LCP INSIGHT CLARITY ADVICE

How are insurers getting most value from their capital modelling?

Insurance market review
Capital modelling 2017

We would like to thank those firms who participated in LCP's insurance capital modelling market review 2017.

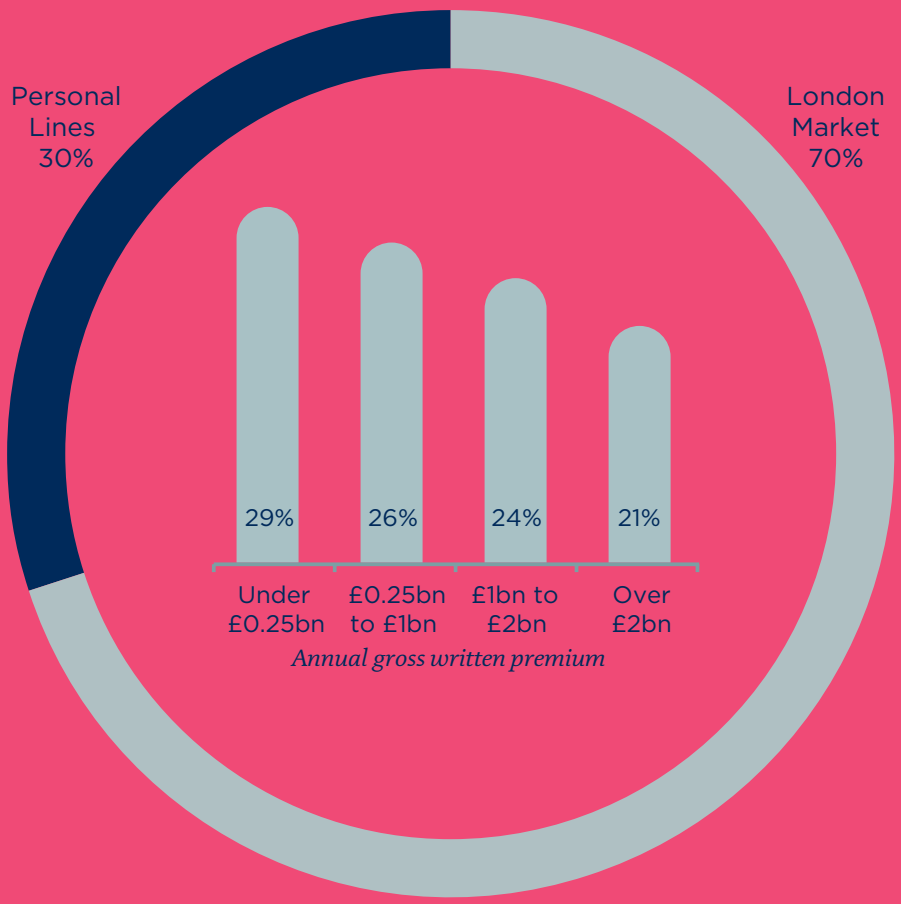
If you would like to discuss any aspect of the review please contact Tom Durkin on +44 (0)20 7432 6606 or email tom.durkin@lcp.uk.com. Alternatively contact the LCP partner who normally advises you.

About the market review

We interviewed 35 general insurers about how they are getting most value from their capital modelling.

The participants represent a cross-section of the UK general insurance market. They are predominately UK headquartered and 83% of participants have gained internal model approval under Solvency II.

The charts below provide further details of the firms that took part.



Contents

1. Executive summary

Over 85% of insurers see their capital modelling adding genuine value to their business beyond regulatory compliance.

Welcome to our 2017 market review on insurance capital modelling.

We met with 35 UK insurers to understand how they are getting most value from their capital modelling. We interviewed board members, other users of the modelling results and members of the capital modelling teams, to understand their different perspectives.

We found a wide range of views. However, through this diversity, clear common themes emerged:

- **Capital modelling is widely recognised as a valuable tool for running an insurer** – examples include a CEO citing the modelling as a central component of business planning, and a CRO of another firm reporting how it has directly and quantifiably increased return on equity for their shareholders.
- **There are eight qualities shared by firms realising the most value from their capital modelling** – these provide a non-technical view into capital modelling good practice, and enable firms to assess their own modelling capabilities.

