
How do you deal with operational risk? A survey of risk management practices in the German insurance sector

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Abstract This paper surveys the *status quo* of operational risk management in German insurance companies with respect to strategies followed, processes implemented and instruments used. Moreover, it provides insights into incumbent risk managers' views on current and future regulation of the risk management process. The findings contribute to current discussions regarding the national implementation and interpretation of the European Solvency II directive by highlighting similarities and differences in dealing with operational risk within the German insurance sector. In particular, the results may be useful to risk managers as a point of reference when assessing the adequacy of their own company's risk management strategies, instruments and processes.

Keywords: *insurance, operational risk, regulation, risk management, Solvency II*

INTRODUCTION

The European Commission's 2009 Solvency II directive (2009/138/EC) brings about substantial changes of the German insurance sector's regulatory landscape. While German insurance firms have long been firmly regulated with respect to how underwriting risk and market risk should be monitored, managed and disclosed, regulatory

requirements concerning operational risk management were but implicit, and rather general in nature. As a consequence, those insurance companies used to deal with operational risk on an *ad-hoc* basis are now challenged in several ways: they have to develop a structured operational risk management process that is consistent with their overall risk management system, and they are forced

to consider as well how to account for operational risk and their respective risk-bearing capacity when making business decisions. Besides the technical aspects of the latter, compliance to the new regulation may induce additional costs to German insurers. In particular, this effect might burden young and small-scale insurance firms, as it raises barriers to entry as well as the minimum efficient scale of operation in the German insurance market.¹ Hence, concerns are that existing small — and often very specialised — insurers could be forced out of the market or into mergers with other firms, which would lead to further industry concentration and possibly less choice for the customer.²

According to Solvency II (Article 13) operational risk is ‘the risk of loss arising from inadequate or failed internal processes, personnel or systems, or from external events’. This definition includes legal risks, but excludes risks arising from strategic decisions and reputation risks (Article 101), and is also employed in German insurance regulation (*Minimum requirements for risk management in insurance undertakings* (MaRisk IÄ), sec. 5). Operational risk may thus materialise in various forms, like internal or external fraud, accounting errors, information technology (IT) failure, modelling errors, or natural disasters. This study differentiates between the following categories of operational risk:³

- technology (eg IT infrastructure, facility management);
- people (eg human resources, internal fraud, negligence);
- organisation (eg communication, business processes, project management, contract management);

- external factors (eg external fraud, natural disasters, outsourcing).

The diversity of potential loss events and the fact that they may coincide with (or be mistaken for) other types of business risk makes operational risk difficult to manage. However, the challenges insurance firms face in this respect are similar to those faced by the banking industry and hence it is not surprising that large parts of the both quantitative and qualitative Solvency II rules on operational risk management show marked parallels to the respective recommendations that have been issued by the Basel Committee on Banking Supervision since 2001.⁴ For instance, the determination of regulatory operational risk capital requirements using either the standard formula, or internal models resembles the Basel II approach of allowing the use of either a simple model — namely the basic indicator approach or the standardised approach — or an advanced measurement approach based on internal models. However, owing to the EU-wide implementation of the Basel accords (directives 2006/48/EC and 2006/49/EC), European banks had already been forced to sustain adequate operational risk management systems by January 2007. As banks and insurance firms share several types of business processes as well as risk exposures, it is not surprising that many of the methods and instruments developed in the banking sector to identify, measure and manage operational risk found their way into insurance firms’ risk management systems.

As far as research on operational risk management is concerned, large parts of the academic literature focus on banks

rather than other types of financial firms and discuss mainly quantitative aspects regarding the estimation of loss impacts or the determination of economic capital.⁵ The paper at hand, however, is concerned with a more general view on how operational risk is actually managed in the German insurance sector. It studies whether and how the processes and instruments necessary to meet new regulatory requirements have already been implemented by German insurance companies, and whether progress in this regard significantly correlates with firm size. In addition, the paper provides insights into incumbent risk managers' attitudes towards operational risk as well as Solvency II and tries to shed light on the question of whether their views depend on factors such as their company's size, legal form, or their own level of experience in risk management. Conceptually, this analysis is close to earlier work by Duldinger⁶ and Pfeifer,⁷ who survey German insurance firms' overall risk management approaches and processes. Furthermore, with a focus on operational risk management, Lim *et al.*⁸ discuss survey results for a sample of US insurers and Kobler *et al.*⁹ perform a similar study based on a sample of Austrian, German and Swiss insurance firms. However, with the aforementioned studies not controlling for firm size or legal form and with the three European studies having been carried out both before the financial crisis and before the passage of the Solvency II directive, it is expected that this survey will provide more meaningful insights into the status of — and open issues in — operational risk management in the German insurance industry today.

