

**DIGITAL TECHNOLOGY  
AND CHANGING ROLES IN  
MANAGERIAL AND FINANCIAL  
ACCOUNTING**

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STUDIES IN MANAGERIAL AND FINANCIAL  
ACCOUNTING VOLUME 36

**DIGITAL TECHNOLOGY  
AND CHANGING ROLES  
IN MANAGERIAL AND  
FINANCIAL ACCOUNTING:  
THEORETICAL  
KNOWLEDGE AND  
PRACTICAL APPLICATION**

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INVESTOR IN PEOPLE

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# PREFACE

In today's rapidly evolving digital landscape, technology has permeated every aspect of our lives, revolutionizing the way we communicate, work, and interact with the world around us. The field of accounting is no exception to this digital transformation, as new technologies continue to reshape the roles and responsibilities of professionals in both managerial and financial accounting.

The book you hold in your hands, titled "Digital Technology and Changing Roles in Managerial and Financial Accounting," explores the profound impact of digital technology on the accounting profession. It delves into the dynamic changes occurring within the realm of accounting, shedding light on the emerging trends, challenges, and opportunities that lie ahead.

Traditionally, managerial accounting focused on internal decision-making processes, while financial accounting centered on reporting financial information to external stakeholders. However, with the advent of digital technology, the boundaries between these two branches have become increasingly blurred. Organizations now have access to vast amounts of data, enabling them to make more informed decisions, optimize performance, and drive strategic initiatives.

This book serves as a comprehensive guide for professionals, academics, and students seeking to understand how digital technology is reshaping the roles of managers and accountants. Through a multidimensional approach, we explore the myriad ways in which technology is transforming accounting practices, including automation, artificial intelligence, blockchain, cloud computing, data analytics, and more.

Each chapter provides a deep dive into specific aspects of digital technology and its impact on managerial and financial accounting. We examine case studies, real-world examples, and empirical research to illustrate the practical implications of these technological advancements. Additionally, we discuss the challenges and risks associated with the integration of digital technology, such as data security, privacy concerns, and ethical considerations.

We hope that this book inspires readers to embrace the opportunities brought about by digital technology and equips them with the knowledge and insights needed to navigate the evolving landscape of managerial and financial accounting. Our aim is to foster a deeper understanding of the profound changes occurring in the accounting profession and to empower individuals to thrive in this digital era.

We would like to express our gratitude to the contributors who have shared their expertise and knowledge, making this book a comprehensive and valuable resource. We also extend our thanks to the readers for their interest in this important subject matter.

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# PART I

## TECH-MANAGERIAL, FINTECH AND FINANCIAL INNOVATION

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# CHAPTER 1

## UTILIZING BIG DATA ANALYTICS LIFECYCLE FOR EARLY DETECTION OF SUSPICIOUS FINANCIAL OPERATIONS: A PROPOSED MODEL FOR MONEY LAUNDERING DETECTION

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### ABSTRACT

*This chapter proposes a model for discovering suspicious financial operations such as money laundering. To achieve this, the authors reviewed research papers on money laundering and financial institutions' cases and problems, especially those related to financial transfers. They also collected primary data through face-to-face semi-structured interviews with financial companies' owners and experts in financial transfers to identify hypotheses that help discover suspicious transfers. The chapter discusses the six big data analysis cycle phases from problem discovery to model deployment to identify suspicious transfers.*

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*The chapter uses hypothetical data and models to discuss the results and focuses on exchange companies willing to analyze financial operations. The chapter proposes tools that exchange companies can use to monitor and prevent suspicious transfers including data visualization and machine learning algorithms.*

**Keywords:** Big data; big data analysis lifecycle; money laundering; financial transactions; decision making; fraud

## 1. INTRODUCTION

The focus on information technology has significantly increased in the last few years to the extent that it has become one of the essential features of the modern era. Parallel with this increase, the volume of data has increased steadily (Mathew, Brintha, & Jappes, 2023). As a result, the term big data has emerged, and the necessity for analytical tools to extract knowledge quickly and accurately has arisen – such knowledge critical to developing information and communication systems. Analyzing, storing, processing, and distributing big data (big in volume and complex in terms of structure) require non-traditional tools (Patra & Roy, 2023).

One of the essential features of the non-traditional tools used in analyzing big data is its ability to quickly analyze enormous volumes of data collected from different sources such as websites, sensors, and social networks (Parashar, Sharma, Rana, & Balaji, 2023). Analyzing such data allows for creating correlations between and among variables to help decision makers identify opportunities, threats, and challenges, including predicting the commercial trends of companies, combating crime in the security field, and many others (Wang, Gunasekaran, Ngai, & Papadopoulos, 2016). Such predictions make decision makers better understand their companies' situations and thus make the decision that achieves their companies' desired goals (Feldman & Ingram, 2009).

Big data analysis helps financial institutions mitigate (if it does not prevent) operational risks and combat suspicious transactions and fraud (Tabesh, Mousavidin, & Hasani, 2019). Moreover, big data analysis helps financial institutions observe their customers' behavior and thus develop informed strategies to improve their service and gain much profit. Banks, for example, make appropriate decisions quickly and accurately with the help of big data analysis (Ravi & Kamaruddin, 2017).