There also remain significant challenges, including:

- **Firms struggling to meet the above eight qualities** – for example, where the capital modelling is not yet responsive to the needs of the business or where firms are still looking to improve the communication of model results.
- **The need to improve efficiency** – this is particularly a challenge for firms with approved Solvency II internal models, where onerous regulatory burden is a barrier to development.
- **Building a consensus on a range of other areas** – including how best to use the model, improve business engagement and avoid model results being misinterpreted.

This report sets out key findings and, on page 18, a clear action plan for board members, model users and capital modelling teams for 2017 and beyond.

Tom Durkin
Partner

Key findings and actions

Key finding	Recommended action
Eight qualities of effective capital modelling We identified eight qualities shared by firms realising the most value from their capital modelling.	Review your capital modelling capabilities againts these eight qualities to assess where you are performing well and agree areas for development. See pages 6 and 7
Model use Firms are typically targeting between 2 and 4 main model uses. There are contrasting (and often strongly held) views on how best to use the modelling.	Consider the range of contrasting views, and seek consensus on your current and planned uses for the capital model. See pages 8 and 9
Business engagement In many firms, the underwriters and other model users are genuinely interested in and engaged with the modelling process. This has led to a virtuous cycle, with better engagement leading to better modelling.	Ensure there is sufficient engagement from the business to support high quality modelling. For example establish a focused group of key senior "ambassadors" to start a virtuous engagement cycle. See pages 10 and 11
Model governance There are four aspects of effective model governance: strategy, oversight, input from subject matter experts and technical review.	Check that your model governance covers all four aspects of effective governance, to ensure your modelling stays reliable and fit for purpose. See page 12
Understanding model limitations Business understanding of model limitations is improving, but remains relatively generic (eg, "no models are perfect"). Further work is required to avoid results being used inappropriately.	Refine your reporting of model limitations to concentrate on a focused list of meaningful considerations. This will help ensure the model is used appropriately for each specific use of the model. See page 13
Team sizes Capital modelling team sizes vary widely. In some cases, teams are more than twice the size of others supporting similar businesses.	Ensure effectiveness and value for money from your modelling by consciously reviewing your team size, composition and skill set. See pages 14 and 15
Model development Internal model approval has become a significant barrier to efficiencies and innovation. Firms are putting up with inferior models, very long run times and inefficient processes to avoid disturbing an approved model.	Actively review your model to ensure it remains fit for purpose. Consider setting an "expiry date" to manage expectations for major development work. See page 17

2. Eight qualities of effective capital modelling

We identified eight qualities shared by those firms realising the most value from their capital modelling. These relate to all aspects of the modelling, including model use, governance, the modelling team and the wider business.

The **first five are core qualities** representing the minimum capability that the board should expect. The **final three are typical of higher performing firms** – working towards these will help you maximise value from your modelling.

Participating firm

Knowledge is spread around the capital modelling team by rotating responsibilities regularly

1 Answers key business questions

There is a clear link between model design and business requirements. Risk and capital questions can be readily answered by the modelling. The modelling supports key strategic decisions.

2 Responsive

Routine queries are answered same day or within 24 hours. Complex queries may take longer, but expectations are well managed and the modelling team is flexible to meet business requirements. The team has built a trusted relationship with key stakeholders.

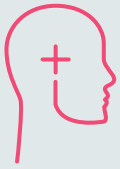
3 Clear communication

Findings are clear and succinct. Information is tailored to the preferences of the board and other stakeholders. There is effective use of graphics and a consistent structure for results, so the board can:

- Quickly identify the most important impacts on the business.
- Understand the reasons for changes in the risk and capital profile.
- Ask challenging questions (and get sound answers).

4 Resilience

Key person risk is well managed within the modelling team. The team culture supports knowledge sharing and people are eager to help others develop. For each area of the modelling, at least two team members have sufficient knowledge and experience to manage the work on their own if required.



5 Well-managed model change

Planned model changes are presented for discussion, with justification for the change, alternatives and the estimated impact. The model change policy is appropriate for the business and is routinely followed in practice. Model development has the same discipline as robust IT development.

