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Innovation @ Munich Re

Bernstein Investor Call

16 June 2016

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Munich Re is well positioned to manage the current market environment and drive industry innovation

Traditional reinsurance:
Tailor-made solutions and cycle management

- Munich Re in excellent position to successfully manage the soft cycle due to:
 - Preferential client access
 - Leading risk know-how
 - Superior diversification
 - Stringent cycle management

Risk Solutions generating strong earnings

- Continuous growth in expertise-driven specialty & niche business
- Business largely detached from reinsurance cycle
- Strong top and bottom-line contribution:
 - €5bn premium volume
 - High profitability

Innovations

- Active development of business opportunities in close collaboration with clients and corporate partners
- Tapping new profit pools by expanding existing market boundaries with innovative products and services

Major innovation trends impact the industry and create opportunities and challenges for (re-)insurers ...

Major Innovation Trends in (Re-)Insurance

Digitalization and new technologies (e.g. sensors) with impact on the risk landscape

Large amounts of **previously not available data** and **sophisticated analysis methods**

Changing customer expectations and behavior¹ regarding product design, services and (digital) sales

Digital market entrants (e.g. large internet players, fin-techs) establishing new distribution channels

Opportunities and Challenges for (Re-)Insurers

- + New exposures and risks (e.g. cyber, business interruption, reputation, connected cars, sharing assets)
- + Bundle products linking insurance with prevention services
- Reduced risks/ loss frequency

- + Improved risk selection and pricing/ rating
- + Long-term competitive advantage for data owners
- Danger of anti-selection if data/ methods not yet mastered

- + Efficient customer acquisition and improved retention through new marketing and sales channels
- New capabilities required to compete with current set-up

- + Opportunities for Corporate Partnering
- Risk of disruption/ disintermediation

+ Opportunities - Challenges

¹ Consumers and commercials.

... Munich Re is well positioned to successfully adapt its business model to market changes

Major Innovation Trends in (Re-)Insurance

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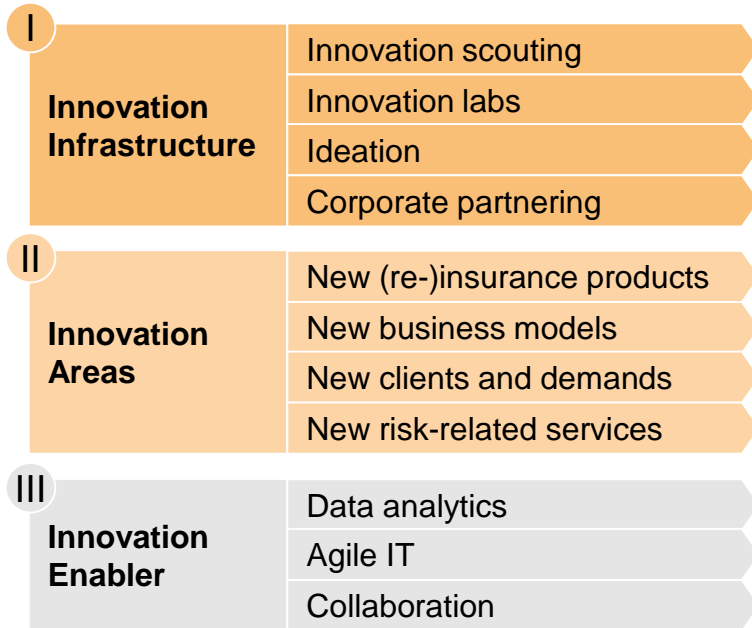
Digital market entrants establishing new distribution channels and opening opportunities for collaboration

