

Global Model
Practice Survey 2010
Adding some hot topics





We are proud to present the second edition of the Model Practice Survey conducted by Deloitte during the first half of 2010. Due to the success of the 2009 edition, which primarily had European financial institutions in scope, it was decided to broaden the scope to global coverage. This survey includes the response of 89 financial institutions, including banks, insurers, and investment managers. The survey elaborates on the challenges that financial institutions face with models in an environment, in which prevailing financial risk management theory is being questioned.

The survey addresses four dimensions of model practice: model governance; model design and standards for acceptance; reporting and calculation systems; and data. The questions asked are relevant for banking, insurance and investment management regulation.

Besides the four model practice dimensions mentioned above, we interviewed the participants in more detail on a number of hot topics. The specific topics for this year's survey are model risk, outsourcing, and counterparty credit risk. We are very grateful to all participating financial institutions, as well as all participating member firms, for their contribution to this research initiative. For now we hope you will find the Global Model Practice Survey 2010 useful.

Sincerely,
Hans van Leeuwen
Partner, Deloitte Financial Risk Management, The Netherlands

Introduction

Model Governance is of utmost importance. Unambiguous accountability and responsibility for each risk model mitigate inefficient processes and regulatory issues

Models provide powerful tools for professionals within the Financial Services Industry for identifying, assessing, monitoring, measuring and mitigating risks, for decision support and scenario analyses, and to determine the value of your assets and liabilities. Both internal as well as external stakeholders rely on information resulting from models. As a result of years of research and using models in practice, model reliability and credibility have increased. This has been manifested in a prominent role for models in supervisory frameworks such as Basel II and Solvency II.

The regulatory frameworks require models to be transparent and of high quality. The output from the models should be such that they can be interpreted unambiguously and applied consistently. Elements like these should be safeguarded by designing and embedding a proper model practice.

Experience shows that there is room for improvement in model practice. This report discusses the current model practice maturity within the various institutions that we interviewed, as well as a number of areas for improvement. The results are also compared, where possible, to the results of the 2009 Model Practice Survey.

Approach

The objective of the survey is twofold. First of all, our interviews are targeted to gain insight into the level of maturity and the progress made since the previous Model Practice Survey. The maturity level is analysed on the four dimensions that constitute the foundation of model practice¹:

1. clear model governance that addresses appropriate levels of approval;
2. appropriate model design and standards for acceptance;
3. reporting and calculation systems that are reliable, flexible, transparent and easy to operate; and
4. data that is easily accessible, consistent and of sufficient quality.

The four model practice dimensions are analysed at an industry level for the banking, insurance, and investment management industry as well as per regulatory framework.²

Secondly, we analyse a number of hot topics in model practice i.e. model risk, outsourcing and counterparty credit risk, in more detail.

The five levels of maturity are defined as follows;

Figure 1: Definition of maturity levels

Level	Explanation
1. Pre-implementation	Few efforts have yet been made to implement the required level of the model practice aspect.
2. Scattered implementation	Some required elements of the model practice aspect have been implemented.
3. Basic implementation	The maturity of the model practice aspect has reached the level of minimum requirement.
4. Uniform implementation	The model practice aspect is uniformly implemented among various models and is aligned with model practice requirements.
5. Full implementation	The model practice aspect is fully developed. It is an integral part of risk management and is aligned with strategic business decisions.

- 1 In this report the four dimensions have been abbreviated to 'Governance', 'Model design and standards for acceptance', 'Reporting and calculation systems' and 'Data,' respectively.
- 2 A comparison is presented of the results of financial institutions that must comply with Basel II and Solvency II.

Respondents

This report is based on the responses of 89 participants who completed the questionnaire. The following paragraph gives a high level overview of the characteristics of the participants. As it is expected that the maturity of model practice will partly depend on regulatory requirements, the last paragraph discusses the results split by the regulatory requirements with which the respondents have to comply.

Respondents

This section describes the characteristics of the survey participants. Respondent characteristics are discussed on a function, geographic, industry and regulatory framework level.

Function

Most of the respondents fulfil a role in the Risk Management function (35%) and at board level (22%). The participants of the survey are distributed over the following functions as depicted in Figure 2.

Geography

33% of the respondents work in institutions located in Europe. South American respondents represent 16%. North America, Asia, Middle East, Africa and Middle America are represented to a lesser extent: 7%, 14%, 13%, 12% and 5%, respectively.

Industry

62% of the respondents are active in the Banking sector. Insurers account for 25%. The Investment Management sector accounts for 13%.

