SAS Monthly

2012/2013 Issue No. 6 - October 2012

Contents

Contact

Office: 81 Clemenceau Avenue
#04-15/16 UE Square
Singapore 239917

Mail Box: Singapore Actuarial Society
Robinson Rd Post Office
PO Box 376
Singapore 900726

Patsy Lau

www.actuaries.org.sg

Editorial.

Following the success of the RBC2 consultation paper it is great to see the SAS also respond to MAS consultation on Key Executive Persons and Directors. The habit of responding to consultation and making our voice heard is a great step forward.

Early November sees the SAS host its first Life Insurance Conference. This event lasts two days and replaces the previous SAS Appointed Actuaries Symposium. Do sign up and register for what is already proving to be a busy agenda. We have reached out to the Institute of Actuaries UK who are sending a speaker to talk about Solvency 2 and the impact it is having in the UK and other markets, a topic that is very relevant for Singapore. There are also sessions on topical local issues, a CEO panel session and a panel session on the high net worth sector. Not to be missed.

Richard Holloway

Message from the President

The SAS has been busy this year, with no signs of slowing down. Events coming up include a forum on Product Innovation (Oct 29), the Life Insurance Conference (Nov 8-9), the Vertical Marathon (Nov 25) and a quiz night (date TBD). As well, committees are hard at work at industry specific studies and topics.

Don't forget to keep up the SAS up to date with your email address (although if you haven't – you probably didn't receive this!) and with your CPD records. CPD is not just an exercise in paperwork; it provides you with the useful record showing that you have kept up to date with current actuarial practices, in case you are ever questioned. With our on-line tool, you can fill out your CPD at time of completing it, instead of waiting until the end of the year.

