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WAYS OF IMPROVING RISK MANAGEMENT FUNCTION IN INSURANCE COMPANIES

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Abstract. The concept of this work is improvement of risk management function according to Solvency II directive framework. The authors have created an insurance company's risk catalogue for identification, classification and assessment of possible risks that is a reasonable solution for risk management function improvement. The authors also have offered the loss database implementation algorithm which helps to realize and improve operational risk management. However the authors have created the operational risk ranking method which helps to discover possible solutions to minimize the probability of operational risk event and in case of operational risk to reduce the possible company's loss.

Keywords: risk management, risk ranking method, Solvency II Directive, risk catalogue, risk management function.

Jel classification: G22

1. Introduction

Insurance is one of the most important parts of every country's economics as it provides possibilities of national prosperity increase. Insurance relates to risk management as the main aim is to ensure insured person safety and to pay to insurant, or beneficiary, or insured legatee the necessary claim sum in case of a risk event occurrence. Therefore, insurance offer to the clients the sense of protection.

Risk is the possibility of an insurance event occurring that will have an impact on the achievement of objectives. In general, risk management is a potential danger and undesirable cases identification process with a risk occurring probability analysis and a risk expected harm assessment.

The Solvency II Directive should establish economic risk – based solvency requirements across all European Union countries (EC 2009). The point is that the Solvency II requirements should establish common risk management principles for every insurance and reinsurance company in the European Union. The Solvency II Directive requirements set many challenges to every insurance and reinsurance company.

Therefore, the article purpose is to find possible ways of improving risk management function in insurance and reinsurance companies due to the Solvency II requirements. The Hypothesis of the paper is that risk factors that affect insurance and reinsurance companies activity and development can be assessed, managed, improved by analyzing.

The object of the article is Life insurance company registered in the European Union, which main activity is life insurance and investment management. Therefore, the subject is the improvement of risk management function due to the Solvency II Directive requirements. In order to achieve the set aim the authors use a theoretical analysis of the scientific literature and analytical methods with the aim to study the Solvency II framework elements and functions. The authors use experts and priority charts methods with the aim to improve risk management function. We focus on improvement possibilities of risk management function.

The article consists of five main sections. A brief review of the development of risk management function under new regime is presented in section 2. In section 3, target risk profile establishment and operational risk management algorithms are introduced according to the Solvency II Directive requirements. Risk catalogue and loss database on Life insurance company's example are performed in section 4 with the point to establish the principles of possible solutions of the risk management function improvement. The final section summarizes the findings and conclusions of the study, and assesses the role and significance of risk management function.

2. The Risk management function development

The Solvency II Directive is based on the three-pillar approach where each pillar fulfills its own function: quantitative requirements, qualitative and supervision requirements, disclosure requirements that mean prudential reporting and public disclosure (EC 2009). In fact the Solvency II Directive requirements are planned to be more risk sensitive and more sophisticated than the Solvency I Directive requirements with the purpose to provide every individual insurance or reinsurance company's real risk better coverage (Bokans 2011).

In order to satisfy the Solvency II Directive requirements risk management function should be established. In fact, risk management function should be fit and proper with the aim of developing strategies, processes, reporting procedures to identify measure, monitor, manage, and report the risk. The conceptual framework of the Solvency II Directive is presented in Figure 1.

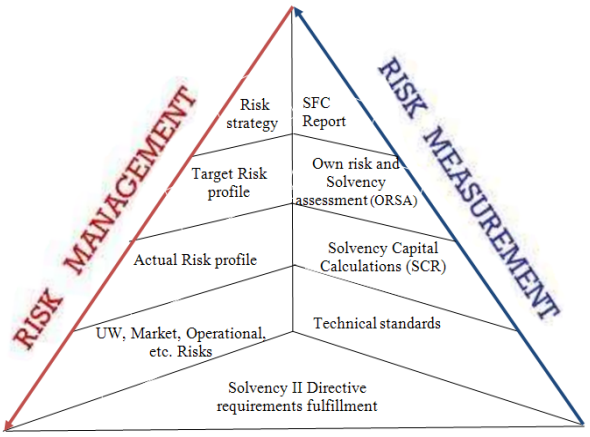

Fig.1. Solvency II Directive interpretation (Source: Bokans 2011 with the authors' changes)

The authors can conclude that risk management and risk measurement are connected and depended on each other.

