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Delivering your model expectations

Insurers have based the business case for their current investment in financial models on leveraging significant operational and commercial advantage post-implementation. The spend levels are significant, but so are the promised benefits. How well are insurers delivering?

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About the research

49 life insurers participated, of which all but three operate within the EU. A combination of face to face and web based survey tools were utilised and supplemented with discussion with leading insurance professionals.

We refer to previous research conducted in 2009 in this report. A Brave New World explored the financial modelling implications of Solvency II on life insurers in the UK. Some were considering wholesale change, developing entirely new suites of models, while others were concentrating on making their existing models better controlled and documented. All were struggling with delivering results in a well-controlled and orderly manner in the timescales required by Solvency II. This had led several insurers to consider adding so-called 'accelerators' to their armoury.

Introduction

In this fast-changing market, this report provides a barometer of how insurers are progressing with their projects to overhaul their financial models, what lessons are being learnt and what the key elements are to have in place.

PwC[1] interviewed companies across Europe, along with the Middle East and South Africa, where regulators and insurers alike are looking closely at the EU's Solvency II programme and following the lead of European insurers in developing ever more complex financial models to underpin the management of life offices. This wider perspective enables us to see whether the level playing field that Solvency II promises is really that level in the crucial area of internal models.

Many companies have based the business case for their current investment in financial models on leveraging significant operational and commercial advantage post-implementation. The spend levels are significant, but so are the promised benefits. How well are insurers delivering? This report explores how life insurers are building up their financial modelling capabilities, highlights the challenges that they face in the lead up to the Solvency II live date and discusses the landscape post Solvency II.

Our thanks go to all the companies who took part, for kindly sharing their time and insights.

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NB. This report was developed and written prior to the Presidency Compromise of the Omnibus II proposals issued on the 21 June 2011 which indicated that the implementation of the full requirement of Solvency II may be delayed until 1 January 2014. The Presidency Compromise is still a working draft and so this report does not take into account its possible implications.

1 "PwC" refers to the network of member firms of PricewaterhouseCoopers International Limited (PwCIL).

Executive summary

Many life insurers launched their Solvency II projects with great expectations, aiming to sharpen decision making and competitiveness. Yet while the companies we spoke to are set to spend more than €300 million on systems improvements for Solvency II, the amount of work still needed to meet the initial 2012 deadline has largely dampened expectations, forcing most to concentrate on basic compliance rather than business benefit.

The draft transitional measures (Omnibus II) are likely to offer little or no respite from the evaluation requirements in force on 1 January 2013 and the need to have modelling capabilities in place to satisfy them. Regulatory demands will continue to increase from 2013 onwards, though there will also be more scope to finally realise initial modelling ambitions. As boards press for the commercial payback on their investment and the required turnaround time for supervisory returns is reduced, the key challenge will be how to develop a faster and more efficient 'industrialised' modelling framework.

Solvency II

Mounting doubts: Despite what, for many participants, has been a huge investment in model development (more than €20 million in many cases), most are now facing the real risk that they might not comply fully in time.

'We need to achieve sufficient progress towards Solvency II goals within the constraints of cost, timescale and availability of resources.'

Participant quote

Pragmatic approach: With so much to do and so little time to do it in, participants are narrowing their focus to the essentials needed to get over the line, while putting more ambitious plans on hold. This includes deferring major developments such as the introduction of a new data warehouse, as it will be difficult to complete this kind of 'heavy lifting' in the time remaining.

Stumbling blocks: Our research indicates that the main hurdles to compliance in most countries are documentation, governance and control rather than systems development, though IT readiness continues to be a key issue in Central and Eastern Europe. Companies also face a huge task in ensuring that boards have the necessary understanding of the model's objectives, workings and outputs to stand up to scrutiny and challenge from supervisors.

Payback time: Boards will want to see significant commercial benefits from their systems investment. In an increasingly volatile risk environment, this includes real-time evaluation of exposures, rather than the often out-of-date information generally provided today. Boards also want to enhance the basis for decision making through more forward-looking capital projections and 'what if' analysis.

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No let-up: Once initial compliance targets have been met, management may view their model as fit enough for purpose. However, the temporary fixes and extra staff resources needed to get over the line in 2012 cannot be sustained indefinitely. The risks and associated costs of controlling error-prone manual entry and intervention are also going to be unsustainable.

Rising bar: The demands on modelling capabilities will continue to mount from 2012 onwards, putting further strain on already hard-pressed infrastructures. This includes a reduction in the required turnaround time for individual entity quarterly regulatory returns from six to four weeks between 2013 and 2015. Experience of comparable developments such as the Internal Capital Adequacy Standards (ICAS) regime in the UK suggests that the overall intensity of supervision will also increase over time. Our research highlights that companies are only now starting to think about the production issues associated with running internal models on a regular basis in shorter timescales than they have historically been used to.

Next phase is 'industrialisation': Post-2012 is likely to require a second phase of development as life insurers seek to develop a more timely, more reliable and cost-effective industrialised approach to modelling. This includes the re-building, re-engineering and other heavy lifting that may have been postponed in the lead up to the initial deadline. A key focus area will be business process management and engineering.

'We want to create an end-to-end process that reduces the use of spreadsheets, manual interventions and out of model adjustments.'

Participant quote

Fit for the future

No magic solution: Many hoped that a new generation of systems innovations would enable them to meet the great expectations for risk and capital modelling. As the systems ratings in our research highlight, however, there is as yet no all-encompassing solution and firms will need to mix, match and adapt to meet their requirements. They will also need to do their homework as boards will not sanction any further investment without a crystal clear business case.

Swifter delivery: Faster reporting is a key priority for participants. Acceleration and aggregation tools would allow them to generate materially accurate risk and capital evaluations in near real time. Swifter delivery would help to make model outputs a much more useful feature of day-to-day management information and thus promote their integration into decision making. Around 20% of companies polled already use an accelerator and a further 25% are either piloting such tools or plan to introduce them.

Untapped demand: The door is open to further innovation in life insurance modelling and the sector is attracting increasing interest from new players and established IT giants alike. There are likely to be significant rewards for vendors who can deliver the next generation of tools.