6 Clear vision and ownership

The owners of the model have well-defined shared goals for the modelling. They are also clear on how the goals will be achieved. The wider business supports this vision and understands what kinds of questions the modelling can (and cannot) support.

Any additional insight required beyond the scope of the main capital modelling is typically provided using other specialist models.

7 Firm-wide view of risk

Management information (MI) from the capital modelling is widely used and consistent with other MI. For example:

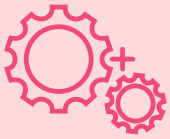
- Capital modelling results are routinely used by risk and other core business functions.
- Underwriters have deep understanding of the capital figures for their business unit and these form a well established basis to support decision making.

Where different views on risk are genuinely required for different purposes, this is well understood and the differences reconciled.

Participating firm

It's all about connectedness – ensuring the capital modelling is genuinely connected to the front end of the business

8 Anticipating future change



The firm has a clear plan for how the modelling will develop beyond the next annual reporting cycle. The modelling team are regularly looking to improve the efficiency, usability and capability of the modelling. The wider firm supports the necessary research and development, for example researching new external data sources, modelling techniques and software platforms. The team responds quickly to opportunities as they arise.

LCP recommendation

Board members should review their firm's capital modelling capabilities against these eight qualities. By identifying any gaps, you can confirm areas where you are performing well and agree any high priority areas for further development.

The capital modelling team should review their own performance against the qualities to ensure the modelling meets current business requirements and can respond flexibly to future changes.

3. Model use

Participating firm

Yes the model does add value. However, once the catastrophe and reinsurance calculations have been done, there is a lot of regulatory baggage

Business value

Over 85% of firms see capital modelling adding genuine business value beyond regulatory compliance.

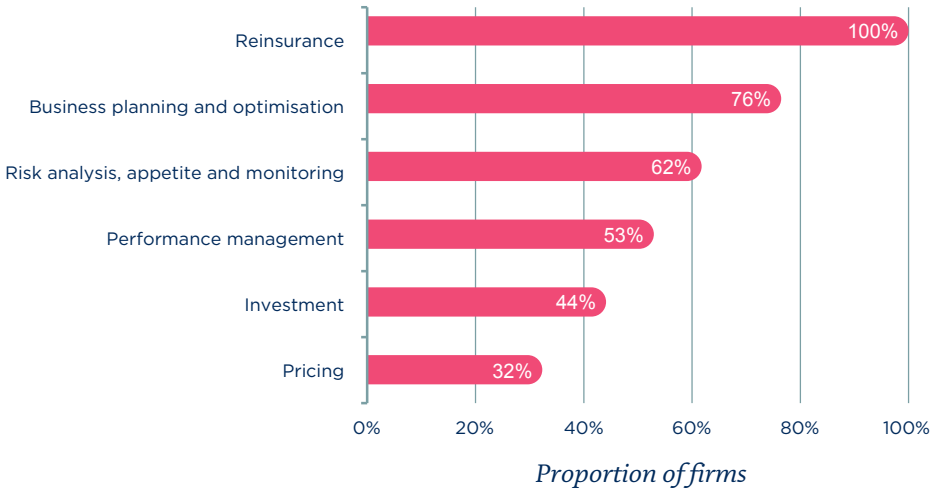
However, of these firms, many complained of significant compliance burden from Solvency II. These firms would prefer to have less complex models that are more tightly focused on the key risks faced by the business.

A small number noted that the modelling has previously been seen as a tick box exercise, but they are recently seeing real business value emerging. This is leading to wider model use.

Capital modelling uses

In addition to capital setting, the most common uses for capital modelling are in the areas of reinsurance, business planning and risk management (eg, risk analysis, risk appetite setting and/or monitoring).

Key uses for capital models (in addition to capital setting)



Half of firms target between 2 and 4 main model uses. Around a quarter apply the modelling extensively across most areas of the business.

One firm said that their internal model has been run over 4,000 times in the last year for a range of different purposes.

Contrasting views on model use

There is range of views on how best to use the modelling for particular purposes. These views are often strongly held and differ by firm and individual.

