVID-19 pandemic and the restrictive measures implemented, the quality of financial reporting became questionable (Josh, 2020). Management and accountants must decide whether events that occurred after the reporting period's conclusion qualify as adjusting or nonadjusting events (Josh, 2020). Management was obligated to examine and update the events and their impact on a regular basis. This demonstrates unequivocally that the COVID-19 outbreak had a major effect on financial reporting.

5.2 *Impact of External Events (COVID-19 in Particular) on Financial Reporting*

One of "The Big Four" corporations, Deloitte, conducted a poll to determine how COVID-19 has affected financial reporting. Forty-four businesses participated in the poll, including 12 from the United Kingdom, 17 from Switzerland, and 15 from Germany across several industries. This study provides an overall view of how COVID-19 influenced various businesses, even if it is not statistically representative (Silva et al., 2021). Four of the 44 firms, including one that concluded its fiscal year on September 30, 2020, did not release financial figures in the third quarter. Out of the 39 remaining firms, 22 (or 50% of the entire sample) have published complete interim financial statements in accordance with either IFRS or US GAAP. Only a

few financial records, such as sales reports and production reports, have been released by the 17 remaining (39%) businesses (Silva et al., 2021).

5.2.1 Violation of the Business Continuity Assumption

The restrictive measures imposed by the government severely affected one of the accounting principles accepted by the International Auditing Standards (IAS) 570 Continuity of Operations (Turishcheva & Kirillova, 2020). The underlying presumption of the concept is that an organization's operations are now continuous and will remain so in the future. Organizations were unable to do business over the next 12 months as a result of unfavourable external occurrences such as the COVID-19 pandemic (Voronova, 2020). An accounting (financial) report must be founded on the idea of business continuity unless there is no choice but to stop operations or participate in intentional liquidation (Tardi, 2022). The COVID-19 outbreak drove many firms to temporarily cease operations, making it challenging for accountants to present the financial results of the trading year. It took time for businesses to decide whether to continue operations due to the COVID-19 epidemic. Most company managers find it difficult to decide whether a firm has access to enough money and can continue to be solvent throughout the interruption and beyond (Silva et al., 2021). This is in line with arguments made by the Financial Reporting Council (2020), indicating difficulties encountered by management if they will ever open their businesses again following the lockdown. Previously prepared budgets and forecasts required significant revision by management before use in audits. More reliable data on the potential length of closure (or whether there will be future closures) and the duration of the economic downturn affecting the business are needed.

5.2.2 Postreporting Events

A postreporting event occurs between the reporting date and the day an accounting report for the reporting year was signed that had an impact on, or had the potential to have an impact on, an organization's financial condition, cash flows, or reporting outcomes (KPMG, 2022). According to Akhmadeev (2019) and Korableva (2019), quarantine substantially impacts how people reflect on events and gauge their financial costs (Avvakumova et al., 2020). In particular, the hotel and tourism industries, as well as public catering, retail, and many other industries, were among the organizations that had to change their reporting (Vidovic, 2022). The same observations were made by Rosenfeld (2021), who indicated that the health industry, food industry, tourism and hospitality industry, and airline industry were heavily affected by the COVID-19 pandemic, with its effects being passed on to financial reports. These companies were to adjust their reporting because the events were significant for their operational activity and decisions made by the users of the reports, including managers' decisions to issue securities and pay dividends. Explanatory notes to the financial reports were required to summarize the events and include a financial

evaluation of their effects since the restrictive measures led to a halt of operations, decreased demand for products and services, and made it challenging to raise loans (Barbu & Baker, 2010; Golubtsova & Zvereva, 2019).

5.2.3 Impact on the Deadline and Format of Reporting

Due to the COVID-19 outbreak, several businesses needed to meet their deadlines to prepare financial reports. Government restrictions made it impossible for certain less technologically proficient firms to operate remotely, which made it difficult for them to fulfil deadlines for the creation of financial statements. Although some deadlines are specific to countries, it has been noted that financial reporting deadlines cannot be met by a number of companies. A study carried out by Turishcheva and Kirillova (2020) revealed that some companies in Russia failed to meet certain deadlines; the deadline for providing an adjusted report for limited liability companies was ten working days after April 30 for joint stock companies and ten working days after June 30, 2020. Yui (2022) made the same observations in Hong Kong and discovered that many firms were affected by the pandemic, causing them to miss financial reporting deadlines.

5.2.4 Impact on Statement of Financial Results

The economic metrics of numerous enterprises were significantly affected as a result of COVID-19's restrictive regulations (Turishcheva & Kirillova, 2020). Gould and Arnold (2020), from the IFAC, stated that many companies were to first report financial effects in interim financial statements (IAS 34—Interim Financial Reporting) because these involved the greater use of accounting estimates. In this context, Laxminarayan (2020) argued that all published financial results, progressively starting in the March 2020 quarter-end, should be closely scrutinized by shareholders, market participants, and regulators.

5.2.5 Significant Impact on Credit Risk and Expected Credit Losses

The methodology for calculating the anticipated credit loss (ECL) and how much should be recognized is described in International Financial Reporting Standard 9. Lifetime ECLs must be recognized when there is a significant increase in credit risk (SICR) on a financial instrument (Petrova, 2019). In the aftermath of COVID-19, a number of presumptions and expectations that had guided the implementation of ECLs in the past were no longer true. The timing and unpredictability of future cash flows need to be reevaluated for each company as a result (Petrova, 2019). It became exceedingly difficult for management and accountants to accurately predict the numbers, making financial reporting difficult.

5.2.6 Fair Value Measurements and Reporting (IFRS 13 Fair Value Measurement (FVM))

A change in the fair value measurement affects the disclosures required by IFRS 13, which requires companies to disclose the valuation techniques and the inputs used in the FVM as well as the sensitivity of the valuation to changes in assumptions (Delloitte, 2020; KPMG, 2020). Peterson (2020) indicated that coronavirus disease 2019 (COVID-19) wrenches into fair value measurements to such an extent that even the basic definition of fair value requires a closer look. The accounting effects of coronavirus on fair value measurements may be significant (Peterson, 2020). Disclosures are needed to enable users to understand whether COVID-19 has been considered for the purpose of FVM (Delloitte, 2020; KPMG, 2020). The key question was, what conditions and the corresponding assumptions were known or knowable to market participants at the reporting date? For 2020, fair value measurements, particularly of financial instruments and investment property, needed to be reviewed to ensure that the values reflected the conditions on the balance sheet date (Delloitte, 2020; KPMG, 2020). This involved measurement based on unobservable inputs that reflect how market participants consider the effect of COVID-19 on their expectations of future cash flows related to assets or liabilities at the reporting date. During the COVID-19 pandemic, the volatility of prices in various markets increased (Delloitte, 2020; KPMG, 2020). This affects FVM either directly—if fair value is determined based on market prices (e.g. in the case of shares or debt securities traded on an active market)—or indirectly, for example, if a valuation technique is based on inputs derived from volatile markets (Deloitte, 2020). Consequently, special attention should be given to commodity price forecasting, which is used in developing fair value conclusions.

5.2.7 Other Consequences

The other fallout of the pandemic on financial reporting was the current rule of the International Financial Accounting Standards (IFRS). The government-imposed quarantine had a significant impact on IAS 36 asset depreciation, a standard that describes a decline in an asset's value that surpasses a reduction anticipated due to physical or functional deterioration (Petrova, 2019). When a business notices a pattern in deteriorating assets, it should first examine its own property using an analysis of anticipated cash flows from the asset (Kevorkova et al., 2020).

5.3 *Effects of External Events (COVID-19) on Financial Reporting*

Accounting and financial reports provide excellent insight into a business's operations. Stakeholders need this type of knowledge and information to make critical economic decisions. Additionally, these data must be comparable, consistent, relevant, clear, and easily comprehensible (Mitevska et al., 2021). This leads to the requirement for ongoing modifications to IFRS regulations (Mitevska et al., 2021). The COVID-19 epidemic put organizations in front of more difficulties while producing their financial accounts, which must follow IFRS. The proposals were issued or updated to recall existing accountant requirements that need to be considered when addressing the financial effects of the pandemic while preparing financial statements for annual or quarterly reporting periods. There are many financial reporting concerns, but some require greater care than others (IFAC, 2020). Tibiletti et al. (2021) lamented the inconsistencies in IFRS application during COVID-19 with negative consequences for future business performance.

5.3.1 Implications for Impairment

An asset is considered impaired if its market value is lower than its value on the balance sheet of the business. When an asset is found to be impaired, its balance sheet must be adjusted to reflect its current market value. Silva et al. (2021) stated that as a COVID-19-triggered event for IAS 36 Impairments, organizations should think about performing an impairment test for all of their assets. IAS 36 ensures that a company's assets are carried at no more than their recoverable amount (the higher of fair value less costs of disposal and value in use) and requires companies to conduct impairment tests when there is an indication of impairment of an asset at the reporting date (Deloitte, 2021). At the conclusion of each reporting period, evaluations were required to determine if there was any concrete proof that a financial asset or group of assets was impaired (Tuovila, 2023). Many businesses decreased operations or shut down entirely as a result of weaker product demand, which led to lower capacity utilization and probable impairment of noncurrent assets (goodwill and other intangibles) (Deloitte, 2021). Depreciation costs based on usage must also be reviewed in light of the updated prediction. Any goodwill and other intangibles recognized through business combinations need to be impaired as a result of the negative impact on future cash flows brought about by decreasing sales or demand for goods or services (Mitevska et al., 2021). An asset may become impaired owing to major price changes caused by shifting consumer demand, materially unfavourable changes in the operational environment that have altered the asset's value, or physical deterioration (Australian Accounting Standards Board [AASB], 2021). A goodwill and current asset impairment test was required in response to the COVID-19 outbreak.

5.3.2 Implications for Revenue Recognition

According to International Financial Reporting Standards, the pandemic had an impact on revenue projections and client contracts (KPMG 2020; Deloitte 2020). As a result of the COVID-19 pandemic and related government measures and actions in many jurisdictions, there were significant changes in circumstances for both an entity and its customers (Certified Public Accountants [CPA], 2020). This is because the entity typically needs to estimate the amount at the beginning of the contract when a contract with a client contains variable considerations, such as discounts, refunds, pricing disputes, and similar items (Mitevskva et al., 2021). According to Ld and Gould (2020), COVID-19 had an impact on the assumptions a business made when calculating revenue from products or services, particularly for contracts that span several reporting periods. According to O'Donovan (2020), businesses would have to declare any changes to the judgements and conclusions that had a material impact on the time, kind, or amount of the revenue reported in their financial statements.

Throughout the term of the contract, an entity producing estimates was obligated to update the assessment to take into account the circumstances that exist at each reporting date. To reflect the entity's new estimates of the amount of compensation it expects to be entitled to, the variable account estimation was updated (AASB, 2021). Coronavirus-related uncertainties cause companies to revise or reevaluate their customer contracts to determine whether it is likely that they would be able to obtain due compensation (Mitevskva et al., 2021). The entity was required to notify the modification in line with the modification requirements if both parties to the agreement agreed to modify the agreement's scope, price, or both aspects. Judgement was required to determine the expectation of partial payments, indicating that there was an implicit price concession for which the variable consideration was to be reported and loss due to damage (Mitevskva et al., 2021).

5.3.3 Implications for Events After the Reporting Period

These are favourable and unfavourable events that occur between the end of the reporting period and the date on which the financial statements are authorized for issue (KPMG, 2020). Making a distinction between occurrences that can be adjusted and those that cannot be adjusted after the reporting period is crucial here. The key problems and questions that emerged during the COVID-19 pandemic included what postreporting period events should be reported in financial statements as adjusting events and which should not, as well as what extra disclosures should be made (Deloitte, 2020). The classification of events that occurred after the end of the reporting period as adjusting or nonadjusting events required judgement. This was highly dependent on the reporting date and the specific facts and circumstances of each company's operations and value chain. Management needed to continually review and update the assessments up to the time the financial statements was issued, given the fluid nature of the crisis and the uncertainties involved (IFAC, 2020).

5.3.4 Implications for Disclosure

During the COVID-19 outbreak, transparency was more important than merely statistics. In the past, straightforward disclosures may have been sufficient because there may not have been much judgement or estimation required (KPMG, 2020; Deloitte, 2020; Silva et al., 2021). Due to the pandemic's effects, more thorough disclosures are needed to support important judgements and estimates that justify the carrying values of assets included in valuations or that are the subject of impairment reviews (KPMG, 2020). Reporting with clarity was essential, especially for narrative reports. From beginning to end, financial statements must be consistent. Additionally, the following elements of annual reports must be coherently distinct (Deloitte, 2020). First, the disclosure of principal risks and uncertainties highlights new risks that arose and how they were mitigated. Second, how were the company's strategy and business model modified to account for new threats? Third, the process used to evaluate and stress test the business model's longer-term sustainability. Fourth, new key performance indicators (KPIs), both financial and nonfinancial, have emerged, as have their goals in relation to the organization's strategy and business model (Deloitte, 2020; KPMG, 2020). Additionally, a thorough going concern evaluation was needed, explicitly outlining the fundamental presumptions and conclusions reached to support the suitability of the going concern premise. Changes to the board and its composition in light of COVID-19 were clearly reflected in the corporate governance statement (KPMG, 2020). Clear stakeholder reporting was also required and was supposed to demonstrate the extent to which directors fulfilled their statutory duties and streamlined their focus and effectiveness.

5.3.5 Use of Projected Expected Cash Flows and Credit Risk Disclosure

It was beneficial to think about adopting an anticipated cash flow method rather than the conventional method given the significant level of uncertainty that prevailed (Deloitte, 2020; KPMG, 2020). In the traditional approach, risk is not taken into account when adjusting cash flows; rather, it is taken into account when calculating the discount rate. According to the anticipated cash flow method, rather than using the discount rate, uncertainty regarding future cash flows is reflected in the various probability-weighted cash flow predictions that are employed (Deloitte, 2020; KPMG, 2020). The greater-than-usual range of potential future outcomes must be explicitly taken into account when using the projected cash flow technique. Given the uncertainty of COVID-19 and the significant judgement involved in estimating ECL, disclosure of the key assumptions and the estimation techniques used was particularly important for users of financial statements to understand the impact of COVID-19 on ECL estimation. Such disclosures included the values of the key macroeconomic inputs used in the multiple economic scenarios and the probability weights assigned to these scenarios, the effect of management overlays, and judgements made on how and the extent to which related support measures have been factored into the assessment of ECL.

5.3.6 Implications of Government Assistance and Insurance Recoveries

Governments in numerous countries explored or passed legislation to assist organizations that were experiencing financial difficulties as a result of the COVID-19 epidemic (Deloitte, 2020; KPMG, 2020). According to Deloitte and KPMG (2020), entities must decide when to recognize such government support (including for the purposes of their impairment analysis and going concern assessment) and consider the necessity of disclosing the information in the financial statement notes. Some organizations also had insurance coverage if they had to stop operating, cancel an event, pay more medical claims, lose assets, or face shareholder lawsuits. Insurance recoveries require extensive estimates and are inherently unpredictable (CPA, 2020). For this kind of insurance coverage, a reimbursement asset was recognized when its existence rather than its value was almost assured. This means that if an entity was virtually certain that it has insurance to cover certain costs, it would recognize a reimbursement asset if the range of possible recoveries was such that it could arrive at a reliable estimate of its amount (CPA, 2020).

5.3.7 Revisiting the Models and Assumptions

Entities must review the models and assumptions used in assessing expected credit losses in light of the uncertainties brought about by COVID-19 (Certified Public Accountants, 2020). For example, to reflect the downside scenarios and/or to increase their weighting due to COVID-19, entities need to reflect on multiple macroeconomic scenarios that reflect the changes in economic conditions and the probability weighting assigned to the scenarios (Certified Public Accountants, 2020). If the effects of COVID-19 cannot be reflected in the models, top-down management overlays or adjustments need to be considered (Certified Public Accountants, 2020).

5.3.8 Implications for Measurement of Inventories

Factories in several nations were compelled to close for a while as part of the government's efforts to stop the spread of COVID-19. Fixed overhead expenditures (rent, fixed labour costs, and depreciation of idle machinery) continued to be incurred when factory activities were suspended. According to Deloitte (2020), inventories are valued at a lower cost and net realizable value (NRV). According to Certified Public Accountants (2020), the NRV is the projected selling price in the regular course of business, less than the estimated expenses of completion and the estimated expenditures required to close the deal. If an entity is forced to temporarily close its factory or significantly reduce production for a period of time, then a significant portion of fixed overhead needs to be expensed as incurred rather than capitalized as part of the cost of the inventory (Certified Public Accountants, 2020).

5.3.9 Interim Financial Reporting

According to Certified Public Accountants (2020), the growth and dissemination of COVID-19 and its responses have mostly occurred since the beginning of 2020 (in some countries). As a result, several organizations' 2019 annual financial statements had relatively scant information concerning the impact of COVID-19. Accordingly, entities that prepared their first interim financial statements since the annual period preceding the outbreak of COVID-19 (e.g. entities with 31 December year-ends) needed to provide more comprehensive disclosures to enable users of the financial statements to understand the effect of the outbreak of COVID-19 and related events on its financial statements (Certified Public Accountants, 2020).

6 Direction for Future Research

At the conclusion of each reporting period, companies must determine whether nonfinancial assets are impaired. When assessing impairment, companies are required to determine the recoverable amounts of assets. The projected cash flows should correspond to management's best projection of the economic environment for the asset's remaining useful life. During the COVID-19 pandemic, it was a challenge for firms to determine the best estimates. Future studies can focus on investigating strategies used by companies to assess impairments and the challenges encountered. Second, future studies can focus on answering this research question: What strategies have been (or can be) adopted to expand reporting practices, and how do they influence different institutional settings during (or after) the COVID-19 emergency?

7 Conclusion

Companies needed to continuously monitor developments in light of the uncertainties over COVID-19 and ensure that they were providing current and relevant information when producing annual reports and financial statements since the disclosures that need to be disclosed are likely to vary over time. Financial statements contain several areas where changes might have an impact on current or upcoming reporting. Companies were willing to thoroughly analyse the possible effects of COVID-19 before compiling or disclosing any financial information.

The pandemic served as a reminder to businesses of the importance of making investments in information and communication technologies. These circumstances prompted accountants to work remotely, which was highly challenging for businesses without effective information systems. Businesses that used paper to preserve records in the old-fashioned way were severely impacted, but some organizations eventually adopted cloud computing. In this sense, businesses need to

follow the conventional method of financial recordkeeping and make use of technology.

The difficulties caused by the pandemic in terms of disclosure also revealed gaps in a number of reporting requirements. This is a blatant example of why standards need to be improved while taking into account the difficulties of the COVID-19 pandemic. It is possible to improve reporting standards based on the observations and lessons that were made.

Key Terms and Definitions

COVID-19 is a global outbreak of coronavirus, an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (WHO, 2020).

Financial reporting is the process of documenting and communicating financial activities and performance over specific time periods, typically on a quarterly or yearly basis (Oliver, 2022).

An *adjusting event* is an event after the reporting period that provides further evidence of conditions that existed at the end of the reporting period, including an event that indicates that the going concern assumption in relation to the whole or part of the enterprise is not appropriate (Deloitte, 2020).

A *nonadjusting event* is an event after the reporting period that is indicative of a condition that arose after the end of the reporting period (Deloitte, 2020).

An *accounting standard* is a common set of principles, standards, and procedures that define the basis of financial accounting policies and practices (Kenton, 2023).

The asset is *impaired* if its carrying value exceeds the amount that could be received through the use or selling of the asset, and the standard requires a company to provide for the impairment loss (ACCA, 2009).

The difference between an asset's carrying value and its recoverable value, or CGU, is known as an impairment loss (ACCA, 2009).

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Navigating the Nexus: Aligning a Business Strategy with AIS Development During COVID-19



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Abstract The accounting information system (AIS) serves as a vital tool for performance evaluation, financial reporting, and decision-making within organizations. The COVID-19 pandemic has posed unexpected challenges, underscoring the importance of responsive strategies for maintaining business operations. This chapter investigates the impact of business strategy on the development of AIS, focusing on the dynamic context of the COVID-19 pandemic. This study delves into the interplay between business strategy and AIS, exploring how organizations' strategic decisions influence the design, adoption, and effectiveness of AIS. This research draws insights from the literature, highlighting the paucity of studies exploring the connection between business strategy and AIS. By synthesizing findings from prior research, this chapter establishes a framework for understanding how different business strategies interact with AIS development, especially in the face of crisis situations such as the pandemic. This study contributes to the understanding of the strategic role of AIS in uncertain times and provides practical implications for organizations seeking to enhance their AIS capabilities to align with their business strategies.

Keywords Accounting information system (AIS) · Business strategy development · COVID-19 · Competitive advantage · Effectiveness · Efficiency · Cost management · Alignment · Organisation · Pandemic · Financial reporting · Business environment · Strategies · International accounting standards · Risk · Sustainability reporting · Supply chain · Decision making · Integration · Adoption

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1 Introduction

An accounting information system (AIS) is one of the critical tools used to determine a firm's performance and serves as a critical tool in the accounting and auditing process. An accounting information system is a system for checking, understanding, gathering, identifying, classifying, construing and collaborating accounting information, as it pertains to a specific body or group (Al-Dalaïen & Dalayeen, 2018). It is an all-inclusive tool used by management to achieve competitive advantage above its customers in rapidly changing business environments (Fatima et al., 2019). Organisations constantly seek to improve performance, and in a bid, to achieve this objective, organisations may encounter situations beyond their control. Thus, there is a need to ensure that a proper responsive strategy is used in the event of any crisis or unexpected situation. COVID-19 was one such unexpected situation for which most organisations were not prepared. Financial information is communicated to stakeholders by accounting information systems in the form of activity reports. This is supported by Lutfi (2022), who noted that the accounting information system has paved the way for competitiveness in business.

According to Saad et al. (2022), "AIS is basically a management information system (MIS) used for the collection, analysis, categorization, addressing and provision of financial information to stakeholders for the purpose of decision making. The use of the AIS makes it possible to document financial transactions for the purpose of performance evaluation (Alshirah et al., 2021). The adoption of an AIS would be useful for effectiveness and efficiency. AISs are useful during unpredictable circumstances because they enable businesses to manage operations in a period of crisis to ensure that businesses continue to profit and avoid losses (Astuti et al., 2022). Akande and Afrogha (2022) noted that there is no debate on the fact that COVID-19 has negatively affected several businesses.

However, business strategy is one of the factors that influences the development of accounting information systems in an organization. This is because a business strategy is required to generate the information required to maintain a competitive advantage (Lilis & Azhar, 2018). Business strategy is often described as the direction an organization plans to take to achieve its long-term goals and objectives. It involves making purposeful decisions that guide an organization's actions towards a specific desired outcome (Teece, 2018). Business strategy can be seen as the set of choices that determine an organization's unique positioning in the marketplace. It involves identifying and leveraging competitive advantages that enable the organization to outperform its rivals (Porter, 2017). According to Rumelt (2017), a business strategy entails making choices about where to allocate resources to achieve specific goals. It also involves defining the scope of the organization's activities, which can include choosing which markets to compete in and which products or services to offer.

The intricate relationship between business strategy and accounting information systems (AISs) has emerged as a pivotal focus in contemporary organizational management. The alignment between these two critical aspects holds the potential to drive enhanced decision-making, resource allocation, and overall organizational performance. As businesses navigate a complex and dynamic landscape, the strategic

integration of AIS becomes instrumental in translating strategic goals into actionable insights. Through the exploration of various business strategies and their interplay with AIS, this review aims to shed light on the multifaceted effects that strategic alignment can have on the design, implementation, and operation of accounting information systems. By investigating how different strategies influence AIS adaptation, customization, and usage, we can glean insights into the mechanisms that underpin successful strategic implementation. The subsequent sections will delve deeper into the nuances of how different business strategies, such as cost leadership, innovation, differentiation, and risk management, intersect with AIS functionalities. Scholars have noted the significance of strategic alignment in enhancing competitive advantage (Chen & Lee, 2019; Smith & Johnson, 2020). This study investigates the multifaceted relationship between business strategy and AIS, delving into how varying business strategies impact the design, implementation, and operation of AIS.

2 AIS and Business Strategy

The customization and alignment of an AIS with specific business strategies are critical for optimized information processing. Research underscores that organizations must adapt AIS functionalities to the strategic context (Chen & Lee, 2019). Smith and Johnson (2020) offer a compelling case study approach, demonstrating that customized AIS leads to better strategic decision-making by providing timely and relevant information. This alignment enhances the accuracy of performance measurement and resource allocation, ultimately driving organizational success. Strategic cost management is integral for organizations aiming to achieve a competitive edge. The effective integration of AIS aids in realizing cost leadership strategies by providing relevant cost-related information. AIS can facilitate activities such as activity-based costing and value chain analysis, leading to efficient cost control and allocation. This alignment empowers organizations to make informed decisions that contribute to cost reduction and operational excellence.

Strategic cost management is integral for organizations aiming to achieve a competitive edge. The effective integration of AIS aids in realizing cost leadership strategies by providing relevant cost-related information. Innovation and differentiation strategies require robust information systems that capture both financial and nonfinancial indicators. AISs can play a pivotal role by enabling enhanced reporting and analysis capabilities (Johnson & Patel, 2022). This facilitates data-driven decision-making, empowering organizations to monitor and assess their innovation and differentiation efforts. The insights provided by the AIS aid in understanding the impact of these strategies on overall business performance. Effective risk management is essential for ensuring business sustainability. AISs play a pivotal role in identifying, assessing, and mitigating risks through their integration with internal control systems (Tan & Chan, 2023). Their study underscores how AIS contributes to enhanced internal controls and fraud detection mechanisms. By aligning AIS with risk management strategies, organizations can better safeguard their assets, maintain regulatory compliance, and ensure the accuracy of financial reporting.

3 COVID-19 and its Influence on Business Strategy and AIS Development

The COVID-19 pandemic had significant effects on various aspects of business operations, including accounting information systems (AISs). Businesses faced the challenge of adapting to remote work and social distancing measures, leading to the adoption of cloud-based AIS solutions (Bartik et al., 2020). The shift to remote work also raised cybersecurity concerns, as the reliance on digital platforms heightened the risk of cyberattacks targeting accounting systems and financial data (Eilifsen & Messier, 2020). The pandemic-induced changes in consumer behavior and supply chain disruptions altered transaction patterns, requiring adjustments in AIS to accurately capture and process these changes. Economic uncertainties stemming from the pandemic have impacted financial reporting, necessitating adjustments in revenue recognition, impairment assessments, and fair value measurements (Stagliano, 2020). These adjustments were essential to ensure the accuracy and transparency of financial statements under changing circumstances.

