IT Trend Radar 2017

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Please get in contact with your responsible Client Manager or with our IT experts for a full client report providing you with further information.

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Digitalisation is omnipresent. It has fundamentally changed the way we live, work and communicate and it has transformed how business is operated. Examples of such digital transformation processes can be found in many industries, from logistics over production to services. It causes a continuous revision and reframing of products and services according to the rules and demands of connected consumers.

In addition to that, new technology frameworks such as cloud computing, mobile networks, CPU power and massive storage capacities set new benchmarks with hardly any limits to new innovations and developments. Just take a look at the latest disrupting developments in artificial intelligence, automated vehicles, robots or smart nano-sensors. Many of these new technologies are still in an early stage, but they all have a great potential for massive future changes in common.

This affects the insurance industry and the financial industry as well as all other business sectors. Thus, insurances and financial institutions must be able to keep up with this speed. Because only those who identify the potential of new technologies and trends in these early stages will be contributing to the basis for valuable innovations and thus, gain a competitive advantage.

The 2017 IT Trend Radar’s objective is to identify new and relevant technologies for ERGO, MEAG and Munich Re and to evaluate them from a group-centric perspective. In doing so, the potential of the individual global trends was analysed and examined with regards to/regarding their applicability and practicality.

Four main trend fields show the big drivers of 2017: IOT, Artificial Intelligence, User Centric Worlds and Data Era. Within these we highlighted over 30 trends and developments concerning the insurance industry.

We hope you enjoy reading. The team around the Trend Radar is gladly available for further discussions. We look forward to it.
Agenda

1. Introduction & Approach
   - Background & Objectives
   - Methodology & References
   - The approach of the Trend Radar 2017

2. Trend Radar & Trend Fields
   - User Centric Worlds
   - Internet of Things
   - Artificial Intelligence
   - Data Era

3. Imprint

Image: dpa Picture Alliance
General purpose

This presentation provides information about technology driven trends relevant for Munich Re and ERGO. It is a collaborative initiative by Global IT Governance at Munich Re and ERGO IT Strategy. It aims at sharpening awareness, evoking discussion and initiating new business opportunities appealing to all units within the Munich Re Group.

In cooperation with the Institute of Electronic Business future trends were gathered and aggregated in this Trend Radar 2017 in order to provide a comprehensive view on technology trends, their maturity and relevance for the Munich Re Group.
Methodology and References

What do we aim at?
- Continuously providing insights of key trends that influence business at Munich Re, ERGO and MEAG
- Promoting innovative initiatives within Munich Re, ERGO and MEAG based on trends and developments from the outside
- Intensifying collaboration and interaction between Munich Re, ERGO and MEAG

How do we reach it?
- Broad external and internal research on IT trends and aggregation in the IT Trend Radar 2017 in order to provide a comprehensive view on technology trends, their maturity and relevance for Munich Re, ERGO and MEAG

What's new in 2017?
- The IT Trend Radar as a collaborative initiative of trend monitoring between Munich Re and ERGO started with the Trend Radar 2015
- Based on this initial initiative the Trend Radar has been updated concerning structure and content
- The IT Trend Radar 2017 contains major relevant IT trends with strategic and operative relevance for the units within Munich Re, ERGO and MEAG IT
- In order to provide more orientation and to guarantee improved understanding of the trend classifications and developments, the IT Trend Radar 2017 categorises the most important IT developments in four primary trend fields with correlated subtrends
- Furthermore, in order to increase the tangibility and adaptability of the report, the IT Trend Radar 2017 includes three relevant use cases for all trends
Methodology and References

Who contributed?

In charge
- Munich Re Global IT Governance / Innovation

In association
- Institute of Electronic Business (IEB)

In consultation
- Munich Re Business Development
- Munich Re Reinsurance Development
- Munich Re Senior Management
- Munich Re IT Architects
- ERGO Digital Ventures Innovation Management
- MEAG IT

Images: dpa Picture Alliance
The approach of the Trend Radar 2017

Step 1: Screening
Analysis of trend developments
Compiling developments and new trends for 2017 with external analysts’ reports, internal market know-how

External data collection completed by internal market intelligence and external analysts

Result: Total Trends

Step 2: Aggregation
Definition of trend fields & subtrends
Aggregating data from screening process and definition of most relevant trends in four primary trend fields

Further drill down and validation with market data and identification of corresponding use cases

