Grant Thornton

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Capital Modelling - Where are we now?

Market survey results

October 2017

Contents

Introduction

We are delighted to present the results from Grant Thornton's 2017 Capital Modelling Survey for general insurers.

Capital models are of ever increasing importance to insurers. In recent years, capital models have taken centre stage in the business planning, reinsurance planning and risk management activities of many insurers.

The increase in the importance of capital models has inevitably resulted in greater pressure on modelling teams to make continual improvements to the sophistication, reporting capabilities and validation of models.

In this survey, we took the opportunity to ask insurers not only about how they currently feel about their capital modelling capabilities and process but also about the key challenges they are facing and the ways in which insurers are looking to improve.

We are enormously grateful to those people who took the time and trouble to complete the survey. It is their efforts that have rendered this document meaningful.

However, whether or not you were one of those individuals, we hope that you find this report interesting, instructive and thought provoking. We certainly do!

Simon Sheaf

Head of General Insurance Actuarial and Risk

For Grant Thornton UK LLP

T (0)20 7728 3280

M (0)7792 228065

E simon.h.sheaf@uk.gt.com

Headline findings

28%

of the survey respondents are Lloyd's managing agencies, **60%** are insurance companies, **6%** are composites and **6%** are reinsurers

15%

of participants require more than ten employee years to review and update modelling assumptions

70%

On average, the number of employees required to review and update modelling assumptions represents around **70%** of the capital team

56% of respondents use a full internal model to calculate their Solvency II regulatory capital requirements and **17%** of respondents use a partial internal model

Igloo and ReMetrica were the most popular modelling platforms with **49%** and **46%** of participants using these respectively

RMS was the most popular external vendor model with **72%** of participants using it

42% of the respondents are responsible for modelling the capital requirements on four or more legal entities while **58%** are responsible for three or fewer legal entities

The most common uses for modelling outputs are the ORSA process, reinsurance purchase and optimisation, business planning, Solvency II risk margin calculation and risk appetite management

49%

of participants see their model or modelling process requiring re-engineering in the next one to three years

50%

of respondents thought it was important to devote time and resources to improving model runtimes. In addition, half thought it was important to devote time and resources to the setting of assumptions

62%

of participants see embedding and increasing model use as a key priority for their business

71% of respondents expect to run the model between five and forty times to update the model from one reporting period to the next, with the most common range being ten to twenty runs which represents **32%** of respondents

47% of participants run between 50,000 and 100,000 simulations of the model to calculate their final capital result with only one participant running more than 500,000

44% of respondents update their capital model assumptions annually and 27% update the capital model assumptions more than once a year

Participants see delays in data sourced from other teams as the most significant challenge to their end to end Solvency II reporting process

One in two participants is likely to implement improvements to process automation in order to increase production capacity of their capital model

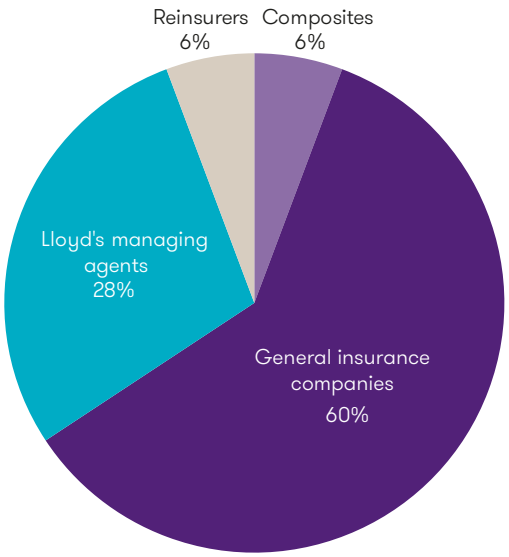
Detailed results

Composition of respondents

Type of companies

For the survey we targeted a wide range of insurance entities. 60% of our respondents were general insurance companies while 28% were from Lloyd's managing agencies (Fig 1). A further 6% were from composites and 6% were from reinsurers.

Fig 1: Type of company

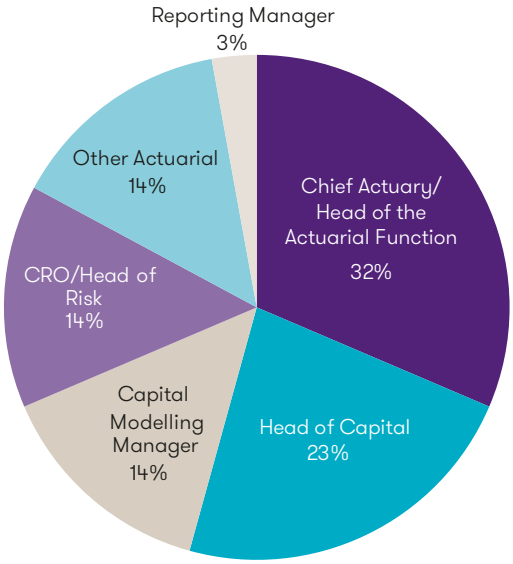


Role within organisation

The survey was sent to a selection of people. Responses were received from individuals in roles including Head of Capital, Chief Actuary, Chief Risk Officer and other actuarial roles.

Approximately a third (32%) of respondents were Chief Actuaries or Heads of the Actuarial Function, while 23% were Heads of Capital (Fig. 2). 14% of responses came from each of Capital Modelling Managers, CROs or Heads of Risk and other actuarial roles.