Furthermore, the pandemic highlighted the importance of scenario planning and forecasting, which became crucial for businesses to assess the potential financial impact of various pandemic-related scenarios. AISs play a pivotal role in generating data-driven insights to guide decision-making (Tong et al., 2020). The transition to remote work also has implications for internal controls and fraud prevention. The reliance on digital processes and reduced physical oversight prompted businesses to adapt their internal controls to the new working environment (Rompelman et al., 2021). Robust internal controls were vital for preventing fraud and errors in a remote setting. As organizations navigated the challenges posed by the pandemic, the role of AIS in supporting decision-making became more evident. Businesses utilized AIS data for data analytics and insights to understand evolving customer preferences and make informed decisions amid uncertainty (Li & Zhang, 2020). The COVID-19 pandemic compelled businesses to adapt their accounting information systems to the new realities of remote work, shifting transaction patterns, and economic uncertainties. The adoption of cloud-based solutions (Bartik et al., 2020) and the implementation of robust internal controls (Rompelman et al., 2021) are among the strategies employed to address these challenges. Moreover, AIS plays a crucial role in facilitating data-driven decision-making (Tong et al., 2020) and ensuring the accuracy and transparency of financial reporting (Stagliano, 2020).

The dynamic business environment compelled organizations to continuously reassess their strategies (Davila et al., 2019). Kim and Mauborgne (2017) introduced the concept of the “blue ocean strategy,” advocating for businesses to explore untapped markets and create new value propositions. This strategy involved breaking away from industry norms and reinventing business models, fostering innovation and differentiation. The alignment between AIS and business strategies became a crucial driver of organizational success (Chenhall, 2018). As businesses embrace diverse strategies, AIS has evolved to support strategic goals (Lilis & Azhar, 2018). Organizations have adopted activity-based costing systems to enhance decision-making (Lee & Goo,

2018). This integration enabled firms to allocate resources efficiently and identify cost drivers, aligning with cost leadership strategies. Advancements in technology redefined business strategies and AIS development (Besson & Rowe, 2017). Digitalization and Industry 4.0 prompted organizations to adopt technology-driven strategies (Davila et al., 2019). Cloud-based AIS solutions have gained traction because they facilitate remote access to financial data (Fatima et al., 2019). Such strategies improved operational efficiency and data-driven decision-making.

AIS innovation has emerged as a cornerstone of strategic differentiation (Besson & Rowe, 2017). Organizations leveraged emerging technologies such as blockchain to enhance the transparency of financial transactions (Frey et al., 2018). These technological innovations improved the accuracy and reliability of financial information, aligning with strategies that emphasized transparency and ethical business practices. Organizations navigated disruptions such as regulatory changes and geopolitical uncertainties, necessitating agile strategic responses (Davila et al., 2019). Companies have embraced adaptive strategies to thrive in turbulent environments (Kaplan & Mikes, 2018). AISs play a pivotal role in facilitating scenario planning and predictive analytics to assess the impact of external factors on financial performance (Chen & Zhang, 2018). In a study by Brennan and Solomon (2018), the authors examined how a multinational corporation integrated AIS with its sustainability strategy. The study showcased the role of AIS in tracking environmental performance indicators, ensuring compliance with sustainability goals, and driving strategy execution. Frey et al. (2018) explored how AIS facilitated strategic decision-making through real-time data analytics. The study emphasized that AIS-generated insights enabled timely and informed decisions, enhancing organizations' competitive agility. The role of data analytics in AIS became increasingly vital during this period. Zhao et al. (2019) explored how AIS leveraged advanced data analytics techniques, including machine learning and predictive analytics, to provide organizations with actionable insights for strategic planning and performance monitoring. Data analytics helped businesses make informed decisions by processing large datasets in real time and identifying trends and patterns.

The pandemic emphasized the importance of managing multinational operations and addressing currency exchange challenges. Gu and Lev (2018) and Kim and Mauborgne (2017) examined how AIS supported organizations in complying with international accounting standards while aligning with global business strategies. As businesses expanded globally, AIS played a pivotal role in consolidating financial data and ensuring regulatory compliance across different jurisdictions. Measuring the alignment between AIS and business strategy has remained essential. Wang et al. (2017) introduced key performance indicators (KPIs) and metrics for assessing the effectiveness of AIS in supporting strategic objectives. These metrics enabled organizations to evaluate how well their AIS contributed to achieving strategic outcomes and making data-driven decisions.

Sustaining competitive advantage is a primary goal for organizations. Li and Chen (2019) discussed how AIS could be leveraged to identify and sustain competitive advantages through real-time data analysis, market intelligence, and cost control mechanisms. AISs help organizations gain insights into market trends and customer behavior, enabling them to proactively adapt their strategies.

Ethical concerns in financial reporting and data management have gained prominence. Garcia et al. (2020) and Brown and Smith addressed the ethical implications of AIS design and usage. They emphasized the need for ethical alignment with business strategies to build trust with stakeholders. Ensuring data integrity and transparency have become critical components of AIS design. Managing risks is a crucial aspect of strategic planning. Patel et al. (2018) explored how AIS assisted organizations in identifying, assessing, and mitigating various risks, including operational, financial, and compliance-related risks. AISs provide real-time data and analytics capabilities, enabling organizations to make informed decisions to mitigate potential risks.

Sustainability reporting continued to gain importance in business strategies. Wu et al. (2018) and Zhang and Wu (2017) explored the role of the AIS in collecting, analysing, and disclosing sustainability-related data. AISs support organizations in meeting sustainability goals, enhancing their reputation, and aligning with environmental, social, and governance (ESG) principles. These additional references provide further insights into how the COVID-19 pandemic influenced business strategies and the development of accounting information systems (AISs) from 2016 to 2020. They underline the significance of data analytics, globalization, strategic alignment metrics, competitive advantage, ethical considerations, risk mitigation, and sustainability reporting in shaping organizational strategies in a rapidly changing environment.

The COVID-19 pandemic profoundly influenced business strategies and the development of AIS. It accelerated digital transformation, emphasized sustainability, and led to the re-evaluation of supply chains and economic recovery planning. AIS development included the integration of AI, the adoption of cloud-based solutions, the exploration of blockchain technology, heightened cybersecurity measures, and adaptation to evolving regulatory requirements.

4 Challenges of Aligning Business Strategy with AIS Development During COVID-19

The COVID-19 pandemic has thrust organizations into a realm of unprecedented challenges, catalyzing strategic adaptations that reverberate throughout every facet of business operation. One pivotal area profoundly impacted by these changes is the alignment of business strategy with the development of accounting information systems (AISs). While the integration of these two realms offers immense potential, it is not without its intricacies and challenges.

Therefore, it is important to note the impact of COVID-19 on business strategy and AIS development. COVID-19 has had profound effects on businesses worldwide. It compelled organizations to reevaluate their strategies and adapt to rapidly changing circumstances. Accounting information systems (AISs) played a pivotal role in facilitating these adaptations. Some of the impacts of business strategy include digital transformation acceleration, sustainability emphasis, supply chain re-evaluation and economic recovery planning. The pandemic accelerated digital transformation efforts across industries. Organizations have recognized the need for AISs that can seamlessly integrate with digital strategies (Sharma et al., 2022). Digital technologies such

as cloud computing, big data analytics, and the Internet of Things (IoT) play a crucial role in enabling remote work and transforming business models (Huang et al., 2020). Sustainability became an even more critical component of business strategy during the pandemic (Rezaee et al., 2020). AISs play a vital role in tracking and reporting sustainability metrics to align with evolving environmental and social goals.

In addition, organizations have increasingly focused on environmental, social, and governance (ESG) criteria to meet sustainability goals and attract responsible investors (Martin & Ruggie, 2020). Supply chain disruptions force organizations to rethink their supply chain strategies. AISs provide real-time visibility to inventory, procurement, and distribution processes, supporting adaptive supply chain strategies (Kumar et al., 2020). Blockchain technology has gained prominence for enhancing supply chain transparency and traceability (Zhang et al., 2018). AISs play a crucial role in financial planning and resource allocation as businesses seek to recover from the economic impact of the pandemic (Cheng et al., 2020). Economic uncertainty has led to a focus on scenario planning and stress testing using AIS (Gupta et al., 2020). Thus, organizations have explored innovative financing options, such as green bonds, to support postpandemic recovery and sustainability initiatives (Zhang et al., 2018).

Furthermore, the impact of COVID-19 on AIS development can be seen in AI integration for decision-making, cloud-based solutions, blockchain financial transactions, cybersecurity challenges and regulatory compliance. The integration of artificial intelligence (AI) into AIS has gained prominence, enhancing decision-making processes (Chen et al., 2019). AI-driven analytics have provided valuable insights for strategic planning and performance evaluation (Wang et al., 2020). Natural language processing (NLP) and machine learning (ML) algorithms were applied to automate data entry, financial analysis, and fraud detection within AIS (Huang et al., 2020). The adoption of cloud-based AIS solutions increased during the pandemic, addressing the need for remote work capabilities. Cybersecurity measures and data privacy considerations have become essential aspects of cloud-based AIS development (Gupta et al., 2020).

The shift to cloud-based AIS reduced IT infrastructure costs and improved scalability and accessibility (Huang et al., 2020). Blockchain technology has gained traction in AIS because of its potential to enhance transparency and security in financial transactions (Liu & Fan, 2019). Research has explored the integration of blockchain into AIS and its implications for financial reporting and decision-making (Liu & Fan, 2019). Smart contracts and distributed ledger technology (DLT) in blockchain streamlined financial transactions and contract management (Zhang et al., 2018). Evolving cybersecurity threats necessitated a focus on cybersecurity measures in AIS development (Zhang et al., 2019). Organizations need to protect their AIS while aligning with their strategic goals (Li & Chen, 2020).

AIS security frameworks and protocols are continuously updated to mitigate risks (Chen et al., 2017). Regulatory changes in response to the pandemic have implications for financial reporting and disclosure (Smith & Johnson, 2020). AISs must adapt to evolving regulatory requirements while maintaining strategic alignment (Smith & Johnson, 2020). The integration of regulatory technology (RegTech) solutions into AIS helps organizations ensure compliance more efficiently (Huang et al., 2020). This chapter delves into the multifaceted challenges that organizations encounter while

harmonizing business strategies with AIS development during the pandemic and explores potential solutions to address these challenges. One of the primary challenges lies in the rapid and multifaceted shifts in business strategies prompted by the pandemic. As organizations navigated remote work, supply chain disruptions, and shifting consumer behaviors, their strategies evolved at an unprecedented pace. However, adapting AIS to mirror these strategic shifts is not always straightforward. Businesses may grapple with the task of aligning their existing AIS with new strategic directions, risking misalignment and inefficiencies. As businesses transitioned to remote work, cybersecurity concerns surged. With the AIS holding sensitive financial information, the vulnerability to cyberattacks has increased. Remote work introduced new entry points for malicious actors to breach AIS systems, posing a substantial risk to data security and integrity (Eilifsen & Messier Jr, 2020).

The pandemic expedited the adoption of new technologies such as cloud-based solutions and data analytics. While these technologies hold immense promise, integrating them into existing AIS frameworks can be complex. The challenge lies in ensuring seamless interoperability between disparate systems and technologies. The pandemic's economic fallout has resulted in resource constraints for many organizations. Aligning AIS development with shifting strategies demands budgetary considerations. However, limited resources may hinder the comprehensive development and implementation of AIS enhancements. The introduction of AIS enhancements aligned with new strategies may result in resistance from employees who are accustomed to existing processes. Inadequate user adoption can undermine the efficacy of AIS changes and impede strategic execution.

The COVID-19 pandemic has thrust businesses into uncharted territories, necessitating swift strategic adaptations for survival and growth. Within this complex landscape, the symbiotic relationship between business strategy and the development of accounting information systems (AISs) has emerged as a pivotal determinant of organizational resilience and success. The literature reviewed underscores the profound impact of the pandemic on reshaping business strategies and the concurrent evolution of AIS to align with these strategic imperatives.

5 Possible Solutions to Challenges

To address these challenges, organizations need to imbue their AISs with strategic flexibility. This entails designing an AIS architecture that can swiftly adapt to changes in business strategies. The creation of modular AIS components that can be reconfigured according to changing strategic priorities will enable seamless alignment, ensuring that AIS evolves in tandem with strategic shifts (Davila et al., 2019; Kim & Mauborgne, 2017). Addressing cybersecurity challenges demands the integration of robust cybersecurity measures within AIS development. Employing encryption, multifactor authentication, and continuous monitoring mechanisms can bolster AIS security. Regular security audits and employee training are vital for cultivating a culture of vigilance against cyber threats (Rompelman et al., 2021;

Stagliano, 2020). Adopting an integrated technology ecosystem is paramount. Organizations should design AISs with modularity that accommodates the integration of new technologies. An API-driven approach fosters interoperability and enables AIS to harness the power of emerging technologies while maintaining cohesiveness (Lee & Goo, 2018; Tong et al., 2020).

Effective resource allocation involves prioritizing AIS development projects based on their alignment with strategic imperatives. Organizations can leverage data-driven insights generated by AIS to identify high-impact projects that deliver maximum strategic value within budget constraints (Brennan & Solomon, 2018; Chen & Zhang, 2018). User involvement and training are integral to successful AIS integration. Involving end-users in the design process ensures that AIS aligns with their needs and workflows. Comprehensive training programs facilitate smooth transitions, enabling users to embrace AIS changes and leverage their capabilities effectively (Astuti et al., 2022).

The strategic shifts that unfolded in response to the pandemic's disruptions were multidimensional and multifaceted. Organizations demonstrated remarkable agility as they transitioned from conventional business models to innovative strategies aimed at ensuring business continuity, adapting to remote work, and navigating supply chain uncertainties. The adoption of strategies such as cost optimization, diversification, and digital transformation (Akande & Afrogha, 2022) illuminated the dynamic nature of strategic decision-making during the crisis. The nexus of business strategy and AIS development during the COVID-19 pandemic encapsulates both opportunities and challenges. Navigating these challenges necessitates a multifaceted approach. By fostering strategic AIS flexibility, embedding cybersecurity measures, embracing integrated technology ecosystems, strategically allocating resources, and prioritizing user-centric design and training, organizations can overcome barriers and harness the full potential of AIS in supporting dynamic business strategies. As the pandemic continues to reshape the business landscape, the synergy between strategy and AIS will remain integral to organizational resilience, growth, and adaptation.

AIS development paralleled these strategic shifts, reflecting a responsive and adaptive approach to meet the demands of the new reality. The rapid adoption of cloud-based AIS solutions has emerged as a defining characteristic enabling seamless remote access to financial data (Bartik et al., 2020). Simultaneously, the integration of robust cybersecurity measures (Eilifsen & Messier, 2020) underscored the imperative of safeguarding financial information in the digitally reliant landscape. Pandemic-induced shifts in transaction patterns and economic uncertainties precipitated changes in financial reporting and revenue recognition (Stagliano, 2020). AISs have evolved to capture and process these dynamic changes accurately, ensuring the transparency and integrity of financial statements. Moreover, the heightened focus on scenario planning and forecasting in strategic decision-making underscores the significance of AIS-generated data insights (Tong et al., 2020). These insights empowered organizations to anticipate and navigate the financial implications of various pandemic-related scenarios.

As organizations grappled with the remote work paradigm, AIS played an instrumental role in enhancing internal controls and fraud prevention (Rompelman et al.,

2021). The agile adaptation of internal control mechanisms via AIS not only ensures data integrity but also aligns with the strategic priorities of risk mitigation and financial stability. Beyond control enhancement, AIS has facilitated data analytics, offering profound insights into evolving customer preferences and market trends (Li & Zhang, 2020). These insights supported informed strategic decisions, aligning AIS development with strategies for business growth. The COVID-19 pandemic has underscored the symbiotic relationship between business strategy and AIS development. Organizations that proactively aligned their AIS with their evolving strategies were better equipped to navigate the uncertainties brought about by the pandemic. AISs play a pivotal role in data-driven decision-making, risk management, and the implementation of crisis response strategies. The lessons learned underscore the ongoing significance of AIS in strategic decision-making and position it as a critical tool for organizational resilience in a rapidly changing business landscape.

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Systematic Review of Libraries and Financial Management Practices Amidst COVID-19



Oluwayemi Ibukunoluwa Odularu 

Abstract This paper conducts a systematic review aimed at examining the practices of library information technology and financial management during the COVID-19 pandemic. While the literature extensively covers library-related topics, there is a notable gap in understanding the technological challenges and financial management practices during the pandemic. This study emphasizes the urgent need for resilience strategies against pandemics such as COVID-19, highlighting the limited research on coping strategies and their effectiveness. By utilizing conceptual model theory as a framework, this study systematically reviews the relevant literature from reputable databases to comprehensively address the complexities of the topic. The research involved searching five databases: Library and Information Science (Ebscohost), Library and Information Science Technology (LISTA), Sabinet, Web of Science (WoS), and Google Scholar. The results highlight the significant impacts of the pandemic on risk factors and suggest innovative approaches to sustain libraries and financial management practices. This study emphasizes the need for further research to develop novel methods of pandemic risk education to effectively address emerging challenges.

Keywords COVID-19 · Libraries · Financial management · Systematic review · Conceptual model theory · Information technology · Pandemic · Resilience strategies · Risk factors · Sustainability · Educational resources · Technological challenges · Crisis management · Financial governance · Digital resources · Remote access · User expectations · Financial constraints · Strategic planning · Decision-making · Technological adaptations · Library services · Community engagement · Digital platforms · Risk education · Bibliometric analysis · Academic literature · Information dissemination · Knowledge preservation · Financial transparency

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1 Introduction

In the unprecedented landscape shaped by the COVID-19 pandemic, the role of libraries in information technology (IT) operations has become increasingly crucial. This study provides a systematic review of library information technology and financial management practices during the COVID-19 pandemic. The study is a systematic review. This approach, endorsed by the American Library Association (2020), involves a meticulous and transparent process encompassing the identification, selection, appraisal, and synthesis of pertinent studies to generate a comprehensive and unbiased overview of the available evidence. Recent studies have employed inclusion and exclusion research designs to enhance the systematic review process. Furthermore, publications, authors, journals, and citation networks offer valuable insights into the characteristics and impact of research literature. By incorporating research design into systematic reviews, researchers can gain a deeper understanding of the research landscape and identify critical knowledge gaps, trends, and priorities (Boudreau, 2019). This method proves instrumental in pinpointing essential studies, thereby contributing to identifying literature gaps that may guide future research endeavors. Additionally, using bibliometric analysis enhances the efficiency of the systematic review process by alleviating the burden of manual screening and increasing the accuracy and reproducibility of study selection (Bill and Melinda Gates Foundation, 2022). Furthermore, bibliometric analyses comprehensively portray the research landscape, revealing influential studies, authors, and institutions while revealing collaboration patterns and interdisciplinarity within a research field (American Library Association, 2017). Numerous studies attest to the value of bibliometric analysis in augmenting the systematic review process, enhancing transparency and reproducibility, and providing insights into research impact (Waltman & van Eck, 2013).

Historically, libraries have been critical in preserving and disseminating knowledge and culture (American Library Association, 2020). They have served as centres of learning, research, and intellectual exchange and continue to play an essential role in our modern society. Libraries have long been regarded as the epitome of knowledge, preserving and providing access to information and resources (Chicago Public Library Business, Science and Technology Division, 2020). With the rapid advancement of technology, libraries have had to rethink their traditional roles and embrace digital technology to remain relevant (Horriggan & Duggan, 2015). The technology age has revolutionized how we create, store, and access information, leading to a paradigm shift in the role of libraries in sustaining information technology operations. Libraries have been at the forefront of providing access to information and knowledge for centuries (Marshall, 2016). They have been the custodians of history, preserving and maintaining historical records, manuscripts, and documents. With the advent of technology, libraries have evolved to meet the changing needs of society. Libraries have embraced digital technology to provide access to information, knowledge, and resources. They have transformed themselves from mere storehouses of books to centres of knowledge, offering their patrons a wide

range of services (Horrigan & Duggan, 2015). Libraries have been essential for sustaining information technology services for many decades. Additionally, libraries face the challenge of balancing traditional services with providing information technology services. However, the following question remains: Is there a necessity for a systematic review of libraries' information technology and financial management practices amidst COVID-19? According to Connell et al. (2021), financial management plays a crucial role in library information services, contributing to the effective management, organization, and accessibility of information. The significance of financial management in library information services is grounded in the profound impact of technology on conventional library operations and the pressing need for financial transparency and sustainability. As documented in scholarly works, the ongoing transformation of libraries has been catalyzed by technological advancements, reshaping their traditional functions into dynamic, tech-driven information hubs. Information technologies have prompted a paradigm shift in how libraries manage, process, and disseminate information. The literature underscores the imperative for libraries to adapt their financial management dynamics to meet the growing demand for digital resources and remote access, particularly during significant global events such as the COVID-19 pandemic. Moreover, this study highlights the essential role of financial management in guiding financial practices within library information operations. According to Salaba and Chan (2023), scholarly discussions emphasize the need for adherence to established financial management standards, recognizing the increasing reliance on sophisticated information technology roles. This adherence is a foundational framework for transparent financial reporting, responsible budgeting, and strategic resource allocation. Scholars assert that adherence to financial management standards is not merely a compliance requirement but an integral component in ensuring the long-term financial health and sustainability of library operations. Delaney and Bates (2018) reported that the literature converges on the idea that adherence to financial management standards is fundamental for the holistic functioning of libraries. This integration is portrayed as essential for libraries to effectively navigate the complexities introduced by technological transformations, aligning library information technologies with financial responsibilities. The literature consistently argues that libraries, combining financial management and financial governance, can meet the immediate challenges posed by the digital age and proactively plan for a sustainable and viable future. According to Delaney and Bates (2018), data organization, cataloging and classification, digital resource management, and search and retrieval ensure financial management standards in library management, which effectively promotes and enhances financial resources to acquire, maintain, and update collections. Tyner (2014) explained that data organization-enhanced information technology (IT) involves organizing, categorizing, and structuring data and resources within a library. This helps in creating efficient systems for the storage and retrieval of information. In addition, Marshall (2016) stated that cataloging and classification are essential for cataloging library materials and classifying them based on established standards such as the Dewey Decimal Classification or Library of Congress Classification. This ensures consistency and facilitates easy navigation for users. Financial

management standards provide a framework for financial reporting, financial statements, budgeting, and resource allocation (Delaney & Bates, 2018). Libraries often have limited budgets and financial management challenges, which help them allocate funds strategically, such as costs for various services (acquisitions and maintenance of library resources), assessing the cost-effectiveness of services, identifying areas for improvement, and demonstrating accountability to stakeholders (Tyner, 2014). Regarding compliance and reporting, libraries are often subject to regulatory requirements and reporting obligations (Veer & Panda, 2021). Adhering to the principles of financial management ensures compliance with financial regulations and provides transparent reporting for stakeholders, including government agencies and funding bodies (Marshall, 2016). Adherence to the principles of financial management improves library information technology efficiency, transparency, and quality. They help libraries meet users' needs, manage resources effectively, and demonstrate accountability in financial and operational matters. Integrating these principles ensures that libraries can provide reliable, accessible, and well-managed information technology to their communities (Salaba & Chan, 2023).

1.1 Aim of the Research

This study aimed to perform a systematic review of libraries and financial management practices related to COVID-19.

2 Research Problem

The research gap identified in the study centers around the limited exploration of the interconnected dynamics between information technology within libraries and the adherence to financial management standards in the ongoing pandemic. While a wealth of literature exists on libraries' responses to technological challenges and financial governance independently, the comprehensive understanding of how these elements intersect and shape the sustainability and effectiveness of libraries' information technology amid the unique challenges presented by COVID-19 remains notably underexplored. The research gap, therefore, lies in the need for a holistic examination that bridges the gap between information technology and financial management practices within library contexts during the global health crisis, providing insights crucial for informed decision-making and strategic planning in this evolving landscape. The volume of research publications on these subjects has steadily increased since the late 1990s. However, despite this extensive research, literature reviews specifically addressing financial management standards and the role of libraries in sustaining information technology are scarce (Veer & Panda, 2021). Furthermore, there is limited understanding of library information technology and financial management practices during the COVID-19 pandemic. An

exploration of the role of libraries, the challenges they encounter, and the potential advantages they bring to sustaining financial management is imperative. While libraries are conventionally perceived as providers of physical materials, their contemporary role in delivering their services has gained significance.

The complexity of the interplay between financial decisions and future strategies is underscored by the unprecedented challenges introduced by the pandemic (ElMassah & Mohieldin, 2020). From an accelerated shift towards digital resources to financial constraints and evolving user expectations, libraries are navigating a dynamic and challenging environment. The accelerated pace of change prompted by COVID-19 necessitates libraries to adapt swiftly to new circumstances. This research gap suggests a lack of in-depth exploration into how libraries manage these rapid changes while seamlessly integrating financial governance principles and forward-thinking strategies. Understanding how libraries navigate adaptability in real time is crucial for informing best practices and ensuring their resilience in the face of ongoing challenges (ElMassah & Mohieldin, 2020). Strategic planning is vital for library resilience, especially amidst unforeseen challenges such as a global pandemic. This research gap underscores the limited insight into how libraries formulate forward-thinking strategies beyond immediate crisis responses. Exploring how libraries strategically position themselves for long-term resilience and adaptability is essential for guiding future planning and decision-making in a rapidly evolving landscape. The absence of comprehensive research has practical implications for libraries seeking guidance in navigating the complexities of COVID-19. Libraries require evidence-based strategies considering the symbiotic relationship between financial adherence and strategic planning. This research gap underscores the need for actionable insights to inform real-world practices, mainly as libraries play an increasingly vital role in providing information technology during and after the pandemic. Addressing this research gap is pivotal for advancing our understanding of how libraries can effectively navigate the multifaceted challenges posed by the COVID-19 pandemic. A more comprehensive and interconnected approach will contribute to academic knowledge and offer practical solutions for libraries to enhance their resilience and effectiveness in the face of unprecedented disruptions. Furthermore, it is crucial to emphasize that sustainability strategies should prioritize the community served, as ElMassah and Mohieldin (2020) suggested, or function as a tool for community building, as Tyner (2014) stated. Libraries, recognized as agents of change, underscore the importance of sustainability factors related to information technology, encompassing economic, social, cultural, and environmental sustainability. Madkhali and Sithole (2023) highlighted the necessity for future research to discuss how libraries and information technology can contribute to and bolster sustainability. This study focuses on the systematic review of libraries' information technology and financial management practices during the COVID-19 pandemic. However, the extent to which libraries can maintain these services and the challenges they encounter remain insufficiently articulated or understood (Tyner, 2014).

3 Theoretical Framework

Conceptual model (CM) theory is a powerful framework that provides insight into how individuals perceive and understand the world around them (Duque, 2014). The theory suggests that people create mental models or representations of various concepts, objects, events, and relationships that they encounter and use these models to make sense of and navigate the world. Multiple factors influence these mental models, including culture, language, and personal experience (Veer & Panda, 2021). One of the critical tenets of CM theory is that mental models are constantly evolving and being updated based on new information and experiences. As individuals encounter further information, they must integrate it into their mental models. This integration process can lead to changes in the mental model and revisions to previously held beliefs and assumptions (Duque, 2014). Thus, CM theory helps explain how individuals can adapt and learn in response to changing circumstances. In addition to providing insight into how individuals perceive and understand the world, CM theory has been applied in various fields, including education, psychology, and computer science. Applying the Conceptual Model (CM) theory to this study provides a robust framework for understanding how individuals perceive and adapt to changes in the world. The CM theory suggests that individuals construct mental models to make sense of concepts, objects, events, and relationships, and these models continually evolve with new information and experiences. In the context of libraries and information technology, adopting a conceptual model can be instrumental in identifying key factors contributing to sustainability and success (Veer & Panda, 2021). The proposed CM for libraries in sustaining information technology encompasses various components, such as technology infrastructure, human resources, user needs and expectations, service quality, and financial sustainability (Duque, 2014). The model guides library administrators and staff to make well-informed decisions regarding technology investments, accounting standards and resource allocation, enhancing overall service quality and effectively meeting user expectations amid the challenges posed by the COVID-19 pandemic (Veer & Panda, 2021).

