



Advanced analytics and the art of underwriting

Transforming the insurance industry



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Introduction

If insurance underwriters had a crystal ball, they would look into the future and know exactly how each risk would perform, and could price them accordingly. Unfortunately, there is no such magic crystal ball.

Traditional underwriting has consisted of the endless search for more meaningful insight into individual policyholder risk characteristics that would improve an underwriter's ability to distinguish good risks from the bad and to accurately price each risk accordingly. The underwriting process is impacted by pressures to grow profitably, often counter-intuitively in soft markets, with few truly insightful underwriting tools to help improve segmentation and pricing discipline concurrently.

With recent catastrophes impacting carrier loss ratios over the past few years, there has been a return to underwriting basics which has resulted in a temporary remediation of inadequate pricing, at least on an aggregate basis. However, given the improvement in investment income over the past couple of years and continued acceptable combined underwriting results, the insurance market could shortly be facing another softening cycle if these parameters continue. Carriers feel the pressure to grow in a "zero sum game".

So, how can insurance carriers develop solutions and enhance business processes that will improve their chances of making an underwriting profit in both hard and soft market cycles?

In the absence of that magic crystal ball, data mining and predictive modeling is one way for insurers to improve pricing and segmentation and to help enhance their underwriting profitability. This discussion document proposes ways in which this can be done.



The business problem

It has always been understood that detailed underwriting is the cornerstone of a profitable book of business. However, account selection based on an underwriter's review of the agent's application and traditional underwriting characteristics often does not develop the necessary underwriting segmentation and introspective pricing insights to deliver the expected financial returns demanded of underwriters today.

Furthermore, many underwriting decisions include a subjective component, which leads to a great deal of variability in underwriting and pricing decisions and from market pressures from agents and brokers. Certainly the cyclical insurance market puts underwriters under increasing pressure to continue to grow in both hard and soft markets. Tools such as predictive models offer underwriters a statistically sound, objective, and consistent method to improve underwriting and pricing sophistication that can dramatically affect the bottom line. In addition, these tools can help carriers differentiate themselves and remain profitable in a highly competitive market.

Data mining and predictive modeling is the process by which historical data is carefully examined to identify patterns in the data, many of which were previously unknown, to formulate an algorithm that can be used to solve a specific business problem. For underwriting and pricing applications, historical carrier internal data, supplemented with external data sources, can be examined to develop a solution that can be used to predict the relative risk of an individual policy in the future policy term.

Data mining and predictive modeling facilitates the delivery of unique customized business and technical solutions which can improve segmentation over traditional underwriting processes and increase accuracy.

Over the past several years, innovative insurance carriers and professional service firms have worked hard to develop predictive modeling solutions that are able to digest an ever growing list of underwriting characteristics or "variables" that can be used to more effectively segment and price Commercial P&C business. This progress has provided early adopters with the ability to better select, manage, and price risks for a variety of lines of business, including Business Owner's Policy, Commercial Package, Commercial Automobile, General Liability, Commercial Property, Workers' Compensation, Umbrella, Errors & Omissions, Directors & Officers, Employment Practices Liability, and Medical Malpractice.

While still in its early stages, the industry enthusiasm for predictive modeling in commercial insurance has grown dramatically and is shortly becoming a core competency as these models provide for repeatable, consistent results in both soft and hard markets. Such models are now becoming a prerequisite to compete in the small- to mid-sized commercial insurance marketplace. Additionally, the expense component of policy issuance is much improved as a result of the streamlined processing of these policies.

