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Tech Trend Radar 2018
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Full report can be requested for Munich Re Clients

Contact Munich Re:
Tom Bonaty
Office of the CIO
Tel +49 (89) 3891-3861
tbonaty@munichre.com

Munich RE

Contribution

WHO CONTRIBUTED?

In charge

Munich Re Office of the CIO/ IT Strategy

ERGO IT Strategy

In association

Institute of Electronic Business (IEB) http://www.ieb.net/

University of St. Gallen/Institute of Insurance Economics

Prof. Dr. Alexander Braun / Dr. Florian Schreiber

In consultation

Munich Re Client Management

Munich Re Reinsurance Development

Munich Re Corporate Underwriting

Munich Re Communications

Munich Re Information Technology

ERGO Digital Ventures Innovation Management

MEAG Digital Business Design

Image: Munich Re

Image: Munich Re

Content

Foreword (1/2)

Our DNA is changing

The world over technology is probably the most important driver of change in the world today, mostly for better sometimes for worse our daily personal and business lives have an ever increasing digital component and the rate of change will only increase. Like other industries Insurance will be greatly changed and the winners will be those can adapt and harness these new opportunities, so it is no surprise that many people are excited about the hot topic of technological trends that opens up a galaxy of innovation opportunities in our industry. And they ask - and rightly so – technology teams for advice and help. In the new digital landscape, the technology department is no longer only a support function but a fundamental building block of future products and future business.

New technologies like AI, Machine Learning, or Smart Data are shaking up business models, creating shifts in approaches to transforming and remodelling the insurance industry.

The Tech Trend Radar 2018 - Trend Scouting for targeted business development, we hope will be a useful tool in exploring these new ideas. My personal motivation for the radar is to increase business' awareness of all the technology capabilities, which will impact our top and bottom lines in the coming years. I am sure that my work will remain exciting. Technology creates countless new opportunities and we keep ourselves busy to select the best. We need to focus on building business value through technology and information with colleagues and customers for successful, future business.

I hope you too will find the Tech Trend Radar useful for your strategic decisions, and take advantage of our assessment of technological possibilities.

Robin Johnson
CIO

Foreword (2/2)

A world full of opportunities

Technology-based innovation arrives faster than most organizations can keep up with. Encouraged, among other things, by competition, the insurance industry has accelerated its activities to seize the opportunities offered by new technologies. The digital imperative has been accepted since digitalization promises additional revenue from new business fields as well as innovative business models. However, implementation remains a challenging task.

To create competitive advantages, business and IT leaders must evaluate the most relevant technology trends. This is the key to a successful future for the insurance industry. Our customers live in a digital world in which they would never want to give up the comfort of their smartphones. They enjoy the assistance they get from Alexa/Echo and are fascinated by the possibilities of industrial IoT. To meet their changing needs and expectations, the insurance industry should invest further in expertise, as well as in hardware and technology, whether this be for data analytics, artificial intelligence, quantum computing or any other emerging trend.

The Munich Re Tech Trend Radar 2018 deals with the most urgent questions surrounding the relationship between technology and new business capabilities in the insurance industry with the aim of gaining a deeper understanding of each relevant trend and its impact on traditional business. We hope you find both the insights rewarding, and the different examples stimulating and thought-provoking for your own strategic decisions. We appreciate your feedback and would be interested to discuss your views.

Thomas Bonaty
IT Strategist - Innovation

IT 1.1.2 Office of the
CIO / IT Strategy

Phone:
+49 (89) 3891-3861
tbonaty@munichre.com

Linked In

Image: shulz / Getty Images

INTRODUCTION

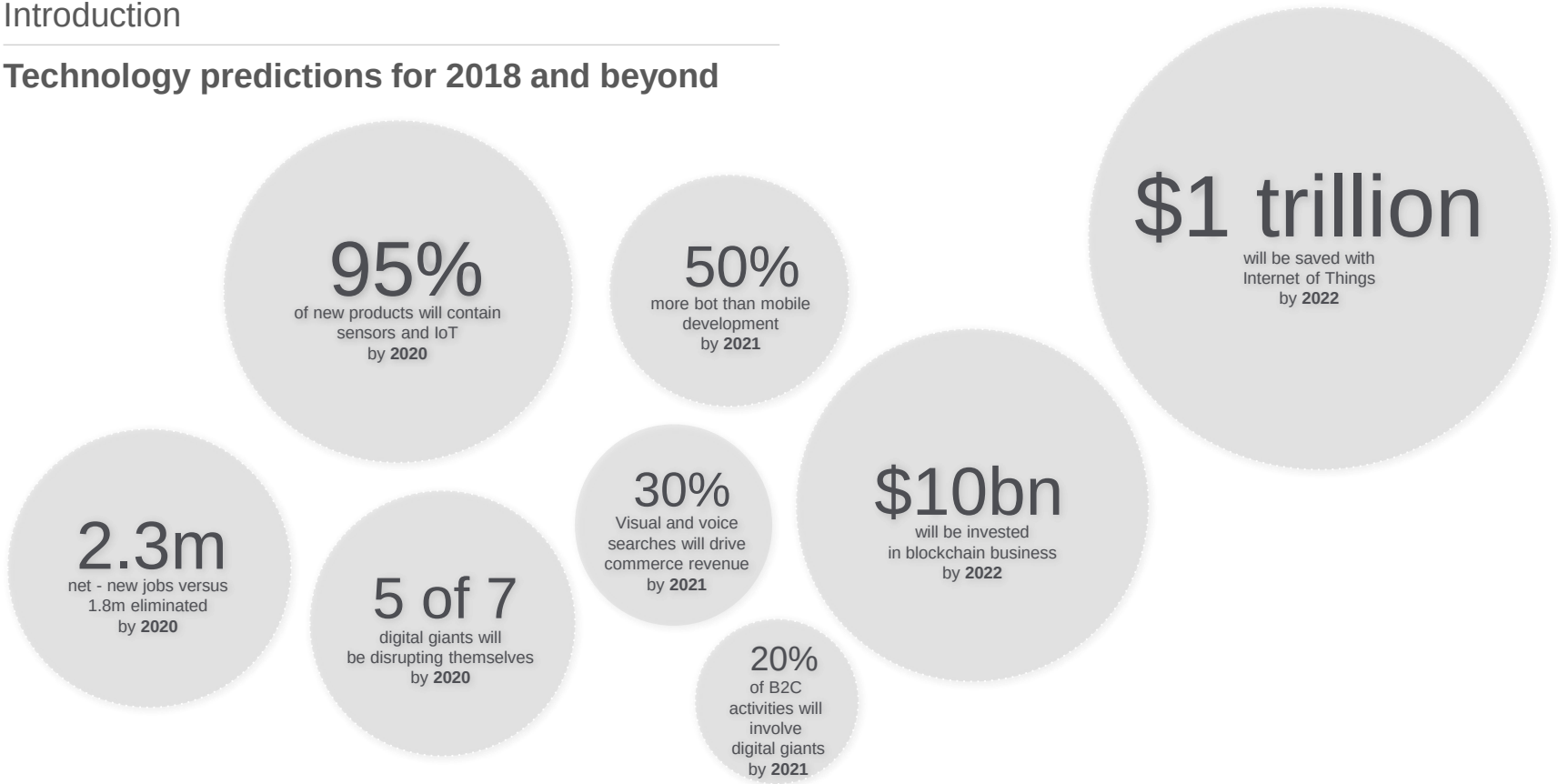
Background & Objectives

GENERAL PURPOSE

This presentation provides information about technology-driven trends relevant for Munich Re and ERGO. It is a collaborative initiative by the Office of the CIO, 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. Furthermore, there is a strong alignment with Business Units and Strategic Units within the Munich Re Group.

In cooperation with the Institute of Electronic Business and the University of St. Gallen, future trends were gathered, aggregated and rated in this Tech Trend Radar 2018 in order to provide a comprehensive view of technology trends, their maturity and relevance for the Munich Re Group and the insurance industry.