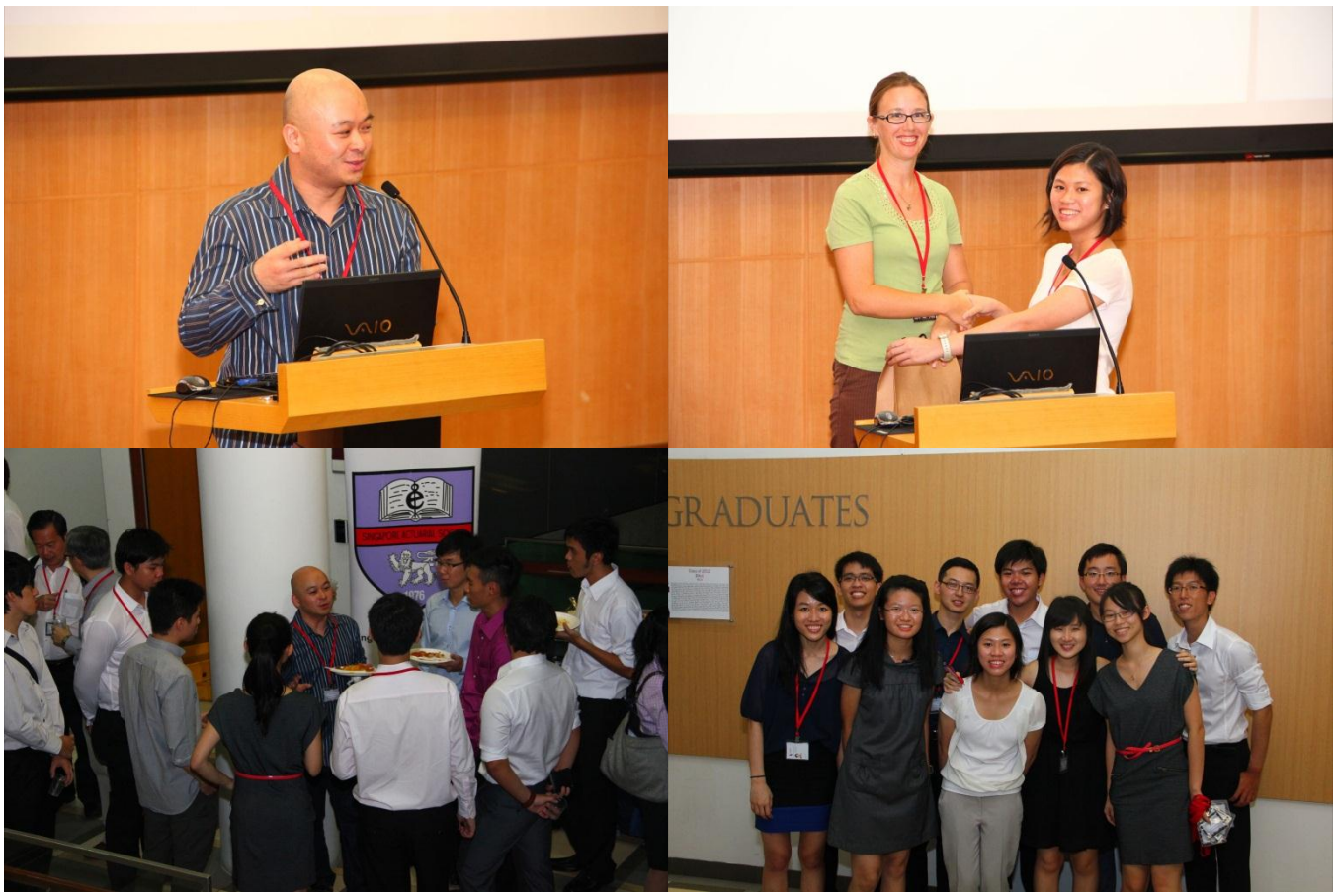
Jill Hoffman

Upcoming Events

Date	Event	Location	Contact
9th – 10th Oct	6th Middle East Healthcare Insurance Conference	Pullman Mall, Dubai	Michelle: michelle@asiainsurancereview.com
15th – 16th Oct	8th Asia Conference on Pensions and Retirement Planning	Regal Hotel, Hong Kong	Loga: loga@meinsurancereview.com
17th – 18th Oct	1st Asia Investment Conference	Regal Hotel, Hong Kong	Wee Ling: weeling@asiainsurancereview.com
29th Oct	SAS Afternoon Talk: Product Innovation	OCBC Centre, Level 33	Patsy Lau: admin@actuaries.org.sg
8th Nov	Life Insurance Conference 2012	Amara Sanctuary Resort Sentosa	Patsy Lau: admin@actuaries.org.sg
8th Nov	Asia Insurance CIO Summit	Marina Mandarin	Michelle: michelle@asiainsurancereview.com
25th Nov	Vertical Marathon 2012	Swissotel, Stamford	Joey Zhou: Joey_zhou@manulife.com
15th – 18th Oct 2013	17th East Asia Actuarial Conference	Resort World Sentosa	Wil Chong: Wil.chong@allianzre.com

Recent Events

Actuarial Networking Night 2012



The inaugural Tri---University Actuarial Science Networking Night 2012, jointly organised by NTU Quantitative Finance and Actuarial Science Club (QFASC) and SAS Student Committee, saw a total of 30 professionals and 70 students who turned up for the event.

The night started off with an opening speech by Pei Ting, the President of NTU QFASC, which highlighted the importance of having a networking night as a

platform for students to gain insights on the actuarial science industry.

Ms Jill Hoffman, who was the guest-of-honour for the Networking event, shared with the guests on her working experience in her opening speech. Her interesting anecdotes of being an actuary engaged the audience and provided aspiring students a glimpse of an actuary's life.

Mr Raymond Cheung, who was the second guest speaker for the event, shared with the audience a short presentation on Enterprise Risk Management. The presentation provided the audience a bird's eye view on ERM, which is currently a hot topic in the actuarial industry.

After the speakers had finished their presentations, industry professionals and students proceeded to the atrium to network over a dinner buffet. Many of the students were eager to speak with the industry professionals to gain career advice and find out more about the actuarial profession in general. A number of students and professionals lingered behind to network, well after the event had officially ended.

Much positive feedback was received, both by students and professionals, on the location of the networking event. Prior to this year's event, actuarial networking events organised by the NTU QFASC had always been held at Nanyang Technological University. The central location of Singapore Management University was a key factor in attracting industry professionals to attend the event. While there was also feedback regarding the warmness of the non-air-conditioned atrium, attendees were generally positive about the convenience of the location. The NTU QFASC and the SMU Actuarial Science Club has taken the feedback into account and will strive to secure an air-conditioned venue for next year's networking night.

Overall, together with the help of the organising committee, as well as the Singapore Actuarial Society's warm support, the Actuarial Networking Night 2012 was indeed a resounding success on most levels.

Scott Yen

Council Update

The representatives of the SAS RBC 2 special taskforce had a fruitful meeting with Monetary Authority of Singapore (MAS) last month to run through our RBC 2 responses and to discuss opportunities to work together. It is agreed that the ERM Committee would take the lead to look into the different components of the RBC 2 before distributing the specific work to the life and General Insurance Committee, possibly by forming various working groups. We will be starting the initial work very soon.

Last month, we also had a great time meeting and interacting with more than 100 actuarial students from the 3 universities in Singapore during the Networking Night organized by the NTU Quantitative Finance and Actuarial Science Club (QFASC). I would like to congratulate the QFASC for organizing such a successful event. We have received many positive feedback from students, alumni and professionals who were present that night.