Fig 2: Role within organisation



Size of company

We have grouped respondents into categories based on their size.

We have done this on two bases, the first of which is net premium income. 17% of respondents had net premium income of less than £200million, 57% between £200million and £1billion and 26% greater than £1billion (Fig 3a).

We have also grouped respondents by the level of their Solvency II net technical provisions. 15% of respondents had net technical provisions of less than £200million, 46% between £200million and £1billion and 40% greater than £1billion (Fig 3b).

Fig 3a: Net Premium Income

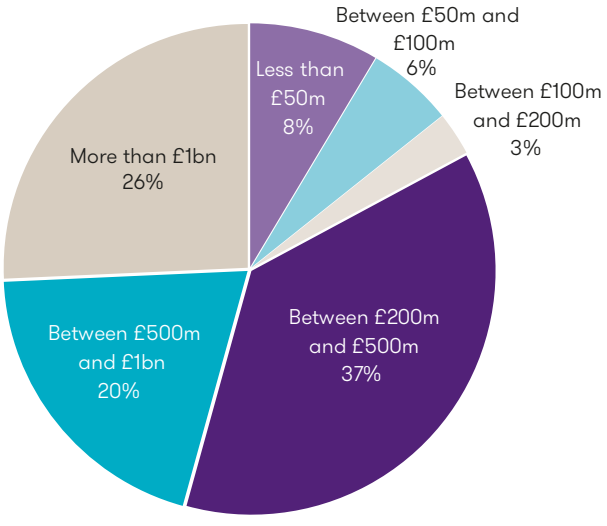
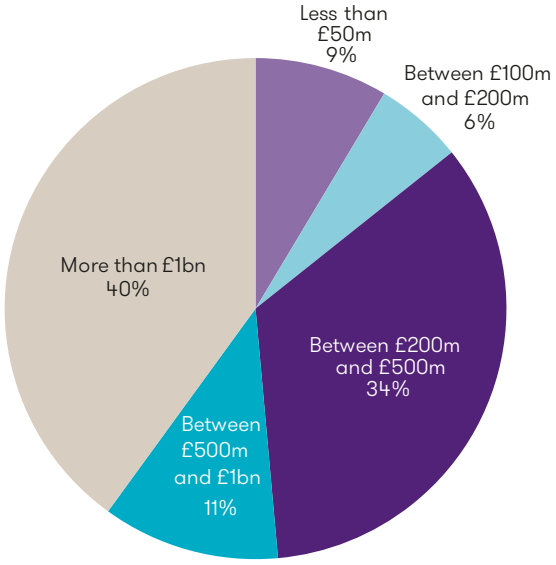


Fig 3b: Net Technical Provisions

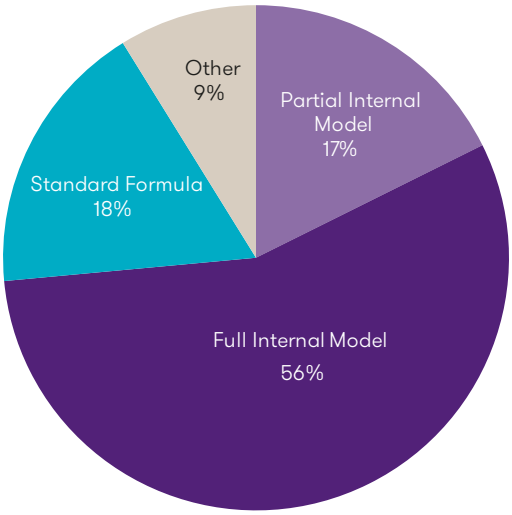


Calculation of Solvency Capital Requirements

Method for calculation of Solvency Capital Requirements

73% of respondents use a full or partial internal model to calculate their Solvency Capital Requirements, while 18% of respondents use the standard formula. The remaining 9% of respondents, who categorised themselves as Other, use a full internal model for some of their legal entities and the standard formula for other entities (Fig 4).

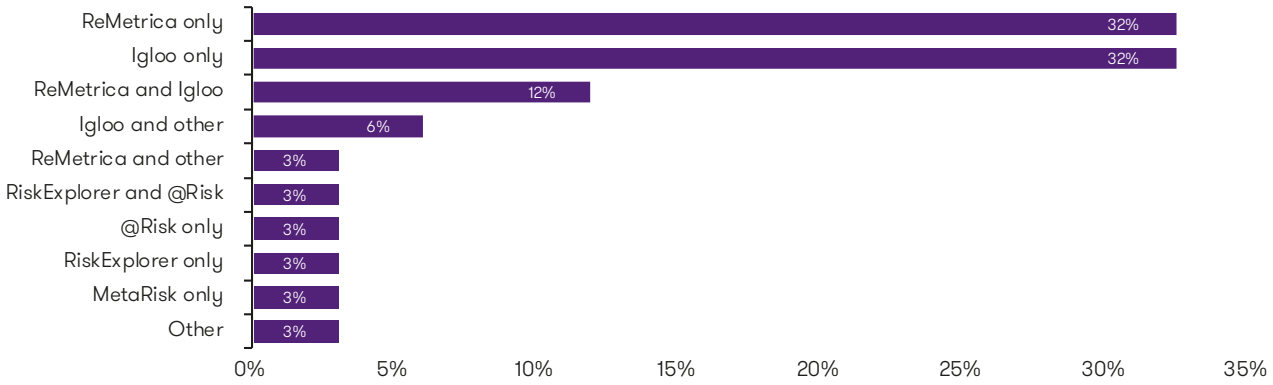
Fig 4: Method of calculation of Solvency Capital Requirements



Modelling platforms used

We asked insurers which modelling platforms they use for running their capital model. By far the most popular platforms are Igloo (49%) and ReMetrica (46%) (Fig 5). Less common modelling platforms used include Excel and @Risk (6%) and Risk Explorer (6%).