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The predictive modeling process

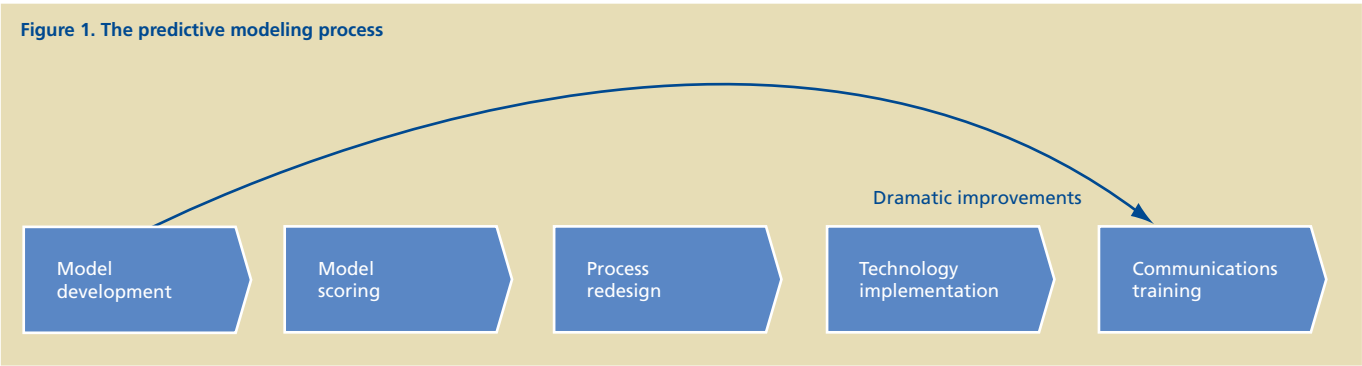
Data mining and predictive modeling can be viewed as part science and part art. The science of data mining involves the application of statistical principles to develop a predictive model solution to solve a specific business problem such as predicting future loss ratio. The art of data mining is embarking on a knowledge discovery process, prior to model development, to generate new, creative, and insightful variables based on innovative external and carrier internal data sources.

These creative variables can be viewed as risk characteristics that are introduced into the predictive modeling solutions to further improve the precision and segmentation power of the risk selection and underwriting process.

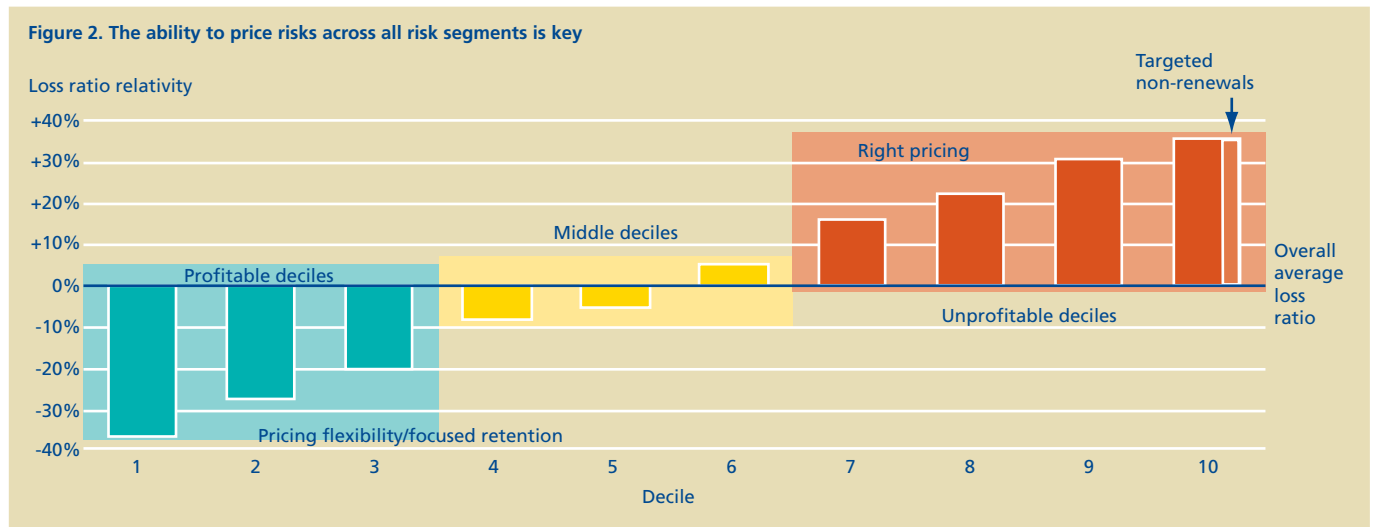
Each set of characteristics is applied in a consistent, repeatable manner through a model that consistently weighs the impact of each variable in order to more accurately determine its interaction with the good and bad risks. In essence, subjective underwriting decision making can be supplemented with objective, repeatable results obtained from the implemented model process.

