

WHITE PAPER

THE MODERNIZATION IMPERATIVE: BRINGING ACTUARIAL SOLUTIONS UP-TO-DATE

Neil Covington

Director of Solutions Management GI
SunGard, iWorks Prophet



CONTENTS

I. Introduction to Need for Actuarial Modernization

II. Property Casualty Industry

III. Factors Creating the Demand for Enhanced Actuarial Capabilities

IV. Predictive Analytics Trends

V. Actuarial Modernization

VI. Conclusion: Best Next Steps

VII. The Author

I. Introduction

Recent shifts in the global economy and shrinking portfolio returns have had a direct impact on the insurance market, particularly the Property and Casualty / General Insurance sector. Record catastrophic losses coupled with increasingly stringent regulatory environments have generated renewed interest in optimizing risk management. Companies are being called to a higher level of stewardship, balancing reserves and hedging against loss in order to protect company exposure.

Management is now tasked to do more, do it faster, and work more cost-efficiently, while still working to reform internal systems and combat resistance to change. Operational friction and corporate culture often compound progress. This white paper attempts to provide an overview of key market dynamics and discusses the growing pressure on Actuarial, particularly within the Property and Casualty industry, to adopt updated actuarial modeling as a scaffold for improved end-to-end risk management and compliance with regulatory mandates. Such modernization will have a profound, positive impact on profitability, ROI and a streamlined process of management at all levels. Future white papers will examine related perspectives on the modern actuarial industry: Confidence in Compliance and Actuarial Solutions: Not One Size Fits All.

The new role of Chief Risk Officer has emerged as the industry evolves to meet growing financial scrutiny and oversight. Multiple stakeholders, from Chief Actuary to Finance and the Executive Board, require increasing access to information and modeling systems for more responsive and better-informed decision making.

This mounting pressure for transparency and robust end-to-end risk management creates a confusing maze of solution choices for an insurance marketplace that has become increasingly fragmented. In companies of all sizes, numerous vendors are attempting to mitigate the situation. The looming requirements of solvency-focused legislation in most regions further pressure companies to commit to products, processes and protocols quickly.

The pressure is on, too, for such solutions to be sufficiently simple to satisfy the risk appetite of the enterprise itself, where the cost of change and its execution can be formidable. Actuarial modernization must not only be effective, but cost efficient as well, as seamless as possible in consideration of existing, embedded systems, and time efficient.

Consultants, software platforms, and inter-departmental teams are called to improve oversight and provide a higher degree of actuarial control over both the manipulation of data and its application to insurance products and risk management. These vendors and solutions offer varying degrees of control and expertise; however, their emergence has revealed the wide

disparities in actuarial solutions in widespread use throughout insurer organizations. In many organizations, in fact, there is no consistent platform for data manipulation; each department relies on legacy home-grown protocols to manipulate data and model scenarios. Closer alignment is needed between these solutions and the variability of client needs.

A primary factor driving the need for modernization is the increasingly complex regulatory environment. Actuarial departments are being called upon to meet the needs of and work with other departments within the company, beyond the traditional departments that actuaries have interacted with like accounting and claims, while still providing sound modeling to drive reserves and risk management based on higher levels of confidence in those model results. Going forward, achieving synergy between departments will likely reshape the inner workings of complex, especially larger, organizations.

To further compound the situation, investment income rates, especially in the bond markets, remain low industry wide, in spite of overall better industry performance year-on year. At the same time, momentum of loss events appears to be increasing, demanding optimized risk management and pricing.

II. Property and Casualty Industry

The property and casualty industry is undergoing meaningful change. The loss of income from investments is further exacerbated by premium shrinkage as the trend to alternative risk markets - captives, self-insurance, and securitization - continues. Cheap oil, and accordingly cheap gasoline/petrol, is leading to increases in risk of auto accidents as drivers take to the road, while rate revenues may not keep up. While net written premiums had been growing, there are indications that price increases are tapering off as capacity expands.

Product innovation is often made commonplace all too quickly, removing competitive advantage promptly. New product opportunities can also face a long and laborious path of regulatory compliance as well as incurring promotional expense and the internal cost of training and systems updating. Investment in development cost is increasingly at risk.