For example:

- **Business planning** – most firms use capital modelling as a critical component of business planning. Others take a deliberate decision not to do this, as they believe the model is unable to assess the quality of the business plan - for example, because the plan is a key input to the modelling.
- **Pricing and investments** – there was debate on whether the main capital model is a useful tool for making pricing and/or investment decisions, or whether these should be left to more specialist models. However, we note that the use of capital modelling in investment decisions appears to be increasing.
- **Remuneration** – a minority of firms (around 10%) use capital modelling to guide remuneration. Others actively avoid this, as they believe it is inappropriate, potentially misleading and/or can lead to unintended behaviours.

Planned developments

Areas of planned model development, to better support model use, include:

- Improving model responsiveness – for example, to enable the model to more easily reflect changes in the economic or business environment.
- Different views on risk and profit – for example, to ensure the model reports profit on a Solvency II basis, or to output both accident and underwriting year results.
- Closer links to business decision making – for example to more closely link the capital modelling and underwriting systems to improve decision making at the point of writing the business.

Participating firm

We are starting to link the catastrophe modelling with the underwriting system to help underwriters understand catastrophe aggregates pre-bind

LCP recommendation

There is a wide range of distinct and valid views on how best to harness capital modelling. Whatever your chosen approach, it is critical to clearly identify the uses of the model – both on a current and target basis. This will ensure there is a common vision of what the modelling can achieve, and the model development plan will be able to reflect this.

4. Building business engagement

Business engagement

A majority of firms reported good success in engaging underwriters and other stakeholders with the capital modelling.

In other cases, risk and capital modelling teams reported frustration at the limited engagement, for example when setting and monitoring appropriate risk appetites.

Clear communication

Participating firm

Common structures provide a framework, like knowing where to look in a newspaper for the crossword and editorial

Clear communication of both modelling capabilities and model results is key to securing business engagement.

From our interviews with board members and capital modellers, three principles emerged for ensuring that the communication is effective:

- **Consistent structure for model results** – familiarity with the structure of the results enables users to quickly identify the most important impacts on the business.
- **Use of graphics and charts** – visualisations can be information rich and help users to more easily understand and act upon the model results.
- **Identify what works well for your audience** – in the best firms, the capital modelling team understand the preferred reporting style of the board and other stakeholders.

A number of firms emphasised the importance of talking through the results, rather than just relying on the written reports. They noted that this helps ensure the main messages are highlighted and supports two-way discussion.

Avoiding silos

Firms identified the challenge of developing new capital modellers' business understanding. They described an increasing risk of the capital modelling team being seen as a silo, separate from the business. This can be a significant barrier to business engagement.

Some firms are addressing this by involving juniors in discussions with the wider business, for example through the parameterisation process or at model results review meetings.

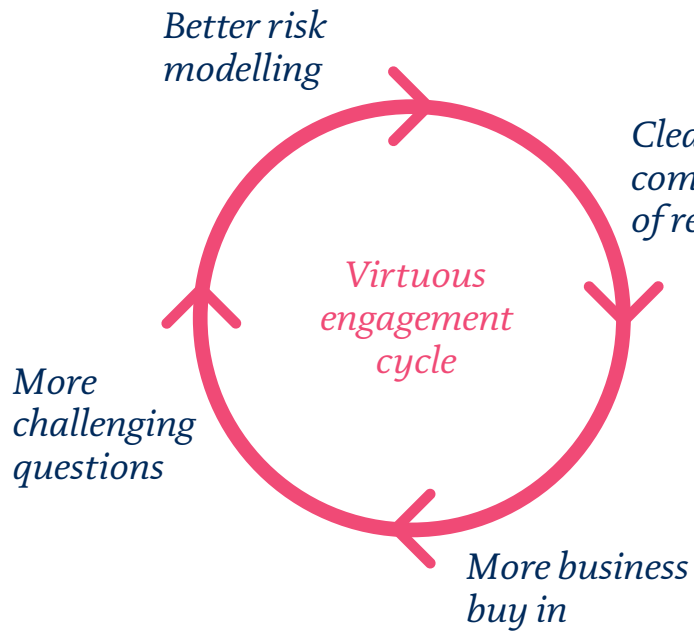
Others have in place a secondment programme to give their team wider business experience.

