

IUMI 2017 TOKYO



Data Analytics and Blockchain An Insurance Perspective

Dr. Ermir Qeli
Head Analytics Modelling & Prototyping
Swiss Re

www.swissre.com

ermir_qeli@swissre.com

<https://ch.linkedin.com/in/ermirqeli>



2017 TOKYO
September 17-20

Content



- Technology driven transformation
 - Short overview
 - Inspirational examples
 - Closing remarks

The Digital Transformation will impact the insurance industry in three key ways

The Digital Transformation

Improvement of **sensing** and **analytics** capabilities



Explosion of **data volume**



Substantial Increase in **computational power**



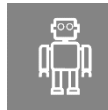
New **digital platforms** and Market Places



Rapid change in **consumer behavior**



Agile digital native **primary attackers**



Technological Shift



Behavioral Shift

The Insurance Transformation



Change Risk Pools

- new emerging risks
- superior insights from new and existing data



Transform Value Chain

- automate existing repetitive processes
- automate basic knowledge work



Disrupt Industry Structure

- new ways to do business
- new ecosystems
- changing roles
- new market players

Impacts fall into two main categories which form a strong foundation for the digital transformation of the (re)insurance industry.



Evolution

Leaner, Better, Faster

Examples:

- automate **Text Analytics** & Data Capture
e.g. for underwriting & claims case processing
- **Advanced Search**, *e.g. «Google» type*
- **Robotics** Automation
- **Predictive** Modelling,
e.g. on high-cost claims & health development



Disruption

New, Different, Revolutionary

Examples:

- **Wearables** – *fitness and medical grade*
- **IoT** (Internet of Things) – *sensor data ecosystems*
- **Cognitive** & **NLP** (Natural Language Processing)
- End-to-end fully automated **parametric insurance**
- **Blockchain** (ledger, smart contracts, sensitive data)
- Digital **Assistant** – *Siri for Insurance?*