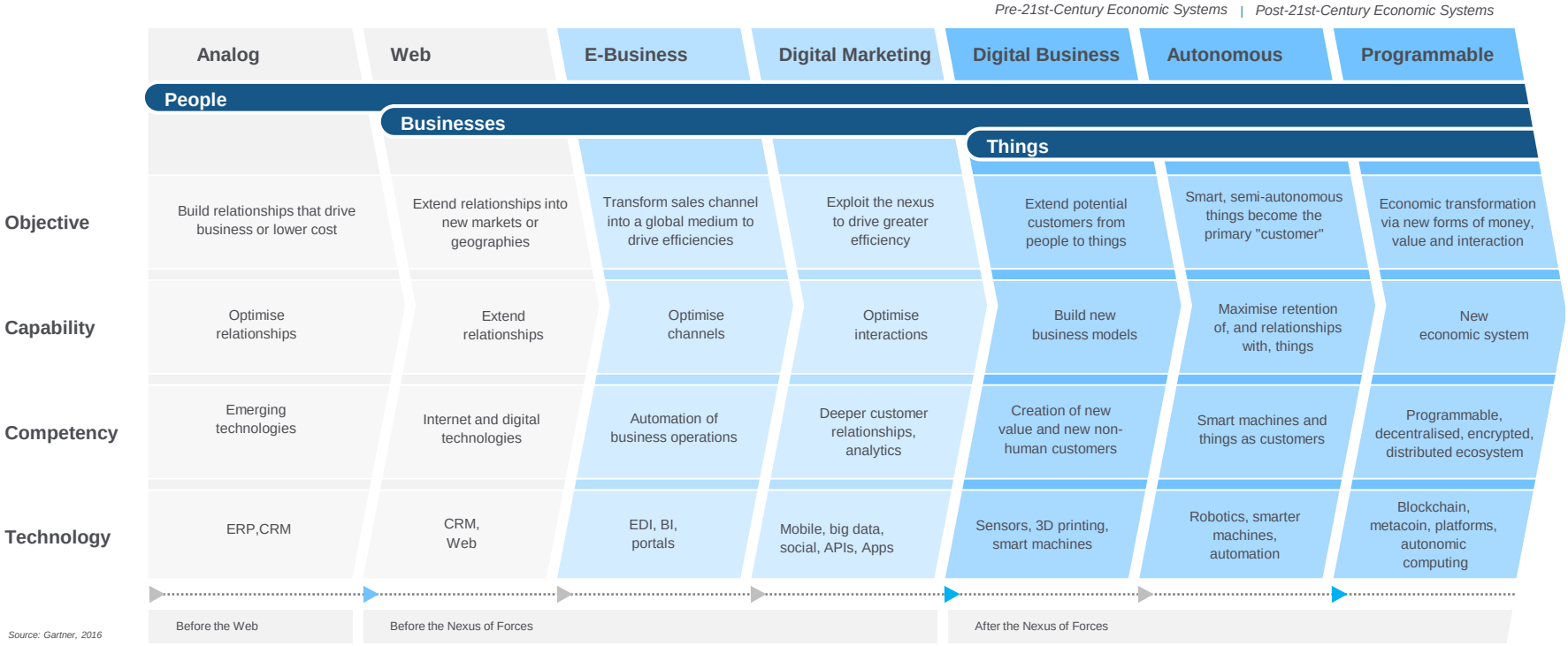
Technology predictions for 2018 and beyond



Source: Gartner, 2017

Digitalisation moves forward

World Economic Forum
In our increasingly connected world, digital life is becoming inextricably linked with a person's physical life. In the future, building and managing a digital presence will become as common as deciding how to present yourself to the world every day. In that connected world and through their digital presence, people will be able to seek and share information, freely express ideas, find and be found, and develop and maintain relationships virtually anywhere in the world.



Source: Gartner, 2016

Image: Yagi Studio / Getty Image

Tech Trend Radar 2018

Methodology (1/2)

WHAT DO WE AIM AT?

- Continuously providing insights into 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 ACHIEVE THIS?

- Broad external and internal research on Tech trends and aggregation in the Tech Trend Radar 2018 in order to provide a comprehensive view of technology trends, their maturity and relevance for the insurance industry

WHAT'S NEW IN 2018?

- The Tech Trend Radar, as a collaborative initiative on trend monitoring between Munich Re and ERGO, started with the Tech Trend Radar 2015
- Based on this initial initiative, the Tech Trend Radar has been updated in terms of structure and content
- The Tech Trend Radar 2018 contains major relevant Tech trends with strategic and operative relevance for the insurance industry
- In order to provide more orientation and guarantee improved understanding of the trend classifications and developments, the Tech Trend Radar 2018 categorises the most important developments in four primary trend fields with correlated subtrends
- Furthermore, in order to increase the tangibility and adaptability of the report, the Tech Trend Radar 2018 includes relevant use cases for all trends
- Assessment of the impact on the Insurance Value Chain for each Technology
- Assessment of opportunities and risks for each Technology

Methodology (2/2)

Selection of trends: The 4 golden rules

1. Technologies that potentially disrupt the insurance industry.
2. Technologies that potentially change the business model.
3. Technologies that improve RUN trends and support GROW and TRANSFORM trends.
4. Technologies that potentially have a influence on RUN, GROW and TRANSFORM.

Selection of Use-cases (Only proven cases are implemented)

PROTOTYPE

First attempt to realize the vision

PILOT

A real project to learn about business cases, acceptance and requirements

Tech Trend Radar 2018 – The approach

STEP 1: SCREENING

Analysis of trend developments

Compiling developments and new trends for 2018 with external analysts' reports, internal market know-how

External data collection completed by internal market intelligence and external analysts

STEP 2: AGGREGATION

Definition of trend fields & subtrends

Aggregating data from screening process and defining most relevant trends in four primary trend fields

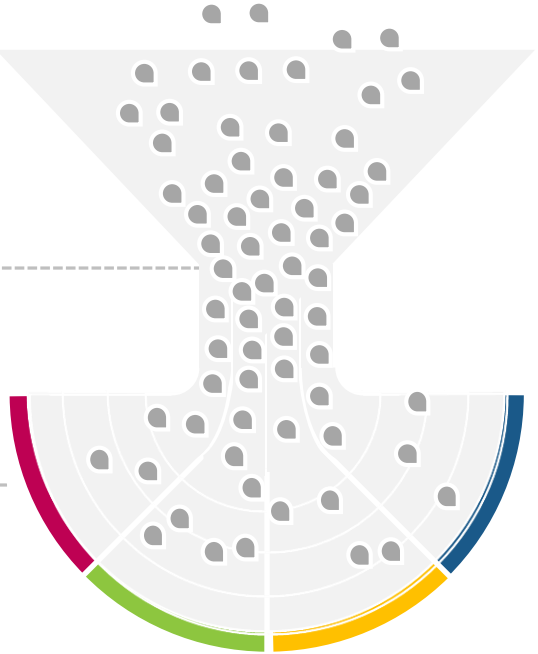
Further drill-down and validation with market data and identification of corresponding use cases

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 Tech Trend Radar 2018 to their impact scenario and assessment



Result:
Total Trends

Result:
Aggregated Trends

Result:
4 Primary Trend Fields and
46 Subtrends

The Tech Trend Radar 2018 – Definitions: levels of relevance

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.