Result: Aggregated Trends

Step 3: Evaluation
Assessment of impact and relevance
Classifying trends according to their level of relevance for ERGO, Munich Re and MEAG and potential impact scenarios

Trend segmentation and classification in the IT Trend Radar 2017 to their impact scenario and assessment

Result: 4 Primary Trend Fields and 33 Subtrends
New in 2017
Four primary trend fields

- User Centric Worlds
- Internet of Things
- Artificial Intelligence
- Data Era

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### User Centric Worlds
- Augmented and virtual worlds
- User centered design
- Loc-based services
- Haptic technologies
- 3D/4D-printing
- Digital identity
- New payment models
- Shareconomy

### Internet of Things
- Smart home
- Telematics
- Wearable devices
- Smart textiles
- Digital health services
- Industrial internet of things
- Autonomous robotics and drones
- Smart dust

### Artificial Intelligence
- Advanced machine learning
- Aut. Machine driven decisions
- Predictive analytics
- Conversational interfaces
- Smart bots
- Autonomous vehicles
- Web of thought extension
- Robotic process automation

### Data Era
- Quantum computing
- Digital twin
- Context aware systems
- Mesh and app service architecture
- Digital technology platforms
- Blockchain technology
- Open API and data
- Cybersecurity
- Serverless computing
Hold
This trend might affect your business unit, but not at this point in time. Keep it on your watch list!

Assess
This trend is worth exploring with the goal of understanding and evaluating how it will affect your business unit.

Trial
This trend will affect your business. But: Only those units acquainted with risk should activate resources for adequate initiatives.

Adopt
An adoption of this trend is strongly recommended. Start initiatives and consider facets and implications of this trend on your business unit.
IT Trend Radar 2017

Adopt initiatives in your unit

Trial initiatives in affected units

Assess Evaluation needed

Hold Watch list

IT Trend Radar 2017

Smart Dust

Serverless Computing

Industrial Internet of Things

Cybersecurity

3D/4D-Printing

Quantum Computing

Augmented & Virtual Worlds

Open API and Data

Loc-based Services

Blockchain Technology

Shareconomy

Mesh App & Service Architecture

Digital Identity

Digital Twin

User Centered Design

Haptic Technologies

Robotic Process Automation

3D/4D-Printing

Automated Machine Driven Decisions

Autonomous Robotics & Drones

Serverless Computing

Telematics

Smart Bots

Wearable Devices

Predictive Analytics

Digital Health Services

Advanced Machine Learning

Loc-based Services

Digital Identity

User Centered Design

Digital Technology Platforms

Robotics Process Automation

Predictive Analytics

Web of Thought Extension

Conversational Interfaces

Automated Machine Driven Decisions

Quantum Computing

Serverless Computing

Open API and Data

Blockchain Technology

Mesh App & Service Architecture

Digital Twin

Context Aware Systems

3D/4D-Printing

Quantum Computing

Open API and Data

Blockchain Technology

Mesh App & Service Architecture

Digital Twin

Context Aware Systems

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### Trend history and changes

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# Trend History and Changes

## Artificial Intelligence

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New in 2017

Four primary trend fields

- User Centric Worlds
- Internet of Things
- Artificial Intelligence
- Data Era
Customer first period

**Augmented and virtual worlds**
An additional layer of digital information enhancing people's perception of their environment and augmenting their reality

**Haptic technologies**
The science of applying the sensation of touch to interact with computers opening a new dimension in virtual realities

**New payment models**
Digital and mobile payment methods that are on the verge of replacing hard cash

**User centered design**
Product or service development that is solely user-oriented and aims at achieving highest usability and best user experience

**Loc-based services**
Digital information and services individually delivered to the user based on his location

**3D/4D-Printing**
An automated manufacturing process that creates multi-dimensional physical objects based on digital designs

**Digital identity**
The total sum of openly accessible personal information from all online and offline resources

**Shareconomy**
A social phenomenon and behaviour of purchasing and using products and services collaboratively

**3D/4D-Printing**
An automated manufacturing process that creates multi-dimensional physical objects based on digital designs

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**Digital Identity**
The total sum of openly accessible personal information from all online and offline resources
The ever-more digitalised and ever-more globalised world led to a period of total information overflow and over-abundance of products and services. However, people (in the Western world) increasingly feel the downside of hyper-optionality: stress, orientation loss and strain.