Our next exciting event would be the inaugural Life Insurance Conference which is happening on the 8th and 9th November. The theme for this year's conference is "Change, Uncertainties and Opportunities". For more details please visit our SAS Website.

We welcome any feedback and suggestions on how we can serve you better in the SAS. Please email me at secretary@actuaries.org.sg or Patsy Lau, our Administrative Executive, at patsy@actuaries.org.sg for any SAS matters.

Raymond Cheung

Committee Reports

• Education Committee

Upcoming CPD Education Events – Mark Your Calendars!

If you read the article on "Relearning our Actuarial A, B, C's" you would have taken note that Behavioral Economics is currently a hot topic in actuarial circles. We are pleased to present two upcoming talks which explore this topic in greater depth…

1. SAS Forum Talk on 29th October – "Product Innovation & Cognitive Science"

This talk is about Product Innovation: the act of creating new products that are "better" than the old ones. But what makes a product better? More technology? More functionality? As a driver of business success, "a better product" can only mean one thing: more people are willing to pay more money for it, more often.

The key challenge for the product innovator, then, is to predict demand for a product that doesn't yet exist. It turns out that some counterintuitive discoveries from the field of cognitive science can help address this challenge. The speaker will be talking about some product innovations that sparked off large changes in their industries, and explaining the cognitive science that explains their success.

The speaker for this talk is Shaun Martin. Shaun is CEO of Applied Cognitive Research: an innovation and strategy research firm he co-founded. Prior to founding Applied Cognitive Research, Shaun taught at Massachusetts Institute of Technology and was a research member of the Institute for Advanced Study, Princeton. Shaun holds a Doctorate in Mathematics from the University of Oxford.

2. Part of a planned one day seminar on 18th December on Behavioral Economics for Actuaries & Risk Managers – "Behavioral Economics and Policy Design".

Why do people in some countries donate organs more than in others? Why do we not save enough for retirement even when we can afford to? Why don't we buy energy-efficient appliances that save us money in the long run? How can more people be encouraged to live healthily?

Around the world, policy makers have begun to pay attention to the growing field of behavioral economics. Instead of assuming that citizens are the rational, interest-maximizing agents of economics textbooks, behavioral economics starts with the more realistic assumption that people are shaped by cognitive biases, complications and limitations. Our rationality, self-control and self-interest are all bounded in ways that have important implications for the way governments design and implement public policies.

The speaker for this talk is Donald Low who is a Senior Fellow and Assistant Dean of Research Centres at the Lee Kuan Yew School of Public Policy. He recently co-wrote and edited Behavioral Economics and Policy Design: Examples from Singapore (2011), a pioneering book which details how the Singapore government has applied ideas from the emerging field of behavioral economics in the design of public policies. Donald holds a double first in Politics, Philosophy and Economics from Oxford University, and a Masters in International Public Policy from Johns Hopkins University's School of Advanced International Studies. He is currently a Vice President at the Economics Society of Singapore, and previously served on the board of the Central Provident Fund.

Gavin Maistry

• GI Committee

The last month has again been fairly busy for the committee, between responding to consultation papers and trying to make progress on the technical notes for reserving and the stress tests.

On the stress tests, we are working on a forum for the end of November on the stress tests, which will be similar to the one last year. Details will be sent out once confirmed, but it will include an update from the MAS as well as an open discussion on the current stress test requirements.

Finally, if you haven't been on the website recently, the papers from the May GI conference have now been posted. For those who couldn't attend, there are some very good presentations worth catching up on and we hope to see you at the conference next year.

Matthew Maguire

New Members

Fellow Membership:

ENG Cheang Giap Philip, ***Singapore Deposit Insurance Corporation Ltd***

GOH Siew Shin, ***Towers Watson***

Associate Membership:

Janka SCHULD, ***Pricewaterhouse Coopers***

Ordinary Membership:

CHOI Yan How Sam, ***Manulife***

KUAH Xin Kun, ***Manulife***

LIN Yiqing, ***Manulife***

CHEW Kwang Hua, ***Towers Watson***

CHUA Wai Ming, ***Towers Watson***

MOH Yuhui Joanne Danielle, ***Asia Reinsurance Brokers Pte Ltd***

News & Articles

• General News

Asia's insurers beef up as bankers face the axe

Reuters, 10 Sep 2012

Slowing economic growth across much of Asia has failed to crimp expansion plans by the region's insurance companies, even as the rest of the financial industry slashes jobs.

While banks and brokerages cut costs and jobs in Asia amid falling corporate confidence and plunging deal volumes, insurers are riding the wave of rising individual wealth across the region.

Economic growth and increasing salaries, combined with high savings rates, are creating fertile ground for more straightforward financial services, such as retail banking and insurance.