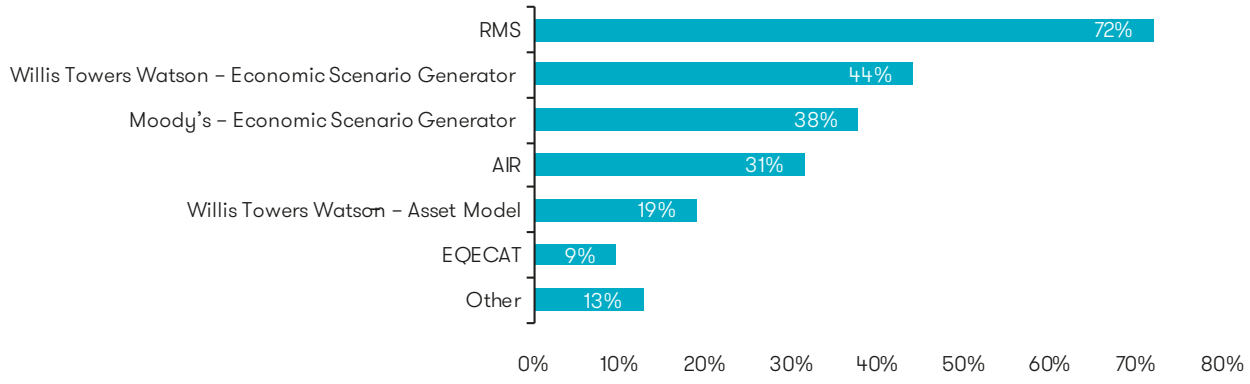
Fig 5: Modelling platforms used



External vendor models

We also asked insurers which external vendor models they use. The most commonly used external vendor model is RMS, which is used by 72% of respondents who use external vendor models (Fig 6). Other commonly used models are the Willis Towers Watson ESG (44%), Moody's ESG (38%), AIR (31%), Willis Towers Watson Asset Model (19%) and EQECAT (9%). Other models used by our respondents include Mazars Horizon, Conning ESG and LCP ESG.

Fig 6: External vendor models used

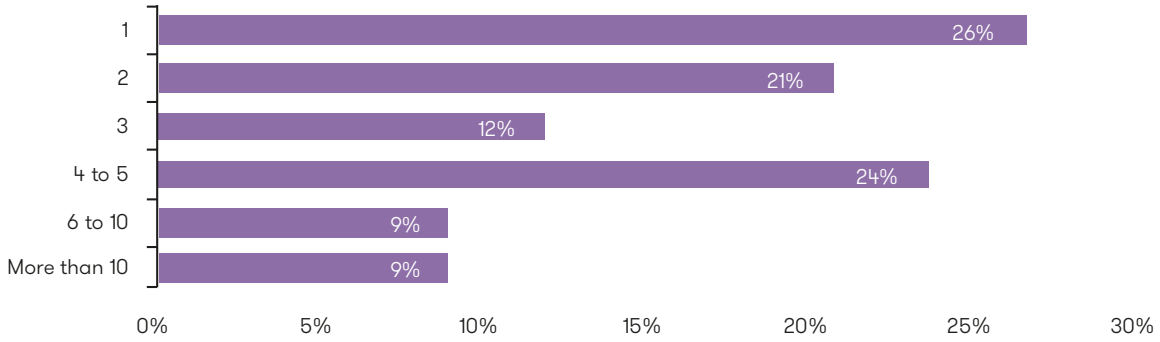


Scope and resources

Number of legal entities covered by Capital Modelling

The number of legal entities for which our respondents perform capital modelling varies widely. 82% of respondents cover five or fewer legal entities within their capital modelling function with 26% of respondents only covering one legal entity. At the other extreme, 9% of our respondents cover more than ten legal entities within their capital modelling function (Fig 7).

Fig 7: Number of legal entities covered by Capital Modelling



Size of team

We asked insurers for the size of their actuarial functions and capital modelling teams, and for the number of people within their actuarial team who are involved in Solvency II reporting.

Our respondents had a wide range of team sizes, with the most common team sizes being six to ten people for capital modelling (Fig 8a), 21 to 40 people for actuarial (Fig 8b) and four to five for Solvency II reporting within actuarial (Fig 8c).

We compared these results with the number of legal entities covered. On average, our respondents have approximately two capital team members for each legal entity covered by the capital team. The 25th and 75th percentiles of the number of capital team members per legal entity are one and two and a half persons respectively.

Fig 8a: How many people are in your capital modelling team?

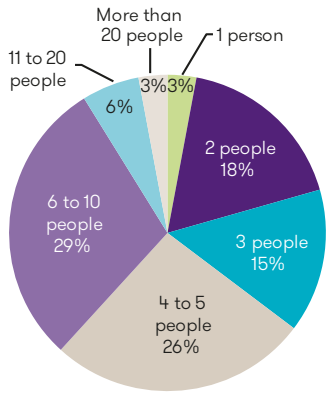


Fig 8b: How many people are in your actuarial team?