The modeling process (Fig. 1) is a revolutionary change to underwriting that improves the underwriter’s ability to evaluate and price a wider set of exposure variables within a consistent and repeatable framework. Data mining and predictive modeling solutions go beyond a purely technical solution. Organizations that take a holistic approach to predictive modeling projects can achieve maximum success by aligning various business functions and implementing change management principles to incorporate these solutions as part of their day-to-day operations.

With predictive modeling, new underwriting characteristics may be introduced through the use of synthetic variables. These underwriting characteristics may not have been previously considered due to the voluminous amount of underwriting data required or the lack of sophisticated software applications. The predictive modeling process allows for the creation of these synthetic variables based on highly intensive computerized calculations, such as geo-centric vector analysis.



The business value



What are the benefits of these models and how do carriers leverage their implementation?

A prime reason for the implementation of such solutions is to enhance underwriting segmentation, resulting in a significant improvement in underwriting loss ratios. By utilizing these models, underwriters can review a larger number of more specific underwriting variables to identify those policies that are most likely to produce losses over a period of time. With this improved insight, underwriters can prospectively address particular loss producing exposures or characteristics through additional loss control services and/or pricing improvement before the account becomes unprofitable.

These predictive models are implemented into underwriting business workflows, resulting in an enhanced ability to target non-renewals, more accurately improve renewal and new business pricing, and enhance segmentation of new business applications within a more efficient underwriting process. These business workflow changes drastically improve the carriers' underwriting and expense ratio and have led many regional and national carriers to employ these predictive models over the past four to five years.

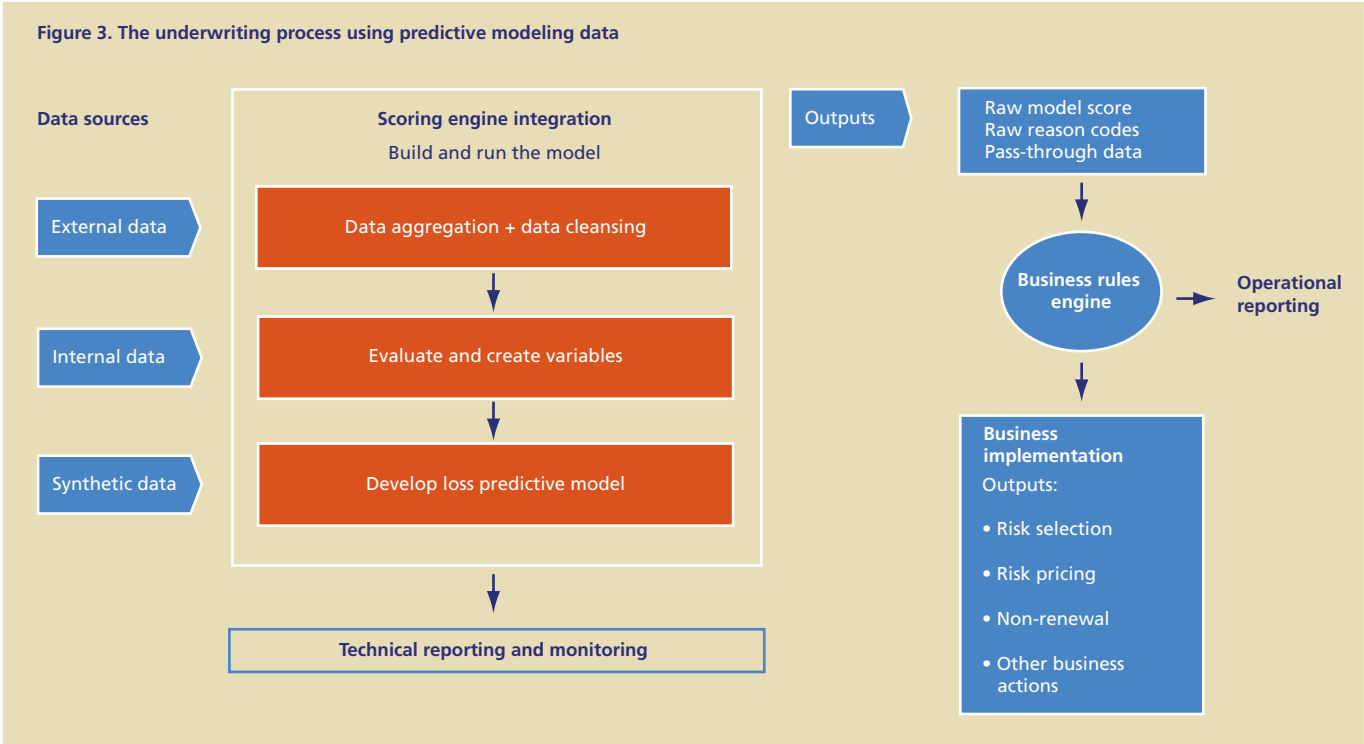
Considering the increasing use of these predictive models in the marketplace, carriers that fail to pursue similar underwriting tools will be facing adverse selection on a broad scale leaving them subject to outdated underwriting processes in the face of another softening rate environment. Additionally, Wall Street and rating bureau analysts are beginning to ask carriers what strategies they will be employing to survive the next soft market, and predictive models are very much the focus of their questioning.