Risk management is a complicated process that covers many activities with the aim to satisfy regime requirements and is presented in Figure 2.

The author has defined that by risk management we mean any kind of considerations which enable businesses to detect critical developments and to take countermeasures early enough (Henschel 2007).

Risk management is about to define risk profile that goes to align with the stakeholder's risk appetite and risk tolerance, likewise keeping risks and losses to within insurer's risk tolerance.

Risk appetite requires a company to consider what its overarching attitude is to risk taking and how this attitude relates to the expectations of its stakeholders (Towers Watson 2010).

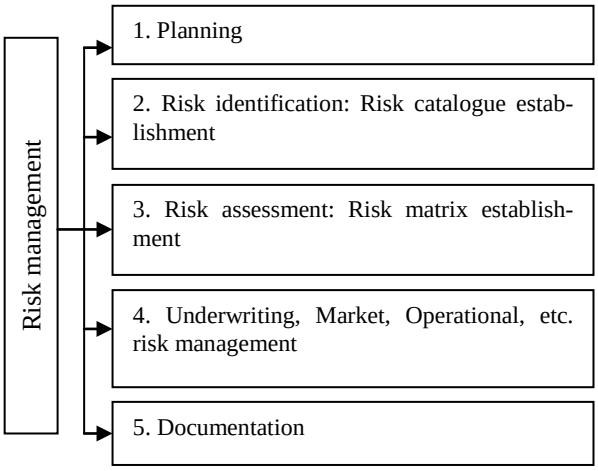

Fig.2. Risk management function's components

Risk tolerance requires a company to consider in quantitative terms exactly how much of its capital it is prepared to put at risk (Towers Watson 2010).

Risk limits require a company to consider at a more granular level how much risk individual managers throughout the organization should be allowed to take within their assigned responsibilities (Towers Watson 2010).

Solvency II sets out risk management and measurement objectives to ensure adoption of robust risk management processes that are carried out across the entire organization and that form the basis for informing and directing the insurer's decision-making (PricewaterhouseCoopers 2010).

The point is that risk management is the risk function field; therefore, risk measurement accomplishment provides actuarial and risk function.

Consequently, the ORSA can be defined as the entirety of the processes and procedures employed to identify, assess, monitor, manage, and report the short and long term risks a (re)insurance undertaking faces or may face and to determine the own funds necessary to ensure that the undertaking's overall solvency needs are met at all times (EIOPA 2010).

There is set that the key point here is that the ORSA is not a one-off exercise or a single report. Rather, it is a fundamental part of the risk management system for an insurance undertaking. In other words, it could be defined as a documented process (Lavelle *et al.* 2010).

The ORSA should encompass all material risks that may have an impact on the undertaking's ability to meet its obligations under insurance contracts (EIOPA 2010).

Therefore, the authors can set that ORSA is the key part of the Solvency II regime and should

perform insurance or reinsurance company's target risk profile with risk appetites and tolerances.

However, it is important to remember that the directive is clear that ORSA does not of itself serve to create an additional regulatory capital requirement (Lavelle *et al.* 2010). The ORSA should cover at least all Solvency Capital Requirements (SCR) risks. SCR is the amount of capital to be held by an insurer to meet the Pillar I requirements under the Solvency II regime (CEA and Groupe Consultatif 2007). SCR requirements are presented in the Figure 3.

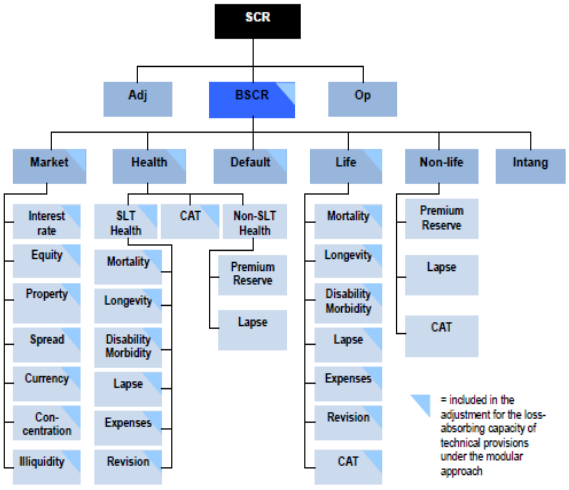

Fig.3. SCR according to the standard formula (Source: EIOPA 2010)

The authors can set that according to SCR calculation with the standard formula reinsurance and insurance company can set its actual risk profile.

