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INDIAN ACTUARIAL PROFESSION
Serving the Cause of Public Interest



20th Global Conference of Actuaries

4th – 6th March, 2019 | Mumbai, India

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CONTENTS

"A noble man's thoughts will never go in vain. -Mahatma Gandhi."

"I hold every person a debtor to his profession, from the which as men of course do seek to receive countenance and profit, so ought they of duty to endeavour themselves by way of amends to help and ornament thereunto - Francis Bacon"

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FROM THE DESK OF PRESIDENT

Mr. Sunil Sharma 4

FROM THE DESK OF CHIEF EDITOR

Ms. Bhavna Verma 5

EVENT REPORT

14th Seminar on Current Issues in Life Assurance (CILA)
Ms. Neha Shah 6

2nd Capacity Building Seminar on IFRS 17
Ms. Swati Jaiswal and Ms. Aditi Mahajan 13

FEATURES

A Student looks at a Cyber Claim
Mr. Piyush I. Majmudar 18

The Ultimate loss ratio
Mr. Sateesh Bhat 20

The Analytics Life Cycle
Mr. Vineet Khanna 21

COUNTRY REPORT

Life Regulatory Review: Sri Lanka 2018
Mr. Frank Munro 26

CAREER CORNER

SUD Life 2
General Insurance Corporation of India..... 17

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“To achieve great things, two things are needed: a plan and not quite enough time”,

The famous quote by Leonard Bernstein, one of the most prodigiously talented and successful musicians in American

history appears to be true in case of 20th GCA & AGFA scheduled on 4th-6th March. Though we started preparing for the event bit late in comparison with the previous year, all GCA related activities taken off without using the runways. The GCA Organising group and the Paper selection and Program Advisory Group have shown enormous synergy and momentum in lifting the event and put it swiftly into the orbit. My sincere thanks to the hard work put by each and every one member of the group under the dynamic leadership of **Mr. Sanjeev Pujari** and **Mr. Liyaquat Khan**.

By the time you read this column, many of the readers must have enjoyed the mega annual event of the Indian actuarial profession and possibly we might also have exchanged our pleasantries at the event venue, Hotel Renaissance, Powai.

At this point, what is equally important for me is to acknowledge services and support extended by the all Partners of the event and the hard work put by IAI office. The speciality of the 20th GCA is the Principal partnership by the Public sector life insurance giant and market leader Life Insurance Corporation of India. Thank you **Mr. Hemant Bhargava**, the Chairman-in-Charge and MD for the great support from your side; I am looking forward to host you at the AGFA & 20th GCA.

I am delighted to share names of Institutions here; most of them are continuing partners of the mega event, hence contributing and promoting to the Indian Actuarial Profession in a big way:

a. K A Pandit Consultants & Actuaries	:	AGFA2019 Partner
b. ICICI Lombard	:	AGFA2019 Partner
c. MetLife	:	Conference Bag Partner
d. SBI Life Insurance Company Limited	:	LED wall partner
e. HDFC Ergo	:	Lunch partner on 5 th March
f. Max Life Insurance	:	Lunch partner on 6 th March
g. Hannover Re	:	T Shirt partner
h. Edelweiss Tokio	:	Wireless mouse partner
i. Kotak Mahindra Life Insurance	:	Lanyard partner
j. ScorRe	:	Graphic recorder partner
k. Star Union Dai-ichi Life Insurance	:	Conference Photo booth partner
l. GIC	:	Mobile App partner
m. Hansa Solutions	:	Speakers Gift partner
n. Swiss-Re, Milliman, HDFC Life & New India Assurance	:	Co-partners
o. Gen Re, ICICI Prudential, SBI General, National Insurance, Exide life, IndiaFirst life, The Society of Actuaries, Cholamandalam MS General, United India Insurance, Shriram Life, Munich Re, PNB Met life, ECG, TATA AIA life, Mahindra Insurance Brokers Ltd, GOQii & Asia Insurance Review	:	Associate partners

The profession is contributed by dedicated members all the time and those volunteer ship and contributions need applause and recognition. The event AGFA scheduled on 4th March is our golden opportunity to honour all our heroes who have immensely contributed their time, effort and energy to take the profession to the next level. Awarding Fellows and Associates is going to be another biggest attraction of the event.

As usual, we are fortunate to have **Dr. Subhash C Khuntia**, Chairman, IRDAI as our Chief Guest of the event; In addition to dignitaries like **Mr. Hemant Bhargava**, the lining up of more than 60 speakers from both India and abroad, most of

them are best known in their area of expertise who have contributed to the Actuarial profession are definitely going to add lots and lots of colours into the two day discussions and deliberations. Topics for discussions are true reflection of the theme of the event **“Expanding the Horizon, Strengthening the Core”**, bringing in many experts from areas of Banking, Finance and Investment, Data Science and Analytics and Enterprise Risk Management. A lot of emphasis has also been given to IFRS17 as well.

Looking forward for a wonderful and colourful AGFA & 20th GCA event.

It is that time of the year where all members of the actuarial fraternity in India, our members working across several overseas markets, and members of the international actuarial community, look forward to getting together at the annual conference of the Institute, the Global Conference of Actuaries. The conference marks 20 years in 2019, which is indeed a big occasion!

The agenda of the GCA clearly establishes the focus on 'Expanding the Horizon' of actuaries into non-traditional fields of banking, data analytics, International Financial Reporting Standards (IFRS), risk management, climate change and public policy on old age security and healthcare. There are of course many others; few that we may not even have identified yet as a professional community. The concurrent sessions, as always, should help participants debate and innovate to tackle critical questions that arise in their specialized areas of practice.

As all of you, I'm also looking forward to the multitude of sessions at the upcoming GCA. It is an ideal time to get wide-ranging insights on topical issues and connect with your professional colleagues before diving into critical year end activities and then the first set of examinations under Curriculum 2019.

This issue of the magazine includes reportage of two important seminars held in 2019 - Current Issues in Life Assurance (CILA) and 2nd Capacity Building Seminar on Internal Financial Reporting Standards (IFRS) 17. The CILA had some interesting discussions around stakeholder management for life insurance actuaries among which customer is the most essential; in the world of increasing disclosures and principle based accounting standards, actuaries will



really need to lead from the front. The IFRS seminar successfully reiterated the pressing need for the industry to invest significant time, resource and effort in understanding, communicating and implementing the standard.

There are also some other interesting pieces in this issue on analytics and machine learning; the analytics life cycle covering traditional and emerging analytics models, the importance of feature selection in a machine learning solution and a case study on a cyber claim.

I would like to encourage contributions to the magazine discussing real world project experiences, possibly in a case study format, in traditional and newer areas, which can help establish analytical methods, good practice, and professional standards for practical actuarial work.

I look forward to hearing from you at library@actuariesindia.org. Do let us know if there are specific topics that would be of interest to you.

See you at the GCA!

14th Seminar on Current Issues in Life Assurance (CILA)

Organised by: Advisory Group on Life Assurance, IAI
Venue: Hotel Sea Princess, Mumbai **Date:** 22nd & 23rd January, 2019

Welcome and Introduction



Mr B. N. Rangarajan, Chairperson of the Life Insurance Advisory Group (LIAG) welcomed all the participants and expressed his gratitude for the overwhelming response with over 150 registrations for CILA. He explained how the Committee had intense discussion on the topics for the conference, including International Financial Reporting Standards (IFRS) and Risk based capital (RBC) at length; and how the final choice were the basics like “what is life insurance - a savings or a risk product?” He also emphasized the importance of specific points like protection premiums getting better, financial reinsurance allowed by the regulator and market considering hedging of the interest rate risk. He also posed hard hitting questions such as “Are we prone to new risks by entering into such contract?”, “Are we doing enough to understand these risks?” and left the audience with some food for thought.

Address from President, IAI



Mr. Sunil Sharma extended a warm welcome to all participants and thanked the profession. He discussed in brief 74 years of IAI and how it has come a long way over all these years. He highlighted the growth by showcasing the increase in number of members from merely a few initially to close to 10,000 in 2018 and the journey from Institute to a statutory body which regulates the profession. However, he also expressed his concern over reducing the memberships over perceptions of limited opportunities for actuaries. He encourage the members to take responsibility of addressing such concerns and take active part in achieving the magical number of 1,00,000 members.

Taking this point forward, Mr. Sharma informed the participants about the '**Hackathon**' that they conducted with around 30 actuaries brainstorming about the newer

areas where actuaries can work. As a result, many ideas came up e.g. IFRS, risk management, data analytics, creating real estate index, weather index etc. He mentioned the need of spreading this awareness and encouraging members to opt for certification in such areas. **He shared an achievable dream of taking up this Game Changer opportunity and make India the Global Outsourcing Centre for IFRS17.**

At the end of his speech he also shared that the Institute is closely working with government agencies to create more awareness about the profession. He concluded the speech with a very small but meaningful story about how the elephant that was always tied to a rope since childhood had forgotten the power he possessed. With this story, he invited the members not to be like that elephant by getting tied to the traditional ways of working and prove themselves by creating newer opportunities for actuaries.