"Before people enter the middle class, they can't afford to buy our products," said Robert Cook, senior executive vice president and general manager of Asia for Manulife Financial Corp, speaking at an investors' conference in Hong Kong on Friday.

Manulife joins AIA Group Ltd, Zurich Insurance Group Ltd, RSA Insurance Group PLC, Direct Asia and Swiss Re AG in planning to grow headcount in Asia, executives and financial sector recruiters say.

Headcount at 29 insurance companies based in Asia that have reported employee figures at the half-year mark increased 3.1 percent in the first six months compared with the same period a year earlier, according to data from Thomson Reuters.

China's state-owned PICC Property and Casualty Co. Ltd saw an 18 percent increase in employees while

Indonesia's PT Panin Financial Tbk, PT Asuransi Multi Artha Guna Tbk, PT Asuransi Harta Aman Pratama Tbk and PT Asuransi Bintang Tbk each increased their headcount by more than 10 percent, according to the data.

Multinationals such as Canada's No. 2 insurer, Manulife, are also hiring. The company has added 1,500 employees in Asia since 2010, bringing its total regional staff to more than 8,000, a spokesman said.

"We expect to continue recruiting at similar levels to help meet our growth ambitions over the coming years," he said.

The insurance industry's headcount growth in Asia contrasts sharply with the multiple rounds of job cuts across much of the other parts of the financial industry, especially investment banking.

The number of Asia-based investment banking jobs posted on the eFinancialCareers website in July of 2012 was down 15 percent compared with July of last year. Insurance jobs were up 4 percent over the same period.

Hiring for insurance front office jobs, including underwriting, business development and product marketing, could be up as much as 15 percent this year, according to Carol Cheung, a financial services team manager at headhunting firm Robert Walters. Hiring for back office insurance jobs could rise more than 5 percent, roughly in line with last year, she said.

Chris Colahan, Asia chief executive for London-based RSA, said he plans to boost his headcount by low single-digits next year, matching what he is doing this year, particularly specialist construction, marine and casualty underwriters.

Demand for middle managers is high, he said, and RSA is willing to offer bonuses of up to 6 months' salary, double normal.

Non-life actuaries are also in demand. With eight years of experience, a non-life actuary can command an annual salary of S$220,000 to S$280,000 ($225,300) -- said Maryann Au, executive director of insurance search agency Huntington Search Partners. That's nearly equal to the base salary of a top investment banker.

Insurance companies are by no means immune to economic troubles. In Asia, however, the sector appears to be little shaken by the slowdown.

Zurich said Asia is a growth market and the company will hire to support its ambitions. DirectAsia said it is considering expanding into new markets but declined to comment on which markets.

"Over the next decade we are going to have a billion new potential customers in the markets in which we operate," said Manulife's Cook, referring to a statistic that cites nearly 1 billion people joining Asia's middle class in the next decade.

Pension systems in trouble

Business World Online, 25 Sep 2012

THE ASIAN Development Bank (ADB) released last month a publication which indicated that "pension systems in many parts of developing Asia are unprepared and underfunded to meet the needs of the region's rapidly aging population." The study included the Philippines, where it said the "significant disparities in the [pension system] challenge both its equity and sustainability."

And sadly for Asia's elderly, the 164-page publication noted, even their traditional fallback to pension schemes -- "family support" from the younger generation -- was being threatened by "globalization." It noted that "family-based old-age support mechanisms, such as with children supporting their elderly parents, are breaking down, particularly as globalized labor markets trigger a surge in migrant workers."

Discussing the new publication, ADB Principal Economist Donghyun Park said in a statement, "Across Asia, great divides exist in pensions available in rural and urban areas, between retirees from the public and private sectors, and those leaving the informal and formal job sectors." Park edited the new book, entitled, "Pension Systems in East and Southeast Asia: Promoting Fairness and Sustainability."

Park added, "Without far-reaching reforms, the financial burden of these [pension] schemes on future workers may become more than they can bear." ADB said the new publication aimed to urge Asian policy makers "to provide adequate old-age income support," citing key lessons from China, Indonesia, Korea, Malaysia, the Philippines, Singapore, Thailand and Vietnam.

Citing some examples, ADB said that in China, where "the number of elderly already outstrips the combined total of senior citizens in all European countries, multiple pension systems cover urban enterprises, rural dwellers and civil servants, and will need to be rationalized to create a balanced, sustainable pension framework."

And in Indonesia, where "the existing system covers just 14% of all private formal sector workers, pension programs will have to expand by more than 700% to cover both formal and informal sectors." And while Singapore has a single-tier pension system with nearly universal coverage, "the average funds per member will be insufficient as the population ages in the next 20 years."