'We want more detailed and accurate output.'

Participant quote

'Difficulties increase the nearer we get to our goals,' said Goethe. The demands of Solvency II are putting intense strains on model infrastructures and will continue to increase.

Synergies with financial reporting

IFRS on the horizon: As the switch to a market-consistent IFRS for insurance contracts edges closer, companies see IFRS requirements as the second most important driver for model development over the next five years, just behind Solvency II. The conceptual similarities between IFRS and Solvency II open up potential synergies in finance and actuarial model development and production. The introduction of IFRS could raise the bar still further in terms of a requirement for more granular calculations.

Key considerations for the board

'Difficulties increase the nearer we get to our goals,' said Goethe. The demands of Solvency II are putting intense strains on model infrastructures and will continue to increase.

How can you be sure that you will meet all the compliance demands before Solvency II goes live at the end of 2012?

How can you make sure that you will continue to meet both business and regulatory expectations thereafter?

Boards need to take stock of where they are now and what will be required to get over the initial hurdles. With many of the Solvency II developments having been designed by project teams, now is also the time to sit down with the wider business to identify what commercial benefits could and should be delivered once some of the current time pressures begin to ease.

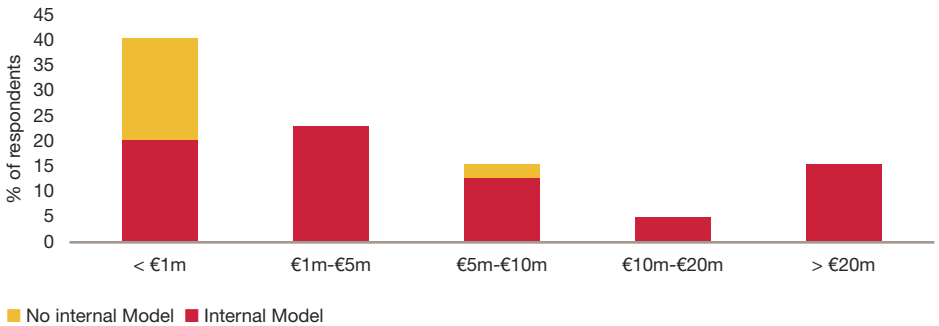
Solvency II – now what?

Although getting over the initial compliance hurdles will inevitably require a high degree of pragmatism and expediency, these fixes cannot be sustained indefinitely.

Most companies we spoke to set out with great expectations for model development under Solvency II. Around three-quarters are seeking internal model approval. Many have also embraced the incoming regime as an opportunity to enhance the basis for decision making, and see compliance as a by-product of this. There is a particular desire to generate real-time risk and capital evaluation, as much of what is delivered at present is too out-of-date to be of much use to management. Many firms also want to improve their ability to project how their risk and capital position will develop under different business plans and market scenarios. The results would enable the company to capitalise on opportunities, while assuring stakeholders that it is operating within assured risk and capital parameters.

However, our research reveals an increasing realisation that the business benefits may have to take a back seat to more pressing compliance demands. Although participants are spending what in many cases is more than €20 million on systems improvements for Solvency II (see Figure 1), few are convinced they will complete all the required developments before Solvency II goes live on 31 December 2012. With the failure to comply now seen as a real risk, project managers are insisting that the focus of implementation is narrowed down to the essentials. While there may still be business benefits, the more ambitious objectives will need to wait.

Figure 1: Expected spend on system improvements and infrastructure to meet Solvency II requirements



Source: PwC

With the failure to comply now seen as a real risk, project managers are insisting that the focus of implementation is narrowed down to the essentials.

While there may still be business benefits, the more ambitious objectives will need to wait.

'Our main priorities are governance, auditability and documentation.'

Participant quote

It is noticeable that the level of confidence among companies seeking internal model approval and those looking to use the standard formula is about the same, suggesting that the latter is unlikely to be a soft option. Companies in Austria and Germany are the most confident and those from Central and Eastern Europe are the least. A report by the Committee of European Occupational and Pensions Advisors (CEIOPS) found that some national supervisors are readier for Solvency II than others, which is likely to leave companies in countries where supervisors are behind the curve or now deciding they want to raise the bar with more to do at the end. While the UK Financial Services Authority (FSA) has pushed hard for the use of internal models from the outset (most UK participants are seeking approval), other countries such as the Netherlands are following suit, casting local firms into an especially tough race against time.

Stage one: Getting over the line

So what are the main hurdles to getting over the line in time? While most eyes are looking ahead to 31 December 2012, the lead up to implementation actually involves a whole series of mini-deadlines. To demonstrate that risk and capital evaluations are integrated into frontline decision making in line with the Use Test, for example, companies should already be using their model outputs as a key basis for business planning and hence be able to compare actual against expected outcomes during 2011.

The initial focus within most companies had been the technical intricacies of Solvency II, especially for companies seeking internal model approval. Our research highlights that many companies are now beginning to recognise the full scale and complexity of the demands relating to model control, documentation and embedding (see Figure 2).

Control and documentation

Actuarial modelling has rarely been subject to the kind of systematic careful documentation and testing of controls seen in core IT business systems such as policy administration. Testing has historically been performed on actuarial systems in an unstructured and inefficient manner. Model control is set to become business critical as risk and capital evaluations and the underlying systems, governance, testing and documentation come under close regulatory scrutiny. The scale of the task ahead is highlighted by the fact that more than half of participants currently have no model control process in place, and few of those that do, come close to meeting the exacting expectations of Solvency II.

