

# Integrated Risk Management

## A holistic Risk Management Approach for the Insurance Industry

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*"The core function of financial institutions in today's markets is to manage risk. That is, to assess price, diversify, hedge, monitor and distribute risks more efficiently than their customers and competitors."*

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### 1. Introduction

Recent years have witnessed ever-greater sophistication not only among policyholders, but also on the part of insurance companies. The trend towards higher retentions and capacities is a widespread development throughout the insurance industry, while the desire for coverage concepts which hedge new types of risks – some of which have been classed as uninsurable – and the call for innovative coverage concepts which offer protection for several risks or risk categories, for example in the context of balance sheet protection, have also become pronounced.<sup>2</sup> The hedging of individual risks or of risks considered in isolation is steadily diminishing in importance and appears to fit less and less into primary insurance companies' conception of risk management. Furthermore, it is no longer merely risk transfer but sophisticated risk management which attracts the interest of insurance companies.<sup>3</sup> After all, insurance companies which take the form of joint-stock companies are exposed to greater demands from their owners and find themselves under increased pressure to boost earnings – a factor which should also be seen against the backdrop of the growing orientation towards shareholder value.

Innovative coverage concepts which satisfy the aforementioned requirements can be arrived at not only through an (integrated) approach to an insurer's overall risk situation, but also through products which emphasize risk equalization over time and thus contribute to the further stabilization of results.

In the light of the developments of recent years and given a glance into the not-too-distant future, it is evident that the service orientation of the reinsurance industry will assume an even more prominent role and consulting services for primary insurers – especially in the field of risk management – will gain in significance.<sup>4</sup> In this area, reinsurers will evolve into problem-solvers for the primary insurance industry and will be able to secure competitive advantages by developing innovative coverage concepts geared to hedging the client's overall risk situation.<sup>5</sup> Intensive consulting activities are a prerequisite for such solutions, which may be designed as a blend of capital market and reinsurance products and can thereby constitute helpful solutions for the risk management of primary insurance companies.

The purpose of this paper is to elucidate what may be understood by integrated risk management and to set out the instruments with which integrated risk management solutions can efficiently be achieved.

## 2. Definition and process of integrated risk management

### 2.1 Definition

Irrespective of the numerous existing definitions of the terms 'risk' and 'risk management', this paper takes a broader base as its point of departure and regards integrated risk management as a technique whereby all the risks of an open system, such as an organization, are taken into account and, furthermore, an attempt is made to optimize them as part of an all-encompassing approach. Consequently, integrated risk management as it is understood here is highly procedural by nature.

In relation to the insurance industry, this means that integrated risk management is geared to the simultaneous recording and managing of – as far as possible – all the risks at a company, irrespective of whether these were previously classed as uninsurable or indeed even belong to the non-underwriting sector, and irrespective of the type of risk-policy instruments to be used. Ultimately, the goal is to hedge both sides of the balance sheet simultaneously as part of an integrated risk management approach.

The main arguments in favour of such an approach are efficiency criteria (cost efficiency); whilst compensating for various risks by separate means generally also results in an enhancement of the overall risk situation, it can entail 'overhedging' effects and bring about ineffective or overly expensive risk management. The holistic approach to risks facilitates more cost-effective and hence more efficient risk management on an overall basis.

### 2.2 Process

The process of integrated risk management spans several phases, which are illustrated in Figure 1; they constitute the basis for the design of an integrated risk management concept.

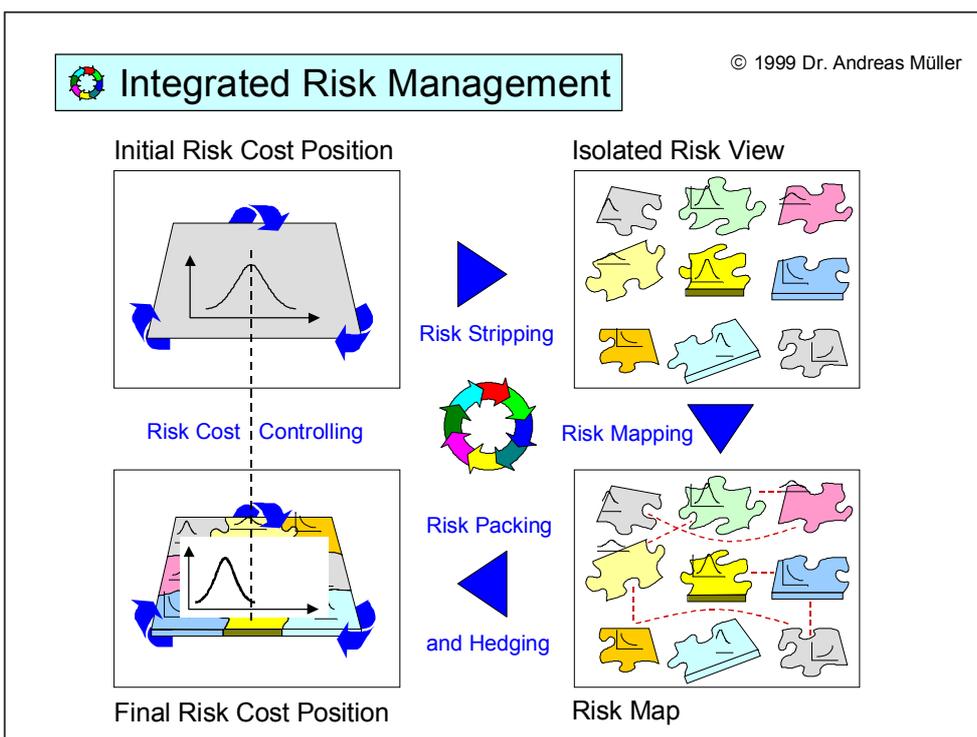


Figure 1: Process of integrated risk management

- Risk Stripping

In the first phase of integrated risk management a disaggregation of the overall risk situation is carried out – on the basis of the Initial Risk Cost Position – in order to arrive at an (isolated) detailed view of all risk situations (Isolated Risk View). Quantification of the individual risks constitutes a further part of risk stripping, and this is shown in the illustration by the division into the individual pieces of the puzzle. In the subsequent phases this disaggregation forms the basis for a reaggregation of selected risks and hence also the basis for greater risk spreading within the company.<sup>6</sup>