4 Literature Review

The COVID-19 pandemic has led to unparalleled disruption across various aspects of society, with its origins traced back to Wuhan, China, in December 2019. Caused by the transmission of the SARS-CoV-2 virus (COVID-19), the pandemic has posed multifaceted risks through various modes of transmission, including contact, droplet, airborne, fecal-oral, bloodborne, fomite, mother-to-child, and animal-to-human routes (WHO, 2020). Its impact swiftly rippled across all industries and organizations worldwide in early 2020, fundamentally altering global social structures. For libraries, COVID-19 has been a catalyst for technological advancements,

accelerating the adoption and acceptance of academic library technology among professionals and users alike (Hossain, 2016). The pandemic necessitated a rapid transition to online environments, as educational institutions shuttered physical libraries to facilitate remote access (Madkhali & Sithole, 2023). Consequently, library facilities, users, and staff have been significantly affected by the global crisis (Mehta & Wang, 2020). Amidst these uncertainties, library leadership has faced challenges, including disruptions to normal services, ensuring the safety of users and staff, implementing social distancing protocols, and enhancing online access. Moreover, the changing information-seeking behaviors of users and their varying levels of digital literacy have compounded challenges for libraries (Ameen et al., 2021). Physical library operations have been severely hampered by lockdown measures imposed in many countries, prompting a surge in the adoption of digital library operations (Ameen et al., 2021). The pandemic has underscored the importance of digital initiatives, prompting libraries to augment existing resources and explore new practices to sustain operations amidst the crisis (Mehta & Wang, 2020). As governments worldwide enforce stringent health protocols and social restrictions, the need for electronic and digital operations, including online libraries, has become more pronounced (WHO, 2020). Libraries have emerged as vital resources for continual learning, aiding users in adjusting to the new normal brought about by the pandemic (Hossain, 2016).

In response to the challenges posed by COVID-19, libraries have been increasingly leveraging artificial intelligence applications and multimedia formats to enhance online operations and resource accessibility (Hossain, 2016; Mehta & Wang, 2020). The shift towards online learning has further underscored the importance of libraries in supporting academic and research activities through remote access to e-resource collections (Hossain, 2016). In conclusion, the COVID-19 pandemic has propelled libraries towards digital transformation, necessitating innovative approaches to sustain operations and meet the evolving needs of users amidst unprecedented challenges. As libraries continue to adapt and evolve in the face of the crisis, their role as essential providers of information and resources remains indispensable in navigating the uncertainties of the new normal. Therefore, on this premise, this study focuses on a systematic review of libraries and financial management practices during the COVID-19 pandemic.

5 Library's Service Delivery During COVID-19

Libraries have long been at the forefront of providing access to information and knowledge for their communities (Ameen et al., 2021). With the rise of information technology (IT), libraries have adapted to meet the changing needs of the public. Libraries are essential for providing access to IT operations, including internet connectivity, computer access, and digital resources (Mehta & Wang, 2020). In the modern era of technology, the role of libraries in providing access to IT roles has become more critical than ever before. Libraries serve as the primary source of

knowledge for the public, and providing IT services is an essential part of this knowledge-sharing process. Ameen et al. (2021) stated that libraries serve as gateways to information and knowledge (Dawson & Sayers, 2013). They are important institutions that provide access to knowledge, and in today's digital age, this access is incomplete without access to IT services. Access to technology is critical because it provides the public with the necessary tools to access information and knowledge, both locally and globally. Libraries have always been crucial in providing access to books and other reading materials. Nevertheless, with the increasing importance of technology in everyday life, they have expanded their role to include access to IT services (Buckley, 2018).

The pandemic has ushered in a change in the efficient delivery of libraries. To address the urgent need for library services arising from the pandemic, all librarians collaborated to swiftly inform customers about new offerings (Dawson & Sayers, 2013). These adjustments were prominently communicated through a large yellow alert box prominently displayed at the top of the library's homepage. Additionally, a dedicated "Coronavirus and Library Services" web page was launched and is regularly updated by all librarians. Concurrently, the library has been actively promoting enhancements to its services through social media channels, email communications, and updates on the library's website (Mehta & Wang, 2020). Libraries worldwide have reacted promptly to the challenges posed by the COVID-19 pandemic, not only by modifying existing services but also by introducing new ones to maintain engagement with their patrons, particularly through digital library systems. Social media platforms, ranging from e-books and streaming media to virtual programming and online community groups, such as virtual storytelling and knitting groups, were utilized to communicate changes in library operations and promote library services (Buckley, 2018).

Ameen et al. (2021) investigated the transition to remote library operations during the COVID-19 pandemic at the Southern Illinois University medical library. While librarians encountered challenges during this period, the adoption of various technologies, service models, and virtual resource offerings proved to be highly beneficial, with their continued usage anticipated long after the pandemic subsided (Dawson & Sayers, 2013). The authors underscored the importance of service models and technological implications for librarians during pandemics, recommending the preparation of accessible online resource lists shared through websites and social media platforms and the provision of such resources through online institutional repositories/library guides. The impact of the COVID-19 pandemic on libraries was further examined by Ameen et al. (2021) in Pakistani libraries, revealing how the crisis compelled stakeholders to bridge the digital divide across different socioeconomic strata through the closure of physical barriers. According to a report by the WHO (2020), approximately 1.6 billion learners in more than 200 countries were affected by the transition to online learning, as traditional face-to-face education was disrupted due to the spread of COVID-19. While challenges such as affordability, accessibility, and learning pedagogy have emerged, opportunities have arisen, including the increased utilization of web conferencing tools and social media platforms for online education delivery (WHO, 2020).

Medawar and Tabet highlighted survival strategies adopted by educational institutions to mitigate business losses and potential closures, emphasizing the shift to virtual library services to cater to patrons' needs. Guidelines developed by institutions such as the International Federation of Library Associations and Institutions (IFLA) and the American Library Association (ALA), along with toolkits provided by publishers in collaboration with libraries, facilitated the provision of services during the pandemic. Connell et al. (2021) noted a decline in website usage for some libraries in the U.S. after COVID-19. However, this trend did not apply universally, with institutions such as Louisiana State University, Northeastern Illinois University, and Valparaiso University libraries experiencing an increase in virtual engagement during the same period. Rafiq et al. observed that librarians were required to work remotely during the pandemic, leading to increased workloads and challenges, including the absence of guiding policies. Librarians identified issues such as the digital divide, lack of information and digital literacy skills, and connectivity challenges as barriers to fully implementing online services in academic libraries during the COVID-19 era.

5.1 Reasons for Changes in the Delivery of Library Services

According to the World Health Organization (WHO, 2020), academic libraries faced the necessity of extending loan periods to prevent fines for patrons, considering restricted movements during lockdowns. Additionally, there was an imperative to expand subscriptions to electronic resources, enhancing the accessibility of library materials to patrons regardless of their location, as long as they had internet connectivity. Although social media platforms have seen increased utilization for service delivery, concerns have arisen regarding exorbitant data charges, rendering access challenging for both librarians and patrons. Academic libraries have encountered significant challenges in collection development and management, as patrons can no longer access services and products as they did before the pandemic. This necessitated a paradigm shift among publishers and e-resource providers to ensure uninterrupted access. Publishers extended support to librarians, offering open and free access to their resources to facilitate continued teaching and learning.

Library leaders grappled with difficult financial situations, facing constraints and budgetary cuts due to the pandemic's impact. Despite the necessity of increasing investments in digital services and products, transitioning to online service provision poses challenges, resulting in decreased usage of web pages and online resources in some academic libraries. Challenges included slow internet connectivity, expensive data charges, inadequate digital literacy skills, and the digital divide. In response, librarians were tasked with promoting virtual services, utilizing the online public access catalogue (OPAC) embedded on library web pages (Ameen et al., 2021). This strategic approach aimed to mitigate the challenges posed by the pandemic and enhance the accessibility of library resources in a digital environment.

5.2 *The Delivery of New Library Services Due to the COVID-19 Pandemic*

To alleviate congestion in physical library spaces during the pandemic, librarians were tasked with working remotely from home, utilizing emails and social media platforms to maintain communication with patrons. Libraries that remained open during lockdown periods were compelled to enforce social distancing measures, including the removal of reading desks and chairs to discourage patrons from lingering on the premises (Ameen et al., 2021). The COVID-19 pandemic underscores the importance of disaster management plans and the necessity of reopening during such crises. Harris (2015) emphasized the significance of pandemic and business continuity plans to ensure uninterrupted service delivery during disasters. Institutions of higher learning should invest in technologies that facilitate access to electronic information resources and provide virtual reference services to support patrons' learning from home. The offer of virtual library tours and orientations would educate patrons on navigating electronic libraries, while video tutorials would guide them in accessing library services and products remotely. In such instances, institutions should support librarians by providing necessary resources and infrastructure for delivering virtual services, such as laptops, internet connectivity, and data charges (Ameen et al., 2021). Academic librarians should continuously develop their skills to remain relevant in the era of online teaching and learning. This entails upskilling and reskilling to acquire the necessary competencies for delivering virtual services effectively. Given the current landscape, remote access to library resources is imperative to ensure public accessibility from anywhere with internet connectivity.

6 Libraries Sustainability Services in the Post-COVID-19 Era

Libraries worldwide face numerous challenges in sustaining their operations due to budget constraints, rapidly evolving technologies, and changing user needs (Ameen et al., 2021). However, libraries can be effective by adopting strategies that ensure the sustainability of their services. According to Mehra and Braquet (2019), the following strategies were identified for library information: adopting source software solutions, collaborating with other libraries and organizations, exploring alternative funding sources, and ongoing investment in technology and infrastructure. Many libraries, such as the Koha integrated library system (ILS) and the DSpace digital repository system, have successfully adopted open-source software solutions for their IT operations. Koha is an open-source ILS that libraries around the world. Koha is a web-based application that provides comprehensive features for managing library resources, including cataloging, circulation, and acquisitions. Koha is highly customizable, and libraries can modify the software to suit their needs

(Radniecki & Klenke, 2017). DSpace is an open-source digital repository system that libraries and cultural institutions use worldwide. DSpace provides a platform for managing digital assets, including documents, images, and multimedia content. DSpace provides a wide range of features for managing digital assets, including version control, access control, and metadata management (Radniecki & Klenke, 2017). The DSpace is highly customizable, and libraries can modify the software to suit their needs (DSpace, 2022). Another approach that libraries can adopt to sustain their services is collaborating with other libraries and organizations. By working together, libraries can leverage each other's strengths and expertise to develop and sustain IT services that may not be possible for individual libraries to support on their own. Collaborative efforts can take many forms, including consortia, partnerships, and shared services. The Digital Public Library of America (2022) is an excellent example of a collaborative effort among libraries and cultural institutions to provide a unified digital library platform (Radniecki & Klenke, 2017).

According to Mehra and Braquet (2019), Libraries can also explore alternative funding sources to sustain their services. Traditional funding sources, such as government grants and municipal budgets, may not be sufficient to sustain their services in the long term. Alternative funding sources include grants, partnerships with private organizations, and crowdfunding. The Institute of Museum and Library Services (IMLS) provides funding opportunities for libraries to develop and implement innovative services. The Gates Foundation has also funded public libraries to develop and implement innovative IT services promoting digital literacy and technology access (Bill and Melinda Gates Foundation, 2022). The Gates Foundation has also financed libraries to develop and implement mobile and remote services that reach underserved communities. Libraries face numerous challenges sustaining their services due to budget constraints, rapidly evolving technologies, and changing user needs (Bill and Melinda Gates Foundation, 2022). However, by adopting effective strategies such as adopting open-source software solutions, collaborating with other libraries and organizations, and exploring alternative funding sources, libraries can overcome these challenges and ensure the sustainability of their services. Libraries implementing these strategies can provide innovative services that meet the needs of their communities and promote digital literacy and access to technology (Radniecki & Klenke, 2017).

7 The Status of Financial Management During the COVID-19 Pandemic

Multiple research studies have examined the impact of the COVID-19 pandemic on various sectors, including tourism, nonfinancial firms, mutual funds, and small and medium-sized enterprises (SMEs). Using a stress testing scenario approach, Rizvi et al. investigated the effects of the pandemic on nonfinancial firms' valuation in ten EU member states. Yarovaya et al. analyse human capital efficiency, particularly

that of mutual fund portfolio managers, during the extreme stress induced by the pandemic. Their findings indicate that equity funds with higher human capital efficiency outperform their counterparts during the outbreak, demonstrating the significance of human capital investments in enhancing efficiency and fund performance during uncertain periods. Additionally, Rizvi et al. assess the preliminary effects of the pandemic on various categories of European mutual funds, categorizing the January–May 2020 period into three evolutionary phases. Mirza et al. focus on the impact of the pandemic on the risk-adjusted performance of Latin American countries' equity funds. By ranking these funds based on human capital efficiency in 2019, the researchers highlighted the superior performance of funds with higher human efficiency rankings. Yarovaya et al. find Islamic equity funds to be more resilient to the initial COVID-19 shock, outperforming their non-Islamic counterparts in terms of risk-adjusted performance. Another set of studies examines crisis management in large and small companies. Small and medium-sized enterprises are particularly vulnerable to crises due to their perceived liability and resource constraints. Eggers specifically investigates SMEs' responses during past crises. Dimson et al. conducted a comprehensive study on over 2200 SMEs across five European countries, revealing widespread revenue decreases, particularly in Italy, Spain, and the United Kingdom. Kalemli-Ozcan et al. estimated a significant increase in SME failure rates across 17 countries during the pandemic, with service sectors such as accommodation, food services, arts, entertainment, recreation, and education being among the hardest hit. Moreover, financial equilibrium in the form of net working capital significantly influences company performance, risk, and value. Indicators such as late payments, late deliveries, and short credit can signal insufficient working capital, impacting the organization's operations (Radniecki & Klenke, 2017).

7.1 Immediate Term and Medium-Term Measures for Financial Management

Drawing from insights gained from previous pandemics and emergency situations, a crisis mitigation approach has been formulated, with particular emphasis on sequencing. Initially, the approach prioritized implementing financial management measures aimed at containing the spread of the virus and providing assistance to affected individuals, including measures aligned with health and social protection policies. Subsequently, attention can be directed towards implementing fiscal, monetary, and financial measures aimed at alleviating the economic repercussions of the COVID-19 pandemic.

7.2 *Short-Term Measures*

Short-term measures encompass the assessment of the socioeconomic ramifications of the pandemic and their interconnectedness. This comprehensive framework guides decisions on assisting public institutions in transitioning to a COVID-19-affected environment. This involves aiding governments in (1) addressing new economic and fiscal constraints and (2) adjusting fiscal policies to support those most impacted by COVID-19, including implementing social protection schemes and economic stimulus packages. Additionally, revising state budgets and related medium-term fiscal frameworks to reprioritize expenditures and secure additional resources for the COVID-19 response is imperative. It is essential to conduct a thorough assessment of the country's assets and capabilities to combat the virus. For example, in Egypt, DAI, through USAID's Macro-Economic Stabilization and Reform Project, collaborated with relevant ministries to evaluate the effects of the outbreak on key sectors, forecast revenue and expenditure, estimate COVID-19 repercussions under various scenarios, and refine the government's fiscal risk management plan. Additionally, understanding the budgetary and legal framework for emergency response mechanisms and establishing fast-track expenditure authorization procedures (e.g., authority delegated to subnational governments) are crucial steps. Support activities may include issuing additional guidance for direct procurement awards, aiding national procurement officers in monitoring international and domestic markets for price comparisons, and ensuring transparency by making all COVID-19 procurement information on government portals public. The European Union-funded Public Finance Management Reforms (Chuma Cha Dziko) program in Malawi has adopted this approach by assisting in drafting emergency procurement procedures and integrating ex post checks to properly direct goods and services.

It is also essential to assist ministries of finance in preparing for high liquidity demands, especially in the health sector and in countries with low cash reserves. Ministries may require support in developing treasury plans for cash management as part of their overall business risk and continuity preparation. Establishing reporting and accountability mechanisms to track COVID-19 expenditures, inform policymakers, and mitigate corruption is crucial. This assistance could involve introducing appropriate budgeting and accounting codes within existing structures to capture COVID-19 allocations and expenditures. Facilitating inclusive policy dialogue and citizen engagement in policy planning processes ensures accountability. For instance, the U.K. Department for International Development's Accountable, Responsive, and Capable Government (ARC) pillar of the Partnership to Engage, Reform, and Learn Programme in Nigeria collaborated with the government to facilitate virtual meetings and national dialogues on various topics, maintaining policy dialogue and citizen participation to ensure accountability and government responsiveness during the crisis.

7.3 *Medium-Term Measures*

In the longer term, donors and implementing partners could play a crucial role in various aspects. They can assist in upgrading and implementing business continuity and recovery plans, as well as help in the development, updating, and implementation of country-owned disaster risk financing strategies. Additionally, they can facilitate COVID-19 coordination among internal stakeholders such as ministries and subnational governments, as well as external stakeholders such as regional development banks and bilateral development partners. Moreover, they can organize peer exchanges and knowledge transfers regarding the fiscal implications of coronavirus and related remedial measures. Initiatives such as the Collaborative Africa Budget Reform Initiative are already engaged in effective work in this regard, introducing tools such as the COVID-19 Public Finance Response Monitor to track African ministries of finance's responses to the crisis. Ultimately, it is essential to collaborate closely with stakeholders to address this crisis and its aftermath comprehensively. This involves ensuring that development assistance is tailored to local needs, informed by in-depth political economy analysis and lessons learned from previous experiences. The aim is to support counterparts not only in dealing with the present challenges but also in planning for the future. Where possible, efforts should be made to turn the immediate crisis into an opportunity to strengthen financial management processes and create conditions more conducive to growth and prosperity for all.

7.4 *Immediate Term Considerations: Identification of Legal Framework for Funding of Budgets*

Finance ministries should assess the emergency response mechanisms available to address unforeseen demands. Most countries possess various tools for managing emergency spending, such as contingency appropriations within the approved budget or a revolving contingency fund. Governments must utilize these resources judiciously and transparently. A clear prioritization of demands on contingency provisions is necessary to ensure that funds remain available for high-priority needs. Some jurisdictions permit emergency spending provisions, enabling expenditures beyond budgeted amounts under streamlined approval processes or continuing spending in the absence of an approved annual budget. Reprioritizing expenditures through reallocations and virements can create flexibility to accommodate additional requirements, with transparency expected within the legal framework. In cases where new resource needs exceed executive authority or the available budget, supplementary budgets may be necessary. Exploring external grants, particularly sector-specific or emergency response funding, is another option. Preemptive action to seek additional funds or reallocate spending may be prudent, requiring timely

authorization to prevent delays in parliamentary approval. When necessary, obtaining authorization to deviate from numerical fiscal rules should also be considered.

8 Libraries and Financial Management During the COVID-19 Pandemic

The COVID-19 pandemic has become an unparalleled global crisis, challenging institutions across all sectors to adapt rapidly to the evolving landscape. Among these, libraries and financial institutions have been thrust into the spotlight, as they play vital roles in society's functioning. This essay delves into the significance of adaptability and resilience in libraries and financial management during the pandemic, highlighting how these institutions have navigated adversity to continue serving their communities.

8.1 Adaptability in Libraries

Libraries, long regarded as pillars of knowledge and community hubs, faced extraordinary challenges as the pandemic forced closures and disrupted traditional service delivery models. However, rather than succumbing to these challenges, libraries showcased remarkable adaptability by embracing innovative solutions to maintain their mission of providing access to information and fostering community engagement.

One of the most notable adaptations was the rapid shift towards digital platforms. Virtual events, online resources, and remote services became the norm as libraries sought to bridge the gap created by physical closures. By leveraging technology, libraries transcended geographical constraints, reaching patrons beyond their immediate vicinity and ensuring continuity in service delivery. Furthermore, libraries demonstrated agility in responding to shifting community needs. From curating digital collections to offering virtual programming and educational resources, libraries have tailored their services to meet the changing and evolving demands of the public in the course of the pandemic. This responsiveness not only sustained community engagement but also reinforced the relevance of libraries as indispensable resources during times of crisis.

8.2 *Resilience in Financial Institutions*

Similarly, financial institutions confronted unprecedented challenges amidst the economic upheaval triggered by the pandemic. As markets fluctuated and consumer behaviours evolved, financial institutions were compelled to adapt their strategies to navigate uncertainty and meet the needs of their clients.

One of the key attributes exhibited by financial institutions during this time was resilience. Despite the turbulence in financial markets, institutions remained steadfast in their commitment to safeguarding the interests of their clients and stakeholders. Whether through dynamic investment strategies, risk management protocols, or digital innovations, financial institutions demonstrated their ability to weather the storm and emerge resiliently. Moreover, financial institutions played a pivotal role in providing financial support and guidance to individuals and businesses grappling with the economic fallout of the pandemic. From offering loan deferments and relief programs to providing financial literacy resources, institutions stepped up to mitigate the impact of the crisis on their communities.

8.3 *Continued Service Amidst Adversity*

Despite the unprecedented challenges posed by the pandemic, both libraries and financial institutions have exemplified resilience and adaptability in their response. By innovating, persevering, and prioritizing their communities' needs, these institutions have demonstrated their unwavering commitment to service amidst adversity. Innovation has been a major factor driving the adaptation and survival of libraries and financial establishments. Whether through the rapid adoption of digital technologies or the development of new service delivery models, institutions have embraced innovation as a means of staying relevant and effective in a rapidly changing landscape. Perseverance has also been a defining characteristic of libraries and financial institutions during the pandemic. Despite facing immense pressure and uncertainty, these institutions have remained steadfast in their mission, refusing to be deterred by obstacles and setbacks. Their resilience in the face of adversity serves as a testament to their enduring value and importance in society.

8.4 *Moving Forward: Lessons Learned*

As we reflect on the experiences of libraries and financial institutions during the COVID-19 pandemic, several key lessons emerge. First and foremost is the critical importance of adaptability and resilience in navigating unforeseen challenges. Institutions that were able to pivot quickly, embrace innovation, and persevere in the face of adversity were better positioned to weather the storm and continue serving

their communities. Second, the pandemic has highlighted the indispensable role that libraries and financial institutions play in society. Beyond their core functions of providing access to information and financial services, these institutions serve as anchors of stability and support during times of crisis. As such, investing in their resilience and capacity to adapt is not only prudent but also essential for building more resilient communities and economies. The COVID-19 pandemic has underscored the importance of adaptability and resilience in both libraries and financial management. Despite facing unprecedented challenges, libraries and financial institutions have demonstrated their ability to innovate, persevere, and continue serving their communities amidst adversity. As we navigate the uncertainties of the postpandemic world, incorporating these lessons into future strategies will be crucial for building more resilient and inclusive societies.

9 Research Methodology

The systematic review methodology employed in this study has the potential to establish a reliable knowledge base by systematically gathering findings from various studies in a reproducible manner. According to Moher et al., a systematic review involves formulating a specific question and utilizing systematic and explicit methods to identify, select, critically appraise, and analyse relevant research data. It follows a transparent and replicable process in identifying, analysing, and reporting literature on a particular topic. This assertion was supported by Odularu and Akande (2024). The author adopted the systematic review for this study because it facilitated the synthesis of previous studies meeting specific criteria not typically addressed in traditional narrative reviews. Academic journal articles discussing libraries and financial management in response to the COVID-19 pandemic were included in the review.

Eligibility criteria: Before conducting the search, the authors established clear inclusion and exclusion criteria. This review focused on peer-reviewed articles published in English journals during the pandemic. The two-stage assessment process involved preliminary evaluation and full-text screening to identify relevant articles. Duplicates were removed, and the full texts of the selected articles were critically evaluated to determine their eligibility. The final stage of the process involved including articles for systematic review and analysis. To ensure rigor and minimize bias, the author created an Excel spreadsheet to record findings from the selected articles.

Sources and Search Technique: The literature search was conducted in five databases: Library and Information Science (EBSCOhost), Library and Information Science Technology (LISTA), Sabinet, Web of Science (WoS), and Google Scholar. The search plan included keywords related to libraries, financial management, and COVID-19. Quotation marks were used for phrases, and a final Google Scholar search was conducted to capture the latest articles. Out of 92 potentially eligible articles, 24 were included for systematic qualitative analysis.

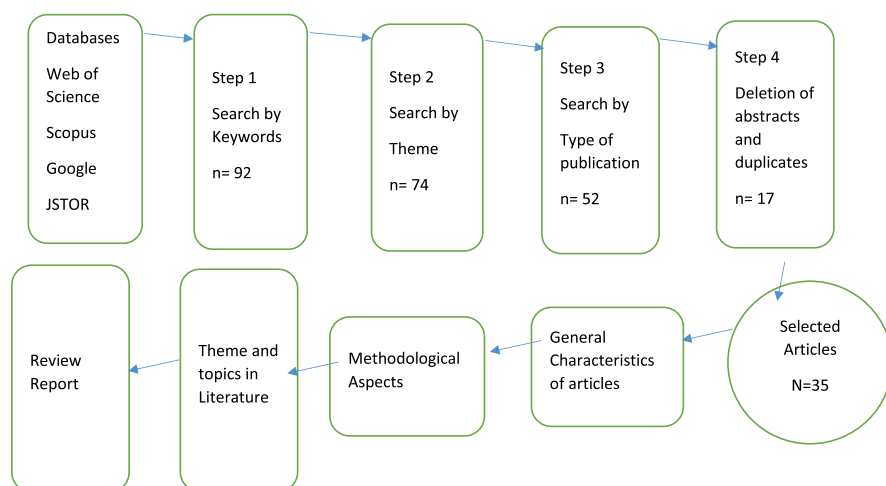


Fig. 1 Systematic literature review flow chart (Odularu & Akande, 2024)

Quality Assessment of Included Studies: Quality assessment is crucial for weighting studies based on their quality and relevance to the research question. The methodological quality of the included studies was independently evaluated by the author, with discrepancies resolved through active reviews until consensus was reached.

Results: This section presents the results of the quality assessment and a synthesis of themes derived from the included studies, focusing on libraries, financial management, and the COVID-19 pandemic.

Quality Appraisal: All studies used screening questions to assess the clarity of their research questions and whether the collected data addressed those questions. Studies meeting these criteria were further assessed based on specific questions related to research design. Seventeen of the ninety-two publications were excluded due to duplication to enhance the quality assessment outcome. The study followed a systematic search process to retrieve relevant data summarised in Fig. 1 below.