On the other hand they are more and more aware of their power towards companies and their offers and grow increasingly demanding. As a consequence, people are about to expect products, services and messages, that are perfectly adapted to their individual needs and demands. Anything perceived as irrelevant will not be accepted and strongly harms the customer experience.

For any company this means that the will and the interest of the customer, client or user is to be the centre priority. A pleasurable customer experience throughout the entire cycle is not a winning momentum, but develops into an obligation.

Unprecedented data streams provide for the necessary information. Technologies merging the off- and online world offer whole new opportunities to augment the customer experience. Be it passively or actively, nowadays, people can use eye-tracking, gestures and voice to navigate their way through a new customer centric reality.

The impact of customer experience

<table>
<thead>
<tr>
<th>What businesses think</th>
<th>What users think</th>
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<tbody>
<tr>
<td>89%</td>
<td>95%</td>
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<tr>
<td>of companies compete mostly on the basis of customer experience (2013: 36%)</td>
<td>of customers say that a good customer experience is relevant to them</td>
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<td>84%</td>
<td>83%</td>
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<td>of companies expect to increase their focus on customer experience measurement and metrics</td>
<td>of users say a seamless experience across all devices is somewhat or very important</td>
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<td>50%</td>
<td>52%</td>
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<td>of companies will redirect investments to customer experience innovations</td>
<td>of users say that a poor mobile experience makes them less likely to engage with a company</td>
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By 2016, more than 150 million people worldwide downloaded the Pokemon Go app, fuelling consumer appetite for immersive AR experiences. (Gartner Predicts 2017: Marketers, Expect the Unexpected, Golvine, Foo Kune, Elkin, Frank, Sorofman, 2016).

By 2018, smartphones will continue to drive more than 90% of AR-related experiences. (Gartner Predicts 2017: Marketers, Expect the Unexpected, Golvine, Foo Kune, Elkin, Frank, Sorofman, 2016).

Gartner predicts sales of HMDs for both AR and VR applications will rise from 1.4 million units in 2016 to nearly 40 million by 2020. (Gartner Predicts 2017: Marketers, Expect the Unexpected, Golvine, Foo Kune, Elkin, Frank, Sorofman, 2016).
Augmented and Virtual Worlds

An additional layer of digital information enhancing people’s perception of their environment and augmenting their reality

Worlds collide and extend the world of the user: Virtual reality completely immerses people in a digital world. 2016 has been the breakout year for augmented reality (AR) and virtual reality (VR). No longer a niche AR and VR have exploded onto the scene with accessible consumer headsets and unprecedented levels of hype developed by apps such as Pokémon Go.

AR/VR industry is forecasted to hit US$120 billion in 2020, overtaking mobile. The next few years will be crucial to establish that continued growth. But already in 2018, smartphones will continue to drive more than 90% of AR-related experiences, which 30% of Forbes Global 2000 companies will use for marketing effort (IDC Forecast, 2016).

Opportunities

- Augmented worlds can be used to visualise damage and risk situations for trainings and enable better risk assessment for dangerous areas
- In the field of car insurance AR/VR can provide a range of personal driving assistance functions including augmented driving, collision warning and “black-box” services such as video recording
- An initial push in new insurance models can come from AR and VR gaming, because it is the most developed application for both technologies
- Being in new virtual worlds can enhance the communication to the customer – with a significant attention or in a playful way
- Ambient user experiences by migration from VR to AR

Related Trends
User Centric Worlds I Digital Twin

Recommendations
Augmented and virtual worlds will affect your business. Insurers can explore pilot proofs-of-concept for some use cases.
Trend Field – Internet of Things
Extensive digital links between products and devices that communicate autonomously and collect and provide information

The Internet of Things is a key trend and provides the foundation for many digital developments. Especially in the last years the Internet of Things has come to further fruition as it continuously merges into our daily life serving in more and more application areas. Ranging from general information supply over autonomous services to warning and alert functions, the Internet of Things is about to develop into an indispensable part of our lives as well as the business world.

As more and more customers are getting accustomed to digital connected services and bestow ever more trust upon such systems, the Internet of Things represents a key innovation factor for insurance companies. However, if insurers are to maintain their current position, respectively prepare for the challenges to come in this challenging environment driven by competing and pre-empting, dynamic innovation processes, quick responsiveness and large-scale initiatives are a must.

Business Insider: Nearly $6 trillion will be spent on IoT solutions over the next five years. (Business Insider, 2016).