Figure 2: Role of respondents

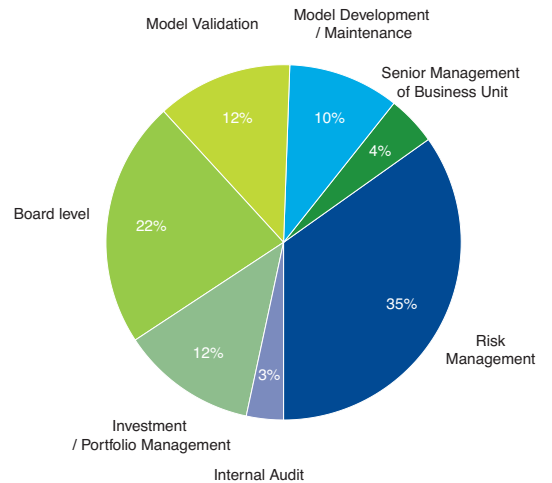


Figure 3: Geographical distribution of respondents

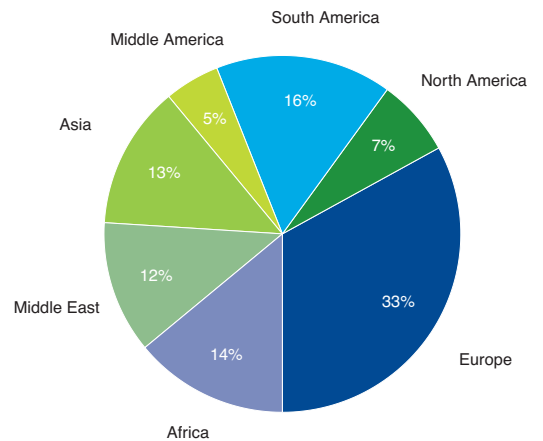
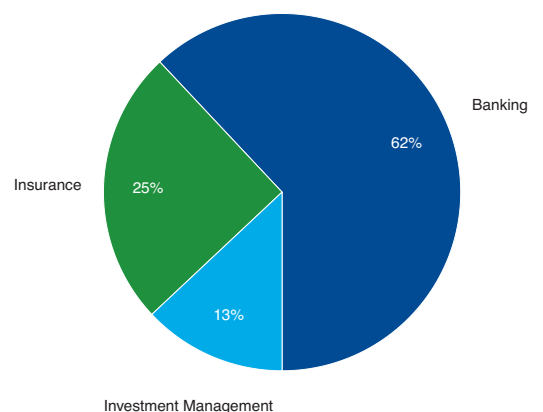


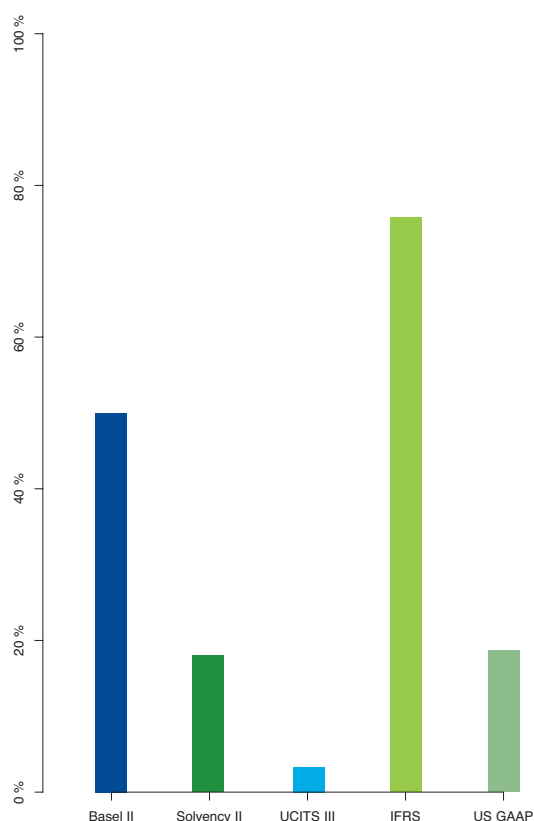
Figure 4: Breakdown of the different sectors within the Financial Services Industry of the respondents



Regulatory framework

50% of the respondents (80% of the banking respondents) need to comply with Basel II regulations. 19% of the total respondents (74% of all insurance companies interviewed) will have to comply with Solvency II. Other regulations, with which respondents predominantly have to comply, are IFRS (76%), US GAAP (19%), and UCITS (2%).

Figure 5: Regulatory compliance for model practice



Deloitte comment – Shigeru Furusawa, Partner Deloitte Touche Tohmatsu, Japan

Recent years have seen a tremendous increase in trading volumes of over-the-counter derivatives and complex products. For these products mark-to-market and mark-by-proxy (IFRS 7 level 1 and 2) can in most cases not be included in disclosures. Hence, mark-to-model (IFRS 7 level 3) is required. To ensure that an accurate fair value is disclosed, in case of mark-to-model, sound model practice is of the utmost importance.

Sector Results

The graph below depicts the mean indicated maturity of the model practice on the four dimensions: governance, model design and standards for acceptance ("design"), reporting and calculation systems ("reporting") and data. The colour of the line indicates the industry the respondents work in.