Why Munich Re is Well Positioned

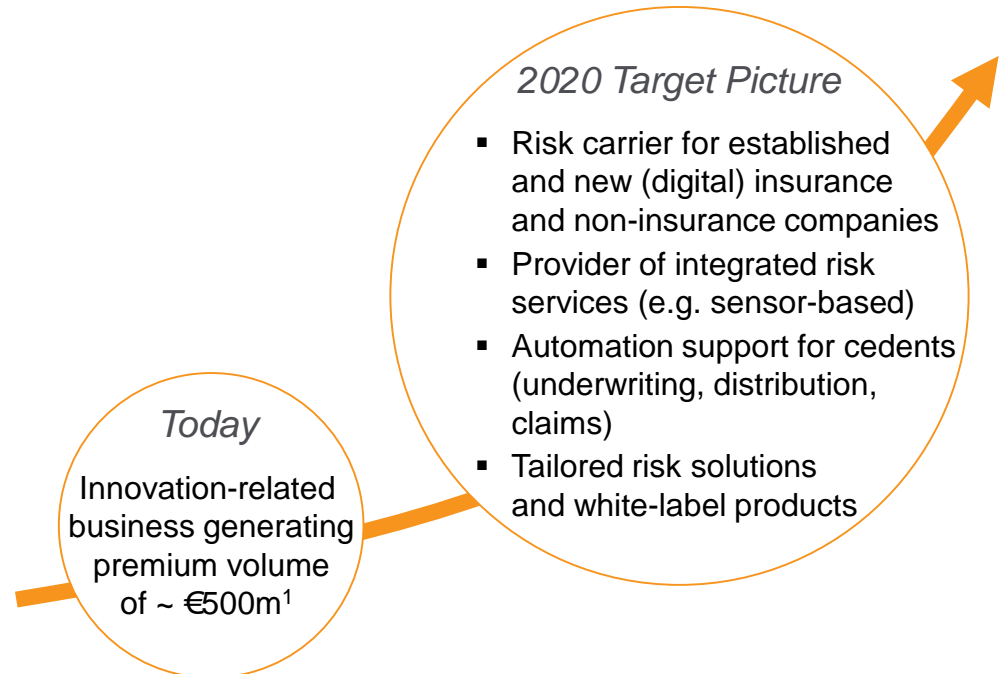
- ✓ Leading risk know-how in all areas of (re-)insurance
- ✓ Experience with bundled insurance offering and risk prevention services (e.g. via HSB)
- ✓ Established partnerships with non-insurance companies
- ✓ State-of-the-art data analytics platform
- ✓ Global data pool (integrating internal and external data)
- ✓ Central and decentral in-house analytics experts
- ✓ Direct customer access via Risk Solutions and ERGO
- ✓ Global expertise in commercial insurance
- ✓ Primary insurance platform can be leveraged for developing/testing innovative reinsurance solutions for clients
- ✓ Leading global insurance know-how
- ✓ No conflict of interest with existing sales channels
- ✓ Global business model facilitates scale-up

Munich Re fosters innovation throughout the global organization – strong focus on tangible business impact

Significant Focus on Innovation ...

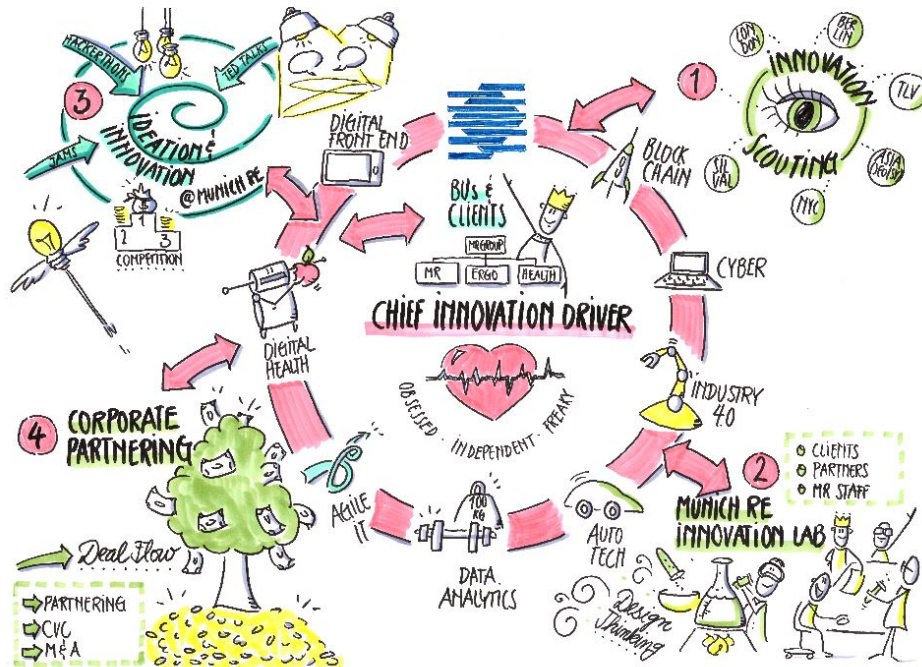


... with Significant Business Impact Already Today



Munich Re builds an infrastructure to support innovation in the insurance space and react to new developments

Overview



Strategic Rationale and Key Components

- **Objectives for innovation infrastructure**
 - Drive innovation in the insurance space
 - Quickly react to new developments
- **Key components**
 - ① **Innovation scouts** establishing networks in innovation hubs worldwide
 - ② **Innovation labs** providing an environment for fast development and testing of ideas
 - ③ **Ideation events and trainings** to develop ideas using new methods
 - ④ **Corporate partnering** to establish partnerships with relevant players
- **Chief innovation driver and central innovation unit** to steer activities and manage dedicated innovation budget

