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# Consultancy services for insurance providers: Solvency II

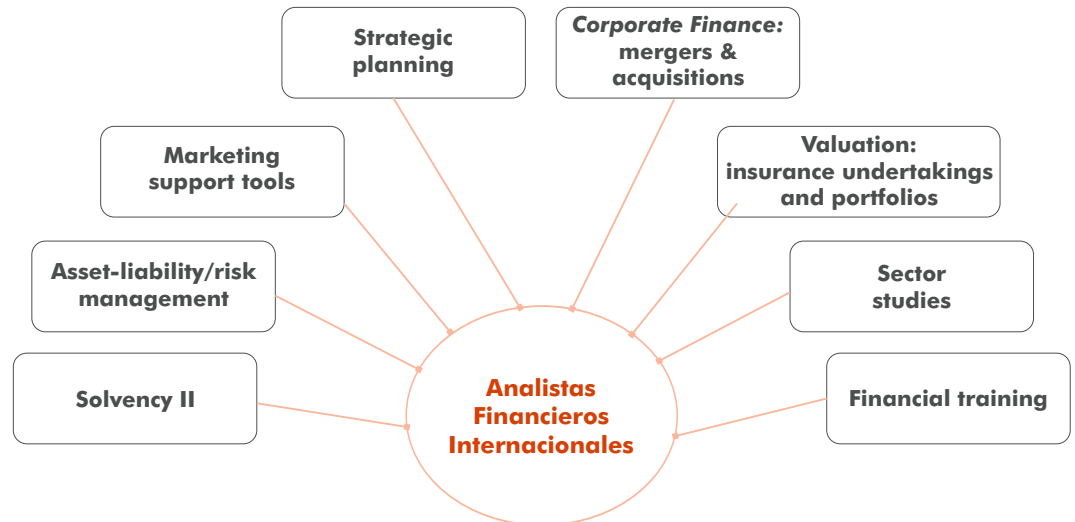


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## Foreword

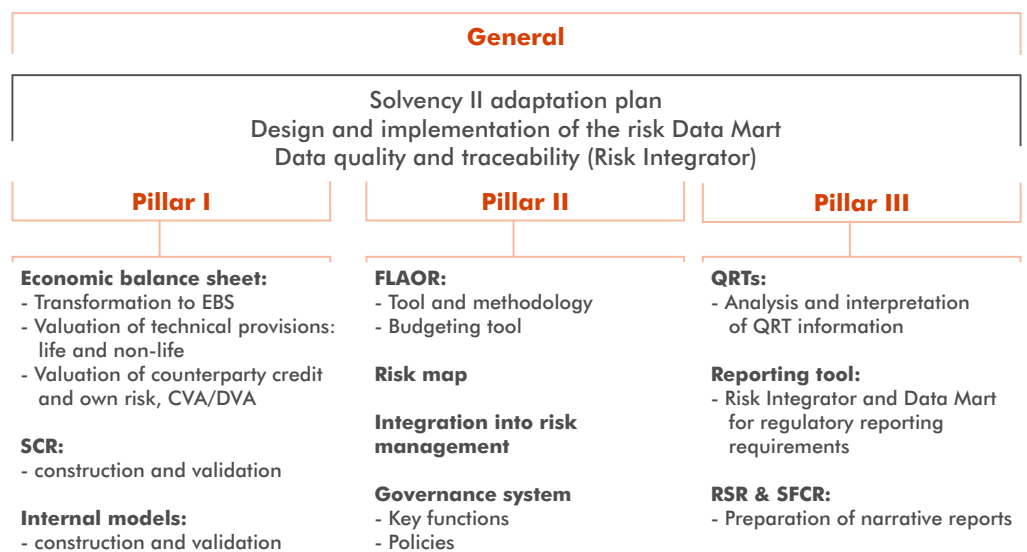
Afi's multidisciplinary team enables it to offer its clients a broad spectrum of financial services. The range of services offered to insurance providers can be grouped into eight major areas:



## Adapting to Solvency II

Effectiveness of Solvency II in the European Union member states from 1 January 2016 is shaping up to be one of the greatest challenges on the horizon for insurers as it entails a degree of regulatory overhaul that forces them to recalibrate all of their risk management and calculation systems for the new capital requirements.