Figure 6: Mean maturity per model dimension



Only 5% of the banks make optimal use of internal models in pricing strategies

The overall implementation of models in the banking sector is relatively mature. This is in line with our expectation because the Basel II framework, including ICAAP, has forced banks to understand their models and improve their risk profile. However, there are still important steps to be taken during the coming years. While the output of the models is compliant with the minimum regulatory requirements, the respondents indicate that the models are not yet fully integrated in the business model. The next step for banks should be to better align their reporting and calculation systems with their business model: i.e. use the systems in trend, sensitivity and scenario analysis, use the systems to guide portfolio management, and in pricing and for accounting purposes.

Compared to the previous survey, it is notable that the view on data quality has improved significantly. In the 2009 survey, 35% of the respondents indicated that this model practice dimension was hardly mature, whereas 73% of the respondents in this survey indicate that the elements of this dimension are at least basically implemented.

Governance

The model governance is relatively mature. The governance structure creates clear accountability and transparency to all internal stakeholders. The communication to external stakeholders with regard to the governance structure can be further improved. Within most banks model governance is uniformly implemented. The following governance elements could be further improved: the implementation of training on model practice as well as the statement of how to deal with possible conflicts of interest between stakeholders: 23% of the respondents indicate that they do not account for possible conflicts of interest between stakeholders in a mature manner.

Model design and standards for acceptance

Similar to the governance structure, the model design and standards for acceptance are implemented in a

relatively mature manner. The maturity of risk models in relation to the regulatory requirements is relatively high. According to 95% of respondents, the risk models within their institutions comply with at least the minimum regulatory requirements. Independence between model development and validation is generally safeguarded, with only 14% of the respondents indicating this is not yet mature. Model effectiveness can be increased, however, by taking diversification effects into account in the models. More than 25% of the respondents indicate that their risk models do not address inter-business and inter-risk diversification effects in an optimal way.

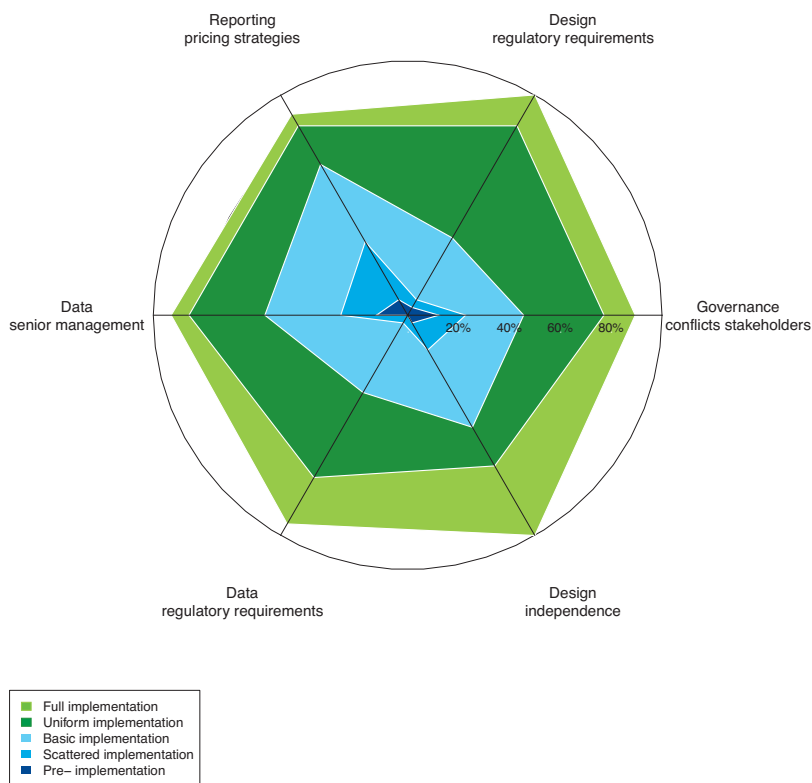
Reporting and calculation systems

In the 'Reporting and calculation systems' section questions are asked about the integration of reporting and calculation systems in the business model of the bank. It covers the use of the systems to guide portfolio management, the use in trend, sensitivity and scenario analysis, the use of reporting and calculation systems in pricing and the use for accounting purposes. This model practice dimension is less mature than the three other model practice dimensions. On the question of whether reporting and calculation systems are used to guide client and product portfolio management, 31% of the respondents indicate that this is maturely implemented. In addition to this, only 5% of banks indicate that the use of reporting and calculation systems for the pricing of their products is fully mature. It seems that banks have developed these systems only to comply with minimum regulatory standards, not as an integral part of the bank's complete business model.

Data

For 73% of the respondents this model practice dimension is at least basically implemented. It seems that data management received more attention from management than last year. In particular, topics on the sufficiency of data history and compliance with regulatory requirements score maturely. Senior management involvement in data management, however, could be intensified. More than 28% of the respondents indicate that senior management is not fully informed on data quality. In the area of data management policies, procedures, and audit trails, improvements could be made. Almost 30% of the respondents indicate that these elements are implemented on a scattered basis or less.

Figure 7: This figure shows the elements on which banks indicate their implementation levels are most mature.