As for the Philippines, the new publication noted that "with the already high benefit-to-contribution ratio of the SSS [Social Security System], greater increases in contribution rates would be required to sustain the pension program if no improvement is made on the current compliance rate of 31%." As such, SSS members and employers should brace themselves for higher premium rates in the future.

The ADB study noted that SSS, the Government Service Insurance System (GSIS), and the Armed Forces of the Philippines Retirement Service Benefit System cover about 79% of the labor force and 28% of the population aged 60 and older. The bank noted the SSS fund is estimated to last until 2031 (another 19 years), and the GSIS fund until 2055.

"The GSIS program generally offers better benefits than the SSS as reflected in the gap between their replacement rates, but in both the rates are much higher than the best practice targets of 40% to 50% which make the programs unsustainable as the population ages. Removing the wage ceiling for GSIS members in 2003 exacerbated the gap, and short-term salary averaging is another source of perverse redistribution," the ADB study said.

"The large discrepancy between the contribution rate of the GSIS (21%) and the SSS (10.4%) reflects the significant imbalance between contributions and benefits in the SSS. This accounts for its shorter fund life (2031) compared to that of the GSIS (2055). In addition, both programs are administered and amended by GSIS members, which could result in bias. The significant disparities between the SSS and GSIS test the fairness and sustainability of the entire system for present and future retirees," it said.

It added that "the longer this imbalance continues, the greater the burden to be passed on to future generations of contributors as greater increases in contribution rates will be required to catch up with ever growing pension payments." The Philippine section of the new ADB study was prepared by Ernesto Reyes, an independent consultant and actuary, and a Fellow of the Actuarial Society of the Philippines.

The ADB study also said that to "preserve the pension system, the government should consider raising the retirement age, increasing contributions, combining the two programs, gradually shifting to a defined-contribution system, and expanding the economy although the current population growth rate of 2%, one of the highest in Asia, will make sustained economic growth a challenge."

The study added that "both the public sector and private sector programs are administered by separate government-run pension institutions; however, the administrators of these institutions, as well as the legislators who created and amend the programs, are covered by the public sector program. This could result in preferential treatment for the GSIS that could be eliminated if the programs were combined."

In arguing for raising the retirement age, the study noted that "decreases in fertility rates combined with increases in life expectancy will age the Philippine population… and if the present trend continues, the top heavy structure may eventually result in the collapse of the system."

In concluding the Philippine section, the study said, the options include reducing benefits by modifying the benefits formula; or, raising the Retirement Age as proposed under Senate Bill No. 2797, which suggests increasing the mandatory retirement age for government workers from 65 to 70. The ADB study

said a corresponding bill applying to the private sector program should also be filed.

The government can also consider combining the Social Security System and the Government Service Insurance System to "remove the current inequities between the two programs, and any savings for the government can be channelled to social assistance programs. This can also involve off-loading non-pension related activities such as the non-life insurance operations of the GSIS, or the social assistance coverage of the SSS," the ADB study added.

Without doubt, the new ADB study is timely. But one can only wish that policy makers are actually in the mood to review and learn from its discussions of options and constraints. More important, the new study presents compelling research data that should convince policy makers of the urgency of reforms in the country's pension systems.

Myanmar to Open Insurance Sector in 2015

Business Recorder, 14 Sep 2012

Myanmar will allow foreign investors into its insurance sector by around 2015 once local private insurers have had time to establish themselves, a senior government official told Reuters.

"We need to give these local companies a chance to gain some experience in this business. And then, we will allow foreign investors to do insurance.

I think it will happen around 2015," Dr. Maung Maung Thein, deputy minister of finance and revenue, said on the sidelines of an investment forum in the nation's capital.

His comments come after the head of Prudential Plc, Britain's leading insurer, expressed interest in Myanmar, and roughly a week after Myanmar's government issued insurance licenses to 12 privately-owned domestic companies.

As Western economies slow and the developed economies in Asia become saturated, insurers are increasingly turning to Southeast Asia, drawn by its growing middle classes and lack of insurance policy holders.

Few in the industry expect major revenues from individual Southeast Asian countries, but they acknowledge the growth potential within the 10-member Association of Southeast Asian Nations (ASEAN).

Myanmar, with its population of around 60 million, is expected to post real GDP growth of around 6 percent over the next five years, according to the International Monetary Fund.

Prudential, which recently won in-principle approval from the Cambodian government to open a wholly foreign-owned life insurance operation there, said last month it was also considering a move into Myanmar. "We are looking all the time at global opportunities Myanmar is on our radar," CEO Tidjane Thiam said.

The 160-year-old insurer generates 45 percent of its sales in Asia, and Thiam said less-developed Asian economies, where take-up of insurance is low, have stronger growth potential as more people will insure themselves and others will take on more cover.