Simply calculating capital requirements using the standard formula will require a notable effort on the part of the insurance industry. Aware of these difficulties, Afi offers a range of services intended to cover insurance undertakings' potential needs under Solvency II, taking an approach that is highly flexible and can be easily tailored to individual entities' circumstances.





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## A. General

### A.1. Implementation Plan

- Review of the undertaking's starting point in respect of Solvency II.
- Detection of potential gaps in terms of methodologies, tools, data, procedures, etc.
- Preparation of a Solvency II Convergence Implementation Plan.

### A.2. Data Governance

- Design and construction of a centralised and documented warehouse of traceable, auditable, accurate and comprehensive data which is also capable of generating management information integrated with the undertaking's solvency information and filling out the quantitative reporting templates (QRTs).

### A.3. Data Governance

- Assurance regarding the quality of the data (accuracy, comprehensiveness and pertinence).
- Assurance regarding data traceability (warehousing, re-processing policies, etc.).
- Data quality policy. Assurance regarding roles and responsibilities during the entire data life cycle.

## B. Pillar I Quantitative requirements

- **Economic capital:** methodology and process for calculating the market value of an undertaking's capital.
- **Technical provisions:** methodologies, implementation and review of calculation procedures for **life** (best estimate computations, valuation of options and guarantees, etc.) and **non-life** (e.g. chain ladder, GLM, etc.).
- **Financial assets:** valuation of structured financial assets, derivatives and/or liquid assets (mark-to-market, stress-test valuations, etc.) and complex financial assets (ABS, CLN, etc.).
- **SCR:** QIS advisory/validation exercises (QIS5, LTGA, etc.), calculation of SCR during the Solvency II preparatory phase and advice on how to perform the stress tests.
- **Internal models:** construction and validation of internal market and subscription models, etc. (prior analysis, statistical advice, modelling solutions).
- Control and management of SCR standard formula calculation (partial and/or full internal model) using **Risk Integrator** (more details below). Validation of the SCR standard formula calculation (partial and/or full internal model).
- **Generation of stochastic scenarios for financial inputs** (interest rates, inflation, etc.) to estimate options and guarantees (profit-sharing, dynamic redemptions, variable returns, etc.).
- **Ability to programme in Prophet, MoSes, Matlab, SAS, R, VBA, etc.**

## C. Pillar II Governance system

- Review of the governance system and other key aspects (fit and proper, outsourcing, etc.).
- Review and implementation of key functions (actuarial, risk management, compliance and internal audit).
- Elaboration of policies and procedures aligned with Solvency II requirements.



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- Definition of the undertaking's risk strategy and appetite.
- Definition of the methodologies to be used to determine the undertaking's risk appetite and profile, capital management and risk appetite monitoring.
- Definition of the FLAOR/ORSA process.
- **Afi's ORSA tool** (more information below).
- Implementation of software to support the FLAOR/ORSA process in respect of risk evaluation and modelling: **Risk Integrator**.
- Elaboration of a pilot FLAOR/ORSA test.
- Advice on implementation of the FLAOR/ORSA process.

#### D. Pillar III Reporting requirements

- Functional and technical design of the QRT models (e.g., data analysis and interpretation, data traceability, etc.).
- Implementation of the reporting platform: **Risk Integrator and Data Mart** for regulatory reporting purposes.
- Elaboration of Solvency and Financial Condition Reports (SFCR) and Regular Supervisor Reports (RSR): **Risk Integrator**:
  - Risk control system user manual.
  - Policies and provisions calculation information systems.
  - Current SCR calculation system and the economic balance sheet.

### Expert advice on Solvency II issues

- Expert reports on valuation, accounting treatments and capital requirements for complex assets and liabilities.
- Ad-hoc reports.

### Provision of advice to investment / ALM / risk committees

- Provision of advice to Risk / ALM committees..
- Hotline and advisory service covering Solvency II, financial variables and investor positioning.
- Provision of advice on SCR analysis.
- Provision of advice regarding impact of alternative investments on SCR.
- Provision of advice on investment concentration, diversification and spread limits.
- RAROC analysis: marginal additional return per unit of additional risk (return / incremental capital requirement) assumed in new investments.
- Analysis of market variables and impact on the insurance business.