DAY 1

Session : Stakeholder Expectations - Role of Actuary - Setting the context

Speaker: Mr. Ranabir Ghosh



Mr. Ranabir Ghosh presented the various facets of the life insurance industry and set the context of the following panel discussions. Key highlights he shared were as follows:

- The CAGR for life insurance industry which was 38% between 2002 & 2008 decreased to -3% between 2010 & 2014 and again rose to 20% between 2016 & 2018. Key reasons for the fall post 2008 were financial crisis in 2008, revision of unit linked regulations in 2010 and non-linked & linked product regulations in 2013.
- The product portfolios of companies have changed drastically over the period.
- More than 130 regulations got issued between 2002 & 2018 to improve the customer focus and improve the turnaround time.
- Persistency of high ticket size cases have improved whereas the number of policies sold reduced in FY15.
- Repudiation of claims has reduced from 5.5% to 3.5% boosting customer confidence; however still 10% of claims are paid after 6 months from the date of claim and need a focus.
- A significant part of grievances from customer (more than 1.5 lakh) are due to unfair business practices.

Session : Stakeholder Expectations - Role of Actuary: Panel discussion on the Customer expectations and the major gaps

Moderator: Mr. Kunj Maheshwari

Panelists: Ms. Pournima Gupte, Mr. Tarun Chugh, Ms. Santosh Agarwal



customer needs, find out ways to increase customer satisfaction and ensure sustainable growth for the industry.

Ms. Santosh Agarwal started the discussion saying that customer needs differ from individual to individual and hence, old methods of pricing need to be revisited. Customers don't mind paying more if the product is right but they look for value for money. Customers who buy online, read and make an informed decision of taking the correct policy resulting into less than 1% complaint rate for Policy Bazaar. She also mentioned that India is a diabetic capital but we do not have any good diabetes product.

Mr. Tarun Chugh emphasized on the incentives required for the distributors to sell the policies. He brought up a comparison between incentives earned by life insurance agents and mutual fund (MF) agents. While Life Insurance companies pay approx. 30% of premium to the agents, it turns out lesser than the 1% that the MF agents earn on the assets under management (AUM). With this he highlighted need of relooking at the incentive policies in life insurance which **Ms. Pournima Gupte** agreed to consider within regulator committee. Mr. Chugh also said that best savings product is NPS which is easy to understand, gives tax rebate and fund management charges are almost NIL.

Ms. Pournima Gupte highlighted the fact that insurance should be sold as a tool for risk management. As the customers do not read the T&C and believe in the verbal promises of distributors, maximum complaints in Integrated Grievance Management System (IGMS) are towards agents' behaviour. These complaints included likes of regular premium sold as single premium; policy sold in-lieu of fixed deposit comes under this etc. She highlighted the benefit of customer education about the products and their rights which helps in bringing out such mis-selling in form of complaints. She informed the audience about payment-of-claims-on-time being the key priority and how majority of the regulations are focussed to ensure the same.

Points like how to tackle lapse and re-entry, phases of products whether it is industry or customer driven, "Product mix Push", digitisation leading to better awareness, "missing the big mass" were also discussed by

The main focus for the discussion was to understand the

the panel. The panel further discussed about how customers can be made aware about what are they buying and solutions like welcome calls, sharing key feature document (KFD), sending message to read the KFD etc. were brought up.

At the end **Mr. Kunj Maheshwari** asked the Panel about their **Dream Product** in the most idealist scenario where there are no constraints on modelling, regulations etc. **Ms. Santosh** desired for a health product for which cover starts after retirement and **Mr. Chugh** preferred a policy which fits into the life goals and its customised modular product.

Session : Stakeholder Expectations - Role of Actuary: Panel Discussion from Shareholder or investors' perspective

Moderator: Mr. Heerak Basu

Panelists: Mr. Sanjeeb Kumar, Mr. Nidhesh Jain, Mr. Abhijit Gulanikar



Mr. Heerak Basu welcomed the panellists and discussion started with how to evaluate the performance of insurance company.

Mr. Nidhesh Jain raised a point on how difficult it is for the investors to evaluate performance of life insurance companies as there are different factors like life growth potential, return on capital, stability of earnings etc. It raises a question on sustainability of the profits and embedded value (EV) performances.

Mr. Abhijit Gulanikar agreed that insurance is a complex sector but believed with passage of time India will learn how to evaluate. He highlighted that outside India, investors have evaluated the sector for a long time and they look at price to book multiple which is suitable for market with high protection business. Asian countries look at price to new business (NB) or price to Embedded Value (EV) ratio. He emphasized that special skills are required to understand the life insurance business and even IFRS 17 will not make it easy!

Mr. Heerak Basu and **Mr. Sanjeeb Kumar** discussed how actuaries can help in analysing the numbers and what can

be done to understand the drivers of the value and how with IFRS17 implementation, the services from actuaries will become necessary. The panel conversed about the barriers to entry for life insurance along with the lack of comfort on the multiple for EV. They also mentioned that like any other industry, the life insurance industry also cannot grow if customers are not happy.

Session : Stakeholder Expectations - Role of Actuary: Panel discussion with Actuaries

Moderator: Mr. P K Dinakar

Panelists: Mr. K.S. Gopalakrishnan, Mr. Richard Holloway, Mr. Sanjeev Pujari



Mr. P K Dinakar welcomed the group and highlighted the importance of role of Appointed Actuary (AA) which is regulated by AA Regulations as well as Actuarial Practice Standard (APS) for AA role and comes with lots of responsibility. He raised a question of how effective the product design process is in meeting the needs of different stakeholders.

Mr. Sanjeev Pujari emphasized on the need for the **out of box thinking** to balance the act of return to customers and to the shareholders whereas **Mr. K. S. Gopalakrishnan** asked “who is the customer” He reiterated APS1 which talks about continuous responsibility of an actuary. He gave an example of selling of a ULIP policy by lift operator to a cook stating that the money will be doubled in 3 years.

The panel discussed about the how to take care of policyholder protection and treat customers fairly. Given the regulation in India being customer friendly, the pricing role of actuaries becomes challenging unlike Malaysia, where different actuaries are appointed for pricing and reporting. The discussions on how to define Policy holder's reasonable expectations (PRE) raised questions whether the premium rates are fair, how communication is important and how can we review the illustrations on ongoing basis.

Mr. Richard Holloway mentioned that other markets do make profits from surrenders and the APS is required to clarify on PRE.

Session : Stakeholder Expectations - Role of Actuary: Summarizing the key points

Mr. Kunj Maheshwari thanked the Panellist, as the discussions during the day brought up new insights and gave perspective of life insurance from customers, shareholders and actuaries. He reiterated the need for articulated understanding on fairness.

Session : Opening up of Reinsurance - New Opportunities, New Challenges- Setting the context

Mr. Ramakant Malpani set the context by giving an overview of the recent changes in the reinsurance regulations and welcomed **Mr. Graham Bancroft**, to present on financial reinsurance.

Session : Opening up of Reinsurance - New Opportunities, New Challenges- Presentation on Fin Re



Mr. Graham Bancroft thanked the Insurance Regulatory and Development Authority of India (IRDAI) for making the new reinsurance regulation very positive for insurers as well as reinsurers. He also appreciated that new areas like financial reinsurance (Fin Re) were permitted, which is accepted globally as a legitimate approach.

He shared his vast knowledge about different usage of Fin Re in areas like Mergers and Acquisitions, dividend upstream, earning volatility management, managing new business strain, reduce the pressure on solvency and enhancing the return. He also presented comparison of variety of options that can be used as financial management tools and discussed topic like the benefits of Fin Re to policyholders, regulators and primary insurer.

He showcased an international comparison of Fin Re arrangement in different countries like Australia, Hong Kong, Japan, Singapore, Malaysia. Mr Graham also responded to questions from the audience like whether it will work for savings plan, and whether interest rate guarantees can be managed by Fin Re.

Session : Opening up of Reinsurance - New Opportunities, New Challenges- Panel Discussion on Setting Retention Policy, and other points to consider in liability / pricing / value calculations

Moderator: Mr. Philip Jackson

Panelists: Mr. Sai Srinivas Dhulipala, Ms. Sunayana Mahansaria, Mr. Subhendu Kumar Bal, Mr. Subhrajit Mukhopadhyay



Mr. Philip Jackson welcomed all the panellists and started the discussion with the poll from the participants on the current reinsurance regulations. Majority welcomed the positive reinsurance regulations and also voted to wait-and watch-strategy for the reinsurance retention limit and not planning to change anything in immediate future.