Resources

Even if they could afford to, firms cannot throw a blank cheque at implementation. Key personnel are becoming ever scarcer and shortages can only mount in the lead up to the December 2012 deadline. Companies are therefore going to have to be ruthless in prioritising what is absolutely necessary for now and making most effective use of available resources within the group. This might include enabling staff to dedicate all of their time to Solvency II rather than splitting responsibilities or

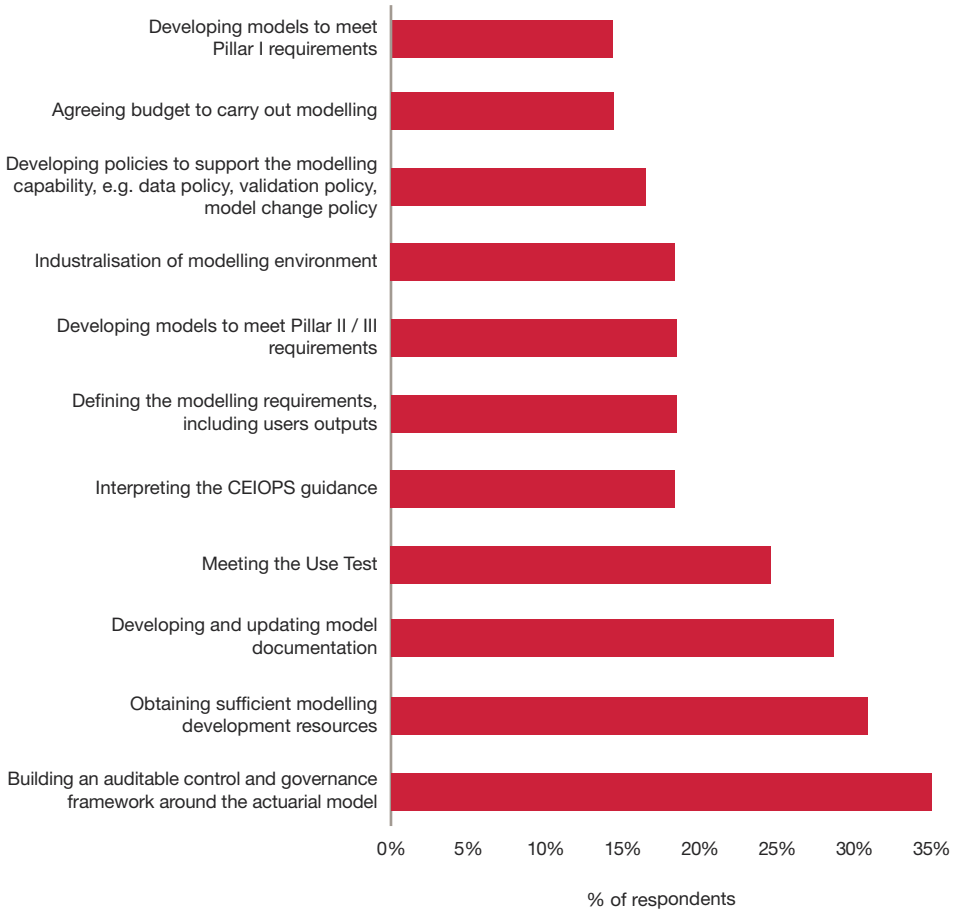
possibly seconding people from the US and other non-EU countries.

Use Test

The Use Test is high on the list of challenges identified by participants as a whole and is seen as the number one hurdle among companies seeking internal model approval. One of the main problems is that actuarial modelling has tended to be viewed in the business at large as an indecipherable 'black box'. This makes it difficult to develop the organisational understanding of, and buy-in to, the model needed to meet the Use Test. These problems have been compounded by the fact that the systems solutions for Solvency II have generally been designed and developed by project teams and may therefore fail to generate the information frontline teams believe will help them to make more effective decisions, how frequently it should be provided and in what format.

Meeting the Use Test will require much closer engagement with frontline teams to discern their needs and how they can best be met. Boards will also need to develop a fuller understanding of the nature, implications and, not least, limitations of what may be complex and unfamiliar risk and capital evaluations. The ultimate aim is a model that is sufficiently important to the running of the business that management has a direct stake in its development and improvement.

Figure 2: Modelling challenges in meeting Solvency II requirements



Source: PwC

The ultimate aim is a model that is sufficiently material to the running of the business that management has a direct stake in its development and improvement.

Validation

Validation of the model outputs and underlying assumptions and calculation techniques is critical in securing regulatory approval. To be effective, the validation requirements should have a strong influence on model development. Effective validation will in turn help to win credibility and buy-in among boards and business teams. Most companies are aware of the need for validation, though few had put significant effort in place. Leaving validation until last could add several months to the implementation process and may allow too little time to correct deficiencies. It would therefore be sensible to embed validation in the wider model development process. As well as saving time, this would make sure that the key people are in place and the work is fresh in their minds.

Staying on track

Now would be a good time to take stock of the Solvency II project and judge whether it is on track. Firms can then prioritise what needs to be done in the first phase of implementation and put in place clear timelines and contingency plans to eliminate any risk of non-compliance. For example, such an evaluation might reveal that a large investment such as a data warehouse is not a real priority at this stage as the firm's data management is satisfactory. Bedding it in would also take up a lot of the key personnel's time, which may be better deployed dealing with more pressing issues.

Stage two: Industrialisation

Once the initial deadline has been met there may be a temptation to sit back and say 'we made it, our systems are working well enough, so let's get back to our day jobs'. Boards might accept that their expectations of better management information may have to be put on hold while compliance is achieved, but they will eventually want to see discernable business benefits in return for their investment. The demands on reporting systems are also going to be ratcheted up from 2013 onwards. This includes cutting the turnaround time for quarterly reporting requirements from six to four weeks between 2013 and 2015. The time allowed for reports to supervisors will also be reduced from eighteen to fourteen weeks. In addition to this periodic reporting, life insurers will need to re-run their models as soon as possible after a major decision or event that could affect their solvency position. The triggers might include a planned acquisition, new product launch or significant fall in asset values.

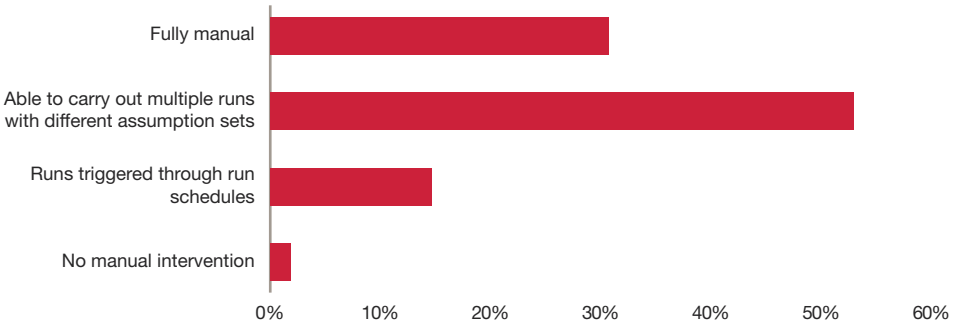
'We have to get on top of the legacy modelling issues to improve the robustness and accuracy of results.'