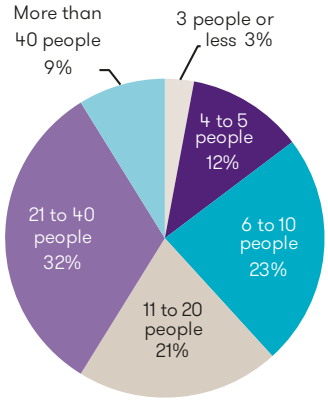
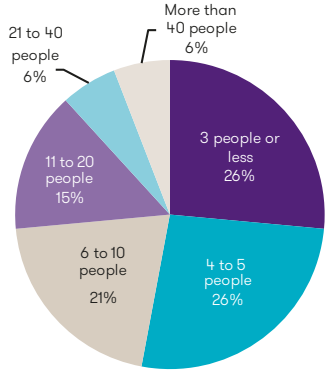


Fig 8c: How many people do you use to report on a Solvency II basis across actuarial?

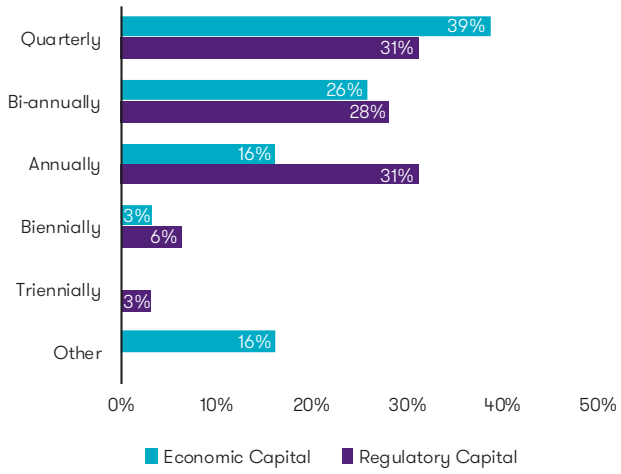


The capital modelling process

Frequency of model runs

We asked insurers how often they run their model to calculate their capital requirements. Of the respondents who use their capital model to calculate regulatory capital requirements, 31% run the model quarterly and 31% annually (Fig 9). Of the respondents who run their model to calculate economic capital, 39% run the model quarterly and 26% run the model every six months.

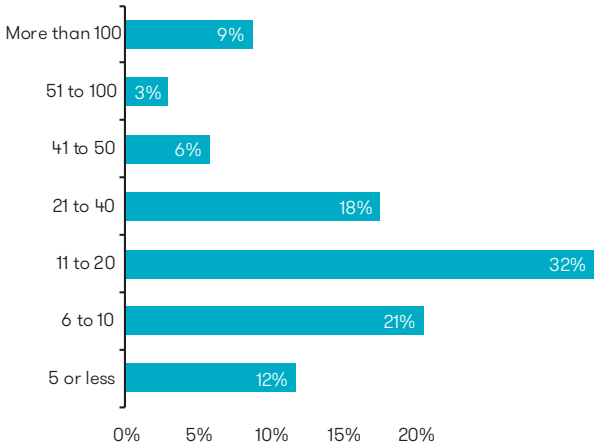
Fig 9: Frequency of model runs



Number of model runs in each reporting period

We asked insurers how many model runs they expect to perform to update the model from one reporting period to the next. 71% of respondents expect to run the model between 6 and 40 times, with the most common range being 11 to 20 runs which represents 32% of respondents (Fig 10).

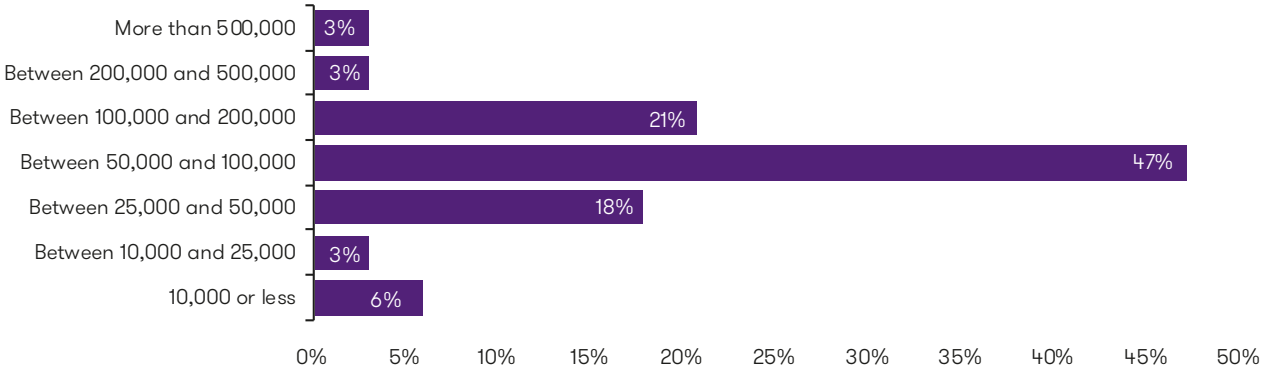
Fig 10: Number of model runs in each reporting period



Number of simulations

The number of simulations that insurers use for the final capital requirement calculation varies greatly between our respondents. 86% of respondents perform between 25,000 and 200,000 simulations, with 47% of respondents performing between 50,000 and 100,000 (Fig 11).

