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# Incorrect predictive intelligence is enormously expensive

The cost of incorrect or inadequate predictive intelligence can be enormous and, as more South African companies turn to business intelligence (BI) in order to address issues - such as new legislation compliance, cost-cutting or good governance pressing business concerns - it is vital that the exercise is forward looking.

Bill Hogarth, managing director of SAS Institute says, "Companies must appreciate that intelligence is not only about the rear view. Knowing what the customer bought yesterday, or that yesterday's transaction was fraudulent, is no longer enough. Companies must be able to predict what the customer will buy tomorrow, or know that a particular current transaction bears the hallmarks of fraud so that it can be investigated in real time,"

SAS provides a new generation of business intelligence software and services. Its solutions are used at more than 40,000 sites globally, including 96 of the top 100 of the 2003 Fortune Global 500.

Many companies, Hogarth adds, have invested heavily in operational software, such as enterprise resource planning (ERP) systems. Now they need to get information out of these systems, and this process needs to be enterprise-wide.

"They need to explore and exploit the value that is hidden in the vast oceans of data, text and voice that they collect on an hourly basis."

SAS has launched SAS 9, a single intelligence technology platform that builds on a company's existing technology investment to give enterprises a single version of the truth.

"Through it we are empowering our customers with a technology platform to leverage the hidden power of all that they capture. The enterprise-wide intelligence platform integrates information from any disparate source, and applies ground-breaking analytics to achieve a higher level of intelligence. It has been designed to deliver value to customers by increasing profit and shareholder value."

Addressing a recent SAS Forum on BI, Suben Moodley of marketing insights company, Knowledge Factory,

says it is crucial to know when a customer is about to jump ship.

"This knowledge can only be achieved using sophisticated analytical software so any customer strategy has to be data-driven."

Citing an example of an organisation whose customer retention strategy was based on assumption he said, "It believed that if it retained a customer for a year, that person would remain a customer for life. The organisation was shocked to discover, following a churn modelling exercise, that in reality, customers of between one and three years had the highest propensity (32 percent) to move to the competition".

Businesses with customer data are now extensively using analytics to identify customers who will churn with excellent returns, according to Moodley.

"Clearly defining churn, and when it has occurred, is critical to churn modelling. Measuring churn is easy, defining it is the problem," he explains.

"Voluntary churn is when a customer decides not to do business with a company any longer, and goes to a competitor. Involuntary churn happens when an organisation decides not to do business with a customer, usually because of a poor payment history. There is also expected churn, for example when customers no longer buy baby food because their babies get teeth. Too many organisations lump these together."

He defines churn as the closure of one account in conjunction with the opening of another for the same product or service, usually at a reduced price or better service.

"Basically, churn is when customers jump ship. Businesses need to construct definitions that are accurate, and tailored to suit their objectives. For example, they may only want to identify high value customers that are about to churn."

Some companies should also enrich their bespoke data with alternative sources, such as geo-spatial information.

This, for example, would enable them to look at churn rates compared to income groups.

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Text mining is also becoming very useful in churn modelling.

"Much of the data in the real world is text, but large volumes of text data go unanalysed," says Moodley.

"Information within text can be converted for use in churn models. Using solutions like SAS Text Miner, we can group similar text information, for example customer discussions recorded by the call centre. When this is filtered into churn models, it can improve predictive performance by up to 50 percent."

Moodley advises companies with huge numbers of records to build representative samples and mine these.

"This way they minimise processing time and get effective sampling with little or no loss of generality."

He also advises companies to keep tracking population and score shifts to ensure their models remain accurate.

"Customers churn because they struggle to see value in the product or service. The business therefore needs to target them to demonstrate value. Retention campaigns, however, are costly to roll out to market. Business cannot simply cross fingers and hope they work. It is important that companies use experimental design techniques and test retention campaigns on small samples initially."

#### To test retention campaigns, Knowledge Factory creates four population coordinates:

- customers with a high propensity to churn, who receive a mailed communication
- a random sample who receive the same communication
- customers with a high propensity to churn who receive no communication
- a random sample who receive no communication.

The churn rates of all these groups are then measured to assess the effectiveness of the churn model, and the communication.

Finally, Moodley stresses that sales, marketing and finance must all collaborate to deliver solutions that provide value for the customer, and hence enhanced margins for the business.