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Figures in € 000	Base case	Option A	Option B	Option C
SCR spread	16.234,6	27.830,7	19.720,0	14.140,7
SCR concentration	11.422,8	11.422,8	11.422,8	11.422,8
SCR equity	12.325,0	12.325,0	36.975,1	49.300,1
SCR interest rate	5.036,0	5.036,0	4.505,9	4.240,9
Undiversified SCR	45	57	73	79
<b>Total SCR</b>	<b>31.863,4</b>	<b>42.415,2</b>	<b>57.061,5</b>	<b>63.981,8</b>
Diversification effect	-31,0	-42,4	-57,0	-63,9

## Risk Integrator

Afi has developed a platform, **Risk Integrator**, to enable undertakings to **comply with their Solvency II requirements as well as to control and automate other processes**. It can be embedded into the execution process of a broad range of market tools (SAS, MoSes, Prophet, IBNRS, etc.).

### Process control and automation

**Risk Integrator establishes centralised and automated control of the undertaking's process workflow.**

Applied to **Solvency II**, this means the computation of standard formula capital using full or partial internal models.

**This control and automation can be adapted for other tasks** (generation of BE assumptions, automated extraction of files for calculation of technical provisions, automation of end-of-period closes, etc.) **and adapted for other regulations.**

### Pillar I EBS

Scope for layering in the **economic balance sheet** and capital requirement calculations and flexibility to incorporate the **standard formula or internal models**; can be tailored for **international or local regulations** (QIS5, LTGA and transitional measures).

### Pillar II ORSA / FLAOR

The flexibility associated with **Risk Integrator** permits users to control, automate and trace **risk strategy and appetite** definition processes and calculation processes associated with **FLAOR**.

### Pillar III Data Mart / Capital reporting (SCR)

**Risk Integrator** can be used to articulate the **process of dumping data** warehoused in the risk IT systems and the data mart required for regulatory reporting purposes in order to **generate scorecards, internal reports for management and QRTs**.

## Using Risk Integrator to calculate SCR

Risk Integrator incorporates the capital requirement calculations using the established standard formula criteria in a simple and straightforward manner:

- The tool replicates the **Solvency II risk tree** structure, so that SCR can be calculated in a transparent and simple manner.
- It comes with a series of **helper tabs** to simplify the process of inputting the necessary data.
- It incorporates and controls the results of **multiple platforms / tools** (e.g. **MoSes, Prophet, IBNRS, SAS, etc.**).
- It is configured to enable the creation of different risk trees and **work environments** (development and production).

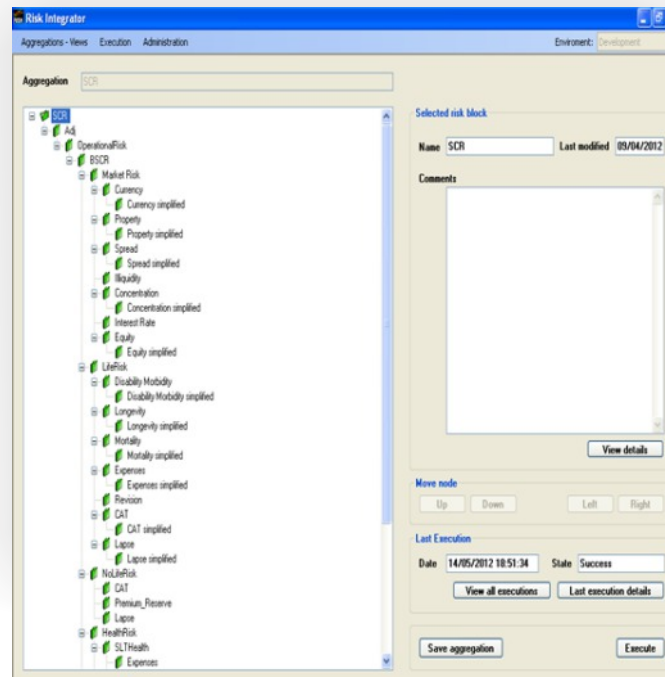


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- It is simple and straightforward to update for **regulatory developments**.
- It can be configured for **multiple clearance levels** (by area: investment, actuarial areas, etc.).
- Scope for having the various areas **use the models separately** (e.g. by adding an SCR market module to the tool which calculates the asset flows).
- Enables the combination of SCR with **partial internal models**.