10 Discussion

This study revealed that libraries and financial management play crucial roles in responding to the COVID-19 pandemic to adapt to evolving public needs. Among the notable roles identified in the reviewed studies is the provision of remote digital access to library resources. Libraries offer digital support through instructional sessions, webinars, and off-campus access to electronic databases, archives, and resources. They also engage in negotiations and partnerships with publishers and database vendors to expand access to electronic materials. Prior to the pandemic, efforts to enhance collaboration and partnership among libraries were already

underway due to declining financial support and the growing importance of integrating new technologies into library functions. Institutional collaboration became particularly vital as many libraries closed their physical spaces during the pandemic, resulting in heightened demand for electronic resources from academia. Consequently, libraries have ramped up their offerings of e-books, electronic journals, and online databases to compensate for limited or restricted physical access. This shift to digital distribution has also been beneficial to publishers, reducing dissemination costs and increasing adoption during the pandemic. Aligning with the principles of open science, recent studies emphasize the importance of open access to accelerate the discovery of COVID-19-related data for more effective solutions. Various professional associations and organizations, such as the Australian Library and Information Association, the Association of Research Libraries, the International Federation of Library Association and Institutions, and the Institute of Museum and Library Services, have been actively compiling and updating information on library service provision since the onset of the pandemic. In addition to their traditional functions, libraries are increasingly engaging in welfare services, providing resources to support the well-being of the reading public. This includes offering relief support through volunteer services, donations, and reading therapy programs. Official development finance has historically served as a crucial resource during past crises, playing a significant role in promoting health and social protection systems in developing economies, which are critical components of the COVID-19 response. While global economic challenges and fiscal stimulus measures may impact official development assistance (ODA) levels, development assistance committee (DAC) members have expressed a commitment to protecting ODA budgets during the pandemic. The Organization for Economic Co-operation and Development (OECD) outlined three possible scenarios for the evolution of ODA levels in 2020, highlighting the importance of increased solidarity and the integration of sustainability principles into stimulus packages and recovery efforts. Collaboration among governments, international donors, and other stakeholders is essential for advancing sustainable development goals (SDGs) and building a more equitable, resilient world.

11 Limitations for Further Study

As this study delves into a novel area of literature, the author acknowledges that the review may not offer a comprehensive overview of libraries and financial management on a global scale. This limitation arises because many of the included studies predominantly centre on academic libraries and accounting standards.

12 Conclusion

The present study focused on a systematic review of libraries and financial management practices during the COVID-19 pandemic. The pandemic has culminated in unwarranted challenges for libraries and financial management institutions alike, forcing them to adapt rapidly to an ever-changing landscape. Despite these obstacles, both sectors have demonstrated remarkable resilience, innovation, and dedication to serving their communities amidst adversity. Libraries have embraced digital solutions, transforming traditional service delivery models to ensure continued access to information and community engagement. Through virtual events, online resources, and remote services, libraries have transcended physical limitations, reaching patrons beyond their localities and fostering inclusivity amidst social distancing measures. Moreover, libraries have shown agility in responding to shifting community needs, reinforcing their relevance as vital resources during times of crisis. Similarly, financial institutions have navigated volatile markets and evolving consumer behaviours with resilience and adaptability. By reassessing risk profiles, diversifying portfolios, and implementing dynamic investment strategies, financial institutions have weathered the storm and safeguarded the interests of their clients and stakeholders. Moreover, financial institutions have played a pivotal role in providing financial support and guidance to individuals and businesses facing economic hardship, reaffirming their commitment to serving their communities in times of need. As we emerge from the depths of the pandemic, the lessons learned from libraries and financial institutions are invaluable. Embracing technology, optimizing costs, strengthening community partnerships, and prioritizing resilience will remain critical imperatives for both sectors in a postpandemic world. Investing in these core principles will not only enhance the resilience of libraries and financial institutions but also contribute to building more resilient and inclusive societies. The COVID-19 pandemic has underscored the importance of adaptability and resilience in libraries and financial management. Despite facing unprecedented challenges, libraries and financial institutions have demonstrated their ability to innovate, persevere, and continue serving their communities amidst adversity. By incorporating the lessons learned from this crisis into future strategies, both sectors can emerge stronger and better equipped to meet the challenges of an uncertain future.

13 Recommendations

The following recommendations are made for the libraries:

Embrace Digital Innovation: Libraries should continue to invest in and expand their digital offerings, including virtual events, online resources, and remote services. This will ensure continued access to information and engagement with patrons, even amidst physical closures or social distancing measures.

Strengthen Community Partnerships: Collaborate with local organizations, schools, and businesses to expand outreach efforts and address community needs collaboratively. By leveraging collective resources and expertise, libraries can enhance their impact and relevance within their communities.

Prioritize Digital Literacy: Offer digital literacy programs and resources to help patrons navigate online platforms effectively. This will empower individuals to take full advantage of the digital resources and services offered by the library, fostering digital inclusion and equity.

Enhance Flexibility in Operations: Develop flexible operational strategies that enable rapid adaptation to changing circumstances. This may include cross-training staff, implementing remote work policies, and leveraging technology to streamline workflows and service delivery.

Advocate for Funding Support: Advocate for continued funding and support from local governments, philanthropic organizations, and other stakeholders to sustain library operations and initiatives. Libraries play a critical role in promoting literacy, education, and community resilience, especially during times of crisis.

Recommendations for Financial Management

Embrace Digital Transformation: Accelerate the adoption of digital technologies to enhance operational efficiency, improve customer experience, and enable remote service delivery. Robust cybersecurity measures should be invested in to safeguard sensitive information and protect against cyber threats. Additionally, libraries can explore new revenue-generating opportunities and diversify investment portfolios to mitigate risk and enhance financial resilience. This may include expanding product offerings, entering new markets, or developing strategic partnerships.

Risk Management: Risk management protocols and contingency planning should be strengthened to anticipate and mitigate potential disruptions. Regular stress tests and scenario analyses were conducted to assess the resilience of financial systems and processes under various conditions.

Financial Support: Accessible and comprehensive financial education resources should be provided to help individuals and businesses effectively navigate economic challenges. Offer guidance on budgeting, saving, investing, and debt management to promote financial literacy and resilience.

Foster Client Engagement and Trust: Prioritize transparent communication, personalized advice, and proactive support to build and maintain trust with clients. Tailoring financial solutions to meet the evolving needs and preferences of clients, demonstrating empathy and understanding during challenging times. Both libraries and financial management institutions can effectively navigate the COVID-19 pandemic by embracing innovation, fostering community partnerships, prioritizing digital literacy, and enhancing resilience in operations. By implementing these recommendations, these sectors can continue to serve their communities effectively and emerge more strongly from the challenges posed by the pandemic.

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Value Relevance of Economic and Accounting Performance Metrics During the COVID-19 Pandemic in South Africa



Dinis P. Maculuve, Anthanasius F. Tita, Akindele J. Ogunsola,
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Abstract This chapter investigates the value relevance of economic and accounting based performance metrics for 51 nonfinancial South African listed companies during the COVID-19 pandemic. This study adopted the Driscoll and Kraay (*Review of Economics and Statistics* 80:549–560, 1998) nonparametric estimator strategy to avoid the problem of misspecification. The findings reveal that COVID-19 has negative implications for shareholder returns on the Johannesburg Stock Exchange (JSE). In addition, accounting-based performance indicators are irrelevant to the behaviour of shareholder returns. However, we found that economic-based metrics, namely, refined economic value added and economic value added momentum, are value relevant to the JSE. Consequently, the chapter concludes that economic-based performance metrics provide superior explanations for shareholder returns on the JSE relative to accounting-based metrics, particularly during the COVID-19 pandemic.

Keywords Covid-19 pandemic · Johannesburg stock exchange · Economic-based metrics · Economic value added · Economic value added momentum · Stock market · South Africa · Return on assets · Return on equity · Market value added · Equity valuation · Return on capital employed · Operational cash flow ·

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Nonparametric estimators · Panel data · Cross sectional dependence · Effects on stock returns · Total assets · Total revenue · Fixed effect models · Ordinary least square · Random effect models · Debt equity ratio · Multivariate regression · Operational cash flow · Multiple regression · Dummy variable · Alternative investment market · Nigerian stock exchange · Sales revenues

1 Introduction

The stock market price shows the valuation of a company by the market. Investors interested in a listed company usually start by confirming the estimated intrinsic value of the stock and confirming whether the market price that has been quoted is attractive enough (Muhammad & Ali, 2018). Indicators such as liquidity, profitability, dividend payments, cash flow growth and traditional accounting-based metrics (ABMs), namely, earnings per share (EPS) and return on equity (ROE), are the most significant factors concerning stock return assessment (Foerster et al., 2017; Seng & Hancock, 2012). However, according to Nakhaei (2016), excluding the cost of equity from the comprehensive income constitutes the major drawback of traditional ABMs. On the other hand, economic-based metrics (EBMs), such as economic value added (EVA), refined economic value added (REVA) and economic value-added momentum (EVAM), all consider the cost of equity, which is paramount from the shareholders' perspective.

EVA measures company profitability derived from conventional accounting principles, and it considers the total cost of capital, which is a function of the cost of debt capital, the cost of equity capital and the capital structure epitomized by the debt–equity ratio (Nugroho, 2018). Notably, under the EVA proposition, equity valuation is based on book value (Stewart, 1991), whereas for REVA, equity valuation is based on market value and is aligned with the market-based total cost of capital (Bacidore et al., 1997). The basis for EBM is that they do not regard a company as truly profitable unless its after-tax return exceeds the capital charge. In addition, under the going concern assumption, a company is seen as continuing in operations for the foreseeable future. The company's economic profit assessment also concerns shareholders regarding a dynamic economic profit comparison. The EVA metric seeks to address the question related to real economic profit assessment. However, EVA as an indicator has been criticized due to its reporting as an absolute monetary value that makes it difficult to use in financial markets due to the size effect embedded in absolute values (Fayed & Dubey, 2016). In an effort to address this issue, EVA Dimensions introduced EVAM, which is reported in relative terms and can easily compare companies of diverse sizes and industries. According to Stewart (2009:74), EVAM is “the one ratio that tells the whole story”. Colvin (2010) confirmed that savvy investors and managers pay attention to EVAM.

Accounting profit adjustment is required to determine the EBM (EVA, REVA and EVAM).¹ Because of the added advantages of EBM, as proposed by their proponents, the value relevance of ABMs and EBM in determining shareholder values has been compared in recent literature (Badruzaman, 2020; Hall, 2018; Nakhaei, 2016; Nugroho, 2018; Rasool et al., 2021). Available pieces of empirical evidence (cf. Al-Lozi & Obeidat, 2016; Hamidah, 2015; Sharma & Kumar, 2010; Weldon, 2013) have yielded contradictory results concerning the value relevance of ABM and EBM to stock prices and, consequently, shareholder value in both developed and emerging markets.

Considering the debate surrounding the predictive power of ABM and EBM and the limited studies on the latter from the emerging market viewpoint, this chapter investigates their value relevance for South African listed companies during the COVID-19 pandemic. Stock prices may rise or fall in response to fundamental business factors and economic changes brought about by the COVID-19 pandemic. Muthu and Wesson (2023) believe that Covid-19 affected the performance of JSE-listed companies, as Covid-19 spread across the world quickly, and the World Health Organization declared Covid-19 a global pandemic on 11 March 2020. From the emerging market perspective, the African stock market consists of 29 stock exchanges. The Johannesburg Stock Exchange (JSE) is the largest African stock market by market capitalization, amounting to USD 1.37 trillion (List of African Stock Exchange, 2019). Therefore, the potential impact of ABM and EBM on shareholder returns on the JSE could provide valuable insight for potential investors on the continent, assuming that the JSE is the leading stock market on the African continent.

The pandemic presents a unique opportunity for examining the value relevance of ABM and EBM. Additionally, the different equity valuation approaches between EVA, REVA and EVAM are the cornerstone in the search for a construct that better explains stock value alongside ABMs (EPS and ROE). The following section presents a literature review on related literature, which is followed by a section on the methodology employed in the study. Thereafter, the results are presented and discussed, while the last section concludes the study.

2 Literature Review

Since Ball and Brown's (1968) seminal work, which was the first test on the value relevance of ABM in the United States, additional studies concerning the correlation between several ABMs and EBM with shareholder value have been conducted around global and emerging capital markets (Anwaar, 2016; Aveh & Awunyo-Vitor, 2017; Babatunde & Evuebie, 2017; Sulistyanie & Sumantri, 2020). However, the outcomes of these studies yielded contradictory results, as will be explained below.

¹ See Stewart's (1991) recommendations for the adjustment process.

2.1 *Accounting-Based Metrics*

For instance, regarding ABM, Anwaar (2016) examined the relationships among the quick ratio, return on assets (ROA), return on equity (ROE), net profit margin and stock return. Using the top 30 firms of the FTSE 100 Index of the London Stock Exchange from 2005 to 2014 as a sample, a panel regression analysis revealed that net profit margin and ROA have a significant positive correlation with stock returns. Even though EPS substantially negatively influence stock returns, ROE and the quick ratio have inconsequential influences. Additionally, Manoppo (2015) and Al-Lozi and Obeidat (2016) both used multiple regression analysis as a data analysis tool. They found that EPS, ROE and ROA are significantly correlated with stock returns and are, therefore, value relevant in the context of insurance companies listed on the Indonesian Stock Exchange and manufacturing companies listed on the Amman Stock Exchange. Alipour and Pejman (2015), based on pooled ordinary least square (POLS) and random effect (RE) models, found that ROE is associated with market value added (MVA) to the Iran Stock Market, and Anwaar (2016) reported that ROE significantly affects the stock price of companies listed on the FTSE 100 Index in London based on the ordinary least square (OLS) model and multivariate regression analysis.

Furthermore, Arabsalehi and Mahmoodi (2012) and Aveh and Awunyo-Vitor (2017) report similar findings for companies listed in Tehran and on the Ghanaian Stock Exchange. Thus, the ROE metric is value-relevant for those stock markets. However, Rasool et al. (2021) reported that ROE does not affect the stock returns of companies listed on the Pakistan Stock Exchange. This study applied the POLS model and multiple regression equation to test this relationship. Finally, the study outcome of Sulistyanie and Sumantri (2020), based on a panel data fixed effect (FE) model, reveals that stock prices are not significantly responsive to ROE on the Indonesian Stock Exchange.

On the other hand, Badruzaman (2020) found that ROE is negatively and significantly correlated with stock prices based on 57 companies listed on the Nikkei 225 Index, meaning that an increase in ROE will negatively impact stock prices. Jabbari and Fathi (2014) and Hamidah (2015) report similar negative linkages between EPS and stock returns in the Iranian and Indonesian stock markets. However, Hertina et al. (2020) claim that ROE and ROA have no impact on stock returns, while EPS is positively correlated with stock returns on property- and real estate-listed companies on the Indonesian Stock Exchange.

2.1.1 *Accounting-Based Metrics on the Johannesburg Stock Exchange*

In the JSE context, De Villiers et al. (2003), Erasmus (2010) and Robbetze et al. (2017) found that EPS are positively correlated with the stock price of JSE-listed companies, while De Wet and Du Toit (2007) explain that EPS and ROE are not associated with shareholder returns on the JSE. Consistent with earlier studies on

the impact of ROA, ROE and EPS on share returns, Vermeulen (2016) examined additional variables, such as the book-to-market ratio, earnings growth, earnings yield, size, dividend payout, asset growth, and leverage, derived from the financial statements of 115 companies that were listed on the JSE between 1994 and 2013. A multiple regression model revealed that the correlation between return and earning yield is positive, as shown in a prior study by Vermeulen and Smit (2011) that used the same methodology. However, ROE and EPS exhibit an insignificant correlation with stock returns; a similar outcome was observed for EPS by Haque and Faruquee (2013) and Umar and Musa (2013) on the Dhaka Stock Exchange and for Nigerian listed companies, respectively.

Reported accounting earnings reflect management's competitiveness in generating profit for the firm. Traditional ABMs, such as ROE, ROA and EPS, have been used intensively to indicate shareholder value (Shao et al., 2018). However, the reliability of these metrics of shareholder wealth assessment tools is questionable because the cost of equity is not accounted for in the statement of comprehensive income—only the cost of debt is recognized. On the other hand, EPS, ROE and ROA are derived from book value. Thus, the flaws in accounting metrics identified by studies (Hasani & Fathi, 2012; Nakhaei, 2016) and the absence of an association between stock returns and firm valuation have led to a search for alternative performance indicators. Therefore, EBM, namely, EVA and shareholder value added (SVA), have been advanced by Stewart (1991) and Rappaport (1986), respectively, to overcome the limitations of ABMs.

2.2 Economic-Based Metrics

According to Sabol and Sverer (2017), EVA is a value-based financial performance metric that emphasizes the creation of company value by management for company owners since it considers the total cost of capital employed. EVA is the excess remaining after appropriate business capital charges have been made (Sharma & Kumar, 2010). Moreover, Stewart (1994), the leading proponent of EVA, claims that EVA drives stock prices, creates wealth and can explain a change in shareholder value better than traditional performance metrics. Therefore, several scholars have investigated and tested Stewart's (1994) claim in various stock markets. Some empirical studies indicate that ABM outperforms EVA in describing stock returns. For instance, Sharma and Kumar (2010) examined the relative information content between EVA and various traditional performance metrics, such as net operating profit after tax (NOPAT), operational cash flow (OCF), EPS, ROE and return on capital employed (ROCE), and their relationships with MVA. Based on a multiple regression analysis and a sample of 70 companies in the Indian manufacturing sector from 2000 to 2007, the study shows that NOPAT and OCF are better than EVA in describing MVA. Moreover, several studies that compared accounting-based and market-based indicators to EVA observed Kumar and Sharma and Kumar's (2010) findings earlier. Chen and Dodd (1997), with a sample of 566 United States

companies from 1986 to 1992, noted that EVA explains only 20% of the inconsistency of stock returns, while ROA can explain 24.5%. There is no conclusive evidence supporting the supremacy of EVA relative to ABM in explaining stock returns. EVA and several ABMs use book value, while shareholder returns are inferred from changes in market stock prices and dividends paid. As a criterion for company performance evaluation, EVA has attracted considerable criticism because it derives the opportunity cost of capital employed from the book value, while investors expect a return based on the market value (Nakhaei et al., 2012). To address this shortcoming of EVA, Bacidore et al. (1997) introduced REVA, for which the opportunity cost of capital is based on market value. Therefore, Ghadiri and Shoghi (2012) claim that REVA measures company shareholder value creation better than EVA does. The difference between EVA and REVA is that the latter assesses its cost of capital for period t based on the firm's market value at the end of period $t - 1$, instead of the economic book value. According to Bacidore et al. (1997), the critical advantages of REVA relative to EVA are that whenever REVA is positive, incremental shareholder value is created; that is, the operating income flowing to shareholders at the end of the period as a percentage of their investments' market value at the beginning of the period exceeds their opportunity cost of capital.

In contrast to ABM and EVA, which include a great number of studies, there is a dearth of literature on the correlation of REVA with stock prices globally and in the South African context in particular. Moreover, the relatively few publications on REVA present mixed evidence in both developed and emerging markets. For instance, the first study on REVA's ability to predict shareholder value creation, conducted in the United States by its proponents, Bacidore et al. (1997), using 600 companies from Standard & Poor's Compustat from 1982 to 1992, reveals that REVA outperforms EVA.

Lee and Kim (2009) compared ROE, ROA and CFO to MVA, EVA and REVA in the context of the explanatory power of stock returns in the hospitality industry in the United States. The study revealed that REVA, EVA, MVA and ROE were all significant, although REVA was the strongest predictor of stock returns. The superiority of REVA is consistent with that of Quintiliani (2017) in Italy. Similarly, Yan and Wang (2016) revealed that REVA and EVA have a high correlation with MVA and are more efficient than accounting-based indicators for explaining MVA in 79 Chinese power utility companies, while Nugroho (2018) studied the impact of EVA, MVA and REVA on stock price and stock returns. Partial least square path modelling indicated that EVA, MVA and REVA substantially correlate with stock prices and returns for 104 Indonesian manufacturing companies.

On the other hand, several other studies failed to confirm the superiority of the REVA over other indicators. For instance, Ashraf (2018) evaluated the relationships between REVA, EVA, EPS, ROA and ROE and MAR for cement companies listed in Pakistan from 2006 to 2014, revealing that EVA outperformed REVA and all ABMs, that is, EPS, ROA and ROE. This finding is consistent with that of Shariat and Badavar (2005), who showed a weak correlation between REVA and return volatility on the Tehran Stock Exchange, and that of Ghadiri and Shoghi (2012), who established that MVA is more positively associated with EPS than is REVA.

Therefore, additional studies have been conducted to test EVA Dimension's claim. Bennett Stewart claims EVAM's superiority in explaining stock prices and, consequently, shareholder returns. EVAM is a new construct based on EVA; despite its associated EVA attributes, EVAM provides valuable additional information concerning changes in a company's economic profit. A positive EVAM indicates how much a company's economic profit improved from the previous period. Conversely, a negative EVAM shows the magnitude of economic profit destruction in that period (Wirawan, 2011). For instance, Mahoney (2011) explored the relationship between EVAM and future financial performance in the United States. The study revealed that, on a pooled basis, there was no evidence supporting a correlation between EVAM and future value measured by the market and total capitalization. Mahoney (2011) noted that the failure of EVAM to explain future value might arise from the matching issue. EVAM is computed by comparing the variance of the EVA in the current period to sales from the previous period. In the United Arab Emirates, Fayed and Dubey (2016) studied the impact of EVAM and traditional financial performance metrics on shareholder value creation. The findings reveal that EVAM, EVA margin and return on investment did not offer greater relevant or incremental information content; however, the price-to-book value multiple offered substantial relative information content, and traditional accounting metrics provided a statistically significant relationship with total shareholder returns.

In addition to Bennett Stewart's claim of EVAM superiority for explaining stock prices and, consequently, shareholder returns, EVAM metric correlation testing has recently been extended to measure its association with various corporate financial performance indicators and market stock prices. In this context, Omneya et al. (2021), using generalized least squares regression, indicate that EVAM effectively improves and explains ROA and ROE, while a mixed outcome was observed for EVA explanatory power. Moreover, Maenuddina et al. (2020) recently studied the correlation between EVAM, ROA, ROE and ROCE and working capital management determined by the cash conversion cycle² in 69 nonfinancial companies in Pakistan. The outcome reveals a positive and substantial correlation between EVAM and the working capital management of firms. The overall superiority of EVAM over ROA, ROE and ROCE means that managers can generate value by reducing a firm's cash conversion cycle (Maenuddina et al., 2020).

In conclusion, EVAM is a new construct that is based on EVA. Although associated with EVA attributes, EVAM provides valuable additional information concerning changes in a company's economic profit. A positive EVAM indicates how much a company's economic profit improved from the previous period. Conversely, a negative EVAM shows the magnitude of economic profit destruction in that period (Wirawan, 2011). Nevertheless, EVAM studies are relatively limited; notably, there is no evidence of EVAM evaluation or comparison with other metrics using data from the JSE other than those presented by Maculuve and Obalade (2023).

² According to García-Teruel and Martínez-Solano (2007) and Melicher and Leach (2011), the cash conversion cycle (CCC) can be calculated as: $CCC = DDTO + DITO + DCTO$, where: $DDTO = \text{days debtor turnover} = (\text{accounts receivable/sales}) \times 365 \text{ days}$; $DITO = \text{days inventory turnover}$.

2.2.1 Economically Based Metrics on the Johannesburg Stock Exchange

In the context of the JSE, De Wet (2005) tested 89 listed companies from 1995 to 2004. It was concluded that compared to accounting indicators such as ROE, ROA, EPS and DPS, ROA (R^2 of 15%) has a better positive correlation with MVA than EVA spread, which explains only 0.08% of MVA. Later, Sauro and Tafirei (2016) reported that EVA is relatively weak compared to EPS and DPS. In commercial banks listed on the JSE. Moreover, Magwegwe (2003) found that the EVA metric is not correlated with the share price of the JSE. On the JSE, Weldon (2013) examined the correlation between EVA and share price for industrial companies listed between 2000 and 2010. The results indicate that EVA is significantly correlated with the share price. Similarly, Hall (2018) expanded the quest for a metric correlated with shareholders' value creation by analysing 192 JSE-listed companies. Multiple regression analysis revealed that stock returns do not explain shareholder value creation; however, depending on the specific industry, Tobin's Q ratio, MVA and the market-to-book ratio are better constructs for expressing shareholder value creation.

2.3 COVID-19 and Shareholder Returns

Apart from the fundamental business factors discussed above, several studies have been conducted in both developed and emerging markets to determine the effect of COVID-19 on stock returns. For instance, Xu (2021), using daily data from Canadian and United States companies and a bivariate structural GARCH-in mean VaR, found that an increase in COVID-19 cases and the number of deaths had a negative impact on the stock market in general. Al-Awadhi et al. (2020) report similar findings on the Hang Seng Index and Shanghai Stock Exchange Composite Index. Furthermore, using companies listed in Botswana and Ghana, Tetteh et al. (2022) analysed how the number of COVID-19-related deaths impacted stock returns. The autoregressive distributed lag cointegration technique revealed a negative and statistically significant relationship between the number of COVID-19-related deaths and stock return performance in both markets. Moreover, Muthu and Wesson (2023) state that COVID-19 had a negative impact on the investment scale, sales revenues, cash flow and liquidity level of JSE-listed companies.

2.4 Research Gap, Question and Hypotheses

In summary, the difference in the results of previous studies concerning the impact of ABM and EBM on shareholder returns and the limited global studies of the impact of REVA and EVAM provide an incentive to assess the impact of ABM and EBM on shareholder returns during COVID-19 on JSE-listed companies. It has been documented that COVID-19 has affected the predictability of stock returns.

However, it is unclear whether the COVID-19 pandemic has influenced the explanatory power of ABM and EBM for shareholder returns. To address this lacuna, this study formulated and tested the following hypotheses.

H₀₁: Economic-based metrics (EVA, REVA and EVAM) do not have positive or significant explanatory power for the shareholder returns of JSE-listed firms during the COVID-19 pandemic.

H₀₂: Accounting-based metrics (EPS and ROE) do not have a positive or significant effect on the shareholder returns of JSE-listed firms during the COVID-19 pandemic.

3 Methods

3.1 *Sample and Data Source*

The study used a purposive sampling technique to select 51 firms from a sample of 164 firms listed on the JSE All Share Index (ALSI). Following previous scholars such as Amyulianthy and Ritonga (2016) and Ejaz et al. (2018) and best practices, real estate companies, banks, financial institutions, unit trusts and companies whose financial statements were unavailable for 2017–2021 were excluded.

The accounting profit must be adjusted to determine the EBMs (EVA, REVA and EVAM). However, according to Anderson et al. (2004), no theoretical guidelines exist for selecting the most relevant items to be adjusted. Therefore, the adjustment process implemented in this study is in line with Stewart's (1991) recommendations and consisted of (1) adjusting the accounting profit, (2) computing the invested capital (I.C.) and (3) determining the total WACC (Jakub et al., 2015). The EBM input variables, namely, NOPAT, I.C., cost of debt, cost of equity, and dependent variable input factors, such as share price and dividends per share, were obtained from the Integrated Real-time Equity System (IRESS) (formerly INET-BFA) data source. The IRESS database was also used by De Wet and Du Toit (2007), Du Toit (2015) and Erasmus (2008, 2010) in studies that required financial information from JSE-listed companies.