Deloitte comment – Eelco Schnezler, Director Financial Risk Management, Regional Basel III lead

A vast number of models that have been developed in the wake of Basel II have been put to the test in the recent crisis. As a result many of these models need to be redesigned and redeveloped. On top of that Basel III and IFRS 9 are expected to result in additional models. Therefore model development, maintenance and validation continues to be high on the risk management agenda.

50% of insurers indicate that the review of models is immature

The survey shows that, on average, the level of maturity of model practice of insurers is less than the level of maturity of model practice of banks and investment managers. This is in line with our expectations since renewed regulatory requirements for insurers have not come into effect yet, whereas most banks already need to comply with such regulation.

As the implementation date for new insurance regulation approaches, insurers have considerable work to bring their model practice up to standard or even best practice. One further challenge lies in the facilitation of user training in order to improve the understanding of the model practice by management. Furthermore, once the models are in place, they need to be validated by independent parties and the data needs to be sorted.

We notice that preparation for Solvency II pays off: we observe that, on average, the maturity level of the model practice dimensions improved since last year's Model Practice Survey.

Governance

Most insurers indicate that model governance is still in development. The average governance maturity is below the basic implementation level and is the least developed model practice element for insurers. The communication to external stakeholders, in particular, could be improved: 67% of the respondents indicate that the current implementation level is scattered or nonexistent. In line with the results for banks, the governance structure could be improved on the description of how to deal with possible conflicts of interest between stakeholders. The results concerning the general model knowledge of users versus senior management is in line with our finding concerning the low maturity on the implementation of training.

Model design and standards for acceptance

Similar to the governance structure, model design and standards of acceptance are implemented relatively immaturely. The maturity level of the implementation of model reviews within insurance firms is fairly low. For example, only a limited number of respondents indicate that their models are subject to a fully developed regular review by internal audit. Moreover, almost half of the respondents indicate that the maturity of their risk models is not high enough to comply with regulatory requirements.

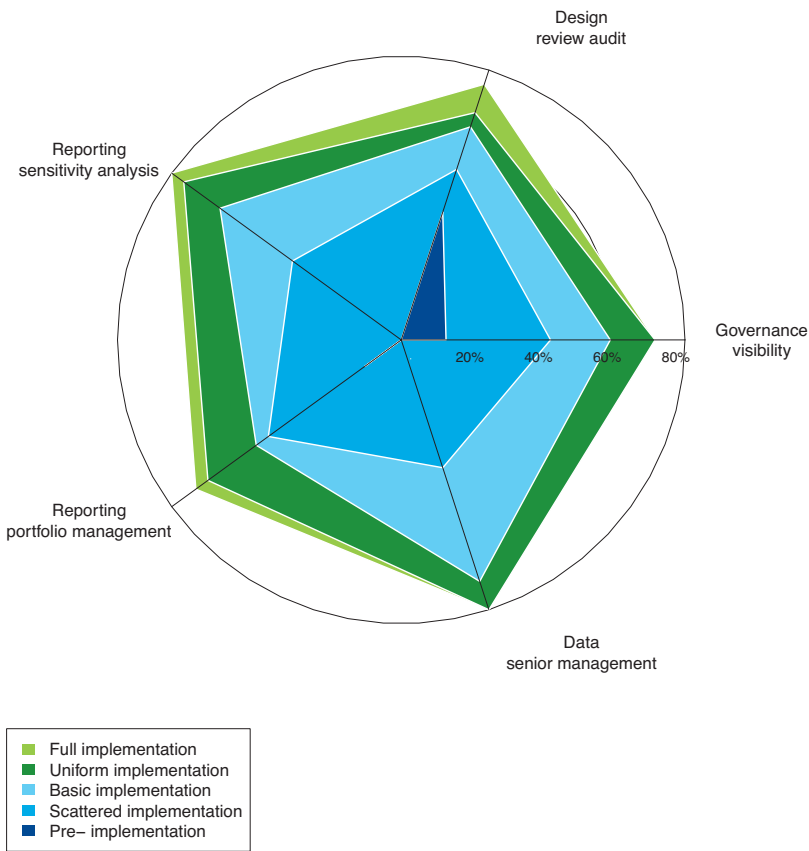
Reporting and calculation systems

This element describes the use of the reporting and calculation systems by insurers for their business decisions. As with the other model practice dimensions for insurers, this dimension has an average maturity below the level of basic implementation. More than 56% of the respondents indicate that the use of models for trend and sensitivity analyses against KPIs such as RAROC or Value New Business is not fully implemented. The use of models to guide client management, product portfolio management, and for client acceptance is at an even lower level of maturity: 71% of the respondents indicate that their maturity is below that of basic implementation.

Data

Within insurance companies, this dimension of model practice is developed relatively well. However, the average maturity level is still just below the level of basic implementation. For more than 61% of the respondents the data element is hardly mature. The reporting of data quality to senior management, and the use of external data sources for calibration and validation of the models, score very low: only 22% of the respondents indicate that they have an implementation level above basic implementation.