Mr. Sai Srinivas Dhulipala initiated the discussion by mentioning the reinsurance regulation as a good change and stating that removal of Right of First Refusal (RoFR) requirement will make the administration of reinsurance simpler and getting the board approval for any change in reinsurance will make internal governance much stronger. **Mr. Subhendu Kumar Bal** highlighted on quota share being allowed which has led to Happy Face for both insurer and reinsurers. **Mr. Subhrajit Mukhopadhyay** emphasized on the fact that risk based supervision is the first steps towards risk management and it helps to optimize the risk. **Ms. Sunayana Mahansaria** believed it's more of a responsibility of the insurer and the reinsurers to make the most of the revised regulations and this will surely lead to more product innovations due to removal of RoFR. She also thanked the regulator for giving a level playing field to reinsurers having branch in India.

The panel discussed about how new reinsurance regulations can help in getting reinsurance more effective for micro insurance and point-of-sale products where the sum assured is very low. It can also lead to shift in product mix and channel mix. Points like impact of the risk based capital, enhanced responsibility of risk management committee and impact of financial reinsurance were also brought up for discussion.

Day 1 was concluded by closing remarks from **Mr. Heerak Basu**.

DAY 2

Session : Term Insurance - Debate on Sustainability of the rates - Discussion on Sustainability of Rates

Speakers : Ms. Sanya Gupta, Mr. R. Srinivasa Rao, Mr. G L N Sarma, Mr. Deependra Prasad, Mr. K. S. Gopalakrishnan



Ms. Sanya Gupta presented the current economic scenario in India and the growing protection business. She highlighted how with increase in GDP and life expectancy, the protection opportunities are way higher as compared to earlier. She also showcased comparison of protection premium rates over past 10 years for different countries and surprisingly the rates for India are lowest.



The session was moderated jointly by **Mr. Vivek Jalan** and **Mr. B. N. Ragarajan**. Before initiating the discussion they conducted a quick poll for all participants on the term insurance rates in India. The level and sustainability of the current term insurance rates were questioned.

Mr. K. S. Gopalakrishnan began the panel discussion by explaining the history of term insurance rates way back in 2006 when Birla Sun Life insurance came up with first term plan; almost 60% cheaper than the then prevailing table 58 of Life Insurance Corporation of India. He



emphasized on the requirement for the customer segmentation, ability to underwrite, robust way to assess the experience and ongoing management of portfolio. **Mr. Srinivas Rao** highlighted why suddenly people are discussing about the sustainability of the rates, including the regulator but also emphasised that policyholders do not have to worry as the rates are guaranteed for the term of the policy. He also emphasized on the point that the term pricing should always be looked at in conjunction with the underlying underwriting of the product. **Mr. Deependra Prasad** added by saying that the assumptions used in pricing of term product should hold true throughout the sales and underwriting process to make the pricing true. The issue of underwriting team not being involved at the time of pricing was well raised by **Mr. GLN Sharma** and 60% of participants agreed that underwriters are involved after finalising the rates with the reinsurer.

The panel also discussed about how the customer profiling can help in better pricing and about the due diligences to be followed at the claims stage. Different types of underwriting which are used to reduce the purchase time and increase the customer satisfaction. Panel also discussed how customer segmentation can have big impact on the final rates. Points like managing the mortality risk by writing longevity risks were also raised during the discussions.

Mr. Kunj raised an alarming question of whether companies should keep premium deficiency reserves which is required if profiling of customer differs for insurer and reinsurer which might lead to claim

Session : Term Insurance - Debate on Sustainability of the rates - Discussion on sustainability of premiums

Speakers : Mr. Sanjeeb Kumar, Mr. Anil Kumar Singh, Mr. Satyan Jambunathan

The session on the term insurance was continued by the representation from insurance company.



Mr. Anil Kumar Singh enhanced the point of view from reinsurer by saying the same thing for term plans that underwriting is more important than pricing and with data analytics we have lot of parameters to underwrite evolved over time. So the “Risk is not Pricing its profiling”. **Mr. Sanjeeb Kumar** stressed on the point for monitoring the experience and said that better experience will emerge in the space where customer is directly interacting with insurer. **Mr. Satyan Jambunathan** gave a new view point by stating that rather than thinking about sustainability think about implications and make it sustainable. He also stated that the management call may be different towards the premium rate when the protection business is 1% and when it is 10%. More protection does not lead to more profits unless it is managed properly.

The panel also discussed about reinsurer as a partner or just as a rate provider, the public pressure if we focus too much on the segmentations, how rates in India are such lower and rates cannot be compared as it is a function of to whom we sale it and how we sale it, the obligation of insurer to verify at new business stage and not to deny at claim stage.

The session was jointly anchored by Mr. Vivek Jalan and Mr. Rangarajan who actively added some polls in the middle of the discussions to get more and more views from the participants.

Session : Financial Risk Management- Getting better or Prone to more risks- Panel Discussion on developments on interest rate risk hedging

Panellists: Mr. Kailash Mittal, Mr. Muzammil Patel, Mr. Rajesh Dalmia, Mr. Jose John

Implementation of 2014 regulations on interest rate derivatives was welcomed by insurers who are having big non participating portfolio with high interest rate guarantees. However, it raised questions like do we understand if there is any residual risk from derivatives? If the risk-reward relationship is tenable?



Mr. Kailash Mittal fuelled the session by presenting the key issues related with interest rate risks and the implementation of derivatives. He also gave a perspective about the credit risk faced by life insurers and whether life insurance companies can go beyond the rating agencies views.

As per the market information, around ₹6500 Cr. of notional amount has been invested in derivatives. **Mr. Muzammil Patel** described various derivatives instruments used in life insurance like Forward rate Agreement (FRA), Interest Rate Swap (IRS), and Interest rate Future (IRF) etc. and termed them as simple vanilla derivative product with the statement that FRAs are longer term and a more effective derivative hedge. He clarified that the instrument seems straight forward but the complications will kick in when companies starts putting them in practice. He also highlighted the point that the Reserve Bank of India (RBI) regulates the banks who write the FRAs and they need to ensure the transparency. **Mr. Jose John** raised a point that risk management done through derivative does not mitigate the risks but increases the operational risk with complex system. Ideally companies need to keep three points in mind - 1) How much non-par business the company should write 2) what is the maximum cap the company is looking at and 3) what is the reserve or extra capital the company is keeping for the interest rate risk. **Mr. Rajesh Dalmia** gave a different perspective by stating that duration matching also gives hedge towards interest rates. There is an increasing focus towards true and fair risk management.

The session covered key aspects like partly paid bonds recurring deposits and financial reinsurance which can be used for hedging the interest rate risks. It also covered areas like extent of reliance on availability of derivatives.

Session : Financial Risk Management- Getting better or prone to more risks- Presentation on managing Credit Risk

Presenters : Mr. Piyush Gupta, Mr. Jiju Vidyadharan

Mr. Piyush Gupta covered the key point that the Debt securities are going to remain the important investment

avenue and portfolios like Employees Provident Fund Organisation (EPFO), Public Provident Fund (PPF) that manage like hold to maturity (HTM) perspective have offered returns in the range of 8 -9% in the past 15 years. He also highlighted the risks covered under fixed income portfolios. Over insurance to one particular sector might impact credit, interest rate and liquidity risks. Case studies of Amtek Auto, IL&FS and Ballarpur industries were also discussed during the presentation. The concept of hold to maturity (HTM) and mark to market (MTM) were discussed and major differences were highlighted. He also emphasized on the point that during the financial crisis of 2008 liquid funds faced heavy redemptions due to difference in MTM and amortised prices.

The risk of relying too much on credit rating agencies were highlighted to the participants and the same was discussed in detail during the presentation.

Mr. Jiju Vidyadharan explained the participants about the risk, return and credit risk relationship. He also emphasized on the point that moving down the credit curve need not always results in superior performance. He took the audience through some of the case studies and discussed the measures of credit risks. The session also covered the measures of liquidity risks.

Day 2 was concluded by closing remarks from **Mr. Ramakant Malpani**.



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20TH GCA BEST ARTICLE & REPORTAGE AWARDS



1st Best Article Award

Genetic disorders can no longer be excluded.
What does that mean for insurers?