3.2 *Operational Variables and Measurements*

The study identifies the dependent variable as Shareholder Returns (ShR); the independent variables are the ABMs (EPS and ROE), EBMs (EVA, REVA and EVAM); and Total Assets and Revenue are the control variables.

3.2.1 Independent Variable: ABMs

According to Ahsan (2012), the ROE links the statement of comprehensive income (NOPAT) and the statement of the financial position component (average shareholder equity). Therefore, ROE is highly regarded by investors. The ROE can be expressed as follows:

$$ROE = (\text{Net Income}) / \text{Shareholders' Equity} \quad (1)$$

EPS is the part of a firm's net profit allocated to each issued share of common stock and can be derived using the equation below (CFI, 2022).

$$ROE = (\text{Net Income}) / \text{Average Outstanding Shares} \quad (2)$$

3.2.2 Independent Variable: EBMs

EVA and REVA are defined as the difference between the adjusted NOPAT and the capital charge. The valuation of the equity component of invested capital (IC) for EVA is based on book value (Stewart, 1991), while for REVA, equity valuation is at market value (Bacidore et al., 1997). EVA and REVA can be written as follows:

$$EVA : REVA = \text{Adjusted NOPAT} - (IC \times WACC) \quad (3)$$

The adjusted NOPAT measures a company's profit from its ongoing operations adjusted from the generally accepted accounting principles (GAAP) distortions to convert the accounting profit into economic profit. *I.C.* is the operating capital employed and refers to interest-bearing debt and equity at the beginning of the period, and *WACC* is the weighted average cost of capital. The difference between EVA and REVA arises from the equity valuation approach; REVA reliance on market stock price means that the REVA proposition is aligned with shareholder value creation, which considers the market stock price (Bacidore et al., 1997).

According to EVA Dimensions (2009), EVAM quantifies EVA growth or deterioration over time and can be expressed following Stewart (2009) as:

$$EVAM = (EVA_1 - EVA_0) / \text{Sales}_0 \quad (4)$$

EVA_1 is the EVA in the current period, EVA_0 is the EVA in the prior period ($t_n - 1$), and Sales_0 is the revenue for the preceding period ($t_n - 1$).

3.2.3 Control Variables: Total Assets and Total Revenue

Firm-specific factors, such as company size (Hirdinis, 2019; Radja & Artini, 2020), profitability (Chen & Chen, 2011; Sudiyatno et al., 2020), and liquidity (Garavito & Chion, 2021; James, 2020), may impact stock prices and, consequently, shareholder returns. Therefore, to determine the accurate impact of ABMs and EBMs on shareholder returns, this study used the natural logarithms of total assets and total revenues as control variables. Other studies (Domnick, 2018; El-Habashy, 2019; Hung et al., 2019) have used the same constructs as control variables.

According to the CFI (2022), total assets consist of current assets (cash, inventory, marketable securities, accounts receivable, and prepaid expenses) and long-term assets (property, plant and equipment, and intangible assets). Revenue is the value of all sales of goods and services from normal business operations and is often the ‘top line’ of a business statement of comprehensive income.

3.2.4 Dependent Variable: Shareholders’ Return

We measure shareholders’ value creation in terms of total shareholder return (ShR), which consists of capital gains/losses plus the dividends received (Tawiah & Benjamin, 2015) and is expressed as follows:

$$ShR = (P_1 - P_0 + D) / P_0 \quad (5)$$

where P_1 is the stock price at year-end, P_0 is the share price at the beginning of the year, and D represents the dividend per share paid in the current year.

3.3 Model Specifications and Estimation

This study adopted the strategy of Driscoll and Kraay (1998), which suggests a simple adjustment of the standard nonparametric time-series covariance matrix estimator to remove cross-sectional or spatial dependence. Nonparametric estimators do not impose any assumptions on the behaviour distribution of the cross-sectional dimension (N), such as avoiding the problem of misspecification. Panel data (or longitudinal data) represent a mix of cross-sectional units and time series. According to Hisao (2014), using panel data has considerable advantages over using only cross-sectional or time-series models. Panel data sets contain more observations than single cross-sections and thus increase the precision of estimated parameters (Hoechle, 2007).

Furthermore, since there are no restrictions on the distribution of N , the size of the cross-sectional dimension in finite samples no longer limits feasibility (Driscoll & Kraay, 1998, p. 550). For a detailed discussion and mathematical exposition, refer

to Hoechle (2007) and Driscoll and Kraay (1998). Consider a generic bivariate panel model:

$$y_{it} = x_{it}\beta + \varepsilon_{it} \quad i = 1, \dots, N, t = 1, \dots, T \quad (6)$$

Assuming $\beta = 0$, a contemporaneous and lagged cross-sectional dependence is introduced into the model, with the disturbance term developing as follows:

$$\varepsilon_{it} = \lambda_i f_t + \vartheta_{it} \quad (7)$$

where:

$$f_t = \rho f_{t-1} + \mu_{it} \quad (8)$$

Since we obtained the data from a nonrandom sample of firms listed on the JSE, these firms are likely to be subject to both observed and unobserved common disturbance factors (f_t). Failing to account for spatial dependence will yield inconsistent estimates of standard errors (Driscoll & Kraay, 1998). Therefore, the multivariate regression model below presents shareholder returns as a function of economic- and accounting-based explanatory variables, dummy variables and control variables; hence:

$$ShR_{it} = f(Economic_{it}, Accounting_{it}, Dummy_{it}, Controls_{it}) \quad (9)$$

$$ShR_{it} = \alpha_0 + \beta_1 EVA_{it} + \beta_2 REVA_{it} + \beta_{it} EVAM_{it} + \beta_4 Dcovid_{it} + \beta_5 \log TA_{it} + \beta_6 \log Rev_{it} + \varepsilon_{it} \quad (10)$$

$$ShR_{it} = \alpha_0 + \beta_1 EPS_{it} + \beta_2 ROE_{it} + \beta_{it} \log TA_{it} + \beta_4 \log REV_{it} + \beta_5 Dcovid_{it} + \xi_{it} \quad (11)$$

Dcovid is a dummy variable that takes a value of 1 in 2020 and 2021 and 0 in 2017, 2018 and 2019. Total assets (logTA) and revenue (logRev) are included as control variables, and ξ_{it} denotes the error term.

4 Results

The results of the study are divided into summary statistics, pairwise correlation matrices and regression outputs. Table 1 provides summary statistics of between- and within -variation variables used for the analysis. The variation within captures the dynamics over time, and where the variation is high, the fixed-effect estimator fits the data. In our case, there is sufficient variation over time, with the exception of total assets and total revenue, with 0.34 and 0.25 average variations, respectively. The low variation reflects the sluggish growth observed over the period, which can be attributed to internal factors as well as external factors such as load shedding

Table 1 Summary statistics of the data

Variable		Mean	Std. Dev.	Min	Max	Observations
ShR	Overall	0.976	10.058	−0.925	120.215	N = 255
	Between		6.344	−0.350	45.360	n = 51
	Within		7.845	−44.482	75.831	T = 5
EVA	Overall	−578367.2	1.16e+07	−1.36e+08	6.93e+07	N = 255
	Between		7688282	−4.89e+07	1.84e+07	n = 51
	Within		8685978	−8.73e+07	5.03e+07	T = 5
REVA	Overall	−4.89e+08	1.85e+09	−1.69e+10	5.14e+07	N = 255
	Between		1.58e+09	−1.10e+10	−1.61e+07	n = 51
	Within		9.74e+08	−6.37e+09	1.04e+10	T = 5
EVAM	Overall	0.025	0.365	−2.494	3.287	N = 255
	Between		0.088	−0.232	0.391	n = 51
	Within		0.355	−2.720	3.062	T = 5
Log TA	Overall	16.760	1.256	13.586	19.988	N = 250
	Between		1.219	13.762	19.873	n = 50
	Within		0.340	15.448	19.263	T = 5
Log rev	Overall	16.669	1.210	13.138	19.184	N = 248
	Between		1.211	13.505	19.060	n = 50
	Within		0.251	15.721	18.510	T = 5
ROE	Overall	120.616	68.786	1.0	241	N = 255
	Between		37.144	27.2	209.6	n = 51
	Within		58.082	−20.184	268.016	T = 5
EPS	Overall	11.109	26.330	−18.18	300.42	N = 255
	Between		19.935	−3.403	106.116	n = 51
	Within		17.382	−80.187	205.413	T = 5

Source: Authors' Computation (2023)

during the COVID-19 pandemic and the spillover effect of the Russia–Ukraine War. Based on the within variation, a fixed estimator is likely to fit the data well.

The study used a sample of 51 companies drawn from across all the various sectors in South Africa, thereby making the panel of firms highly heterogeneous. As such, multicollinearity is unlikely to be a problem. Table 2 below depicts the correlation matrix for the variables used in the estimation. In addition to total assets and total revenue, which have a correlation coefficient of 80.4%, the other independent variables have a very low correlation. As such, these two variables are not included in the same regression because of the problem of multicollinearity.

We first estimate a fixed-effect regression and implement De Hoyos and Sarafidis's (2006) xtcsd test for cross-sectional dependence to justify our choice of Driscoll and Kraay's (1998) consistent covariance matrix estimate with spatial dependence. The value of the Pesaran test of cross-sectional independence is 37.613, with a p value = 0.00, and the average (absolute) value of the off-diagonal elements is 0.764. The results imply that the fixed-effect regression produces cross-sectional dependent residuals with an average (absolute) correlation between the residuals of

Table 2 Pairwise correlation matrix

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) ShR	1.00							
(2) EVA	−0.36 (0.00)	1.00						
(3) REVA	0.02 (0.72)	−0.07 (0.29)	1.00					
(4) EVAM	−0.04 (0.56)	0.15 (0.02)	0.05 (0.43)	1.00				
(5) Log TA	0.24 (0.00)	−0.13 (0.04)	−0.17 (0.01)	0.07 (0.30)	1.00			
(6) Log rev	0.19 (0.003)	−0.05 (0.47)	0.01 (0.93)	−0.003 (0.96)	0.804 (0.00)	1.00		
(7) ROE	0.01 (0.93)	0.19 (0.002)	−0.09 (0.172)	0.20 (0.001)	0.10 (0.107)	0.17 (0.01)	1.00	
(8) EPS	0.07 (0.28)	0.339 (0.00)	−0.520 (0.00)	0.03 (0.69)	0.296 (0.00)	0.201 (0.001)	0.23 (0.00)	1.00

Source: Authors' Computation (2023)

economic variables of 0.76. Hence, we need Driscoll and Kraay's (1998) estimator to account for cross-sectional dependence. Table 3 below reports the outputs of Eq. 10 (EBM).

The first column of Table 3 captures the impact of economic variables on shareholder returns estimated using the Driscoll–Kraay fixed-effect strategy. Our results show that the past value of shareholder returns has a positive but insignificant impact on current shareholder returns. The key economic variables in the FE–Driscoll–Kraay model that explain variations in shareholder returns are REVA and EVAM. While EVA does not have a significant impact, REVA has a significant positive relationship with shareholder returns. In contrast, EVAM has a significantly negative relationship with shareholder returns. Intuitively, a 1% increase in EVAM reduces shareholder returns by 2.13%, holding all other variables constant. As expected, the COVID-19 pandemic dummy significantly negatively impacts shareholder returns. Travel restrictions and economic lockdowns marked this period to prevent the spread of the virus. We estimate that when all other factors are held constant, if the spread of the pandemic increases by 1%, shareholder returns will decrease by between 2.7% and 2.8%. Meanwhile, the control variables Total Assets and Revenue exert significant positive and negative effects on shareholder returns.

Similar results are confirmed by the Driscoll–Kraay random effect (columns 3 and 4), but this time, EVAM is statistically insignificant, whereas EVA continues to exert a positive effect on shareholder returns. The impact of the pandemic remains negative and statistically significant at the 1% level, but the magnitude of the effect is lower than that in the FE–Driscoll–Kraay model. The new evidence suggests that economic variables have positive and negative effects on shareholder

Table 3 Economic-based metrics

Variable	FE-DK	FE-DK	RE-DK	RE-DK
	b/t	b/t	b/t	b/t
Lag.ShR	0.214 (0.59)	0.265 (0.72)	0.465 (1.52)	0.477 (1.54)
EVA	0.000 (1.29)	0.000 (1.44)	0.000 (0.07)	0.000 (0.04)
REVA	0.000** (2.22)	0.000*** (2.93)	0.000*** (3.29)	0.000** (2.39)
EVAM	-2.040*** (-4.23)	-2.131*** (-2.93)	-0.342 (-1.11)	-0.028 (-0.05)
During Covid-19	-2.684*** (-6.59)	-2.811*** (-5.45)	-2.162*** (-3.52)	-2.165*** (-3.57)
Log TA	0.024 (0.01)		1.357 (1.01)	
Log rev		-5.106 (-1.60)		1.040 (0.90)
Constant	2.589 (0.09)	88.115 (1.65)	-20.740 (-0.92)	-15.473 (-0.80)
N	200	198	200	198
Between R ²	0.078	0.090		
Overall R ²			0.269	0.261

Source: Authors' Computation (2023). Note: *t*-statistics are in parentheses, and ***, ** and * indicate 1%, 5% and 10%, respectively

returns, but the magnitude of the negative impact is greater than that of the positive effect.

We now turn to Table 4 ABM to explain fluctuations in shareholder returns (Eq. 11). Four models are estimated: the FE–Driscoll–Kraay model (columns 1 and 2) and the RE–Driscoll–Kraay model (columns 3 and 4). The results are mixed, with Revenue significantly negatively impacting shareholder returns (Table 4, Column 1). A 1% increase in revenue is associated with a 1.9% decrease in shareholder returns, and all other factors remain constant. However, this is strange because revenue growth should increase shareholder returns and nothing else. Total assets have a significant positive effect on shareholder returns, which is statistically significant at the 1% level. The Covid-19 pandemic dummy continues to significantly negatively affect shareholder returns in both the FE– and RE – Driscoll–Kraay models. Apart from the lagged values of shareholder returns, which have a marginally significant positive effect on shareholder returns (Table 4, columns 3 and 4), ABMs such as ROE and EPS have relatively low explanatory power for fluctuations in shareholder returns.

In summary, our results suggest that EBM can explain differences in shareholder returns. In other words, changes in shareholder returns can be best predicted using EBMs rather than ABMs, as the ABMs are positive but insignificant in the FE – Driscoll–Kraay and RE – Driscoll–Kraay models.

Table 4 Accounting-based metrics

	FE-DK	FE-DK	RE-DK	RE—DK
	b/t	b/t	b/t	b/t
Lag ShR	0.009 (0.03)	−0.001 (−0.00)	0.459* (1.86)	0.473* (1.87)
ROE	0.001 (0.30)	−0.002 (−0.82)	0.005 (1.47)	0.005* (1.76)
EPS	0.048 (1.67)	0.038 (1.43)	0.010 (0.72)	0.018 (0.92)
Log Reve	−1.937** (−2.21)			0.909 (1.20)
During Covid-19	−2.287*** (−9.87)	−2.246*** (−9.41)	−2.114*** (−4.25)	−2.198*** (−4.05)
Log TA		0.994* (3.80)	1.145 (1.08)	
Constant	33.951** (2.40)	−14.501*** (−3.57)	−18.172 (−0.99)	−14.151 (−1.08)
N	198	200	200	198
Between R ²	0.025	0.024		
Overall R ²			0.269	0.263

Source: Authors' Computation (2023). Note: *t*-statistics are in parentheses, and ***, ** and * indicate 1%, 5% and 10%, respectively

4.1 Discussion of Findings

The outcome from the fixed-effect and random-effect models reveals that EBM (EVA and REVA) positively correlate with shareholder returns, but the impact is statistically insignificant for EVA. The minimal effect of EVA on shareholder returns aligns with Kyriazis and Anastassis (2007) on the Athens Stock Exchange and Fayed and Dubey (2016) in the Arab Emirates. In the context of the JSE, Magwegwe (2003) reports similar findings. In contrast, Parvaei and Farhadi (2013) claim that EVA is positively and statistically associated with the Iranian Stock Exchange stock return. Babatunde and Evuebie (2017) and Obeidat and Darkal (2018) observed similar findings on the Nigerian Stock Exchange and the Abu Dhabi Stock Exchange, respectively.

REVA has a positive and significant impact on shareholder returns. This finding is consistent with the first REVA study conducted in the United States by Bacidore et al. (1997) and recent studies in the Tehran Stock Exchange and companies listed on the alternative investment market (AIM) in Italy, such as Pourali and Roze (2013) and Quintiliani (2017). Moreover, the current findings are similar to those of Maculuve and Obalade (2023) on the JSE, despite the model and time differences. However, the positive impact of REVA on shareholder returns does not conform to the outcomes of previous studies, such as Nakhaei (2016) regarding companies listed on Bursa Malaysia and Lestari and Oktaria (2019) on companies listed on the

Indonesian Stock Exchange. Furthermore, both FE and RE show that EVAM has a significantly negative correlation with shareholder returns. The current study supports EVA Dimensions (2009) and Stewart's (2009) claim of the superiority of EVAM in explaining stock prices. However, this outcome contradicts that of Mahoney (2011), who indicates that EVAM fails to explain future value in the U.S., and that of Wirawan (2011), who does so in Indonesia, where EVAM has nonsignificant effects on stock returns. This finding contradicts Fayed and Dubey (2016), who reveal that EVAM does not offer more incredibly relevant information content in the United Arab Emirates than ABM. On the other hand, the FE and RE models reveal that EPS and ROE are positively associated with shareholder returns, but the impact is insignificant. The ROE evidence aligns with the findings of Rasool et al. (2021) and Sulistyanie and Sumantri (2020) related to companies listed on the Pakistan Stock Exchange and Indonesian Stock Exchange, respectively. Additionally, for the EPS, Haque and Faruquee (2013) and Umar and Musa (2013) report similar findings for the Dhaka Stock Exchange and Nigerian listed companies, respectively. Moreover, in the JSE context, De Wet and Du Toit (2007) and Vermeulen (2016) observed that EPS and ROE are not associated with shareholder returns. In contrast to the current evidence, Anwaar (2016) reports that ROE significantly affects the stock price of companies listed on the FTSE 100 Index in London. Furthermore, Arabsalehi and Mahmoodi (2012) and Aveh and Awunyo-Vitor (2017) report similar findings for companies listed in Tehran and on the Ghanaian Stock Exchange. Additionally, Manoppo (2015) and Al-Lozi and Obeidat (2016) found that EPS and ROE significantly correlate with stock returns in the context of insurance companies on the Indonesian Stock Exchange and manufacturing companies on the Amman Stock Exchange, respectively. Notably, Jabbari and Fathi (2014), Hamidah (2015) and Badruzaman (2020) equally observed a negative impact of ROE and EPS on stock returns for companies listed on Iranian and Indonesian stocks and 57 companies listed on the Nikkei 225 Index.

The current study found that COVID-19 significantly negatively affected shareholder returns in the FE- and RE-Driscoll-Kraay models. Our findings are consistent with recent scholarship, such as Al-Awadhi et al. (2020) on the Hang Seng Index and Shanghai Stock Exchange Composite Index, Xu (2021) on Canadian- and US-listed companies and Tetteh et al. (2022) on companies listed on the Botswana and Ghana Stock Exchanges.

4.2 Conclusions

This study assessed the value relevance of economic- and accounting-based metrics during the COVID-19 pandemic on the JSE. The study concludes that EBMs exert positive and negative effects on shareholder returns, but the magnitude of the negative impact is greater than that of the positive impact. Specifically, although EVA is positively correlated with shareholder returns, its impact during Covid-19 was not significant. In contrast, REVA and EVAM were materially relevant during Covid-19,

meaning that an increase in REVA and EVAM led to an increase and a decrease in shareholder returns, respectively, for the JSE-listed companies.

Concerning the ABMs, the study concludes that despite a positive association between EPS and ROE, their impact on shareholder returns during COVID-19 was irrelevant. Overall, the greater negative impact of EVAM on shareholder returns may suggest that the value relevance of EBM to the JSE might be hampered by a highly depressed economic environment during the COVID-19 pandemic. Similarly, for ABMs, despite the relative leverage of EPS arising from compulsory disclosure requirements, one may assume that the prevailing market sentiment during COVID-19 had the upper hand on the relevance of EPS value. Overall, economic-based performance metrics provide a superior explanation for shareholder returns on the JSE relative to the ABMs, particularly during COVID-19.

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Corporate Cash Holdings Puzzle and the Role of the Covid-19 Pandemic



Trust Chireka

Abstract Corporate cash holdings decisions represent a key strategic decision for corporate managers, with consequences for the performance of both the corporate and economic growth of a nation. However, empirical studies have found evidence of persistently rising corporate cash holdings. Coincidentally, cash buildup in firms around the world has led to a reduction in dividend payouts over time. Modern-day corporations seem to have adopted a form of mercantilism by stockpiling cash that should otherwise be used for investment. Questions have been asked as to why corporate giants such as Apple have been sitting on large cash piles instead of spending them for growth, product development, and employment creation. The purpose of this chapter is to shed light on the drivers of corporate cash holdings and help readers acquire a better understanding of why firms hold so much cash. This chapter explains the motives behind corporate cash holdings, which include transaction, precautionary, agency, speculative, predation and tax motives. The theories that predict corporate cash holding decisions and how these decisions may be influenced by institutional and macroeconomic conditions are also discussed. The dominant theories of cash holdings are the trade-off, pecking order and agency theories. This chapter also discusses how the COVID-19 outbreak impacted the cash hoarding trend.

Keywords Corporate cash holdings · Motives · Trade-off theory, pecking order theory, agency theory, free cash flow hypothesis · Risk-reduction hypothesis · Institutions · Macroeconomic environment · COVID-19

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1 Introduction

Corporate investment, which includes the purchase of capital goods, such as land, industrial machinery, vehicles, building factories, housing, and offices, contributes significantly to the socioeconomic development of a nation (Ririhena & Djanggo, 2018; Kumo, 2012). When corporations cut back or delay investment, the economy stagnates, and citizens' access to key infrastructure, including job opportunities, is adversely affected (Kumo, 2012). Corporations invest resources such as cash to enhance their ability to produce goods and services (Ririhena & Djanggo, 2018). For this reason, the attention of policymakers, researchers, and other stakeholders has been drawn to the global trend of rising corporate cash holding levels, with some stakeholders alleging that corporations are on a sabbotaging the real economy in favour of hoarding cash (Graham & Leary, 2018).

The rise of corporate cash holdings has occurred across the world. US nonfinancial corporations were sitting on \$4 trillion worth of cash and near-cash securities (Faulkender et al., 2019). As of the last quarter of 2023, Apple was reportedly sitting on \$167 billion in cash and financial investments, while Alphabet was holding about \$150 billion (Krantz, 2023). The report further showed that 13 nonfinancial companies in the S&P 500 (mainly tech giants such as Apple, Alphabet, and Microsoft) had over a trillion dollars in cash, enough to gift every man, woman and child in the U.S. with \$7926. Corporate managers are supposed to invest cash in all available productive and profitable projects and to return the cash to shareholders when no viable investments exist. At present, firms are reluctant to either invest cash or return it to shareholders (Krantz, 2023). For instance, Microsoft shook the financial world when it borrowed \$10.75 billion in 2015 to purchase LinkedIn, despite having \$92 billion in cash (Worstall, 2015). This begs the question of why these large corporations hold so much cash.

In his address to the Chamber of Commerce in Washington D.C. on the seventh of February 2011, as he persuaded businesses to invest in America, President Obama highlighted that American corporations where cash was held in excess of \$2 trillion on their balance sheet (Pinkowitz et al., 2013). In Korea, corporate cash holding levels have surged to record levels, forcing the government to mull over the possibility of taxing corporate cash holdings as a way of encouraging firms to draw down on their cash holdings (Chon & Choi, 2015). The Korean government was firmly convinced that corporations within its borders were holding on excessively high cash reserves.

In South Africa, the JSE companies held R600 billion in cash as of November 2015, nearly twice as much cash as they held at the beginning of the 2008 global financial crisis. Unless managers have a clear plan for how to invest this cash wisely, they should distribute this cash to shareholders either through dividend payments or through buying back undervalued shares. This surge in global corporate cash holdings has ignited serious debates as researchers, market commentators and politicians ponder what is driving this phenomenon.

The surge in cash holdings was further spurred by the exogenous liquidity shock caused by the COVID-19 pandemic. The coronavirus outbreak was first reported in the Chinese city of Wuhan in December 2019. By March 2020, it had spread across the globe, forcing governments to announce lockdowns that shattered supply chains and sent capital markets into turmoil. The supply shock meant that the firms' productive capacity suffered, as did their revenue generation capabilities (Qin et al., 2020). The demand side was not spared either as workers lost their jobs and had to cut back on their consumption of goods and services (Goodell, 2020). In such times of heightened uncertainty and plummeting financial markets, firms tend to move to sustain themselves by stockpiling cash to prevent underinvestment (Qin et al., 2020). To cope with this issue, this chapter discusses some of the theories that explain corporate cash holdings, the motives behind holding cash and the challenges that arise when corporations delay investments in favour of stock piling cash.

The next section discusses the motives behind corporate cash holdings.

2 Motives for Holding Cash

Firms hold cash for different reasons. This section discusses the prominent reasons for corporate cash holdings identified in the literature.

2.1 Transaction Motive

Firms need large amounts of cash for various transactions, such as paying salaries, distributing dividends, research and innovation and investment projects. If such a need for cash arises when companies do not have cash, they must either withdraw these resources from internal capital (cash and near-cash assets held in the business) or approach external markets (Opler et al., 1999). Having cash reserves helps firms save money in the form of conversion costs when they avoid liquidating assets to undertake their investment transactions (Keynes, 1936). While firms can raise cash for transaction purposes by issuing equity, Miller and Orr (1966) argue that equity issues come with heavy brokerage fees, justifying the maintenance of large cash reserves as a cheaper source of capital. In other words, firms incur significant costs when they raise capital through liquidating assets or issuing debt or equity instruments to capital markets. These transaction costs can be significantly lowered by having liquid reserves such as cash and other cash equivalents that have low conversion costs.

2.2 *Precautionary Motive*

According to the precautionary motive, corporations are driven to hold cash when they anticipate increasing volatility of cash flows in the future (Opler et al., 1999). They turn to cash reserves to provide a buffer against possible adverse shocks that might be experienced in the future (Han & Qiu, 2007). Prior studies show that the cash holdings of corporations with good growth opportunities and high R&D activity but facing high cash flow volatility increase (Mitani, 2020; Bates et al., 2009). Firms increase their precautionary cash holdings when they expect negative shocks, idiosyncratic and/or aggregate, especially when access to external capital is costly or constrained (Hankins et al., 2020).

The precautionary motive of cash holdings has been observed in financially constrained firms. This is because these firms have a high risk of default, and as such, capital markets might be reluctant to extend financing to them or, if they do, will lend them at penultative cost (Mitani, 2020). In response, financially constrained firms can only increase future investments by either reducing current investments or by holding more cash (Han & Qiu, 2007). While the precautionary motive means that high cash flow volatility leads to higher cash holdings, inadvertently, it leads to reduced investment activity in financially constrained firms (Han & Qiu, 2007).