Tech Trend Radar 2018

Contact **Munich Re:**
Tom Bonaty
(Office of the CIO)
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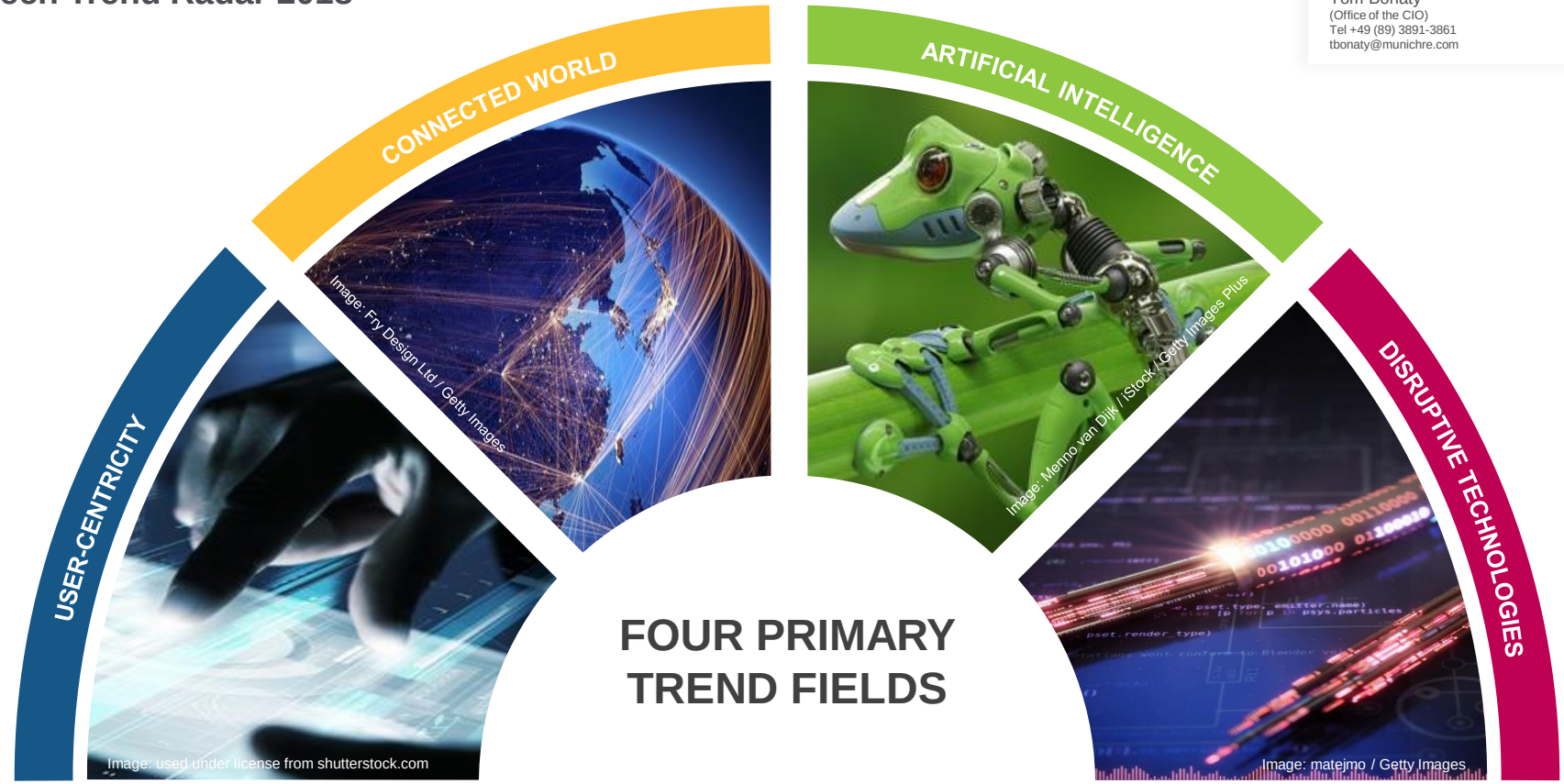

Tech Trend Radar 2018 – The trend fields and related subtrends

USER-CENTRICITY

- HAPTIC TECHNOLOGIES
- VIRTUAL WORLDS
- AUGMENTED WORLD
- LOCATION-BASED SERVICES
- CONTEXT-AWARE SYSTEMS
- SOCIAL ANALYTICS
- DIGITAL IDENTITY
- NEW PAYMENT MODELS
- CUSTOMER-CENTERED DESIGN

CONNECTED WORLD

- SMART DUST
- DIGITAL TWIN
- SMART TEXTILES
- HUMAN ENHANCEMENT
- DIGITAL ECOSYSTEMS
- OPEN DATA
- OPEN API
- INDUSTRIAL IOT
- DEEP MAPPING
- AUTON. ROBOTICS & DRONES
- AUTONOMOUS VEHICLES
- SMART HOME
- WEARABLE DEVICES
- DIGITAL HEALTH SERVICES
- CYBER SECURITY

ARTIFICIAL INTELLIGENCE

- ARTIFICIAL GENERAL INTELLIGENCE
- HARDWARE-EMBEDDED AI
- CONVERSATIONAL INTERFACES
- MACHINE-DRIVEN DECISIONS
- SMART BOTS
- DEEP LEARNING
- NLP & SPEECH RECOGNITION
- ADVANCED MACHINE LEARNING
- ROBOTIC PROCESS AUTOMATION
- PRESCRIPTIVE ANALYTICS
- COMPUTER VISION

DISRUPTIVE TECHNOLOGIES

- 5G
- VOLUMETRIC DISPLAY
- PROGRAMMABLE MATERIALS
- NEUROMORPHIC HARDWARE
- BRAIN COMPUTER INTERFACE
- QUANTUM COMPUTING
- SWARM INTELLIGENCE
- 3D PRINTING
- CYBER THREAT INTELLIGENCE
- CLOUD EDGE
- BLOCKCHAIN TECHNOLOGY

Tech Trend Radar 2018

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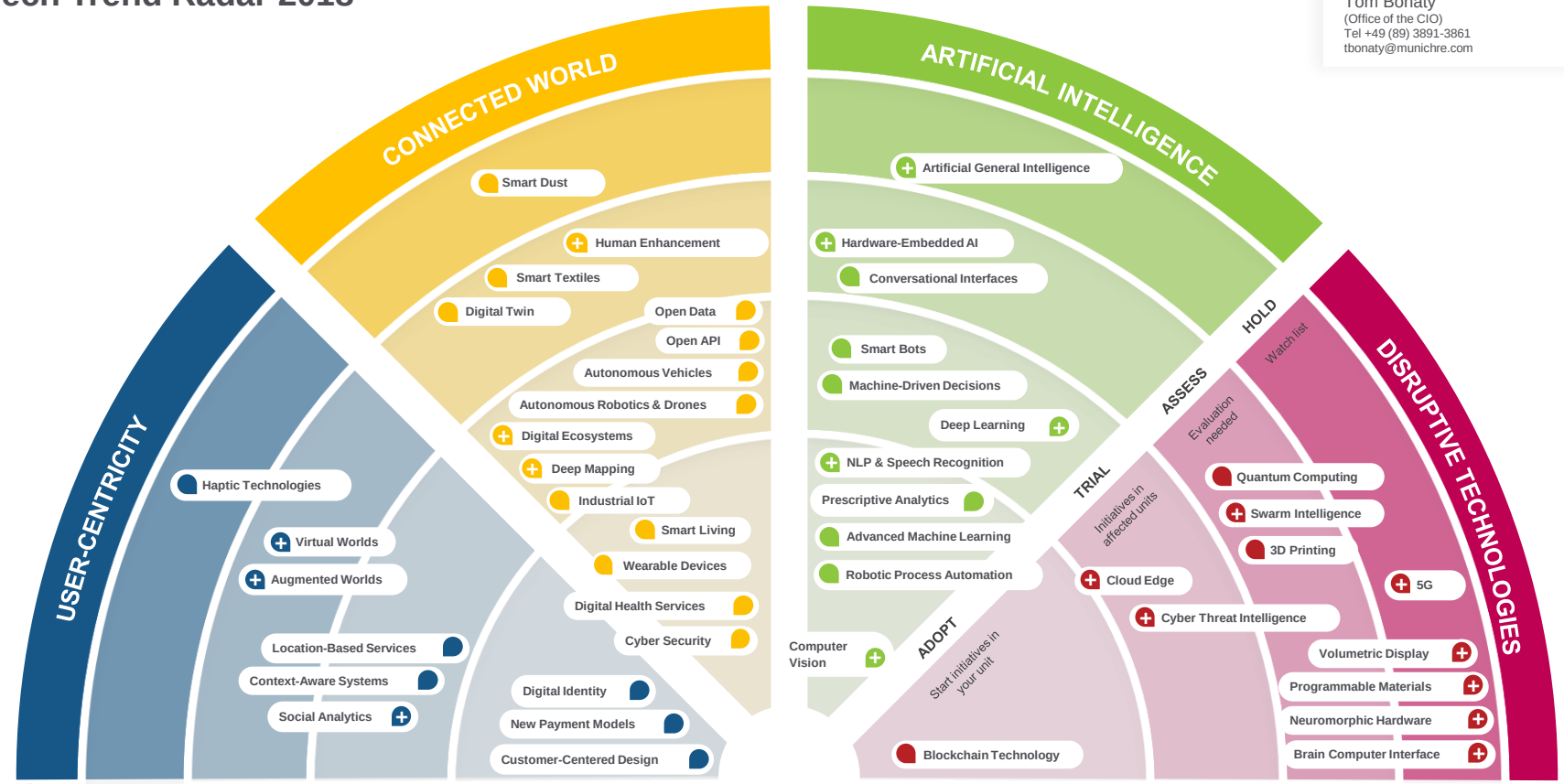


⊕ = *new in 2018*

Trend field

User-centricity

Trend field

User-centricity

In a multi-optional and increasingly transparent world, companies must – more than ever – focus on their customers' needs and expectations to maintain their position in the market. Consuming habits are changing rapidly as mobile devices and social media take over greater and greater parts of our lives. Today's customers expect products, services and information that are adapted to their individual needs. Anything perceived as irrelevant will harm the customer experience. Analytical technologies provide companies with the necessary information to fulfil these challenging demands. Social analytics help companies to meet their customers' needs by analysing countless online sources. The technique also supports them by identifying fraudsters. The smartphone already plays a major role in the customer journey concerning the mobile search of products and services, prices, reviews and the ordering process. Augmented reality features and haptic technologies will extend the user's experience in many industries. To name just one example: the clothing retail industry could gain from these technologies by allowing users to feel the texture of clothes on their smartphone or other devices.
In the transformational process toward user-centric services, business leaders must show radical openness and agility. They have to be willing to question old beliefs and structures in order to develop convincing answers in these times of rapid technical development and change.