Typically, Eskom Distribution is using sophisticated business intelligence and analytical intelligence software to predict equipment failure. Now in pilot phase, the plant maintenance optimisation project is expected to save the power giant millions by accurately predicting when its multi-million rand transformers will require maintenance.

The intention is to use the SAS data mining solution

for everything from cable theft prediction to prepaid metering fraud detection. Right now, however, the focus is on predicting the failure of transformers. The power giant's capital investment in transformers is substantial and intelligent predictive maintenance is needed to ensure proactive intervention to protect these assets.

"The pilot project focuses on monitoring the oil within the transformers," explains independent consultant, Francois Horton, Business Analyst, Distribution Information Strategy Management at Eskom. "Oil serves as an isolator within the transformers, so is a good indicator of their condition. If Eskom does not detect transformer problems in time, massive losses occur. Taking a transformer out of service for unplanned maintenance typically costs R1,5-million per maintenance activity."

By analysing the results of laboratory tests on the oil, proper planned maintenance can be carried out, and action taken as soon as a fault is detected.

Basically, the laboratory analyses the oil for gases which indicate what kind of fault is starting to occur. For example, a high level of corona in the oil indicates leakage currents, meaning that the insulation is breaking down. Arcing in the oil is an indicator of an imminent fault which, if left to continue, would cause the transformer to blow up.

The data mining pilot project aims to predict what gases would occur at levels which would indicate that maintenance was required, given the measurement of only one input, preferably oil temperature.

Results were gathered from the laboratory, and then data mined. "In the past, employees decided on the tests they would request from the laboratory based on experience and gut feel," says Horton. "If they noticed x, then they would ask only for y test, believing this to be a good enough indicator. Data mining gave them an understanding of the importance of different variables to the outcome. Even slight variations in the presence of gases, could change the causes dramatically. Eskom is on the verge of taking huge strides into this whole area of data mining, It will assist management to improve availability of the plant, increase ROI and reduce loss of income."

It is envisaged that SAS Enterprise Miner will be used in a number of other areas in future, including customer knowledge, prepaid metering fraud detection, cable theft prediction, root cause of failure analysis, as well as plant maintenance optimisation in other areas of the network, for example circuit breakers, poles and lines.

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## New Math essential component of BI

*Today's business intelligence solutions require a whole new breed of mathematics and we asked André Zitzke, Solutions Specialist at of SAS to elaborate.*

**Q:**

**Why has sophisticated predictive analytics, based on advanced mathematics, become an essential component of BI?**

**A:**

The new rash of compliance legislation, for example the operational risk component of Basel II, has opened up a totally new field for mathematicians and statisticians. New maths is having to be developed to meet the demand.

**Q:**

**Corporates have in the past been quick to examine new mathematical concepts. What's different?**

**A:**

Businesses have leapt ahead in their requirements, and the maths is having to catch up in order to solve new business problems quantitatively, as well as to cope with the vast volumes of data being generated today. In the past the question was always: Do we have enough data to do the analytics?"

For example, large financial services organisations now have to analyse and predict their operational risk to comply with Basel II, a set of broad policy guidelines that each country's supervisors can use to determine the supervisory policies they apply. The new framework is intended to align capital adequacy assessment more closely with the key elements of banking risks, and to provide incentives for banks to enhance their risk measurement and management capabilities.

Operational risk is not a finite, tangible area that lends itself to traditional analysis. Instead, it involves

a disparate mix of everything from business areas and functions to material loss events and physical security.

**Q:**

**How do enterprises face the challenge of investing in the right BI maths solution?**

**A:**

SAS has a large numbers of PhDs - actuaries, statisticians and mathematicians - working in its research and development department. These experts either develop new maths themselves, or are well versed in the latest mathematical developments globally to ensure that SAS utilises these advancements to help businesses solve their current problems.

**Q:**

**Does this call for a new breed of employees?**

**A:**

No, the good news is that need no knowledge of the sophisticated mathematics built into the solutions. There are basically two groups of users. The vast majority are in business or finance, and use the results of analysis to perform their functions. They use BI to look at specific scenarios, asking 'what if' questions such as 'if the interest rate changes, what impact will this have on the future financial state of the company, and what are the risks associated with it, and how can an organisation optimally hedge this risk?'

The other group are the quantitative analysts who understand the maths and stats behind the solutions, and develop statistically sound models that produce the results needed by the end users.

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