The remainder of the paper is organised as follows. The next section

describes the underlying sample and the methodology used while the third section outlines and discusses the results. The final section summarises the main conclusions.

SAMPLE DATA AND METHODOLOGY

By the end of 2011, the German insurance industry comprised 1465 insurance companies, of which 610 were subject to supervision by the Federal Financial Supervisory Authority *BaFin*.¹⁰ The remaining firms, in most cases smaller mutual insurance societies, were supervised directly by the respective federal states in which they resided. In terms of industry size, German insurance firms' total gross premium volume was about €232bn in 2011 (2010: €229bn).¹¹

This paper provides results of a survey conducted among risk management professionals — either members of the management board, or incumbent risk managers — from 160 German insurance companies. The sample contains public limited companies or *Societas Europea*, mutual insurance societies and public law insurance corporations. Questionnaires as well as cover letters including an internet link to a password-protected pdf version of the questionnaire were sent to this target group in June 2011. Questionnaires could be handed in until September 2011 either via mail, or electronically using an embedded anonymous upload function.

The questionnaire consists of 44 items, classified into the following categories:

- Items 1–5: Company's profile (legal form, business lines, premium volume, number of employees, solvency ratio).

- Items 6–12: Respondent's profile (role, experience, age, gender, educational background).
- Items 13–23: Overall risk management strategy and design of the risk management system.
- Items 24–34: Identification and measurement of operational risk.
- Items 35–38: Risk preventing and risk mitigating measures.
- Items 39–42: Cost–benefit assessment of operational risk management.
- Items 43–44: Most pressing topics in operational risk management and lessons learnt.

Questions were either open or closed. In case of closed questions, respondents were given the opportunity to add comments. Forty analysable questionnaires were received, which is similar to the sample sizes of prior insurance industry studies focused on operational risk management (eg 26 US insurers in the case of Lim *et al.*¹²; nine Austrian, 29 German and 16 Swiss insurers in the case of Kobler *et al.*¹³). The response rate of 25 per cent corresponds approximately to the response rates achieved by prior more general risk management surveys in the German insurance sector (eg 30 per cent in the case of Duldinger¹⁴; 34 per cent in the case of Pfeifer¹⁵). Company information provided by the participants confirms that all 40 questionnaires relate to different firms. In terms of gross premium volumes, the sample covers about 16 per cent of the entire German insurance market. However, as the overall number of observations is low, applicability of statistical significance tests is limited. Where possible, Brandt–Snedecor tests for homogeneity were conducted in responses from small firms

and large firms, or from public limited companies and mutual insurance societies, to detect differences in views between these groups of companies.

The final sample consisted of 17 public limited companies, 19 mutual insurance societies and four public law insurance corporations. Among the business lines most frequently stated by these firms are property insurance (27), accident insurance (20), and life insurance (13). In 2010, 25 firms achieved a gross premium volume above €50m and 22 firms have more than 250 employees. On average, insurance firms constituted as public limited companies are markedly larger than mutual insurance societies in the sample.

Twenty-eight respondents stated their company's solvency ratio according to the most recent quantitative impact study. While most of the firms report a solvency ratio between 100 per cent and 300 per cent, mean deviation is significantly smaller for public limited companies than for mutual insurance societies. In the case of the former, nine out of ten ratios are within the above bounds. However, solvency ratios of mutual insurance societies are below 200 per cent for about 40 per cent of the firms and above 300 per cent for 50 per cent of firms.

About 75 per cent of the respondents are male. Fifty-five per cent hold a managerial position, and the remaining are predominantly staff members in the respective firms' risk management units. About two-thirds are aged 40 years or above, with the average age tending to be higher for mutual insurance societies than for public limited companies. Eighty-five per cent of participants hold an academic degree, most of them in the area of business studies and economics.

