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Incorporating unstructured data in fraud analytics

Businesses must tap the power of unstructured data to better detect fraud, says Gary Pan

CORPORATE fraud in Singapore is reported to be on the rise. The new KPMG-SMU Singapore Fraud Survey 2014 report suggests that 29 per cent of the survey respondents experienced fraud incident within their organisation over the past two years, up from 22 per cent in the 2011 survey.

Interestingly, some of these respondents in the survey highlighted that fraud incidents were first detected by data analytics. This seems to suggest that as data analytics becomes more prevalent, the use of advanced analytical technologies to identify fraud may increase.

Traditionally, corporate fraud detection tends to rely heavily on the manual skills of the fraud investigation team using experience, instinct, and persistence to analyse data related to the fraudulent activity. Nevertheless, the sheer volume, velocity and variety of data now being generated every day in a corporation is likely to overwhelm fraud investigators' best attempts at data analysis.

Therefore, fraud detection has to evolve to be more technology-centric so as to make better sense of big data insights.

Inadequate awareness and expertise in fraud analytics

As it is, many companies have not utilised big data analytics to provide better fraud detection insights to management and board.

According to EY's Global Forensic Data Analytics Survey 2014, only 7 per cent of the survey respondents are aware of any specific big data technologies and that only 2 per cent are leveraging big data processing capabilities in their Forensic Data Analytics programmes. Besides the challenge of "digesting" big data, there seems to be inadequate awareness and expertise in fraud analytics among businesses.

A major reason that contributes to inadequate awareness of fraud monitoring and detection is the fact that there could be a false sense of security among businesses towards their risk exposure to fraud. This is possible as companies may not evaluate their internal controls regularly, hence overlooking or underestimating the sophistication of new fraud

schemes and concealment methods, which often circumvent existing internal controls.

In addition, being unfamiliar with the fraud analytical tools that are available in the market could also suggest businesses may not know what they are missing.

Therefore, it is important for businesses to know more about fraud analytics, and be familiar with the fraud analytical tools that are available in the market. This will significantly improve the overall effectiveness of fraud monitoring and detection in businesses.

In terms of the availability of fraud data analytics expertise, traditional audit and IT skills may not incorporate the more advanced data mining skill sets required for performing fraud analytics techniques. Therefore, it will be useful to have someone in the fraud investigation team who has big data and other advanced forensic technology skill sets to assist with gathering, validating and analysing the data and turning it into meaningful information. Ideally, this person should be someone who possesses database management and data analysis skills, in addition to anti-fraud and accounting-related skills.

Furthermore, it will be useful to instil a fraud risk analytics culture within the business and develop processes for gathering, managing and reporting data in an efficient manner, as this will go a long way in establishing an effective fraud monitoring and detection programme.

Applying unstructured data in fraud detection

The advancement in analytical tools plays a key role in supporting fraud analytics. Several of these analytical tools are built on the premise that the source data is stored in a structured form, for example, spreadsheets and databases that can be queried using structured query language (SQL).

While the analyses on structured data have offered significant insights, they apparently cover only 20 per cent of the data held on company computer systems. Approximately 80 per cent of the company's data is stored in an unstructured form which does not lend itself to

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– Prof Gary Pan, Associate Professor (Education) and the Associate Dean for Student Matters of the School of Accountancy, Singapore Management University

conventional analysis. These unstructured data may include employees' electronic mails, telephone conversations and many others.

So with substantial untapped unstructured data, the major decision lies in whether to allocate resources to mine unstructured data in order to analyse patterns of behaviour and establish relevant links between individuals and activities to extract valuable insights into fraudulent activity.

With the availability of emerging analytical applications today to keep pace with increasing data volumes, as well as business and regulatory complexities, the most effective fraud analytical strategy is to integrate available structured and unstructured data, and then perform fraud data visualisation, statistical analysis and text mining among other capabilities. This will help improve detection rates. For instance, one may leverage data from electronic mail conversations and social media sites, and combine insights gained from these (unstructured) sources with official (structured) records and transactions in traditional databases and spreadsheets.

In other words, integrate social media, electronic mail, free-text and other unstructured data sources into traditional accounting analytics that historically rely on only numerical information. The mining and visual analytical tools would help to highlight anomalies derived from the multi-dimensional attributes within the dataset.

Using text mining to make sense of data

Unstructured data sources such as text can also provide a wealth of analytical insights, from evaluating free-text descriptions for suspicious payment activities in accounts payable or cash disbursement journals, such as "respect payment", "friend fee", "help fee" or "problem resolution" to electronic mail communications indicating risk areas where fraud intent may be present.

For example, banks can analyse a customer's current accounts, mortgages and wealth management (structured data) and spending habits/lifestyle of the same customer

on blogs/discussion forums (unstructured data) to assess the customer's credit worthiness and the likelihood of him or her committing fraud.

This may also improve existing credit-rating methods. Overall by analysing both structured and unstructured data, companies are able to identify concealed patterns in non-financial, financial, and textual data that would not otherwise be detectable with structured data alone.

Another example would be businesses may analyse unstructured data to investigate collusion. Unstructured data may reveal mismatches between the language people use when they are communicating confidentially to colleagues and when they are processing external transactions. The analysis of unstructured data is much more nuanced in the interpretation of language than is possible in the case of structured data.

In summary, it is important to incorporate as much unstructured data as possible in fraud analytics. Given that 80 per cent of the available data is unstructured, more effective use of this large untapped dataset can better detect fraud. If unstructured data is under-emphasised or overlooked, one may argue that a fraud analytics programme is under-performing. It is worthwhile for businesses to invest in the skills and technological solutions to leverage the power of unstructured data to reinforce their existing fraud detection capabilities, as such investment may improve overall efficiency, consistency and quality of fraud detection process.

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