- Risk Mapping

During the second phase – which builds upon the comprehensive description of all corporate risks in phase I – the prevailing dependencies between various risk categories are analysed (e.g. correlation analysis). A holistic description of an organization's risk situation can only be arrived at through a detailed analysis of the relations between all risk positions. This step makes it possible to determine the way in which various risks behave in relation to one another (effects of amplification or diversification). The purpose of this sometimes highly extensive and complex Risk Mapping is to identify possible diversification effects within an organization's individual risk positions. For example, consideration is to be given to the structure of the correlation between various risks – the simultaneous occurrence of which can be regarded as unlikely – in order to be able to realize risk diversification effects. Consequently, not only the analysis of dependency structures but also the identification of non-correlated risks provides valuable information for the further process of integrated risk management. The product of this subprocess is a picture (risk map, risk profile, risk spectrum, ...) <sup>7</sup>, which reveals the interdependent relations between all the risks of an organization and forms the basis for structuring an all-encompassing integrated risk management solution.

- Risk Packing and Risk Hedging

The purpose of the sometimes very extensive and complex process of Risk Mapping is to identify and exploit all possible diversification effects (related to the risk costs) within an organization's overall risk situation. Thus, on cost grounds it may be considered expedient to bundle certain – ideally non-correlated or negatively correlated – risks into risk packages (Risk Packing) and to hedge these packages – in the light of already existing diversification effects within the portfolio – as a totality by using appropriate means (Risk Hedging). Even though the simultaneous consideration of various risk categories and the packing of certain risks into risk packages can be misinterpreted as an undifferentiated approach, it is the idea – in itself trivial – that an organization's most widely differing risks in the final analysis have the same implication and in some way or other impact upon the financial situation of the company which renders an integrated approach expedient.

In conjunction with the risk analysis set out above, the risk synthesis explained here in the context of Risk Packing makes up the process of risk engineering, which is of decisive importance to the attainment of an improved risk cost situation. The risk-policy measures which are to be applied in the Risk Hedging phase ultimately lead to a – compared to the Initial Risk Cost Position – leftward displaced and compressed risk cost distribution (Final Risk Cost Position, see figure 1). However, the individual distributions within the pieces of the puzzle remain unchanged. In business terms, such a scenario means quite simply reduced and stabilized risk costs (risk premium) – something which should be of considerable interest to the insurance industry in particular. The precise effect of

integrated risk management can be analysed and quantified by way of Risk Cost Controlling.

### 3. Cost benefits of an integrated risk management solution

#### 3.1 Cost reduction and cost stabilization

Although integrated risk management solutions involve a highly individual and customized approach, which initially generates expenses, it will be shown below that these concepts can produce a number of cost benefits.

The systematic combination of various risk financing techniques can facilitate the achievement of economies of scope, i.e. the holistic (integrated) consideration and coverage of various risk potentials of a company can – through the realization of diversification effects – contribute to enhanced cost efficiency and at the same time an improved risk and capital allocation in terms of a reduction in risk capital costs (Risk Adjusted Capital); this is to be seen against the backdrop of more profitable capital utilization and, in the case of joint-stock insurance companies, is any case increasingly called for by shareholders as part of the concept of shareholder value. Furthermore, such concepts also make possible increased retentions with lower capital and reserve costs.

In order to understand reduced risk capital costs, it should be pointed out that the capital costs to be allocated to a risk do not depend exclusively on the risk in question but are also to a large extent determined by the (risk) portfolio in which the risk is embedded. If diversification potentials exist within a (risk) portfolio, they can be exploited on cost grounds since the costs for the isolated coverage of different corporate risks are higher than the costs for comprehensive coverage of intelligently combined (non-correlated) individual risks (risk packages). This type of internal portfolio hedging effect can be achieved through an appropriate portfolio mix.

Last but not least, further cost digression effects can be generated as part of the economies of scope with combined solutions through savings in administrative costs (for example the elimination or simplification of the annual renewal process). In this way, price advantages can be passed on to cedants and client loyalty enhanced as a result of the fact that the insurer receives a holistic risk management solution from a single provider. An additional risk cost digression effect can derive from the design of integrated risk management solutions as multiyear products.

If it were also possible to standardize such concepts, a further, significantly greater latitude for cost digression effects would be opened up. However, in view of the fact that such standardization can scarcely be anticipated now or in the coming years, exploitation of the frequently cited economies of scale cannot be expected for the time being in the case of integrated risk management. Moreover, it should be pointed out that in most cases – due to the individual nature of such solutions – the standardization of integrated risk management solutions is neither possible nor desirable in the light of client requirements.

In addition to the absolute cost benefits, another advantage offered by integrated risk management concepts rests in the stabilization of risk costs, thereby enabling cedants to enjoy increased planning reliability. Assuming their non-correlation, the overall volatility of the costs of several risks transferred as part of a package is lower than the total of the volatilities of various individually transferred risks. The multiyear approach to and calculation of a comprehensive risk coverage concept will not only cut the absolute risk costs but will also contribute to a further valuable stabilization effect in relation to the risk costs. Stabilization effects arise due to the fact that multiyear considerations are based on a certain temporal distribution of the integrated risks.