- Ms. Joanne Buckle & Ms. Neha Taneja



2nd Best Article Award

Living Better (↓qx), Living Longer (↑ex)

- Mr. Ajay Gupta, Mr. Nirav Mehta
& Ms. Vinayeta Gaba



1st Best Reportage Award

1st Capacity building seminar on IFRS17

- Mr. Abhishek Chadha & Mr. Ashik Salecha



2nd Best Reportage Award

19th GCA Concurrent Sessions on Data – driven decision frontiers

- Ms. Jasika Singh



2nd Capacity Building Seminar on IFRS 17

Organised by: Advisory Group on IFRS 17 (IND AS 117), IAI
Venue: Hotel Sea Princess, Mumbai **Date:** 14th February 2019

Welcome and Introduction

The seminar was opened by **Mr. Kunj Maheshwari**, Chairperson of the Advisory group on IFRS 17, who welcomed all the attending members. He briefly touched upon the recent developments pertaining to IFRS 17 and noted that the high turnout for the seminar was a sign that the profession is well and truly gearing up for the new standards.



Inaugural Address



The seminar began with an address by **Mr. Sunil Sharma**, President - IAI, who welcomed the attendees of the 2nd Capacity Building Seminar on IFRS 17. He emphasized that the implementation of IFRS 17 is a big opportunity for the profession and that the deep diving sessions are being held to encourage discussions with the participants on these topics. He mentioned that ample support from the government and the regulators is available and assured the members that the Institute is geared up for meeting all challenges for IFRS 17 implementation. In the end, he also urged members to use social media to publicize the actuarial profession and volunteer for the upcoming initiative of an online discussion portal to generate new ideas.

Session : Methodology deep-dive: measurement approach for participating products

Speaker: Mr. Philip Jackson

Session Highlights

The session started with highlighting the two key questions involved in deciding the methodology for participating products. The first being; which out of the 2 models namely: General Measurement Model (GMM) or the Variable Fees Approach (VFA), applies to participating



business and the second being; whether the financial statements envisioned under IFRS 17 are fit for use in par business, considering current laws and regulations. For answering the first question, **Mr. Philip Jackson** took the help of a numerical example using a sample participating contract. The example conclusively showed that all other things being equal, the GMM approach will produce a more volatile income statement than VFA and hence, VFA seems a more suitable approach for par business. However, in the latter part of the presentation, it was seen that the level of guarantee offered under the product (i.e. high or low) would also impact the choice of the model.

For the second question, Philip explained how par products operate under the existing regulations and followed it up with the definition of a direct participating contract under IFRS 17 B101. Under IFRS 17 B101, the policyholder participates in a share of a clearly identified pool of **underlying items** and a **substantial share** of the fair value return on these underlying items is payable to the policyholder. The definition of underlying items is flexible and may be interpreted as either simply assets of the par fund or all forms of surplus under the fund. With the help of an example, Philip discussed the difference between these two schools of thought by showing the variation in the fair value return under each approach.

The session continued with an elaboration of the relevant part of the standards corresponding to the implicit assumptions for calculation of the policyholders return. This included the concepts of present value probability-weighted average and mutualisation. It concluded with listing out issues that we need to watch out for with respect to participating products under the new standards.

Session : IFRS 17 cash flow illustration for a Non Participating Savings product - General Model approach

Speakers: Ms. Eshwari Murugan, Mr. Abhishek Chadha, Mr. Gaurav Taneja



Session Highlights

The session was opened by **Ms. Eshwari Murugan** by

stating that IFRS 17 is the first serious attempt to produce single global accounting standard and is a principal-based standard allowing an entity flexibility to make several choices. She also encouraged to understand the impact of different elements by working in Excel and playing with cash flows.

The second part of the session was taken by **Mr. Abhishek Chadha** by giving a brief about the three measurement models (General Measurement Model, Premium Allocation approach and Variable Fee Approach) under IFRS 17. He further explained the three blocks of General Measurement Model and components of P&L statement under IFRS17. Abhishek explained the illustration of cash-flows and calculation of Contractual Service Margin (CSM) under General Measurement Model for Non-Participating Saving non-onerous contracts and P&L statement under scenarios where experience is consistent with the assumptions, as well as non-participating savings onerous contracts. The examples given showed how changes in discount rates and financial risks adjust CSM, how fair value changes are absorbed in CSM, that CSM is recognised in line with insurance and investment service provided and that the release of loss component for onerous contracts is in line with cash outflows.

In the latter part of the session, **Mr. Gaurav Taneja** explained the illustration of cash-flows, CSM movement and Risk adjustment under General Measurement Model for Non-Participating Saving non-onerous contracts and P&L statement under four scenarios where experience is not in line with the assumption with respect to mortality, interest rate.

Session : IFRS 17 cash flow illustration for a Unit Linked product - Variable Fee approach

Speakers : Ms. Gulshan Garda, Ms. Kruti Malde



Session Highlights

The session was opened by **Ms. Gulshan Garda** stressing the fact that IFRS 17 will bring along with it a paradigm shift in terms of how actuarial and finance teams currently work. Under the new regime, the two teams

will have to work together to understand both actuarial and accounting concepts instead of merely being skilled at their respective domains. She then started off by laying out the basics of unit-linked contracts including how these are currently dealt in the balance sheet. This was followed by the definition of variable fee approach and the three pre-requisites for insurance contracts with a Direct Participating Feature (DPF). An example of a non-par, non-linked endowment contract was given which does not fall under a DPF as it does not have an identifiable pool of assets. The terms underlying items, substantial share and variable fee were discussed from the point of view of Unit-linked contracts.



The second part of the session was taken up by **Ms. Kruti Malde** who explained the illustration of cash-flows under variable fee approach for both unit linked non-onerous contracts as well as unit-linked onerous contracts. The examples given showed how changes in discount rates and financial risks adjust CSM, how fair value changes are absorbed in CSM, that CSM is recognised in line with insurance and investment service provided and that the release of loss component for onerous contracts is in line with cash outflows.

Session : Methodology deep-dive: Transition approach - Fair Value assessment

Speaker: Mr Kshitij Sharma

Session Highlights

This session focused on providing the participants an overview of approaches available to transition under IFRS 17/ Ind-AS-117 accounting framework with focus being on the fair value approach to transition. **Mr Kshitij Sharma** started the session by providing insight into the three approaches available by group of contracts to transition under IFRS 17. The available approaches are Full Retrospective approach (FR), Modified Retrospective approach (MR) and Fair Value approach (FV).

He explained that under FR approach, an insurer shall look at the contract inception and project forward the



CSM from that date right up to the transition date for each group and each cohort of contracts. This will involve a significant amount of historic data and assumptions at the point of sale, which might be impracticable or costly to gather. In case historical information about cash flows is not available to calculate the CSM/LC, the insurer can go for MR approach or FV approach. The MR approach aims to achieve the outcome that most closely resembles the FR approach, albeit with some approximations and simplifications, using reasonable and supportable information available without undue cost or effort.

Under the fair value approach, the CSM is determined as the difference between the fair value of a group of insurance contracts (measured in accordance with IFRS 13) and its fulfilment cash flows at the transition date (which are determined in accordance with IFRS 17) and there is no requirement to divide the groups of contracts into annual cohorts. The IASB concluded that the costs associated with the full retrospective approach or modified retrospective approach might exceed the benefits if there is little information available at the transition date. Thus, the fair value approach is permitted.

In his next segment which saw active engagement by the audience, Kshitij discussed the modifications permitted under FV approach. He quickly explained the determination on grouping of contracts, yearly cohorting, measurement model and discount rate will be based on the information available at transition date rather than inception date, under FV approach. Further, he outlined how the three approaches compared in terms of judgment needed, application, and relative value of CSM and Other Comprehensive Income (OCI) & Loss component at balance sheet date. The Retrospective approach being the most difficult in term of application but will result in highest CSM value, whereas Fair value approach is heavily judgement-based approach and will result in very small or zero CSM value.

The IFRS 13 defines the Fair Value as 'the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market

participants at the measurement date'.

- **Fair Value = as determined by IFRS 13 ('exit price on going concern basis')**

The speaker explained the FV measurement framework and measurement techniques used under IFRS 13 i.e. Market Approach (Price and other relevant information), Income Approach (Discounted future cash flows) and Cost Approach.

The session was concluded with discussion on the practical issues in applying IFRS 13 for Fair value and additional Disclosures required by IFRS 13 such as separate disclosures requirement for insurance contracts, Transition modifications adopted, Measurement models used and Initial & subsequent Measurement.

Session : Premium Allocation Approach Eligibility

Speaker : Mr. Alasdair Smith



Session Highlights

The session introduced the Premium Allocation Approach (PAA) which is the only optional approach out of the 3 measurement models specified by IFRS 17, the General Model and Variable fee approach being mandatory. The premium allocation approach can

simplify short term contracts with low variation and hence, is best suitable for general insurance and short term life insurance contracts such as certain group contracts.

Mr. Alasdair Smith explained how the PAA differs from the general model only for the unexpired risk calculation and works exactly the same as the General model for the portion of the expired risk. Profit and Loss recognition under both models was discussed after which the session focussed on the two approaches for PAA eligibility i.e. using contract boundaries and using actuarial modelling. Alasdair highlighted several important points including assessment at group of contracts level rather than portfolio level and the use of various sensitivity tests such as yield curve, expected claims ratio and policy length variation.