### Example of the standard formula process



## Asset-liability valuation and profit-testing tool - Afi ALM & PT

Afi's projection tool enables quick and accurate creation of the asset and liability flows generated at the undertaking. The tool is capable of generating scenarios for the requirement valuations of assets and liability optionality and reflecting how assets and liabilities interact using ALM techniques, thereby complying with stringent Solvency II requirements.

It is based on the following principles:

- **A robust, open architecture and scalable platform.** The Afi projection model's calculation driver is capable of handling with ease a large number of stochastic scenarios, long projection periods and interactions between assets and liabilities (ALM). It can be integrated with the rest of the undertaking's systems without any problem whatsoever.
- **Scenario projections and aggregation:**
  - Projections for market-consistent valuations, economic capital, Solvency II, ALM, pricing, O&G, etc.
  - Generation of model points, policy holder behaviour projections, etc.
  - Aggregation of scenarios to capture possible impacts and sensitivities.



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- **Reporting definition and generation flexibility.** The tool is highly flexible in terms of both defining the guarantees covering the insurance products comprising liabilities and generating all manner of reports for visualising the results.
- **Modular solution.** Afi has opted for a modular solution as the optimal means for catering to its clients' needs. The platform modules can be coupled with the undertaking's existing systems.

The modules comprising the platform are::

- **Asset portfolio valuation:**
  - ♦ Deposits, bonds with fixed/floating rates, zero coupon bonds (at par/discount), etc.
  - ♦ Step-up coupon and CMS (with/without cancellation option), securitised assets.
  - ♦ Equities, fixed-income and equity mutual funds, IRSs.
  - ♦ FX forward contracts, asset swaps, special structures: flows, coupons, etc.
- **Liability valuation and scenario simulation:**
  - ♦ Scope to layer in liability projections generated using other tools.
  - ♦ Flow projections of different types: BEL, SCR, etc.
  - ♦ Dynamic modelling of policy holder behaviour.
  - ♦ Scope to adapt the customer investment strategy by portfolio.
  - ♦ Various classes of profit-sharing strategies.
- **Options and liability guarantee valuation:**
  - ♦ This model allows in-depth analysis of the obligations arising from the options and guarantees derived from the insurance policies.
- **SCR calculation (standard formula):**
  - ♦ The platform then calculates the capital requirement (SCR) using the data obtained from the above models, factoring in the stress tests required under Solvency II to this end.
- **Profit testing:**
  - ♦ The platform performs a detailed study of hypothetical results when designing a product, providing information regarding inflows and outflows, capital requirements, profit and loss, RAROC, etc.
  - ♦ It enables several configurations for a given product in a single run.
- **Generation of economic scenarios:**
  - ♦ The platform enables the generation of real world and market consistent scenarios.
  - ♦ Interest rate, credit spread, portfolio default rate, equities, inflation scenarios.
  - ♦ Calibration is updated at projection dates in accordance with the above modules.



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- **Matching adjustment (MA):**
  - The platform determines the matching adjustment as a function of the asset and liability valuations calculated by the above-listed modules using different calculation options (e.g. maximum IRR, manual, etc.).

## Non-life - Afi non-life risks

The **Afi Non-Life Risks** solution permits calculation of the capital requirement corresponding to **premium and reserve risk** and management of the various reinsurance scenarios. Accordingly, it enables undertakings to comply with their Solvency II requirements in this respect.

This tool is divided into the following calculation modules:

1. **Distribution Fitter.** Calibration of LoB probability distributions for the basic variables: frequency and severity. Goodness-of-fit tests and graphic verification resources.
2. **Scenario Simulator.** Generation of Monte Carlo simulations of the frequency and severity of payments for each LoB and calculation of total aggregate risk for the undertaking. Calibration by copulas.
3. **Reinsurance Analyzer.** Reinsurance scenario management.
4. **Reserving.** Deterministic and stochastic reserve modelling. Risk margin calculation using Solvency II simplifications. Calculation of parametric uncertainty.
5. **Agregator.** Risk aggregation using variance-covariance and Gaussian and Archimedean copulas.

