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The role of actuarial technologies in innovation development of the company

Insurance industries cannot survive without using actuarial technices. Professional life insurance started 250 years ago with actuarial knowledges considering the importance of biometric statistics for pricing and valuation of reserves. Non-life insurance is based on using high sophisticated statistics; it´s going to be influenced more and more by actuarial technics in these days considering the requirements of new solvency rules and accounting principles.

Principally actuarial technics are used to value financial implications and contingent events regarding the stochastic nature of insurance processes. Statistic and stochastic models are used to value risk potentials inherent in asset and liabilities and to calculate premiums and technical provisions. Actuarial knowledge plays a dominant role in

- pricing and designing products: Modern calculation technics (e.g. profit testing, office modelling, portfolio analysis etc.) are the basis for product design that faces the needs of the consumers as well as the requirements for profitable companies.
- valuating technical provisions: The valuation is based on actuarial technics - not only in life insurance, but also in non-life insurance The international accounting principles defined by IAS/IFRS will change the accounting to market consistent valuation. And that asks for the implementation of actuarial technics like actuarial

simulations and deterministic or stochastic extrapolation of the insurance portfolios by discounted cash flows.

- managing risks and monitoring solvency: The insurance industry is going to implement new solvency rules under Solvency II - following principles of Basel II for the banks. These requirements will have a dramatic influence on the risk management of the companies.

Actuarial technology has changed within the last decades:

- Actuarial knowledges have become more international; the globalization process is driven by increasing requirements in accounting and solvency rules, both on an international level. Solvency II and IAS/IFRS will influence actuarial practice a lot; both concepts will use more actuarial technics than before. The process is driven by many international institutions including actuarial institutions like the International Association of Actuaries (IAA) and the Groupe Consultatif (GC), the European body of the national actuarial associations.
- Within the EU the process is managed by the EU commission in order to deregulate and to harmonize the markets within EU. Deregulation is stimulating the competition, and harmonization is forcing the convergence of actuarial practice within the EU countries step by step. One example is the EU-directive “Mutual recognition of diplomas” asking for a standardized curriculum of actuarial education (see below).
- For every country it´s of great importance to get integrated in the actuarial communication on an international level. That´s especially important for the east-European actuarial communities to stay “online” with the international development of actuarial technology..
- Actuarial technology is high correlated with the progress in IT-technology. IT-technology has offered a new dimension of actuarial technics. Sophisticated portfolio analysis of assets and liabilities and stochastic simulations are available. Actuarial IT-tools are available in the markets supporting product development and risk management.

The result of actuarial technology can be seen in product development, product administaration and risk management of the companies::

- The deregulation process has influenced the importance of actuarial knowledge as a key success factor of the companies. Product competition and time-to-maket have become more important. Best practise in product development has become a relevant success factor stimulating product innovation.This is especially important for the life and pension markets with its great potential of innovating idears. We can face an increasing merge of asset correlated products and classical life product, especially in the pension market. Companies with excellence in actuarial knowledges took and take advantage of this.
- Flexible actuarial driven IT-systems have to support this. In Germany most companies use a parameter controlled so called “product machine” that is able to improve the processes of product development and administration. Modern actuarial technics are integrated by modelling the future of policy portfolios by discounting cash flows on a deterministic and/or stochastic basis; this integrates the modelling of the asset market and the asset portfolio of the company as well as of the product portfolios.
- The other dimension is the change in the requirements for the risk management of the companies. The expected solvency rules together with improved actuarial technics have stimulated the companies to improve their risk management

systems. Risk potentials can be measured on the liability side as well as on the asset side. Actuarial tools are implemented to monitor financial soundness. These tools are based on asset-liability-measuring to control the correlation between the assets and liabilities. Scenario technics are going to be implemented to find out the risk potentials by adverse deviations of the relevant success factors.