Many innovative projects already create tangible impact – explorative projects prepare the next wave of innovation

Evolving Innovation (short-term impact)

New (re-) insurance products

- Cyber solutions for broad range of risks
- Technical performance guarantees
- Non-damage BI solutions

New business models

- Automated underwriting platforms / vers.diagnose
- White-labelling solutions for primary insurers, e.g. “US Homeowners Inland Flood Coverage”

New clients and demands

- Private and public sector epidemic/ pandemic risk solutions
- Alternative Capital solutions for peak risks addressing institutional investors (e.g. Eden Re)

New risk-related services

- Data analytics-enabled early loss detection service
- Drones and satellites-enabled claims services
- Primary consulting services

Exploration (mid-term impact expected)

- Further extending the borders of insurability by leveraging big data and new technologies
- Adopting existing products to new trends, e.g. autotech/ connected cars or sharing economy
- Providing automated underwriting solutions in Life and Non-life for cedents to support their digital customer frontend at point-of-sale
- Partnering with non-insurance players to provide embedded insurance products together with other products/ services at point-of-need
- Leveraging data analytics¹ to provide predictive/ preventive services
- Leveraging technology (e.g. sensors) to provide integrated risk mitigation services and insurance

¹ E.g. fuzzy matching, text mining, natural language processing.

Cyber (re-)insurance: Munich Re with leading-edge expertise and strong market presence to profitably exploit segment

Reinsurance (RI):

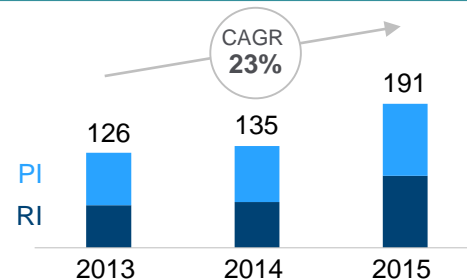
First mover and global market leader

- Dynamic growth through joint projects with cedents (including white label products) in developing markets
- Steady increase of profitable cyber portfolios in the US
- Continuous update of accumulation models (e.g. virus, cloud, critical infrastructure)

Primary insurance (PI): Specialised single-risk taker for a broad range of cyber risks

- Hartford Steam Boiler
Established player in US market for cyber liability/privacy covers for SMEs and individuals. Introducing HSB Total Cyber for mid-size companies
- Corporate Insurance Partner
Traditional and non-traditional cyber solutions for large corporate clients. Cooperation with IT providers for holistic cyber protection

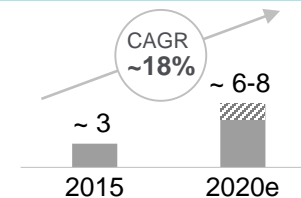
Munich Re cyber portfolio¹ \$m



Munich Re well positioned

- Bundling of cyber expertise in dedicated cyber unit
- Market differentiation through talent acquisition
- Systematic build up of cyber exposure, loss and threat database
- Cyber accumulation strategy based on inside-out and outside-in data, with probabilistic models
- Partnering with cyber insurance market pioneer Beazley to provide cyber protection for the digital assets of the world's largest companies

Cyber insurance market² \$bn



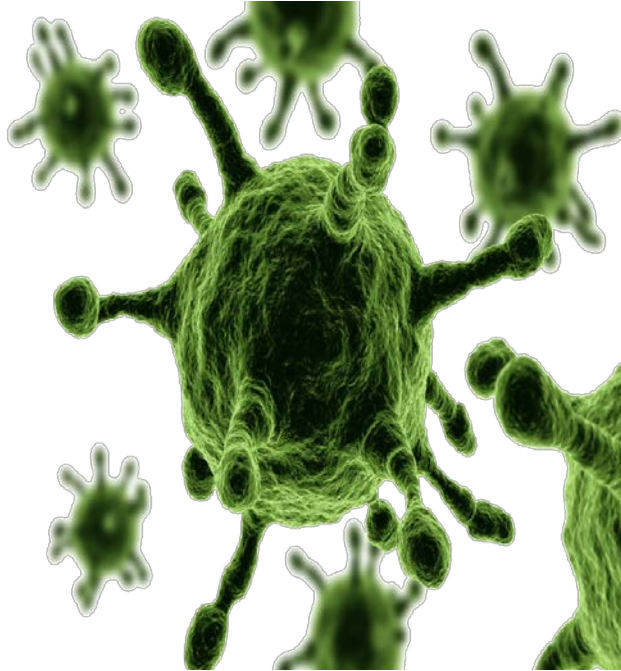
Securing profitable growth through diversification, innovation and accumulation control

¹ Premium development.