The risk cost digression and stabilization effects elucidated above can be rendered in very simple formulae on the basis of the following example: given several independent risks, for example natural catastrophe exposures ( $R_{cat}$ ) and currency risks ( $R_{cur}$ ), the coverage of several risks through an overall limit may be more expedient than the use of a number of independent covers. The key to such concepts lies in the non-correlation of different risks (I); after all, why should – as in the above scenario – natural catastrophes occur simultaneously with currency depreciation or appreciation or why should fluctuations in exchange rates provoke natural catastrophes?<sup>8</sup> The joint coverage of both risks will, on the one hand, reduce the incurred risk costs as against two separate individual covers (II: left-displacement of the risk cost distribution) and, on the other hand, make possible greater stability in the risk costs (III: compression of the risk cost distribution).

$$I: \quad \text{cov}(R_{cat}; R_{cur}) \leq 0 \quad (\text{premise})$$

$$II: \quad K(R_{cat} + R_{cur}) \leq K(R_{cat}) + K(R_{cur})$$

$$III: \quad \sigma(K(R_{cat} + R_{cur})) \leq \sigma(K(R_{cat})) + \sigma(K(R_{cur}))$$

If this approach is extended to include a temporal dimension, thereby integrating the notion of equalization over time, a further absolute cost digression effect (IV) as well as an additional volatility-reducing effect (V) is generated.

$$IV: \quad K(R_{cat}^{t=1\dots n} + R_{cur}^{t=1\dots n}) \leq \sum_{t=1}^n (K(R_{cat}^t) + K(R_{cur}^t))$$

$$V: \quad \sigma(K(R_{cat}^{t=1\dots n} + R_{cur}^{t=1\dots n})) \leq \sum_{t=1}^n [\sigma(K(R_{cat}^t)) + \sigma(K(R_{cur}^t))]$$

With regard to the risk cost digression effects set out above, it must, however, be pointed out that the scale of such effects which can actually be realized on the market is also crucially guided by market conditions and the interplay of the supply and demand mechanism. Furthermore, it should be noted that innovative coverage concepts – at least during their introductory phase – typically entail high transaction costs which must be taken into account in the margin of the reinsurer or other participating institutions.

### 3.2 Risk cost budgeting

In addition to the aforementioned exploitation of cost digression and stabilization effects, a further advantage of an integrated risk management solution from the cost perspective is that a tailor-made programme can be offered under clearly specified risk costs. Particular consideration should be given here to the 'offer from a single provider' aspect, since only in this way can a specified cost budget be sensibly realized as a restrictive side constraint under an integrated risk management solution.

At this point the advantage of client loyalty through an 'all-round solution' also becomes directly evident for the cedant. In future, clients will more often demand optimal solutions from a reinsurer at fixed prices; the reinsurer's task will then be to implement risk engineering and utilize its results or to combine various risk categories and risk management instruments in order to be able to offer a specific risk management programme at predefined costs. Needless to say, in this context cedants can be presented with a selection of various alternative programmes; the extent to which room for

manoeuvre over pricing may be available will depend not only on any existing cost budgets but also of course on the cedant's risk attitude and risk acceptance respectively risk tolerance. The possibility of the cedant specifying certain risk tolerance values may be considered here.

In the light of the preceding comments it is apparent that the ideal prerequisite for efficient risk cost budgeting is a 100% participation by a reinsurer or at least a leading reinsurer. Furthermore, it only appears fair and reasonable that reinsurers should be remunerated for the time-consuming process of risk engineering or for the necessary consulting services, since an all-round integrated risk management concept is geared to the cedant's individual (risk) situation and thus cannot be reused. However, such consulting services will only have to be actually paid for in the event that the cedant decides in favour of a competitor's offer or ultimately decides not to implement an integrated risk management solution. Where the solution is implemented by the consulting reinsurer, it is possible to assume, for example, that these consulting costs can be netted with the actually incurred transaction and risk costs.

## 4. Instruments of integrated risk management

### 4.1 Preliminary remarks

The aim of the following section is to provide a brief summary of the various instruments which may – depending upon the specific objectives – be employed on a combined basis for the purposes of integrated risk management. Abstracted from the reinsurer's consulting services, it is also possible here in a stricter sense to speak of risk financing instruments.<sup>9</sup> Taking the latter interpretation as our point of departure, the following products and concepts constitute instruments which can be used to manage and finance a broad range of corporate risks; in the present context corporate risks should be understood as events which can exert a lasting influence on the financial and business results of a (primary) insurance company.

### 4.2 Consulting services

Consulting services are to be regarded both as an instrument of integrated risk management and as an indispensable precondition for the conceptual design of an integrated risk management solution: they lead directly to the use of further instruments, as set out below. Prior to this, however, a number of consulting services will be described which in some cases already belong to the range of services offered by a reinsurer; furthermore, a large number of additional consulting services exist which in the future will constitute a further area of activity for a reinsurer involved in integrated risk management.

Taking a sample selection of insurance-specific consulting services, the following may be briefly mentioned: market analysis, product development, pricing and rating, risk selection, portfolio analysis and structuring, claims settlement, access to international markets, support for mergers and acquisitions and, last but not least, the structuring of efficient reinsurance programmes.

The category of consulting services which are not exclusively insurance-specific may encompass consulting services in the IT sector, asset management including asset-liability management, the training of primary insurance clients etc.

Last but not least, mention should be made of support for general risk recognition and sensitization, which can be classed under both insurance-specific and non-insurance-specific consulting services and which on the part of the insurer constitutes an essential prerequisite for the implementation of an integrated risk management concept.

#### 4.3 Conventional reinsurance

As already mentioned at the outset, traditional reinsurance products are primarily used to provide targeted coverage for individual risks or the risks in a particular class of business, and it is because of this defined purpose that they can only partially satisfy the needs of an integrated, balance-sheet-protecting coverage. Nevertheless, traditional coverage concepts can be considered as an important component of integrated coverage concepts.

