Emerging Risks & Opportunities
Veekash Badal & Ger Bradley
Giro 2016
Dublin
What do we mean by Emerging Risk?

An issue that is perceived to be potentially significant but which may not be fully understood or allowed for in insurance terms and conditions, pricing, reserving or capital setting.

– Lloyd’s

...Think of it as an opportunity.
The economic outlook
Interesting Times Ahead

- Low Interest Rates
- Low Oil Prices
- Gold back in favour
- Emerging Economies
- Brexit
- Urbanisation
- Political Landscape – Trump, North Korea, Middle East, tensions between the Western world and Russia
How should we react to low interest rates?
Consistent increase in inflation
Implications on Capital

• Decrease in investment return on reserves could lead to more activity in the legacy market
• Lower cost of capital
• Alternative capital
• Increase in mergers and acquisitions as companies try to achieve economies of scale
• Mergers & acquisitions continue to keep the market preoccupied although actual completed transaction well down from 2016.
What Brexit might look like...
Implications on the Insurance Industry

• Impact on capital coming to London but too early to tell
• Possibly lower cost of capital for Foreign Investors..but risk of fragmentation
• Alternative capital
• Lloyd’s to move operations elsewhere?

“...it does represent a new opportunity and it will be exciting to see how London responds”

“...if we are not able to access the single market, either through passporting rights or other means, the inevitable consequences for Lloyd’s—and indeed other insurance organisations—will be that we will transact the business onshore in the EU—and that obviously will have an impact on London.”

– John Nelson, Chairman of Lloyd’s
Global Urban Population

- 1950: 0.746 Billion USD
- 2014: 3.9 Billion USD
- 2045: 6 Billion USD
Quadruple of mega cities with a population over 10 million over less than 40 years

India and China expected to account for 30% of the projected world’s urban growth by 2050

1.5 million people are added to the global urban population every week

50% of global GDP is generated by the 300 largest metropolitan areas

Over 65% of the world’s population will be in urban areas by 2050
For the Insurance Industry

- Electric power supply and distribution
- Transportation infrastructure (roads, railroad, airports, ports)
- Water supply and sewage
- Communications infrastructure
- Many opportunities for the insurance industry to help people get on with their lives
- Suggestion during 2015 WEF in Davos to spend $90 trillion redesigning all the cities so they don't need cars.....but
Autonomous Cars

Ger Bradley
What are they?
A vision from 1957

Playing scrabble while your car is driving itself on the Turnpike.

As early as 1956 the Central Power and Light Company inserted this ‘inspired’ advertisement in leading US newspapers.

“Electricity may be the driver”
Autonomous Cars: What are they?

**Definition:** A robotic vehicle that is designed to travel between destinations without a human operator.
Levels of Autonomous

The National Highway Traffic Safety Administration defines vehicle automation according to following five levels, what are they?

- **Level 0**: No Automation
- **Level 1**: Function Specific Automation
- **Level 2**: Combined Function Automation
- **Level 3**: Limited Self-Driving Automation
- **Level 4**: Full Self-Driving Automation

**FULL DRIVER RESPONSIBILITY**

**FULL VEHICLE RESPONSIBILITY**
3 Main Technologies will work together for AVs

- Vehicle to Vehicle or Vehicle to Infrastructure Communication
- LiDAR
  - Light Detection & Ranging
- Inertial Navigation Systems & GPS
  - Calculates position, orientation & velocity using computers, accelerometers & gyroscopes
Vehicle to Vehicle

V2V Function comprises a wireless network where automobiles send messages to each other with information about what they’re doing.

This data would include:

- Speed
- Location
- Direction of travel
- Braking
- Loss of stability
Stats

- In 2015, **1.25m** road death fatalities worldwide
- **94%** of accidents are human error
- Biggest single killer of young people
- Even imperfect technology can reduce these numbers substantially
- However crashes that do occur might be much more serious – e.g. clumps of crashes due to a software bug
Risks
Introduction

Organ Transplants
Who lives?

Morality Decisions
Who dies?

Clumps of Accidents
Who programs?

Cyber Risk
Who hacks?

Car Ownership

RISK AHEAD
Change
(or go out of business)
Change

• How can we help as actuaries
• Data will be the key
• But what data
• New Products
## Risks & Rating Factors

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<thead>
<tr>
<th>Demographic Factors</th>
<th>“Old”</th>
<th>“New”</th>
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<tbody>
<tr>
<td></td>
<td>Where you live</td>
<td>Where you live – quality of satellite imagery coverage GPS maps</td>
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<td>Age/Gender</td>
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<td>Credit Score</td>
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<td>Profession</td>
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<tr>
<th>Car related Factors</th>
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<td>Make</td>
<td>Who is the software engineer?</td>
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<td></td>
<td>Model</td>
<td>Cyber security 55% risk</td>
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<td>Type</td>
<td>Hacking</td>
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<td>Size</td>
<td>Make</td>
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<td></td>
<td>Age</td>
<td>Model</td>
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<td></td>
<td>Likelihood of Theft</td>
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<tr>
<th>Personal Driving Habits</th>
<th>“Old”</th>
<th>“New”</th>
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<tr>
<td></td>
<td>Driving Activity</td>
<td>Who is the software engineer?</td>
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<td>Driving History</td>
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Liability

Liability Issues

Software and Other Updates
Should they be necessary?
Mandatory?
Who is responsible for availability/installation?