**Ajuste de la Distribución de Costes para siniestros Masa por Tramos**

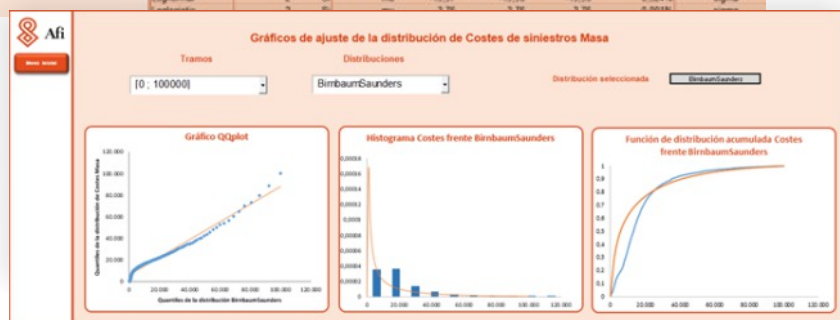
Distribuciones con mejor ajuste para cada tramo

Tramos				Parámetro 1							
Límite inferior	Límite superior	Distribución	Número de parámetros	Posible ajuste	Nombre parámetro	Valor Parámetro	Límite inferior	Límite superior	Error estándar	Nombre parámetro	Pa
-478.326	0	ExtremeValue	2	Si	mu	556.415,52	-54.925.240,64	86.638.071,68	4361389129,357%	sigma	Pa
0	100.000	BirnbaumSaunders	2	Si	beta	6.077,48	6.679,94	6.115,02	1915,279%	gamma	Pa
100.000	200.000	Rayleigh	1	Si	theta	73.529,13	71.910,17	75.168,10	83111,979%		
200.000	388.555	Rayleigh	1	Si	theta	134.988,02	129.943,13	140.032,92	257797,296%		

Selección del tramo a visualizar

[100000 - 200000]

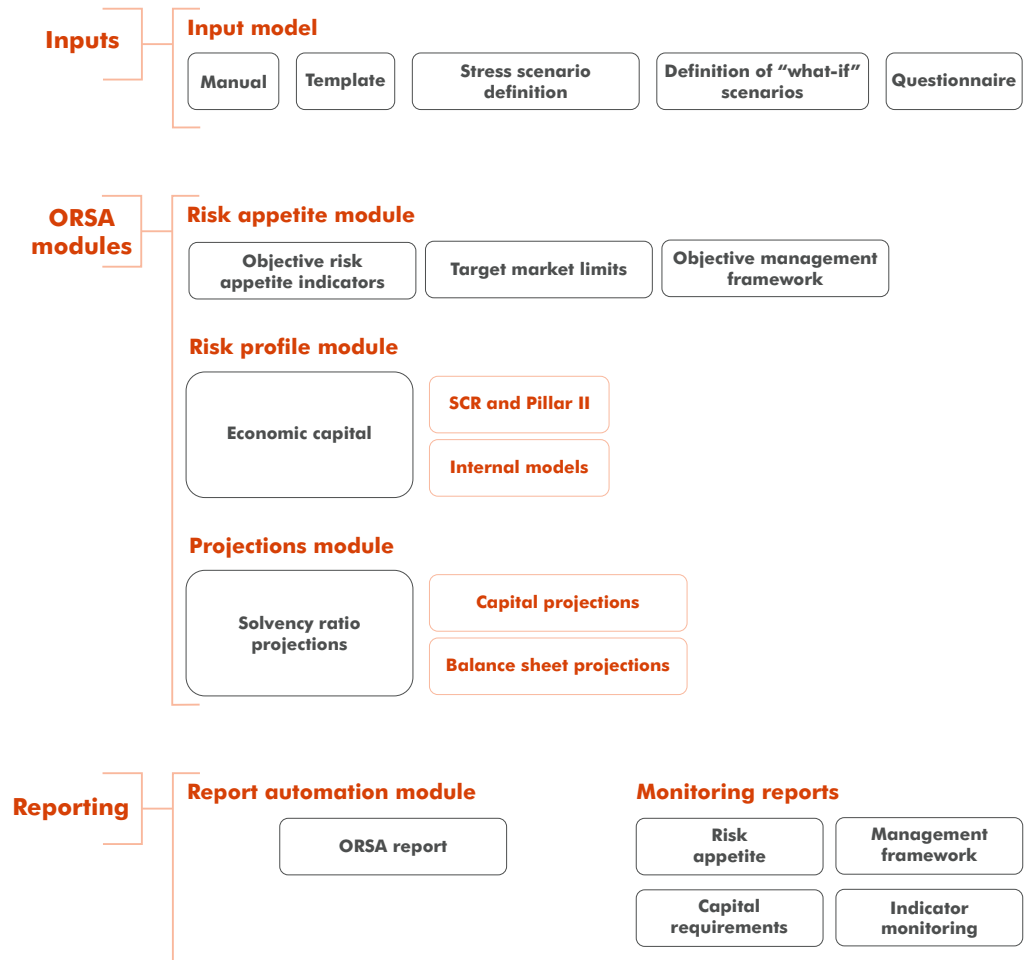
Tramos				Parámetro 1							
Límite inferior	Límite superior	Distribución	Número de parámetros	Posible ajuste	Nombre parámetro	Valor Parámetro	Límite inferior	Límite superior	Error estándar	Nombre parámetro	Pa
100000	200000	Rayleigh	1	Si	theta	73.529,13	71.910,17	75.168,10	83111,979%		
100000	200000	ExtremeValue	2	Si	mu	-4.688.128,55	-4.689.074,67	-4.687.182,84	48272,014%	sigma	1.42
100000	200000	Logistic	2	Si	mu	-699.410,05	-729.261,91	-669.558,19	1523082,306%	sigma	1.42
100000	200000	BirnbaumSaunders	2	Si	beta	20.754,13	-17.868,63	59.380,89	1970687,119%	gamma	1.42
100000	200000	Normal	2	Si	mu	-2.742.948,34	-2.743.141,42	-2.742.755,27	9605,524%	sigma	38
100000	200000	Weibull	2	Si	A	3,79	-23,79	31,29	1402,843%	theta	Pa
100000	200000	Lognormal	2	Si	mu	-13,67	-13,68	-13,66	0,524%	sigma	Pa