² Estimates based on different external sources (Marsh & McLennan, Barbican Insurance, Allianz).

Epidemic risk solutions: MR develops covers for public and private clients – Pandemic Emergency Facility just announced

Epidemic Risk Business



Munich Re Approach

- Objective is the **development of products covering losses triggered by epidemic events** – sustainable approach by actively managing pandemic accumulation exposure
- **Partnership with Silicon Valley based Metabiota** extends MR's toolbox by broadening historical database and monitoring breach of new trigger definitions

Achievements and Outlook

- Mandated by the World Bank, Munich Re (jointly with Swiss Re) comprehensively supports the **Pandemic Emergency Financing Facility** that is designed to quickly provide \$500m after an outbreak
- **Discussions with private sector clients and first pilot cases** show significant interest (cedents, hotels, hospitals, airlines, etc.)

Automated underwriting platforms: Munich Re has market tested solutions for life insurance in place

Munich Re Automation Solution

- **Automated underwriting** of life insurance policies for every point-of-sale (multi-channel)
- **Benefit for Munich Re's clients:**
 - Unrivalled risk selection and pricing
 - Reduction of administrative costs through excellent interconnectivity
 - Agile and flexible easy-to-use tool
- **Outlook:**
 - Enhancement with big data and new analytics
 - Feasibility study on transferring automated underwriting services for non-life

vers.diagnose (New Broker Platform in Germany)

- **Automated point-of-sale underwriting platform** for life insurance and professional disability
- **Benefit for Munich Re's clients:**
 - Open architecture for insurance companies and distribution agents (platform)
 - Automated risk assessment and tariffing with Munich Re underwriting rules in the core
 - Consistent underwriting results
- **Outlook:**
 - Partnering with additional life insurers
 - Adding health and casualty/ non-life covers
 - Generating 3rd party traffic beyond traditional distribution (e.g. pure online players)

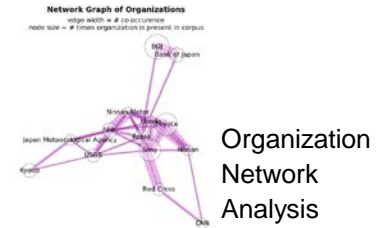
Munich Re built a state-of-the-art data analytics platform that enables experts globally to work on client use cases

Strategic Rationale

- Significant investments in **state-of-the-art global data infrastructure** and ...
- ... **build up of central and decentral data analytics experts** (access for trained experts in the business units globally to run analyses and create concrete use cases for clients) ...
- ... to **create value for cedents and Munich Re** using data analytics combined with risk management and industry expertise
 - Faster and improved claims experience
 - Design of new products
 - Preparation for data-driven business models

Core Functionalities and Examples

- **Global scope:** Self-service access and analytics for users in the whole Munich Re Group
- **Data integration:** Merging of different information sources
- **State-of-the-art analytics infrastructure:**
 - High performance power of SAP HANA, Hadoop, SAS HPA
 - Sophisticated data mining for advanced users (statistical models, machine/ deep learning, clustering, text mining)
- **Stringent compliance process**
- **Examples:**





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Thank you very much for your attention!

16 June 2016

Torsten Jeworrek, Marcus Winter

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Innovation scouting: Dedicated scouts build networks in relevant global hubs and establish partnerships

Munich Re Scouting Locations



 Access via reinsurance

 Access via primary insurance

Achievements

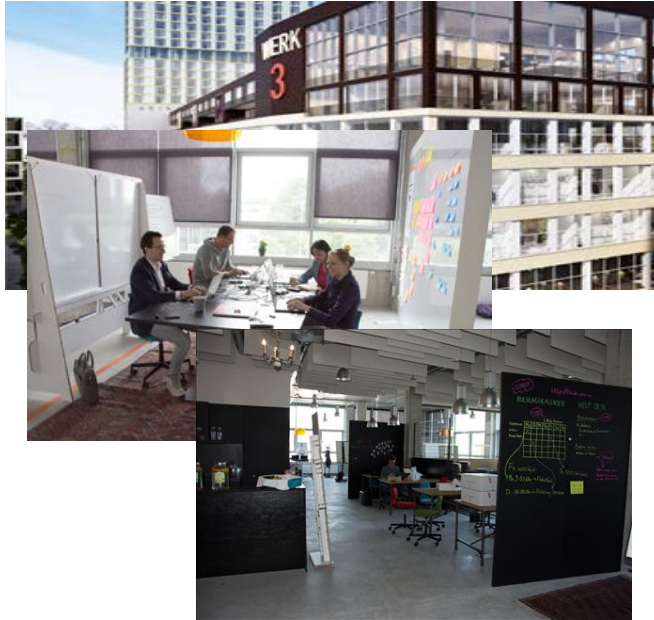
- First reinsurer with permanent presence in Silicon Valley
- Innovation scouts networking in relevant, global innovation centers
- Access to relevant innovation ecosystems through partnerships with well-known accelerators

