Swiss Re Institute (SRI)

2017

Introduction and Focus
The Swiss Re Institute (SRI) is an important differentiating component of Swiss Re’s strategy

Goals of the Swiss Re Institute:
• Leverage and steer R&D activities across Swiss Re’s organisation
• Deploy knowledge to concrete client opportunities
• Position Swiss Re as a thought leader
• Serve as an access point for clients, external partners, and other stakeholders
• Collect and curate a wide array of data
External perspectives

**SRI** brings together powerful **internal expertise with world class external partners** to create impactful insights on issues that matter in our world.

We accomplish this objective through **conferences, research, client executive programs** and **strategic partnerships** in support of Swiss Re’s strategy.

Our strategic focus includes **High Growth Markets** and **Technology**.
We are well known for our sigma research studies but engage also with external institutions to create impactful insight.

- Financing resilient energy infrastructures with the World Energy Council
- SEARCH collaboration with Harvard - Health risk factors analysis in HGM
- Willingness-to-Pay study for L&H insurance in China
- Mind the risk. A global ranking of cities under threat from natural disasters
- Cyber risk transfer market with HSG University of St. Gallen;
- Willingness-to-Pay study for L&H insurance in India
- Diabetes and CVD trend projections in China/India
- Flood Risk Argentina with Reinsurance Casualty Underwriting Latin America
We manage a strategic selection of personal and institutional expert networks and partnerships.

Most prominently, SRI manages the Advisors to Swiss Re.

Some strategic partnerships we maintain:
- Peking University
- International St. Gallen Symposium
- ETH Zurich Risk Center/Singapore SEC
- Harvard School of Public Health
- Zurich Centre for Finance & Insurance
- Oxford Centre for Socio-Legal Studies
- Munich Risk and Insurance Centre
- NUS Business Analytics Centre (Singapore)
- London School of Economics
Conferences

We design and develop content for corporate & industry research events in target markets

SRI identifies and manages external speakers from our extensive global network

Some of our recent conferences

- Next Generation Insurance Customer: Keeping pace with the digital consumer
- Health monitoring: Making sense of sensors
- Insurance in the Age of Drones
- C-ROSS FORUM: The upcoming regulatory change in China - the Second Generation Solvency Regime
Executive Programmes

SRI develops concepts and content for tailor-made executive programmes for clients and strategic partners.

We differentiate Swiss Re in the market and give leaders of clients access to knowledge they can obtain only through Swiss Re.

Recent programmes

- High Growth Markets (HGM) – Swiss Re Class of Excellence
- Insurance Management Simulation, Dali China
- Government Programs for Heilongjiang, Guangdong and Indonesia
Drivers of R&D agenda

• Building a risk knowledge library (staying abreast of market trends)
• Closing the protection gap on existing risk pools
• Finding new risk pools (what makes a risk pool insurable in practice?)
• Improving underwriting quality
• Improving the efficiency of the insurance value chain
• Supporting capital allocation to target liability portfolios
• Supporting strategic asset allocation
• Supporting strategy development
• Supporting risk management

Data & communication are important focuses as SRI executes on its agenda.
We have created a strong asset base of risk knowledge

Selected R&D investments over past 25 years (man-years)

- Building knowledge and competence through R&D has been our focus for a long time
- We have built up an enormous amount of value
- Significant competitive advantage virtually impossible to replicate within a reasonable time frame

We have invested over 3,200 man-years in R&D activities over the past 25 years

Note: Estimates based on the cost of accumulated FTEs for the specific areas over the years of existence
SRI Focus: Data
Drivers of value in the technology space

1990s
Intellectual Property

2000s
Networks

2010s
Data (collected & curated)
Capacity opportunities and challenges

• Moore’s law: Processing speed doubles every 18 months—*reaching physical limit*

• Kryder’s law: Storage capacity doubles every 12 months—*actual increase may be more like 15% per year— but likely to accelerate*

• Nielsen’s law: Bandwidth doubles every 21 months

*Collecting, curating, and coordinating data have replaced processing data as the binding constraints on evidence-based R & D efforts.*

*Open-source algorithms are relatively less valuable than data access & insight.*
Technology is affecting the insurance value chain

Virtualisation of the value chain

**PHYSICAL VALUE CHAIN**

- Product design/development
- Pricing/underwriting
- Marketing
- Distribution
- Policy/claims management

**DIGITALISATION**

- Robotics/Telematics/Internet-of-things (IoT)/wearables offer usage-based insurance opportunities
- Emerging risks such as cyber
- Social-network insurance groups
- Use of Big Data/analytics to identify new claims drivers
- Predictive/Prescriptive underwriting techniques
- Artificial intelligence (AI) to hone risk assessment
- Position insurance as more customer-centric
- Increase frequency of interaction
- Use Big Data/analytics for micro market segmentation and personalisation
- Customers prefer multi-touch, omni-channel interaction
- Smart devices
- Less face-to-face engagement
- Scope for gains in efficiency in offline channels
- AI-driven Robo-advisors
- Use of Big Data to reduce fraud and improve claims processes
- Self-service apps to improve customer post-sales experience
- Blockchain applications for smart contracts and claims administration

**VIRTUAL VALUE CHAIN**

**INFORMATION CAPTURE AND ANALYSIS**

Source: Swiss Re Institute.
Marrying finance and technology

• Fintech

• Insurtech

• Regtech [Both compliance and supervision]

• Robotic process automation (RPA) [Processtech?]

