



WHITE PAPER

INSURANCE RISK MANAGEMENT

**CAPITAL MODELING UNLEASHED:
DOING MORE, BETTER AND FASTER
TO OPTIMIZE ENTERPRISE PERFORMANCE**

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Introduction:

What it is, what it isn't, and why you should care

Shift to capital modeling is a growing phenomena












Capital modeling used to mean actuaries sitting in a corner performing the dark arts of actuarial science involving something like a crystal ball, with little or no interaction with the 'real' business. But this is no longer the case with capital modeling now playing an important part of an end-to-end risk management process. This is mainly driven by evolving global regulations whereby regulators are looking to manage the risks of each company more according to their specific risks as opposed to a standard or assumed risk profile.

A lot of the drive has been from the European Solvency II regulations but many other global regulators have been adopting similar approaches directly. Also many companies by virtue of being part of a corporate group covering other regions are being required to consider similar approaches.

Some of the key elements of the regulatory developments are moving towards more sophisticated quantitative capital requirements, often termed Pillar 1, alongside robust and integrated qualitative risk management measures, Pillar 2. These are then underpinned by disclosure and reporting requirements, Pillar 3.

Another key element of regulatory developments includes a risk self-assessment, often called the own risk and solvency assessment, ORSA. Many if not all regions have or are adopting a form of this:

Individual companies have no choice but to respond to these regulatory changes.

Region	ORSA
 Europe	FLAOR/ORSA
 South Africa	ORSA
 Singapore	ORSA
 Mexico	ORSA
 Brazil	ORSA
 Australia	ICAAP
 U.S.	ORSA
 Canada	ORSA
 Bermuda	CISSA
 China	SARMRA
 International	ICP16

Global trend now reaching the U.S. market, where it brings both benefits and challenges to progressive businesses

Through the solvency modernization initiative, SMI, the U.S. is similarly enhancing risk management principles for insurers. Quantitative capital requirements are managed through the risk based capital, RBC, calculations. A further element of qualitative risk management was introduced in 2011 through the ORSA requirements.

The ORSA requirements although set out nationally by the National Association of Insurance Commissioners (NAIC), require individual state legislation for adoption and a number of states have already completed this with most others expected to follow. The ORSA however is not mandatory for all U.S. insurance companies, currently the ORSA only applies to any individual U.S. insurer that writes more than \$500 million of annual direct written and assumed premium, and/or insurance groups that collectively write more than \$1 billion of annual direct written and assumed premium.

An insurer that is subject to the ORSA requirements is expected to:

- Regularly, no less than annually, conduct an ORSA to assess the adequacy of its risk management framework, and current and estimated projected future solvency position.
- Internally document the process and results of the assessment.
- Provide a confidential high-level ORSA Summary Report annually to the lead state commissioner if the insurer is a member of an insurance group and, upon request, to the domiciliary state regulator.

The ORSA report and process is wholly owned by the board of directors, again emphasizing the 'own' aspect of an ORSA process.

Genuinely transformative initiative, not a regulatory noose

But regulatory compliance is only one benefit of the new regime and companies that embrace the new requirements, as opposed to seeing them as an additional burden, have the opportunity to improve shareholder and stakeholder value through improved risk management benefiting both direct bottom line profitability and capital efficiency.

Further, rating analysts are starting to take note and a robust risk management framework can help to support and even improve credit ratings.

The regulatory initiatives should be welcomed as a step change to risk management, and business practices enhanced to align with this. Seeing them as a necessary evil and adopting a 'good enough' approach will typically fail to realize all of the benefits that they have the opportunity to bring to a company.

Companies are continually looking to add value to their enterprise, capital models are one way to do this and in so doing tick off these regulatory requirements. In essence this stems from strong ERM practices that not only include capital modeling but also other areas like investment strategy, operational planning, etc.