Figure 8: This figure shows the elements on which insurers indicate their implementation levels are most mature.



Deloitte comment – Pelle van Vlijmen, Senior Director Financial Risk Management, Regional Solvency II lead

Models are widely used by insurance companies. The range of models consists of models used for product pricing and reserving to models that are used for capital management. The (internal) models for capital management are often not mature enough to comply with the new Solvency II regulations since they were not necessarily designed for that purpose. The challenge for insurance companies will be creating and/or adjusting their internal models and assumptions to meet regulatory standards so that they gain the approval of the regulator. A bigger challenge for the insurance industry will be ensuring that their organisations are fully compliant with solvency II, that the assumptions taken within the model are correct and that the insurer is able to prove to actually use the results of the models in the daily steering of the company.

Investment Management

92% of investment managers comply with future regulatory requirements

A general observation for investment managers is that model practice scores are high compared to banks and insurers. This could be explained by the fact that regulatory requirements are less stringent for investment managers in comparison with banks and insurers. This must be taken into account when interpreting the results. Moreover, model usage by investment managers is widespread and has been implemented for a significant period. The challenge for the coming years will be to embed the models throughout the investment process. We observe that models are not yet fully integrated in the business process. For example, there seems to be a discrepancy between the models investment managers use in relation to how products are priced.

Governance

Although regular training on model usage is not fully implemented (36% above basic implementation), the governance structure creates clear accountability and transparency to all stakeholders. According to 82% of the respondents, the maturity of their implementation is above basic implementation. The governance structure for dealing with possible conflicts of interests between stakeholders is mature.

Model design and standards for acceptance

Similar to the governance dimension, the model design and standards for model acceptance are implemented relatively maturely. The results on compliance with future regulation are high: 92% of the respondents indicate that their compliance with future regulation is at least uniformly implemented.

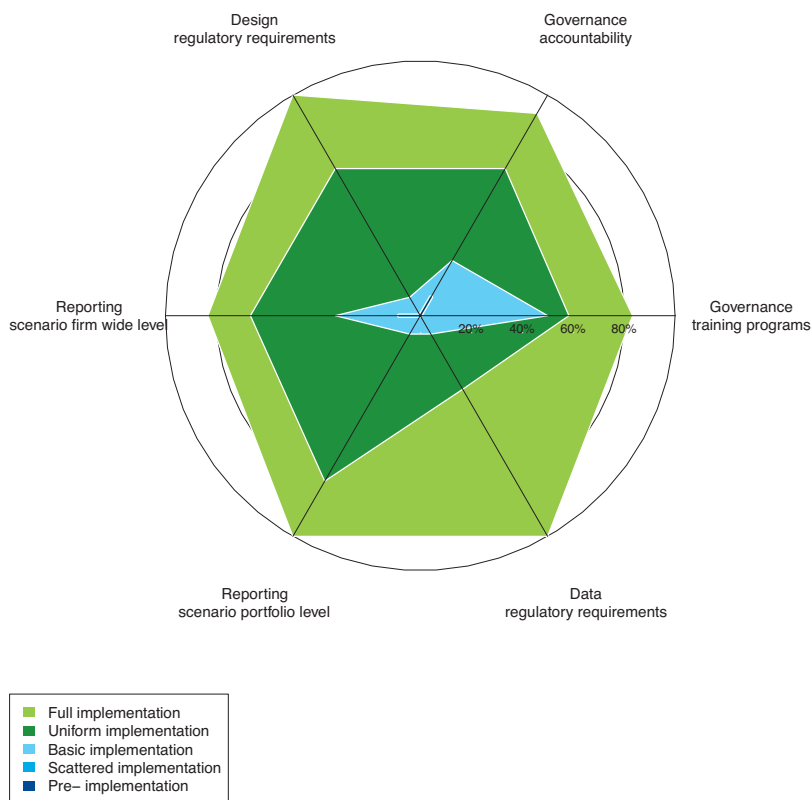
Reporting and calculation systems

Based on the survey results are an integral part of the investment process for investment managers. Almost 92% of the respondents indicate that reporting and calculation systems are used for scenario analyses at a portfolio level. The use of scenario analyses at a firm-wide level is relatively immature. However, 60% of the respondents indicate that their implementation level is at least uniformly implemented. The use of models in the client and product portfolio management could be further improved, because one third of our respondents indicate that their maturity is limited to scattered implementation.

Data

Of all model practice dimensions discussed in this survey, the data dimension at investment managers is the most mature: 50% of the respondents indicate that they have fully implemented this. Within the total population, only one respondent indicates that its implementation level is below the basic level of implementation. As observed for the other model practice dimensions, data management is almost completely compliant with regulatory requirements (92%).

Figure 9: This figure shows the elements on which investment managers indicate their implementation levels are most mature.