Billions of dollars move through global markets every day. With the help of big data analytical tools, financial institutions can monitor data quickly and accurately, make predictions, detect patterns, and develop predictive strategies (Darvazeh, Vanani, & Musolu, 2020). Unlike traditional tools that cannot analyze unstructured data, non-traditional means can process unstructured data (convert it into readable format) and then store and interpret it to help financial institutions identify opportunities, assess risks and threats, and thus make informed decisions such as improving the service or preventing fraud (Agrawal et al., 2011). Worth mentioning here that data analysis relies mainly on creating default patterns for suspicious transactions and applying them to financial transactions. This enables banks to freeze card transactions and immediately notify customers of security

threats. This also allows banks to identify suspicious transactions and fraud signs by analyzing massive user behavior data using machine learning (Leo, Sharma, & Maddulety, 2019).

Nowadays, there are many challenges facing electronic financial transactions, including the ease of money transfer and the lack of tools and techniques that help detect suspicious transactions and reduce financial crimes such as money laundering and fraud (Nicholls, Kuppa, & Le-Khac, 2021).

Even though information technology, which has become a feature of this era, has made conducting financial operations so easy, there is a darker side to using such technology, namely in money laundering. Vienna's 1988 Convention describes money laundering as a punishable crime, defining it in Article 3.1 as the concealment of the sources of illegally gained money. The said convention criminalizes anyone who does so or helps another escape legal consequences (Booth, Farrell, Bastable, & Yeo, 2011).

Employing the life cycle of big data analysis, this chapter proposes a methodological framework for discovering suspicious financial transfers such as money laundering. The proposed framework seeks to achieve that end by establishing several hypotheses and applying them to suspicious financial operations. All the stages of the life cycle of big data analysis will be displayed and discussed in the coming pages.

This chapter explores the big data analytics lifecycle and its impact on organizations. The chapter includes an introduction that explains the importance of understanding the lifecycle and a literature review that examines existing research on the topic. Section 3 outlines the research methodology, while the Section 4 describes each lifecycle stage and examines its role in achieving organizational goals. The section also identifies challenges and best practices related to implementing the lifecycle. The chapter concludes with a summary of key findings and implications for practice and future research.

## 2. LITERATURE REVIEW

Big data can be defined as huge (in volume) or complex data to be quickly analyzed and processed by non-traditional relational data-processing application software – data that traditional methods cannot analyze and process (Casado & Younas, 2015). Big data's essential characteristics include volume, velocity, and variety; its forms include structured, semi-structured, and unstructured data; its sources are social media, portable devices, and the Internet of things (IoT) (Mohammed, Humbe, & Chowhan, 2016). Organizations use big data analytics in machine learning projects, predictive modeling, and other advanced analytics applications. Many organizations today use big data analytics to improve operations and competitive advantages, make appropriate decisions, provide better customer service, customize marketing campaigns, increase profits, and reduce costs (Stephenson, 2018).

The benefits of big data analytics include making appropriate decisions fast. Companies can access different data sources to gain insights and act accordingly,

discover patterns that help them determine their performance, and frame patterns for suspicious operations so they can identify potential risks and neutralize them (Balachandran & Prasad, 2017).

The data analytics lifecycles are usually designed to solve the problems of organizations that use big data. The big data analytics lifecycle is a six-stage methodology meant to reach practical results with the help of which analysts set priorities, define requirements, identify needs, and give a general perception of the expected outcomes. This step-by-step methodology helps companies redefine their purposes and organize activities and tasks, such as obtaining, processing, and analyzing data. The big data analytics lifecycle is a circular process that consists of investigating the problem, developing appropriate hypotheses to solve the problem, planning a model, building the model, communicating the results, and finally operationalizing the results (Allaymoun, Khaled, Saleh, & Merza, 2022).

Emphasizing the importance of employing the data analytics lifecycle, Allaymoun (2022) employed the six-stage methodology to monitor the performance of a group of Islamic banks in 2019 and 2020 (Allaymoun, Qaradh, Salman, & Hasan, 2023). In addition, the author used this methodology to determine the extent to which Covid-19 affected the banking sector. For his study, Allaymoun used Google Data Studio (GDS) to analyze the data, considering the problem framed and the hypotheses developed in the discovery phase.

Allaymoun, Al Saad, Majed, and Hashem (2023) also used the data analytics lifecycle to help the virtual Mega Start Company explore the problems that cannot be discovered by employing traditional methods and make the right decision to solve those problems. Highlighting the importance of applying all stages, the author indicated that dealing with such problems requires building effective patterns commensurate with the situation and the hypotheses developed. In another paper, Allaymoun et al. (2023) clarified, employing graphics generated by GDS, that the data analytics lifecycle benefits companies as it helps them build predictive models for improving customer services, tracking sales operations, exploring risks, and predicting the future (Allaymoun et al., 2022).