Crash Responsibility Vehicle designer or manufacturer?
Software designer or manufacturer?
Vehicle operator?
Passenger?
Jurisdiction?

Inclement Weather
Who is responsible for inability to function in severe weather?
One Solution to Liability Issues: SPLASH Pooling?

- Create an insurance pool for each autonomous carmaker—a Supplier Product Liability Autonomous Share (SPLASH) pool
- SPLASH pool funded by carmaker and all suppliers
- Funding is commensurate with expected losses
- Losses paid directly from the fund
- Eliminates manufacturer’s role of managing indemnification from the supplier
Next Steps
The future of agriculture…?

- While it may look ordinary, the New Holland NH Drive revealed August 2016 is a fully autonomous tractor.

- Monitored and controlled remotely by the farmer’s tablet.

- Although the technology for the tractor is complete, not likely to hit market for at least two years, until there is more definition regarding legal and liability issues.
Nvidia and Baidu partner on a ‘top-to-bottom’ platform for self-driving cars
The Mercedes Driverless Truck

**It can…**
Allow drivers text/talk/watch Youtube
Detect vehicles in front
Steer through curves/turns
Start count-down when driver needs to steer

**It can’t…**
Overtake slower cars
Change lanes
Exit highways
Park
Work in cities
Work on roads with insufficient markings
Estimate of when driverless cars will come to market

2016
2018
Audi
Google

2020
Nissan
Ford
Toyota

2021
Tesla

2024
Jaguar
Land-Rover

2025
Continental
Daimer
US Secretary of
Transportation

2028
Insurance
Information
Institute

2030
Uber

http://www.driverless-future.com/?page_id=384
UK Connected Intelligent Transport Environment (CITE)

• Eight projects have been awarded £20 million in funding to develop the next generation of autonomous vehicles.

• Jaguar and Land Rover is investing in a 41 mile 'living laboratory' project on UK roads to develop new Connected and Autonomous Vehicle (CAV) technologies.

• The test corridor includes 41 miles of roads around Coventry and Solihull and be used to evaluate new systems in real-world driving conditions.
UK: 3 years to pave the way for introduction of AVs

£20m of government funding for “Introducing Driverless Cars to UK roads” initiative

Yielded three projects:

Milton Keynes & Coventry | Autodrive Project
Lutz pods drive in pedestrian zones
Max speed 15 mph
Electronic AV

Greenwich | Gateway Project
Gateway shuttles
Electronic AV
Local tour with drop-off points

Bristol | Venturer Project
Venturer consortium will investigate congestion & safety
A Final Thought

Not everyone is quite so optimistic.

“We are still operating in an era when car makers are recalling millions of vehicles for the simplest of technology failures: ignition switches, floor mats and air bags”

– Robert Hartwig, Insurance Information Institute president, in speaking to The Wall Street Journal
Samsung Galaxy Note 7 – Beautiful…
Samsung Galaxy Note7 set to be recalled over fire risk
Data Science...is now the art of automation!

Big Data
What we know...

The rest...

- Big data brings new challenges
- Consideration should be given to the well known “5V” definition:
  - ✓ Volume
  - ✓ Variety
  - ✓ Velocity
  - ✓ Veracity
  - ✓ Value
What are we waiting for...

• 2016: Rolls-Royce to use Microsoft IoT and analytics tools for jet engine predictive maintenance

• They have been using big data for a while to analyse the failure of engines

• Not just about collecting a vast amount of data but having the foresight to use intelligent data
### Opportunities and Threats

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<th>Description</th>
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<tr>
<td>Technological advances in data analytics and storage</td>
<td>Data storage uncontrolled and too expensive</td>
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<td>combined with a significant increase in available data</td>
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<td>A sea change in competitive advantage</td>
<td>New entrants seize competitive advantage</td>
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<tr>
<td>Improvement in segment analysis will considerably</td>
<td>Current analysis subject to anti selection by new</td>
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<tr>
<td>change underwriting and pricing with more focussed</td>
<td>smarter methods</td>
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<td>marketing and retention of customers</td>
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<td>Distribution could evolve with a concentration on</td>
<td>New entrants dominate distribution</td>
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<tr>
<td>customer needs rather the product</td>
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<tr>
<td>Claims management</td>
<td>New entrants exploit faster and gain expense advantage</td>
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Predictive Analytics

Two classes of how this could help:

- Med Mal
- Marine Hull
Challenges

- Challenges for actuaries
  - Predictive modelling and advanced analytics – get coding
  - Training in advanced statistics and programming skills
  - Alternative resources: Masters and PhDs from statistics, computer sciences as well as economics and financial mathematics already equipped with the requisite knowledge

...Think of it as an opportunity.
“The pessimist sees difficulty in every opportunity. The optimist sees the opportunity in every difficulty.”

– Winston Churchill
“The pessimist sees difficulty in every opportunity. The actuary sees the opportunity in every difficulty.”

Veekash Badal

Milliman
September 2018
Questions

Veekash Badal & Ger Bradley Milliman