#### 4.4 Finite risk reinsurance

Alongside conventional covers, finite risk reinsurance concepts may constitute an interesting supplement to a conventional reinsurance programme for certain purposes. Depending on the underlying problem, prospective or retrospective product types may serve as suitable instruments. The key features of finite risk reinsurance products include a limited risk transfer to the reinsurer, an emphasis on profit-sharing with the cedant, a multiyear design and the explicit allowance made for investment income in the pricing calculation. Specifically, finite risk concepts may help to stabilize or smooth (underwriting) results over time – one of the most important goals of risk management which should particularly be viewed in the light of the increased orientation towards shareholder value. Higher retentions and the striving to optimize reinsurance expenditure are also increasingly creating a key area of application for finite concepts. Through the intelligent use of finite concepts it is possible to make a virtue out of the necessity caused by restricted reinsurance demand in areas of exposure with a low loss frequency. Against the backdrop of current market trends, what could be more obvious than the involvement of reinsurers in the provision of consulting and support services for insurers with regard to the structuring of their retentions? Following a detailed portfolio analysis, it is possible to devise customized prefinancing and postfinancing concepts which enable cedants to enjoy efficient and stable retention costs.

In addition to the above goals, further objectives such as a decoupling from reinsurance cycles, optimization of the balance sheet structure, equity replacement, liquidity supply, planning reliability, support for mergers and acquisitions etc. are casting finite risk products in an increasingly attractive light.

Precisely because of their hybrid nature, blending a reinsurance and financing product or involving an optional transfer of various risks, finite risk coverage concepts are particularly suitable for use in integrated risk management programmes. Furthermore, they contribute independently to the reduction and stabilization of risk costs.

#### 4.5 Multiple trigger concepts

If an insurance benefit is made dependent upon the occurrence of several events, this is referred to as a multiple trigger concept. Such concepts may include various events or risks as the factors which trigger the benefit. Thus, for example, in addition to the underwriting risk, market risks and financial risks such as exchange or interest risks may be integrated or covered.

Concepts which provide for coverage upon simultaneous materialization of a previously defined underwriting loss (liabilities portfolio) and a defined attachment point of an assets portfolio (e.g. a particular, defined or generalized reference investment portfolio) are known by the term 'dual' or 'double trigger covers'. Such constrictions are particularly interesting for insurance companies which perceive a serious threat to their existence in the simultaneous decline of underwriting and non-underwriting business. The payment

resulting from a double trigger concept based upon an underwriting attachment point  $L$  (loss ratio) and an investment portfolio index  $PFI$  can be represented formally as follows:

$$payment = \min \{ \max [L + \Delta PFI - retention, 0], limit \}$$

At this juncture, reference should again be made to the consulting services in the area of asset-liability management mentioned in Section 4.2. The separate management of assets and liabilities portfolios is increasingly diminishing in importance; the goal under asset-liability management is the risk-efficient management of an overall portfolio consisting of asset and liability items which display certain interdependencies. Ultimately, within the framework of holistic risk management, the fluctuation and performance structure of the company as a whole is decisive. It may be assumed that not only within the two portfolio classes certain (unsystematic) risk components can be diversified away through systematic portfolio structuring, but that a reciprocal harmonization of asset and liability items may also generate diversification effects. Consequently, prior to designing the multiple trigger products set out above, it is necessary to conduct a causal analysis – in other words, influencing factors and their impact on the assets and liabilities portfolios must be identified. Once such reciprocities have been analysed and potential eliminatory and compensatory effects identified, it is possible to systematically apply multiple trigger concepts to specific assets and liabilities portfolios.

Figure 2 elucidates the integrated treatment of various portfolio classes over a number of periods. The consideration of the balance sheet in the light of various risk-policy instruments makes clear the increasing leftward displacement and compression of the risk cost distribution over time, a development which is attributable to the growing degree of integration of the risk management. The point of departure sees merely a hedging of separate individual risk positions; in the subsequent period diversification effects within the assets portfolios are exploited and the combined assets portfolios are hedged together, producing a reduction and stabilization in the risk costs. Finally, in the third period, diversification effects both within the assets and between the assets and liabilities portfolios are opened up for exploitation, thus resulting in a further leftward displacement and compression of the risk cost distribution. Needless to say, it is essential to regularly review and if necessary adjust the interdependencies within and between the portfolio classes in the light of their stability over time.

In general, a double or multiple trigger coverage is expected to offer cost advantages compared to several covers with separate triggers. However, in the scenario set out above, a cost advantage can only be assumed if the insurance solution for the hedging of the assets portfolio is more cost-efficient than the purchase of a put option for the underlying equity portfolio. Nevertheless, at the present point in time and given the current development status of such multiple trigger concepts, it appears that market and financial risks can still be hedged most efficiently on pure cost grounds by means of bank products and financial derivatives. Coverage of these risks by means of reinsurance can, however, offer advantages from the point of view of balance sheet and disclosure considerations.