European insurers will probably stay away from Myanmar at first, but the Japanese could be interested, said Fitch Ratings' Asia Pacific head of insurance Jeffrey Liew.

"You see insurers like Aviva pulling out of their non-dominant markets," he said. "European insurers are still exposed to sovereign debt crises in their home markets and need to preserve capital."

"The Japanese could be more aggressive. You see them venturing into Southeast Asia, especially Indonesia," Liew said, adding, however, that while foreign insurers may secure licenses they will be cautious about committing resources in a market with such a recent fractious past.

Both Sompo Japan Insurance Inc and Tokio Marine & Nichido Fire Insurance Co Ltd have representative offices in Yangon, according to the Insurance Directory of Asia 2013, published by the Asia Insurance Review.

Before the former military government launched a sweeping nationalization in 1963, there were more than 70 local and foreign private insurance companies operating in Myanmar. Only the government-owned Myanmar Insurance Enterprise has been doing insurance business since then.

In the year to end-March, Myanmar Insurance wrote gross premiums totalling 24.1 trillion kyat around $28 million at official exchange rates.

• Article of the Month

Relearning our A,B, C's…

Actuarial Science is an evolving discipline. When the profession first appeared in the 17th century, actuaries were mainly involved with determining life expectancies for the life insurers of the day using deterministic methods. It took around 250 years before actuaries started to get more involved in the property & casualty space and to start to use stochastic techniques. Only as recently as the 1980's have investment actuaries started to employ financial economics techniques – prompting the famous Swiss actuary Hans Bühlmann to coin the phrase – actuary of the 3rd kind. In the last decades or so actuaries have started to become more involved in the risk management area and in particular ERM – which Paul Embrecths from the ETH in Zurich now terms the actuary of the 4th kind. So what new technical skills – beyond the standard probability, mathematics, statistics, demography, finance, economics, financial economics, and computer programming – will the actuaries of the 5th kind and beyond need to use to deal with the increasing complexity of the areas we work in? This is not an easy question to answer – but here are some interesting fields that actuarial science should look to embrace in future…

a. Accelerating Technologies – the futurist Ray Kurzweil (www.kurzweilai.net) postulates a law of accelerating returns in which the speed of technological change increases exponentially. This has already been borne out in many fields like computing power (Moore's law); artificial intelligence and medical science. This dynamic has huge implications for the long term predictions that we actuaries have to make – and implies that the past experience will likely not be a good indication of the future. As an example, a major reason for actuaries consistently underestimating future mortality improvements is the accelerating pace of medical advancements. In his book The Singularity is Near Kurzweil discusses the concept of accelerating technologies and the advent of the singularity. The word "singularity" is borrowed from astrophysics and it refers to a point in space-time at which the rules of ordinary physics do not apply. Similarly, with technology, technological change can be so rapid and so profound and its impact so deep that there will be a fundamental shift from the normal rules – making long term predictions very difficult. This is a fascinating area and to study it further the Singularity University was established in cooperation with NASA & Google in Silicon Valley with the stated aim to "assemble, educate and inspire a cadre of leaders who strive to understand and facilitate the development of exponentially advancing technologies and apply, focus and guide these tools to address humanity's grand challenges." It would be good if we actuaries could also participate in this ambitious goal.

b. Behavioral Economics – this field studies the effects of cognitive and emotional factors on the economic decisions of individuals and institutions and is gaining increasing attention in actuarial circles. The June 2012 issue of the American Academy of Actuaries' magazine Contingencies headlined with an article on why cognitive science matters to actuarial science. Fundamental concepts in insurance & actuarial science - like risk aversion; information asymmetry; anti-selection; moral hazard and misalignment of interests - have their roots in behavioral science. Indeed, there are a myriad applications of behavioral economics in actuarial science – like product innovation (see upcoming talk); pricing strategies; policyholder buying & lapse behavior; behavior of risk managers and also the

erratic behavior of stock markets at certain times when the neo-classical economic assumptions of rationality fail. This idea is expanded on in many good articles such as The End of Rational Economics by Duke University's Dan Ariely in the August 2009 issue of Harvard Business Review. A more recent book by Daniel Kahneman's (Nobel Economics Laureate in 2002) called Thinking, Fast and Slow exposes the many flaws in our thinking & decision making – due to cognitive biases and heuristics or simplifications that prevent us from making rational decisions. The book has been described as alarming and intellectually aerobic at the same time and will appeal to us actuaries with various numerical examples on flawed deductions from data; misestimation of probabilities and the wonders of Bayes' theorem. Looking at actuarial problems through a behavioral economics lens should add another dimension to our analysis. In his seminal work on multiple intelligences, the American developmental psychologist Howard Gardner talks about multiple types of intelligences (logical-mathematical; linguistic; interpersonal; intrapersonal; musical; spatial; etc.). The dimension that actuaries excel at is obviously logical-mathematical intelligence – we are number/reasoning smart. Newer fields like Behavioral Economics should help us gain greater insights into important interpersonal (interaction with others) and intrapersonal (introspective and self-reflective capacities) dimensions that are also very important for success.