Finally, respondents' average level of experience is rather high, with almost 75 per cent of them having more than 10 years of industry experience and about 50 per cent having more than 5 years of experience in risk management.

RESULTS

Overall risk management strategy and design of the risk management system

Most of the sample firms use the Solvency II directive's definition of operational risk for risk management purposes, which excludes risks arising from strategic decisions, and reputation risks from the scope of operational risk management. While all firms allege to deal with operational risk consciously in general, only 60 per cent of them follow a structured and formally defined risk management process. Out of the remaining 40 per cent, most respondents indicated that operational risk is managed rather implicitly, ie without explicit formalisation. About 30 per cent of the sample firms relied on third party support in managing operational risk, with small firms dominating this group ($p < 0.05$).

More than 80 per cent of the respondents stated that their company's formal and informal operational risk management processes involve both intra- and interdepartmental functions. Managerial responsibility lies mainly with the respective department heads (72.5 per cent) and risk managers (57.5 per cent). About half of the respondents stated that their existing operational risk management structure is the — either concerted or undirected — result of a combined top-down/bottom-up process.

Operational risk management principles are usually described within the company's risk strategy documentation. More than three-quarters of the respondents stated that the main targets pursued in risk management are a reduction of the probability of loss occurrence (ie frequency), and of the amount of expected losses in case of an operational risk event (ie severity). Consequently, only a few participants indicated that operational risk is not taken into account in the company's strategic business policy decisions. Rather, most of the firms either implicitly or explicitly perform cost-benefit analyses. Twenty per cent of them include an operational risk-related cost factor in pricing either specific, or all of their insurance products. Interestingly, it was found that about 60 per cent of the small firms in the sample tend to avoid business transactions that are likely to incur high operational risk (eg entering into contracts that would require changes in established business procedures). For large firms, this number is only 15 per cent, indicating a significant heterogeneity of the two groups ($p = 0.1$).

Identification and assessment of operational risk

To identify and to assess operational risks, both small and large firms typically employ several instruments simultaneously. Among these, reliance on expert opinions dominates in the sample, as Figure 1 shows.

About 75 per cent of the firms assess operational risk using both qualitative and quantitative approaches. However, 20 per cent — first and foremost mutual insurance societies, including both small and large