Benefits of Capital Modeling

Dynamic articulation of company's risk exposure, not a priori assumptions of risk profile or a 'standard' model, one size fits all

In the past capital requirements from the regulator have been set as a non-risk based formula, often based on a fixed proportion of gross written premiums. How can this truly reflect the individual risk of different companies? While an argument may have existed for this in the past, as insurance companies become more innovative and diverse this is certainly no longer the case.

Most, if not all regulators have now moved to a risk based formula for capital requirements, typically providing separate calculations for premium risk, reserve risk, asset/market risk, operational risk and so on. To bring these all together a dependency structure is often used allowing for some correlation of the various risks. The formula is usually an articulation of a defined measure of risk, for example a one in two hundred years value at risk measure over a one year time horizon. But this is still a standard formula with an element of assumption around a typical risk profile.

The next step that a number of regulations are moving towards is a full internal model approach, most notably European Solvency II. In this case, the standard formula can be replaced by the company's own internal model. The internal model has no prescribed format other than to adhere to the prescribed measure of risk within the regulations. This then removes any element of standard risk profile assumption and relies upon the company's own risk models that should better fit the true risk profile.

An internal model however cannot be used unchecked and these regulations are accompanied by a number of additional requirements that introduce fairly strict rules, the meeting of which are subject to formal approval by the regulator. As well as rules around governance of the models, it is important to be able to prove that the model is actually used within the business itself to guide decision making – satisfying the use test. Why should a regulator trust your model if you don't trust it enough yourself to use it?

In this sense too, it should be appreciated that the internal model is not just a quantitative, numerical, model but also includes risk management processes around this.

The ORSA is usually an extension of the quantitative risk modelling but includes a much more qualitative assessment of ongoing risk management. Capital modeling itself is usually concerned with the extremes, the one in two hundred years events that could cause company failure. The ORSA is more aligned to ongoing risk management of a going concern. As such the ORSA will typically consider less extreme, more likely events, for example one in ten years.

An internal model can be used for both capital, extreme, event modeling and ORSA, more likely, modelling whereby a full stochastic model will provide for the full distribution of outcomes. Such a model however is not a pre-requisite for the ORSA and it can be equally acceptable to perform more deterministic, stress and scenario based, modeling to evaluate outcomes.

Engages board-level and C-level management with more comprehensive and understandable data: Creates an avenue for all units/departments to inform strategic planning

A company can only build, manage and maintain ongoing appropriateness with engagement throughout the business.

The business is full of experts in many areas. A modeling team cannot assume to know as much about the business as these people do and hence engagement and communication is paramount for building a capital model that is fit for purpose.

Further, once built, the model cannot be run in isolation. Businesses are often undergoing constant change in both an operational and underwriting environment. In order to ensure a model remains fit for purpose it must be up to date with and responsive to these changes. In fact the model should be used to help inform these business decisions in the first place.

This level of use throughout the business both engages and requires the full support of the board and C-level management. Without this support the model will not embed within the business. It can also help to leverage what can be the significant benefits of the model beyond pure capital assessments. Embedded and appropriate use of the model can add value to many areas of the business, not just risk management but also business planning, reinsurance management, investment strategy, operational planning, management and so on.

The benefits of wider model use can include:

- Validation
 - More use means potentially more validation hence a better model.
- Engagement
 - Credibility and confidence will improve as trust builds.
- Timely monitoring
 - Potential earlier warning of any issues.
- Transparency
 - The model is no longer 'hidden' from the business or seen as the dark arts of actuaries.
- Education
 - The business understands the model better and provides constructive feedback for continued improvement.
- Decision time
 - Quicker and more robust decisions can be made in individual functions.
 - Better business proposals can be made to the management and the Board.
- Limitations
 - Help identify any model limitations to ensure no inappropriate use.
- Triggers
 - Can provide appropriate triggers for when re-validation of the model may be required.
- Expert judgment
 - Can help validate or ratify expert judgment being made within the business.

Helps un-silo and connect the total enterprise

Through embedded use a capital model can help to unify elements of the business as it can open up visibility of impacts of decisions in one area on another. By also bringing the business together to collectively contribute to the capital model a wider sense of involvement and ownership can be achieved.