Recent studies suggest that the precautionary motive of holding cash has been weakened by technological and financial advancements (Raghibi et al., 2021). Firms can hedge against all types of risks through derivatives and thus secure sufficient funding to meet their investment needs. However, there is still a dearth of empirical evidence supporting this view.

2.3 *Agency Motives*

The agency motive postulates that corporate cash holdings are driven by managers' self-interest, which might be at odds with their fiduciary duty to maximise shareholder value (Thakur & Kannadhasan, 2019). From the viewpoint of shareholders, cash holdings are not ideal for two reasons. First, cash holdings yield a low rate of return because they are low-risk assets. Second, high cash reserves escalate the agency conflict between managers and shareholders (Thakur & Kannadhasan, 2019).

The agency motive posits that corporate managers seek to entrench themselves by stock piling cash reserves, which they will either invest in negative net present value (NPV) projects or to extract excessive perquisites (Xu et al., 2019). Self-seeking managers view cash holdings as quasi-internal capital markets that help them evade monitoring by capital markets when they provide capital (Harford et al., 2008). Firms with poor corporate governance opt for nonmonitored cash instead of bank credit because of the scrutiny and reporting requirements imposed by the banks.

Markets punish inefficiencies such as high cash holdings. For instance, firms with high cash holdings are often targets of hostile takeovers. Firms that adopt

anti-takeover provisions are characterised by ill discipline by self-interested managers who are protected from hostile takeovers by predators seeking to unlock value in their target's inefficiencies (Dittmar & Mahrt-Smith, 2007; Yun, 2009). However, the market mechanism tries to address the agency problem by discounting the value of cash holdings in firms with poor corporate governance (Dittmar & Mahrt-Smith, 2007). The agency problem has also been observed in public firms. Studies show that public firms (which typically have fewer financial constraints owing to government support) tend to hold twice as much cash as private firms due to the higher agency costs present in public firms (Gao et al., 2013).

2.4 Predation Motive

The predation motive is sometimes viewed as another form of precautionary motive (Mitani, 2020). Predation risk is the likelihood of a firm underinvesting and thus losing good investment opportunities as well as shedding market share to rivals (Che et al., 2019; Mitani, 2020). To avoid the problem of underinvestment, firms in concentrated industries with investment opportunities very similar to those of their rivals tend to have large cash holdings (Mitani, 2020). The risk of predation is high in highly competitive industries, and firms build large cash reserves to reduce their chances of underinvesting (Haushalter et al., 2007).

Cash holdings, therefore, offer firms with 'long purses or 'deep pockets' to counteract predatory manoeuvres by rivals as well as fend off new entrants from the industry (Bolton & Scharfstein, 1990).

2.5 Tax Motive

The other important motive for holding cash is the tax motive. Some countries still follow the old US tax system that taxes multinational firms' foreign income only when it is repatriated to the home country (Tran, 2020). To avoid this tax, multinational companies will hold large cash reserves by avoiding or delaying the repatriation of foreign earned income (Hanlon et al., 2017). In the drive to "make America great again", the Trump administration (with effect from 2017) changed the corporate tax law to facilitate the repatriation of foreign earnings by US firms (Haines, 2017).

An alternative argument for the tax motive of cash holdings was suggested by Hanlon et al. (2017). Tax-avoiding firms, whether domestic or multinational, are uncertain of tax burden from possible tax audits by revenue authorities and will thus have high cash holdings as a buffer.

The next section discusses the main theories that have been used to understand corporate cash holdings.

3 Corporate Cash Holdings Theories

Three main theories exist to explain corporate cash holding behaviour: agency theory, pecking order theory, and trade-off theory. This section will discuss these theories in detail.

3.1 Trade-off Theory

Trade-off theory, which was originally used in the capital structure literature, has been used to explain corporate cash holdings. This theory explains that management will compare the incremental benefits and the related incremental costs of holding cash to achieve an optimal cash holding level that maximises shareholder wealth (Kariuki et al., 2015). Therefore, trade-off theory assumes that every firm has an optimal level of cash holdings at which shareholder value is maximised.

Figure 1 shows the optimal level at point C, where the marginal benefits of cash holdings are equal to the marginal costs of holding cash. Deviation from C towards A means that the firm's cash holdings are lower than the target levels and thus leads to reduced shareholder value. Deviation from C towards B means that the firm is holding too much cash, which is costly and detrimental to shareholder value. Most corporate cash holdings studies argue that most firms hold too much cash.

When firms hold cash, there is an opportunity to hold more cash, as cash is generally a zero- or low-return-yielding asset. Shah (2011) argued that the cost of holding cash is mainly the opportunity cost of the capital tied up in cash holdings. As such, firms that hold cash incur opportunity costs, such as forfeited profitable investments (Ferreira & Vilela, 2004). According to Opler et al. (1999), cash holdings are

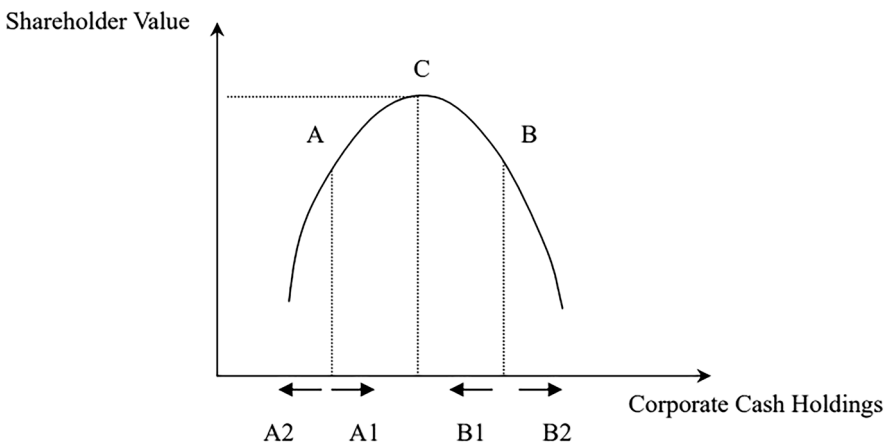


Fig. 1 Optimal cash holdings [Source: Tong, 2014]

costly because of the inferior or zero rate of return yielded by cash due to its liquidity premium as well as its inherent tax disadvantage. Therefore, while holding cash seems safe, firms that hold too much cash reserves do so to the detriment of shareholder value.

On the other hand, two crucial benefits of holding cash are identified: first, the transaction cost saved by avoiding raising funds from the capital markets and not having to liquidate assets to make payments (Fresard, 2010; Kariuki et al., 2015). Holding cash also lowers the risk of underinvestment due to the unavailability of capital to finance those projects.

Management has the fiduciary duty to maximise shareholder wealth, which includes optimising cash holdings for a firm. By trading off the incremental costs of cash shortages and the incremental costs of holding cash, companies can determine their respective optimal cash holding levels (Chon & Choi, 2015). Therefore, the trade-off theory of holding cash makes it possible to identify whether management is committed to their fiduciary duty of maximising shareholder wealth by looking at the firm's cash holding level relative to the optimal cash holding level.

3.2 Pecking Order Theory

The pecking order theory (Myers & Majluf, 1984) refutes the existence of an optimal cash level. It argues that firms see cash as a buffer between corporate sources of cash (retained earnings) and its growth requirements (Kariuki et al., 2015). The theory argues that due to the information asymmetry between firms and capital markets, external funds are more expensive for firms, which incentivises them to hold cash. Lenders incur high monitoring costs as well as the cost of performing due diligence on firms with high information asymmetry (An et al., 2012). Markets recover these costs from the borrowing firms by charging a premium on interest rates and fees as well as requirements for transparent reporting and disclosures. Altogether, this makes external capital costly and restrictive for companies when information asymmetry is high (An et al., 2012).

To avoid the costs and monitoring emanating from asymmetric information, firms opt to use and exhaust internal resources to fund investments before approaching external markets for secured debt, risky debt and equity (Chon & Choi, 2015). Pecking order theory is based on the presence of asymmetric information, which implies that management has more information than external stakeholders. This makes external financing more expensive than internal financing since the less informed stakeholders are, the more they would want to be compensated for the risk of not having equal information (Kim et al., 2011). Against this backdrop, managers with a fiduciary duty to optimise shareholder wealth will seek to fund available investment opportunities in this order, first with internal resources, second with cheap debt and finally with equity (Kariuki et al., 2015).

Incidentally, Chon and Choi (2015) envisage that firms that generate sufficient cash flows tend to utilise their cash flows in this sequence, fund their new

investments, settle debt, and then hold the remainder as cash reserves. However, if the operating cash flows are not sufficient, firms draw down on their cash holdings to fund new investments and issue debt if needed. Cash holding is thus a result of the contrasting financing and investment choices suggested by the pecking order of theory (Al-Najjar, 2013).

Therefore, the argument of the pecking order theory is that managers prefer internal funds over costly externally sourced funds. Firms will build up as much cash reserves as possible to limit financing investments with costly external capital. However, why has the level of corporate investment in the real economy decreased?

3.3 *Agency Theory*

Although separating business ownership from control enhances the free-market mechanism that allows for specialisation, it leads to increased agency costs (Copeland et al., 2013). Agency costs result from the agency problem, which, itself, derives from the fact that agents (managers), acting on behalf of the principals (shareholders), are responsible for business decisions that ought to optimise shareholder wealth. There are myriad benefits arising from this separation of ownership and control. For instance, the ownership of a firm can be transferred without any negative impact on its operations. Hiring agents also increase the potential of having highly skilled people to drive the firm (Gomes, 2012). The agency relationship has the potential to add value if parties act in good faith. However, ongoing corporate scandals show how problematic the agency relationship can be to both shareholders and capital markets.

The benefits of this agent-principal relationship flow as long as there is goal congruency between the two parties. In other words, as long as managers continue to uphold their duty of serving in the best interest of shareholders, value will be optimised. In real life, however, managers are often faced and overcome conflicts of interest, whether to seek shareholder value optimisation or to cater to their private interests (Attig et al., 2013). Often, agent-principal conflict arises when the principal and the agent have contrasting risk preferences. For instance, conflicts often occur when managers start pursuing self-serving transactions and strategies that shareholders use are complex and costly to verify or monitor. Additionally, where the risk appetites of the two parties are significantly different and shareholders and managers cannot agree on how to reconcile them, conflicts are inevitable (Mouline & Sadok, 2021). In such cases, managers and shareholders will have different objectives than disadvantaged shareholders in that they do not have a direct influence on business decisions. Decisions made by self-willed managers can thus erode shareholders' wealth. Therefore, agency theory opines that corporate cash holdings might reflect empire building by managers rather than shareholder value optimisation.

Agency theory can be further subdivided into two perspectives: a) the free cash flow hypothesis and b) the risk-reduction hypothesis. These two perspectives will be discussed below.

3.3.1 The Free Cash Flow Hypothesis

The free cash flow hypothesis (Jensen, 1986) refutes the existence of an optimal cash holding level proposed by trade-off theory. According to Kariuki et al. (2015), managers view corporate cash holdings as free cash flows that remove scrutiny and pressure from capital markets. With enough cash holdings, management can pursue selfish interests that are unfettered but at the expense of shareholder wealth. The free cash flow hypothesis thus predicts that managers will have high cash holdings to enjoy more autonomy with regard to investment decisions (Gill & Shah, 2012). With free internal funds, managers can pursue any investment, even negative NPVs, extravagant spending on luxuries (perquisites) and suboptimal mergers and acquisitions (Thanatawee, 2011). Cash holdings allow managers to bypass scrutiny and other transparency requirements of capital markets (Gomes, 2012). To correct this anomaly, markets tend to discount the value of cash holdings in firms exhibiting agency conflicts (Dittmar & Mahrt-Smith, 2007).

In the absence of viable investment opportunities, shareholders expect managers to distribute excess cash back to them through dividends or share buybacks. However, self-interested managers have the contrary objective of expanding assets under their control. Additionally, paying out cash to shareholders increases the probability of managers approaching financial markets for future financing and thus increases monitoring and reporting (Chireka & Fakoya, 2017). Trapped in this dilemma, managers would rather use their cash holdings to fund the available even negative NPV opportunities instead of returning the cash to shareholders (Thanatawee, 2011). This is known as the empire-building hypothesis (Iskandar-Datta & Jia, 2014). Studies also show that compared with their cash-poor counterparts, entrenched managers in cash-rich firms are unlikely to use cash in acquisitions. Rather, they prefer using stocks in their acquisition activities rather than depleting their cash reserves (Pinkowitz et al., 2013). Could this explain why Microsoft had to borrow a paltry of \$10.75 billion in 2015 to purchase LinkedIn while sitting on a cash pile of \$92 billion?

On the whole, the free cash flow theory argues that managers will increase cash holdings to have vast resources under their control, giving themselves flexibility and autonomy in investment decisions without having to be subject to the oversight of capital markets.

3.3.2 Risk-Reduction Hypothesis

The risk reduction hypothesis has received less attention from empirical studies than the more popular free cash flow hypothesis. The risk reduction hypothesis envisages several problems that arise as a result of the different risk profiles of the management (agent) and the shareholders (principals). For instance, shareholders, who are often well diversified, are risk neutral, preferring that managers take up every positive and risky NPV opportunity (Tong, 2010). Unlike the shareholder, the manager is often undiversified, committing all his time and human capacity to that

particular firm and having a significant portion of his wealth (Executive Stock Options) linked to the performance of that firm. Managers thus prefer to reduce firm-specific risk by avoiding risky, high-NPV projects while allocating more firm assets to less risky assets (Tong, 2010). Heron and Lie (2013) contend that unless incentivised, managers would rather take up less risky, negative NPV projects or accumulate cash holdings than invest in risky projects, even when they may have positive NPVs. This is referred to as the cushion effect (Jeffrey et al., 2010).

Corporate cash holdings are, in many cases, referred to as risk-free investments. A self-interested, risk-averse chief executive officer (CEO) will increase corporate cash holdings to lower corporate risk (Tong, 2006). As such, some risky but positive NPV projects might be avoided as managers opt for more predictable projects that sometimes have negative NPVs. This is detrimental to shareholder wealth.

To encourage managers to take on more risk and lower cash holdings, most firms introduce executive stock options (ESOs). The ESO can ameliorate this risk-related agency problem (Heron & Lie, 2013). The value of the ESO increases with increasing stock return volatility; thus, the ESO seeks to encourage managers to accept more risk in their investment decisions, effectively lowering the managerial risk aversion problem (Heron & Lie, 2013). Therefore, the introduction of ESOs might result in lower cash holdings by traditionally risk-averse managers who, because of the new status quo, are forced to overcome their low risk and low value-adding shell. However, corporate cash holdings remain high worldwide despite the presence of ESOs.

While the above theories package corporate cash holdings as an outcome of firm-specific characteristics, recent studies have begun to argue that corporate cash holdings might be driven by external factors such as institutional and macroeconomic conditions. The next section discusses how understanding the state of institutional and macroeconomic conditions in the external environment can help us comprehend the corporate cash holdings puzzle.

4 Institutional Theory and Corporate Cash Holdings

Recent literature argues that corporate cash holding decisions are influenced by factors in the external environment. The prevailing institutional conditions in a country have a significant impact on its level of economic activity (Hayat, 2019). Vibrant institutions such as the rule of law, investor protection, lack of corruption, political stability and good regulations stimulate healthy economic activity (Nguyen et al., 2018). In contrast, in a poor institutional environment where there is no rule of law, the lack of protection of poor shareholder and creditor rights institutions and corruption are rampant, and transaction costs and business risks are high, which reduces corporate affinity for investing (Hayat, 2019).

On this backcloth, a growing number of researchers argue that corporate cash holdings are influenced by a country's institutional environment. Differences in institutional qualities such as investor protection, financial development, financial

liberalisation and corruption are predicted to explain why firms in some countries decide to increase their cash holdings (Orlova & Sun, 2018). Such poor institutional settings lead to high levels of transaction uncertainty and may give rise to several inefficiencies, such as high corporate cash holdings (Al-Najjar, 2013).

5 Macroeconomic Determinants of Corporate Cash Holdings

Corporate finance theory has predominantly sought to establish decisions that optimise firm performance and value (Goldstein & Hackbarth, 2014). However, corporate finance theories are mostly inwards-looking, emphasising the impact of firm-specific characteristics. Recent studies have increasingly questioned the efficacy of internal firm-specific factors in explaining capital structure and other corporate decisions. An empirical study (Frank & Goyal, 2003) revealed that firm-specific factors only explain approximately 30% of the determinants of capital structure decisions, with the rest explained by institutional and macroeconomic factors.

Macroeconomic factors exist outside the control of any individual company, but their impact is felt by all companies operating within that environment. For instance, global economic uncertainty has grown owing to the effects of bank liquidity, and firms have responded to hedging against this risk by ramping up cash holdings (Magerakis et al., 2020). Hunjra et al. (2020) observe that in the aftermath of the 2007 global credit crisis, most firms increased their cash holdings to reflect elevated economic uncertainty. Corporate cash holdings are an important safety net against financial constraints, especially in times of macroeconomic turmoil (Bates et al., 2009).

Orlova (2020) states that macroeconomic factors such as domestic credit, GDP per capita, inflation, interest rates, policy uncertainty and business confidence have a significant influence on variations in corporate cash holdings. Responding to concerns that South African firms were holding too much cash and not investing to grow the economy, the South African Reserve Bank Governor, Lesetja Kganyago, said, “If there is no investment taking place and corporates are sitting on cash, you just have to go and look at the business confidence indicators and see that you have a problem” (Davis, 2021). Firms will delay investments in favour of holding cash when economic and political uncertainty is heightened.

According to studies, macroeconomic uncertainty shocks are more frequent, and their effects are felt more in emerging markets owing to their relatively unsophisticated markets, high levels of information asymmetry and the shortcomings of government interventionist policies (Guizani & Ajmi, 2021; Lemma & Negash, 2013). This means that there are likely to be more corporate cash holdings in emerging markets than in developed markets. Consequently, the level of investment will also decrease, delaying economic development and ensuring that the gap between developed and developing nations remains.

6 COVID-19, Corporate Investment and Cash Holdings

The COVID-19 pandemic severely impacted production, supply chains and ultimately revenue generation (Tawiah & O'Connor Keefe, 2022). The pandemic was unprecedented, with total government lockdowns in most countries bringing entire supply chains to a standstill. These negative supply chain shocks severely reduced firms' productive capacity, leading to widespread job shedding and loss of income and ultimately a global demand shock as households were forced to reduce their consumption of goods and services (Guerrieri et al., 2022). According to the US Bureau of Economic Analysis, corporate profits in the US plummeted by 11.8% in the last half of 2020, the largest recorded decline since the height of the 2008 credit crunch. Mergers and acquisitions (M&As) in the US decreased by more than 50% in the first quarter of 2020 to \$253 billion compared to the first quarter of 2019 (Harroch et al., 2020).

Organically, firms grow by increasing investments that lead to increased output and revenue generation, or inorganically, which is growth from (M&A). To sustain investment or acquisition activity, firms need capital in the form of either debt or equity. Prior studies show that the borrowing capacity of firms is dependent on their operational cash flows (Holmstrom & Tirole, 1997). Therefore, creditors are more interested in a firm's EBIDTA (earnings before interest, taxes, depreciation and amortisation) when extending credit. The disruptions to production, supply chains and revenue growth caused by the COVID-19 outbreak meant that the operational cash flows of firms declined, adversely impacting their borrowing capacity.

Tawiah and O'Connor Keefe (2022) reported that capital expenditures and M&A levels decreased by 37% and 71%, respectively, in US nonfinancial firms during the COVID-19 pandemic. However, the study revealed that the impact of COVID-19 was much less pronounced for cash-rich firms. Firms with very large cash holdings were able to maintain their pre-COVID-19 investment and acquisition levels (Tawiah & O'Connor Keefe, 2022).

Le and Nguyen (2022) found that the COVID-19 outbreak adversely impacted corporate risk-taking activities. This is because the pandemic increased economic policy uncertainty as the government battled to contain both the spread and the effects of the coronavirus. Managers respond to such exogenous shocks by abandoning, reducing or delaying risk-taking activities such as investments and hiring (Ming et al., 2016). Corporate cash holdings are preferred in such times because they are low-risk assets.

While holding excess cash can be detrimental to shareholder value due to expropriation and abuse by managers (agency theory), in times of exogenous shocks such as COVID-19, excess cash holdings can be more valuable to a firm (Tawiah & O'Connor Keefe, 2022). During the pandemic, firms with excess cash enjoyed financial flexibility because they did not have to rely on external markets for cash for their investments and acquisitions. Such firms were able to sustain their long-term activities and gain a competitive advantage over financially constrained rivals. Firms that had excess cash holdings before the onset of the pandemic were able to

use their cash reserves to sustain their investment and operational activities and performed better than firms that had less cash reserves (Zheng, 2022). The study argued that in crisis periods, such as the COVID-19 pandemic, financing frictions increase, and external financing is either inaccessible or expensive, as firms face heightened refinancing risk. In such times, cash holdings are vital for business survival.

7 Conclusion

Corporate cash reserves make up a valuable and strategic asset, as they give corporations the flexibility to respond to unexpected cash flow constraints, as was imposed by the COVID-19 pandemic. The management of cash holdings is a critical aspect of corporate financial management decisions. Corporate cash holdings are directly linked to all business aspects, including operations, investment activities, financing decisions and dividend pay-out decisions. In times of crisis, such as during the COVID-19 outbreak, corporate cash holdings offer firms a low-risk investment. However, corporate cash holdings are viewed as a ‘lazy capital’ due to their low yields and high opportunity costs. One would expect that corporations would not hold excessive amounts of this lazy capital. However, global trends show that corporate cash holdings have been increasing for several decades.

This study discussed the motives behind companies holding cash. The main theories that have been used to explain corporate cash holdings were also reviewed. Given that these theories have failed to provide a conclusive understanding of corporate cash holdings, this chapter also discusses emerging arguments on how institutional and macroeconomic conditions could be the missing pieces in understanding the corporate cash holdings puzzle.

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Effect of Business Strategy on Accounting Information System Development



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Abstract Diverse definitions exist for the concept of “strategy.” Essentially, strategy encompasses the delineation of “how,” “where” “when,” and “why.” It serves as a structural foundation within business, aiding in the formulation of plans, encompassing the actions, rationale, methodologies, and timing. Accounting information systems, the tools and processes for collecting, storing, retrieving, and purging accounting data, play a crucial role. While previous studies have delved into corporate strategy, a deeper exploration of its interplay with operational frameworks such as accounting information systems is warranted. Notably, the capabilities of accounting information systems are at times overlooked when devising organizational strategies. This negligence can contribute to the failure of strategy implementation, attributing the misalignment between strategy and operational potential, including the accounting information system. The emergence of the COVID-19 pandemic accentuated the necessity of harmonizing strategies with operational proficiencies. For instance, as the pandemic unfolded, numerous companies smoothly transitioned to remote access to their accounting systems. Conversely, many micro, small-, and medium-sized enterprises (MSMEs) encounter challenges in this respect, consequently undermining effective strategy execution within these entities. The present study explores the influence of corporate strategy on the development of accounting information systems against the backdrop of the COVID-19 pandemic. This exploration is facilitated through a comprehensive review and critical assessment of the literature and questionnaires administered on LinkedIn.

Keywords Business strategy · Accounting information systems · Symbiotic relationship · Strategic alignment · Dynamic capabilities · Resource-based view ·

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1 Introduction

In the dynamic landscape of modern business, the concept of “strategy” stands as a cornerstone for organizations striving to navigate complexities, seize opportunities, and achieve their objectives. The multifaceted nature of strategy encompasses a range of dimensions, including the “how,” “where,” “when,” and “why” of actions, forming a roadmap that guides decision-making and shapes the direction of an enterprise. Mckeown (2019) opined that strategy is about shaping the future—it is about how to attain desirable ends with available means. He further explained that strategic planning is designing a path to move from where you are to where you want to be. At its core, strategy provides a framework that delineates not only the rationale behind various actions but also the methodologies for their execution and the timing of their implementation.

One pivotal aspect of this discussion is the realm of accounting information systems. These systems, encompassing the tools and procedures for collecting, storing, retrieving, and managing accounting data, play an indispensable role in the functioning of organizations. They serve as nerve centers for financial information, enabling businesses to maintain accurate records, make informed decisions, and ensure compliance with regulatory requirements. In essence, accounting information systems are the bedrock upon which financial transparency and operational efficiency are built.

Despite the significance of both strategy and accounting information systems, the interplay between these two critical components has often been overlooked. While numerous studies have explored the nuances of crafting effective corporate strategies, there remains a discernible gap in our understanding of how these strategies interact with operational platforms such as accounting information systems. This interaction becomes particularly pivotal in the context of the contemporary business landscape, where the rapid advancement of technology, evolving consumer behaviors, and unforeseen disruptions can significantly impact an organization’s ability to execute its strategic vision.

The current research seeks to address this gap by delving into the intricate relationship between corporate strategy and the development of accounting information systems, with a specific focus on the unprecedented challenges posed by the COVID-19 pandemic. The pandemic reshaped the business landscape in profound ways, compelling organizations to adapt swiftly to remote work environments,

supply chain disruptions, and shifting market demands. As businesses navigated these uncharted waters, the alignment between strategy and the capabilities of accounting information systems emerged as a critical factor in determining resilience and success (Shailer, 2018).

Through a comprehensive exploration of the literature and in-depth interviews with key stakeholders, this study aims to shed light on how corporate strategy influences the design, implementation, and utilization of accounting information systems. By examining the impact of the COVID-19 pandemic on this intricate interplay, we seek to uncover valuable insights that can inform strategic decision-making in a rapidly evolving business environment. Ultimately, the findings of this research endeavor have the potential to enhance our understanding of the symbiotic relationship between strategy and technology, providing a roadmap for organizations to navigate complexities, capitalize on opportunities, and thrive in an era of uncertainty.

Research Objectives

The objectives of this research are to determine the extent to which:

1. Does business strategy impact accounting information system development?
2. The COVID-19 pandemic compelled organizations to swiftly reassess their business strategies and reevaluate their technological infrastructures.
3. The COVID-19 pandemic has provided an opportunity for enterprises to redefine their purpose and rebalance their resilience and correct their courses where necessary.
4. Business strategies shifted to accommodate remote operations, digital customer engagement, and crisis management.
5. The pandemic underscores the importance of resilience and adaptability in both strategy and AIS development.

Research Questions

1. To what extent does business strategy impact accounting information system development?
2. To what extent do pandemics such as the COVID-19 pandemic compel organizations to swiftly reassess business strategies and reevaluate technological infrastructures?
3. To what extent do pandemics such as the COVID-19 pandemic provide opportunities for enterprises to redefine their purpose and rebalance for resilience and course correction?
4. To what extent does the business strategy shift to accommodate remote operations, digital customer engagement, and crisis management?
5. To what extent do pandemics such as the COVID-19 pandemic underscore the importance of resilience and adaptability in both strategy and AIS development?