Analytics Capabilities



Big Data
Methods



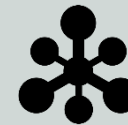
Text Analytics



Machine
Learning



Predictive
Modelling



Visual
Analytics



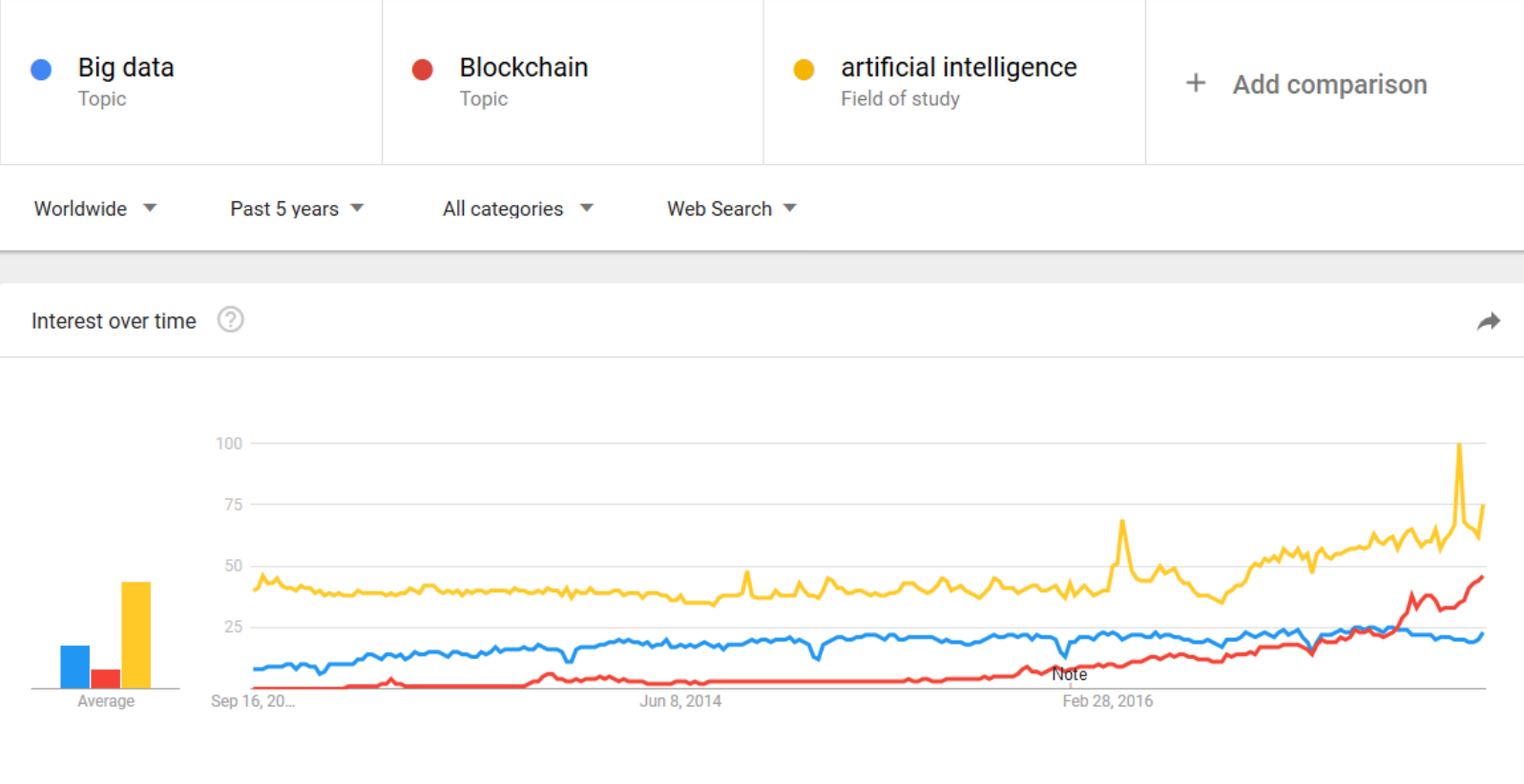
Rapid
Prototyping

Content



- Technology driven transformation
- Short overview
- Inspirational examples
- Closing remarks

Evolution of the interest on Big Data, Blockchain and Artificial Intelligence over the last five years



[Source: Google Trends, September 2017]

Technical capabilities with the potential to generate tangible business impact along insurance the value chain

Big Data Methods



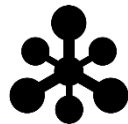
Infrastructure as well as the methodologies and **algorithms** for processing **large data sets**, including **sensor data**, **unstructured** textual information, user behavior data with the ultimate aim of answering various **business questions**

Machine Learning



Algorithms and methods that learn from data with the final aim of making better **predictions**. Applications range from **search engines** (Google), **social network analysis** (Facebook), **recommender systems** (Netflix) and (dynamic) **pricing** (AirBnB, Uber).

Blockchain



Open and **distributed ledger** that can record **transactions** between two **parties** efficiently in a **verifiable** and **permanent way** [Iansiti and Lakhani, HBR, January 2017]. Applications range from enabling transactions between **untrusted** parties, **smart contracts**, exchange of **sensitive data** and obviously **digital currencies**.

Blockchain in a nutshell

What is Blockchain	Related Concepts
<p>Open and distributed ledger that can record transactions between two parties efficiently in a verifiable and permanent way <small>[Iansiti and Lakhani, HBR, January 2017].</small></p> <p>Applications range from enabling transactions between untrusted parties, smart contracts, exchange of sensitive data and obviously digital currencies.</p>	<ul style="list-style-type: none"> • Decentralized consensus is the basis of the underlying protocol that governs Blockchain • Blockchain behaves like a database where part of the information is completely transparent and public and where all interactions are verifiable by cryptography • Smart contracts and smart properties as building blocks for decentralized applications – smart contracts contain little programs associated with a monetary value, which is released automatically upon fulfillment of the contract • Trusted computing without central organizations • Proof of work system as the right to participate in the Blockchain system. • Types of Blockchain: public, consortium or private

[Source: www.oreilly.com/ideas/understanding-the-blockchain]

Potential areas of application of Blockchain within re/insurance

Applications

Financial Transactions



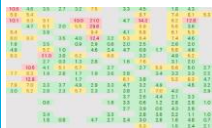
Lowering **transaction costs** in conducting financial transactions between trusted parties – respectively **simplify** substantially such transactions between **untrusted parties** (no intermediaries).