Fig 11: Number of Simulations



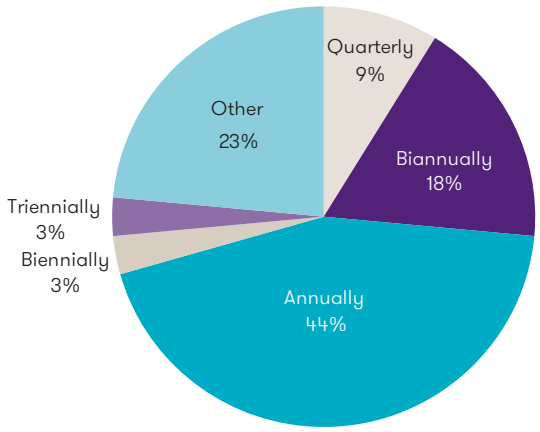
44% of firms run the same number of simulations for all results and analyses based on the capital model, while 56% of respondents run a different number of simulations for intermediate model runs or other analyses. Of the latter group, 58% of respondents run the model for significantly fewer simulations for intermediate model runs and 5% run the model for significantly more simulations. The remaining 37% of respondents run the model for a different number of simulations but still within the same ranges as in Figure 11.

Frequency of updates to modelling assumptions

We asked insurers how often they review or update their model assumptions. 9% of respondents review and update model assumptions quarterly, 18% biannually and 44% annually (Fig 12). A small number of respondents review and update assumptions on a less frequent basis than annually.

The "Other" category in Fig 12 represents respondents that review and update their assumptions continuously throughout the year or at different rates depending on the nature of the assumption in question.

Fig 12: Frequency of reviews and updates to model assumptions

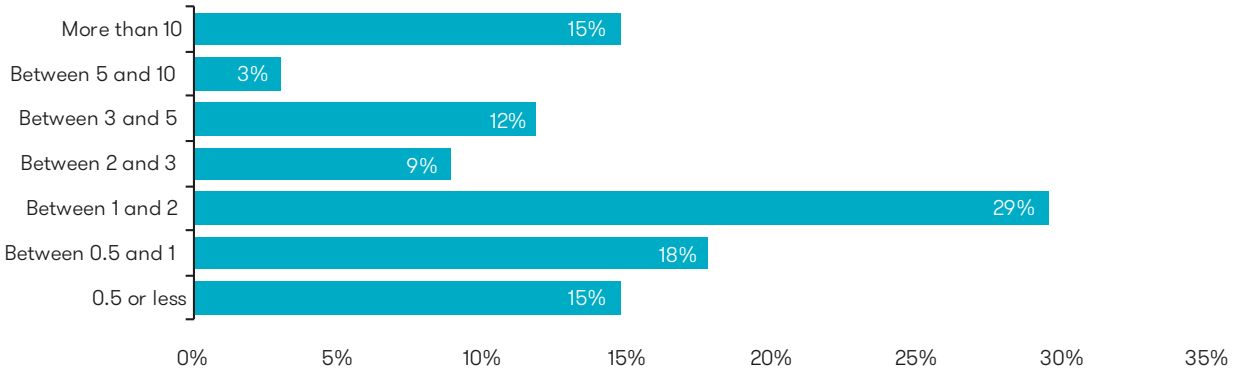


Employee years required to review and update modelling assumptions

We asked our respondents for the number of employees required to review and update modelling assumptions each year. 32% of respondents reported that it takes less than one employee year to update modelling assumptions, 29% of respondents reported that it takes between one and two employee years and 38% of respondents reported that it takes more than two employee years (Fig 13). 15% of respondents reported that it takes more than ten employee years.

We have compared these results to the size of respondents' capital teams. On average, the number of employees required to review and update modelling assumptions is around 70% of the size of the capital team. The 25th and 75th percentiles of the distribution of number of employee required to review and update modelling assumptions are around 20% and 75% of the capital team size respectively.