Today

56% of users are interested in ordering meals from restaurants using **voice assistants.**

44% of users are interested in using **voice assistants** for making banking transactions.

24% of users would use a **voice assistant** rather than visiting a website.

20% of users would prefer to use a **voice assistant** instead of visiting a shop or a bank branch.

+1 year

20% of large companies will evaluate and use **AR, VR** and **mixed-reality** solutions.

+2 years

20% of organisational business plans will include **infonomics** aiming to increase performance.

25% of large organisations will be either selling or purchasing customer data via online data marketplaces.

50% of **virtual** and **augmented reality** sales will be generated by software and services.

+3 years

40% of users would use a **voice assistant** rather than visiting a website.

31% of users would prefer to use a **voice assistant** instead of visiting a shop or a bank branch.

(Source: Gartner 2017; Bloomberg 2017; Capgemini 2018)

2018

By the end of 2018, virtual reality will increasingly become a mass market tool for companies to improve social engagement.

2021

Forecasts state that by 2121, virtual and augmented reality will reach a global market size of $108 billion (KPMG 2017).

2022

The continuous improvement and acceptance of virtual and augmented reality will enhance neuro-reality, primarily used in the health and defence sectors (KPMG 2017).

Trend field

User-centricity

HOLD – Watch list

HAPTIC TECHNOLOGIES

The science of applying the sensation of touch to interact with computers, opening a new dimension in virtual reality

ASSESS – Start initiatives in your unit

VIRTUAL WORLDS

Digital, three-dimensional environments, which users can explore and interact with

AUGMENTED WORLD

Adding a virtual dimension to reality by connecting people, devices, content and services

TRIAL – Evaluation needed

LOCATION-BASED SERVICES

Digital information and services individually delivered to users based on their location

CONTEXT-AWARE SYSTEMS

Software capable of sensing the user's condition and environment and adapting accordingly

SOCIAL ANALYTICS

Monitoring, analysing, measuring and interpreting digital interactions and relationships

ADOPT – Initiatives in affected units

DIGITAL IDENTITY

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

NEW PAYMENT MODELS

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

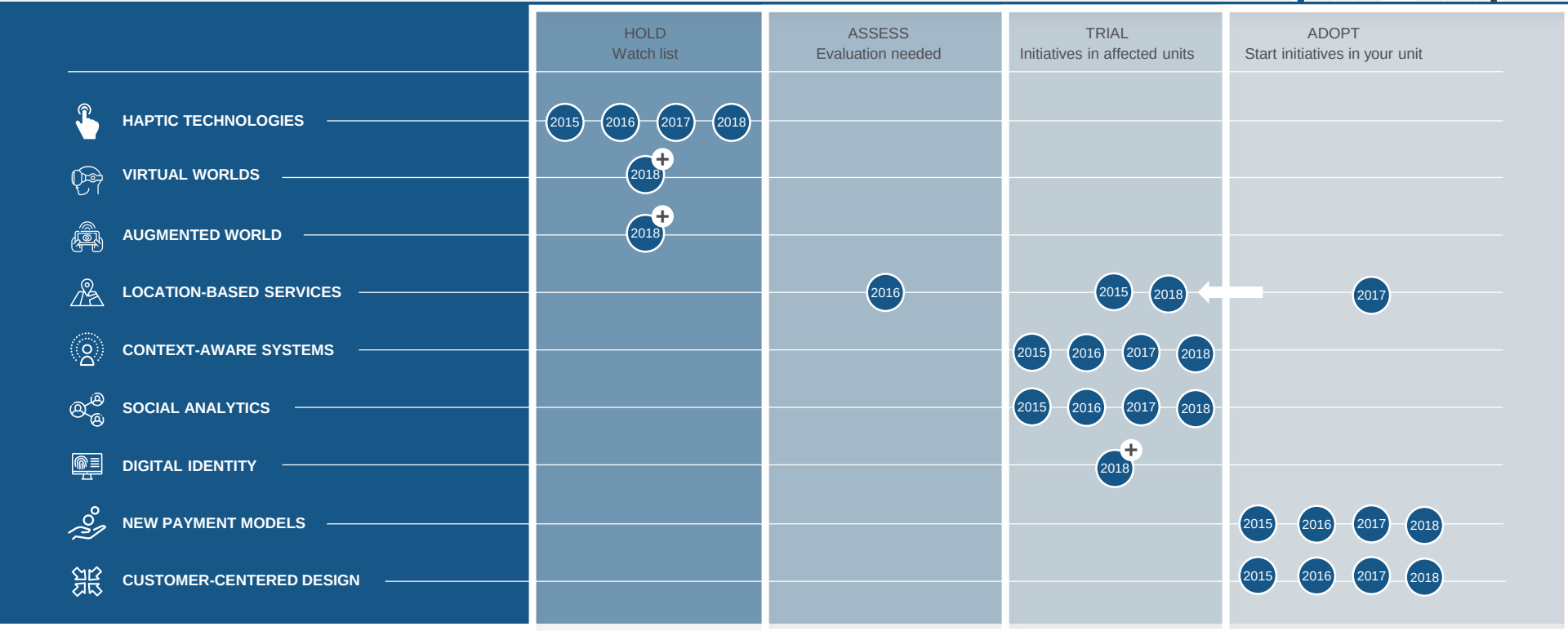
CUSTOMER-CENTERED DESIGN

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

= new in 2018

Trend history and changes

User-centricity



= *new in 2018*

Munich Re's solutions

Munich Re
Realytix

Source: used under license from shutterstock.com

Designing innovation from idea to market

Realytix is a cloud-based digital transaction platform for Primary insurers, Brokers and MGAs focusing on worldwide non-life standard business. Realytix is opening up entirely new opportunities in development and distribution of non-life-commodity products. Time-to-Market is the key term: With Realytix, insurers can take product innovations from the initial idea to market readiness in just a few weeks. Via the platform they can immediately be put into production.
Munich Re is also driving forward the automation of reinsurance products with Realytix providing online skills for facultative risks.

Benefits at a glance:
- Much reduced time to market
- Customizable, flexibly implementable platform
- Digital distribution
- Increased (process) efficiency, cost and time savings

Munich Re / Realytix

Munich RE

Special and Financial Risks / Munich Re
Infrastructure Risk Profiler

Source: Juan Camilo Bernal / Getty Images

Holistic risk assessment for investments in infrastructure

Proper analysis of risks typically associated with infrastructure requires comprehensive expertise drawn from diverse fields.
The extensive IRP-analysis covers all risk factors pertinent to infrastructure projects: Macroeconomics, technology, natural hazards, project execution and operation, environmental impact as well as microeconomics. The approach considers and weights relevant risks individually and holistically.

Benefits at a glance:
- holistic, objective and transparent overall perspective
- solid basis for an informed investment decision to better secure the return on their investments
- thorough analysis within up to 4 weeks
- comparability of different infrastructure projects that match their individual appetite

Munich Re / IRP

Munich RE

Business Analytics / Munich Re
Analytics Suite

Source: monsitj / Getty Images

Transforming Data into business potential

This platform – filled with Munich Re expertise and data – offers advanced analytical solutions for health insurers.
The Analytics Suite allows for new insights into insurers portfolio and therefore enables to leverage business potential along the entire value chain. The insights can be enhanced by Munich Re's experts, including medics, underwriters and actuaries.