Exchange of Sensitive Data



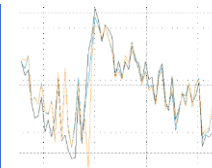
Exchanging **sensitive data** – especially between **untrusted** parties – could become much easier through Blockchain with applications in Healthcare (exchange of health records), IoT for sensor data as well as traditional **claims data** between various parties

Parametric Insurance



Lowering **transaction costs** for parametric insurance products and making them available for a broader customer base. Blockchain could potentially provide a common denominator for **heterogeneous** parametric products – and together with **Machine Learning** change the way these products are offered.

Microinsurance



Providing **low-cost, index-based** crop insurance for policy holders (in emerging markets). **Smart contracts** are to allow for automated translation of index data to the right to claim, and for the automated and transparent execution of insurance processes

Content



- Technology driven transformation
- Introduction to smart analytics
- Inspirational Examples
- Closing remarks



Stork – Lean Flight Delay Insurance

Creating new delay insurance products and services using worldwide flight data

Opportunity

- Cheap insurance covering short delays
- Automatic data driven claim payout
- Scalable platform to offer parametric insurance products

Approach

- A strategic partnership with a data provider, FlightStats was set up, which gave us exclusive access to data on all passenger flights worldwide.
- A tailor-made machine learning model was set up to capture the key drivers of each route and project them forward into the future.
- The final model is being deployed in a cloud environment, enabling fast integration with the various sales channels.

Benefit

Thanks to dynamic predictive analytics we can capture the precise risk of a specific flight being delayed. This is the basis for highly competitive pricing and an innovative product with the potential to disrupt the current market. The core architecture can be re-used for other similar products, creating new growth opportunities.

1 hr

delays could now be insured cost-effectively.



Agriculture – Digital Tools

How can we leverage satellite imagery for large scale insurance of small risks through parametric products

Opportunity

- Identifying **automatically** areas that might require insurance coverage
- Closing the Protection Gap by designing new **Parametric Products** to cover uninsured Agro risks

Approach

- Establishing the infrastructure to be able to process **large scale image processing** capabilities
- Tailor-made **machine learning models** to perform
 - parcel extraction
 - parcel classification
 - crop types and health
 - crop yield prediction

Benefit

- Damage assessment and risk mitigation
- **Fraud Detection**
- Crop yield and health monitoring
- **Parametric products** for AGRO insurance

A little teaser about marine hull ...

Motor Insurance

Sum Insured: low to medium

Number of rating factors: depending on the market. For mature markets >20 rating factors

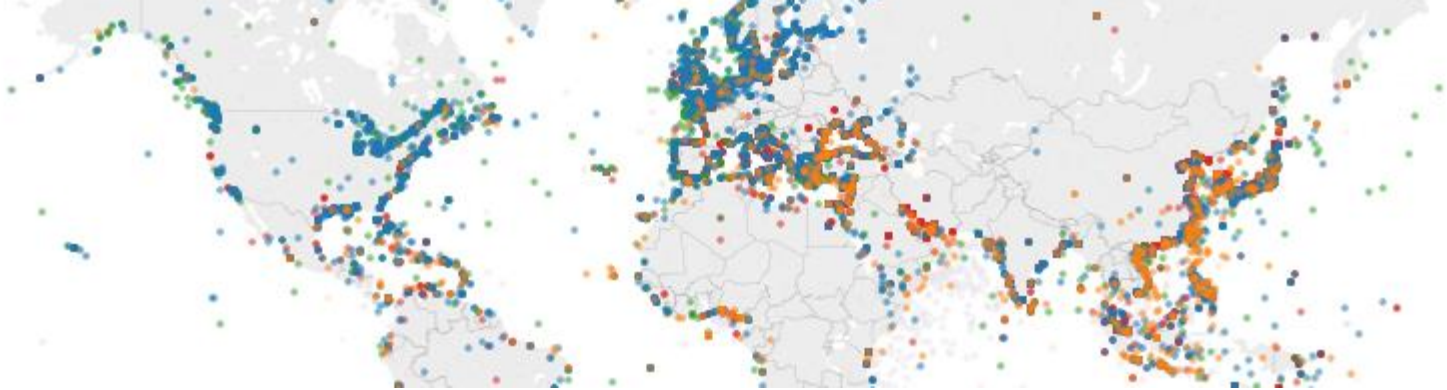
Data exchange: Market dependent – quite advanced in specific markets