Starting a virtuous cycle

In many cases, engagement with the business has led to a virtuous cycle: it has driven more challenge from the business, which has improved the understanding of what the model is doing. This increased level of interest has supported further investment in the modelling and in the presentation of results which, in turn, has made it easier for the business to see the added value.

Participating firm

There was a little bit of interest ... then lots of interest ... then there was a steady pull on the model by the business as they realised the model CAN do something and they wanted it



LCP recommendation

Firms looking to improve model engagement and use should decide how best to improve communication and accelerate a virtuous engagement cycle.

An effective approach is often to start by engaging with a focused group of potential model users. For example, by first demonstrating value to a small number of underwriters with a natural interest in the modelling. This will help you engage with other, more sceptical, underwriters.

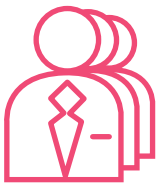
5. Model governance

Firms described four aspects of effective model governance:

1. Model strategy

An overarching strategy is essential to provide vision and direction to the modelling.

This is often most effective when driven by a relatively small and focused group of individuals, either as a separate steering group or as part of model oversight.



2. Model oversight

Model oversight provides formal challenge to the model results and reporting.

This is typically done by a senior committee, such as the Board Risk or Risk and Capital committee.

3. Subject matter experts

Input to the modelling from across the business ensures it appropriately reflects the business risk profile. This brings subject matter experts closer to the modelling and may also free up the modelling team to provide independent challenge.

Involvement of subject matter experts is typically achieved through the parameterisation or validation processes.

4. Technical review

Technical review supports the development and review of the detailed modelling approach and methodology.

The approach to technical review varies significantly between firms. Examples include multi-disciplinary technical modelling working groups, open briefing sessions or, for smaller firms, one-on-one conversations outside the formal committees.

There is often overlap in participants for each aspect of the governance. Some firms have tried to streamline the governance by reducing the number of layers – eg, by disbanding the technical modelling working groups. Results have been mixed – with some firms reporting improved efficiencies and others noting that the detailed conversations have bubbled up to more senior, and arguably less appropriate, committees.

LCP recommendation

To ensure their capital modelling is reliably controlled and reflects the current business risk profile, firms should review how they address each of these four aspects of effective model governance.

6. Understanding model limitations

Firms reported that understanding of the modelling has improved significantly in recent years.

A number of firms also reported an improvement in understanding of model limitations, but noted that further improvements are required.

For example:

- **Confirmation bias** – model users tend to emphasise limitations when they do not agree with or dislike the output they see. They place greater reliance on results that corroborate their preconceived ideas.
- **Link to model uses** – clearer links are required between the generic model limitations (ie, "no models are perfect") and the implications for specific model uses under consideration.
- **Headline results** – modelling results are being used out of context, for example, the results are being quoted by board members without appropriately articulating the key uncertainties and limitations.

Participating firm

The business understands it's 'just a model', but this is mentioned most when the model disagrees with preconceptions.

Understanding is weaker on the use of the outputs to make business decisions, whereby they might get attached to specific numbers and not appreciate that a wide range of outcomes are possible.

On occasion, some capital modelling teams have refused business requests where they see attempts to use the model inappropriately. Others have considered routinely reporting just directional or qualitative findings, in order to emphasise the significant uncertainties.

LCP recommendation

There is still work to be done to ensure that model limitations are well understood. Two-way dialogue between model users and the modelling team is essential to ensure the modelling is used appropriately.

We recommend you refine your reporting of model limitations to concentrate on a focused list of meaningful considerations. This will help ensure the model is used appropriately for each specific use of the model.