3. Description of the Target risk profile establishment

The point is that ORSA should cover all material risks; therefore, the risk catalogue establishment is one of the possibilities of risk management function improvement.

The scope of risks that should be included in the analysis will depend on the purpose and context of the assessment (EIOPA 2010). The risk catalogue creation is presented in Figure 4.

Nature and complexity of risks are closely related and, for the purposes of an assessment of proportionality, could best be characterized together. Indeed, complexity could be seen as an integral part of the nature of risks, which is a broader concept (EIOPA 2010).

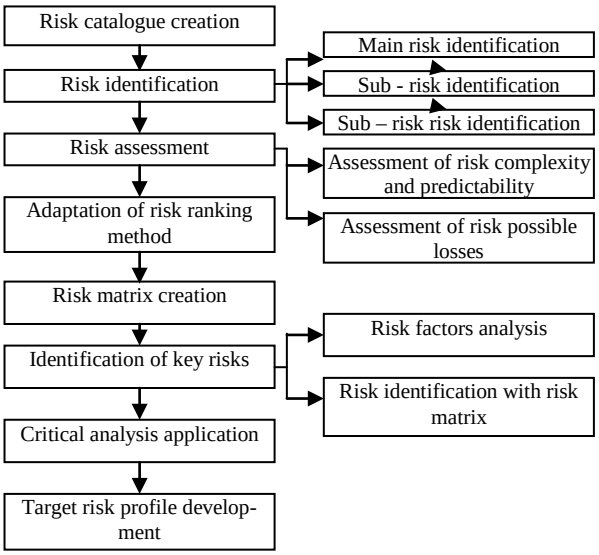

Fig.4. Algorithm of Target risk profile development

The authors offer to recognize as the main risks of insurance company's risk catalogue the CSR standard formula settled risks:

– Market risk is caused by changes in values caused by market prices or volatilities of market prices differing from their expected values. (CEA and Groupe Consultatif 2007).

– Operational risk is risk of a change in value caused by the fact that actual losses, incurred for inadequate or failed internal processes, people and systems, or from external events (including legal risk), differ from the expected losses(CEA and Groupe Consultatif 2007).

– Life or non-life underwriting risk is caused by underwritten insurance contract.

– Credit risk is the risk of a change in value due to actual credit losses deviating from expected credit losses due to the failure to meet contractual debt obligations (CEA and Groupe Consultatif 2007).

After establishing the risk catalogue, it is necessary to create the risk matrix with the aim to identify key risks.

The three indicators – nature, scale and complexity – are strongly interrelated, and in assessing the risks the focus should be on the combination of all three factors. This overall assessment of proportionality would ideally be more qualitative than quantitative, and cannot be reduced to a simple formulaic aggregation of isolated assessments of each of the indicators (EIOPA 2008).

In terms of nature and complexity, the assessment should seek to identify the main qualities and characteristics of the risks, and should lead to an evaluation of the degree of their complexity and predictability. For this purpose, it may be helpful to broadly categorize the risks according to

the two dimensions "scale" and "complexity / predictability" (EIOPA 2008).

Risk matrix consists of three main parts:

– risks in the yellow part are classified as normal risks with the minimal impact on company's activity, therefore it is necessary to pay attention to their future development;

– risks in the orange part are classified as critical risks with the necessity of managing and controlling;

– risks in the red part are classified as very critical risks with the necessity of the immediate actions towards managing and controlling the risks.

In order to improve risk management function there is also a possibility to settle principles of operational risk management. Therefore, the authors perform operational risk ranking method algorithm – loss database.

For operational risk, details should be provided on the gross operational loss amount suffered by undertakings, the number of operational loss events, how the undertaking monitors, classifies and collects data on operational loss events and some detail of operational losses suffered compared to own funds (EIOPA 2009).