Underwriters can also leverage these tools to prospect for new, more profitable books of business. With the ability to identify sub-segments of business with a greater likelihood of generating profitable future returns, underwriters now can more adequately price prospective books of business in a much more uniform manner than ever before and pick the best risks, even from some of the more challenging classes. Most importantly, this targeted pricing deters underwriters from over pricing books since they can employ a tool that "right prices" the risk and its exposures.

"Decile Management", or the ability to accurately and objectively price risks across all risk segments, is the cornerstone of achieving financial benefits from a fully integrated data mining and predictive modeling solution.

Predictive models facilitate the creation of a streamlined back-office processing environment. Models provide the technological “DNA” necessary to automate underwriting on a larger portion of a carrier’s Commercial or Personal lines policies, freeing up underwriters to manually review only those risks which do not readily lend themselves to an automated solution.

This enhanced underwriting environment can also be applied to supportive underwriting services, such as identification of accounts that warrant additional targeted loss control and audit services. This allows for the selective application of these expensive services to only those accounts that warrant them.



The bottom line

Improving underwriting segmentation and pricing decisions within an efficient processing environment is the primary objective of implementing predictive models. By leveraging these new insights, carriers are better able to compete, not only on their existing business, but also in a variety of new markets. Underwriting efficiency and the leverage of predictive models throughout all aspects of the Commercial and Personal insurance underwriting process directly impacts a carrier's bottom line with a return of five to ten times the investment in the model. Given these possible rates of return, it behooves carriers to implement these techniques throughout their organizations to help maximize their investments and to deliver repeatable and sustainable returns in both hard and soft market insurance cycles. Predictive models have proven to be very effective not only in underwriting and claims adjudication for Property and Casualty lines but also in Healthcare, Professional Liability, and Medical Malpractice. Deloitte Touche Tohmatsu (DTT) member firms have extended these techniques into other non-insurance business applications, including consumer business, public sector, financial services, mortgage servicing, human resource management, soft fraud identification, and other specialized applications.