*Trust, brand, & regulations continue to hinder small startups.*

*Data access, management, & understanding continue to be critical.*
Trends in data, models, and decision support

• Data (particularly unstructured) is available in ever increasing quantities
• Data regulation has become much more complicated
• Data are plentiful, but noisy—often noise characteristics are misunderstood
• Non-linear, self-reinforcing processes under more scrutiny
• Averages less important than distributions
• Behavioral studies have become a focus, feature, and a fear-monger
• Model validation is different & difficult in a machine-intelligence-based world

Thus...

Inference to the best explanation can be hard to implement in practice
Data is the new “oil”— extract, refine, distribute

• Collect
  – Structured: Time series
  – Unstructured: Text, audio, and video
  – Moore’s law gives way to Kryder’s & Simpson’s laws as binding constraint
  – Key is finding novel data

• Curate
  – Manage heterogeneous formats
  – Address noisy & missing data
  – Key is ensuring data is reliably retrievable in the future

• Contemplate
  – Beware quantifauxcation (assigning a meaningless number, then pretending that since it’s quantitative, it’s meaningful—Stark [2015])
  – Address cognitive biases
  – Better to be approximately correct than precisely wrong

Final—and crucial—step is communication
SRI Focus: Communication
When and how are individuals persuaded enough to change their minds and act?

• Science communication requires a particular set of skills

• Embed in a narrative

• Address cognitive biases upfront

• Find “goldilocks” conclusions (not too obvious and not too obscure)

• Inject energy into logic & evidence

What is the “so what” or the “therefore”?
Insight pyramid

- Actionable insight
- Visualization
- Algorithmic processing
- Data wrangling & curation (collecting, joining, cleaning, formatting, loading -- ETL)
Cognitive biases

• **False dichotomy**: Presenting two choices such that it seems they are the only possibilities.
  - Simple vs. complex model
  - Use no models vs. use only one model
  - “All models are wrong, but some are useful.” – Box

• **Perfect as the enemy of the good (or good enough)**

• **Red herrings and missing forest for the trees**

• **Confirmation bias (Affect heuristic)**: Analyst or executive has “fallen in love with” a particular output so that they minimize model problems and exaggerate model strengths

• **Sunk-cost fallacy**: A particular model output has driven strategy/investment
How to persuade an individual to make a decision

<table>
<thead>
<tr>
<th>Agree on values</th>
<th>Disagree on values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree on facts</td>
<td>Computational decision</td>
</tr>
<tr>
<td>Disagree on facts</td>
<td>Experiment</td>
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</tbody>
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Compelling communication addresses working memory

- Working memory
  - Operates over a few seconds and stores information temporarily
  - Manipulates & focuses attention
  - Resists distractions
  - Guides decision-making
- Can only process 5 to 9 “chunks” of information within working memory at any given moment in time (Miller, 1955)
- Deviating from expectations typically causes the listener to disengage
- Working memory dis-fluently “chunks” instead of focusing on what matters
- Working memory “calls” long-term memory to assist in processing; if nothing is there, cognitive flow is broken—result is likely disengagement

*Education & explanation over a period of time is essential to build up long-term memory*
Communicating scientific uncertainty is critical to moving listeners to action

• Emphasize reproducibility (preproducibility—document enough to facilitate credible reproduction of output, Stark [2015])
• Explain signal and noise in specific terms
• Communicate how model disentangles signal and noise
• Identify and root out data biases
• Educate on error bars and confidence intervals

*Sampling error does not necessarily equal “uncertainty” in terms of implications of model output; i.e., strength of results should lead to decisions/actions.*
Communicating a theory/model’s adequacy

1. **Accuracy** *(out-of-sample confirmation of estimated probability distribution and contributions of underlying components to that distribution)*

2. **Consistency** *(both internal and external)*

3. **Broadness in scope** *(granularity and comprehensiveness)*

4. **Simplicity** *(complex enough to capture dynamics, but simple enough to be diagnosed and communicated to a quantitatively-informed business head)*

5. **Fruitfulness** *(output substantively contributes to impactful decisions)*

Depending on the theory under evaluation, criteria may contradict each other so a relative weighting may be needed i.e., given a particular circumstance, some criteria are more important than others. Kuhn (1977)

**Timeliness** is typically added to the evaluation process— a successful theory/model/system that cannot provide timely output is often useless in practice.
Key points for compelling communication

• Make as simple as possible/necessary— but no simpler!
• Frame within a narrative and contextualize (across time & across cohorts)
• Address biases: Highlight data selection concerns and explain assumptions
• Communicate “goldilocks” content
• Avoid “quantifauxcation”
• Use transparency in model estimation process to spark questions & debate
• Compare output from multiple models (when possible)
• Visualize data— encourage interactive diagnostics and drill-down
• Emphasize actionable insight

Build on understanding: Descriptive, cognitive, and prescriptive

Move from analysis (breaking into components) to synthesis (re-assembling with insight)
SRI value proposition

Influential thought leadership

We combine our powerful expertise together with world-class research partners to create impactful insights on issues that matter in our world.

Our industry-leading research enables risk-focused decision-making and identifies new strategic opportunities for Swiss Re and our clients.
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