Hull Insurance

Sum Insured: medium to very high

Number of rating factors: half a dozen

Data exchange: small



Marine Hull – Insights and Pricing

How can we turn Marine Hull into a quantified business with an end-to-end business solution for efficiency and profitability

Opportunity

- :
- **Portfolio Steering** to generate insights about markets and adjust our portfolio accordingly
 - **Vessel Intelligence** to provide automated underwriting support
 - **Improved costing** based on a broader data set of vessel exposure information, claims data and advanced machine learning

Approach

- A **partnership with an external data provider**, Clarksons was set up, which gave us access to data on all vessels worldwide.
- A tailor-made **machine learning model** is being built to capture the key drivers for all different hull incident categories including large losses
- **State of the art** visualization techniques to analyze better our portfolio, and benchmark our performance against the market

Benefit

- :
- Develop analytics capabilities to provide **client and risk insights** that support the selection of potential clients as well as enhancement for the portfolio steering capabilities
 - Adapt the **current costing engine** to reflect the information provided by the new data sources (vessel & ownership, claims, up to data vessel valuation data)

Content



- Technology driven transformation
- Introduction to smart analytics
- Inspirational Examples
- Closing remarks

Some closing remarks on usage of Data Analytics and Blockchain in insurance

- **Data Analytics** and **Machine Learning** are there to stay – in symbiosis with the actuarial modelling efforts
- Potential applications include:
 - **Customer targeting** with the aim of selecting the right risks
 - **Mining** the text of **submission** documents
 - **Ranking submissions** based on the propensity to bind or profitability
 - **Dynamic pricing** of single risks
 - Identify potential fraudulent claims
 - Estimate **claims severity** with incomplete information
 - Enhance natural catastrophe models with non-traditional data sources
 - Augment existing pricing models with **additional data sources**

- **Blockchain is not the solution to every problem.** Most of the underlying technologies have been around for a while. Insurance might profit from this **foundational technology** in many areas:
 - Lowering transactional costs for **parametric insurance** or micro-insurance
 - **Smart contracts** – implementation of digital marketplaces for placing risk
 - **Risk assessment** (e.g. tracking provenance of products/parts in supply chains)
- A lot of **open questions** still exist
 - Storing/retrieving data at scale in Blockchain
 - Doing Data Analytics on data/transactions stored in Blockchain
 - Global platforms beyond cryptocurrencies yet to be established

Innovation in this space is continuing at high speed – from big players in tech space, open source community as well as startups.

Legal notice

©2017 Swiss Re. All rights reserved. You are not permitted to create any modifications or derivative works of this presentation or to use it for commercial or other public purposes without the prior written permission of Swiss Re.

The information and opinions contained in the presentation are provided as at the date of the presentation and are subject to change without notice. Although the information used was taken from reliable sources, Swiss Re does not accept any responsibility for the accuracy or comprehensiveness of the details given. All liability for the accuracy and completeness thereof or for any damage or loss resulting from the use of the information contained in this presentation is expressly excluded. Under no circumstances shall Swiss Re or its Group companies be liable for any financial or consequential loss relating to this presentation.