Strategic Rationale

- Understand relevant start-up ecosystems to react to developments early on
- Establish contacts to insurance and technology startups to enter partnerships/ investments with relevant players
- Use insights to further evolve reinsurance business model and support cedents in innovation efforts

Munich Re innovation labs: Labs on three continents provide an environment for fast development and testing of ideas

Impressions “THE LAB” Munich



Achievements

- First Munich Re labs opened in Munich and Beijing, and New York opening in early summer 2016
- Teams already working on concrete go-to-market of ideas
- Partly co-creation projects with clients

Strategic Rationale

- Munich Re labs provide an environment for internal teams to develop and test ideas together with clients ...
- ... and drastically reduce time-to-market through lean methods, mentoring by experienced investors and entrepreneurs, and learning effects

Ideation: Events bringing together fin-tech players and co-creation workshops with clients support idea development

Recent Successful Events



Achievements

- Events together with partners over the last months bringing together Munich Re, primary insurers, other financial services players and fin-tech start-ups
- Successful co-creation workshops with clients and several trained Design Thinking facilitators in-house

Strategic Rationale

- Empower Munich Re staff to develop new products together with clients
- Create ideas for the insurance market and establish partnerships by bringing the ecosystem closer together
- Position Munich Re as relevant player in the fin-tech ecosystem

Munich Re drives innovation primarily in four innovation areas supported by data, agile IT, and collaboration as enablers

New (re-) insurance products

Munich Re strives to position itself as leading (re-)insurance product developer for new and emerging risks (in a digital world).

New business models

Munich Re ensures its competitiveness against existing and new players by further developing its business model.

New clients and demands

Munich Re brings in non-insurance players as business partners, and expands business relationships within existing customer groups.

New risk-related services

Munich Re offers risk-related services creating tangible value for clients.

Enabler

Data analytics

Proprietary and big data; data analytics

Agile IT

Fast and flexible IT, interconnectivity, digital customer experience, and process chains

Collaboration

Collaboration models with players within and beyond insurance eco-system

Technical performance guarantees and non-damage BI solutions: Munich Re is extending the border of insurability

Energy and Technology Technical Performance Guarantees

Technology / Solutions

- Solar energy ▪ LED
- Wind energy ▪ Satellites
- Fuel cells

Benefit for Munich Re's clients

- Financial security
- Credible long-term guarantee
- Technical endorsement by neutral party
- Rating improvement (reducing finance costs)
- Higher attractiveness for investors

Munich Re's achievements and outlook

- Long-term coverages at the cutting edge of technological developments
- Successful transactions in multiple industries
- Unique support of innovative companies and reinsurance clients in single-risk business
- Complex risks, difficult to copy for competition

Non-Damage Business Interruption

- Pharma NDBI: Protection of life science companies against business interruption triggered by regulatory actions

- Insurance protection for a significant risk in the value chain of life science companies
- Risk consulting to assess and limit the impact of regulatory interruptions

- Positive reception in Life Science sector – already several closed transactions
- Partnering with Marsh Risk Consulting
- Exploring NDBI solutions in other business fields

White-labelling: Munich Re developed a primary insurance solution addressing underinsurance in US inland flood risk

US Homeowners Inland Flood Coverage

Solutions

- Low limit personal lines flood insurance product for homeowners in low-to-moderate-hazard flood zones
- Incorporating location-specific hazard information and state-of-the-art flood modeling, resulting in “risk appropriate” pricing attractive to policyholders
- First product of its kind using model informed pricing for residential flood
- Complements the state-run National Flood Insurance Program (NFIP), which focuses on high-hazard zones