Increases sustainability and competitiveness, not just profitability of the enterprise

Risk management whilst influencing bottom line profitability can also impact indirect areas of shareholder and stakeholder value. A capital model can open the eyes of a business wider to a longer term strategic view potentially away from a hand to mouth, living by the day approach. Certain strategies may yield higher longer term value to a company compared to some shorter term options and embedded use of a capital model can help to identify and support these strategies.

Makes bottom line more understandable/reliable as new investment players (investment banks, VCs, etc.) increasingly consider the industry; buoys existing stakeholders

A capital model can also open up transparency of the sources of profit or loss during periods and hence improve the understandability of the business and its performance. With ever evolving and new sources of investment capital and risk transfer arrangements the capital model can shed light on the true impact and potential of these.

Supports both capital requirements and ORSA risk management

A capital model has the ability to support both capital, extreme, modeling and ongoing, more likely, risk management in a single, coherent manner. It can provide a single model that is fit for both purposes and in doing so provide a more efficient approach to production and analysis of these results. Both requirements are then able to leverage the benefits that the model has already provided in terms of embedding within the business and wider acceptance.

A Tough Sell

Can be complex and expensive, but also can be reasonably simple if appropriate to the business, (e.g., stress and scenario models versus full stochastic ones). Often start off simple and grow with business and experience

There is no single capital model that is appropriate to all businesses. This echoes one of the key principles of the regulations themselves, the own element in the ORSA. It is about the company deciding what is appropriate to it based on its own intricate understanding of its own business.

A full stochastic model can produce full distributions of outcomes and hence can lend itself instantly to capital, extreme, assessments as well as ongoing, more likely, assessments. But a full stochastic model may not always be appropriate or necessary for every business. If a business feels it is appropriate and fit for purpose then a more deterministic, stress and scenario, approach can be perfectly acceptable.

Indeed the approach adopted by many companies embarking on this regulatory journey is to start off simple with a deterministic based model and then to evolve, enhance and grow this as the business becomes more comfortable with it and the business itself potentially grows.

The adoption of a flexible modelling solution will help support the business use.

Very broad reaching: If done right, may force meaningful but challenging internal change

The embedding and use of a capital model throughout a business should not be underestimated however. There will be natural challenges and resistance to such a change, as with many changes. A cultural shift is likely needed to change current perceptions of capital models and what they can and do actually do. This however will only come about with board level ownership and appropriate selling to the key stakeholders within the company.

An inertia breaker in a conservative industry

The insurance industry itself is often characterized as risk adverse, even though the very nature of the business is itself to accept risks. But risk aversion should not be confused with good risk management. A capital model provides the tools to manage risk to the desired level of risk appetite and is itself neither about taking risks nor avoiding risks, but managing risks.

Not implemented completely weakens the net total effect on the enterprise, risks sloppiness. Decision trees won't have all their limbs and branches

And a word of caution, a partially implemented or adopted capital model can be more dangerous than not having one at all as it may provide a false sense of security, a safety net only secured on one side. Whilst robust use may be being made of the model in some areas, unless it is all tied up and consistent across the business this may not be providing the benefits or outcomes expected.

Forces senior-most levels of management to engage at greater depth in planning, implementation and subsequent use. (Not so much resistance to change but to the rigors of change)

Embedding and use of a capital model does not necessarily require wholesale shifts in culture and paradigm for a company. A company is likely to have elements of the right process in place already. The adoption of the capital model may merely focus attention on these areas and encourage a greater depth of consideration or additional rigor in the process.

Requires commitment to ongoing monitoring, testing, maintenance and revision – can't just 'set it and forget it.'

It is not enough for a capital model to be fit for purpose on a given day and then assumed to remain so. Businesses change, business environments change, employees change, processes change. Only by embedding and adopting the model can a company ensure that it remains fit for purpose. In today's environment constant change is often the new stability.