- With these actuarial technics internal risk models are built in the companies. Value-based-management and similiar risk management systems are going to be developed in many companies. – to improve profitability of the companies and to face the needs of the stakeholders - rating agencies, shareholders, policyholders.
- Long-term solvability is important especially for life insurance against the background of long-term contracts and the social importance of those products. Long-term-profitability and financial stability of the companies is the best consumer protection and one of the the key marketing factors in life and pensions. Prudent calculation of premiums by efficient actuarial technics enables the companies to increase consumer´s confidence in the insurance industries and markets.
- An efficient actuarial reporting to the supervisory authorities can ensure sound actuarial practise. In this context the traditional actuarial reports will be changed to more actuarial risk reports. These reports will integrate the valuation of technical reserves as well as requirements for risk management of the company. Actuarial technics used are based on deterministic and/or stochastic scenarios and sensitivity analysis. Even in non-life business actuarial technics are increasingly used to plausibilate the estimations of claims reserves.

This situation has stimulated the companies to invest in actuarial knowledges. Today one can find actuaries in many functions - actuarial analysis and reporting, product development, product marketing, accounting, controlling and even in IT and business administration. Most countries within EU have implemented a responsible actuary, who is in charge of sound calculation of premiums and reserves and monitoring solvency. Major companies have more than 50 actuaries working in the different functions. That´s the reason why actuarial education is increasing. For example: The actuarial association of Germany has around 2600 members. In addition to that there are more than 1000 students trained for the actuarial exam.

Against this background actuarial education has become more and more important. Well educated actuaries are of great importance for the national industries. There is an international standard for actuarial education – a core syllabus with concrete requirements of actuarial education defined by IAA and GC. National actuarial associations that fulfill these requirements for its own actuarial education are entitled to join the international actuarial community and - ergo - are able to get integrated into the international communication and competence. It is especially important for the east European markets. International actuarial consultants could fill the actual gap; but the countries itself have to develop own actuarial competence within the market and within the companies. That´s why the author of these lines recommend these countries to invest in actuarial competence and to install a responsible actuary as integrated part of the company management.

Some years ago the German, Dutch, Swiss and Austrian actuarial associations decided to establish a European Actuarial Academy (EAA). Vision and mission is to support the east European countries in developing actuarial competence. EAA started with seminars on advanced actuarial topics in different cities – Budapest,

Prague, Salzburg, Bratislava, Ljubljana, Zagreb, Moscow, Warsaw, Riga, Tallin. The next Seminars will take place in Kiew, Bukarest, Tallin, Vilnius, Moscow. In addition to that an e-learning based education system is already offered for east European countries.This system integrates the actuarial knowledge of four well developed actuarial associations and follows the mentioned core syllabus of the international actuarial institutions. To give an impression about the requirements of an actuarial education see below a simlyfied modul structure of the EAA curriculum:

- Basic knowledges in computing, economics and business processes and its use for actuarial matters
- Grounding in classical financial mathematics; knowledges of the economic and financial environment
- Valuation of financial derivatives and to construct Asset-Liability-Managemnt
- Portfolio management: Traditional and modern concepts of managing and valuing risk potentials of the assets
- General principles, calculation, risk valuation and practice in non-life insurance
- Stochastic models and relevant actuarial technics in life insurance, pensions and living benefits
- General knowledges and practise in pension business and living benefits (e.g. health, disability insurance)

The author of these lines is consulting the Russian and Ukrainian market in order to establish an efficient actuarial infrastructure. A deregulated market needs some self-regulating procedures. Today the actuarial associations play a dominant role in the well-developed insurance markets by educating and training actuaries, by supporting the actuaries working in the companies with actuarial knowledges and advice, by communicating with the supervisory authorities to establish efficient control structures and standards of actuarial practice. It is of great importance for east Europe to develop such an infrastructure. And it is of great importance that the insurance industry understands and accepts this and is prepared to invest in actuarial knowledges. Companies who would do it will be in a better market position in the future.