P&C companies have got to maintain a relentless focus on managing costs. **My view on rates is that they may not begin to recover in a measurable way until the economy does, the timing of which is anybody's guess.**

Ernie Csiszar
Director of the Risk Center,
USC Moore School of Business



Climate related changes add further uncertainty to products and operations. Flood insurance, for instance, is often subject to changed or increased national regulation to protect open access to insurance cover for all. Potential regional fire and earthquake hazards, among others, clearly require an increased ability to weight and score such variables in the overall risk environment. Another distinctive challenge to insurers is the change in both communication and sales distribution to the web, where aggregators, agencies, auction and even classified advertising sites are creating a new marketplace for insurance shoppers who seek multiple quotes from different carriers. This is not limited to consumer prospects; carriers and online intermediaries increasingly go online to sell commercial insurance coverage direct to small-business customers. Telematics-driven, usage based motor insurance and the launch of private exchanges to sell health insurance also offer remarkable growth potential. Their impact on risk assessment, pricing, security, service and ultimately on profitability are formidable, and require a place in the analytics mix.

III. Factors Creating the Demand for Enhanced/ Modernized Actuarial Capabilities

The current climate is creating great pressure for management, tasked with producing more accurate information, having it accessible to a greater number of stakeholders, and getting the job done while controlling expenses.

A fundamental factor in defining the need for modernization of an actuarial function is the need to optimize assessment of loss potential. A view of the scope of natural events worldwide suggests that the scale and number of loss events is likely to increase. For example, United States tornado share of loss is increasing; wind typically causes the most catastrophic loss, exceeding even hurricanes, which are also expected to increase in number and severity. Thunderstorm loss is up seven-fold, with the five-year running average of total loss up sharply. (Source: Property Claims Service, MR NatCatService) Additionally, the rate of earthquakes has increased steadily at about 21 events per year until around 2000, when it increased about 50% to 31 events per year. By 2004, the number increased sharply to about 151 events per year.

(Source: US Geological Survey).

Some of these losses are specifically geographic in nature, likely climate related, time-variable and variable in the scope of loss (e.g. population and property densities). This suggests that an increasingly sophisticated data management and analytic platform, that is open, flexible and scalable, is essential. **Where one major natural catastrophe can shake the very solvency of an entire industry, it would be imprudent not to overachieve in analytic readiness.**

If optimum readiness to address both specific as well as broad scale loss potential is critical, so is the speed and reliability of analytics, reporting and translatability of findings into strategic implications. Management up to the most senior levels may have to respond almost instantly to loss events and decision support must be absolutely clear, timely and incontrovertibly sourced. It must also represent the comprehensive perspectives of all stakeholders across the enterprise, from finance through operations, marketing, sales and strategic planning. Only in doing so can it help steer a company towards managing and improving profitability.

Changes such as introducing a new line of business, expanding into another industry or sector, even shifts in branding and marketing may influence the need for additional actuarial capabilities. These may introduce a natural need to craft analytics to support new or changing initiatives with improved management and reporting tools, to fine tune financial performance and to address any related change or addition of regulatory requirements.

Outside the specific requirements of business, the ongoing pressure of regulation most influences the need for modernization. Today's regulation is tomorrow's appeal; in a regulatory environment where rules sometimes seem made to be changed. Analytic systems must provide not only accurate and timely metrics, but the ability to refine the analytic platform to accommodate later iterations of law, policy or market change.

As a comprehensive and necessary interactivity grows among all stakeholder units of a company, analytics must go beyond risk management into investment analysis and all other areas of capital management. Cohesiveness afforded by the adoption of analytic sophistication enterprise-wide is its own kind of insurance. The rapidity of change may challenge the ability of a company to effectively utilize the growing amounts of data that will emerge, for the benefit of all enterprise initiatives, not just risk management. General management will require more and better decision support. This complex industry continues to fragment and change, with the speed and reliability of information now defining a company's direction overall.