Essential to demonstrate improved reporting and granularity to top management, who may have entered the initiative not really 'getting' the benefits

It is also important to ensure that all the benefits of a capital model are indeed realized. The building, maintenance and use of a capital model is not without both time and monetary investment. For these to be justified and accepted the model must deliver to the needs of the business, and it must continue to deliver. It is all too easy to slip back into old ways. Culture can best be thought of like a rubber band, if you stretch it too far it will break, and if you stretch it without then giving it a sound anchor point it will just snap back to how it was. The capital model needs to deliver and continue to deliver to help embed itself in the new business norm.

Best Practice Implementation Eases the Shift to Capital Modeling

Key steps

Markets change, economies shift, technology advances and cultures evolve. With each turn, we must iterate, adapt and adjust our approach. The adaptive enterprise is able to do this, it can pivot, it is agile, and it can effectively compete.

An adaptive enterprise ensures a successful implementation of any project by jointly addressing the three areas of people, technology and processes at the same time.

It is imperative to understand the requirements of the capital model, not just on day one but also over a longer horizon. This is so that a capital model is fit for purpose both now and into the foreseeable future.

A business may neither have the need, the experience or the appetite to adopt a full stochastic model on day one, but nonetheless this does not remove need for a capital model itself. It must merely be fit for purpose on day one.

Small, incremental changes are likely to be easier to achieve than larger changes. But also there is greater risk of regression from only a small change. A capital model implementation is likely to need a balance of a step change to introduce the concept and the process re-engineering to the business alongside a possible smaller change in terms of the initial scope of the model itself.

Success can often be achieved more efficiently by starting off as simply as you can. This can allow the business to bed in new technology, new processes and enhancements to people's roles in a more achievable manner:

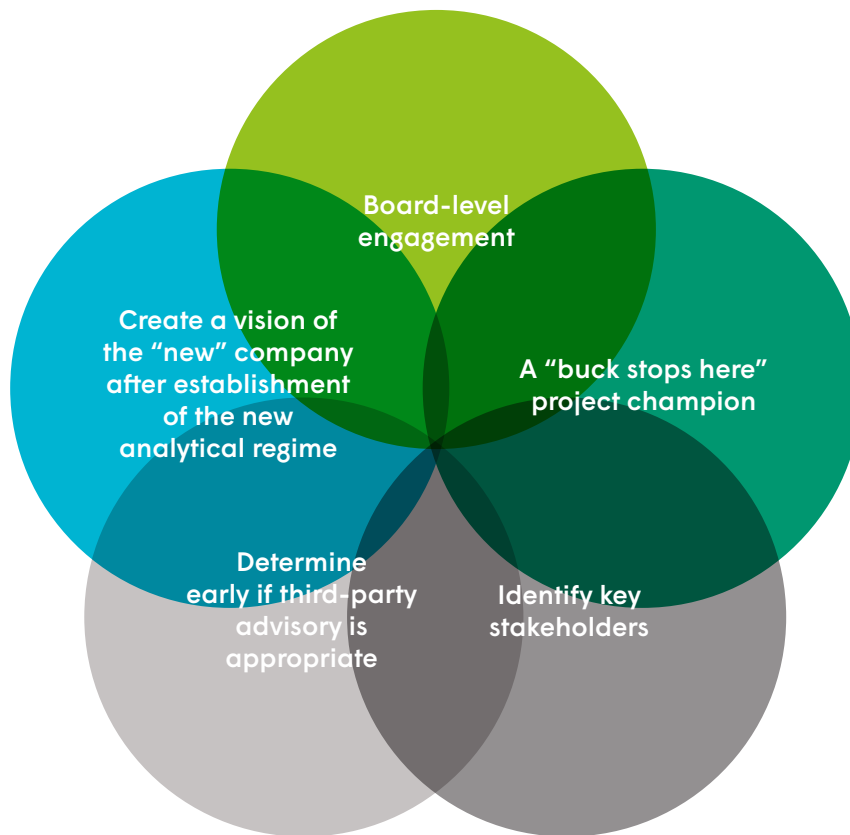
- On day one a deterministic based, stress and scenario, model may be fit for purpose.
- Where a full stochastic model is needed it may be possible on day one to utilize out of the box functionality as opposed to a fully customized solution.