The session concluded with a bonus coverage of risk adjustment in GI which captured the definition and requirements of risk adjustment per the standards, the decisions that will need to be taken by insurers in practise and the debatable market issues.

Vote of Thanks and Felicitation



The proceedings for the day were brought to a close with a Vote of Thanks by Mr. Ashish Ranjan, Secretary, Advisory Group on IFRS 17.

Written by



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GENERAL INSURANCE CORPORATION OF INDIA
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**APPOINTMENT OF FULL TIME APPOINTED ACTUARY FOR
GENERAL REINSURANCE BUSINESS**

GIC Re, the 'Indian Reinsurer' and 10th largest Reinsurance Company in the world with the network in India and abroad is inviting Applications for the post of 'Appointed Actuary' on Full Time Basis for General Reinsurance Business:-

Name of the Post	Appointed Actuary (General Reinsurance Business)
No. of Post	One
Age (as on 1/2/2019)	The candidate should not be over the age of 55 years as on 1.2.2019.
Qualifications	The candidate should be a Fellow or an Affiliate Member in accordance with the Actuaries Act, 2006. He/She should be a "Fellow" of Institute of Actuaries of India with specialization in General Insurance as prescribed by Institute of Actuaries of India. The candidate should satisfy all the requirement specified in regulation No. 3 sub regulation (B) of IRDA (Appointed Actuary) Regulation, 2017.
Emoluments and Benefits	Negotiable based on experience and qualification. Please indicate last salary drawn and expected.
Duties and Obligations	As per Regulation 9 of IRDA (Appointed Actuary) Regulation, 2017. Above includes rendering actuarial advice to the management particularly in the areas of their operations viz: Investments and Reinsurance. This would involve amongst others Reserving; CAT modelling; Exposure accumulation/ monitoring/ control; RBC; Economic Capital; Stress testing; ALM; FCR; Ensuring Solvency; Pricing; Product design; Insurance contract wordings; Team building; Actuarial valuation/ estimation/ analysis etc.
Service Conditions	Should be resident of India. After appointment he/she is not expected to act as an Appointed Actuary of any other Insurance Company nor work in any other capacity in any General Insurance Company.
Selection Procedure	The selection procedure shall be by way of personal interview. The employment will be on contract basis.
How to Apply	Completed application on foolscap paper typed in CAPITAL LETTERS, along with a recent photograph & copies of requisite certificates/documents including valid COP should reach us at the following address on or before 8th March 2019 with the subject line on the envelope as “Application for the post of Full Time Appointed Actuary”:- To, Assistant General Manager, HRD, General Insurance Corporation of India, 170, J.T. Road, Churchgate, MUMBAI – 400 020. Softcopy of application may also be mailed to recruitment@gicofindia.com

General Instructions:

1. Corporation reserves the right to restrict the number of candidates to be called for interview.
2. The decision of the Corporation will be final and binding in all the matters.
3. In case, it is found at any stage of recruitment that the candidate does not fulfil the eligibility criteria and or he/she has furnished any incorrect/false/incomplete information or has suppressed any material fact(s), the candidature will stand cancelled. If any of these shortcomings are noticed even after appointment his/her services are liable to be terminated forthwith. Before applying for this post, the candidate should ensure that he/she fulfils the eligibility and any other norms mentioned in this advertisement. The decision of the Corporation in respect of the matters concerning eligibility of the candidate, the stages at which such scrutiny of eligibility is to be undertaken, the documents to be produced for the purpose of conduct of interview selection and other matters relating to recruitment will be final and binding on the candidate.
4. The Corporation shall not entertain any correspondence or personal enquires. Canvassing in any form will disqualify the candidate.

Assistant General Manager
Human Resource Department
GIC Re

Brief facts of the case, (as gleaned from Public Domain) is for illustrative purposes only and to stimulate discussion and to understand the correct applicability of the Principles of Insurance. Hereunder, we offer comments based on OUR understanding thereof:

1. Insured M is situated in **country B** (hereafter called B) and has worldwide operations; also **country A** (hereafter called A) has not the best of relations with B;
2. M has an insurance cover with insurer Z;
3. M suffered a huge loss due to a cyber-attack which destroyed 1,700 servers and 24,000 of M's laptops. M also suffered the loss of thousands of user credentials, unfilled orders and other related economic losses from the security breach. N.B. For simplicity and for developing the argument, it has been assumed that the entire claim arose in B, worldwide operations notwithstanding.
4. M made a claim with its insurer Z for the costs on its property insurance policy that, it said, provided cover for 'physical loss or damage to electronic data, programmes, or software, including physical loss or damage caused by the malicious introduction of a machine code or instruction'.
5. According to M, its cyber insurance policy with Z specifically covered 'all risks of physical loss or damage to electronic data, programmes or software' due to 'the malicious introduction of a machine code or instruction.'
6. Z refused to pay out the \$100 million claim from M. Z said the present ransomware attack was actually an act of cyber war, therefore, is not covered by the policy.
7. Given the enormity of data breaches and network security attacks at major companies around the world, the language in the cyber insurance policy was specifically designed to be broad and general enough to protect M in the event of any kind of cyberattack or hack.
8. The attack would seem to fit the definition included in the cyber insurance policy - it was a bit of malicious code that effectively prevented M from getting its systems back up and running. But Z invoked the 'act-of-war' clause to refuse the claim. According to Z, it is

not liable for any payment of the claim if the attack was actually a hostile or warlike action in time of peace or war. Z said, the cyber-attack originated with A's hackers working directly with the government of A to destabilise B. This is the 'cyber war' and good excuse to get out of paying the claim. Z points to the official statements of national security officials from other governments, all of which blamed country A for the present cyberattack. **Act-of-war is always excluded from all insurance policies**

Yes, all insurance policies exclude an act of war, but then who decides what would be the threshold of malicious cyber activity that can qualify as an act of war. Let us analyse from insurer Z's viewpoint:

1. The policy had an exclusion for hostile or warlike actions, including "action in hindering, combating or defending against an actual, impending or expected attack" by any of the following:
 - (i) government or sovereign power (de jure or de facto);
 - (ii) military, naval, or air force; or
 - (iii) agent or authority of any party specified in (i) or (ii) above.
2. The size of the loss would qualify as emanating from "war" (also see 4 & 5 below);
3. We can assume that with the help of technology, it has been established that the attack originated from A;
4. It is reasonable to conclude that A wanted to damage the economy of country B;
5. Hence at their behest, the hackers attacked B and its establishments.
6. Obiter : No insurance/reinsurance company can repeatedly bear loss of this size. A permanent arrangement covering losses of this magnitude has to be devised. Government has to step in;

Both parties have agreed that the claim apparently falls on the policy. The point is, whether it falls within the Exclusion. Let us analyse from the insured A's viewpoint:

Is the War Clause exclusion applicable in this case?

Look at the facts:

1. Relations of A and B are not the best; (No ransom has

been asked. Hence this is not a ransomware attack. It is a malicious attack. The size would suggest a conspiracy).

2. Hacking is used as a State Policy to damage the economy of the other country;
3. Normally it is done through the proxies;
4. The above facts - the probable losses arising from a (an impending?) cyber-attack - were known to all the 3 parties - the Brokers who negotiated, the insured and the Insurer. In fact, that was the precise reason why cover was taken;
5. In view of the above, it can be taken that the exclusion was waived.
6. Also it cannot be the case of the insurer that they would settle claims of small amounts and not the Total Loss claim. Claim size has nothing to do with the admissibility of a claim. Agreed that the claim size has upset the insurer's PML calculations.

Was the Insured negligent?

1. Insured has to take care as if he is uninsured;
2. What were the Loss Prevention/ Loss minimisation measures taken by the insured? Surely 1700 Servers/24000 Laptops getting affected in a single attack would suggest negligence or complacency or outwitting by the hackers;

3. Contributory negligence: Also due diligence has not been observed by the insurer/brokers. Normally for a cover of this size, a survey of Loss Prevention/ Loss Minimisation should have been conducted and the insured guided appropriately.

Conclusion:

Please appreciate that only in criminal cases, the crime has to be proved Beyond Doubt; in civil cases, it is just the weighing of probabilities.

1. To invoke War clause Exclusion seems farfetched;
2. Questions of Negligence/ Contributory negligence to be decided on the basis of actual facts. (Claim to be considered for scaling down thereafter).

The first principle of Insurance - Uberrimae fidei - the principle of - Utmost Good Faith - is getting violated in the instant case. The Insurer has given the cover knowing fully well the attendant circumstances. Every hacking against B emanating from A would fall under the so called War Clause as per the Insurer. Hence the cover is in fact not available. The contract is void ab initio. This was never the intention.