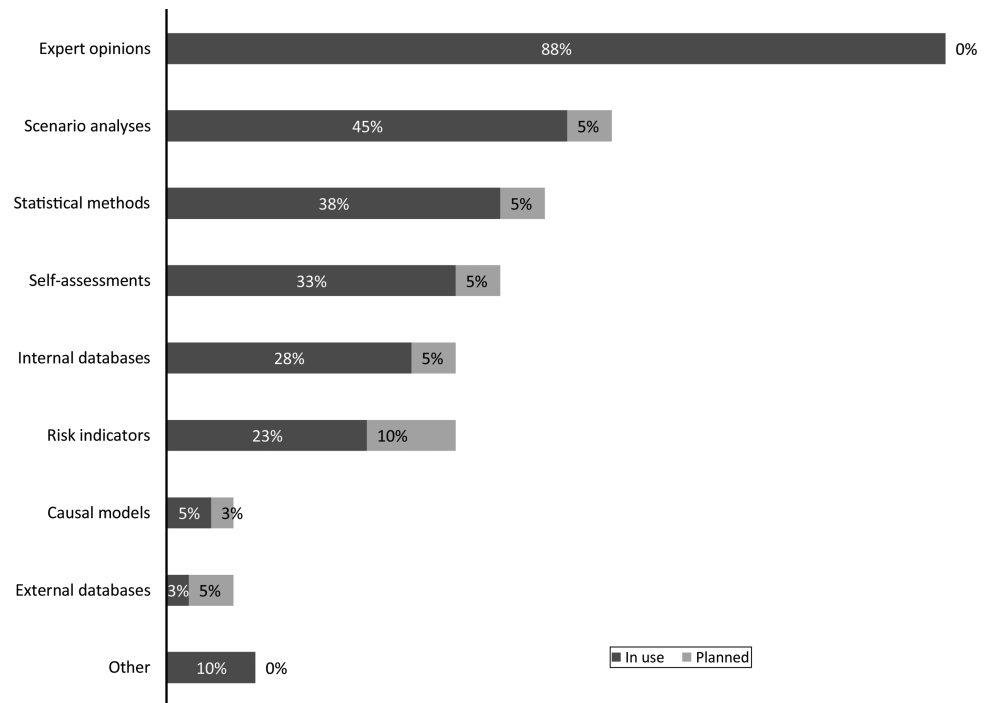


Figure 1: Methods used to identify and assess operational risks

firms — mainly rely on qualitative risk assessments. Risk assessment frequencies vary across firms. While most of them monitor operational risks at annual, biannual or quarterly intervals, only a few firms assess (or reassess) risks more frequently, or refrain from regular monitoring activities.

In addition, participants were asked to assess the probabilities of operational risk events occurring in their company, using a given categorisation. Twenty-two responses were received, which were used to derive a rank order of potential operational risk events. As Table 1 shows, answers were similar for small and for large firms. However, it was found that the former assign a markedly higher relative probability to risks arising from deficient or inadequate business processes than the latter, which is consistent with the present observation that small firms tend to put less

emphasis on detailed process documentation. Also, smaller insurance firms seem to be more concerned about lack of staff qualification or capacity.

In addition, it was found that operational risk events occur most frequently in the areas of technology and organisation for insurers constituted as public limited companies. However, mutual insurance societies experience mainly technological operational risk events, with a focus on the firms' IT systems. Consistent with Kobler *et al.*,¹⁶ the latter finding is also the area where firms — irrespective of their legal form — expect the highest losses in the case of an operational risk event.

Risk preventing and risk mitigating measures

Having identified a source of operational risk, management needs to decide

Table 1: Respondents' assessment of relative operational risk event frequency in selected areas

Risk category	Sub-category	Rank	
		Large firms	Small firms
Organisation	Project management	1	3
Organisation	Management and communication	2	4
Technology	Information technology	3	6
People	Staff qualification and capacity	4	1
Organisation	Business processes	5	1
People	Negligence	6	7
Organisation	Legal risks	7	5
Technology	Infrastructure	8	10
People	Fraud (internal)	9	11
External factors	Third-party services	10	8
External factors	Fraud (external)	11	9
People	Unauthorised activities	12	12
External factors	Disaster	13	13

whether or not to revert to risk mitigating measures. Ten per cent of respondents stated that in this context risk reducing measures are taken as a matter of principle, ie without prior analysis of their costs and benefits. About 50 per cent indicated that while the respective costs and benefits are assessed, their firm does not follow a standardised risk mitigation approach. Moreover, only a few companies rely on qualitative criteria exclusively.

As a result of pretesting feedback received from industry professionals, it was decided to provide illustrative examples in the case of one question regarding which two-to-three risk preventing measures are deemed the most important (item No. 36). While the examples are likely to have an anchoring effect on participants, this approach was preferred over asking an entirely open question to lower the probability of missing answers. Thus, with respect to this item, a bias in favour of the anchors may be expected. However, answers received show that

only some of the examples provided rank among those most frequently stated by respondents. For instance, with respect to technology risks failsafe data backup routines are considered imperative by 55 per cent of the respondents, while only 25 per cent rank restricting access to the IT system or software tests among the most important measures. Yet hardware maintenance, another example provided, is considered less relevant. Answers regarding measures to prevent organisational risk events are diverse, but nevertheless reveal a focus on internal reporting (30 per cent), a comprehensive monitoring system (27.5 per cent), and in-depth process documentation (22.5 per cent). Finally, in preventing risks arising as a result of external events, respondents deem the existence of emergency plans, or business continuity plans (67.5 per cent), and of IT security strategies (57.5 per cent) the most relevant. Figure 2 summarises the main findings.

