

: *How can analytics and decision support reduce insurance fraud?*

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Preventing and detecting insurance fraud is a critical task at insurance companies. There is some evidence that insurance fraud is actually increasing (cf., Ramos et al, 2012), but information technologies to detect fraud are also improving. Data quality and data availability are also improving. Overall, the increasing availability of new data sources and more rapid access to historical data has created new possibilities for predicting and detecting insurance fraud. What is called "big data" by technology marketers has created renewed excitement about analytics and decision support. The promises are significant. For example, Accenture Managing Director Eva Dewor asserts that "advanced analytics can help insurers reduce loss costs and improve their performance." The key question for managers and information technologists is how to make the promises a reality and improve detection, deter misstatements and yet increase the speed of processing legitimate claims all while improving customer satisfaction.

According to McKinsey Global Institute (MGI) and McKinsey's Business Technology Group, "big data" can become a basis of competition and a source of innovation. New data sources and real-time data can provide inputs for recommendation decision tools, sentiment analysis, fraud detection, and risk modeling. A key question is what data to use and how to analyze the data to get these results.

Broadly, fraud means lying and misrepresenting facts. Derrig and Krauss (1994) proposed that the term fraud be reserved for criminal acts, "provable beyond a reasonable doubt, that violate statutes making the willful act of obtaining money or value from an insurer under false pretenses or material misrepresentations a crime." Predicting fraud means finding current behavioral indicators that are highly correlated with fraud. Fraud can occur at many points in the insurance cycle -- at the application stage, at the claims stages, at the final settlement stage. Different types of decision support seem necessary at each stage. For example, at the application stage, decision support may focus on screening to predict fraud or an assessment of the risk of fraud and the potential magnitude of fraudulent claims. Is the prospect of little larcenies or major criminal activity? So what might be done to support decision makers?

Some screening and scoring models that have been proposed and tested include: logistic regression, decision trees, naive Bayes models, neural networks, and weighted criteria models (cf., Derig, 2002). Analytics and decision support using one or more of these models can assist in both deterring fraudulent claim by flagging opportunities for abuse while prescribing proactive deterrence and by detecting claims with a high likelihood of involving significant fraud. Decision support screening and scoring should focus on identifying problematic cases so investigators and managers can assess the cost of further information gathering and investigation. So what steps should be taken by companies and industry groups?

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First, improve screening of applicants. A weighted screening model based upon historical fraud data can either reject applicants or assign a likelihood score for fraud to each applicant. Managers can determine how much risk they want to assume. High likelihood for fraud customers can be monitored more closely for possible fraudulent claims.

Second, improve detection and decision support for processing of claims. Identify claims that based on historical data are potentially fraudulent. An analytical model based upon the cost of various actions from rejecting the claim to investigating the claim can recommend follow-on actions.

Third, collect more and better data, especially track claims and suspicions to improve detection models. As fraudulent claims are identified using other means, the screening and rejection models can be improved. Meta-analysis of claims can be linked to data derived from other anti-fraud and fraud detection measures to improve the models.

Fourth, create better industry-wide anti-fraud database(s) that merge data from participating insurers, data collected from credit bureaus and consider other, novel data sources. Applicants can be checked for prior abuses or suspected abuses to identify patterns and applicants can be evaluated for possible links to other abusers.

Fifth, monitor social media and other sources to identify indications of group abuse and consider incorporating social media data in policy application and claims processes.

Reducing fraud is a major task that will use significant resources. There is evidence of some successes. Ramos et. al (2012) report that a "major insurance company decided to implement advanced analytics and claims predictive modeling to support fraud referrals in its workers' compensation and auto bodily injury lines of business, which it had identified as the areas offering the greatest opportunities. The models use both company data and also external data sources to identify potential fraudulent claims. Even before a claim is submitted, the models can identify policyholders who are more likely to submit fraudulent claims, which is useful in underwriting."

Manyika et al. assert that "big data" and "sophisticated analytics can substantially improve decision-making." The ongoing task is to figure out how to make that happen. Talented professionals will need to figure out answers to the "how" questions for specific companies and industries in the next few years. Managers and legislators will need to clarify the constraints on data analysis in the areas of data privacy, data security, intellectual property, and liability for erroneous

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results.

As Derig noted, the goal of increasing decision support and analytics in the claim processing system should not be to replace adjusters, but rather to assist and provide more timely information and flag cases for expert evaluation. The philosophy of decision support has emphasized the need to keep human decision makers in the decision loop as decision makers (cf., Power, 2013).

Analytics and targeted decision support systems should screen and sort claims in what Derig calls bins with associated actions. Ideally this categorization and sorting will also attach likelihood estimates to the category and indicate the magnitude of the suspected claim misrepresentation. Some of the categories will certainly have proof criteria far short of establishing provable criminal activity beyond a reasonable doubt. The cost of gathering more information should also be considered in recommending actions to fraud investigators. Reducing loss costs and improving company profits with analytics and decision support is dependent upon critical success factors like good data and good models (cf., Power, 2013).

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