Written by



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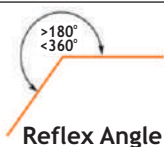
CALL FOR ARTICLES

We invite articles from the members and non members with subject area being issues related to actuarial field, developments in the field and other related topics which are beneficial for the students of the institute.

The font size of the article ought to be 9.5. Also request you to **mark one or two sentences that represents gist of the article**. We will place it as 'break-out' box as it will improve readability. Also it will be great help if you can suggest some **pictures that can be used with the article, just to make it attractive**. Articles should be original and not previously published. All the articles published in the magazine are guided by **EDITORIAL POLICY of the Institute**. The guidelines and cut-off date for submitting the articles are available at

http://actuariesindia.org.in/subMenu.aspx?id=106&val=submit_article





Similar to a Reflex angle which is the larger angle more than 180° but less than 360° , this is an attempt to take a look albeit little philosophical, at the broader aspects of life other than professional through an actuarial lens.

The Ultimate loss ratio



As actuaries, we are trained to look for the "Ultimate". The ultimate loss ratio of a portfolio, the long term (ultimate) viability of a pension scheme etc. The motto of our profession is "Making financial sense of the future" which means we are able to predict using certain techniques, the future financial outcomes of our current business decisions or the ultimate result of our current actions. We do this by using many mathematical techniques that include Interpolation and extrapolation. We do this to safeguard the interest of our clients and of course the public interest. The actuarial techniques are not just limited to the financial outcomes. We can possibly apply them to many facets of our daily life.

We are a great cricket loving nation that has produced great cricketers. For us cricket is a religion, we play cricket in every nook and corner of our city, town and villages. We postpone our personal work, take an off from our jobs and even 'declare' a holiday on important cricketing days. In effect we talk cricket, eat cricket and live cricket. We happily follow our cricketers and buy every product they endorse. More than playing cricket, we watch cricket in our drawing rooms for hours together and munch on all the snacks endorsed by our cricketers. The long term effect of our current action is a generation obese and sedentary in lifestyle. The ultimate result is exactly the opposite of what is expected of a game. Similar to a long tail liability insurance policy, the ultimate loss

to our health because of the current actions is not known until many years into the future.

We know the losses that may occur or reported to an insurance company in the future are uncertain. Similarly, the future events in our life and possibly our responses to them too are uncertain. The age old Indian philosophy may call it the "karma" of an individual which is nothing but the future reactions of our current actions. Like an actuary who continuously monitors the health of an insurance company, we need to continuously monitor our actions and their reactions. Our responses to circumstances are what determine our ability to remain continually happy. Remaining happy irrespective of the circumstances in life is what everyone aspires.

Consider this life of ours as a long tail class which pays out partial claims, earns investment income and runs off in some years. Making it profitable is entirely in our hands. If the claim payouts are compared to the personal possessions, the investment returns are the benefits that we accrue to the society. Surely the portfolio of life will run off one day and we want that runoff to be sweet as ever.

Upon run off when "The Appointed Actuary" evaluates the portfolio of my life, I want to be doubly sure that my NCOR is less than 100% and I have adequately contributed to the well being of this planet in my lifetime!

Written by



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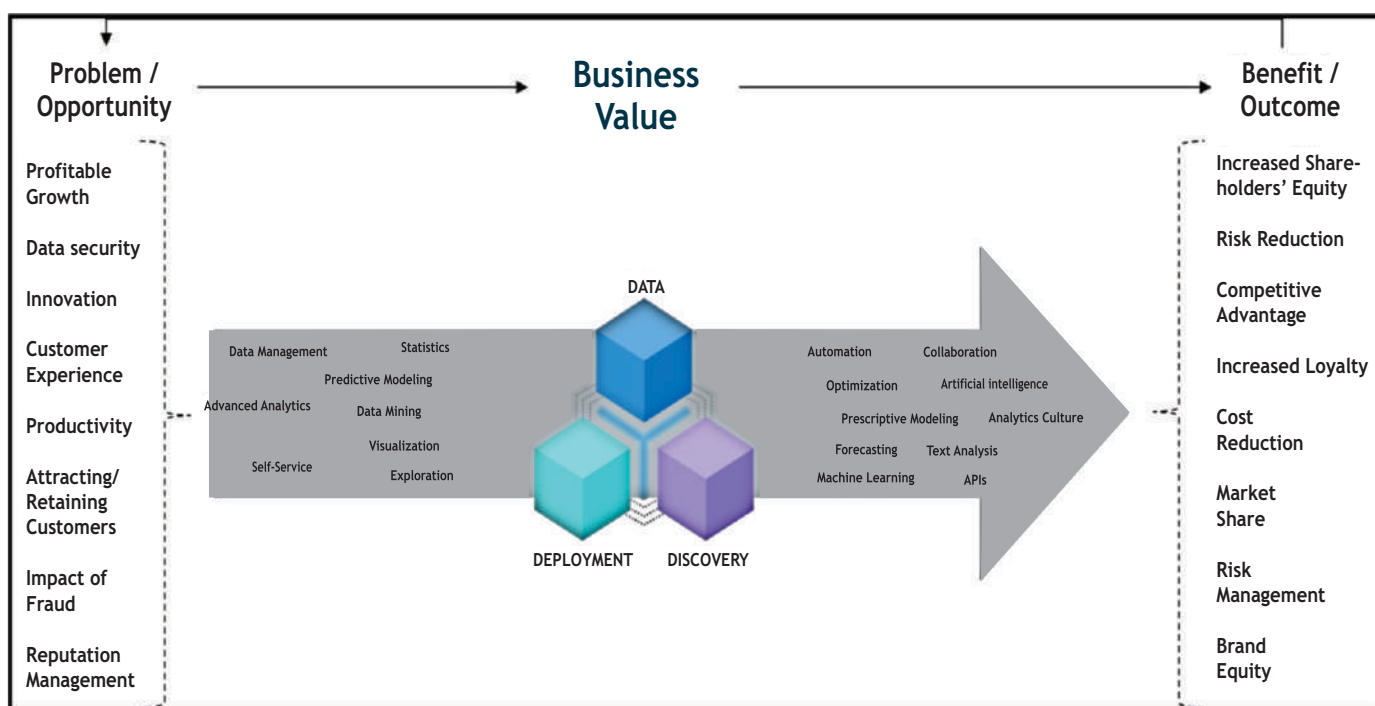


With the explosive growth in volume and variety of data - being generated by enterprise business systems, online interactions, social media and other channels - turning all of it into useful information is a challenge for most organizations. Many organizations, over the past few years are taking steps to embed analytics into daily operations to make better decisions that reduce costs, improve pricing and meet compliance obligations.

Discussions on operationalizing Analytics, using Artificial Intelligence & Machine Learning to grow the business,

improve customer experience and build competitive advantage in the marketplace are now the board room topics.

This article discusses the components of the “Analytics Lifecycle” framework - Data, Discovery and Deployment and highlights some of the best practices and techniques that business analysts, data scientists and other domain experts use to turn their data into valuable insights.



Data

Of all the steps in the Analytics Lifecycle, Data management is often 60 to 70 % of the effort. Data can reside in multiple transactional systems and Database architects spend a significant amount of time running queries from various data sources and joining tables, all the while competing for system resources with other users.

Analysts who use this data must have a clear goal in mind when preparing the data for analysis. For example, they need to consider the objective of their models, define them accordingly, and understand what data will be available at execution time.

Data Preparation

Analysts aim to achieve the quality of data optimally suited for analytics that resolves specific business problems. There are several data preparation techniques that can process the growing volume and variety of data that organizations collect, generate and access externally. Analysts perform the tasks of file importing and appending, merging and dropping variables, addressing missing values, filtering outliers and developing segmentation rules.

Binning is one of the ways analysts can divide the range of a numeric variable into a set number of subranges (or bins) and replace each value with its bin number.

Binning can also be a powerful way of dealing with variable skewed distributions, as the outliers are all placed together in one bin. For example, actuarial department can use binning with the ratemaking process to determine the bands for pricing models. Some of the standard binning definitions are weights by records, weights by premium, or weight by exposure.

Data Exploration

The science of extracting insight from data is constantly evolving. But regardless of how much data you have, one of the best ways to discern what information is important - and what isn't - is through exploratory data analysis. Some of the commonly used techniques Analysts use are Line Graphs, Bar and Pie Charts, Scatter and Bubble Plots, Correlations Matrices (used to keep variables with strong correlation with target carriable) and Clustering. Clustering in fact is very popular as sometimes patterns that are not apparent in a large volume of data can be found within simpler clusters. Organizations often use clustering for customer segmentation to improve marketing campaign performance. By dividing a large customer base into smaller, more homogeneous groups, they can treat each customer in a group in a similar fashion in terms of messages, offers, pricing and more, and be confident in their relevancy.