## ORSA/FLAOR tool

The ORSA/FLAOR tool developed by Afi serves to comply with undertakings' Solvency II requirements in respect of the ORSA/FLAOR process.



### FLAOR methodologies

- Definition of risk appetite, tolerance, limits and thresholds..
- Analysis of Pillar I risks.
- Analysis of Pillar II risks.
- Application of principle of proportionality.
- Definition of methodologies for determining the metrics comprising the undertaking's risk profile.
- Establishment of projection scenarios.
- Solvency ratio projection methodology.
- Monitoring of risk appetite vs. risk profile.

### FLAOR process and policies

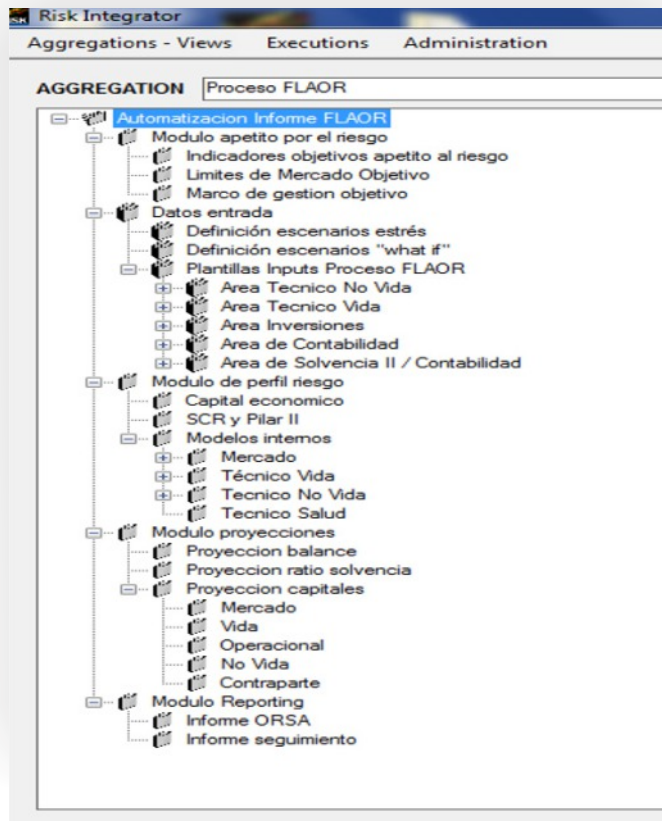
- Definition/adaptation of the FLAOR process.
- Establishment/adaptation of the FLAOR policy.
- Definition/adaptation of capital management policy.
- Definition/adaptation of the FLAOR report.