Looking to the future, it may be assumed that harder conditions on the international reinsurance markets will offer enhanced development opportunities for such concepts and that they will become increasingly attractive. Needless to say, to this end there will also be a need for a change in the general attitude towards such concepts; thus, for example, an investigation revealed that most of those surveyed expect that traditional insurance risks and financial risks will continue to be treated and covered separately in the future.<sup>10</sup>

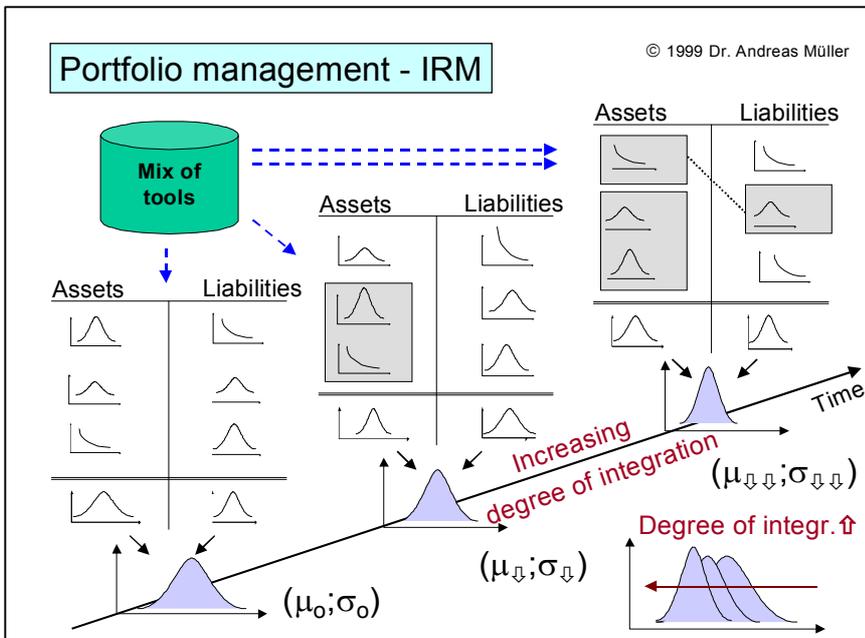


Figure 2: Treatment of various portfolio classes with increasing integration within the framework of integrated risk management (IRM)

#### 4.6 Capital market concepts

Since the beginning of the 1990s a promising future has been anticipated for capital market concepts, especially innovative capital market instruments such as derivatives and the securitization of (insurance) risks, with regard to their use in the area of underwriting risk transfer; some opinions even tend towards the view that the future role of capital market instruments will be to make a major contribution to the overall risk management of insurance companies. Yet capital market concepts will never replace traditional reinsurance; rather, they can only ever be a supplement which can be used, for example, in the event of capacity shortages, if it is difficult to cover new types of risks by traditional means or if there is a desire for alternative<sup>11</sup> coverage. Not only in order to survive in the competitive environment but also owing to the need to provide comprehensive service in terms of integrated risk management, reinsurers are increasingly tending to step up their involvement in this area and include capital market concepts in their product range.

Most popular in recent years has been the transfer – by way of a transaction known as securitization – of the underwriting risk to the capital markets or (professional respectively institutional) investors, who in the case of an ex ante defined (underwriting risk) event are on risk with their interest and/or capital repayment claim.<sup>12</sup> Even though the use of bond securitization solutions has so far been very largely restricted to the coverage of natural catastrophe risks, there are no limits to possible future developments since the qualification of a risk as an underlying for a securitization is chiefly geared solely to the possibility of quantifying this risk.<sup>13</sup>

Derivatives have assumed a significant role in risk management for quite some time now; they are particularly suited for protecting the assets side or investments by way of systematic hedging strategies. By means of the insurance derivatives traded on the Chicago Board of Trade (CBOT) known as PCS options (Property Claims Service)<sup>14</sup>, which are based upon a market claims index as the underlying, it is also possible through the construction of synthetic layers – with limitations – to hedge the liabilities side of insurance companies. The limitations arise out of the residual basis risk, which derives from a

differing development between the underlying market index (average value) and the individual claims portfolio of an insurance company.<sup>15</sup> The basis risk remaining from the use of index-based covers (e.g. options, swaps or indeed other index- and parameter-based insurance securitization solutions) can be effectively assumed by reinsurers under such transactions or holistic coverage concepts, thereby providing the client with an optimal, total coverage concept. Approaches geared to the refinement of the underlying indices in order to reduce the basis risk run up against the problem that this would result in diminished standardization and thereby crucially restrict the general applicability of such derivative instruments. Compared to traditional reinsurance, this type of coverage would ultimately have to be categorized as inefficient.

A further instrument, commonly known by the designation 'contingent capital', makes possible direct access to liquid funds upon occurrence of a previously precisely defined event (such as a natural catastrophe) at a similarly ex ante fixed price, and in the case of so-called contingent equity (CAT-E-PUT: catastrophe equity put) this produces a compensatory effect on the balance sheet (balance sheet protection).<sup>16</sup>

What is fascinating about the use of capital market instruments in the underwriting sector is that the imagination can enjoy a virtually free rein as regards the transferred risk. Such concepts are available not only for the transfer of the underwriting risk, but also open extensive possibilities for risk management. Capital market transactions should always be viewed in the context of the insurer's objectives. Thus, for example, the issue of options and bond options constituted an attempt to hedge against a possible rise in rate levels on the international reinsurance market. Such concepts provide the insurance industry with a set of risk-policy instruments which make possible greater planning reliability and the hedging of reinsurance costs. It should, however, be mentioned that the market success of these concepts is primarily determined by potential investors' readiness to invest in them.

A further interesting area of application for capital market instruments – especially for non-insurance joint-stock companies – is the securitization of future profits, an instrument which brings about, so to speak, a premature realization of future profits and which may constitute an efficient means to procure equity capital. Another capital market transaction helped to solve a common problem among new and growing life insurance companies; in 1998, for the first time, acquisition costs under life reinsurance treaties were transferred to the capital market.<sup>17</sup> The background for this extraordinary transaction is to be found in German accounting regulations, which do not permit acquisition costs to be shown on the assets side and which therefore compel companies to search for other possibilities to ease the heavy burden on results arising out of new life insurance business.

The examples cited above demonstrate that a broad spectrum of risks can be transferred to the capital markets; a wide range of constructions are possible, and these can protect both the liabilities side and assets side of an insurer's balance sheet.