In a modernized company, a synergy of efficient processes with clearly defined stakeholder expectations exists between and among the risk, finance, actuarial and IT functions.

Mariani Brodie
Schwartz, Insurance Experts Forum, 8/2014



The benefits are not speculation. A recent study showed that the more companies characterized themselves as data-driven, the better they performed on objective measures of financial and operational results. In particular, companies in the top third of their industry in the use of data-driven decision making were, on average, 5% more productive and 6% more profitable than their competitors. This performance difference remained robust after accounting for the contributions of human resources, capital, purchased services, and traditional IT investment. It was statistically significant and economically important.

(Source: Harvard Business Review).

IV. Predictive Analytic Trends

The major trends in predictive analytics of greatest application to P & C businesses are the need to operate increasingly large amounts and variety of data, the need for more iterative analysis, optimization of assumption validity and the growth in magnitude of information-based decisions.

As data and analytics management expands enterprise wide, the size and type of data will grow as rapidly as implementation expands. Operations, finance, marketing and sales, infrastructure management - every data point will be added to the pool so greater efficiencies and more effective strategies may emerge from the increased sophistication of analysis. Company growth into new business initiatives, expansion of human and other resources, association with other business entities, mergers and acquisitions will all add to the weight of data to be captured, curated, accommodated and processed.

One of the most critical needs in the process of analysis is the validation of assumptions upon which business decisions are made. The better assumptions are vetted by analysis before processed, the better outcomes are accurately estimated. Financial, risk and regulatory capital measures are requiring increasingly complex calculations and insurers are realizing that ineffective model development or validation can have a number of adverse consequences, including mistakes in critical business decisions, underestimation of risks, and large financial misstatements.

There is ever-increasing rigor and sophistication in Analytics requirements. Types of models and analysis are continually emerging and require evaluation to meet changing actuarial needs as well as initiatives across the enterprise. The promise of these new analytics is their predictive abilities in addressing increasingly complex regulation, business relationships, diversity of products and changing end-user behaviors and helping to price increasingly complex risk scenarios, protect product pro-formas and capital investment.

Achieving this goal can only be accomplished, however, with a commitment to replace outdated systems, to simplify and enhance functionality as data grows, to optimize reporting design, to establish sensitivity at the analytic level to the changing demands of regulation, and ultimately, a Board-level commitment to an enterprise-wide solution.

Analytics are being used beyond underwriting; fine-tuning assumptions and results in pricing/rating, management of reserves, evaluation, marketing and responding to claims. Global interest rate policy is contributing to some insurance companies changing the composition of their investment portfolios by introducing more diverse asset classifications. This requires analytic evaluation of other factors influencing the conduct of the business.

(Source: Marketing Study).



The hype of 'Big Data' is now actually being translated into business benefits. There's a greater level of appreciation for insights and data, and a realization that the volume, size and complexity of today's data just can't be handled by traditional means. **In addition, easier tools are now available. These give people access to predictive technology without having to overinvest in new skills.**

Shekhar Iyer
Global VP, Business Intelligence
and Predictive Analytics, SAP



V. Actuarial Modernization – Factors for Success

The demand for actuarial change requires, at the very least, a plan to bring analytic rigor to risk, cost and pricing, and reporting requirements to address not just claims but fiscal management of all insurance processes. An understanding of the scope of change in actuarial functionality and its impact enterprise wide must also be defined and articulated. In the best of circumstances, where the use of rebuilt predictive analytics is engaged across the enterprise, the reach of the initiative must be carefully defined, and communicated from a key center of change responsibility. Accordingly the development of a feedback mechanism is essential to ensure that communication of the initiative has not only been delivered, but understood, and agreed upon by all stakeholders. In the ideal, it will:

- › Formalize a structure identifying the planned liaison between change agents who manage the transition and all the appropriate stakeholders.
- › Require a plan to address whatever regulatory complexity exists at the time and be sufficiently flexible to anticipate change.
- › Proactively involve C-level management who will be its beneficiaries, and who must therefore participate in the development of reporting and report delivery.
- › Include a commitment to new software and most likely, new hardware, and a commitment to related training and retraining.
- › Be predicated on a carefully detailed modernization strategy, perhaps developed with the help of its vendor and perhaps with the assistance of third-party consultation. The strategy will have, at its base, a shared visualization and unanimity of agreement on its goals and outcomes.
- › Clearly state expectations in delivery and performance, self-evaluation and metrics for determination that the process has met its goals.
- › Establish the specific processes and milestones through completion, with ongoing governance protocols for project management feedback – no surprises.