Participant quote

It is questionable whether already stretched legacy systems will be able to cope with these mounting demands. While some temporary fixes will be needed to meet the 2012 deadlines, these will not be sustainable in the long run. There is a particular need to eliminate, or at least curb, the proliferation of spreadsheets upon which most actuarial teams rely. Such manual intervention heightens the risk of error and is costly to control. It also requires the kind of qualified personnel that are in increasingly short supply and would be better deployed on alternate higher value tasks.

Most companies are aware of the need for validation, though few have put any firm plans in place. Leaving validation until last could add several months to the implementation process and may allow too little time to correct deficiencies.

Figure 3: Automation of runs



Source: PwC

'We want to configure data, assumption and model processes in a streamlined batch-automated environment ready to run monthly.'

Participant quote

The basis for a more sustainable solution is greater automation, though as Figure 3 highlights, most companies have quite a way to go. There will also be a growing case for introducing new tools to accelerate delivery and expand capacity. As we examine in the coming sections, however, even the most advanced systems solutions only go so far and what is successful in some companies may not work elsewhere.

Over the line and beyond

The immediate priority is getting over the line on 31 December 2012. However, smart firms are set to sustain the momentum as they seek to re-engineer systems capable of meeting initial expectations and future demands. The period after 2012 will be an opportunity to re-examine what information the business needs to make more effective decisions and how this can be delivered, with the regulatory requirement for faster reporting providing a strong catalyst for continued development and refinement. Tools such as Business Process Management (BPM) will become a key element in the delivery of actuarial results. In such an environment, there is a clear separation between the engine that delivers actuarial results in a reporting/management process and the sandbox application, which is how actuaries have traditionally viewed actuarial modelling software. For the former use, the traditional actuarial tools have struggled to deliver the performance and enterprise embedding that is required by companies. We expect this to be a major area of development for vendors and for companies to start to renew their legacy models.

Actuarial modelling software

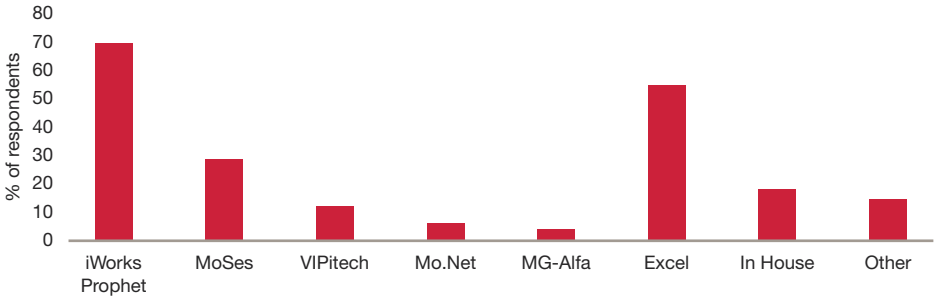
The actuarial software market is still led by the three longest established providers – iWorks Prophet from SunGard, MoSes from Towers Watson and VIPitech from Algorithmics (see Figure 4), though this year we also sought to examine the extent that Excel and internally developed models are used as part of an insurer's suite of financial models, with most companies confirming that it played a key part for some elements.

VIPitech was historically developed and sold by Watson Wyatt, but following the merger of Towers Perrin and Watson Wyatt, the software package was sold to Algorithmics as a condition of the merger set by the European Commission. It has recently been renamed Algo Financial Modeler.

Since our last report, there is little evidence of firms switching from one software package to another though there are examples where firms have rationalised their models from, perhaps, more than one platform onto a single platform.

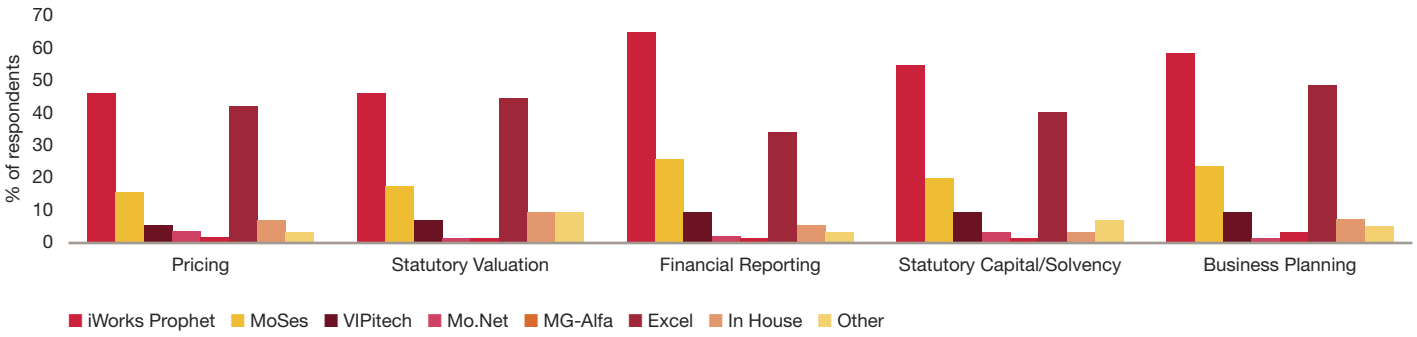
Looking at how the usage of tool varies by application (see Figure 5), financial reporting is the primary use for the third party tools, for which Excel and in-house developed applications are noticeably used less. This reflects the origins of the third party tools in embedded value and other reporting type applications and the templates supplied with these applications.