Discovery

All Organizations have one thing in common: Key insights, relationships and answers needed to run their businesses better are buried somewhere in corporate data. For example, you can analyze your data to answer pressing questions such as:

- Which customers will purchase what products and when?
- Which customers are leaving and what can be done to retain them?
- How should pricing be set to ensure profitability?
- How can you predict which claims are likely to be fraudulent?

Let's look at some of the most valuable, analytical techniques.

Traditional Analytical Models:

Regression Models

Regression models are one of the most commonly used predictive modeling techniques. The simplest form is a linear regression model that has a single variable or input. In reality, multiple factors influence outcomes, so regression models often have more than one input. Selecting just the right variables that increase the predictive power is the most important aspect of any

analytical modeling effort.

Another type of regression model is a logistic regression. Logistic regressions are frequently used when the target variable has a binary outcome, such as when building credit scorecards for a pool of retail assets.

General insurance companies have adopted the use of generalized linear models (GLMs) for ratemaking. By identifying additional characteristics that can segment existing rating cells into smaller cells with different rates, an insurer can use this more granular structure to compete with other insurers by using lower prices - and continue to charge an appropriate premium.

Decision Trees

Decision trees, also known by its more modern name Classification and Regression Trees (CART), analyze problems or predict behavior that's influenced by multiple factors. Decision trees present influencing factors incrementally as a series of one-cause, one-effect relationships that are easier to understand than more complex, multiple-variable techniques.

Decision trees are popular with business users with a limited background in advanced analytics since they can easily build and interpret the results of this powerful tool. This technique is also employed by advanced analytical users (e.g., to analyze many parameters and further fine-tune analyses).

Forecasting

Generating forecasts is a crucial step for decision making and strategic and tactical planning. Forecasting is the process of analyzing conditions or events that take place over time to anticipate what is likely to happen in the future. Time series forecasting uses historical data to project future outcomes. Recent advancements in this area allow immense scalability e.g., building Multi Hierarchical forecast across multiple timeseries using different models for varying forecast horizons.

Emerging Analytical Models:

The digital age has brought with it a huge increase in the amount of data available to companies. However, for most organizations, dealing with big data is not the problem. Organizations are more concerned about the variety, veracity and velocity than the volume of data being created in today's digital environment. Most importantly, most new data sources are semi structured and unstructured, which require new analytical techniques to generate insights. Let's take a closer look at some of the most important, emerging analytical



techniques used to analyze big data.

Link Analysis

From a technical perspective, link analysis converts data into a set of interconnected, linked objects that can be visualized as a network of effects. Financial Services Organizations are successfully using link analysis to detect and prevent organized fraud by going beyond transaction and account views to analyze all related activities and relationships at a network dimension. E.g., by network visualization insurance claims investigators can identify linkages among seemingly unrelated claims.

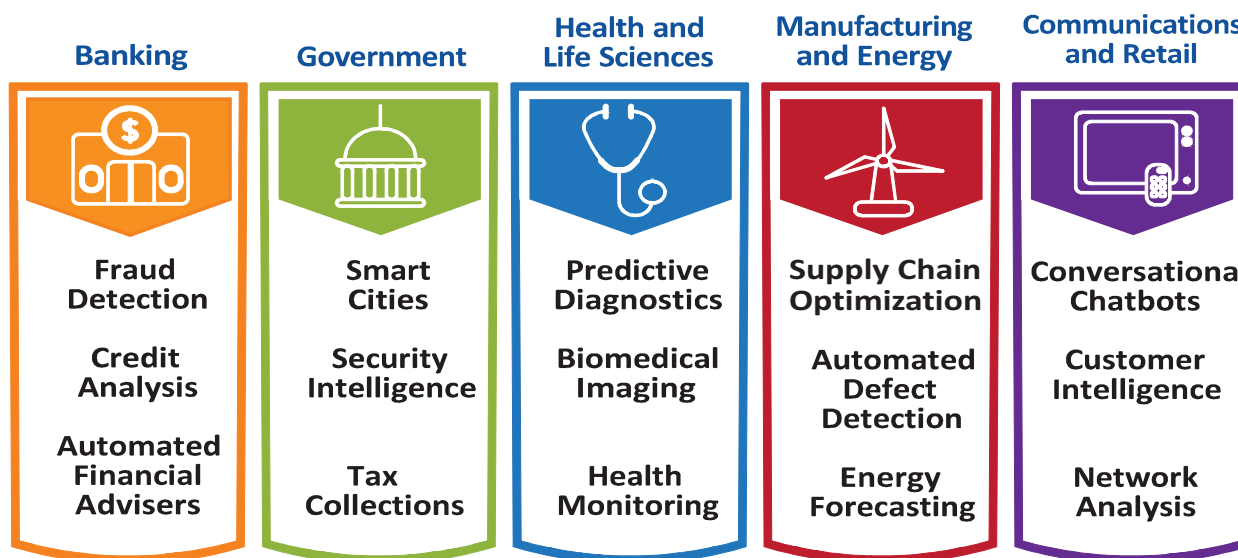
Text Analytics

Text analytics annotates and extracts information from documents and electronic text sources and analyzes that information for business purposes. Insurance companies are beginning to explore the vast power of text analytics by analyzing and gaining insights from unstructured data, such as medical records, emails, underwriter notes, call center logs, even Twitter and blogs.

Another textual visualization technique that can be used for semi structured or unstructured data is the network diagram. Network diagrams view relationships in terms of nodes (representing individual actors within the network) and ties (which represent relationships between the individuals, such as friendship, kinship, organizations, business relationships, etc.). These networks are often depicted in a diagram where nodes are represented as points and ties are represented as lines.

Deep Learning

Deep learning is a type of machine learning that trains a computer to perform humanlike tasks, such as recognizing speech, identifying images or making predictions. Instead of organizing data to run through predefined equations, deep learning sets up basic parameters about the data and trains the computer to learn on its own by recognizing patterns using many layers of processing. Deep learning is used strategically in many industries.



Deep learning methods use neural network architectures to process data, which is why they are often referred to as deep neural networks. Each type of deep neural network has advantages and disadvantages, depending upon the use. A few examples of deep learning applications are discussed below.

Computer Vision

Deep learning plays a major role in the field of computer vision. Convolutional Neural Networks (CNNs) are used in applications such as facial recognition, image question answering systems, scene labeling and some image segmentation tasks. With respect to image classification, CNNs achieve a better classification

accuracy on large scale data sets because of their joint feature and classifier learning capabilities. The ability to interpret raw photos and videos has been applied to problems in retail, medical imaging and “data for good” initiatives like wildlife conservation.

AI Assistants and Bots

Computer programs capable of human-level speech and comprehension have evolved rapidly with the help of deep learning. The bots are self-trained to respond to situations such as forecasting sales of new products or providing insights into customer churn. With a well-trained model, chatbots not only can interpret natural language input but can also generate a response for any

situation. Deep Learning has enabled chatbots to communicate via text, speak in a more natural voice, understand context using natural language interaction and run deep learning models to answer analytical questions.

Time Series Analysis

A time series is a sequence of data points recorded at specific, equally spaced intervals over time. Recurrent Neural Networks (RNNs) are good for sequence data. This makes time series data a good match for RNNs. Time series data often adds to the modeling complexity due to autocorrelation - where successive observations are dependent on each other. For example, a video can be looked at series of highly correlated images. Under RNN, each node maintains its own internal memory and uses the previous state output as the input for the successive step.

Natural Language Processing (NLP)

Deep learning approaches provide very high performance across numerous NLP tasks. For instance, recurrent neural networks are used for sentiment analysis, speech-to-text conversion, natural language generation and document summarization. For example, contact center operations now greatly benefit by giving instant feedback to agents - while they are talking to customers - about their tone of conversation and customer sentiments, rather than recording conversations only to be played later for training propose.

Rare-Event Modeling

Deep, fully connected networks are predominantly used in cases of rare-event modeling such as defect analysis and fraud detection. Because it is hard to isolate or detect rare events, deep learning models can often isolate fraud through progressive learning. For example, unsupervised and supervised models can be used together to monitor transactions for fraud by first detecting an incident and then evaluating that incident as fraud or not fraud - all without hindering the fraud detection system.

Deployment

Model management and deployment are critical steps in the analytics life cycle. They involve validating a model, selecting a champion model, and publishing or deploying your models (in batch or real time). Model performance is also evaluated and monitored constantly to decide whether current models should be retired or upgraded, or if new ones are needed. Let's explore some important best practices for model management.