Long-term structural transformation has four characteristics: scale (the change affects all or most of the organization), magnitude (it involves significant alterations of the status quo), duration (it lasts for months, if not years), and strategic importance. Yet companies will reap the rewards only when change occurs at the level of the individual employee.

Aguirre Jones
Calderone, Strategy+Business Magazine



VI. Best Next Steps – Gearing Up for Change

Sound planning can help establish a strong environment of collaboration, evaluation and structure even if the change initiative is not executed enterprise-wide, and even if started just in Actuarial and IT departments and scaled later to the rest of the enterprise. The following basic steps will provide groundwork for the undertaking, and a starting point for its implementation.

1. Board-level engagement

Change of this magnitude cannot succeed if it does not have complete management support, from the Board down through all operations. It must have Board approval, and a Board-level champion.

2. A “Buck Stops Here” project champion

Ideally, one key individual leads the project and coordinates with senior management and departmental leaders. This individual should have a working familiarity with all of the company’s operations. He or she should be more strategic than tactical, but able to delegate tactical control and events.

3. Identify key stakeholders.

Each department affected by this change should have its own project champion to give that department a voice in the project. Stakeholder interaction should have a formalized contact schedule, and a communications plan to engage and inform relevant parties.

4. Determine early if third-party advisory is appropriate.

Some advisors are well-practiced in this type and scope of initiative. Involving them can shorten the internal learning curve with the net effect of speeding implementation, reducing risk and enhancing the end result

5. Create a vision of the “new” company after establishment of the new analytical regime.

Articulate how processes and outcomes will be improved. This will establish the real signs, beyond development milestones and metrics, that the company has achieved a successful transition. This “Vision” will help establish the project as an internal Brand and give it credibility enterprise-wide.

6. Define the needs of the analytic change.

Establish a Company Profile based on traditional industry segmentation characteristics: net premium revenues, size and type of company – whether independently owned, affiliated with or owned by a group – product mix, lines in development or planned, and portfolio asset/classification mix. This defines benchmarks against which change will be measured, and the company and its analytic position can be compared to peer organizations.

VI. Conclusion

The insurance industry now faces its most unique challenges to date. There is an unprecedented need to protect assets and optimize risk in an environment fraught with regulatory uncertainty, higher natural and user-based risk, and threats to solvency capital in spite of high cash reserves and year-on-year revenue growth. There is increasing pressure to do more, do it quicker and do it cheaper. Potentially massive increases in the amounts and types of data to be operated and a need to optimize risk and seamlessly impact operations enterprise-wide, requires a new analytic paradigm. With the right governance structures and end-to-end systems in place, the most accurate, timely and trusted information can be provided to Management to support business decision making and strategic planning. This is increasingly important in the face of a more demanding business environment that is proving less forgiving of inadequate information.

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Confidence in Compliance

Emerging governance, compliance and control requirements inform the design, testing and delivery of new actuarial solutions for informed decision making.

Actuarial Solutions: Not One Size Fits All.

Each company's distinctive footprint of operation, risk commitment and investment profile determines its optimum actuarial solution.

VII. The Author

Neil Covington, MBA, FIA, is Director of Solutions Management General Insurance for SunGard, iWorks Prophet. He is responsible for leading global general insurance solution strategy and direction. Neil's background includes more than twenty years of actuarial experience in insurance, working in both companies and consultancy. His deep background includes the design and development of models, as well as experience using, interpreting and explaining them across the business and to Boards. In previous roles, he served as Chief Actuary and Head Actuary for multi-line, multi-national businesses.

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iworks.info@sungard.com



Telephone
Americas: 1-800-755-5991
Asia-Pacific: +852 2530 1404
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