Figure 4: Modelling software used



Source: PwC

Figure 5: Modelling software by usage



Source: PwC

We asked insurers to provide an overall rating on how closely their software use meets their requirements. Mo.Net scored well with a significantly higher rating than the other packages, but this package is new into the industry with just three smaller users in our sample. From the more established software packages, Prophet and VIPitech scored well but MoSes gained a lower score. MoSes is generally used by larger insurers who appear to be more demanding.

Comparing the scores from the corresponding respondents in our previous report in 2009, there is an evident trend which shows MoSes and Prophet receiving lower scores, but more marked in the case of MoSes (see Figure 6).

Figure 6: Match to company requirements

Software Package	2010 Score	2010 Score (2009 Participants)	2009 Score
MoSes	6.6	5.8	7.0
iWorks Prophet	7.3	6.8	7.4
VIPitech	7.2	6.7	7.0
Mo.net	8.3		

Source: PwC

On the whole, sales and service, functionality and production score well, whereas development and output and controls receive weaker scores.

The satisfaction ratings are lower than the scores we have seen for how well the software meets company requirements, a trend that matches the results seen in 2009.

Responses from outside of the UK were introduced into our research this year, displaying noticeably higher scores in their overall responses for the main software packages, which has offset the trend of lower scores across corresponding UK respondents since the previous survey.

Respondents have provided satisfaction ratings for a number of categories which describe different aspects involved with their use of the software package (see Figure 7). There is further clarity here in that MoSes has scored lower in each category in comparison to all the other packages.

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Figure 7: Satisfaction ratings

Category	MoSes	iWorks Prophet	VIPitech	Mo.Net
Sales and service	6.2	7.1	7.1	7.7
Functionality	6.6	7.2	7.6	8.2
Development	6.1	6.8	6.5	7.0
Production	6.5	7.6	6.8	8.4
Output and controls	5.5	7.0	6.4	7.7

Source: PwC

The production process

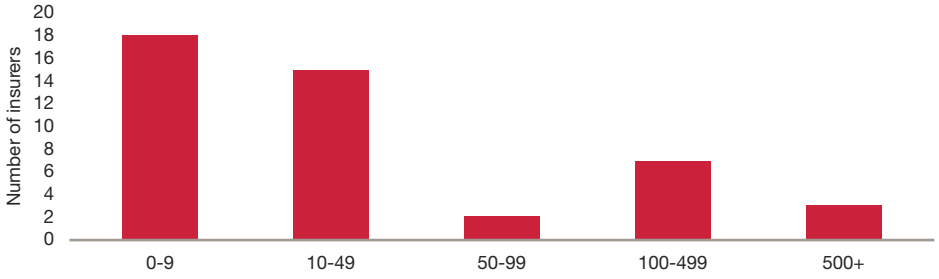
We asked firms to specify the number of computer cores they have available in their actuarial modelling infrastructures, as shown in Figure 8.

The graph shows the wide range in scale of the modelling infrastructure capability that is available to different companies. Generally this is linked to the size of the organisation and to the level of sophistication of the modelling developments. Thus similar-sized organisations in the UK have larger modelling environments than their counterparts in some of the CEE countries, due to the greater level of complexity in their models and the need to run them quickly.

In addition, companies are generally increasing the size of their modelling infrastructure. We are aware of plans by a number of insurers, particularly in the UK, to increase their infrastructures significantly, up to 2,000 or more cores.

Despite this, companies are having to push their infrastructures hard, particularly during the year end reporting period. Eighty per cent of the organisations that provided information utilise their infrastructure at least 60% of the time on a 24/7 basis during their year-end (see Figure 9). However, only 11% of organisations utilise their infrastructure for more than 60% of the time over a full year. This highlights that most organisations have periods of high intensive use on their actuarial modelling infrastructure with large periods of inactivity, where their infrastructure is idle.

Figure 8: Number of processors employed in insurers' production environment

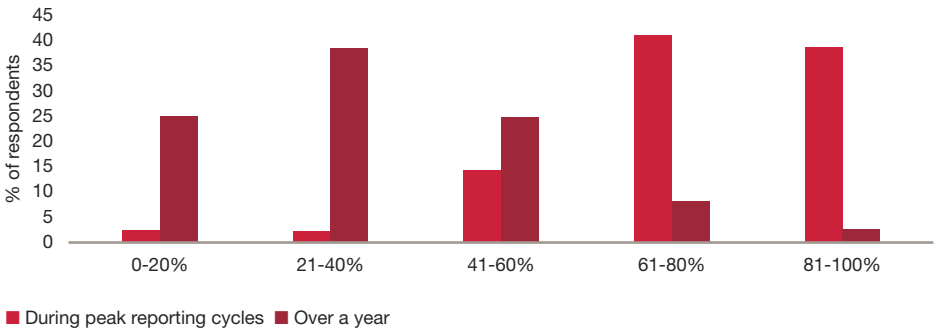


Source: PwC

Renting, in particular, can look an attractive option in theory, but organisations are finding it hard to make it work.

When asked about the frequency at which they run their actuarial models for different purposes, there was a wide range of responses.

Figure 9: Hardware capacity used



Source: PwC

A number of organisations are starting to look at other sourcing options for their actuarial infrastructure, including outsourcing, renting or, where they are part of a group, sharing the infrastructure across their various business units, for example utilising the enterprise versions of their actuarial software. Several insurers with operations across Europe either have or are currently looking to develop central process/data centres with a shared 'grid' for model runs from across the region (including some that have gone further and centralised all modelling development and production processes).

Renting, in particular, can look an attractive option in theory, but organisations are finding it hard to make it work. The high end specification machines needed for actuarial model production are not the standard kit generally available for renting, which is focused on providing a large number of machines available at short notice for simple tasks and which can be shared across different companies, generally in different industries. The other organisations likely to want access to these machines are other insurers, whose own pattern of peak usage will naturally coincide.

38 insurers who produce a statutory valuation, over half only run a full policy run, while 15 companies, particularly in the UK, run a monthly or quarterly production run on cut down data, with a full policy run less frequently.