The implementation plan should also include post day one project plans at least at a high level. In doing so these should fully incorporate the feedback loop and experiences from the initial implementation as what might be perceived as the best step now may alter following initial usage and embedding.

Similarly day one process and technology solutions should allow for future expansion and requirements.

Overcoming resistance

Culture and organizational inertia naturally produce resistance to any changes. Common steps on the path to success typically include the following:



Communication essentials

Appropriate communication is essential to any path to success and at its core involves making sure everyone knows:

- What they need to do
- When they need to do it
- Who else is doing what

Appropriate however also requires a judgment of balance:

- Enough information to be informative but not too much to be unclear.
- Often enough to be timely and relevant but not too often to be annoying and hence not read.
- Wide enough to give the bigger picture but not too wide to be distracting to each person's own role.

Process monitoring and reporting

As part of any project management routine, monitoring and reporting are at the heart. This is true of both waterfall and agile approaches. Appropriate tangible milestones should be identified and incorporated within the capital model implementation not just for managing the delivery timelines but also so that the business can see real progress as the project is underway. Equally, the tangible milestones may be part of the information needed for other following parts of the project itself.

Iterative process

The development of a capital modeling process is likely to be an iterative journey rather than a completely known fixed path at outset. Whilst you know the area you want to end up in now you may not know exactly where within that area yet. The journey however can begin with design and objective decisions being agreed and refined along the way. This thus lends itself very much to an agile, iterative project approach and consideration should be given to the use of an experienced project manager to ensure progress continues in the right direction and deliverables are met.

An iterative approach also supports the start off simple approach whereby an initial model, or iteration, can be delivered, used and reviewed helping to build the next iteration and so on. For example, a deterministic model, followed by stress and scenario testing, followed by a full stochastic model.

Validation

Validation can be a crucial element of any capital model. It confirms that the model is fit for purpose and continues to be so, it sets out action plans to correct and improve elements of the model, it ensures that robust processes exist around the functioning of the model. It is therefore beneficial to think about these elements alongside the design and build of the model as opposed to tagging them on at the end.

By developing these streams alongside each other they can be made more consistent and align better to each other. The danger of leaving them to the end and tagging them on then is that the designed process may not lend itself as well to validation as could have been the case if different decisions were made. Validation should be considered an integral part of any model build and not an afterthought.

Summary

Like all major business initiatives, a shift or enhancement to capital modeling disrupts the status quo. This introduces risk and resistance.

However when done correctly there will be a long lasting positive impact and the benefits will far outweigh the pain of implementation helping to generate improved risk assessment, stronger regulatory compliance and an easier data landscape. This will all help to protect the longer term profitability and durability of a company as well as the viability of the ongoing business strategy.

As with any project or new endeavor, the right partner can help to minimize the pain of making the shift by bringing relevant experience and expertise. This can substantially reduce the implementation risk and accelerate the benefits, supporting the business case itself.



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His background includes more than twenty years of actuarial experience in insurance, working in both insurers and consultancy. This 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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About FIS' Prophet

FIS' Prophet solution is a leading actuarial modeling system that helps insurance and financial services firms develop more profitable products faster, improve risk management decisions, and meet their reporting responsibilities efficiently. Prophet provides comprehensive coverage across life, general insurance, health and pensions for all major insurance markets on a single platform, providing common models, code, assumptions and reporting capabilities, plus end-to-end data management and business intelligence. It offers actuaries an easy-to-use, flexible product design environment combined with a controlled, enterprise-level production environment, enabling the fast delivery of accurate, auditable and clearly presented information to risk managers, senior management and regulators. Prophet can be deployed on-premise, hosted or on the cloud, and is relied on by more than 10,000 users at over 850 customer sites in more than 65 countries.

About FIS

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