Benefits at a glance:
- Cost effective, easy-to-use self-service tool
- comprehensive analytical applications, quality proofed
- results provided in dynamic, user-friendly reports
- basis to derive analytical insights and recommendations for underwriting, claims and sales

Munich Re / Analytics Suite

Munich RE

Munich Re’s solutions

Risk Management Partners / Munich Re
NATHAN for Location Risk Intelligence

Source: used under license from shutterstock.com

Comparing risk assessments on a global scale

The Location Risk Intelligence tool provides a transparent, detailed and fast approach to natural hazard analyses and comparison of assessments. NATHAN helps risk managers and underwriters carry out natural hazard analyses and compare assessments at any time, from the location-based individual risk through to entire risk portfolios. Complex interrelationships become transparent, pricing calculations become more precise, and cost-driving extra charges are reduced. The tool speeds up business processes and enhances both portfolio management and claims management.

Benefits at a glance:
- Comprehensive Geo Coder
- Hazard Score rating on a worldwide base
- Risk evaluation on a global scale
- Munich Re risk insights included
- Climate change impact evaluation

Munich Re / Location Risk Intelligence

Munich Re
NatCatSERVICE

Source: plainpicture/Westend61/Martin Rietze

Complex risk modelling with regard to natural perils

The data base enables evaluations, analyses and applications for risk modelling with regard to natural hazards.
Munich Re provides comprehensive data on insured, economic and human losses caused by any kind of natural peril. Data are received from own sources as well as from insurance associations and from systematic evaluation of media reports. It is used for developing customized insurance solutions, for political decision-making processes and also by researchers.

Benefits at a glance:
- flexible, easy to use and fast
- reliable data on natural catastrophes back to year 1980
- hazard-specific analyses (e.g. tropical cyclones, hurricanes/typhoons, earthquakes)
- charts can be shared directly (social media channels/download)

Munich Re / NatCatSERVICE

Risk Management Partners / Munich Re
Regulatory Risk Intelligence

Source: Wavebreak Media ltd / Alamy Stock Photo

Implementing the requirements of GDPR

Munich Re offers a software solution for the complex requirements of the new EU General Data Protection Regulation. A dialogue system guides the data security staff through all processes. It classifies data, compares processes with legal requirements, illustrates the process architecture, and explains the procedure step by step. It automatically generates the legally required documentation, including an overview of processing activities, documentation of the data protection impact assessment, a ready-to-sign agreement on data processing, and templates to fulfil information requirements.

Benefits at a glance:
- Easy to use dashboard functionality for the data protection professionals
- User friendly and secure tool
- Dashboard overview and delegation of processes
- Automatic generation of required documents legally required by GDPR

Munich Re / Regulatory Risk Intelligence

Trend field

Connected world

Image: Fry Design Ltd / Getty Images

Trend field

Connected world

How we connect and communicate with each other has changed beyond recognition. In today's digital age, advanced communication takes place not only among people, but also between humans and machines.
This connectivity has opened up endless possibilities: Seemingly futuristic technologies are becoming an everyday reality for many of us. Wearable devices are tracking body data and supporting digital health services. Owners of Smart Homes control lighting, heating and security installations, as well as washing machines, ovens and refrigerators, by using wireless connections.
Moreover, machines are becoming better at recognizing their environment and engaging with each other. This enhances technologies such as autonomous driving vehicles and autonomous robots. Already today, drones can transport a defibrillator to a patient at a speed of almost 100 kilometres per hour, and without the usual 10-minute response time of an ambulance. Commercial application of drones will also become the norm in other industries, such as construction, transportation and news gathering.
Around 100 years ago, people were amazed by the first telephone call. Today's connected world enables companies to go almost beyond the limits of geography, thereby improving their productivity and efficiency.

From 2017 to 2018 an increase of 18% in customer spending in connected home devices will represent a total of $189 million.

Within the next two years companies which are digitally trustworthy will generate 20% more profit than those who are not.

Customer – question of future mobility:

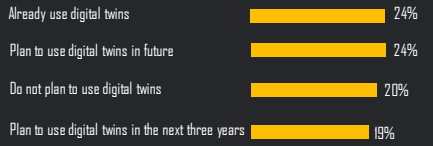
55% know person/s who switched from private cars to a new mobility concept.

55% agree with the use of fully autonomous robocabs.

45% would use autonomous robocabs if they were cheaper

40% would buy an electric car.

Organisations – use of digital twins:



99% of multinational corporations will sponsor the internal use of wearable devices to track employee fitness in order to improve their corporate performance by next year.

50% of agent interactions will be influenced by real-time analytics by next year.

(Source: Roland Berger 2018, Gartner 2017)

2018

According to Gartner, 29% of the organizations using or piloting augmented reality stated that it exceeded their expectations (Gartner 2017).

2020

Gartner predicts significant growth and evolution of head-mounted displays over the next few years (Gartner 2017).

2021

Gartner predicts that the market for head-mounted displays will reach 67.2 million shipped units and $18.8 million in revenue by 2021 (Gartner 2017).

Trend field

Connected world

HOLD – Watch list

SMART DUST
Smart dust are tiny wireless systems with a wide range of functions, such as communication, computation, and sensing technologies

ASSESS – Start initiatives in your unit

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

SMART TEXTILES
Smart textiles and clothes with interwoven microfabrics able to analyse the wearer's condition and interact with other devices

HUMAN ENHANCEMENT
Science that enhances people's capabilities by developing advances in genetic engineering and machine technology

TRIAL – Evaluation needed

DIGITAL ECOSYSTEMS
A group of stakeholders that connect through digital platforms for a beneficial purpose

OPEN DATA
Information that is openly accessible by the public without copyright restrictions, patents or other control mechanisms

OPEN API
A programming interface of a proprietary software or application that is publicly available to developers

INDUSTRIAL IoT
Integration of modern information and communication technologies into industrial production processes to develop the "smart factory"

DEEP MAPPING
Deep mapping is the layering of multiple types of geo-tagged data within a GIS (geographic information system).

AUTONOMOUS ROBOTICS & DRONES
Intelligent machines powered by Artificial Intelligence that naturally integrate and support in daily tasks imitating human behaviour

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

ADOPT – Initiatives in affected units

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

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

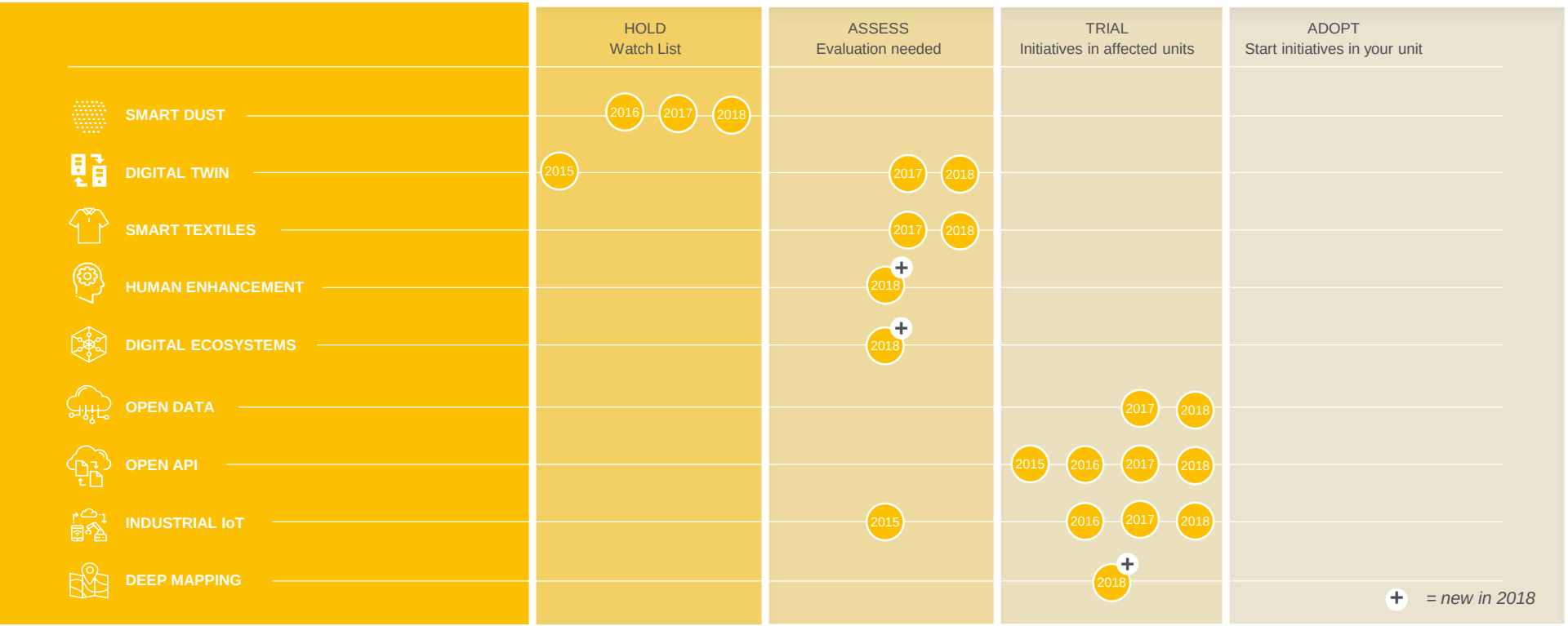
DIGITAL HEALTH SERVICES
Automatic and remote monitoring of a user's health status through advanced apps and wearables that innovate the health sector