The integration of capital market instruments is rendered more straightforward by the increasing convergence between the capital and insurance markets. This development is also making it increasingly easy to combine (traditional) reinsurance concepts with capital market instruments such as insurance securitization, thereby producing a more cost-effective risk transfer in overall terms than an exclusively capital market solution by way of securitization. As part of their 'all-round service', reinsurers will continue their involvement in capital market solutions in the future; in this connection, it is most notably risk assessment and the structuring of complex capital market transactions as well as the assumption of any basis risk, the fronting function and the provision of any necessary bridge cover which constitute the business fields for the reinsurance industry in combination with interfaces with additional cooperation partners from the financial sector, such as investment banks. Under successful capital market transactions, the reinsurer's

task will ultimately be to provide professional support and guidance for the cedant's entry into the capital market.

#### 4.7 Mix of instruments

Against the backdrop of an integrated risk management approach, it is important that the instruments discussed here be used not on an isolated basis but in combination (see Figure 3). The way in which these instruments are to be combined will depend not only on the underlying problem or the overall risk situation and structure but also, crucially, on the objectives pursued by the cedant.

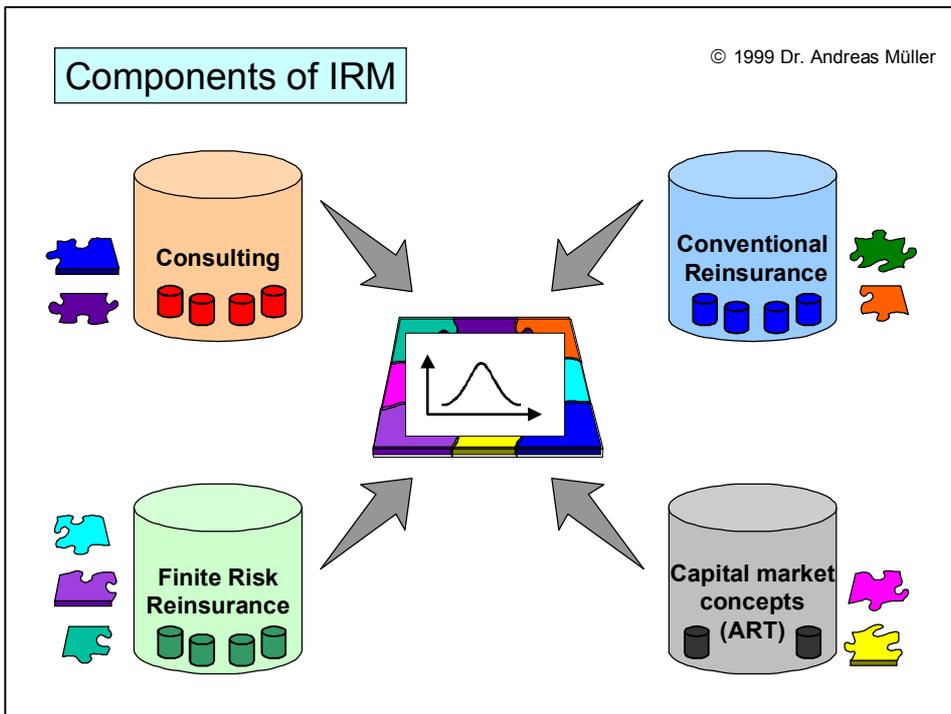


Figure 3: Components of integrated risk management (IRM)

In addition to the combined use of different risk-financing instruments to cover various risk situations (multiline), such combinations can also be used over a period of several years (multiyear) and thereby contribute to a risk-effective and cost-efficient as well as multiline/multiyear integrated coverage. Since multiyear approaches constitute a broader and more stabilizing equalization basis for comprehensive risk management, there can be no doubt that they offer the key to integrated risk management programmes.

Multiyear concepts which combine (traditional) reinsurance concepts with modern capital market instruments thus make possible integrated risk management solutions which cover the entire risk spectrum of an insurance company. Furthermore, multiline/multiyear concepts offer greater latitude for the integration or coverage of new types of risks – hitherto sometimes even classed as uninsurable – and special financial risks.<sup>18</sup> Ultimately, multiline/multiyear concepts – especially when viewed against the backdrop of the reinsurance industry's increased client orientation – appear most likely to satisfy all the requirements (multiline) of a client over a prolonged period of time (multiyear).

Finally, a key difficulty with combined solutions should be pointed out; the art of innovative problem-solving approaches lies less in the development of independent products or in the adaption of capital market instruments which have long been known in the banking sector, but rather in the harmonization of various instruments (alignment of parameters such as

liability, period, attachment points etc.) to form a combination which offers comprehensive coverage tailored to the client's needs.

The extent to which such problem-solving concepts for the optimization of an overall risk situation can actually be offered by the reinsurance industry as an 'all-round service' for insurers will depend both on the basic strategic orientation with regard to core areas of competence and on a number of different organizational factors.

## 5. Requirements facing the market and market players

### 5.1 Situation on the reinsurance market

As has been demonstrated, it is the inefficiencies of isolated partial solutions and the resulting cost considerations which make integrated risk management concepts interesting. It is evident that during periods of soft conditions on the international reinsurance markets – cycles which generate a supply of partial solutions on relatively favourable terms – the achievement of additional cost savings through integrated solutions offers less appeal.

When rate levels on the traditional reinsurance market increase, it can be assumed that the attraction of finite risk reinsurance concepts and capital market concepts will grow.<sup>19</sup> Savings through integrated risk financing concepts will then also arouse cedants' interest.

### 5.2 Reinsurers

The steps set out above for the implementation of integrated risk management already make clear the need for a highly specialized, interdisciplinary team.