c. Complexity Science – recently a speech given by the Prime Minister of Singapore, Lee Hsien Loong, stressed the importance of an "appreciation of complexity" by graduates. This remark seems to underscore the fact that Complexity Science, together with Behavioral Economics, is now much the rage in government and public policy. This has been backed up by the recent establishment of the Singaporean Institute for Complexity Sciences at NTU. Complexity Science involves the scientific study of complex systems - systems with many individual parts that interact to produce interesting global or emergent phenomena that cannot easily be explained by analyzing the individual constituent elements. Complex systems include IT networks (e.g. the Internet), biological ecosystems, human biological systems, stock markets, traffic patterns, etc. The insurance markets can also be viewed as a complex systems – making it ripe for applications of complexity science. Some progress in this area has already been made e.g. in the modeling of price cycles in the P&C insurance market; the dynamic lapse assumptions under variable annuities in Life insurance; etc. – but more can be done. The domain of actuaries are contingencies and their financial consequences – areas of great complexity. The leading think-tank in the world for Complexity Science is the Sante Fe Institute or SFI (www.santafe.edu). At an SFI seminar that I recently attended on how Complexity Science can help us understand the recent Global Financial Crisis – the program covered an intellectually rich range of topics including network theory; human behavior; neuroeconomics; neural networks; evolutionary economics and systemic risks. The September 2011 issue of Harvard Business Review was devoted to how companies should embrace complexity – the article mentions that we cannot avoid complexity in today's hyperconnected business world - but we need to study and understand it and we can then profit from it.

d. Big Data – is another hot topic and certainly an area that we actuaries need to embrace. Harvard Business Review's October 2012 issue tackles the topic of Big Data in detail and how these vast new streams of information are changing the art of management. Companies like Google and Amazon are data driven organizations and build competitive advantage with their ability to collect, analyze and apply the findings from very large data sets. For the insurance industry, the volume of the information now stored in data warehouses is also rapidly increasing - but are we doing enough with this treasure of information? Sophisticated analytics on big data can substantially improve the decision-making and risk management of companies. In addition, the big data findings can be used to improve the development of the next generation of products and services. With the exponential growth in data available there will be a shortage of talent necessary for organizations to analyze big data. The abovementioned Harvard Business Review issue also has an article on data scientists – touted as being the sexiest job of the 21st century – the data scientists today are akin to the Wall Street "quants" of the 1980's and 1990's . Actuaries have long been analyzing large data sets for experience studies; pricing & valuation data; etc. and have the necessary skill set to be the leading data scientists of the future. Areas like Predictive Modeling, Data Analytics and Data Visualization that actuaries have already utilized fall within the ambit of big data analysis.

e. Evolutionary & Biological Theories – there are many parallels between economic systems and biological evolutionary theory. Based on evolutionary principles, new theories like the Adaptive Markets Hypothesis (AMH), put forward by MIT's Andrew Lo, provide a more realistic alternative for stock market behavior to the battered and bruised Efficient Market Hypothesis (EMH) of classical financial economics. This model applies the principles of evolution to financial interactions: competition, adaptation and natural selection. There is an increasing acceptance of this modeling approach as evidenced by Andrew Lo's appearance amongst Time magazine's 2012 list of the 100 most influential people in the world. Lo states in the Time write article that he believes markets are less rule-based and more like messy biological systems. Moving to computer science, there are evolutionary & genetic algorithms which generate solutions to optimization problems using techniques inspired by natural evolution, such as inheritance, mutation, selection, and crossover. This technique is routinely used to generate useful solutions to difficult optimization and search problems – like those that we may increasingly observe in actuarial practice – and where simple analytical techniques fail. In the business world companies like Amazon now describe their business model as an ecosystem - it is not just a product – but a combination of product, software, services and infrastructure.

f. Fractals – Fractal geometry is the mathematics of roughness – ubiquitous in nature; biology and financial markets. The pioneer of this field is the famous French mathematician Benoit Mandelbrot. His book aptly titled The Misbehavior of Markets - A Fractal View of Financial Turbulence gives a good overview of the fractal or rough nature of financial markets and he challenges the standard models of modern financial theory (CAPM, EMH, Black Scholes; etc.) with their simplifying techniques and assumptions. The result is a revolutionary reevaluation of the standard tools and models - replacing the outdated assumptions of smoothness; normality and independence with the roughness of fractals; power laws; fat tails and dependence. Mandelbrot's 17 minute TED Talk on Fractals (available on YouTube) is a brilliant introduction to this topic.