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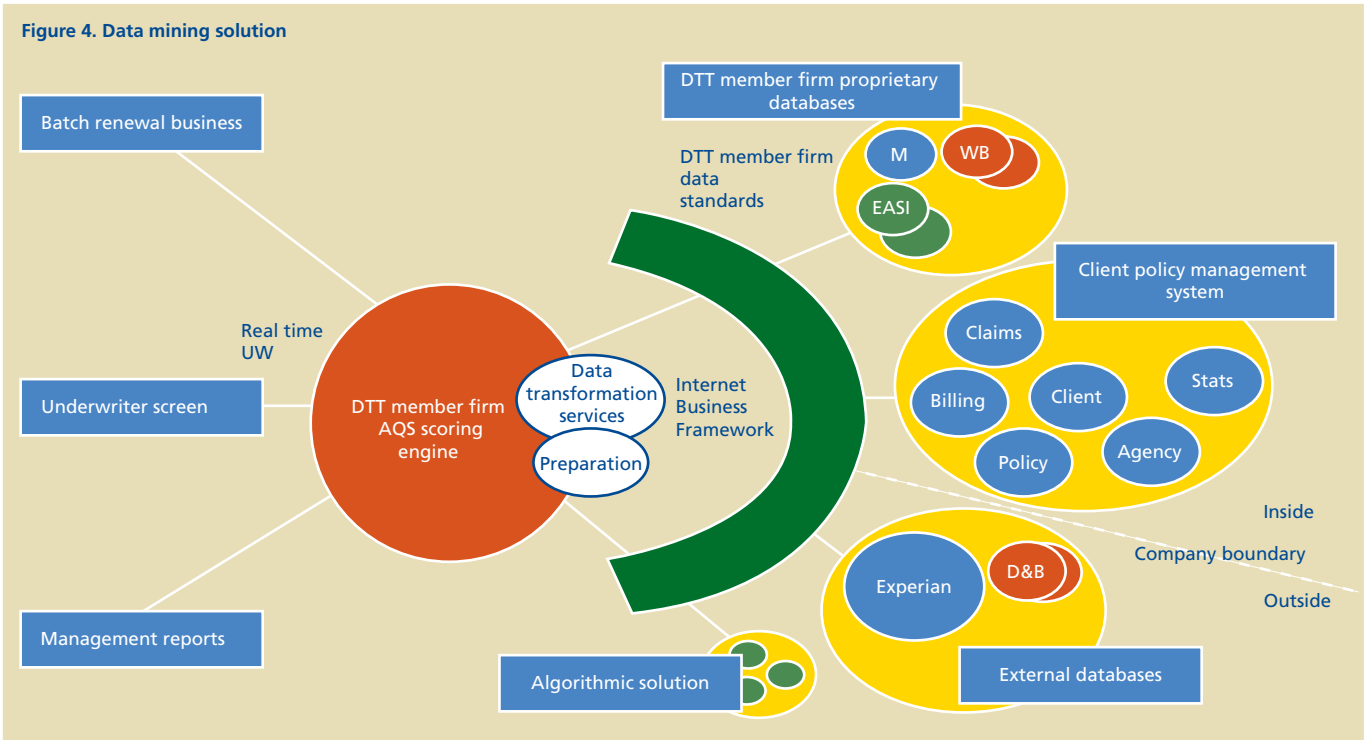


Implementing a data mining solution

A fully integrated data mining and predictive modeling solution offers significant financial and operational benefits to insurance carriers. To realize these benefits, insurance carriers must carefully plan and execute a sound business and technical implementation strategy that examines the numerous business processes that would be impacted by a data mining and predictive modeling solution. Data mining and predictive modeling solutions, when integrated within an insurer's underwriting systems and workflows, can help insurers achieve accurate pricing of each and every risk helping reduce losses and maximize profitability.

DTT member firms combine a breadth of data mining, predictive modeling, technical implementation, business process redesign, change management, insurance and regulatory expertise to offer end-to-end development and deployment of data mining solutions for their clients. DTT member firms' strategic relationships with over fifty external data vendors provide a unique capability to examine an exhaustive list of risk characteristics during the knowledge discovery phase and predictive model development.

An ever-growing segment of the property and casualty insurance industry is electing to maximize value through the proper implementation of these models. The appeal of predictive modeling solution will continue to grow as carriers recognize the substantial pricing improvements and enhanced returns that result from the implementation of this solution.



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