**Deloitte comment – Arjen Pasma CFA,
Senior Director Financial Risk Management,
Investment Management cluster lead NL**

The use of models and risk systems has been an integral part of the investment process for investment managers. The question is now how investment managers can use models to improve their business process and firm wide risk management.

Regulatory Framework Results

Basel II vs. Solvency II

The previous section discussed the major findings per industry. This section focuses on differences between the two model practice-related regulatory frameworks Basel II and Solvency II that predominantly apply to the respondents in the banking and the insurance industry.

Given the impact that Solvency II is deemed to have on the insurance industry, it is no surprise that the majority of the insurance companies indicate that their model practice is not compliant with Solvency II requirements. Since Basel II regulation came into effect during 2008, whereas Solvency II will start at the end of 2012, it is not surprising that insurers trail banks in this respect. Since insurers are in the middle of the Solvency II implementation process, we expect that the general model practice differences between banks and insurers will narrow in the future.

Governance

As indicated in the section on banks, the governance dimension of model practice is implemented at a mature level within banks that need to comply with Basel II regulations. Average implementation scores are well above basic implementation. Comparing the model governance structure of institutions that need to comply with Basel II with that of insurers that need to comply with Solvency II, we can conclude that the implementation level at insurers is less mature. In relation to the governance structure defining the risk appetite and its connection to overall strategy and capital planning, differences are most prominent: only 4% of the banks indicate that their maturity level is below basic implementation. In comparison, this percentage is 71% for insurers. The definition of the standards for the general level of knowledge of the models for senior management is not mature for insurers: only 13% of the respondents indicate that this element is mature. Within banks, senior management is more knowledgeable on models, where more than 50% of the respondents indicate that this element is maturely implemented.

Model design and standards for acceptance

Similar differences on model practice maturity are present for model design and standards for acceptance. Insurance respondents indicate that only 18% of them have a mature model design and standards for acceptance process in place. Within banks this is 36%. With regard to risk models being compliant with future regulatory requirements, our expectations are confirmed by the data: 56% of the insurers indicate that their models are not compliant with future regulatory requirements. Within banks, this percentage is only 4%.

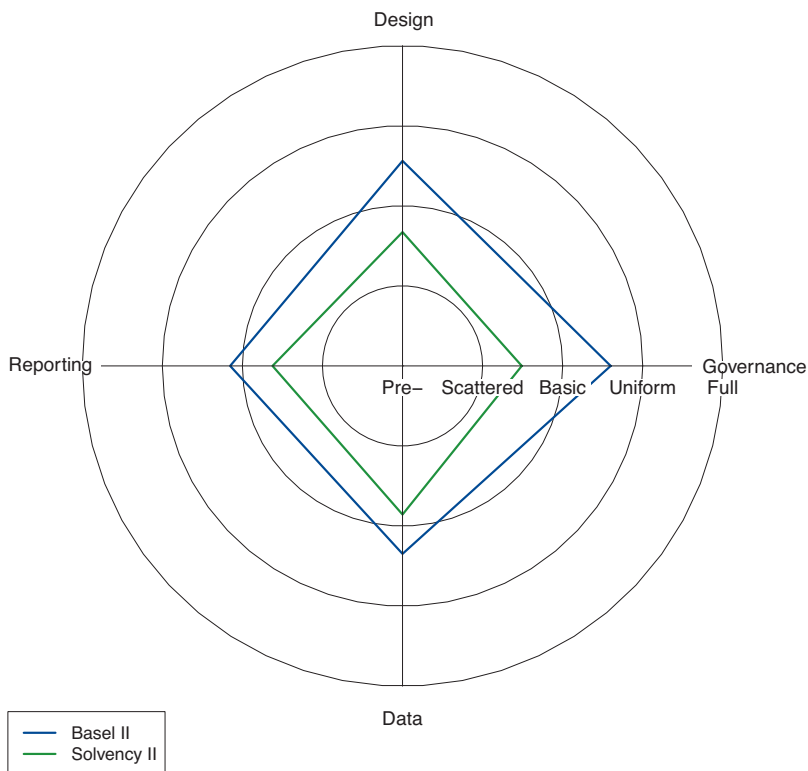
Reporting and calculation systems

Differences in this model practice dimension between banks and insurers are slightly smaller compared with the previous two model practice dimensions. A reason for this could be that on average banks indicate that their implementation levels are less mature on this dimension than on the other model practice dimensions. Banks do score better on for instance the use of their reporting and calculation systems for scenario analysis at a firm-wide level; 85% of the banking respondents indicate a basic or higher implementation level, versus 47% of insurance respondents.

Data

Again, taking a view on the maturity of this model practice dimension in light of compliance with regulatory requirements, we notice that banks are more advanced in comparison than insurers. Nearly all respondents in the banking industry (98%) indicate that their data management is compliant with regulatory requirements. Within insurers, just over a quarter (27%) indicate that their data management is compliant with future regulatory requirements. Examining the involvement of senior management in data quality management, we conclude that senior management seems to be more involved within banks. Here, 43% of the respondents indicate that senior management is involved in data management whereas none of the insurance respondents indicate that they have fully mature processes in place that involve senior management in data management.