Benefit for Munich Re’s clients

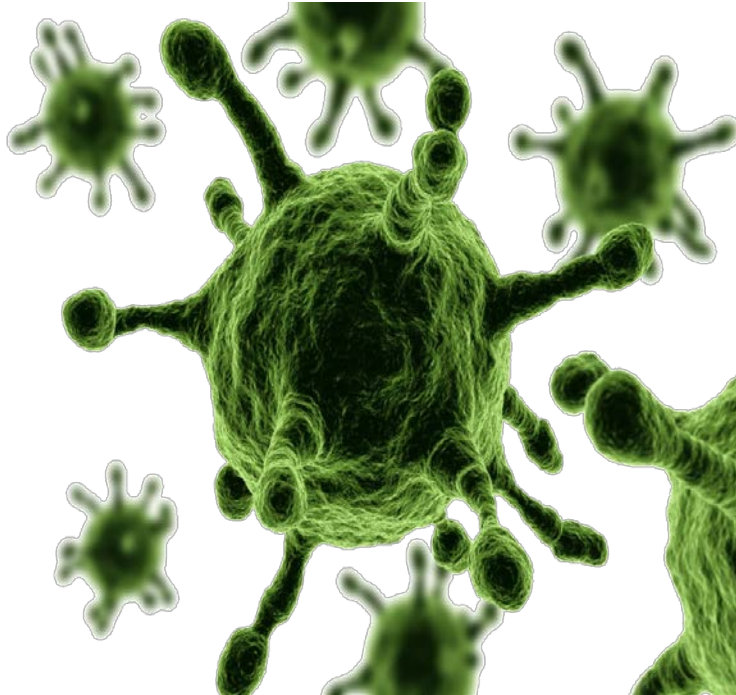
- Full implementation services for insurance carriers provided by Munich Re
- Lower administrative burden than stand-alone policy as endorsement policy can be attached and tailored to existing homeowners insurance policies

Munich Re’s achievements and outlook

- White-labelling solution for primary insurance carriers launched in August 2015 as first step into the private flood insurance marketplace
- Leveraging synergies of Munich Re America: HSB (product implementation) AMIG (claims management), Reinsurance Division (product development, reinsurance)
- Launch of further white-label flood products in preparation

Epidemic risk solutions: Munich Re partners with Metabiota to develop products covering losses from epidemic events

Epidemic Risk Business



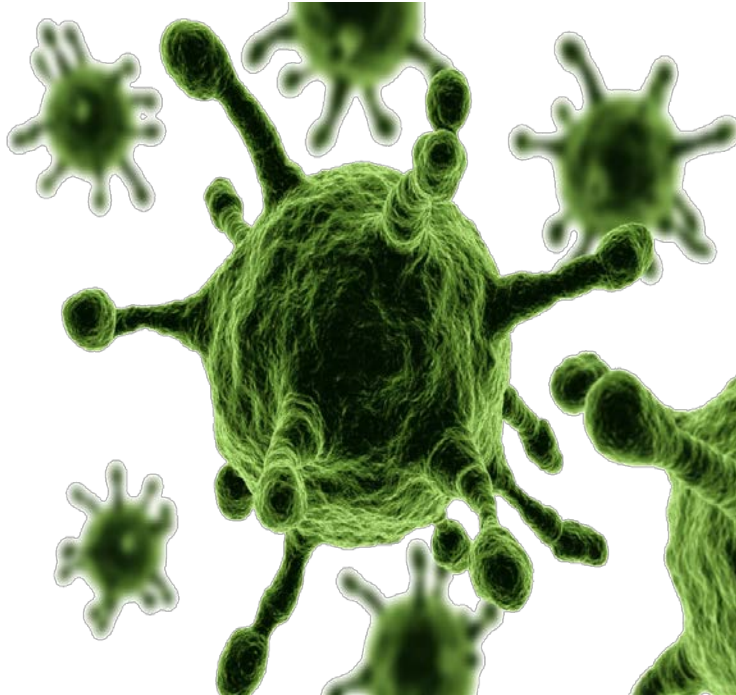
Munich Re Approach (Private Sector Clients)

- **Motivation:** Past epidemic outbreaks caused enormous revenue losses or significant expenses in many industries, e.g. tourism, travel, duty free, hospitals, labor-intensive production sites
- **Aim:** Development of products (incl. trigger definition, pricing and wording) for various lines of business covering losses triggered by epidemic events, e.g. revenue losses of hotels due to drop of bookings through MERS in South Korea in 2015
- **Partners:** Partnership with Metabiota, a company from Silicon Valley specialized in monitoring of outbreaks, enabling the monitoring of breach of new trigger definitions and extending MR's historical data base
- **Target Industries:**



Pandemic risk solutions: Munich Re mandated structurer for World Bank's first insurance facility against pandemic outbreaks