When asked about the frequency at which they run their actuarial models for different purposes, there was a wide range of responses. For example, of the 38 insurers who produce a statutory valuation, over half only run a full policy run, while 15 companies, particularly in the UK, run a monthly or quarterly production run on cut down data, with a full policy run less frequently (one organisation never used a full production run). While a similar number of organisations only run full policy data for business planning/MI purposes, relatively few, all of whom are based in the UK, run their full or cut down data monthly, with most running their data quarterly or annually.

Organisations were also asked about the percentage of their result that was attributable to spreadsheets rather than the actuarial model. There was a significant discrepancy between different bases, with nearly 20% of respondents having over 50% of their IFRS value calculated through spreadsheets, compared with only 3% of organisations in a similar position on embedded values.

While most organisations' production run times have remained the same over the last year, many of those where improvements have been seen have mentioned improved or increased hardware (see Figure 10 overleaf). There have also been some examples where fewer policies/model points have been run or the version of the underlying actuarial software tool has been upgraded. Where runtimes have worsened, this is generally due to increased model complexity. How insurers cope with the greater complexity of Solvency II and the greater granularity of the proposed IFRS changes will be one of their challenges over the next few years. Our research highlights that companies are only now starting to think about the production issues associated with running internal models on a regular basis in shorter timescales than they have historically been used to doing.

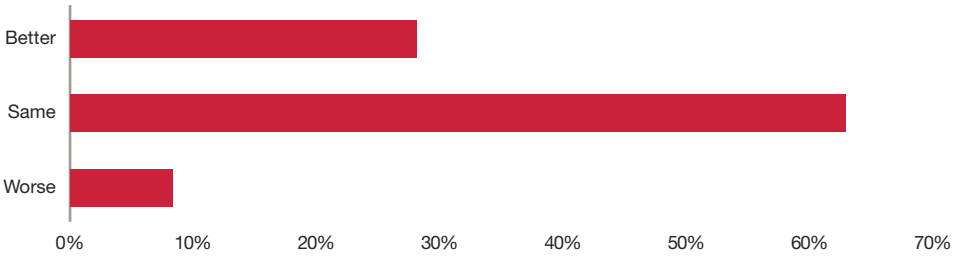
How insurers cope with the greater complexity of Solvency II and the greater granularity of the proposed IFRS changes will be one of their challenges over the next few years. Companies are only now starting to think about the production issues.

We can identify three main themes relating to production issues:

- The quality and timeliness of input data
- The time it takes to carry out production runs and the lack of automation
- The lack of available resources to carry out the production processes

Most companies have recognised that they have become over-reliant on spreadsheets in their financial reporting processes and although this is typically one of the areas addressed in a Solvency II programme there are still significant numbers of insurers with more than 100 spreadsheets in the process.

Figure 10: Change in production run time



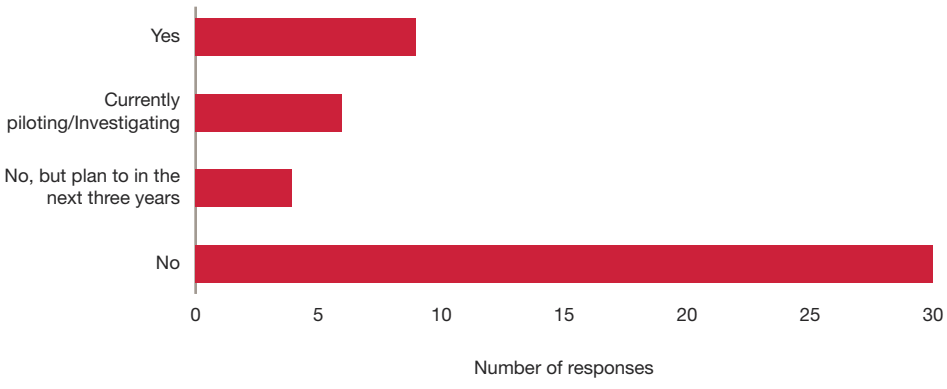
Source: PwC

Accelerators and aggregators

In our 2009 report, we anticipated that a number of insurers would start to look at how they would consolidate their results and how companies would need faster ways of delivering their solvency balance sheets and solvency capital requirements to be able to meet the demands of a quarterly submission to the regulators and monthly capital assessments for management.

The larger insurers, particularly the multinationals, are focusing on this area as is shown in Figure 11, where there are 10 insurers investigating or planning to implement an accelerator tool in addition to the nine insurers who already have one.

Figure 11: Insurers using acceleration tools



Source: PwC

There are a number of simpler approaches that can be adopted, particularly by smaller insurers who want to be able to produce materially accurate results quickly and frequently without running their complex calculation engines, or for 'what-if' scenarios, such as evaluating reinsurance options or considering different business opportunities.

There are a number of different approaches that organisations can adopt in building an accelerator tool. Two of the more sophisticated approaches generally used by larger insurers are:

- Replicating portfolios, where a portfolio of assets is constructed which replicates the liability cash flows profile as closely as possible under a large number of economic scenarios, using a complicated optimisation exercise. The market-consistent value of liabilities at each point in time can then be determined by calculating the value of the proxy asset portfolio. Within our research, 11 organisations are using or looking to use this approach.

- Curve fitting techniques, where a number of different deterministic stress scenarios are run up to the point in time where the simulation of future liability values is required. Full stochastic simulation is then run starting from that point using each stress scenario as a starting point. These different outcomes produce a curve (or multi-variate surface) of liabilities as a function of market variables. The market-consistent liabilities can then be read off the curve/surface based on the underlying values of the relevant market variables. There are four participants who are using or looking to use this approach.

In addition, there are a number of simpler approaches that can be adopted, particularly by smaller insurers who want to be able to produce materially accurate results quickly and frequently without running their complex calculation engines, or for 'what-if' scenarios, such as evaluating reinsurance options or considering different business opportunities. These include the use of closed form solutions, making proportionate adjustments to underlying cash flows or risk solvency capital or using sensitivities.