Emergency plans are conveyed to employees mainly via manuals and

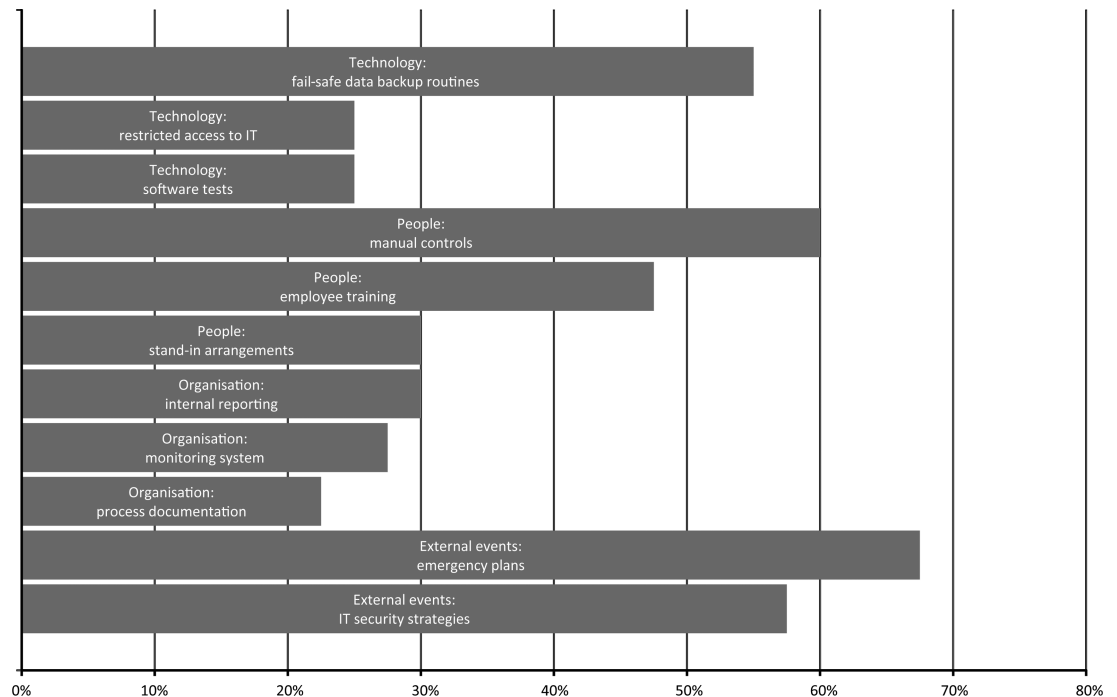


Figure 2: Most important risk preventing measures per risk category

emergency drills (75 per cent), and about 40 per cent of the firms use circular letters or conduct emergency-related staff training. Emergency drills generally take place at least once a year in most of the companies and usually focus either on the evacuation of buildings, or on simulated breakdowns of the firm's IT system.

As far as risk reducing measures are concerned, most of the respondents stated that their firm usually reacts to operational risks by adjusting business processes (82.5 per cent), by implementing manual controls (72.5 per cent), by increasing the degree of process automation (62.5 per cent) and by conducting staff training (62.5 per cent). In addition, about one-third take out risk-specific insurance policies. With respect to these answers, no significant differences were observed between small and large insurers, or between public

limited companies and mutual insurance societies.

From a regulatory perspective, operational risk is provided for by these qualitative measures as well as by adherence to minimum capital requirements. In the latter context, Solvency II allows insurance firms to choose between two approaches to determine regulatory capital, namely the standard formula, and internal models. Regarding this option, about 72.5 per cent of the respondents indicated that they currently rely on the standard formula, and only 10 per cent already use internal models (no response: 17.5 per cent). In the foreseeable future, 72.5 per cent intend to keep on using the standard formula, 10 per cent will continue using internal models, and 5 per cent — one plc and one mutual insurance society — stated that their firms consider implementing an

internal model (no response: 12.5 per cent).

Cost–benefit assessment of operational risk management

Some of the merits typically associated with an elaborate operational risk management system are a reduction of both regulatory capital requirements and reputational risk, an increase in operational efficiency, as well as a mitigation of negative effects of operational risk events on profitability. However, one of the major downsides is the costs incurred in setting up and maintaining such a system. Faced with the question of whether they believe that the respective costs of a structured operational risk management approach exceed its benefits in the medium and long term, two-thirds of the respondents working with large insurance firms stated that benefits outweigh costs. For small firms, this number amounts to only 43 per cent, indicating a different view ($p = 0.1$). In addition, when dividing the sample according to legal form it was found that while 88 per cent of public limited companies in the sample are upbeat about the benefit–cost ratio, only 26 per cent of mutual insurance societies share this opinion. In the case of the latter, the majority (53 per cent) believe the ratio to be close to one. Controlling for respondents' characteristics, it was found that neither age nor prior experience in risk management seem to influence answering behaviour significantly.