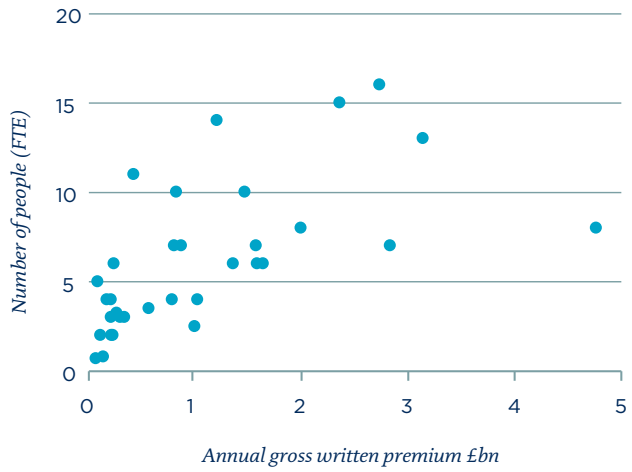
7. Capital modelling teams

Team size

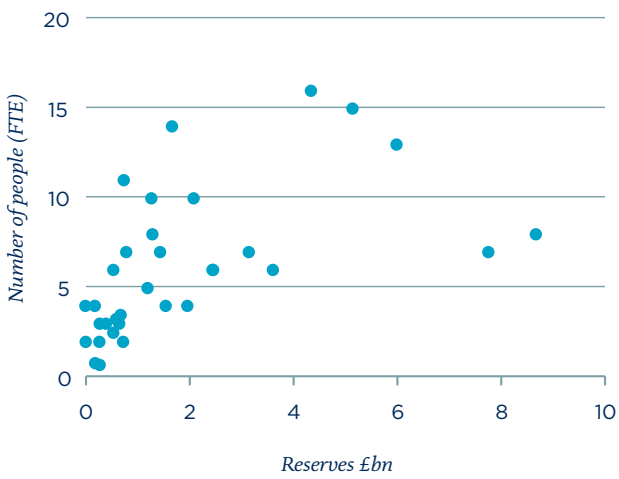
As expected, the size of capital modelling teams typically increases in line with business size and complexity. However, within this overall trend, there is a wide variation in team sizes. In some cases, teams are twice the size of others supporting similar businesses.

The charts below illustrate the range of team business sizes by annual premium, level of reserves, number of classes of business and overall complexity. The level of complexity has been assessed by considering a range of factors such as premiums, reserves, frequency of reporting and outwards reinsurance arrangements.

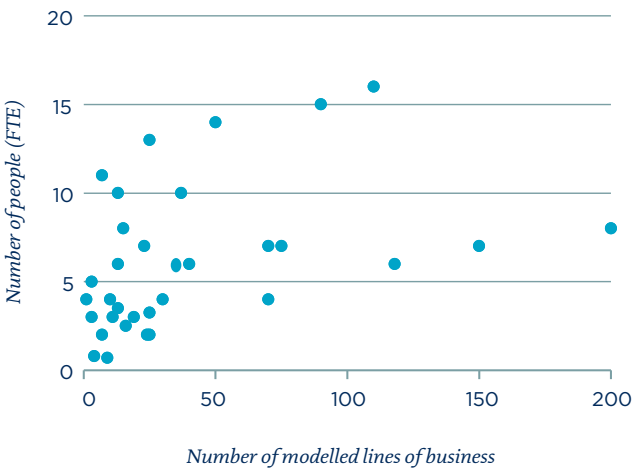
Team size vs premium



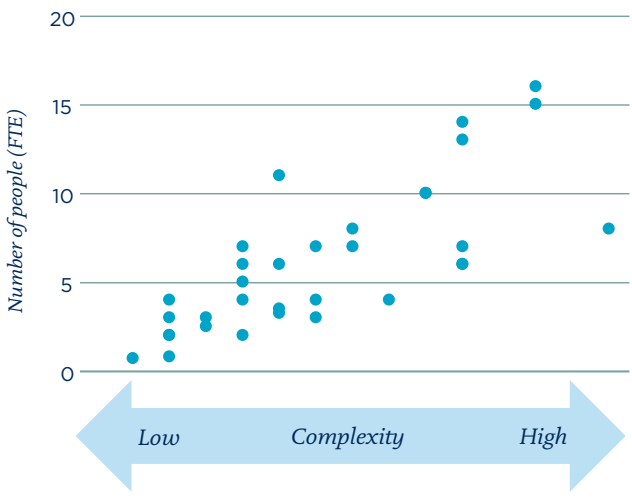
Team size vs reserves



Team size vs lines of business



Team size vs business complexity



There are a range of reasons why teams may be larger or smaller than average. For example:

- Some firms with larger teams cited extensive and high-profile use of the modelling across the business, requiring quick turnaround times at short notice.
- Some smaller teams explained how they have developed highly streamlined processes; others draw on wider stakeholders to support the core modelling team, for example drawing on the reserving function to support reserve risk parameterisation.