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## Implementation within Risk Integrator



## ERM tool

→ A web platform conceived of for the insurance business which permits:

- Risk measurement and control: economic capital and limits.
- Based on each undertaking's corporate policies and methodologies.

→ An end-to-end enterprise risk management system which permits risk oversight with enough flexibility to cover each entity's needs and with the capability to:

- Encompasses relevant risks on the **asset** (interest rates, exchange rates, price, credit, etc.) and **liability** sides (various classes of insurance cover, etc.) and the **interactions** between the two at both the overall, and portfolio/product levels.
- It adjusts the **economic capital** calculation for the characteristics of each undertaking and its risk tolerance levels.
- It therefore improves capital management, decision-making and **earnings quality**.



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Detalle de la petición | Contenido | Informe de salida | Salidas | Log de ejecución

**Selección de detalle**

Compañía: SEGUROS | Cartera: Agregado

Compañía: SEGUROS | Divisa: NUEVO PESO MEXICANO  
 Cartera: Agregado | Set de precios: MÉXICO  
 Fecha valoración: 29/06/2012 | Horizonte temporal: 12M  
 Usuario: U0000

**Vista de impresión**

**Composición de cartera de activo** Mostrar ayuda >

Ver composición de cartera por Tipo de instrumento | Divisa: Agregado

Tipo de instrumento	Valor de mercado	%/VM
RENTA FIJA	2.407.257.978	49,25 %
NO SENSIBLE	1.000.000.000	20,46 %
TITULIZACIÓN	686.408.441	14,04 %
MUTUAL & COMMON FUNDS	533.020.530	10,91 %
RENTA FIJA INFLACIÓN	260.994.688	5,34 %
<b>Total</b>	<b>4.887.681.638</b>	<b>100,00 %</b>

**Riesgo de mercado** Mostrar ayuda >

**Capital económico**

Variable	Valor	
Nivel de confianza	99,00 %	
	Factor de riesgo	CeR
Precio	7.634.143	8.746.167
Tipo de Interés	39.626.309	43.204.028
FX	48.738.193	55.837.619
Tipo de Interés/FX	0	0
<b>Total</b>	<b>73.879.249</b>	<b>83.001.087</b>

**Pérdidas y ganancias** Mostrar ayuda >

**Histograma de la distribución de PyG**

Capital económico			
-39.626.309			
Probabilidad	Importe	Probabilidad	Importe
0,20 %	-45.935.819	13,20 %	1.075.674
1,00 %	-41.234.070	11,80 %	5.776.833
1,20 %	-36.533.521	12,40 %	10.477.973
1,40 %	-31.832.371	5,20 %	15.179.122
3,80 %	-27.131.222	6,00 %	19.880.271
3,00 %	-22.430.073	3,00 %	24.591.420
4,40 %	-17.728.923	2,80 %	29.282.570
9,60 %	-13.027.774	1,40 %	33.983.719
8,20 %	-8.326.625	0,00 %	38.684.868
11,20 %	-3.625.475	0,20 %	43.386.018

**Sensibilidad de cartera** Mostrar ayuda >

Divisa: Agregado | Curva: Agregado

Valor de mercado					
Tramo	VA activo	Duración act.	VA pasivo	Duración pas.	VA neto
<= 5	1.807.399.052	1,99	688.727.080	2,49	1.118.671.972
5 a 15	1.099.621.091	8,75	1.178.580.860	9,77	-78.959.769
> 15	447.640.965	17,66	368.548.820	16,97	79.092.145
<b>Total</b>	<b>3.354.661.108</b>	<b>6,29</b>	<b>2.235.856.760</b>	<b>8,71</b>	<b>1.118.804.348</b>

Variación de tipos +100pb						
Tramo	VA activo	Sensibilidad act.	VA pasivo	Sensibilidad pas.	VA neto	Sensibilidad neta
<= 5	1.780.711.920	-26.687.132	670.610.546	-18.116.534	1.110.101.374	-8.570.598
5 a 15	981.437.410	-118.183.681	1.042.959.881	-135.620.979	-61.522.472	17.437.298
> 15	411.380.988	-36.259.977	347.352.151	-21.196.669	64.028.837	-15.063.308
<b>Total</b>	<b>3.173.530.318</b>	<b>-181.130.790</b>	<b>2.060.922.578</b>	<b>-174.934.182</b>	<b>1.112.607.740</b>	<b>-6.196.608</b>
Variación	-5,40 %	-	-7,82 %	-	-0,55 %	-