Most pressing topics in operational risk management and lessons learnt

Finally, participants were asked what in their view are the most pressing topics in

operational risk management and what are the main lessons learnt. As their replies show, both questions are closely linked. One main conclusion drawn by many participants is that both the credible measurement of risk model parameters — in particular, probabilities — and the assessment of benefits associated with operational risk utility seem daunting and largely arbitrary tasks. As a means of reducing respective uncertainties, some respondents advocate increasing transparency of business processes and management decisions. In addition, they emphasise that it is necessary to establish a common, firm-wide understanding of risk management and of its long-term benefits.

Yet, the aforementioned areas — improving risk assessment models as well as process documentation and promoting risk awareness across the firm — are what risk management professionals identify as the most pressing subjects to address within their own company. In addition, concrete projects like improving IT security, or meeting the requirements of Solvency II, are considered important current topics in operational risk management by some participants.

CONCLUSION

The results reveal several commonalities in the way operational risk is managed by German insurance companies. First, most of the sample firms define operational risk in the same way the Solvency II directive does, excluding risks arising from strategic decisions, and reputation risks. Secondly, most of the firms pursue the same targets in risk management, namely reducing probability of loss occurrence as well as minimising the amount of expected losses in case of an

operational risk event. Thirdly, to mitigate operational risk insurance firms usually rely on a high level of business process standardisation, and on the implementation of manual or automated controls. Moreover, only a few companies choose to take out insurance policies to transfer specific operational risks to third parties. With respect to the determination of regulatory capital, it was found that most of the firms — both public limited companies and mutual insurance societies — intend to rely on the Solvency II standard formula in the foreseeable future, instead of developing their own (partial) internal model. From a risk management perspective, this finding is interesting because the standard formula bases the operational risk charge on earned premiums and technical provisions,¹⁷ and thus assumes that firm size serves as a good proxy for a company's operational risk profile.¹⁸ This assumption may be acceptable from a regulatory point of view, which is mainly concerned with the stability of the insurance sector as a whole. However, at the individual firm level, and in particular with respect to smaller firms, employing the simple standard approach may create adverse effects, since it may entice risk managers to rely on an inappropriate model and to neglect handling and monitoring operational risk consciously.

As far as structural differences among the sample firms are concerned, the survey shows that in terms of compliance with the Solvency II framework, operational risk management systems tend to be more advanced in larger insurance firms. For instance, having a well-defined risk management system is less common for small companies, as they tend to rely more on 'implicit' (ie informal) risk management processes.

Moreover, perceived uncertainty about how to quantify operational risks seems to be higher in these firms, since they prefer qualitative risk assessment approaches and they show a stronger tendency to avoid business transactions that are assumed to incur high operational risk. In addition, the company's business processes are stated more often to be a major potential source of operational risk and as one of the main areas where operational risk events actually occur by participants employed with small insurance firms.

Because of the fact that most of the large firms in the sample are constituted as public limited companies and most of the small firms as mutual insurance societies, the main results also hold if firms are classified according to their legal status instead of their size. However, differences are more pronounced when using size as a discriminatory variable, indicating that the observations may mainly reflect smaller firms' inability to build up specialist knowledge owing to limited staffing capacity, which leads to a higher perceived uncertainty with respect to managing operational risk.

Finally, one distinct difference between participants employed with either larger or smaller firms shows in the case of the question regarding the cost–benefit ratio of an elaborate operational risk management system. While two-thirds of the former stated that in their view benefits from sustaining a well-structured approach to managing operational risk exceed respective costs more or less markedly, only about 40 per cent of the latter share this opinion. On that score, the survey reflects aforementioned concerns within parts of the German insurance industry that the introduction of Solvency II may unduly burden small

and medium-sized insurance firms and that regulators might make use of the leeway given in this regard by the principle of proportionality in a too restrictive way.¹⁹

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