Fig 13: Number of employee years to review and update modelling assumptions

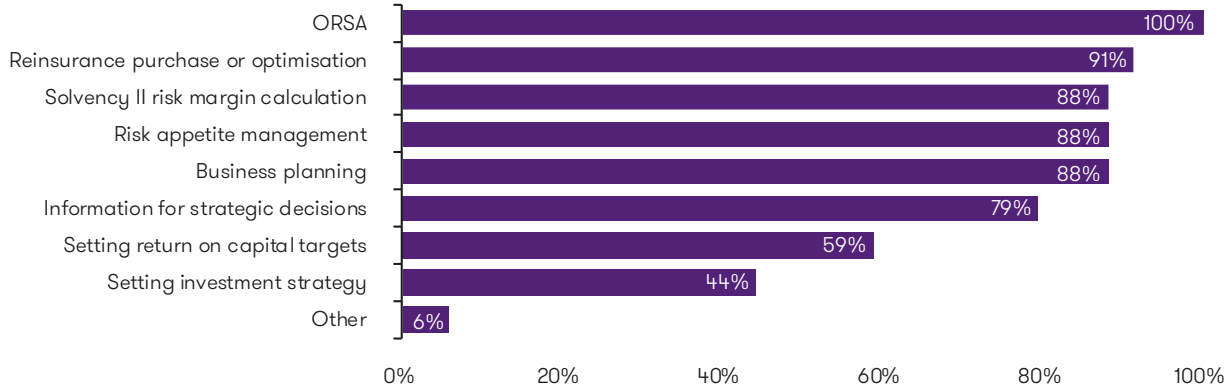


Capital model uses

In addition to calculating capital requirements, we asked insurers what they use their capital model outputs for. The most common use was for the ORSA, with all respondents using the capital model for this purpose. This was followed by reinsurance purchase or optimisation (91%), business planning (88%), risk appetite management (88%) and Solvency II risk margin calculation (88%) (Fig 14). In addition, 79% of respondents use capital modelling outputs for strategic decisions, 59% for setting return on capital targets and 44% for setting their investment strategy.

Other uses for capital model outputs that respondents listed included allocating reinsurance costs and recoveries and assessing the appropriateness of the Standard Formula.

Fig 14: Capital model output uses

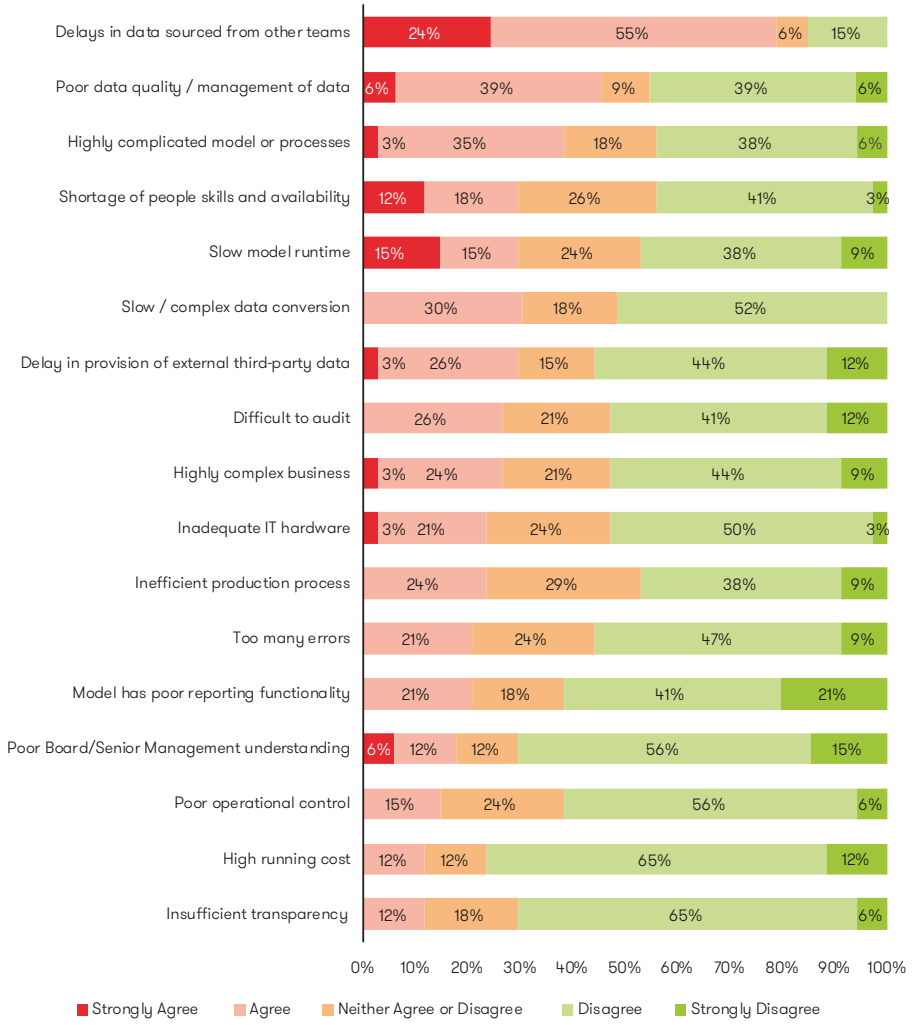


Challenges

We asked insurers to what extent they agreed that a number of issues pose a significant challenge to their end-to-end Solvency II reporting process. These included data issues, complexity of models or processes, speed of models, operational control issues, audit difficulties, cost issues, resourcing constraints and errors.

Delays in data sourced from other teams was the most common area that respondents thought posed significant challenge, with 79% agreeing or strongly agreeing (Fig 15). This was followed by poor data quality (45%) and model complexity (38%).