In conclusion, the above list of new fields and techniques that will be useful to actuaries in future is by no means exhaustive. The topics are also not independent but overlap – e.g. Complexity Science often includes ideas from Behavioral Economics & Evolutionary Biology; the latest Singularity Summit on Accelerating Technologies (singularitysummit.com) included topics on Behavioral Economics & Complexity Science. The above list also focuses on the technical skills & analytical problem solving skills which we as actuaries need to regularly update and master. However, we also need to recognize that we must sharpen our softer skills like communication & other business savy skills (to borrow a few from the Society of Actuaries competency framework - Industry Knowledge; Leadership; Professional Values; & Strategic Insight & Integration). It would be interesting to hear from readers on what other new areas they think we as a profession should be exploring?

Gavin R. Maistry - Chairman of the SAS Education Committee

Interview of the Month: Keith Walter

How would your friends describe you?
My friends find me interesting, creative, charismatic, and with a great personality. Of course, those are my friends who are accountants and lawyers. Don't ask my friends who are artists or investment managers.

Why did you become an actuary?
I didn't know anything about being an actuary until my second year of University. Actually my father encouraged me to explore the profession, and after taking a few courses, I discovered that I really enjoyed it. When I graduated from University, I had B.Sc. with a combination of Computer Science and Actuarial Science. After applying for a variety of jobs, I had offers in both fields. However, the job as an Actuarial Student paid a bit better, so that sealed the deal and led me to pursue a career as an actuary.

What is your current role?
I am the Market Leader and Director for Towers Watson insurance consulting practice in South East Asia. My role is to work with insurance companies in the region to assist them in dealing with risk, actuarial, and business strategy issues.

What do you enjoy most about your job/role?
Two things come to mind. Firstly, I really enjoy the variety of work in my role since I have the opportunity to work with clients throughout the region on projects covering a wide range of business issues. This gives me the chance to meet many interesting people. Secondly, I enjoy working with a team of motivated professionals who are willing to roll up their sleeves and do whatever it takes to help clients succeed.

What motivates you?
I am motivated by the positive feedback for a job well done and by the recognition we get from our clients. I have always found it interesting to understand business strategy and business issues and it is motivating to see your work contribute in some way to helping companies achieve business success. After 30 years in the industry, I find that I am less motivated by things like promotions and titles, but still very driven by the challenges of our work and the impact that our work has.

What do you do to relax out of office?
I enjoy skiing in the winter. I am a Canadian and grew up with snow and ice every year. I still try to take a couple of weeks back in Canada every winter for a "ski break". Now that I am getting older, I have to be more careful that the ski break doesn't turn into a bone break.

What is the greatest risk you have ever taken?
Making the decision to move away from my home country in order to pursue opportunities in other parts of the world. However, I have now lived in three different cities in Asia (Hong Kong, Tokyo, and Singapore) so I do not feel the same stress and struggles of living "away from home". Looking back, the first time that I relocated to Asia was a big move with a lot of risk and stress. The learning curve was steep, but on hindsight, well worth it.

If you were not an actuary now, what would you most likely be doing?
When I was young I entertained the thought of becoming a farmer. I spent a summer working on a farm in the prairies in Canada. If I was not an Actuary right now, I may be sitting on a tractor trying to bring in the harvest for the season.

If the world ends tomorrow, what would be doing today?
Spending time with my family – my wife and 3 daughters. At the end of the day, I get to come home to my family, especially if it's the last day!

Any advice for aspiring actuaries?
The profession gives you great opportunities, but don't just rely on the exams or the technical aspects of being an Actuary. Build connections, learn from others, be curious, ask lots of questions, and don't quit until the answers make sense. We need aspiring actuaries to challenge us as a profession to keep getting better.

Brainteasers

#1
A man died, leaving 17 camels. His will specified that they be divided among his three sons as follows:

1/2 to the oldest son
1/3 to the second son
1/9 to the youngest son

The three sons were puzzled over how this could be done when a wise man happened to ride by on a camel How did the wise man solve their problem?

#2
If Teresa's daughter is my daughter's mother, what am I to Teresa?

Note: If you have a fun brainteaser that you would like to share, please feel free to email Zi at ZiXiang.Low@milliman.com

Answers for last month's brainteasers:

#1
0, the river is the Nile.

#2
Because a flat mirror doesn't really reverse anything but simple reflects back the light that impinges upon it. We think we see a reversed image because our minds want to think that the person behind the mirror is an actual person and not a reflection.