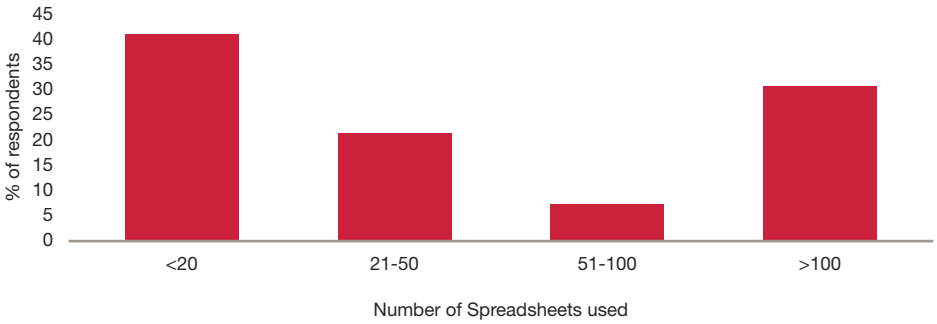
The main proprietary software tool in use or being considered by insurers is the Algorithmics tool with five larger insurers mentioning it. On the other hand, four insurers are using Excel, which is a simpler and easier tool to understand and implement, provided the development is not made overly complicated.

Calibration is critical to the successful execution of accelerator tools. The frequency of calculation varies across companies but there is a growing consensus among companies about calibrating quarterly or half-yearly. However, calibration is as much about the effectiveness of the tool when used, particularly in changing market conditions. While insurers are generally satisfied with effectiveness in stable market conditions, they are less happy with effectiveness in changing market conditions. Those companies who consider their tool effective in changing market conditions generally have used the tool for longer and have therefore been able to understand and embed the model more successfully. This suggests that companies considering the use of accelerator tools should plan on a long period of implementation, as these tools do take a lot of time to understand and calibrate effectively.

Accelerator tools are still in relative infancy and many companies comment that there is little point in building in greater sophistication than that which is available from the base input information and that one of the key areas of consideration was about communication of the tool's capability and limitations.

The aggregation tool of choice is clearly Excel. While it is easy to use and manipulate, it is not generally thought of as a well-controlled environment or capable of handling large volumes of data quickly. It is also a tool which encourages spreadsheet proliferation. As Figure 12 highlights, a third of companies use in excess of 100 different spreadsheets as part of their statutory valuation process, with two companies using over 900 spreadsheets for each valuation.

Figure 12: Spreadsheets used in the reporting process



Source: PwC

This level of spreadsheet use is not sustainable in a controlled and efficient manner. It is likely that companies will look to consolidate their use of spreadsheets, either by building more functionality into the actuarial modelling software or by re-engineering their spreadsheets.

Organisations are starting to look at other options to consolidate their results effectively, quickly and in a more controlled manner. Solvency II will drive that trend as the aggregation of results across different risks, for example, using correlation matrices, will make the aggregation process more complicated and time consuming. The introduction of more sophisticated methods, such as copulas, will only accelerate this process, with a result that larger companies will find extensive use of Excel untenable.

Actuaries will not be able to add additional spreadsheets or amend functionality without going through a managed development process.

Aggregation will become a controlled and auditable process which may even be capable of being run without the intervention of actuaries, freeing them up for carrying out more valuable activities such as results analysis.

We therefore see the development of more controlled aggregation tools being implemented in one of two directions:

- Companies that continue to use Excel as their aggregation tool will put an overlay of a spreadsheet control software tool, such as Finsbury Solutions, Cincom or Second Floor, around it. This will ensure that all changes are properly managed and that an audit trail is put in place.
- Larger organisations will look at more industrialised tools such as SAS, Business Objects or Hyperion Essbase and will only use Excel where it is necessary.

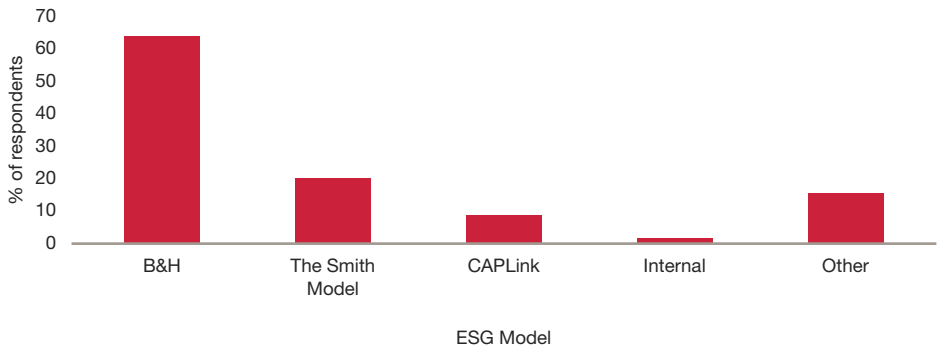
In either situation, actuaries will not be able to add additional spreadsheets or amend functionality without going through a managed development process. As a result, aggregation will become a controlled and auditable process which may even be capable of being run without the intervention of actuaries, freeing them up for carrying out more valuable activities such as results analysis.

Stochastic modelling and economic scenario generators

The key shift in the use of actuarial models in the last 10 years has been the move from deterministic to stochastic calculations of technical liabilities. This is still focused largely on market risk for life insurance portfolios, but we are seeing increasingly complex methods of looking at longevity and mortality related risks including the introduction of Monte-Carlo methods.

The main tool for driving stochastic calculations for market risk is the Economic Scenario Generator (ESG), a market which continues to be dominated by Barrie & Hibbert (B&H) though several new entrants have entered the market since our previous report. B&H's ESG is used by approximately two thirds of the companies we spoke to in the course of our research that use an ESG (see Figure 13). Most companies that use an ESG are quite reliant on the provider to provide a large amount of input to the calibration of the ESG. There is however a large number of companies (30% of our participants), particularly outside the UK market, that do not currently use an ESG.

Figure 13: ESG usage



Source: PwC

Almost all users of ESGs use the variance reduction techniques built into the standard tools to reduce the number of scenarios required to be run.

Most companies modelled cash, equities, property and government bonds as individual asset classes, with a limited number of participants looking at more complex asset categories such as CDOs, property and corporate bonds, overseas bonds and non-listed equities (see Figure 14).