Team composition and skill set

On average teams are split 50-50 between senior and junior individuals, although a few smaller firms have dispensed with junior support entirely.

As capital modelling has matured, so too has the mix of skills required for an effective team. For example, the work now often requires updating of established processes, rather than developing the processes from scratch.

The most effective teams recognise the value of a disciplined IT mindset to ensure that the modelling is robust and well maintained.

Communication was cited as the most important non-technical skill required.

Some firms have inadvertently created significant key person risk by over-relying on individual team members for specific areas of knowledge. They are now taking steps to address this, for example by ensuring that at least two team members have good knowledge and experience of each area of the model.

Participating firm

Coding and modelling is relatively easy... clear communication is hard.

LCP recommendation

The wide variation in capital modelling team sizes shows a significant opportunity for firms to improve value for money from their modelling. For example, firms with larger teams making extensive use of the modelling should actively challenge which model uses are genuinely valued by the business and which uses could be scaled back.

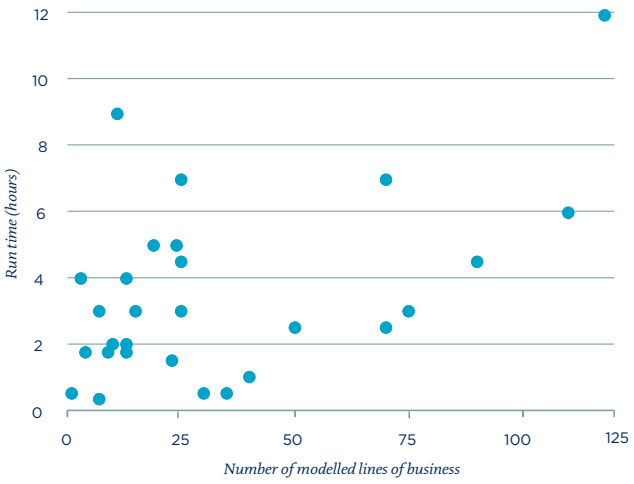
All firms should assess the mix of skills and key person risk within their team to ensure work is being done by the most appropriate individuals and to improve team resilience.

8. Model run times

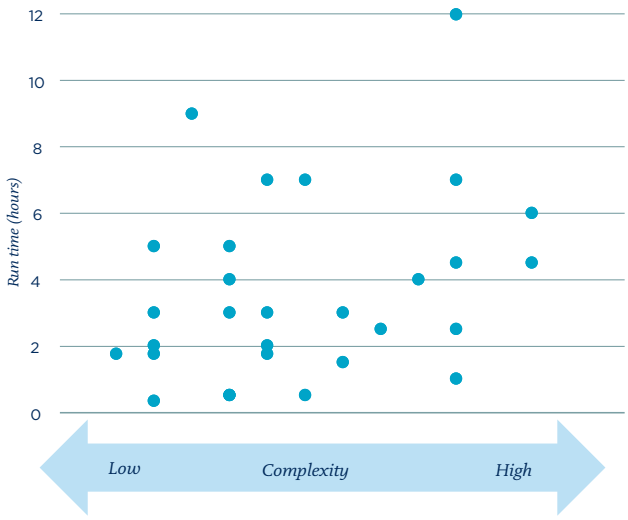
Many capital models still have very long run times and this can significantly reduce their usefulness.

The charts below illustrate the range of run times by number of lines of business and by business complexity.

Run time vs lines of business



Run time vs business complexity



Four firms have a run time of between 18 and 48 hours. To improve readability, these are not shown on the above charts. They have between 3 and 200 lines of business and a range of business complexities.

Half the firms we met have a model that takes 4 hours or longer to run. They described how:

- This makes it difficult to run the model twice within a working day and how a failed model run can lead to significant delays in results.
- Model runs need to be carefully planned, making it harder to respond quickly to ad hoc requests.
- Model validation typically requires a large number of runs – this can lead to a week or more of constant model runs to support a single validation cycle.