As has been shown, the implementation of integrated risk management necessitates not only special (re-)insurance knowledge, but also capital market experience as well as expertise in market research and methods. The latter are particularly indispensable for the risk analysis phase; risk synthesis calls for experts who have detailed product knowledge and are able to generate efficient product combinations which can effectively bridge the open risk positions – whatever they may be – of an insurance company. In addition to the traditional class(-specific) perspective, future reinsurance experts will have to take an approach which covers the client's company as a whole, encompassing not only financial but also tax, balance sheet and market-policy considerations. As a key area, however, financial engineers will have to focus on the corporate finance sector.

Two major options are available for assembling the aforementioned teams. On the one hand, external cooperation is possible, i.e. collaboration with partners from other sectors such as consultants, (investment) banks, scientific institutions etc. On the other hand, by organizing interdisciplinary teams (underwriting, marketing, finance, tax, accounting, research and development etc.) a reinsurer can build up in-house know-how which – particularly when backed by in-house processes – can quickly and efficiently assist in the development of holistic risk management solutions. In both instances interfaces will remain, the management of which depends primarily on the readiness, motivation and communicative skills of the participating cooperation partners and staff.

Summing up, as far as the organizational aspect is concerned, it may be stated that a central<sup>20</sup>, lean, team-oriented, flexible, skilled, interdisciplinary and creativity-enhancing type of organization is essential for the development and marketing of integrated risk management solutions. Only given these basic conditions is it possible to design high-quality solutions for complex client requirements in an appropriately short space of time.

### 5.3 Clients

Given the complexity and holistic approach of integrated risk management concepts, it is evident that in order to design such concepts a reinsurer requires considerably more comprehensive and detailed information than is the case with traditional products. Consequently, insurers must be very open with their reinsurer and sometimes provide information which for reasons of business policy or on strategic grounds would normally only be available for in-house use.

In the case of integrated risk management, the relationship between insurer and reinsurer can therefore only be conceived of in terms of long-term, partnership-based cooperation. For the purposes of integrated risk management the cedant and reinsurer must thus work actively together in order to arrive at a solution which really satisfies the client's requirements.

As has already been made clear in the arguments put forward in section 3.2 (Risk cost budgeting), integrated risk management solutions can only sensibly be offered by a single provider. Insurers should therefore be willing to place their risk management in the hands of a competent reinsurer, who takes on this task alone or at least as the leading reinsurer in a small consortium. From the insurer's viewpoint, there are principally three direct advantages which would support his willingness to do this:

- Although comprehensive risk financing programmes are also possible through the combination of separate covers<sup>21</sup> from various reinsurers, this nevertheless leaves open the risk of a gap in coverage, over-hedging or inefficient coverage, which would have been avoided with a "single-provider" philosophy.
- It will also be in the interests of all insurers not to pass on to a large number of reinsurers the degree of detailed and far-reaching information which is required to construct an integrated risk management concept.
- Finally, cost considerations clearly favour a solution from a single provider, since it need hardly be pointed out that the cost of an integrated risk management solution must inevitably increase if several reinsurers are involved.

A major problem facing many (insurance) companies striving for holistic risk management is the fact that while numerous members of staff are busy with various risks and in some cases possess a high level of information about them, organizational and personnel circumstances preclude an overall perspective and hence holistic risk management. Yet the fact remains that it is not only the desire of many insurance companies and indeed even their obligation to analyse all the company's risks as part of an all-encompassing corporate risk approach and then, in a subsequent step, to control them in a risk portfolio and hence hedge the entire (risk) balance sheet. In these cases, it makes sense to call upon reinsurers less because of their specialist expertise than in their role as coordinators and facilitators. Insurers who have a central risk management department need considerably less consulting support with risk analysis and synthesis, as a result of which the tasks relating to the design of an integrated risk management solution can be divided between the insurer and reinsurer and the effective, uncomplicated cooperation between both parties can play a major role in the success of the integrated risk management concept.

Virtually the ideal (organizational) precondition for the type of cooperation outlined above is the institution of a Chief Risk Officer (CRO), who will embody the future role of a risk manager for the company as a whole and at insurance companies will be the point of contact for reinsurance companies engaged in integrated risk management issues. In addition to the development of a holistic risk management system, the primary task of a Chief Risk Officer will be to handle the communication of relevant recommendations for

action at the level of company management.<sup>22</sup> However, in view of the fact that the above comments are currently tantamount to an 'organizational vision of the future', for the time being it is reinsurers who will constitute the more active party in the design of integrated risk management solutions and who will continue to provide extensive consulting services.

## 6. Summary and outlook

As has been shown, developments on the (re-)insurance market are increasingly tending towards customized and comprehensive solutions which combine "innovative" and "traditional" types of coverage. Integrated risk management solutions will place increasing emphasis on client loyalty, cooperation and the long-term orientation of client relationships. From the client's perspective, the appeal of integrated risk management solutions lies in the following key points:

- holistic approach,
- reduction and stabilization of risk costs,
- provision of cost-effective covers for bundled risk categories,
- multiyear balance sheet protection and multiyear stabilization of annual results.

Ultimately, an integrated risk management strategy will lead to an enhancement in shareholder value at insurance joint-stock companies in the medium to long term and, irrespective of legal form, to an increase in a company's value.

The above observations illustrate that the field of 'integrated risk management' not only opens up an opportunity for reinsurers to effectively position themselves in the market, but also that it has already evolved into a basic necessity for lasting survival in the competitive environment. Furthermore, if reinsurers are successfully able to cultivate and assert themselves in the area of integrated risk management, it may be assumed that in future they will increasingly offer their services to industrial enterprises directly, thereby tapping into further client potential (corporate clients).