The operational risk's loss database algorithm is presented in the Figure 5.

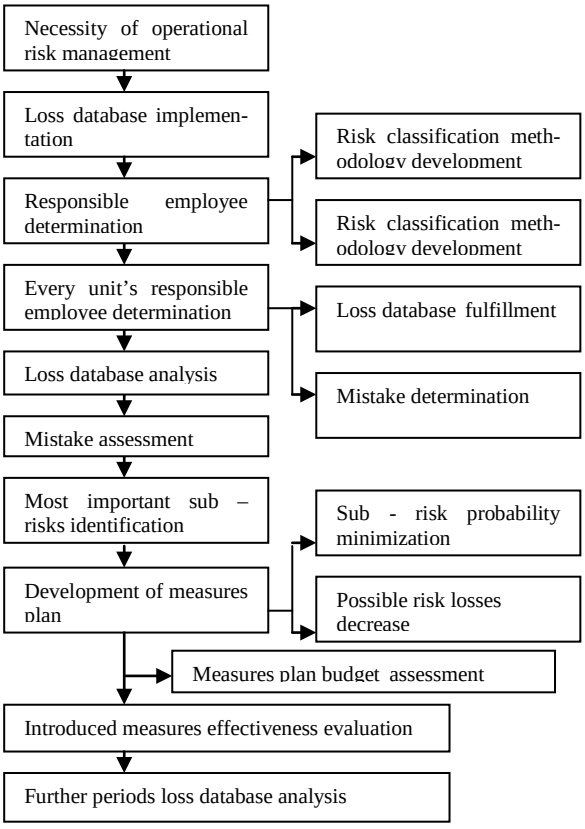

Fig.5. Loss database implementation algorithm (Source: Created by the authors)

Loss data bases, both internal and external, are important aspects of an operational risk program. An understanding of interconnectivity of different risks is a prerequisite to controlling problems and assessing practices. Firms should strive to understand the causes and related factors relevant to operational risk losses. Comprehensive qualitative information can help managers identify the commonalties among loss events. Seeing these patterns or common threads may allow managers to recognize red flags in their own controls before incidents occur. Quantitative tools further enhance a database by allowing it to be used for benchmarking (International Association of Financial Engineers 2011).

Loss database has the following aims:

– to minimize operational risk occurring probability and reduce possible losses in case of operational risk occurrence;

– to improve communication at all company's levels, control system, procedures, processes and IT system.

Loss database should include: mistake registration date, operational risk sub-risk identification, mistake description, losses assessment, profit or losses evaluation, company's units where a mistake has occurred, risk category identification, risk status, identification of mistake risk factor.

Mistake category assessment with the aim to indentify the possible impact on company's activity is presented in Table 1.

Table 1. Mistake categories

Rank	Description	Color
1	The losses of mistake are less than 300 EUR	no
2	The losses of mistake are more than 301 EUR but less than 800 EUR	no
3	The losses of mistake are more than 801 EUR but less than 1500 EUR	light grey
4	The losses of mistake are more than 1501 EUR but less than 15000 EUR	grey
5	The losses of mistake are more than 15001 EUR	dark grey

Risk statuses are presented in Table 2.

Table 2. Risk possible statuses

Status	Description	Color
Not started	Mistake is identified, but correction process is not started	dark grey
In process	Mistake is identifies, but correction is in process	grey
Finished	Mistake is identified, corrected	no

Also, mistake's risk factors identification is shown in Table 3.

Table 3. Mistake categories

Factors	Description
People	Mistake is caused by people
Manual work	Mistake is caused by manual work
IT system	Mistake is caused by IT system
Outside	Mistake is caused by outside factors

The point is that loss database is easier to implement in MS Excel as it is free of cost environment, known and familiar almost by every employer. Also, mistake registration procedure is provided with special lists created with MS Excel tool Data Validation and identification colors for some fields with MS Excel tool Conditional Formatting, that helps review easily the substantive errors.

4. Target risk profile development on Life insurance company's case

The authors will create on life insurance company's basis the risk catalogue that is presented in Table 4.