2 Conceptual Review

This conceptual framework outlines the intricate interplay between strategy, business context, system developments, and the accounting information system. It underscores the importance of cohesive alignment across these components to ensure the organization's ability to navigate complexities, respond to challenges, and seize opportunities in a dynamic business environment.

2.1 *Strategy*

Arguably, strategy has been around and used even before the word strategy. For example, Sun Tzu, the Chinese military general who lived during the Eastern Zhou period of 771–256 BCE, is credited with the saying that all men can see the tactics whereby I conquer, but what none can see is the strategy through which victory evolves. While originally a term from the military domain, the quote from Sun Tzu concisely captures the fundamental nature of strategy in achieving organizational success. Consequently, it can be argued that strategy serves as the method through which companies achieve victory in markets, military commanders overcome the most challenging conflicts, and individuals attain enduring accomplishments. At the core of organizational planning and decision-making, “strategy” entails a comprehensive approach that defines the path an organization intends to follow to achieve its goals. It encompasses a range of dimensions, including the identification of objectives, formulation of action plans, allocation of resources, and consideration of external factors that influence the organization's direction.

2.2 *Business*

Business refers to the broader context within which organizations operate. The “business” environment encompasses industry trends, competitive dynamics, regulatory frameworks, and market conditions. It represents the canvas on which strategies are conceived and executed, impacting an organization's success and sustainability.

Dating as far back as 1870, Georg Siemens, the visionary architect and inaugural Chief Executive Officer of Deutsche Bank, formulated the concept of utilizing entrepreneurial finance to bring together a stagnant and agrarian Germany through industrial advancement. Similarly, Mitsubishi was also established upon the foundation of business theory, and within a decade, it ascended to a position of leadership in a nascent Japan. Remarkably, within a span of two decades, Mitsubishi transformed into a pioneering multinational enterprise (Wood & Wood, 2003).

These companies exemplify the conceptual underpinning of business as a framework for the actualization of entrepreneurial capitalism.

2.3 Business Strategy

Business strategy is the deliberate selection and alignment of actions that an organization undertakes to achieve its overarching objectives (Shapiro, 1989). Verbeke (2013) argues that it involves making choices regarding the target market, differentiation, cost structure, and competitive advantage. An effective business strategy leverages internal strengths while addressing external challenges.

Farida and Setiawan (2022), in their work titled *Business Strategies and Competitive Advantage: The Role of Performance and Innovation*, examined the role of performance and innovation in helping SMEs develop winning strategies and gain competitive advantage. Their study showed that business strategies have a positive impact on competitive advantage. Better business strategies improve the competitive advantage of SMEs. Furthermore, business performance and innovation also mediate the relationship between business strategies and competitive advantages.

Zackery et al. (2022) reported that during the pandemic, adaptive strategies to survive the pandemic took precedence over shaping strategies to build post-COVID-19 realities. They found the core themes of management research during the pandemic to be corporate strategy (subdivided into supply chain resilience, corporate values, management behavior and corporate social responsibility), corporate culture (social distancing), corporate design (virtualization and teleworking and digital transformation) and subcategory (consumer behavior, deglobalization, service sector and tourism, economic impacts & COVID & emerging technologies).

Given the difficult investment atmosphere we have in post-COVID-19 and the resulting effects on inflation and the cost of the living crisis, which is beginning to dampen consumption, many businesses are beginning to scale down their operations. This is largely borne out of the desire to take better control of their supply chain dynamics while also consolidating on mature markets with less volatility and modest and guaranteed (how low) returns. This phenomenon could result in better outputs from accounting information systems as reporting needs become narrower due to deglobalization Zackery et al. (2022).

2.4 System Developments

System developments refer to the processes of creating, enhancing, or modifying organizational systems to align with strategic goals. This can encompass technological advancements, operational improvements, and the incorporation of innovative approaches to streamline processes and enhance efficiency. Ahituv et al. (2014)

view system development as a rigid sequence of activities often involving the interplay of development efforts, environmental influences, organizational culture and leadership influences.

In the realm of system development, the process is complex and multifaceted, involving various stakeholders and factors. Bansler and Havn (1994) highlight the interconnected nature of system development, emphasizing that it is not merely a linear sequence of activities. Instead, it is a dynamic interplay of development efforts, environmental influences, organizational culture, and leadership impacts. The authors argue that understanding and navigating this intricate web of factors is crucial for successful system development initiatives. A holistic approach that considers both the technical aspects of technological advancements and operational improvements, as well as the softer elements of organizational dynamics and leadership influence, is needed.

Moreover, Gaffikin (2008) posited that the rigid sequence of activities in system development should be viewed as a framework rather than a strict roadmap. This perspective allows for flexibility and adaptability, acknowledging the evolving nature of technology, business environments, and organizational needs. The author stresses the importance of incorporating innovative approaches within this framework, fostering a culture of continuous improvement and adaptation. By doing so, organizations can leverage system development as a strategic tool not only to align with current goals but also to anticipate and respond proactively to future challenges and opportunities. In essence, the view presented by Ahituv et al. (2014) encourages a more nuanced and dynamic understanding of system development that goes beyond a linear process and recognizes the need for agility and innovation in the ever-changing landscape of organizational systems. This view is further reinforced during the COVID-19 and post-COVID-19 pandemics, where companies embraced some measured agility to remain competitive and fluid in a volatile, uncertain complex and ambiguous business atmosphere.

2.5 Accounting Information System

The accounting information system serves as an inclusive framework enabling the collection, storage, processing, and dissemination of financial and operational data within an organization, offering insights into its financial health, aiding decision-making, and supporting regulatory compliance (Grabski & Leech, 2023). This comprehensive system is pivotal for ensuring the efficient management and utilization of financial and operational information for organizational purposes. The “accounting information system” is a comprehensive framework that facilitates the collection, storage, processing, and dissemination of financial and operational data within an organization. It provides insights into an organization’s financial health, aids decision-making, and supports regulatory compliance.

The process of accounting information system development involves the systematic design, implementation, and evolution of systems dedicated to capturing and

managing financial data. This intricate process encompasses critical decisions related to the selection of software and hardware components, establishment of database architecture, design of data flow, implementation of security protocols, and seamless integration of the system with other organizational systems. Accounting information system development, therefore, is an ongoing and dynamic process, adapting to the evolving needs and technological landscape of the organization (Al-dmour et al, 2017).

The accounting information system (AIS) stands as a crucial cornerstone in modern organizational management. Its comprehensive framework, as outlined by various scholars (Almajali et al., 2016), facilitates the systematic collection, storage, processing, and dissemination of financial and operational data. By doing so, it not only provides a real-time snapshot of an organization's financial health but also empowers decision-makers with the necessary insights to steer the organization effectively. The significance of this system extends beyond internal operations; it plays a vital role in ensuring compliance with regulatory requirements, fostering transparency, and enhancing accountability. As organizations navigate the complexities of the modern business landscape, the accounting information system has emerged as an indispensable tool for aligning financial management with broader strategic objectives.

In the realm of accounting information system development, the intricate process involves more than just the technicalities of selecting software and hardware components. It encapsulates a holistic approach encompassing database architecture, data flow design, security protocols, and seamless integration with other organizational systems. The dynamic nature of this development process reflects the evolving technological landscape and the ever-changing needs of organizations. Scholars underscore the importance of viewing this development not as a one-time event but as an ongoing evolution that adapts to organizational growth and the challenges presented by technological advancements. By acknowledging this dynamism, organizations can ensure that their accounting information systems remain robust, efficient, and aligned with the broader objectives of financial management in an ever-evolving business environment.

2.6 Accounting Information System Development

Accounting information system development involves the design, implementation, and evolution of systems that capture and manage financial data. This process encompasses the selection of software and hardware components, database architecture, data flow design, security protocols, and integration with other organizational systems.

The advent of the COVID-19 pandemic has significantly influenced the landscape of accounting information system development, introducing both challenges and opportunities. The immediate shift towards remote work and the urgency for virtual collaboration compelled organizations to reevaluate their technological

infrastructure. Scholars note that the pandemic accelerated the adoption of cloud-based accounting information systems, allowing for seamless access to financial data from various locations (Belfo & Trigo, 2013). This shift, driven by the necessity for remote operations, has not only enhanced accessibility but also underscored the importance of data security and privacy protocols within accounting systems.

The pandemic has also prompted a reassessment of the scalability and flexibility of accounting information systems. Organizations have had to adapt quickly to changing market conditions, requiring adjustments in reporting structures and financial analyses. The need for real-time data to inform strategic decision-making became more critical than ever, emphasizing the dynamic nature of accounting information system development (Yoshikuni et al., 2023). The integration of machine learning and predictive analytics within these systems gained prominence as organizations sought to forecast financial scenarios in an environment marked by uncertainty.

Moreover, the pandemic highlighted the resilience of accounting information systems in ensuring business continuity. Organizations with robust systems were better equipped to handle disruptions, with the ability to maintain accurate financial records and support remote auditing processes. In contrast, instances of system vulnerabilities surfaced, emphasizing the need for continuous development and adaptation to unforeseen circumstances (Yoshikuni et al., 2023). Scholars argue that the lessons learned during the pandemic underscore the imperative for organizations to invest in agile accounting information systems that can evolve in tandem with external disruptions, such as the global health crisis.

In conclusion, the COVID-19 pandemic has left an indelible mark on accounting information system development. This has prompted a re-evaluation of technological infrastructure, accelerated the adoption of cloud-based systems, and underscored the importance of data security and scalability. The lessons learned during this period emphasize the need for organizations to view accounting information system development as an ongoing and dynamic process capable of adapting to unforeseen challenges and ensuring resilience in the face of disruptions.

2.7 Interactions Within the Conceptual Framework

Business Strategy and System Developments: The formulation of a robust business strategy influences the types of system developments undertaken. For instance, a strategy focused on cost leadership might drive the development of systems that enhance operational efficiency and cost tracking.

Business Strategy and Accounting Information System: The chosen business strategy dictates the requirements for the accounting information system. A strategy emphasizing rapid growth may necessitate an accounting system capable of handling complex financial transactions and providing real-time reporting.

System Development and Accounting Information System Development: As an organization undergoes system development, the accounting information system

must evolve to accommodate new data sources, integration points, and reporting requirements arising from these developments.

Accounting Information System and Business Performance: The quality and functionality of the accounting information system impact the accuracy and timeliness of financial information. This, in turn, influences the organization's ability to monitor performance, make informed decisions, and achieve its strategic objectives.

Business Strategy, System Developments, and Accounting Information System: The alignment of business strategy, system developments, and accounting information systems is crucial for coherent and effective organizational functioning. A misalignment could lead to inefficiencies, inaccuracies in financial reporting, and hindered strategic execution.

3 Theoretical Review

In the realm of business management and organizational studies, the application of various theoretical perspectives provides invaluable insights into understanding and analysing the complex interactions and dynamics that shape an organization's strategies, systems, and overall performance. This theoretical framework draws upon several prominent theories—strategic alignment theory, dynamic capabilities theory, resource-based view (RBV), contingency theory, agency theory, and strategic management theories—to comprehensively examine the intricate interplay between business strategy, system developments, and accounting information systems (Gaffikin, 2008).

3.1 Strategic Alignment Theory

This theory emphasizes the importance of aligning various aspects of an organization, including its information systems, with its chosen business strategy. This theory posits that when there is congruence between an organization's strategy and its information systems, the organization is more likely to achieve its goals effectively. In the context of AIS development, this theory suggests that the design, functionality, and data captured by AIS should align closely with the strategic objectives of the organization.

Strategic alignment theory plays a pivotal role in understanding and maximizing the impact of accounting information system development, particularly in the context of the challenges and adaptations brought about by the COVID-19 pandemic. The theory emphasizes the importance of aligning organizational strategies with information technology strategies to enhance overall performance. In the wake of the pandemic, organizations found themselves at a juncture where strategic alignment became imperative for navigating uncertainties and ensuring the resilience of their accounting information systems.

The swift adoption of cloud-based accounting information systems during the pandemic exemplifies strategic alignment theory in action. Organizations strategically aligned their technological investments with the imperative of enabling remote work and virtual collaboration. The alignment of these systems with the overarching organizational goal of business continuity allowed for seamless access to financial data, regardless of employees' physical locations. This strategic move not only facilitated day-to-day operations but also demonstrated the inherent adaptability and scalability of the accounting information systems, aligning technology with the evolving needs of the organization.

Furthermore, the theory underscores the importance of real-time data availability for informed decision-making. The strategic alignment of accounting information systems with the organizational goal of dynamic decision support became particularly crucial during the uncertain times brought about by the pandemic. Organizations sought to make strategic decisions based on up-to-date financial information, necessitating the integration of machine learning and predictive analytics within accounting systems. This alignment not only supported immediate decision-making needs but also positioned the organization for strategic resilience in the face of future disruptions.

The lessons learned during the pandemic emphasize the strategic imperative for continuous development and adaptation in accounting information systems. Organizations must view these systems as strategic assets that evolve alongside the broader organizational landscape. This aligns with strategic alignment theory's central tenet of ensuring that information technology strategies are responsive to and supportive of organizational strategies. As the business environment continues to evolve, the strategic alignment of accounting information systems remains paramount for organizations seeking to thrive in an increasingly dynamic and uncertain landscape.

3.2 Dynamic Capabilities Theory

Dynamic capabilities theory posits that organizations must continuously adapt, innovate, and reconfigure their resources and capabilities to effectively respond to changing environments and seize new opportunities. In the context of this study, dynamic capabilities offer a lens through which to understand how an organization's ability to develop and evolve its accounting information systems aligns with its broader business strategy. This perspective sheds light on organizations' agility in responding to technological advancements, market shifts, and unforeseen disruptions.

Dynamic capability theory offers valuable insights into how organizations can develop and adapt their accounting information systems (AISs) to address the challenges and opportunities presented by the COVID-19 pandemic. At its core, dynamic capability theory emphasizes an organization's ability to integrate, build, and reconfigure internal and external competencies in response to changing environments.

In the context of AIS development, organizations with dynamic capabilities are better positioned to respond to unexpected disruptions such as the pandemic. These organizations view their AIS not as static systems but as evolving assets that can be continuously adapted to changing circumstances. For instance, during the pandemic, organizations with dynamic capabilities quickly enhanced their AIS with features such as real-time data analytics, scenario planning, and remote access, allowing them to swiftly adjust to new working conditions and evolving business dynamics (Conger, 2020).

Furthermore, dynamic capability theory underscores the importance of organizational learning. In the face of the pandemic, organizations with dynamic capabilities engaged in ongoing learning processes related to AIS. This involved learning from the crisis, understanding how the AIS could be more effectively utilized, and incorporating these lessons into future developments. For example, organizations recognized the need to enhance cybersecurity measures within AIS as remote work became more prevalent, showcasing the adaptive learning inherent in dynamic capabilities.

A key aspect of dynamic capability theory is the idea of sensing and seizing opportunities. During the pandemic, organizations with dynamic capabilities were adept at sensing shifts in the business environment and seizing opportunities to strategically enhance their AIS. This could involve investing in emerging technologies, reconfiguring data flows, or integrating additional functionalities to address emerging needs. The ability to sense and seize opportunities ensures that the AIS remains not only resilient but also aligned with the organization's strategic goals in a rapidly changing landscape.

Moreover, dynamic capability theory encourages organizations to foster a culture of innovation. This is particularly relevant in the context of AIS development, where innovation is critical for remaining ahead of technological advancements and changing business requirements. Organizations with dynamic capabilities actively promote a culture that encourages experimentation, welcomes new ideas, and embraces technological advancements in the AIS domain.

In summary, dynamic capability theory provides a robust framework for understanding how organizations can strategically develop and adapt their AIS in response to the challenges posed by the COVID-19 pandemic. By cultivating dynamic capabilities, organizations can ensure that their AIS remains agile, resilient, and aligned with strategic goals, enabling them to navigate uncertainties and capitalize on emerging opportunities in the ever-evolving business landscape.

3.3 *Resource-Based View (RBV)*

The resource-based view (RBV) centers on the idea that an organization's unique bundle of resources and capabilities is the key driver of competitive advantage. Applying the RBV to this framework enables an exploration of how an organization's strategic choices, system developments, and accounting information systems

leverage its distinctive resources to create value and maintain a sustainable edge in the market.

The resource-based view (RBV) theory offers valuable insights into the strategic implications of accounting information system development, particularly in the context of the challenges presented by the COVID-19 pandemic. According to the RBV, an organization's sustained competitive advantage is derived from its unique and valuable resources. In the realm of accounting information system development, the theory emphasizes that these systems, as organizational resources, should not only be technologically advanced but also possess characteristics that are rare, valuable, and difficult for competitors to replicate (Gaffikin, 2008).

The pandemic underscores the significance of accounting information systems as strategic resources. Organizations with robust, well-developed systems found themselves in a better position to navigate the complexities brought about by the sudden shift to remote work. The technological infrastructure, characterized by features such as cloud-based accessibility and integrated data analytics, represented rare and valuable resources during a time of unprecedented change. This resource-based perspective highlights that organizations possessing such advanced systems are better equipped to ensure business continuity, maintain financial transparency, and make informed decisions despite the disruptions caused by the pandemic.

Moreover, the strategic development of accounting information systems aligns with the RBV's emphasis on the dynamic nature of resources. As the business environment evolves rapidly, organizations recognize the need to continuously develop and adapt their accounting information systems. The ability to evolve these systems in response to external changes became a source of competitive advantage. This aligns with the RBV's argument that resources, including information systems, must possess dynamic capabilities to remain valuable over time.

Additionally, RBV prompts organizations to consider how the integration of accounting information systems with other organizational resources enhances overall competitiveness. During the pandemic, the seamless integration of these systems with remote work platforms, communication tools, and other technological resources showcased how well-developed accounting systems can act synergistically with other organizational assets. This integration not only enhanced internal operations but also contributed to the creation of a holistic organizational capability that was challenging for competitors to replicate.

In conclusion, resource-based view theory provides a lens through which to understand the strategic significance of accounting information system development. As organizations continue to grapple with the aftermath of the pandemic, the RBV emphasizes that these systems, when viewed as valuable, rare, and dynamically evolving resources, contribute to sustained competitive advantage and overall organizational resilience in a rapidly changing business landscape.

3.4 *Contingency Theory*

Contingency theory asserts that the effectiveness of management practices depends on the alignment between an organization's strategies and its external environment. By applying this theory, we can analyse how the alignment between business strategy and accounting information systems might differ based on contextual factors such as industry characteristics, regulatory frameworks, and technological trends.

Contingency theory, with its focus on the idea that there is no one-size-fits-all approach, is particularly relevant for understanding the varied responses of organizations to the challenges and opportunities presented by the COVID-19 pandemic in the context of accounting information system development. The theory suggests that the effectiveness of accounting information systems is contingent on how well they align with the specific needs and environmental factors unique to each organization.

The pandemic acted as a catalyst for diverse organizational responses, and contingency theory sheds light on why certain accounting information system strategies were more successful in specific contexts. For organizations operating in industries with a greater reliance on remote work, the contingency theory perspective highlights the need for accounting information systems that are flexible, cloud-based, and capable of supporting virtual collaboration. In contrast, businesses with a stronger on-site presence might emphasize systems that seamlessly integrate with physical infrastructure while still accommodating remote capabilities where necessary.

Furthermore, the theory underscores the importance of tailoring accounting information system development to an organization's size, structure, and external environment. Larger organizations, for instance, might require more complex and scalable systems that can handle extensive data flows, while smaller enterprises may prioritize cost-effectiveness and simplicity. Contingency theory suggests that the alignment between accounting information systems and organizational characteristics is crucial for optimizing system effectiveness.

The dynamic nature of contingency theory is evident in the adaptive responses that organizations have taken during the pandemic. For instance, businesses in sectors heavily impacted by economic uncertainties leveraged accounting information systems not only for traditional financial reporting but also for scenario planning and risk assessment. The theory highlights that the effectiveness of these adaptive strategies depends on the unique contextual factors influencing each organization.

In summary, the application of contingency theory to accounting information system development amid the COVID-19 pandemic underscores the need for tailored approaches. It emphasizes that the success of these systems hinges on how well they align with the specific characteristics, needs, and contingencies of the organization. As businesses continue to navigate uncertainties, contingency theory provides a valuable framework for understanding and optimizing the role of accounting information systems in diverse and dynamic organizational contexts.

3.5 *Agency Theory*

Agency theory delves into the relationship between principals (owners/shareholders) and agents (managers) and how potential conflicts of interest can impact decision-making and organizational outcomes. In the context of this framework, agency theory offers insights into how strategic decisions, system developments, and accounting information systems align with the interests of stakeholders and how these alignments contribute to organizational performance.

Agency theory provides insights into the relationship between principals (such as organizational leaders or stakeholders) and agents (employees or management) and can be applied to the dynamics of accounting information system development, especially in the context of the challenges posed by the COVID-19 pandemic. This theory is particularly relevant for understanding how information systems serve as tools for mitigating agency problems and aligning the interests of different stakeholders.

During the pandemic, agency theory illuminates the importance of accounting information systems as mechanisms for reducing information asymmetry between principals and agents. With the sudden shift to remote work, organizational leaders need real-time and accurate financial information to monitor and control dispersed teams effectively. Accounting information systems play a crucial role in providing transparent and accessible data, fostering trust and reducing the agency costs associated with information discrepancies (Shailer, 2018).

Furthermore, the theory underscores the role of accounting information systems in aligning the interests of various stakeholders. For instance, shareholders and management may have divergent interests, and accounting systems that offer clear and standardized financial reporting contribute to the mitigation of agency conflicts. This is particularly pertinent during periods of economic uncertainty, such as the COVID-19 pandemic, where stakeholders seek assurance and transparency regarding the organization's financial health (Mitnick, 1990).

In terms of system development, agency theory also sheds light on the design and implementation choices made by organizations. The emphasis on controls, security protocols, and data integrity within accounting information systems is directly tied to agency concerns. Organizations recognize the importance of ensuring that these systems are resistant to manipulation, thereby safeguarding against potential opportunistic behaviour by agents (Zogning, 2022). The design of access controls and audit trails within these systems becomes a critical aspect of aligning the interests of principals and agents, minimizing the risk of information abuse or misuse.

However, agency theory also recognizes that complete alignment of interests is not always feasible. The theory acknowledges the existence of information asymmetry and potential conflicts but emphasizes the role of accounting information systems in managing and mitigating these challenges. The transparency and accountability embedded in these systems provide a mechanism for monitoring and controlling agents, fostering a level of trust between various stakeholders within the organization.

In conclusion, agency theory provides a valuable perspective on how accounting information systems serve as tools for reducing information asymmetry, aligning interests, and mitigating agency problems. The theory highlights the crucial role of these systems, especially during times of crisis, in promoting transparency, accountability, and effective communication between principals and agents. As organizations continue to navigate the complexities of the postpandemic landscape, the principles of agency theory offer guidance on optimizing accounting information systems to address ongoing agency concerns.

3.6 Strategic Management Theories

Strategic Management Theories encompass a range of perspectives that provide structured approaches for developing, implementing, and evaluating strategies. These theories offer a foundation for understanding how organizations formulate and execute business strategies, how they integrate system developments into their strategic endeavors, and how accounting information systems contribute to the realization of strategic objectives.

Strategic management theory provides a comprehensive lens through which to analyse the role of accounting information system (AIS) development in organizations, particularly in the context of the challenges posed by the COVID-19 pandemic. Strategic management emphasizes the alignment of organizational objectives with actions and resources, and the development of AIS is integral to this alignment.

In the strategic context, AIS is not merely a technical tool but also a strategic asset. Organizations strategically leverage these systems to gain a competitive advantage. During the pandemic, the ability of the AIS to provide real-time financial insights and support data-driven decision-making became paramount. Strategic management theory posits that organizations that strategically align their AIS with broader goals could turn disruptions into opportunities. For example, by investing in predictive analytics and scenario planning capabilities within AIS, organizations were able to proactively respond to the uncertainties brought about by the pandemic.

Moreover, strategic management theory underscores the importance of flexibility and adaptability in strategic decision-making. AIS development, particularly during the pandemic, has become a strategic imperative for organizations seeking to remain agile in the face of unprecedented challenges. Organizations that recognize the strategic value of adaptable AIS could pivot their strategies more effectively, adjusting to changing market dynamics and ensuring business continuity.

The theory also emphasizes the role of leadership in strategic management. During the pandemic, effective leaders recognized the strategic significance of AIS and championed its development to align with the organization's vision. Strategic leaders understood that AIS is not a one-time investment but an ongoing process that requires continuous development and alignment with organizational strategies. This aligns with strategic management theory's focus on the importance of leadership in shaping and executing strategies effectively.

Strategic management theory also directs attention to the competitive landscape. Organizations that strategically positioned their AIS to enhance efficiency, transparency, and decision-making gained a competitive edge. The theory suggests that organizations should continually assess and enhance their AIS to stay ahead in the dynamic business environment. The COVID-19 pandemic acted as a strategic catalyst, accelerating the need for organizations to reassess and strategically manage their AIS to thrive in the postpandemic era.

In conclusion, strategic management theory provides a robust framework for understanding the role of AIS development in organizations, especially during disruptive events such as the COVID-19 pandemic. By recognizing AIS as a strategic asset, aligning it with organizational goals, fostering adaptability, emphasizing leadership, and staying attuned to the competitive landscape, organizations can navigate uncertainties strategically and position themselves for long-term success.

To conclude, this section, by synthesizing these diverse theoretical perspectives, these frameworks provide a holistic lens through which to explore the alignment between business strategy, system developments, and accounting information systems. It seeks to uncover the nuanced relationships, causative factors, and outcomes that emerge from the interplay of these crucial elements, shedding light on the mechanisms that underpin successful strategic execution and organizational resilience in a rapidly evolving business landscape.

4 Effect of Business Strategy on Accounting Information System Development

The relationship between business strategy and accounting information system (AIS) development is a pivotal dynamic that shapes an organization's technological infrastructure and its ability to achieve strategic objectives. Business strategy serves as the guiding framework for an organization's direction and goals, influencing decisions related to differentiation, cost leadership, market focus, etc. This, in turn, has a profound impact on the design, implementation, and evolution of accounting information systems.

Figure 1 above underscores the interconnected nature of business strategy and AIS development, highlighting their interdependence in driving organizational success. It encapsulates the idea that the strategic direction an organization charts has a cascading effect on the technological infrastructure it deploys. Figure 1 serves as a visual reminder of the significance of strategic alignment in the digital era, where the ability of an organization's AIS to support and actualize its chosen strategy is paramount. The visual illustration in Fig. 1 encapsulates a narrative of adaptation and evolution, where the organization's AIS transforms in tandem with shifts in business strategies, ensuring that technological advancements amplify strategic intentions. Ultimately, this visual representation encapsulates the intricate synergy

between business strategy and AIS development, reaffirming their synergistic collaboration as a cornerstone for competitive advantage and operational excellence.

Different business strategies demand distinct functionalities from AIS. For instance, a cost leadership strategy may require streamlined and efficient transaction processing, accurate cost tracking, and budgeting capabilities. On the other hand, a differentiation strategy might necessitate AIS features that support real-time performance measurement and complex analytics to enable informed decision-making based on unique product attributes.