Gartner predicts: By 2018, more than 10 billion things will be connected in the combined consumer and business worlds. (Gartner Top Strategic Predictions for 2017 and Beyond: Surviving the Storm Winds of Digital Disruption, Plummer, Reynolds, Golvin et al., 2016)

Gartner predicts: By 2022 the IoT will save consumers and businesses $1 trillion a year in maintenance, services & consumables. (Gartner Top Strategic Predictions for 2017 and Beyond: Surviving the Storm Winds of Digital Disruption, Plummer, Reynolds, Golvin et al., 2016)
Extensive digital links between products and devices that communicate autonomously and collect and provide information

**Smart Home**
Integrated home control systems in which home devices interact with each other and the connected outer world and can be controlled remotely

**Smart Textiles**
Smart textiles and clothes with interwoven microfabrics able to analyse the wearer's conditions and interact with other devices

**Autonomous Robotics and Drones**
Intelligent machines powered by Artificial Intelligence that naturally integrate and support in daily tasks imitating human behaviour

**Telematics**
Wireless devices and "black box" technologies monitoring and transmitting data in real time

**Wearable Devices**
Computer technologies worn on the user's body as accessories or implants monitoring daily activities and providing analyses and instructions

**Digital Health Services**
Automatic and remote monitoring of a user's health status through advanced apps and wearables that innovate the health sector

**Industrial Internet of Things**
Integration of modern information and communication technologies into industrial production processes to develop the "smart factory"

**Smart Dust**
A system of wirelessly operating miniscule micro electromechanical devices able to detect environmental micro data

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Integrated home control systems in which home devices interact with each other and the connected outer world and can be controlled remotely.

The market of Smart Home and household management control systems is growing and the interaction with household devices from where ever via digital control devices (e.g., via mobile apps) becomes a new reality.

Smart devices will become the new household manager, linking all systems (water, lightning, heating, entertainment, ...) together, managing them and operating them in accordance to people’s needs and requests. Such highly connected systems open up great potential, e.g., in questions of energy saving, home security, healthcare and fitness equipment or simply living comfort.

Driven by ever lowering price barriers (esp. for simple devices), improved high-speed internet connections and smartphone penetration, analysts expect the household penetration of smart domestic equipment in Germany to hit 35% in 2021 (2017: 11%) – with ever rising average numbers of connected devices (Statista Digital Market Outlook, 2016).

According to Gartner, by 2022, a typical smart family home could contain several hundred smart devices, all linked to a certified ecosystem (Gartner The Future Smart Home: 500 Smart Objects Will Enable New Business Opportunities, Nick Jones, 2014).

Opportunities

- Smart Home will transform the insurance industry, enabling changes in pricing, damage detection and property insurance
- Smart Home technology gives the possibility of new products, e.g., flexible household insurance based on tracked (and shared) Smart Home application data
- IT also provides damage reduction and prevention for buildings insurance through Smart Home applications using sensors to detect damage in early stage or alarm before a damage
- Especially in the healthcare sector Smart Home services become more and more attractive → see: Digital Health Services
- Digitalisation of real estate management processes by mobile solutions and IoT

Recommendations

Smart Home has a huge potential on new products and insurance models. Find relevant use cases and new business models.

Related Trends

Digital Health Services I Wearable Devices I Context-aware Systems I Cybersecurity
The capability of a machine to imitate intelligent human behaviour

Artificial intelligence (AI) is omnipresent and will progressively augment and enhance virtually every technology and application. Robots are doing the grunt work in factories. Autonomous driving has become a reality. A WiFi-enabled Barbie uses speech-recognition to talk (and listen) to children. Companies are using AI to improve their product and boost sales – AI is already common practice, not only in the high tech industry.

AI and machine learning (ML), which include technologies such as deep learning, neural networks and natural language processing, can also encompass more advanced systems that understand, learn, predict, adapt and potentially operate autonomously. Systems can learn and change future behaviour, leading to the creation of more intelligent devices and programs. The combination of extensive parallel processing power, advanced algorithms and massive data sets to feed the algorithms has unleashed this new era. Productivity is experiencing AI vibrations, smart programs, machines and systems will not be completely integrated into the value chain but will furthermore work side by side with humans, leading to an augmentation of processes and production.