Table 4. Risk catalogue

Risk	Sub-risk	Sub-risk risk	Description
Life underwriting risk	Policyholder behavior risk		Risk of the insurance company's policyholders will act in ways that are unanticipated and have an adverse effect on the company.
		Mortality risk	The treatment of mortality risk is intended to reflect uncertainty risk.
		Longevity risk	The treatment of longevity risk is intended to reflect uncertainty risk.
		Disability risk	The treatment of disability risk is intended to reflect uncertainty risk.
	-	-	-
Market risk	Interest rate risk		The risk of a change in value caused by a deviation of the actual interest rates from the expected interest rates (CEA and Groupe Consultatif 2007).
	-	-	-
Credit Risk	Settlement risk		The risk of a change of value due to a deviation from the best estimate of the time-lag between the value and settlement dates of securities transactions (CEA and Groupe Consultatif 2007).
	-	-	-
Operational risk	Reputational risk		The risk that adverse publicity regarding an insurer's business practices and associations, whether accurate or not, will cause a loss of confidence in the integrity of the institution (CEA and Groupe Consultatif 2007).
	-	-	-

The point is that risk catalogue due to the Solvency II Directive requirements should be analyzed by with the help of risk matrix.

Therefore, it is necessary to set occurrence probability and possible losses ranking shown in Table 5.

Table 5. Description of risk matrix's ranks

Rank	Description	
	Risk probability	Possible losses
1	Rare (less than 1 %)	Insignificant
2	Unlikely (1.1 % – 10 %)	Low
3	Moderate (10.1 % – 50 %)	Average
4	Almost possible (50.1 % – 80 %)	Maximum
5	Possible (80.1 % – 100 %)	Catastrophic

Assessment of main risk sub-risk possible losses and occurrence probability can be provided by life insurance company's expert group and therefore is presented in Table 6.

Table 6. Sub-risk assessment

Rank	Sub-risk	Probability	Impact
R1	Pricing risk	3	4
R2	Policyholder behavior risk	5	5
R3	Reserving risk	2	5
R4	Lapse risk	4	4
R5	Claim risk	4	3
R6	Expense risk	3	3
R7	Biometric risk	2	3
R8	Product design Risk	2	4
R9	Volatility risk	3	3
R10	Economic environment risk	4	4
R11	Interest rate risk	3	4
R12	Concentration risk	2	3
R13	Spread risk	3	4
R14	Equity risk	3	2
R15	Real Estate risk	1	1
R16	Foreign exchange risk	4	4
R17	Liquidity Risk	4	4
R18	Settlement risk	3	3
R19	Default risk	2	3

End of table 4

Rank	Sub-risk	Probability	Impact
R20	Policyholder Credit Risk	2	2
R21	Reputational risk	2	5
R22	Strategic risk	3	5
R23	Model risk	2	4
R24	Business risk	1	5
R25	Legal risk	2	4
R26	Catastrophic Risk	1	5
R27	Internal audit risk	3	4
R28	Human Risk	5	3
R29	IT system risk	5	4
R30	Political risk	1	5

Actually, by using sub-risk assessment table it is possible to develop risk matrix presented in Figure 6.

Probability assessment						
	5			R28	R29	R2
	4			R5	R4, R10, R16, R17	
	3		R14	R6, R9, R18	R1, R11, R13, R27	R22
	2		R20	R7, R12, R19	R8, R23, R25	R3, R21
	1	R15				R24, R26, R30
		1	2	3	4	5
	Possible impact (losses) assessment					

Fig.6. Risk matrix

The risk matrix analysis is a complex process of the expert's group work, whose illustrated analysis is presented in Figure 7.

The assessment of the risk matrix reflects the company's risks in an obvious way. The point is that the most dangerous risks of the company are policyholder behavior risk with the common assessment of ten points and IT system risk with the common assessment of nine points.

In fact, the authors can conclude that operational risk sub - risks (are illustrated from R21 to R 30) are more risky than the other main risks because of the common assessment with a quite high occurrence probability and possible losses assessment.