### 3. RESEARCH METHODOLOGY

Besides identifying the appropriate procedures for developing a preliminary model for the big data analytics lifecycle stages, several research papers on money laundering were reviewed and meta-analyzed to understand better how to apply the big data analytics lifecycle effectively. The articles reviewed for this study included papers on the modern tools, mechanisms, and techniques organizations employ to discover and limit money laundering. In addition, financial institutions' cases and problems were reviewed and analyzed, especially those related to financial transfers.

For this study, primary data was also collected through face-to-face semi-structured interviews with financial companies' owners and experts in financial transfers – the semi-structured interviews allow researchers to ask questions whenever a question comes to mind. The interviews helped the authors identify

the hypotheses that help discover suspicious transfers. The point is to review the big data analytics lifecycle stages to discover suspicious transfers.

## 4. BIG DATA ANALYTICS LIFECYCLE

In this part, the big data analysis cycle phases will be explained. Fig. 1.1 shows the six phases, and the explanation later shows how a clear methodology capable of detecting money laundering was reached.

It is worth mentioning here that the paper used hypothetical data and models to discuss the results and applied them to exchange companies to analyze financial operations and thus discover suspicious transactions.

### 4.1. Phase 1: Discovery

The first phase of the big data analytics lifecycle is discovering the problem that exchange company's face. The company's data science team will identify and explore the problem, create context and knowledge, and identify the projects required and available data sources during this phase. Additionally, the team develops hypotheses that can be tested with the data later.

#### 4.1.1. Learning the Business Domain

It is crucial to comprehend the problem's domain. When exchanging money, exchange companies must discover suspicious operations, money laundering, and fraud to enhance financial procedures, implement the law, and monitor

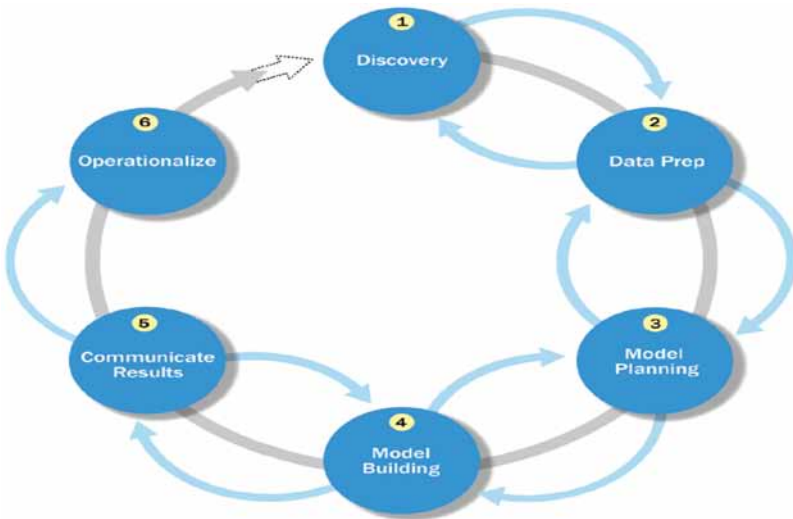


Fig. 1.1. Overview of Data Analytics Lifecycle (Dietrich, Heller, & Yang, 2015).

operations to stop suspicious activities. This issue needs to be recognized because of its seriousness and pervasive effects. It may have a regional and local impact on enterprises, economies, and society. Money laundering has a variety of detrimental repercussions on the economy. Financial institutions that unintentionally participate in money laundering are exposed to the danger of seeing sudden changes in their assets and liabilities. The public authority is alerted by the news of money laundering at certain banking institutions. In this scenario, there will be more pressure on these institutions' audits, which will harm the institution's reputation.

#### 4.1.2. Resources

The exchange company must ensure the availability of resources such as technology, tools, systems, data, and people. Additionally, there must be proof of every previous exchange transaction from the preceding year to proceed to the next stage. The team can advance to the following level if these characteristics are available. The following specifics must be included in transactions:

1. Information about the customer, including name, ID card or passport number, birthdate, address, phone number, and bank account number.
2. Information on suspicious financial transactions.
3. The purpose of the exchange or transfer.

#### 4.1.3. Framing the Problem

A suspicious transaction may involve several elements that individually may not appear noteworthy but, when taken together, raise concerns that the transaction may be connected to the conduct of a serious crime such as money laundering, terrorism financing, or both.

Transactions must be assessed in light of what is reasonable and consistent with the norms of a specific exchange company line. The determination of whether there is a ground for suspicion must be made after properly evaluating all pertinent information, including knowledge of the customer's line of work, whether the transactions are consistent with the accepted industry standards, and financial background, history, and behavior.

#### 4.1.4. Developing Initial Hypotheses

Creating a group of IHs is one of the crucial elements of the discovery phase. After investigating the issue under investigation, it was discovered that the exchange company had many suspicious transactions. The parameters that would be used to spot questionable transfers are listed below:

*IH1: Customers receiving payments from different addresses or sources (Dietrich et al., 2015).*

*IH2: Individuals with debits or credits in excess of BD 50,000 over 24 hours at any location (Dietrich et al., 2015).*