Fig 15: Significance of challenge to end-to-end Solvency II reporting process



Future plans

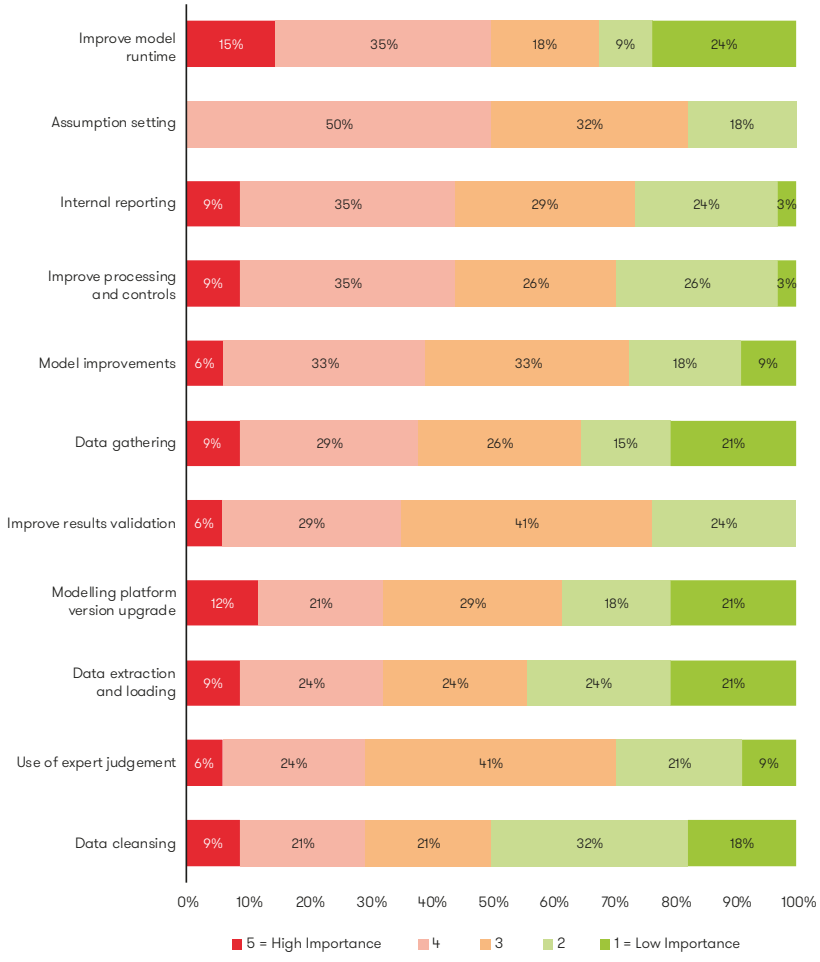
Areas to focus on in the future

We asked respondents how important it was for their company to spend time and resources in making improvements to various aspects of the capital model and capital modelling process. Respondents were asked to rate a number of areas in respect of importance from 1 to 5, with 5 representing high importance and 1 representing low importance.

Fig 16 below summarises the responses. These are shown in descending order of the proportion of respondents rating an area with a score of 4 or 5.

The areas which emerged as most important were improving model runtime and assumption setting. For each of these, half of respondents rated these areas with a score of 4 and above in terms of importance. These were followed by internal reporting (44%), improving processes and controls (44%), model improvements (39%) and data gathering (38%).

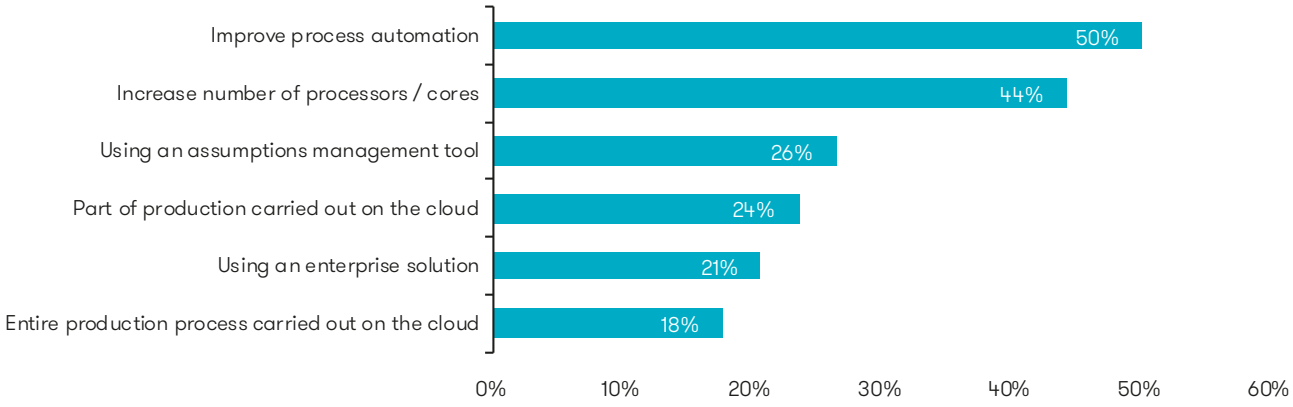
Fig 16: Importance of spending time and resources in the future to enhance the following



Modelling improvements likely to be implemented

We asked insurers what improvements they were likely to implement to increase production capacity of the capital model. The most common improvements related to process automation, with 50% of respondents looking to make improvements in this area (Fig 17). 44% of respondents said they were likely to increase the number of processors/cores.