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

= new in 2018

Trend history and changes

Connected world (1/2)



Trend history and changes

Connected world (2/2)

	HOLD Watch List	ASSESS Evaluation needed	TRIAL Initiatives in affected units	ADOPT Start initiatives in your unit
AUTON. ROBOTICS & DRONES			2015, 2018	2016, 2017
AUTONOMOUS VEHICLES			2016, 2017, 2018	
SMART LIVING			2015	2016, 2017, 2018
WEARABLE DEVICES				2015
DIGITAL HEALTH SERVICES				2015, 2017
CYBER SECURITY				2015, 2016, 2017, 2018

+ = *new in 2018*

Munich Re’s Solutions

Hartford Steam Boiler / Munich Re
Cyber Insurance Solutions

Source: ANDRZEJ WOJCICKI / Getty Images

Tailored solutions in cooperation with clients

Cyber is an increasing and complex risk which requires multifold expertise, strong accumulation control and special customer proximity.
A huge range of cyber polices are already available. But cyber threats and covers are both evolving rapidly and have to be designed along clients’ needs. Munich Re offers tailored solutions in cooperation with cedants and large corporate clients. As a specialized single-risk taker Hartford Steam Boiler offers cover for small and medium enterprises as well as individuals.

Possible coverage types:
- Loss or theft of data
- Privacy breach protection
- Cyber extortion
- Business interruption resulting from a cyber event.

Hartford Steam Boiler / Cyber-risk

HSB Engineering Insurance

Hartford Steam Boiler / Munich Re
IoT and Sensor Technology Solutions

Source: uschools / Getty Images

Leveraging data gained through sensors and the cloud

HSB’s IoT efforts are focused on two markets. For the Industrial IoT market, HSB is helping customers differentiate their products and improve their operational efficiencies, while also providing financial solutions that enable new risk transfer approaches and new business models.
For the small-and-medium enterprise (SME) market, by providing an end-to-end IoT solution of hard- and software technology, data analytics, backend operations, targeted alerts, and 24/7 monitoring support, HSB reduces the complexity of IoT and enables easily scalable applications for a diverse set of business classes.

Benefits at a glance:
- Access to new data sources and business intelligence
- Fewer claims and increased profitability
- Enhanced underwriting and risk profiling
- Value-added services

Hartford Steam Boiler / Sensors-IoT-insurance

HSB Engineering Insurance

Global Clients Innovations / Munich Re
IMPROVEX

Source: bestbrk / iStock / Getty Images

Added value through data pooling

Munich Re offers the IMPROVEX data pool to insurers who want to extract more from their own data. Valuable business insights are generated through data exchange, enabling the pool participants to permanently improve their underwriting strategy, portfolio management and pricing. Munich Re operates this data pool and, in addition to its own data, provides explicit knowledge and experience using the latest data analysis methods.

Advantages at a glance:
- Higher data quality thanks to synergy effects
- Improvement in the existing underwriting and growth strategy using empirical data.
- Increase in competitiveness, including the possibility of identifying attractive business potentials.
- Quick access thanks to intuitive web application

Munich Re / Improvex

Munich RE

Munich Re’s Solutions

Risk Management Partners / Munich Re

Business Risk Intelligence

Source: used under license from shutterstock.com

Comprehensive business insight on one intelligent platform

Risk Management Partners at Munich Re help insurers and loss adjusters to assess individual risks applying Munich Re know how and manage portfolios dynamically. One of the use cases of the Business Risk Intelligence tool is to document historic information on losses, compares this with current pictures of damage, and eventually AI helps identify potential cases of insurance fraud.

Benefits at a glance:

- Huge amounts of information on losses, assets and other information processed and enriched with Munich Re data
- Claims data analysis
- Portfolio visualization and analysis
- Accumulation analysis
- Reporting via customized dash boarding

Munich Re / risk-management-partners

Munich RE

Artificial Intelligence

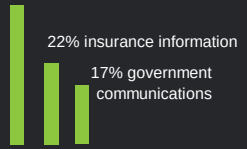
Image: Menno van Dijk / iStock / Getty Images Plus

Trend field

Artificial Intelligence

The Interest in artificial intelligence (AI) is growing rapidly. Creating systems that learn, adapt and act autonomously will be a major topic for companies in the next years. Machine learning is fuelled by the availability of massive amounts of data as well as advanced hardware that is creating ever more sophisticated algorithms. In the future, more and more applications and services will incorporate AI. The technology gives rise to a wide range of implementations. These include physical devices such as robots, autonomous vehicles and consumer electronics, as well as apps and services, such as virtual personal assistants (VPAs) and smart advisors. VPAs such as Google Now, Microsoft's Cortana and Apple's Siri are becoming smarter and more advanced in their abilities. Chatbots, such as Facebook Messenger, can be powered by AI and – like other systems – create a new intelligent layer between people and systems. Predictive analytics are able to calculate what is likely to happen and help companies prevent undesirable occurrences, such as a customer cancelling a contract. Computer vision makes high-level understanding of digital images or videos possible and can be used for medical diagnosis for example. Companies are well advised to invest significantly in skills, processes and tools to exploit these techniques. They need data scientists to understand AI algorithms and developers to design user interfaces. For companies, AI will replace people (e.g. in customer service tasks such as driving a bus), but it is much more than that: It is a way of augmenting human activity.

Customers areas of interest for virtual assistants:



90% of analytics platforms and modern BI will apply natural language generation as a standard feature within the following year.

50% of analytics queries will be generated using natural language generation within the following year.

The average error of speech recognition is currently at 5% which matches the human parity.

1M jobs of phone-based customer support agents will be disrupted through AI by 2020.

5% of the age group 65+ will have a personal health care robot by 2020.

2 hours a day of half a billions of users will be saved through AI-powered tools by 2020.

10% of emergency field services will be scheduled and performed by AI by 2020.

Main areas of interest for AI:

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

(Source: Gartner 2017; JWT 2017)

2017

In 2017, 31% of voice technology users already take advantage of this artificial intelligence at least once a week (Ovum 2017).

2018

Today, Siri speaks over 20 languages, while Google Assistant will be able to speak 30 languages by the end of 2018, covering 95% of Android users (Statista Survey 2017).

2022

By 2022, 66.3 million U.S. households will have a smart home device (Forrester 2017).

Trend field

Artificial Intelligence

HOLD – Watch list

ARTIFICIAL GENERAL INTELLIGENCE +

AGI is only a subject for science fiction and "what if" discussions.

ASSESS – Start initiatives in your unit

HARDWARE-EMBEDDED AI +

The integration of artificial intelligence into hardware creates smart automation solutions with benefits like energy saving and cost efficiency, as well as the elimination of human error.

CONVERSATIONAL INTERFACES

The third application program that simulates human conversations and chats through artificial intelligence via voice

TRIAL – Evaluation needed

MACHINE-DRIVEN DECISIONS

Business decisions that are derived and backed by verifiable, quantitative data analysis

SMART BOTS

The third application program that simulates human text and chats through artificial intelligence

DEEP LEARNING +

Deep Learning creates knowledge from multiple layers of information processing. Its technology is modelled after the human brain and each time new data is poured in, its capabilities get better.

ADOPT – Initiatives in affected units

NLP & SPEECH RECOGNITION +

For most enterprises, the simplest, strongest and most immediate use cases for NLP are typically related to improved customer service and employee support.

