



Digitisation provides more data points and opportunities to detect fraud. However, only 3 per cent of fraud is detected using fraud-focused analytics, leaving plenty of scope for firms to leverage on technology to intensify fraud detection efforts.
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Forensic accounting must be more robust

As firms and industries become increasingly reliant on technology, the science of detecting wrongdoing has to be able to analyse large tranches of data more quickly. BY CLARENCE GOH

IN JUNE 2009, Bernie Madoff, a former chairman of the NASDAQ stock exchange, was sentenced to 150 years in prison for operating the largest Ponzi scheme in US history. Over the course of several decades, he had systematically defrauded investors of up to US\$65 billion, engaging in illegal activities including securities fraud, money laundering and making false filings with the US Securities and Exchange Commission (SEC).

While the scale of the US\$65 billion scam was eye-catching, what was perhaps more surprising was that he had managed to run the Ponzi scheme for decades without getting caught. In the wake of the high-profile case, forensic investigators have been left asking themselves whether there were any clues that could have alerted them to the scam earlier.

There is evidence that ordinary organisations are also falling victim to fraud. A recent report by the Association of Certified Fraud Examiners says that fraud accounts for US\$6.3 billion in losses globally, with the typical firm losing up to 5 per cent of its revenues to the scourge annually.

What is forensic accounting?

It has become increasingly important for organisations to take steps to detect fraud, and accountants can play a key role in doing so.

Forensic accounting is an area of accounting that engages in the investigation of an organisation's records for evidence of financial crime, including fraud. Forensic accountants seek to detect evidence of fraud, misconduct and other regulatory violations by carefully examining data from an organisation using both quantitative and qualitative techniques.

Traditionally, forensic accountants have had to rely on manual processes in conducting their investigations. This often involves meticulous and tedious reviews of accounting documents to identify suspicious transactions and records. Because even the most insignificant records can represent evidence of fraud, all records have to be painstakingly reviewed and scrutinised.

Using technology

In a recent article examining how technology can be used in forensic accounting, Lem Chin Kok and Elisa Ang from accounting firm KPMG highlighted that digitisation "provides more data points that may constitute evidence, and hence, more opportunities to detect instances

of fraud, misconduct and non-compliance. Investigator techniques and approaches have changed along with the digitisation of the environment we live in".

However, with a recent survey by KPMG finding that only 3 per cent of fraud is currently being detected using fraud-focused analytics, there is scope for firms to leverage on technological advances to intensify their use of analytical techniques in fraud detection.

According to fraud analytics expert Delena D Spann, there are five common categories of fraud analytics approaches to detecting fraudulent activities:

■ **Rules-based analytical approaches** detect fraud by identifying known behaviours that fraudsters commonly exhibit in committing specific fraudulent activities and seeking to uncover these behaviours when they occur. Such analytical techniques help to identify abnormal transactions or data, drawing attention to these instances for further investigation.

■ **Anomaly detection** analytical techniques identify abnormal patterns in aggregated data that do not conform to established normal behaviour. Any abnormal patterns identified in the data are indicators of potential fraud and are flagged for further investigation by fraud investigators.

■ **Predictive modelling** analytical techniques involve the statistical analysis of current and historical data to assess or predict future behaviour. To the extent that predicted behaviours differ from actual behaviours, fraud investigators should examine the reasons for these differences in behaviours and establish if they are due to fraud.

■ **Neural networks:** Recent improvements in machine-learning technologies have allowed fraud investigators to rely on neural networks – a form of unsupervised learning based on historical data – to identify unknown patterns which may be indicators of fraud.

■ **Visual analytics** techniques seek to establish graphical representations of relationships and correlations found in data. Visual analytics techniques represent a powerful way in which fraud investigators can design analytical procedures to detect fraud.

Using Benford's law

Would the analytical techniques have been effective in detecting fraud like the one that was being perpetuated by Madoff?

Interestingly, a simple analytical test, designed based on the relatively obscure Benford's law, could have pointed investigators to the Madoff fraud even before it began to unravel. Benford's law gives the expected frequencies of digits in tabulated data. For example, the law provides that, in a randomly generated set of data, numbers should have 1 as their first digit about 30.1 per cent of the time. This expected frequency then decreases progressively for digits 2 to 9, with numbers expected to have 9 as their first digit only about 4.6 per cent of the time.

A Ponzi scheme, like the one ran by Madoff, often falsely leads investors to believe that profits derive from an underlying business when it in fact generates returns for early investors simply by using investments from new investors to pay profits to older investors. Accordingly, any profits or returns disclosed by a Ponzi scheme are likely to be fabricated because no real underlying business actually exists. If data on profits or returns were fabricated, they would then not be likely to obey Benford's law.

Consistent with this, digital analysis performed to compare the frequencies of the first digits of the monthly returns from 1990 to 2008 of Fairfield Sentry Fund – one of Madoff's largest feeder funds – with expected frequencies based on Benford's law shows substantial anomalies in the monthly returns reported by the fund (with average deviations of about 3 per cent), consistent with fraudulent activity.

Moving forward with technology

In the face of the ever-growing threat of fraud, organisations need to develop robust methods of detecting fraudulent activity. As we enter the digital age, and as the accounting industry becomes increasingly reliant on technology, forensic accountants must develop forensic analytical techniques that allow them to examine large volumes of data expeditiously to effectively detect anomalies, patterns and trends that may be indicative of fraud.

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