Pandemic Risk Business



World Bank's Pandemic Emergency Financing Facility (PEF)

- **Objective:**
 - Creating a more resilient world by providing an insurance facility which disburses funding swiftly in case of a disease outbreak to support coordinated containment efforts
 - Creating an insurance market for pandemic/ epidemic risk
- **Target beneficiaries:** Governments, multilateral agencies and non-governmental organizations in eligible lower to middle income countries
- **Core Functionalities:**
 - Fund release if parametric triggers are met, based on size, severity and spread of an outbreak (based on WHO data)
 - Cover is targeted at infectious diseases which are most likely to cause major outbreaks¹
- **Involved parties:** Munich Re and Swiss Re (Structuring, Placement), AIR (Modelling), IBRD (Counterparty), supported by WHO

¹ Including influenza, SARS, MERS, Ebola and Marburg.

Alternative Capital: Munich Re is utilising all ART channels as basis for risk management and an expanded product range

Munich Re Channels to Tap Alternative Capacity Sources

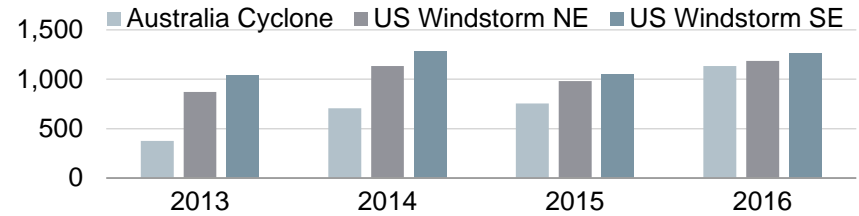
Eden Re Programme¹

- Sidecar was increased by \$70m to \$360m cat XL capacity in 2015
- Broader regional coverage including Australia cat XL book

Queen Street Programme

- Additional cat bonds of \$200m issued in 2015 (Queen Street X and XI)
- Broadened investor base for fully collateralised cover of Munich Re peak zone risk

Retrocession – Protection per nat cat Scenario² €m



Retrocession use reflects favourable market terms and strong Munich Re capital base

Enhanced Risk Management and Client Offerings on Basis of ART Channels

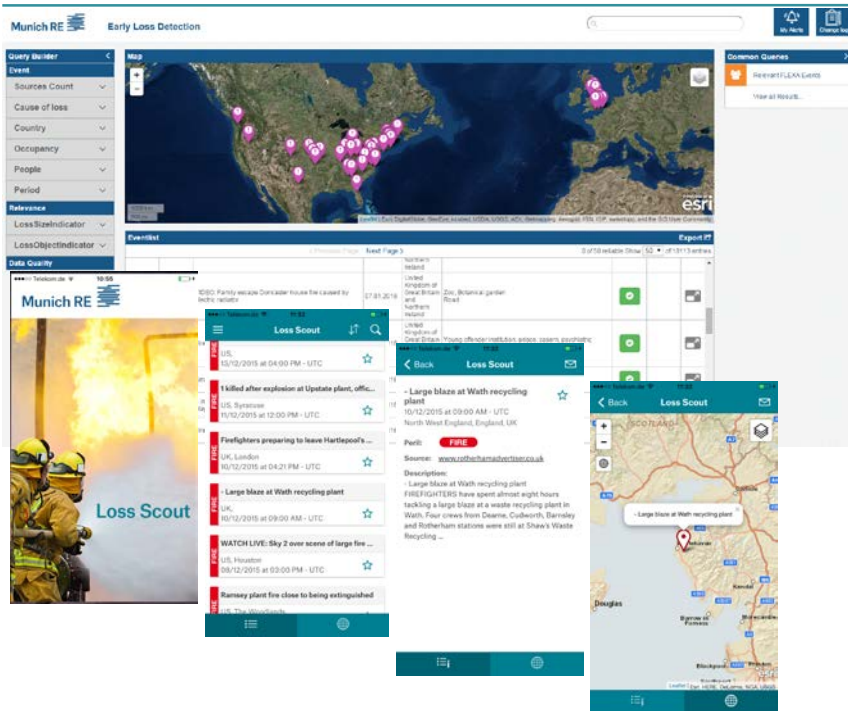
- Combining Munich Re’s peak risk competence and client access with institutional investors’ interest in reinsurance risk
- Taking advantage of new sources of capital for clients and Munich Re’s own book
- Munich Re ILS service for 3rd parties completes offer as customised stand-alone service or integrated in traditional solutions

¹ Munich Re structured and arranged transactions.