Figure 10: Mean implementation level per model dimension per regulatory framework



Hot Topics

Figure 11: Level of maturity of documentation and understanding of limitations of models for banks.

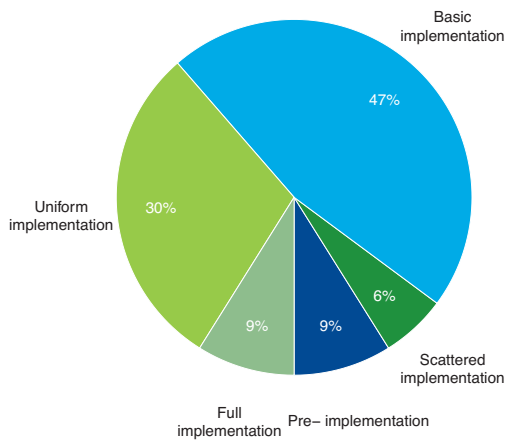


Figure 12: Level of maturity of documentation and understanding of limitations of models for insurers.

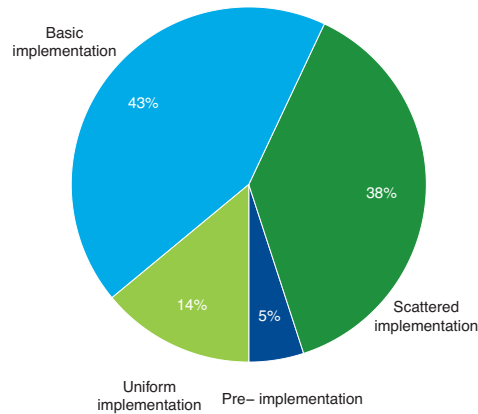
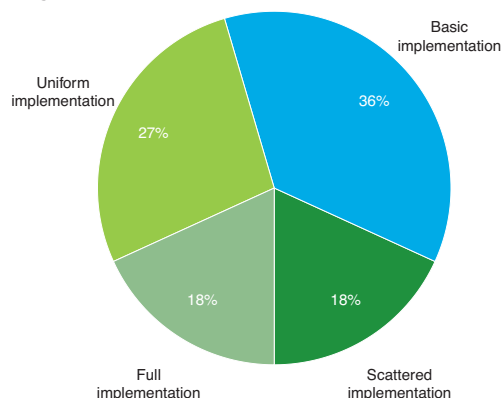


Figure 13: Level of maturity of documentation and understanding of limitations of models for investment managers.



The turmoil in financial markets during recent years has shown that good model practice is key in managing risks and navigating your business during turbulent times. We have identified several hot topics regarding model practice and investigated these in more detail.

Model Risk: more knowledge can be obtained from external parties

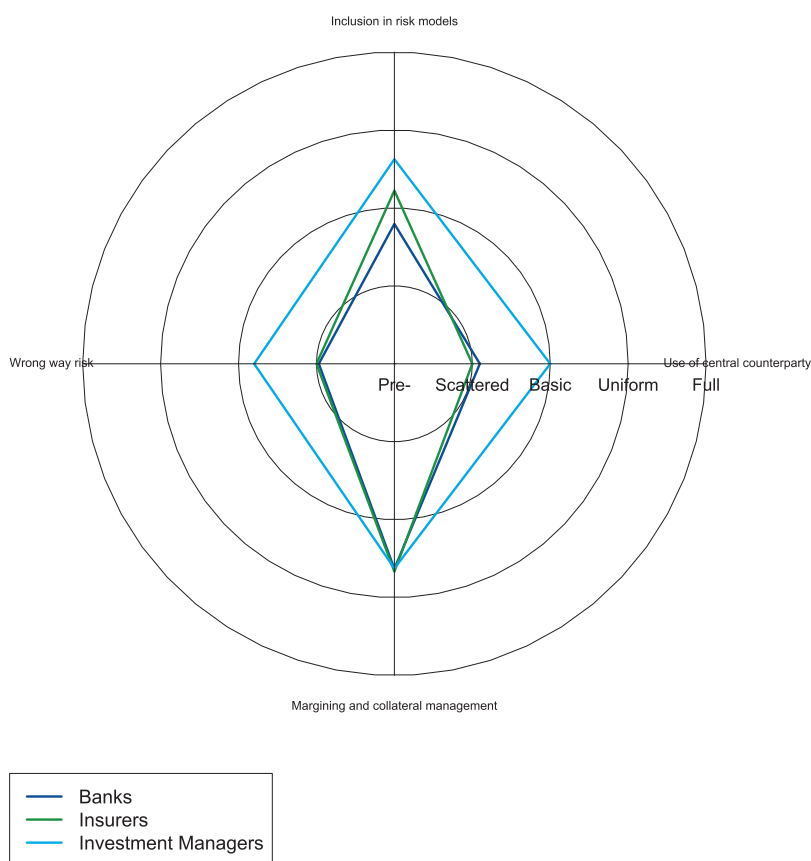
Through a reduction of model risk, costs and potentially-large losses can be avoided. This survey shows that the implementation of documentation and understanding the limitation of risk models is relatively mature for banks and investment managers. This is a good basis for addressing model risks. For insurers, however, 43% of the respondents indicate a less than basic implementation on this topic, as can be seen in Figure 12. There is room for improvement, because understanding model limitations is an important part of the overall risk assessment.