ADVANCED MACHINE LEARNING

The science of getting computers to act without being explicitly programmed

ROBOTIC PROCESS AUTOMATION

RPA "robotize" existing applications in the digital system to achieve efficient, automated business processes

PRESCRIPTIVE ANALYTICS

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

COMPUTER VISION +

Computer vision tasks include methods for acquiring, processing, analysing and understanding digital images, and extraction of data from the real world.

+ = *new in 2018*

Trend history and changes

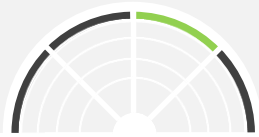
Artificial Intelligence (1/2)

	HOLD Watch List	ASSESS Evaluation needed	TRIAL Initiatives in affected units	ADOPT Start initiatives in your unit
ARTIFICIAL GENERAL INTELLIGENCE	2018 +			
HARDWARE-EMBEDDED AI		2018 +		
CONVERSATIONAL INTERFACES		2017 2018		
MACHINE-DRIVEN DECISION	2015	2016	2017 2018	
SMART BOTS		2017	2018	
DEEP LEARNING			2018 +	
NLP & SPEECH RECOGNITION				2018 +

\+ = *new in 2018*

Trend history and changes

Artificial Intelligence (2/2)



	HOLD Watch List	ASSESS Evaluation needed	TRIAL Initiatives in affected units	ADOPT Start initiatives in your unit
ADVANCED MACHINE LEARNING			2016, 2017	→ 2018
ROBOTIC PROCESS AUTOMATION			2017, 2018	
PREDICTIVE ANALYTCIS				2015, 2016, 2017, 2018
COMPUTER VISION				2018 +

\+ = *new in 2018*

Munich Re's Solutions

Life and Health / Munich Re
MIRA Digital Suite

Source: Munich Re

Accelerating life insurer's underwriting and claims handling

MIRA Digital Suite provides life insurers the tools they need to utilize competitive advantages through digitalization: Cloud-based MIRApply completely digitalises key parts of the risk assessment process, reducing the time required by Underwriters by up to 90% – to just five minutes. CLARA halves process duration from claims notification to decision-making. MIRA Digital Suite is being systematically enhanced. In future, it will serve as the platform for deployment of artificial intelligence – e.g. machine-learning. This also enables individual risk assessments and customized products.

Benefits at a glance:
- Remarkable faster process time in underwriting and claims handling
- Innovative, flexible and customized products
- More efficient processes inside the company
- Improved risk results
- Access to the newest, continuously updated insurance solutions

Munich Re / MIRA Digital Suite

Financial Solutions / Munich Re
FIVE

Source: Munich RE

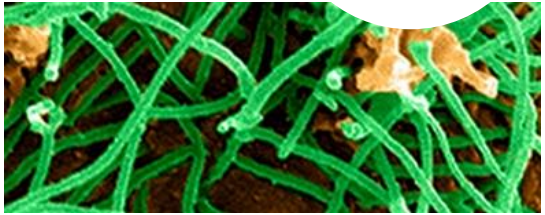
Rules-based investment strategies

Using modern technologies, FIVE develops rules-based investment strategies for insurance companies and institutional investors globally. Insurance clients value the convenience of a one-stop-shop boutique which is able to combine investment strategies, guarantees and insurance covers into a single product solution – lean and tailored to individual needs. Moreover, they can access a suite of highly diversifying return sources, benefit from cost-efficiencies, and aim to improve their balance sheet utilization.

Advantages for insurers at a glance:
- Access to an assorted selection of quantitative investment strategies
- Less friction by working hand-in-hand during the product design process
- Better risk transfer by sourcing complete investment solutions directly from Munich Re
- Attractive payouts combined with guarantees and insurance covers

Munich Re / FIVE

Munich Re
Epidemic Risk Solutions



Source: Callista Images / Getty Images/Cultura RF

Holistic solutions saving lives, protecting economies

Epidemic risks are hard to predict and even harder to insure. New covers are data based and incorporating intelligent accumulation management. The major advantage of an insurance approach to epidemic risks is that the ex-ante financing of necessary response measures is geared to rapidly contain the outbreak itself. Both, the course and severity of an epidemic can be influenced, even during the outbreak. Additionally, the potentially severe financial consequences for companies can be mitigated.

Munich Re develops a holistic set of solutions for companies and the public sector, e.g., hospitality business or mining.
Benefits of products at a glance:
- Revenue stability
- Balance sheet protection
- Indemnification of lost revenues or profits

Munich Re / Epidemic Risks

Trend field

Disruptive technologies

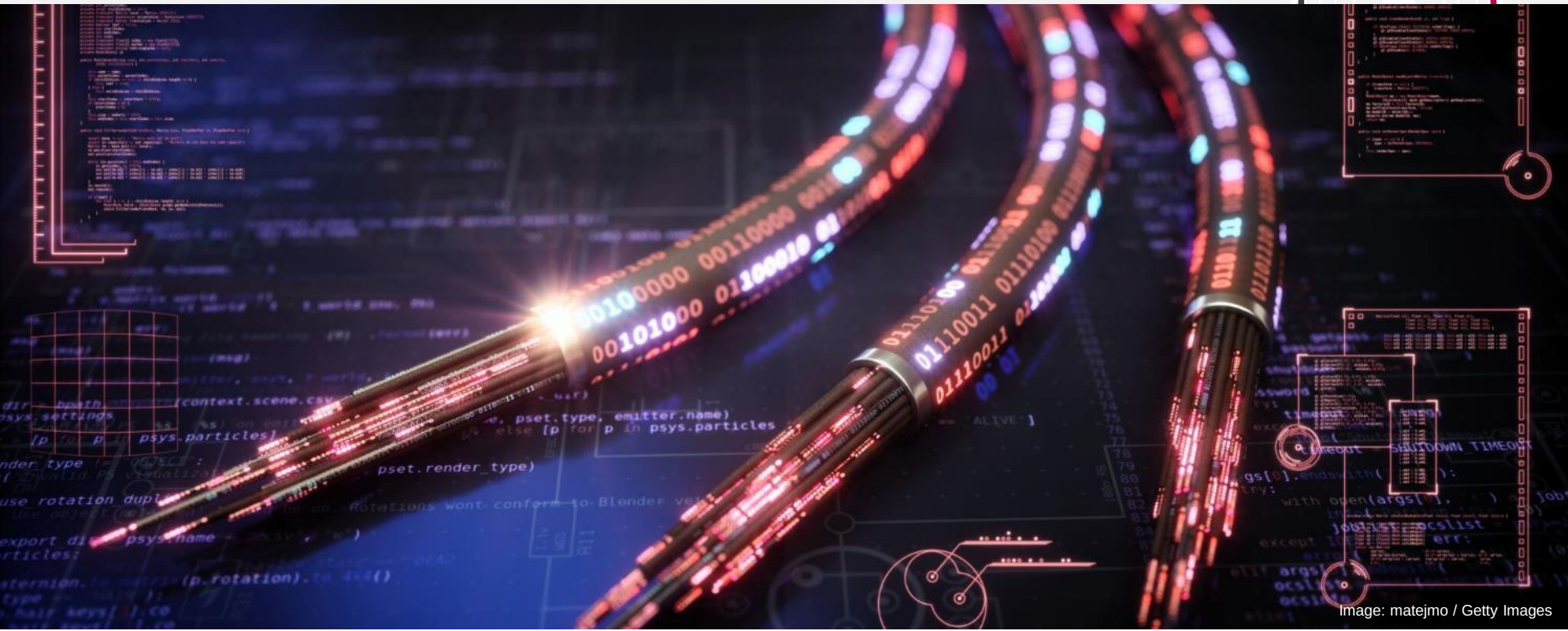


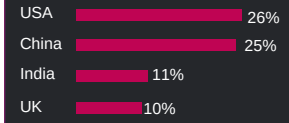
Image: matejmo / Getty Images

Trend field

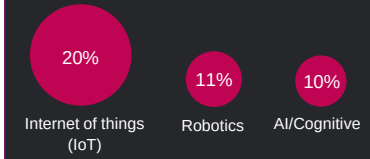
Disruptive technologies

Disruptive technologies are those that disturb the success of a former, established product, or that could even substitute it completely in the future, sometimes creating a whole new industry – as the telephone and the internet have done in the past.
What is tricky about them is the fact that no-one can really tell yet how they might develop. Not every emerging technology will alter the business or social landscape, but some do have the potential. It is therefore important that business leaders understand which future technologies they should be concerned with, and prepare accordingly.
One of these is blockchain, which is the underlying technology of Bitcoin. The insurance company Axa has just launched a blockchain-based insurance called fizzy, which offers direct, automatic compensation to policyholders whose flights are delayed. Further use cases are yet to be proved, but it is likely that the technology will develop quickly and gain acceptance.
5G is the next-generation cellular standard after 4G. Commercial network infrastructure with early 5G-standard compliance could be achieved by 2019. Giants like AT&T, Telstra and T-Mobile already plan to use the technology on a large scale. Companies will soon be able to use 5G to support services such as Internet of Things communications or high-definition video.
These potentially disruptive technologies may influence or even change your business in the future. So always be on the lookout for the latest disruptive technology.