Furthermore, the pace of technological advancements and shifts in the business landscape often prompt adaptations in business strategies. As organizations adjust their strategies to remain competitive, the corresponding changes in priorities and objectives ripple through the AIS development process. Therefore, flexibility and agility in AIS development are crucial for ensuring that the systems align with the evolving strategic direction of the organization.

5 Methodology

This research employed a combination of methods to collect data and synthesize arguments. These methods included a literature review and closed-ended short questions administered on LinkedIn. The literature review encompassed a thorough examination of both historical and recent works related to business strategy and the development of accounting information systems. Of the 124 questionnaires



Fig. 1 Interaction between business strategy and AISD. Source: Authors Own Construct

administered, the researchers received responses from 100 professionals, representing an 81% response rate.

6 Data Analysis

Research Question 1: To what extent does business strategy impact accounting information system development?

From Table 1 above, 8 respondents, representing 8% of the total respondents, believe that business strategy has no impact on accounting information system development; 42 respondents, representing 42% of the total respondents, believe that business strategy impacts accounting information system development to a large extent; 35 respondents, representing 35% of the total respondents, believe that business strategy impacts accounting information system development to a very large extent; and 15 respondents, representing 15% of the total respondents, believe that business strategy impacts accounting information system development to an extremely large extent. Therefore, based on the views of the respondents, it can be inferred that business strategy impacts the development of accounting information systems.

Research Question 2: To what extent do pandemics such as COVID-19 compel organizations to swiftly reassess business strategies and reevaluate technological infrastructures?

Table 2 shows that 14 respondents, representing 14% of the total respondents, believe that the COVID-19 pandemic did not compel organizations to swiftly reassess their business strategies and reevaluate their technological infrastructures; 40 respondents, representing 40% of the total respondents, believe that the COVID-19 pandemic compelled organizations to swiftly reassess their business strategies and reevaluate their technological infrastructures to a large extent; 33 respondents, representing 33% of the total respondents, believe that the COVID-19 pandemic compelled organizations to swiftly reassess their business strategies and reevaluate their technological infrastructures to a very large extent; and 13 respondents, representing 13% of the total respondents, opined that the COVID-19 pandemic compelled organizations to swiftly reassess their business strategies and reevaluate their technological infrastructures to an extremely large extent. Therefore, based on the views of the respondents, it can be inferred that the COVID-19 pandemic compelled

Table 1 Survey response count and percentages for each choice

Response option	Response count	Percentage
Zero or no extent	8	8%
Large extent	42	42%
Very large extent	35	35%
Extremely large extent	15	15%
<i>Total</i>	<i>100</i>	<i>100%</i>

organizations to swiftly reassess their business strategies and reevaluate their technological infrastructures.

Research Question 3: To what extent do pandemics such as COVID-19 provide opportunities for enterprises to redefine their purpose and rebalance resilience and course correction?

From Table 3 above, 17 respondents, representing 33% of the total respondents, believe that the COVID-19 pandemic did not provide an opportunity for enterprises to redefine their purpose and rebalance for resilience and course correction where necessary; 33 respondents, representing 33% of the total respondents, believe that the COVID-19 pandemic provided an opportunity for enterprises to redefine their purpose and rebalance for resilience and course correction where necessary to a large extent; 20 respondents, representing 20% of the total respondents, believe that the COVID-19 pandemic provided an opportunity for enterprises to redefine their purpose and rebalance for resilience and course correction where necessary to a very large extent; and 30 respondents, representing 30% of the total respondents, opined that the COVID-19 pandemic provided an opportunity for enterprises to redefine their purpose and rebalance for resilience and course correction where necessary to an extremely large extent. Therefore, based on the views of the respondents, it can be inferred that the COVID-19 pandemic provided an opportunity for enterprises to redefine their purpose and rebalance for resilience and course correction where necessary.

Research Question 4: To what extent does a business strategy shift to accommodate remote operations, digital customer engagement, and crisis management?

From Table 4 above, 10 respondents, representing 10% of the total respondents, thought that business strategies did not shift to accommodate remote operations, digital customer engagement, and crisis management; 60 respondents, representing 60% of the total respondents, believed that business strategies shifted to accommodate remote operations, digital customer engagement, and crisis management to a large extent; 15 respondents, representing 15% of the total respondents, believed that business strategies shifted to accommodate remote operations, digital customer engagement, and crisis management to a very large extent; and 15 respondents, representing 15% of the total respondents, believed that business strategies shifted to accommodate remote operations, digital customer engagement, and crisis management to an extremely large extent. Therefore, based on the views of the respondents, it can be inferred that business strategies shifted to accommodate remote operations, digital customer engagement, and crisis management.

Table 2 Survey response count and percentages for each choice

Response option	Response count	Percentage
Zero or no extent	14	14%
Large extent	40	40%
Very large extent	33	33%
Extremely large extent	13	13%
Total	100	100%

Table 3 Survey response count and percentages for each choice

Response option	Response count	Percentage
Zero or no extent	17	17%
Large extent	33	33%
Very large extent	20	20%
Extremely large extent	30	30%
<i>Total</i>	<i>100</i>	<i>100%</i>

Table 4 Survey response count and percentages for each choice

Response option	Response count	Percentage
Zero or no extent	10	10%
Large extent	60	60%
Very large extent	15	15%
Extremely large extent	15	15%
<i>Total</i>	<i>100</i>	<i>100%</i>

Research Question 5: To what extent do pandemics such as COVID-19 underscore the importance of resilience and adaptability in both strategy and AIS development?

Table 5 shows that 20 respondents, representing 20% of the total respondents, believe that pandemics such as COVID-19 do not underscore the importance of resilience and adaptability in both strategy and accounting information systems (AIS) development; 37 respondents, representing 37% of the total respondents, believe that pandemics such as COVID-19 underscore the importance of resilience and adaptability in both strategy and AIS development to a large extent; 13 respondents, representing 13% of the total respondents, believe that pandemics such as COVID-19 underscore the importance of resilience and adaptability in both strategy and accounting information systems (AIS) development to a very large extent; and another 30 respondents, representing 30% of the total respondents who opined pandemics such as COVID-19, underscore the importance of resilience and adaptability in both strategy and accounting information systems (AIS) development to an extremely large extent. Therefore, based on the views of the respondents, it can be inferred that pandemics such as COVID-19 underscore the importance of resilience and adaptability in both strategy and accounting information systems (AISs).

7 Discussion of Findings

The outbreak of the COVID-19 pandemic introduced unprecedented disruptions across industries, compelling organizations to swiftly reassess their business strategies and reevaluate their technological infrastructures. The impact of the pandemic on both business strategy and accounting information system development has been multifaceted. According to Accenture, companies should embrace agility in their

Table 5 Survey response count and percentages for each choice

Response Option	Response count	Percentage
Zero or no extent	20	20%
Large extent	37	37%
Very large extent	13	13%
Extremely large extent	30	30%
<i>Total</i>	<i>100</i>	<i>100%</i>

quest to remain competitive, internalize resilience, and continue to meet the dynamic demands of customers. They argue that the COVID-19 pandemic provides an opportunity for enterprises to redefine their purpose and rebalance for resilience and course correction where necessary.

In response to lockdowns, supply chain disruptions, and remote work mandates, many organizations underwent strategic pivots. Business strategies shifted to accommodate remote operations, digital customer engagement, and crisis management. Consequently, accounting information system (AIS) development has experienced a surge in demand for capabilities such as remote access, data security, and enhanced reporting to support these novel strategic imperatives.

Furthermore, the pandemic has underscored the importance of resilience and adaptability in both strategy and AIS development. Organizations that had invested in flexible accounting information systems capable of rapid adjustments were better equipped to navigate the uncertainties caused by the crisis and implement revised business strategies effectively.

In summary, the intricate relationship between business strategy and accounting information systems development serves as a linchpin for organizational success. The authors, based on the methodology adopted, opined that business strategies shape the requirements and priorities of AIS development, while the adaptability of AIS determines an organization's ability to respond to changing business strategies. Additionally, the COVID-19 pandemic further highlighted the interdependence of these factors, emphasizing the need for strategic alignment and agile AIS development to ensure resilience and sustained performance in times of disruption.

8 Conclusion

In a dynamic and interconnected business landscape, the symbiotic relationship between business strategy and accounting information system (AIS) development emerges as a critical factor in shaping an organization's success, resilience, and competitive advantage. This journey through the realms of strategy and technology has unveiled a profound interplay, where the alignment between these two components stands as a cornerstone for effective decision-making and strategic execution. This position reiterates that of Romney et al. (2012), who conclude that accounting information system development helps the fiscal discipline of firms and helps them

prevent financial misdemeanors. Such misdemeanors include but are not limited to fraud, cyber-attacks, system failures, asset misapplication, creative accounting, and misleading financial reporting that distorts the relevance of reported information.

The insights drawn from the fusion of strategic alignment theory, dynamic capabilities theory, the resource-based view (RBV), contingency theory, agency theory, and strategic management theories underscore the multidimensional nature of this relationship. Business strategy provides the compass, steering the organization towards its objectives, while accounting information systems (AIS) development constructs the technological infrastructure to support and enable the chosen strategic path. Gaffikin (2008) argued that for practice to be effective, it must be reasoned practice. Through this exploratory study, the author concludes that the alignment of strategic imperatives to accounting information systems is sine qua non to efficient strategic implementation.

The transformative impact of the COVID-19 pandemic has illuminated the dynamic nature of these interactions. Organizations navigated uncharted waters, adapting their business strategies to unprecedented challenges, and simultaneously recalibrating their AIS development efforts to facilitate remote work, digital transformation, and crisis response. The pandemic underscored the imperative for agility, emphasizing that organizations with adaptable AIS were better poised to translate strategic shifts into operational realities.

As organizations continue to navigate an era of rapid change and innovation, the lessons drawn from this exploration serve as a compass for strategic alignment and technological evolution. It is through this synergy that organizations can position themselves as agile, resilient, and strategically poised entities capable of charting a course to success, regardless of the challenges that lie ahead.

Finally, the intricate interplay between business strategy and accounting information systems development is a synergy that underpins an organization's ability to thrive amidst complexity and uncertainty. As business strategies evolve to embrace technological advancements, market shifts, and changing consumer behaviors, alignment with AIS development becomes increasingly vital. This alignment cultivates not only the efficient flow of financial information but also the strategic foresight necessary to make informed decisions and execute with precision.

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The COVID-19 Pandemic and Its Impact on Accounting Information Systems: A Conclusion

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Abstract The present volume synthesises key findings across diverse chapters to highlight significant transformations in accounting practices due to the pandemic. This critical analysis demonstrates how the crisis expedited the adoption of digital technologies and integrated reporting, requiring adaptations in regulatory standards and enhancing corporate governance. As businesses faced unprecedented economic disruptions, the necessity for robust, transparent, and adaptable accounting information systems became evident, steering the evolution of accounting standards to better meet future global challenges. Profound insights for both academics and practitioners were offered emphasising the integral role of strategic adaptation and forward-thinking in the resilience and continuity of accounting practices.

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1 Summary of Key Findings

This volume provides a detailed examination of the multifaceted effects of the COVID-19 pandemic on the field of accounting, with a particular focus on information processing and accounting standards. This concluding chapter encapsulates the key findings from the various contributors, weaving together the core themes and insights into a cohesive narrative. The key findings highlight the transformation of accounting information systems, the shift towards integrated reporting, the adaptation to regulatory changes and standards, and the role of corporate governance, among others.

The onset of the COVID-19 pandemic precipitated unprecedented disruptions across global economies, compelling businesses to reassess and rapidly adapt their accounting practices and information systems (Leoni et al., 2021; Raghavan, 2021). One of the seminal findings of the book is the accelerated digital transformation within accounting departments and firms. Faced with the challenges of remote work, businesses rapidly adopted cloud-based accounting systems, leveraging technology to ensure continuity, enhancing data processing efficiency, and maintaining the integrity of financial information (Marcello, 2023).

A pivotal theme from the book is the growing impetus towards integrated reporting. This shift underpins a broader recognition of the need for greater transparency, accountability, and sustainability in financial reporting. Integrated reporting, which amalgamates financial data with nonfinancial data—encompassing environmental, social, and governance (ESG) factors—has gained traction to provide a holistic view of an organisation's performance and long-term value creation capabilities. The pandemic has underscored the interdependencies between businesses and their broader social and environmental contexts, highlighting the inadequacies of traditional financial reporting in capturing these complex relationships.

The book also delves into the regulatory responses to the pandemic and their implications for accounting standards and practices. Regulators worldwide issued guidance and temporary reliefs to address the challenges posed during COVID-19, from allowances for remote audits to adjustments in the application of accounting standards such as IFRS 9 (Markova & Hristov, 2021). These regulatory adaptations have necessitated businesses to be agile, requiring them to update their accounting information systems to comply with evolving standards and ensure accurate financial reporting amid uncertainty.

Another significant finding pertains to the role of corporate governance in steering the adoption of robust accounting information systems and practices during the pandemic. Effective corporate governance has been instrumental in ensuring that shifts in accounting practices, especially towards integrated reporting, are grounded in a commitment to transparency and accountability. The book highlights how governance mechanisms, such as board oversight and stakeholder engagement, have been pivotal in guiding businesses through the turbulence of the pandemic, emphasising the importance of ethical leadership and strategic foresight in navigating these challenges.

COVID-19 pandemic catalysed profound changes in accounting, driven advancements in information processing technologies, orchestrated the move towards integrated reporting, and reshaped regulatory landscapes and corporate governance practices. These transformations reflect a broader evolution towards more resilient, transparent, and sustainable accounting practices that not only respond to the immediate challenges posed by the pandemic but also lay the groundwork for addressing the complex global challenges of the future. The book's exploration of these themes offers valuable insights for academics, practitioners, and policymakers alike, highlighting the enduring impact of the pandemic on the accounting profession and the ongoing journey towards a more sustainable and accountable financial ecosystem.

2 Implications for Theory and Practice

The implications of the chapters from this book extend significantly to theoretical frameworks and practical applications in accounting and financial information systems. This synthesis delves into how the chapters contribute to the broader discourse on accounting standards and information processing and the practical implications for stakeholders within the financial services industry.

2.1 Theoretical Implications

The chapters underscore the pandemic's transformative impact on accounting information systems, offering a critical lens through which to view the interplay between emergent global crises and accounting practices, especially regarding the reporting of correct financial information. They contribute to the dynamic field of accounting theory by illustrating the practical challenges and adaptations necessitated by the COVID-19 pandemic, thereby enriching the understanding of contingency theory and institutional theory within accounting.

Contingency theory, which posits that an organisation's success is contingent upon the fit between its internal operations and external environmental demands (Otley, 1980; Gordon & Miller, 1976), is vividly exemplified in the chapters. They illustrate how the pandemic was a powerful external shock, compelling organisations to reassess and adapt their accounting information systems for resilience and continuity. This highlights the need for flexibility and responsiveness in accounting systems, reinforcing the theory's premise about the importance of alignment with environmental contingencies.

Institutional theory, which focuses on the deeper and more resilient aspects of social structure (Benvenuto et al., 2023; Nguyen et al., 2018), is also enriched by the discussions in the chapters. They explore how institutional pressures—coercive, regulatory changes, and normative, shifting stakeholder expectations—have driven the adoption of integrated reporting practices. This aligns with the theory's emphasis on the role of institutional forces in shaping organisational practices, offering

insights into the mechanisms through which such pressures lead to innovations in accounting standards and practices.

2.2 Practical Implications

For practitioners, the chapters underscore the critical importance of embracing technological advancements and integrated reporting to enhance transparency, accountability, and sustainability in financial reporting. The pandemic has accelerated digital transformation initiatives across the financial services sector, demonstrating the value of robust, flexible, and transparent accounting information systems in navigating crises.

The discussions around integrated reporting have practical implications for businesses seeking to align their financial and sustainability goals. By adopting integrated reporting practices, organisations can better communicate their value creation processes, responding to increasing demands from investors and regulators for comprehensive financial and nonfinancial performance disclosures. This not only aids in meeting regulatory requirements but also enhances stakeholder's trust and supports sustainable business practices.

Moreover, the chapters guide policymakers and regulatory bodies in developing and enforcing standards that facilitate the transition towards more sustainable and resilient financial systems. This includes recommendations for policy frameworks that encourage the adoption of technology-enabled accounting practices and integrated reporting, underscoring the role of regulation in driving industry-wide changes towards sustainability.

The chapters contributed to this book significantly contribute to theory and practice within the accounting field. They highlight the critical interdependencies between external environmental factors, such as the COVID-19 pandemic, and accounting information systems, offering valuable insights into the theoretical underpinnings of these relationships. Practically, they provide a roadmap for organisations, policymakers, and regulatory bodies to navigate the challenges and opportunities the pandemic presents, advocating for a shift towards more transparent, accountable, and sustainable financial reporting practices. Through this dual lens of theory and practice, the book advances the discourse on accounting standards and information systems, charting a path forward in the postpandemic world.

3 Challenges and Opportunities

The chapters from this book collectively explore a multifaceted landscape where the global pandemic has acted as both a disruptor and an accelerator for change in accounting and financial reporting. This synthesis essay delves into the challenges

and opportunities identified across the chapters, offering a nuanced understanding of the evolving accounting standards and practices in the wake of COVID-19.

The pandemic unearthed several challenges for accounting information systems and standards, primarily emphasising the urgency for adaptability and resilience in financial reporting. One prominent challenge was the rapid shift to digital modes of operation, which, although necessary, exposed companies to increased cybersecurity risks and highlighted significant disparities in digital readiness. This transition necessitated reevaluating internal controls and risk management strategies to safeguard sensitive financial information against emerging cyber threats.

Moreover, the chapters underscore the strain that COVID-19 has placed on traditional financial reporting frameworks. The unprecedented economic uncertainty compelled organisations to rethink their approach to liquidity management, asset valuation, and impairment assessments, challenging the adequacy and relevance of existing accounting standards in providing meaningful insights into an organisation's financial health during a global crisis.

Conversely, the pandemic also paved the way for considerable opportunities within the accounting and financial reporting field. A key opportunity highlighted across the chapters is the accelerated adoption of integrated reporting frameworks. These frameworks, which emphasise transparency, accountability, and sustainability, have gained prominence as stakeholders increasingly demand comprehensive disclosures that encapsulate financial, environmental, social, and governance (ESG) impacts. This shift represents a significant evolution in accounting practices, moving beyond traditional financial metrics to a more holistic view of value creation and sustainability.

Furthermore, the challenges brought about by the pandemic have acted as catalysts for innovation within accounting information systems. The necessity for remote work and the demand for real-time financial information have driven advancements in cloud computing, artificial intelligence (AI), and blockchain technologies. These innovations can enhance financial reporting processes' efficiency, accuracy, and security, enabling more timely and informed decision-making.

The chapters from the book reveal a landscape of accounting and financial reporting that is undergoing profound transformations in response to the COVID-19 pandemic. While the challenges are significant, ranging from cybersecurity concerns to the limitations of traditional accounting frameworks, the opportunities for innovation and progress are equally compelling. The pandemic has underscored the need for flexible, resilient, and transparent accounting practices that can withstand the pressures of unprecedented global events. As the world continues to navigate the aftermath of COVID-19, the evolution of accounting standards and information systems will undoubtedly play a pivotal role in shaping a more sustainable and accountable financial landscape.

4 Future Research Directions

The chapters presented in this volume collectively unravels the intricate ways the pandemic has reshaped accounting practices, revealing both immediate challenges and future avenues for research. This essay synthesises these insights to suggest future research directions that could further our understanding of the pandemic's long-term impact on accounting standards and information systems, particularly within emerging economies.

Further research is recommended on the integration of environmental, social, and governance (ESG) factors in accounting systems. The chapters emphasise the acceleration of integrated reporting, highlighting a gap in understanding how ESG factors are incorporated into accounting systems in the face of crises such as COVID-19. Future research should explore the methodologies, and framework organisations in emerging economies adopt to embed ESG considerations into their accounting systems. This includes examining the effectiveness of these frameworks in enhancing corporate transparency and accountability.

The field of digital transformation of accounting information systems also requires further research. The pandemic has underscored the importance of digital technology in ensuring the resilience of accounting information systems. There is a need for comprehensive studies investigating the specific digital solutions supporting accounting functions during the pandemic, including cloud-based systems, AI, and blockchain technology. Research should focus on the adoption challenges, costs, and impact on data integrity and security in diverse regulatory environments.

This volume discussed the disruption in traditional accounting practices, pointing to a significant gap in current accounting education and training. Future research could delve into the modifications required in accounting curricula to prepare future professionals for similar global disruptions. This includes exploring the integration of crisis management, digital literacy, and ESG reporting into accounting education.

The impact of COVID-19 on accounting standards and information systems is likely to vary across emerging economies due to varied economic, cultural, and regulatory landscapes. Future research should undertake comparative studies to identify these differences and similarities. This could provide insights into best practices and challenges emerging economies face in adapting the new standard in accounting standards and practices.

The contributions focus on immediate responses to the pandemic but lack a long-term perspective on the recovery process. Longitudinal studies tracking the recovery of accounting systems postpandemic in emerging economies would provide valuable insights into the resilience and adaptability of these systems. This includes examining the long-term effects of pandemic-induced changes on financial reporting quality, investor trust, and corporate governance.

The evolving nature of accounting standards in response to the pandemic highlights a need for research on the role of regulatory bodies. Future studies should explore how these bodies in emerging economies adopt policies to support the

transition towards more resilient and transparent accounting practices. This includes examining the effectiveness of regulatory interventions in promoting integrated reporting and sustainability accounting.

This volume provides a foundational understanding of the shifts in accounting practices induced by the COVID-19 pandemic. However, they also unveil significant gaps that present opportunities for future research. Addressing these gaps through empirical studies across various emerging economies will enrich the theoretical frameworks around accounting standards and information systems and offer practical insights for navigating future crises. Academic and professional accounting communities must collaborate to explore these uncharted territories as the world grapples with the pandemic's aftermath.

5 Policy Recommendations

This volume delves deeply into the transformative changes prompted by the global pandemic within the accounting and financial sectors. A synthesis of the policy recommendations outlined across its chapters emphasises a strategic pivot towards sustainability, accountability, and enhanced transparency within financial services. This synthesis essay articulates a cohesive set of policy recommendations and advocacy points, underscoring the need for a concerted effort to embed sustainability into the core of financial reporting and operations.

Transition towards sustainable financial services: The COVID-19 pandemic has acted as a catalyst, accelerating the shift towards sustainable financial practices. This transition is not merely a response to the crisis but also a forward-looking approach to ensuring resilience and sustainability in the face of future uncertainties. Regulatory bodies and policymakers are urged to champion this transition, fostering an ecosystem where sustainable financial services can thrive. Recommendations include formulating guidelines and frameworks encouraging financial institutions to adopt sustainable practices, such as green financing and investments in sustainable development projects.

Integration of sustainability in financial reporting and operations: A significant emphasis is placed on integrating sustainability considerations into financial reporting and operations. This approach aligns with the broader objectives of ensuring corporate accountability and transparency. Policymakers are encouraged to mandate the inclusion of environmental, social, and governance (ESG) factors in financial disclosures and reports. Such regulatory measures would enhance transparency and provide stakeholders with comprehensive insights into a company's sustainability initiatives and performance.

Development and enforcement of relevant policies: The development and enforcement of robust policies play a crucial role in realising the vision of a sustainable financial ecosystem. These policies should create a conducive environment for adopting and implementing sustainable practices within the financial sector. Regulatory bodies should consider introducing incentives such as tax benefits,

subsidies, or grants for institutions that demonstrate substantial commitment to sustainability. The development of standardised metrics and benchmarks for sustainability reporting could also enhance comparability and reliability across industries.

Encouragement of collaboration and innovation: Innovation and collaboration are vital in driving sustainable financial services. Policymakers are called upon to encourage partnerships between the public and private sectors, academia, and non-governmental organisations. Such collaborations could spur innovation in sustainable finance and the development of new financial products, services, and technologies that address pressing environmental and social challenges.

Advocacy and awareness: Raising awareness about the importance of sustainability in finance is critical. Policymakers and regulatory bodies should engage in advocacy efforts to highlight the long-term benefits of sustainable financial practices for the environment and society and the resilience and profitability of the financial sector. Educational initiatives targeting industry professionals, investors, and the broader public could significantly contribute to building a culture of sustainability in finance.

The policy recommendations derived from the book underscore a collective journey towards a more sustainable, transparent, and accountable financial ecosystem. As the world grapples with the repercussions of the COVID-19 pandemic, the outlined recommendations offer a blueprint for harnessing the transformative power of sustainability. By embracing these policy directions, regulatory bodies, policymakers, and the financial sector can contribute to a more resilient, equitable, and sustainable future.

6 Final Thoughts

This volume comprehensively explores the profound shifts induced by the global health crisis in the accounting and financial reporting domain. The enduring impact of COVID-19 on accounting information systems, coupled with the emergent necessity for integrated reporting, underscores a pivotal moment for the financial sector's evolution towards sustainability and resilience. This synthesis essay encapsulates final thoughts from the book's findings, emphasising the imperative for collaborative efforts to navigate the path towards a sustainable and inclusive future.

The COVID-19 pandemic has irrevocably altered the landscape of accounting information systems, thrusting organisations into a state of rapid adaptation and reevaluation of financial practices. The crisis has highlighted the limitations of traditional accounting frameworks in addressing unprecedented challenges, accelerating the transition towards more dynamic, flexible, and technology-driven systems. These shifts underscore the critical need for accounting information systems that ensure operational continuity in times of crisis and embrace forward-looking approaches that anticipate future challenges and opportunities.

Integrated reporting emerged as a beacon of innovation after the pandemic, offering a holistic framework that transcends conventional financial reporting. By combining financial performance with environmental, social, and governance (ESG) factors, integrated reporting provides a comprehensive view of an organisation's impact and value-creation processes. This approach is instrumental in guiding businesses towards sustainable practices, informed decision-making, and enhanced transparency. The critical role of integrated reporting in navigating towards a sustainable future cannot be overstated; it serves as both a tool and a catalyst for embedding sustainability at the heart of corporate strategy and operations.

The transition to sustainable financial practices and the effective implementation of integrated reporting necessitates a concerted effort among various stakeholders. Businesses, regulatory bodies, and stakeholders must collaborate to foster an ecosystem conducive to sustainability and transparency. This collective effort involves embracing changes in accounting standards and practices, advocating for policies that support sustainability integration in financial reporting, and fostering a culture of accountability and environmental stewardship. The book emphasises that the journey towards sustainability is a shared responsibility, requiring active participation and commitment from all sectors of society.

The enduring impact of the COVID-19 pandemic on accounting information systems has set the stage for profound transformations within the financial sector. Integrated reporting is pivotal in this transformation, enabling businesses to align their operations with sustainable and socially responsible principles. The book reiterates the necessity for a unified approach among businesses, regulators, and stakeholders to embrace and drive these changes. By collectively committing to adopting sustainable practices and integrated reporting, the financial sector can contribute significantly to the well-being of society and the environment, ensuring resilience and sustainability for future generations. The path forward is clear: together, we can navigate the challenges and opportunities that lie ahead, fostering a more sustainable, transparent, and equitable global financial ecosystem.

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