Some firms have successfully reduced run time without affecting the quality of the modelling. One firm cited a reduction in run time from 24 hours to 4 hours through a combination of simplifying non material aspects of the model calculation and sampling fewer results – this was achieved within the same modelling platform.

Others firms are developing mini-models to deliver results more quickly, for example by using approximations or running a cut-down version of the main model. This is a useful approach, but has the disadvantage of requiring multiple models to be maintained in parallel.

9. Model development

For firms with an approved Solvency II internal model, model approval has become a significant barrier to efficiencies and innovation.

Around a third of firms reported they are disincentivised from making changes due to their model change policy and/or regulatory pressure.

Firms are putting up with inferior models and inefficient processes to avoid disturbing an approved model. Others are running two models – one approved, and the second being their true view of risk.

Participating firm

We try not to change the model, unless it's a minor change.

LCP recommendation

Firms should actively review their model to ensure it remains fit for purpose. It is useful to set an "expiry date" for the model to manage expectations for future major development work.

Firms with an approved model should look to revise their model change policy to better support innovation. In the build up to Solvency II, many firms prepared overly prescriptive change policies and we are seeing a trend of these being updated to more appropriately reflect the needs of the business.

A small number of firms are harnessing recent developments in new technology to optimise their modelling capability. This includes moving to new, faster, modelling platforms, or delivering model results through interactive dashboards.

A number of firms reported and that they constrain model changes into a pre-specified window within their annual work calendar.

Few firms have an explicit expiry date for their current model. Model development is more typically done in stages – for example, by enhancing key sections of the model in turn.

Participating firm

Model lock down helps with good discipline. It reduces tinkering and gives time to reflect.

It's peaceful once you get used to it.

10. Plans for the future

Action checklist

There remain significant opportunities for insurers to get more value from their capital modelling. To achieve this, firms should act now to ensure their modelling capabilities continue to evolve.

1. Assess your firm against the eight qualities of effective modelling:

5 *core qualities:*

- ☐ Answers key business questions
- ☐ Responsive
- ☐ Clear communication
- ☐ Resilience
- ☐ Well managed model change

3 *qualities typical of higher performing firms:*

- ☐ Clear vision and ownership
- ☐ Firm-wide view of risk
- ☐ Anticipating future change

2. Confirm there is consensus on your firm's current and planned uses for the capital model, and that this is reflected in your development plans.
3. Assess the current level of engagement from the business. Where improvement is required, achieve this through a virtuous engagement cycle.
4. Ensure your model governance covers the four aspects required to be effective – strategy, oversight, input from subject matter experts and technical review.
5. Ensure model limitations are well understood. Focus on a list of meaningful considerations caused by these limitations.
6. Assess the effectiveness and value for money from your modelling, by reviewing your team size, composition and skill set against the benchmarks on page 14 of this report.
7. Ensure you are not putting up with an inferior model due to the internal model approval process. Plan now, to manage expectations for future development work.

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Contact us

For further information please contact our team.

Tom Durkin
Partner

tom.durkin@lcp.uk.com
+44(0)20 7432 6606

Catherine Drummond
Partner

catherine.drummond@lcp.uk.com
+44(0)20 7432 0637

Richard Holloway
Senior Consultant

richard.holloway@lcp.uk.com
+44(0)20 7432 6787

Neil Gedalla
Consultant

neil.gedalla@lcp.uk.com
+44(0)20 7432 7780

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Lane Clark & Peacock LLP
London, UK
Tel: +44 (0)20 7439 2266
enquiries@lcp.uk.com

Lane Clark & Peacock LLP
Winchester, UK
Tel: +44 (0)1962 870060
enquiries@lcp.uk.com

Lane Clark & Peacock Ireland Limited
Dublin, Ireland
Tel: +353 (0)1 614 43 93
enquiries@lcpireland.com

Lane Clark & Peacock Netherlands B.V.
(operating under licence)
Utrecht, Netherlands
Tel: +31 (0)30 256 76 30
info@lcpnl.com