Model Validation and Comparison

With advances in modeling software and computing performance, it's both easy and feasible to build multiple candidate models for use in analyses. By experimenting with different binning definitions, analysts can efficiently select alternate input variables, model techniques and build multiple models. But before using these models, Organizations need to evaluate them to determine which ones provide the greatest benefit. Models can be compared across several metrics based on their statistical merit using measures like lift, receiver operating curve (ROC) and Kolmogorov-Smirnov (K-S) charts.

Model Deployment

Analytical models are at the heart of critical business decisions - for example, when you need to find new opportunities or manage uncertainty and risks. But their real business value is only realized when they are put into production, either in batch or real time, for use by decision makers on a day-to-day basis. It's only when analytical models can be used in a call center environment, by an underwriter assessing risk, or a special investigative unit (SIU) determining fraud that insurers truly operate based on smarter decisions.

The challenge is that many organizations spend on an average three to six months converting a predictive model into a programming language that can be used by traditional transaction systems (e.g., a Loan origination system in a bank). In today's environment, customer preferences, cultural influences and marketing offers change faster than ever. Organizations that can reduce the time to deploy analytical models will gain considerable competitive advantage.

Model Monitoring

To be effective over time, analytics must be an iterative process. The work doesn't stop after a model has been created, tested and deployed. Models need to be monitored regularly and adjusted to optimize their performance. Outdated, poorly performing models can be dangerous, as they can generate inaccurate projections that could lead to poor business decisions. For example, a model could fail to detect changing market requirements or trends - and create room for a competitor to step in and capture market share.

As a best practice, once a model is in a production environment and being executed at regular intervals, the champion model should be centrally monitored through a variety of reports since its predictive performance will degrade over time. When performance degradation hits a certain threshold, the



model can be replaced with a new model that has been recalibrated or rebuilt.

Model Governance

For banks and insurance companies, greater regulatory scrutiny increases the need for model transparency. However, keeping records of the entire modeling process - from data preparation through model performance - can be time consuming and unproductive. As a best practice, many organizations build model governance frameworks, complete with documentation to create qualitative notes, summaries and detailed explanations. Having an efficient model governance approval process can also save time and money, as it can help organizations avoid audits and regulatory fines.

Governance over Analytics Assets

Finally, a few thoughts on striking the right balance between desire for flexibility and importance of control in an organization, as the employees might be using a mix of more than a dozen packages for analytics and data management.

This mix includes open source technologies, commercial software solutions, enterprise-hosted applications and cloud deployments. When data and analytical professionals use the programming languages and tools of their choice, they are happier and more efficient. And when technical skills are in short supply, flexibility around skills helps organizations find the talent they need and make the most of what they already have.

How can such an organization make sure that analytics projects are using trustworthy data, the best models and a rigorous process that will guarantee compliant, useful and repeatable results? And whose responsibility is it to stitch together all the disparate code bases and business scenarios to monitor the outcomes or find other opportunities for business improvements?

Organizations are increasingly looking at ways that unify their data and analytical silos. Ones that can integrate existing and emerging technologies to bring together analytics endeavors and provide shareable access to analytical assets across divisions - with whatever code and tools are in the mix. This will give data and analytical professionals the freedom to create, experiment, test and rapidly deploy different methods easily, using whatever skills they have. It will allow IT leaders to easily manage the entire analytics life cycle, from data to discovery to deployment, for all analytical assets from centralized controls - thereby strengthening the governance in this fast-changing Analytics landscape.

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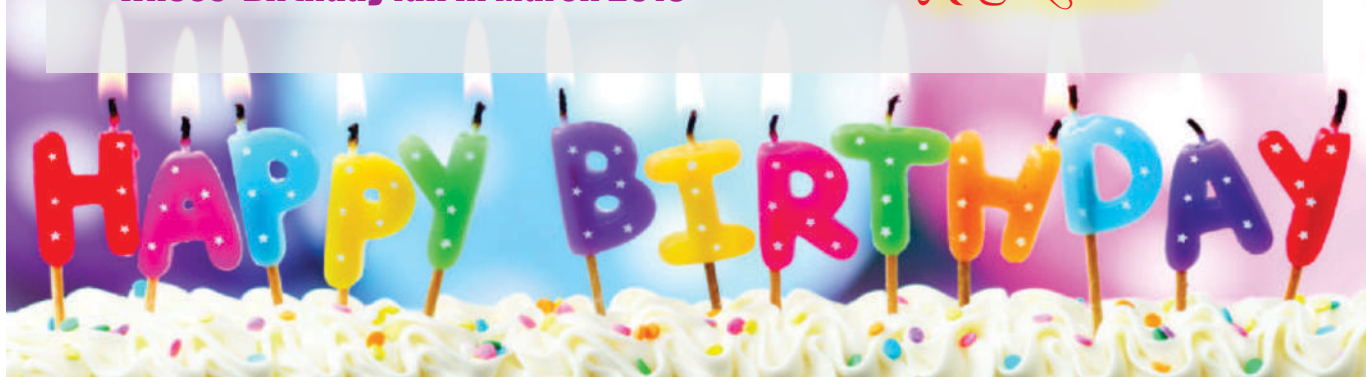


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**The Actuary India wishes many more
years of healthy life to the
fellow members (above 60)
whose Birthday fall in March 2019**

**Mr G Chidambar
Mr H C Mehta
Mr Hitesh Motichand Shah
Mr K K Dharni
Mr S Krishnan**



In this article I will briefly cover the key life regulatory developments that took place in Sri Lanka during 2018.

MolF

In February 2018 the IRCSL issued Direction #15: Procedures on Management of Insurance Funds (MolF) - Long Term Insurance Business (Direction #15). Direction #15 required the segregation of the policyholders' liabilities (including expense allocations) and assets, which could hitherto be held in aggregate, into the following fund categories:

- Traditional participating
- Traditional non-participating
- Participating annuity
- Non-participating annuity
- Unit linked investment funds (per fund)
- Universal life
- Other*

**Where the benefits given to policyholders are linked to the performance / surplus / investment profit / insurance profit arising.*

RBC One-off Surplus Treatment

The insurance industry had adopted a Risk Based Capital solvency regime from January 2016, and the Insurance Regulatory Commission of Sri Lanka (IRCSL) had instructed that the RBC One-off Surplus that arose due to the change in solvency regime must be held within the policyholder funds until the IRCSL issued further instructions in this regard.

In March 2018, the IRCSL issued Direction #16: Identification and Treatment of One-off Surplus.

Direction #16 defined a specific methodology for the computation of the RBC One-off Surplus to be uniformly adopted by the industry (prior to this, various methodologies had been adopted). Subject to this, it allowed for the transfer of the One-off Surplus (excepting that portion arising from participating business) from the policyholder funds to the shareholder funds. Once transferred, the One-off Surplus had to be retained within the company, though it continued to be admissible in terms of supporting the RBC solvency capital requirement.

Direction #16 further contained information relating to the potential future distribution of the One-off Surplus; essentially, such a distribution would be subject to annual transfer caps as well as the strength of internal policies covering expense allocation, policyholder dividend, participating bonus, asset-liability management and the internal target Capital Adequacy Ratio (CAR).

One additional key requirement within Direction #16 covered the interest rate basis for universal life plans under the RBC framework, where it was indicated that "the discount rate should be the risk-free interest rate curve; and the crediting

rate assumption should be set consistent with the discount rate". Previously the RBC crediting rate assumption could be determined by the individual companies; this change had major ramifications for the liabilities and market risk capital charges under the RBC framework.

Changes to Taxation Basis

In October 2017 a new Inland Revenue Act was enacted by parliament. The Inland Revenue Act No. 24 of 2017 (new IRA) is effective for years of assessments commencing April 2018, and introduced a significant change for life insurance taxation in Sri Lanka. The prevailing I-E taxation basis was replaced with a surplus based taxation basis for life business and a new I-E basis for taxing shareholder profits. This basis was agreed between the ministry of finance and the local life insurance industry. The driver behind the change was the virtual lack of taxation being levied on the life insurance industry because of the persistent I-E losses of most players.

The salient features of the new IRA are that for non-participating business, shareholders bear the entire tax on surplus burden, whereas for participating business the tax is shared between policyholders and shareholders. This in turn means that the competitiveness and profitability of both participating and non-participating business fundamentally changed.

IFRS 17

The Institute of Chartered Accounts of Sri Lanka (ICASL) formed a sub-committee comprised of representatives from the ICASL, IRCSL, industry consulting firms and key market players with a view to formulating industry guidance notes for the implementation of IFRS 17. Subsequently, the sub-committee issued a Data Collection Format to the industry to identify implementation issues with "Separating non-insurance components" and "Aggregation of insurance contracts".

Summary

2018 was a very busy year for the life insurance industry, with multiple major regulatory changes. The ramifications and interdependencies of these changes continue to be experienced by the industry; significant operational changes may result in the coming year.

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Vintage is our Vantage



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