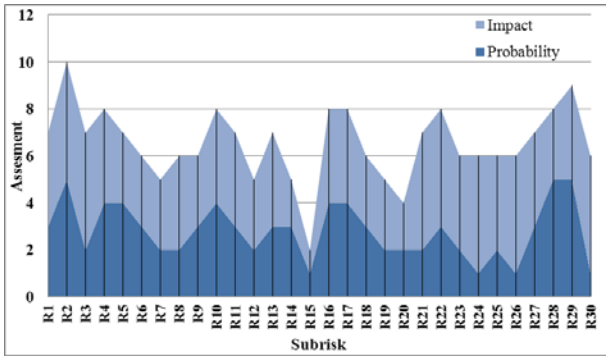

Fig.7. Risk matrix assessment

Eventually the authors have created life insurance company's operational risk loss database that is presented in Figure 8.

	A	B	C	D	E	F	G	H	I	J	K
1	Nr.	Registration date	Sub-risk identification	Description	Direct expenses	Indirect expenses	Losses, EUR	Unit	Category	Status	Risk factors
2	1	07/10/2011	Human risk	Mistake in booking	yes	yes	-500	Finance	2	In process	Manual work
3	2	13/10/2011	IT system risk	Incorrect calculation of policy mathematical reserve	no	yes	-300	Actuarial	1	In process	IT system
4	3	20/10/2011	Human risk	Incorrect premium fee for group policy since start	yes	yes	-100	Finance	1	Open	Manual work
5	4	01/11/2011	Human risk	Incorrect claim amount paid out	yes	no	-1200	Finance	3	Finished	Manual work
6	5	09/11/2011	Internal audit risk	Mistake in reinsurance calculations	yes	yes	-14500	Actuarial	4	In process	Manual work
7	6	14/11/2011	Human risk	Incorrect administration costs calculation for several policies	no	yes	-203	Policy administration	1	Open	People
8	7	30/11/2011	IT system risk	Incorrect P/L amount	yes	no	-35000	Actuarial	5	Finished	IT system
9	8	06/12/2011	Bussiness risk	Incorrect fund price	yes	yes	-1400	Actuarial	3	Finished	Outside factors
10	9	15/12/2011	Human risk	Incorrect acquisition cost amount for several policies	yes	no	-400	Policy administration	2	In process	Manual work
11	10	19/12/2011	Human risk	Incorrect booking	yes	yes	-110	Finance	1	Open	Manual work

Fig.8. Loss database example

Loss database assessment can be performed in many ways:

– to discover and analyze the most dangerous risk factor;

– to indentify the most essential operational risk sub - risk;

– to calculate the probability of operational risk event occurrence.

Therefore, the authors can make the following conclusion after analyzing loss database:

– operational risk sub-risk human risk is the most important by the occurrence probability of 60 % ;

– the most important risk by the losses assessment is IT system risk;

– the most essential risk factor by the mistake category is IT system and manual work;

–the most significant risk factor by the mistake occurrence is manual work.

All in all, after loss database assessment it is essential to develop possible appropriate measures of improving the current situation:

– to minimize IT risk possible looses that means to improve the current IT system by testing with the aim to identify all the weak areas of it;

– to start audit process with the aim to recognize possible solutions for the manual work minimization.

The evaluation and assessment of Life Insurance company's risks with the aim to set actual and target risk profile is possible way of risk management function improvement under the Solvency II framework.

5. Conclusions

The point is that the Solvency II Directive requirements set new rules and a new vision of risk management principles.

In fact, it is essential to recognize the possible ways of risk management function improvement with the aim to develop every insurance or reinsurance company's actual risk profile throw target risk profile settlement.

Target risk profile can be developed with the Own risk and the Solvency assessment requirements that every insurance and reinsurance company should cover all material risks including the Solvency Capital requirements risks.

The authors have created risk catalogue that includes the main Solvency capital requirements risks with all sub – risks. The risk catalogue is possible to analyze by risk matrix.

Besides, the authors have developed loss database with the purpose of minimizing the operational risk significance.

The suggested approaches of target risk profile settlement is the start point of risk management function improvement that will enable to control every insurance and reinsurance company's trends within its development towards the sustainability, solvency, and growth.

The authors would seize the opportunity in the future to continue the present research by developing improving possibilities of risk management.

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