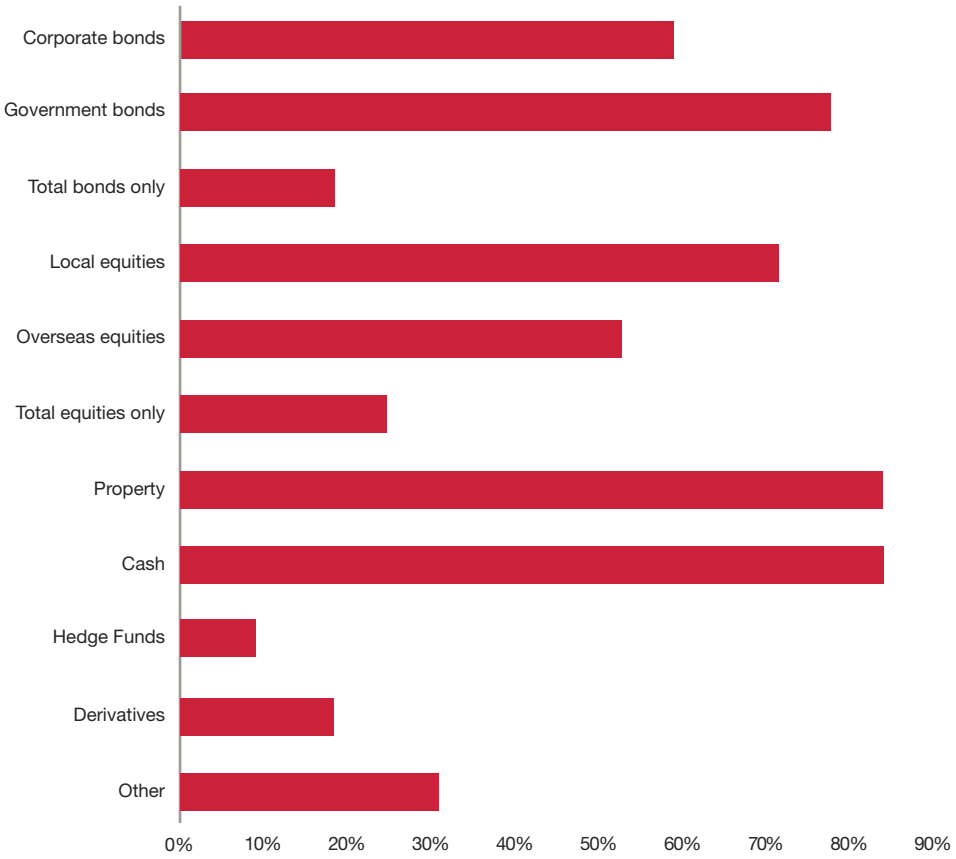
Almost all users of ESGs use the variance reduction techniques built into the standard tools to reduce the number of scenarios required to be run.

In general, insurers are satisfied with the ESG software that they use, and in particular users pay most attention to:

- The accuracy of standard calibrations supplied by the vendor
- Confidence of validity of market data for market consistent calculations
- Timeliness of standard calibrations
- Capability of calibration tools
- Flexibility and functionality of the model, and
- Transparency and documentation of the model

Most dissatisfaction with the tools tends to be the result of unhappiness with one of these areas, though a number of users commented on the expense of these tools.

Figure 14: Assets modelled in the ESG



Source: PwC

Conclusion

So how do companies ensure they are delivering the business benefits needed to meet senior managements' expectations from modelling? There is a real risk that companies will 'flop' over the line exhausted, with no appetite for further change. What does the smart company do?

Pragmatism is king for those companies who will successfully deliver their Solvency II financial modelling projects:

- Take stock, we've had 24 months of frantic planning and development for some companies. What has really been achieved and how are you progressing against your business requirements? What do you plan to deliver going forward?
- If not done already, identify the future state core business processes
- Identify the minimum development required to support core business processes – this is the pragmatic plan
- Revalidate the identified strategic, operational and commercial benefits of the development with internal stakeholders and get external perspective
- Validate that the current plan will deliver originally identified business benefits
- Re-plan – how do you get assurance that you'll deliver for 2012? Plan to deliver the essentials early then build complexity – i.e. get the framework right even if not all the elements are in place
- Focus on keeping the models as simple as possible avoiding unnecessary complexity
- Think about what will need to be done after 2012 – heavy lifting is too risky pre-2012 so leave until after, but plan for it so that you can achieve the promised benefits. Formulate your modelling and IT strategy for the next five years, which will support and deliver the benefits. This could potentially include evaluating the benefits of a major refresh and replacement of core business systems

Delivering your model expectations

If you would like to discuss any of the issues raised in this paper and how we can support your business in finding answers to these questions, please contact one of the authors listed below.

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Appendix – Participating companies

PwC would like to thank the following companies for participating in our research:

ALICO

Allianz Elementar Lebensversicherungs AG

Aviva

AXA Sun Life Services

Barclays Insurance Dublin

BENEFIA TUnŻ S.A. VIG

Co-operative Financial Services

Discovery Life

Donau Versicherung

Engage Mutual Assurance

Equitable Life

Fortis Life

Friends Provident

Gen Re

Generali Deutschland Holding AG

Generali Pojistovna

ING Life Insurance

Just Retirement

KD Življenje, d.d.

Kooperativa pojistovna, VIG

Kvarner Vienna Insurance Group d.d.

Legal and General

Liverpool Victoria

Lloyds Banking Group

Momentum

NFU Mutual

Phoenix Group

Poisťovňa Slovenskej sporitel'ne, a. s.

Pojišťovna České spořitelny, a.s.

Police Mutual Assurance Society

Prudential

Royal Liver Assurance

Royal London Group

Sanlam

Sparkassen Versicherung AG

St. James' Place Wealth Management

Standard Life

Swiss Life AG

Swiss Re Services Ltd (London)

Union Vienna Insurance Group Biztosító Zrt.

UNIQA zivotno osiguranje a.d.o. Beograd

Wesleyan Assurance Society

Wiener Städtische Versicherung AG

Zurich Financial Services

In addition, responses were received from 5 other insurers, who did not wish to be identified.

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