Top uses of AI and Machine Learning

- Research
- Consumer behaviour analysis
- Fraud detection
- Market projection/forecasting
- Internet & IT security monitoring
- Office automation

54% of respondents say potential users in their organisations have little to moderate interest in AI and machine learning

42% of respondents say their company lacks the skills to implement/support AI and machine learning, but 30% say they’re investing in skills development

42% of respondents say they’re working on adding AI and machine learning to their corporate IT security plan

Respondents whose companies plan to implement AI and Machine Learning

- No plans in foreseeable future: 31%
- Plan to use it next year: 26%
- Plan to use it in a few years: 24%
- Currently using it: 19%

AI and Machine Learning in the Enterprise

Source: CBS Interactive; Survey of 234 IT professionals in 09/2016

IBM Watson wowed the tech industry and a corner of U.S. pop culture with its 2011 win against two of Jeopardy’s greatest champions.

Global annual revenue of AI products and services will hit US$ 36bn (a 57-fold increase towards 2016) – the fastest growing segment of any size in the IT sector (IBIS World, 2016).

AI will surpass human intelligence (IBM, 2016).
The capability of a machine to imitate intelligent human behaviour

Advanced machine learning
The science of getting computers to act without being explicitly programmed

Automated machine-driven decisions
Business decisions that are derived and backed by verifiable, quantitative data analysis

Predictive analytics
Predictive Analytics delivers the basis (of analysed data) for optimizing and even for automating decision processes

Conversational interfaces
Digital information enhancing people’s perception of their environment and augmenting their reality

Smart bots
The third application program that simulates human conversations and chats through artificial intelligence via text messaging

Autonomous vehicles
Vehicles that are able to sense and interact with their environment and can drive without human supervision or input

Web of thought extension
Web of Thought extension describes the (emotional) interaction between humans and computers through human interfaces

Robotic process automation
RPA ‘robotize’ existing applications in the digital system to achieve automated and efficient business processes

Conversational Interfaces
Automated Machine Driven Decisions
Advanced Machine Learning
Predictive Analytics
Data era

Data – the driving foundation of a digitalized, connected world

In the Internet of Things each and every device, either used and controlled by a human or acting autonomously develops into a data supplier. Everyday, 2.5 exabytes of new data are produced and the figure doubles every 40 months. The world creates a digital cast of itself, a cast that is highly dynamic, updating itself constantly and autonomously.

Tremendous computational capacities, advanced algorithms and deep neural networks make this flood of information utilizable. They allow us to harvest the data, help us classifying and analysing the information, allow us to gain unprecedented insights and enable us to draw ever smarter conclusions and to make predictions about future incidents.

Data has become the new oil. Just like the raw material, data can be extracted and refined. For businesses it will be a crucial success factor to be able to collect, save and finally interpret vast amounts of data in real time. Investments in infrastructure and corresponding competences will not be a matter of differentiation and gaining a competitive edge, but of mere survival.

IDC FutureScape: Worldwide Big Data and Analytics Top 10 Predictions
Source: IDC FutureScape 2016, courtesy of Cloudera

In 2015, global mobile data traffic amounted to 3.7 exabytes per month (Cisco VNI Global IP Traffic Forecast, 2015–2020).

According to Gartner, there will be more than 21 billion connected sensors and endpoints, and digital twins will exist for potentially billions of things. (Gartner Forecast: Internet of Things –Endpoints and Associated Services, Worldwide, 2016, Middleton, Hines, Tratz-Ryan et al., 2016)

Cisco predicts by 2020 global IP traffic will reach 2.3 ZB per year, or 194 EB per month. (Cisco VNI Global IP Traffic Forecast, 2015–2020).
Data – the driving foundation of a digitalized, connected world

- Quantum computing
  Area of study focused on computer technology following the laws of quantum physics promising a new era of computational performance

- Digital twin
  The virtual representation of a physical product or machine for real-time simulation and optimization

- Context-aware systems
  Software capable of sensing the user’s condition and environment and adapting accordingly

- Mesh and app service architecture (masa)
  IT architecture that supports the delivery of connected apps and services to the digital mesh

- Digital technology platforms
  A technology-enabled business model that facilitates the connection between multiple groups creating an open and dynamic ecosystem

- Blockchain technology
  A decentralized peer-to-peer system representing a shared public ledger enabling secure transactions without the need of intermediaries

- Open API and data
  Information that is openly accessible by the public without copyright restrictions, patents or other control mechanisms

- Cybersecurity
  Technologies, processes and practices developed to protect digital networks, computers from unauthorized access and other attacks

- Serverless computing
  An event-driven application design in which computing resources are provided as scalable cloud services

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