It is notable that 50% of the respondents for insurers and banks indicate that they do not participate in user groups for externally developed models. There is room for more collaboration here, because the models could be better customised if regular consultation with external parties were to take place. Furthermore, employees could benefit from the knowledge of external parties by participating in user groups. Investment managers score better on this topic, although a third of the respondents still indicate that they do not join user groups.

Outsourcing: independent review on externally developed models relatively immature

Outsourcing has been an important topic during recent years, because specialised external parties gain more and more knowledge and experience on the implementation of risk models. This can reduce model risk and ensures a better quality of models. This survey shows that a review of the externally developed models by an independent party is not standard practice at 33% of the participating financial institutions. Having an independent party review these models could reduce the risk that models produce incorrect results, leading to a better estimation of the business risk profile.

Figure 14: Mean implementation levels of the counterparty credit risk mitigating measures per industry



Counterparty Credit Risk: there is room for improvement on almost all mitigation measures

The Basel Committee, the US and the EU have proposed changes to the Basel II framework in order to strengthen capital requirements and risk management standards for counterparty credit risk. As the financial crisis has shown the complexity of counterparty credit risk, understanding and modelling this risk type could well be seen as a hot topic for the coming years. This survey indicates that the implementation of the proposed measures is relatively immature for all sectors.

Two thirds of the participants indicate that the inclusion of “wrong-way” risk in their risk models is less than basic. As the financial crisis has shown, not taking the correlation of exposure and credit quality into account could have considerable consequences. Identifying and monitoring “wrong-way” risks could help management to develop better-informed decisions on improving the risk profile of their business. One third of the respondents indicate that the inclusion of counterparty credit risk in their risk models is at an immature level.

Modelling these risks may result in an overview of the total business risk profile and lead to opportunities to reduce overall risk. Furthermore, more than half of the respondents indicate that the preparation for the use of a central counterparty is at an immature level. The Basel Committee has proposed to increase the incentive to use central counterparties, such as clearing houses, for OTC derivatives. Therefore it is recommended to accurately monitor the discussion concerning central counterparties and prepare properly. Most financial institutions (more than 90%) indicate that they do use margining and collateral management in order to account for counterparty credit risk arising from OTC derivatives. Most respondents (more than 90%) indicate that this mitigating measure is at least implemented at a basic level.

Deloitte comment – Thomas Siwik, Partner, Deloitte & Touche GmbH, Germany

Measurement and mitigation of counterparty credit risk for OTC derivatives remains a disputed issue for the coming years. Discrepancies arise due to the different views from accounting, hedging and pricing as well as the banks’, corporates’ and regulators’ perspective.

Conclusion

The Global Model Practice Survey, performed during the first half of 2010, surveyed 89 financial institutions, banks, insurers, and investment managers worldwide on the status of their model practice. The objective of the survey is:

1. To gain insight into the level of maturity and the progress made since the previous Model Practice Survey. The maturity level is analysed on the four dimensions that constitute the foundation of model practice: governance, model design and standards for acceptance, reporting and calculation systems, and data; and
2. To assess the maturity of hot topics in model practice, i.e. model risk, outsourcing and counterparty credit risk, in more detail.

Below we present the major findings:

- Since the implementation of Basel II, banks have improved their model practice significantly and now comply with the minimum requirements. The next step for banks could be to fully integrate their reporting and calculation systems in their business model: use the systems to guide portfolio management, in trend, sensitivity and scenario analysis, in pricing, and for accounting purposes.
- The maturity of model practice within insurers has improved since our previous model practice survey. However, there remains room for improvement, because the basic requirements on the model practice dimensions have not yet been met.
- The maturity of model practice at investment managers is fairly high compared to banks and insurers. Risk management and risk models are part of the investment process. However, risk models are not yet fully embedded in the business processes and need to be integrated throughout the entire institution.
- All financial institutions have room for improvement concerning the reduction of model risk, because many mitigating measures of model validation are not fully embedded.
- At two thirds of the participating institutions, a review of the externally developed models by an independent party is not standard practice. Having an independent party review these models could reduce the risk that models produce incorrect results, leading to a better estimation of the business risk profile.
- With future regulatory requirements to strengthen capital requirements and risk management standards for counterparty credit risk in mind, all financial institutions need to think about a way to cope with this issue, because the current implementation level of the proposed measures is immature for all sectors.

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Model practice can be improved by means of various projects. However, keeping your complete model practice up to standard requires a change in corporate culture, horizontally as well as vertically throughout the organisation

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