In conclusion, we should again recall the increasing convergence between the insurance and capital markets, a trend which not only fosters the development of integrated risk management solutions but also can be considered a fundamental precondition for the design of efficient coverage concepts for risk situations which are growing steadily in complexity.

Summing up, it may be asserted that while integrated risk management concepts are currently still in the developmental phase, they have a highly promising future. These products will be in a constant state of (further) development, precisely because the main area of application for such concepts is the dynamic business environment – characterized by increasingly rapid changes – in which insurance companies operate. Even though these concepts sometimes display a relatively high degree of complexity, development conducted on the basis of partnership-based cooperation between insurers and reinsurers can produce integrated risk management solutions which facilitate the coverage of a broad spectrum of corporate risks in a highly efficient, innovative and dynamic manner.

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<sup>2</sup> See here Müller, Andreas: Financial Reinsurance und ART, unpublished manuscript for an event of the same name held during the 1998 summer semester at the Institut für Betriebswirtschaftliche Risikoforschung und Versicherungswirtschaft (INRIVER) at Ludwig-Maximilian-University, Munich.

- <sup>3</sup> Cf. Bauer, Wolf Otto: Alternativer Risikotransfer, in: Zeitschrift für die gesamte Versicherungswissenschaft 1998, p. 562.
- <sup>4</sup> Cf. here also Nierhaus, Fedor and Vogelsberger, Nikolaus: Die sich verändernde Welt der Rückversicherer, in: Zeitschrift für Versicherungswesen 1998, p. 597f.
- <sup>5</sup> The name change from Centre Reinsurance to Centre Solutions should also be viewed against this development into problem-solvers.
- <sup>6</sup> Cf. Milligan, Amanda: Risk mapping a new path to risk financing options, in: Business Insurance, November 23, 1998, p. 2.
- <sup>7</sup> Cf. Swiss Reinsurance Company (ed.): Rethinking risk financing, Zürich 1996, p. 20.
- <sup>8</sup> The opposite case, i.e. the influencing of economic sectors by natural catastrophes is, however, entirely conceivable. See here also in passing Vukelic, M.: Access to a Wealth of Capital Ideas – Accessing Capital Markets, in: reinsurance, September 1996, p. 17ff.
- <sup>9</sup> It should be pointed out that significant importance attaches to consulting services during the conceptual design phase of an integrated risk management solution.
- <sup>10</sup> Cf. Mundy, Chris: Risk Integration and Research, in: Luxembourg Rendez-Vous, June 1998 Supplement, p. 9.
- <sup>11</sup> In this context: 'non-traditional'. On the use of the term 'alternative' within the field of insurance science and the associated problems of interpretation see also anonymous author: ART, in: Business Risk, November 1998, p. 21; Punter, Alan: Works of ART, in: Business Risk, November 1998, p. 34; Fanning, David: Old dogs learn new tricks, in: reinsurance, December 1998, p. 27; Zech, Jürgen: Will the International Financial Markets Replace Traditional Insurance Products?, in: The Geneva Papers on Risk and Insurance 1998, p. 490.
- <sup>12</sup> Further explanations in this regard are to be found i.a. in Wagner, Fred: Risk Securitization – An Alternative of Risk Transfer of Insurance Companies, in: The Geneva Papers on Risk and Insurance 1998, p. 540-607.
- <sup>13</sup> Examples of non-natural catastrophe risks which constitute potential risks for a securitization solution are to be found in McLeod, Douglas: Moving beyond cat bonds key to growth of market, in: Business Insurance, September 21, 1998, p. 3 and Hanley, Mike: Risky but not spooky, in: The Review, October 1998, p. 37.
- <sup>14</sup> There is now also the possibility of trading insurance derivatives on the Bermuda Commodity Exchange (BCX), on which the GCCI (Guy Carpenter Catastrophe Index) is based. Cf. Guy Carpenter (ed.): The Evolving Market for Catastrophic Event Risk, Special Report August 1998, p. 23f.
- <sup>15</sup> Cf. Albrecht, Peter and Schradin, Heinrich: Alternativer Risikotransfer – Verbriefung von Versicherungsrisiken, in: Zeitschrift für die gesamte Versicherungswissenschaft 1998, p. 591.
- <sup>16</sup> There are also so-called contingent surplus notes, which can constitute an interesting contingent capital solution for non-joint-stock companies. More detailed explanations in this regard are to be found in Albrecht Peter and Schradin, Heinrich: loc cit, p. 590.
- <sup>17</sup> This refers to the L1 transaction of Hannover Re. See here URL: [http://www.hannover-rueck.de/home/3\\_news/default\\_o\\_j.html](http://www.hannover-rueck.de/home/3_news/default_o_j.html) (as at 12.2.1999).
- <sup>18</sup> Cf. anonymous author: Bespoke ..., p. 15 and Swiss Reinsurance Company (ed.): Corporate ..., p. 19. The integration of currency risks is generally considered to be relatively straightforward. Cf. here Zolkos, Rodd: Integrating risk pays off for Honeywell, in: Business Insurance, 30 November 1998, p. 13.
- <sup>19</sup> It should be pointed out that in the event of an increased occurrence of catastrophe events it must be anticipated that the cost of capital market concepts and finite risk concepts will also increase.
- <sup>20</sup> This aspect is growing in importance on grounds of client orientation since clients (primary insurers) should if possible have a central contact partner.
- <sup>21</sup> Different layers, traditional reinsurance, financial reinsurance, capital market concepts etc.
- <sup>22</sup> In some cases the board level is also mentioned here. Cf. Goddard, Sarah: An integrated approach to risk sensible, in: Business Insurance, November 23, 1998, p. 38. In this regard it is important to distance oneself from the view that risk managers – if they exist – should be organizationally assigned to the finance department within companies; after all, the intention is that all risks of a company should fall within the area of responsibility of a risk manager.