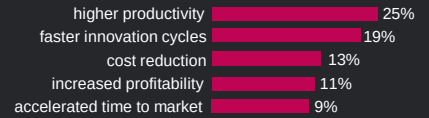
Countries that show the most promise for disruptive technological breakthrough:



Top technologies that will drive business transformation over the next 3 years:



Business benefits from IoT adoption according to global tech leaders:



3% of the communication service providers will launch commercial 5G networks by 2020.

Business units influenced by disruptive innovation:

- Product/service development
- Manufacturing
- Buyer behaviour
- Sales channels and supply chains
- Distribution
- Customer service
- Workforce
- Back office

Future applications areas for quantum computing:

- Machine learning
- Artificial intelligence
- Finance
- Healthcare
- Computer science

(Source: Gartner 2018; KPMG 2017)

2018

Over the next three years, with 20% IoT presents the main driver of the global technological business transformation (KPMG 2017).

2020

By 2020, the IoT unlocks immense business opportunities through the connection of 20.4 billion objects worldwide (Gartner 2017).

2021

Spending on IoT evolves to $1.4 trillion by the year 2021.

Trend field

Disruptive technologies

HOLD – Watch list

5G
The 5G technology is 40 times faster compared with the actual standard of LTE (4G).

VOLUMETRIC DISPLAY
Volumetric displays create visual representations of objects in three dimensions, with a 360-degree spherical viewing angle in which the image changes as the viewer moves.

NEUROMORPHIC HARDWARE
The knowledge of how to process a detailed map of the human brain is used to design neuromorphic chips modelled after the neural brain network of humans.

BRAIN COMPUTER INTERFACE
Current brain-computer interface projects aim to develop techniques for brain-robot interaction

PROGRAMMABLE MATERIALS
It is possible to program a wide range of materials to change appearance and other material properties on demand.

ASSESS – Start initiatives in your unit

QUANTUM COMPUTING
Area of study focused on computer technology following the laws of quantum physics and promising a new era of computational performance

SWARM INTELLIGENCE
Swarm intelligence systems consist typically of a population of agents interacting with one another and with their environment.

3D PRINTING
An automated manufacturing process that creates multi-dimensional physical objects based on digital designs

TRIAL – Evaluation needed

CYBER THREAT INTELLIGENCE
Is a set of up-to-date data regarding security threats, threat actors, exploits, malware, vulnerabilities and compromise indicators, mostly offered by IT security companies.

ADOPT – Initiatives in affected units

BLOCKCHAIN TECHNOLOGY
The technology is eliminating the need for a trusted central authority. It also does not need intermediaries, which makes it a decentralized, safe and transparent data network.

CLOUD EDGE
The science of getting computers to act without being explicitly programmed

= new in 2018

Trend history and changes

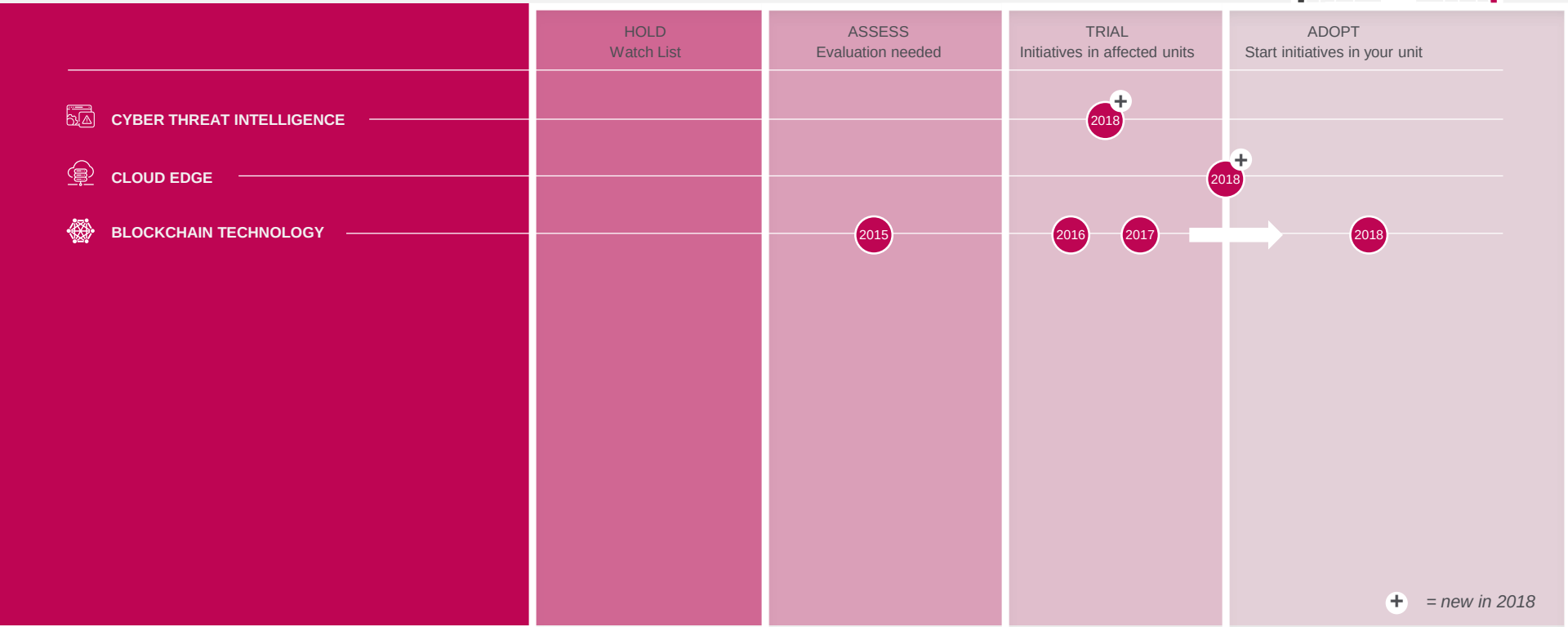
Artificial Intelligence (1/2)

	HOLD Watch List	ASSESS Evaluation needed	TRIAL Initiatives in affected units	ADOPT Start initiatives in your unit
5G	2018 +			
VOLUMETRIC DISPLAY	2018 +			
NEUROMORPHIC HARDWARE	2018 +			
BRAIN-COMPUTER INTERFACE	2018 +			
PROGRAMMABLE MATERIALS	2018 +			
QUANTUM COMPUTING	2016, 2017	2018		
SWARM INTELLIGENCE		2018 +		
3D PRINTING	2015	2016, 2017, 2018		

+ = new in 2018

Trend history and changes

Artificial Intelligence (2/2)



Munich Re's Solutions

Special and Financial Risks / Munich Re

Hyperloop Technology

Source: Hyperloop TT

Supporting technological innovations with risk expertise

The Hyperloop technology sees passengers and goods being transported in capsules travelling at high speeds in a low-pressure environment using electromagnetic propulsion

The combination of technological and infrastructure innovation create new insurance needs that require specific solutions. Munich Re entered a strategic partnership with Hyperloop Transportation Technologies (HyperloopTT). A project team within Munich Re collaborates with HyperloopTT to expand the boundaries of transportation and insurability.

Objectives:

- Analysis of entrepreneurial and technological risks
- Development of a Hyperloop insurance concept
- Supporting the integration of an active risk management system

Munich Re / Risk Report Hyperloop

Munich RE

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IT INNOVATION MANAGEMENT

Contact Munich Re:
Tom Bonaty
(Global IT Governance)
Tel +49 (89) 3891-3861
tbonaty@munichre.com

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TECH TREND RADAR 2018