Fig 17: Solutions likely to be implemented

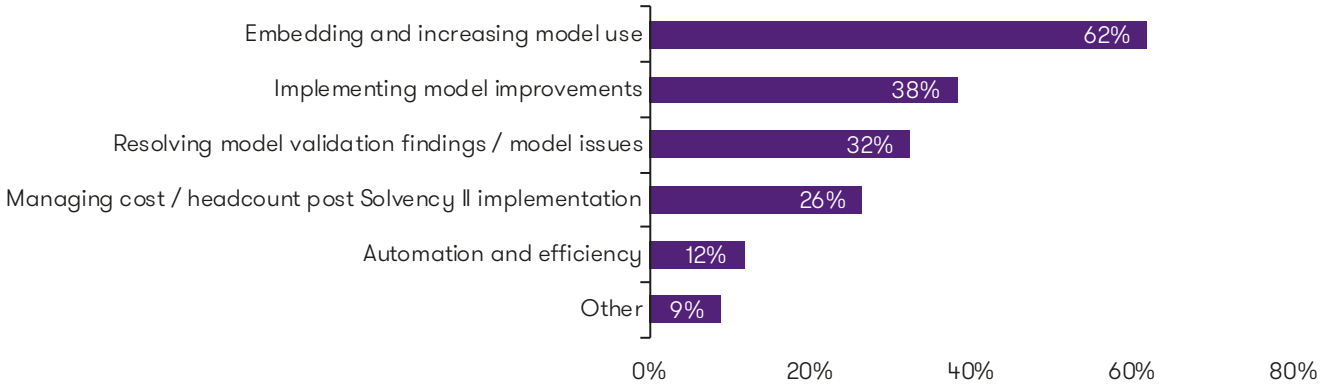


Key modelling priorities for next 12 months

We asked insurers for their key modelling priorities over the next 12 months. 62% of respondents said that embedding and increasing model use was a key priority (Fig 18). Resolving model validation findings and issues was a key priority for 32% of respondents and implementing model improvements was key for 38%. Managing cost and headcount post-Solvency II implementation was key for 26% of respondents.

Other key priorities included automation and efficiency, improving modelling sophistication and upgrading modelling software or changing modelling platform.

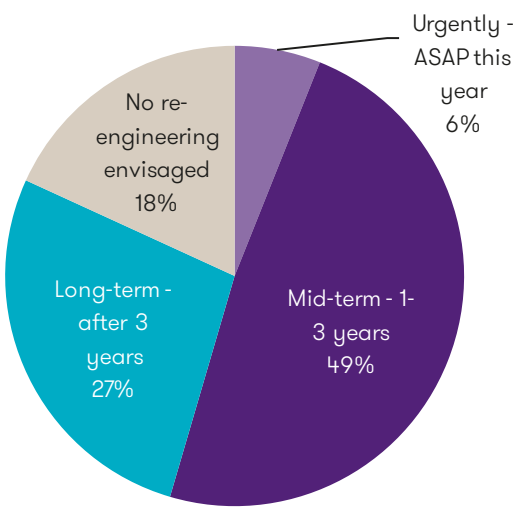
Fig 18: Key modelling priorities



Re-engineering of modelling processes

We also asked insurers how urgently they envisaged their models or model processes requiring re-engineering. 6% of respondents see their model or model processes needing re-engineering urgently, with 49% of respondents expecting re-engineering within the next one to three years and 27% expecting re-engineering in the longer term (Fig 19). 18% of respondents did not envisage that any re-engineering was required.

Fig 19: Re-engineering model processes



Concluding remarks

It is apparent from our survey results that capital models are of key importance to the insurance sector and are actively being used for a range of activities central to the running of insurance companies.

All insurers in our survey use their capital models for their Own Risk and Solvency Assessment and the vast majority also use them for assisting with reinsurance decisions, business planning, the calculation of Solvency II risk margins, managing risk appetite, and quantifying the risk and capital impact of strategic decisions. However, it is notable that more than 60% of respondents thought that embedding the model and increasing its use remain key priorities for the next year.

Insurers have invested in their capital modelling capabilities, and capital modelling teams make up a high proportion of the overall actuarial headcount. As Solvency II models mature, the balance of the workload of modelling teams shows signs of moving away from model development towards the setting of modelling assumptions. Indeed, over 70% of the modelling headcount of our respondents is focused on getting the modelling assumptions right.

Despite the huge efforts of recent years, it is clear from our survey that firms recognise that more work needs to be done to enhance and streamline their capital modelling processes. More than half of respondents expected their models to be re-engineered within the next three years, and key areas of future focus included improving runtime, assumption setting, internal reporting, improving processes and controls, model improvements and data gathering.

This is borne out by our discussions with the market, which indicate that a growing number of insurers are engaged in efforts to improve their modelling reporting times, data quality, and data flows and to manage the on-going modelling and model validation costs following Solvency II implementation. Areas in which firms are starting to invest include new process automation technologies and machine learning.

As Solvency II becomes business as usual and as computing power continues to increase, capital models have the ability to become ever more useful by becoming ever more sophisticated. In order to derive maximum benefit from this, insurers will need to streamline and speed up their capital modelling processes. This will require an investment of time, money and human capital, but the benefits of this investment are likely to far outweigh the costs.

Contacts

Simon Sheaf
Head of General Insurance
Actuarial and Risk
T +44 (0)20 7728 3280
E simon.h.sheaf@uk.gt.com

Bharat Raj
Associate Director
General Insurance Actuarial
T +44 (0)20 7865 2697
E bharat.r.raj@uk.gt.com

Jinit Shah
Associate Director
General Insurance Actuarial
T +44 (0)20 7865 2274
E jinit.shah@uk.gt.com

Adrian Gilder
Senior Manager
General Insurance Actuarial
T +44 (0)20 7865 2841
E adrian.gilder@uk.gt.com

Sophie Weisenberger
Senior Actuarial Analyst
T +44 (0)20 7184 4377
E sophie.e.weisenberger@uk.gt.com

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