Variación de tipos -100pb						
Tramo	VA activo	Sensibilidad act.	VA pasivo	Sensibilidad pas.	VA neto	Sensibilidad neta
<= 5	1.838.364.889	30.965.836	710.209.624	21.482.544	1.128.155.265	9.483.293
5 a 15	1.253.165.577	153.544.486	1.354.669.815	176.088.955	-101.504.238	-22.544.469
> 15	493.101.636	45.460.671	395.398.215	26.849.395	97.703.421	18.611.276
<b>Total</b>	<b>3.584.632.101</b>	<b>229.970.993</b>	<b>2.460.277.654</b>	<b>224.420.894</b>	<b>1.124.354.447</b>	<b>5.550.999</b>
Variación	6,86 %	-	10,04 %	-	0,50 %	-



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## Marketing support tools

- **Pension contribution simulator (calculation of retirement deficit) and short-term risk coverage simulator. Tax simulators and tax optimisation tools.**
- **Afi Investment Funds and Pension Plans Service.** Product comparison and recommendation tool.
- **Fund, pension plan, unit-linked, etc. portfolio reporting service..**
- **Report generation for clients.** Quarterly report on pension plans, consolidated client statement generation, etc.
- **Tool for helping the undertaking with analysis and decision-making vis-a-vis financial service providers.** Enables estimation of the return the financial institutions generate from each of the relationships (products) with the insurance undertaking.

## New product and price design

- Advice on the **technical and strategic aspects of the product development and management process** - opportunity, viability, design, return analysis, pricing and rollout.
- Development and implementation of **profit testing** methodologies and tools (including risk-adjusted return analysis).
- **Design and application of pricing methodologies** by client segment, analysis of significant variables, profit maximisation, etc. by use of GLM techniques, etc.
- **Analysis of standard client conduct** in respect of the various classes of products arranged and their interrelationships with the aim of maximising cross-selling opportunities.
- **Actuarial quotes for collective savings schemes.** Expert reports substantiating valuation assumptions.

## Advice on how to win and retain clients

- Identification of the most important specific elements for the company to determine its **client lifetime value (CLV)**.
- Development and implementation of **methodologies for calculating the present and future expected value of its clients** using data-based predictive models and analytical techniques, including the effects of:
  - cross-selling, cannibalisation;
  - marketing initiatives;
  - customer characteristics;
  - etc.
- Client segmentation based on both dimensions.
- Determination of the **optimal marketing strategy** for each customer segment based on its CLV.
- **Determining the target profile** of the clients who add the most value to the undertaking to determine the most appropriate strategy for attracting and retaining them.



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## Strategic planning

- Help with the **bancassurance strategic planning process** for several financial institutions, including bancassurance players. This process contributes to definition of the business development framework.
- **Comparison of the various corporate/transaction options** (joint venture, business acquisitions, etc.) to evaluate the outcome of recent transactions and pinpoint comparables vis-a-vis potential transactions under analysis.
- Elaboration of **strategic plans** for positioning undertakings on a growth path that will enable them to tap their upside, warranting strategic reflection about the insurance line of business to ensure strategic alignment with the financial business.
- **Integration of strategic planning into the ORSA/FLAOR process to project the solvency ratio over the same timeframe. Establishment of capital management and action plans as needed.**

## Enterprise and portfolio valuation

- **Valuation of insurance providers:** claims rulings and reports, fair value reports, investee valuations, IPOs, LBOs, etc.
- **Corporate advisory services:** provision of corporate advisory services to enterprises, financial institutions and business associations on specific transactions and also on an ongoing basis: leverage structure, dividend policy definition and substantiation, corporate governance, business restructurings.
- **Advice on bancassurance M&A activity.**
- **Investment opportunity search and analysis.**
- **Support for investee acquisition and disposal negotiation processes.**

## Sector studies

- **Sector studies.**
- **Strategic plans for insurance companies.**
- **Financial sector analysis and monitoring (bancassurance, insurance, etc.) in Spain and internationally.**
- **Definition and benchmarking of bancassurance strategic business plans.**

## Enquiries

For any additional information or queries, please contact:

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