² Including indemnity retrocession, ILW/derivatives, risk swaps, cat bonds and the sidecars Eden Re I+II. Selection of main scenarios.

Early loss detection: Big data application enables faster and more effective claims management

Impressions Munich Re “Early Loss Detection”



Core Functionalities

- Text mining and geo referencing enables detection and severity assessment of losses
- Possible matching of risk data portfolio
- Steering of claims adjustment using data analytics

Benefits for Munich Re's Clients

- Transparency of losses independent of participation and risk assessment (efficient information gathering)
- Database on loss events enabling in-depth trend detection and improved tariffs and risk assessment
- Faster and more effective claims management (e.g. improved steering of loss adjuster, loss mitigation, fraud detection)

Drones and satellites-enabled claims services: Munich Re pioneers in piloting drone services on a global basis for clients

Drones and Satellites-Enabled Claims Services

Solutions

- Usage of aerial imaging and enhanced analytics in risk assessment and/ or claims management
- Pilot application areas: Post-loss assessment for treaty and facultative business

Benefit for Munich Re's clients

- Access to technology and analytics with limited administrative effort (no need to build up market/ legal expertise in a highly dynamic field)
- More efficient and effective claims management (e.g. faster loss assessment and payout, increased reporting accuracy, improved fraud prevention)

Munich Re's achievements and outlook

- Access to technology providers with broad geographical coverage (e.g. cooperation with PrecisionHawk, a global drone data platform)
- Technological expertise (e.g. of selecting the right technology)
- Analytical expertise (e.g. of interpreting/ modelling the data produced)
- First successful application (April 2016 earthquake in Ecuador)
- Scalable client services

Primary consulting services help clients to significantly improve portfolio quality and develop innovative solutions

Primary Consulting Services

Solutions

- Motor Consulting Services (established)
- Property Consulting Services (new)

Benefit for Munich Re's clients

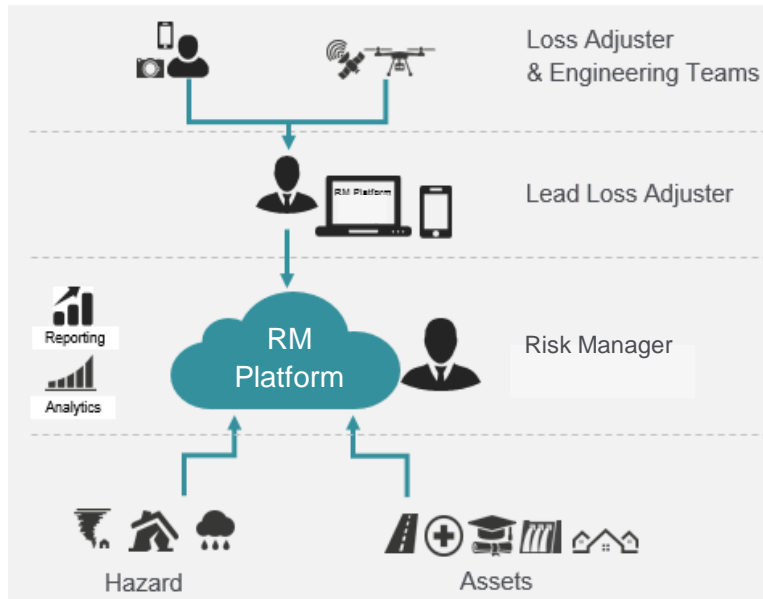
- Tailor-made actuarial service for motor insurance as well as personal and commercial property lines
- Supports clients in improving portfolio quality, product development, pricing and tariff design

Munich Re's achievements and outlook

- Very strong track record in Motor Consulting
- Property pilot projects showing promising results
- Further enhancement via data analytics
- Support of clients on innovative topics such as telematics, car sharing, autonomous vehicles (motor) and smart homes (property) and joint development of insurance solutions

Big data use case: Munich Re develops a digital risk management platform for nat cat risks

Munich Re Digital Risk Management Platform for nat cat Risks



Core Functionalities

- Integrated risk management platform for nat cat risks visualizing assets, historic losses and hazards to assess exposures, and mitigate and insure risks
- Leveraging of areal imaging to identify assets, risk metadata (e.g. quality of roads, preexisting damages) and, after a disaster, the corresponding losses
- Target segments include governments, disaster fund managers, nat cat pools, large corporate clients and cedents

Benefits for Munich Re's Clients

- Improved transparency on insured assets, hazards, historic foot prints and modeled losses
- Efficient risk assessment and loss adjustment in remote areas
- Faster and more effective claims management
- Database on loss events allowing in-depth trend detection