

Chapter 11

Role of Data Science and Data Analytics in Forensic Accounting and Fraud Detection

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ABSTRACT

The chapter examines the roles of data science and big data analytics to forensic accountants and fraud detection. It also considers how data science techniques could be applied to the investigative processes in forensic accounting. Basically, the current increase in the volume, velocity, and variety of data offer a rich source of evidence for the forensic accountant who needs to be familiar with the techniques and procedures for extracting, analysing, and visualising such data. This is against backdrop of continuous global increase in economic crime and frauds, and financial criminals are getting more sophisticated, taking advantage of the opportunities provided by the unstructured data constantly being created with every email sent, every Facebook post, every picture on Instagram, or every thought share on Twitter. Consequently, it is important that forensic accountants are constantly abreast with developments in data science and data analytics in order to stay a step ahead of fraudsters as well as address evolving vulnerabilities created by big data.

INTRODUCTION

Fraud constitutes a leakage on the resources of businesses and threat to the livelihood for individuals (Deloitte, 2018). It is an intentional and calculated deed that is against the law, precepts or policy, carried with the aim of getting undue economic or personal gains (Sharma & Panigrahi, 2012). The Oxford Dictionary defines fraud as the wrongful or criminal deception intended to result in financial or personal gain. Moreover, the Institute of Internal Auditors' International Professional Practices Framework (IPPF)

DOI: 10.4018/978-1-7998-3053-5.ch011

defines fraud as: "... any illegal act characterized by deceit, concealment, or violation of trust. These acts are not dependent upon the threat of violence or physical force. Frauds are perpetrated by parties and organizations to obtain money, property, or services; to avoid payment or loss of services; or to secure personal or business advantage". Authors Vlasselaer, et al. (2015) provide an all-encompassing by defining fraud as "an uncommon, well considered, imperceptible, concealed, time-evolving and often carefully organized crime which appears in many ways".

The various categories of fraudulent include; confidence tricks, embezzlement, corruption, counterfeit, product warranty fraud, health fraud, bankruptcy fraud, credit card fraud, insurance fraud, telecommunication fraud, money laundering and the use of tax haven countries to carry out illegal activities, click fraud, identity theft and plagiarism (Baesens et al. 2015; Bressler, 2010). Jofre and Gerlach (2018) asserted that committers of financial fraud are driven by personal gains or by explicit or implied contractual commitments such as debt agreements and the strong desire to achieve market projections. Fraud is associated with substantial economic risks that may pose a threat to the profitability and perception of business organisations (Bănărescu, 2015). Fraud is a growing issue for financial institutions, as tech-savvy criminals increasingly target the payments industry in new and inventive ways. Financial frauds are responsible for the sudden failure of many reputable organisations (Sule et al. 2019).

The importance of fraud detection and prevention is due to the colossal consequences. A typical organization is reported to lose 5% of their revenues to fraud annually; the annual insurance fraud in the United States is over \$40 billion while fraud is costing the United Kingdom about £73 billion annually (Baesens et al,2015).According to PwC's Global Economic Crime and Fraud survey of 2018, nearly half (49%) of 7,200 global organisations have experienced economic crime in the past two years, up from 36% in their last survey. Synectics Solutions' latest statistics showed that organised fraud rose to 59.58% during 2017 from 57% in the previous year. Similarly, the Association of Certified Fraud Examiners (ACFE) Report released in 2018 provided a global analysis of the costs and effects of occupational fraud.16% of all the cases in the study resulted in a median loss of USD 118,000 and continued for a median 18 months before they were discovered (ACFE,2018). Ernst & Young Global Fraud survey of 2018 revealed that 11% of companies have encountered a substantial fraud in the last two years while 38% of respondents affirmed that acts of bribery/corruption take place widely in organisations within their countries (Ernst & Young, 2018).The annual online fraud is 12 times larger than offline frauds of companies report, resulting in severe financial losses to the global economy (Zheng et al,2018).It is also reported that 5% of the organisation revenues is lost to fraud.

It is evident that financial fraud is a worldwide concern that signifies a major threat to the stability of the economic system because of the consequent weakening of business confidence and trust of regulatory establishments (Jofre & Gerlach, 2018). Financial fraud is a serious concern for businesses and economies around the globe (Gepp et al.,2018). The disastrous outcomes of financial fraud reveal the susceptibility and defencelessness of financial community (Jofre & Gerlach,2018).The inadequacy of statutory audit to curtail the misappropriation of company's financial assets and thwart the increase in economic crime has placed a burden on accountants and legal practitioners to develop better ways of reducing fraud (Oyebisi et al,2018). Forensic accounting has emerged as a veritable means to identify and respond to the rising accounting or financial frauds around the world. Forensic accounting is concerned with the employment of accounting methods, auditing procedures and investigative processes for the purpose of finding solutions to legal issues and providing financial analysis that would be deemed appropriate for litigation, and on which discussions, debates and dispute resolution can be based (Oyebisi et al. 2018). Modugu and Anyaduba (2013) have argued that the increasing intricacies of financial frauds demand the

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