



Tech Trend Radar 2021

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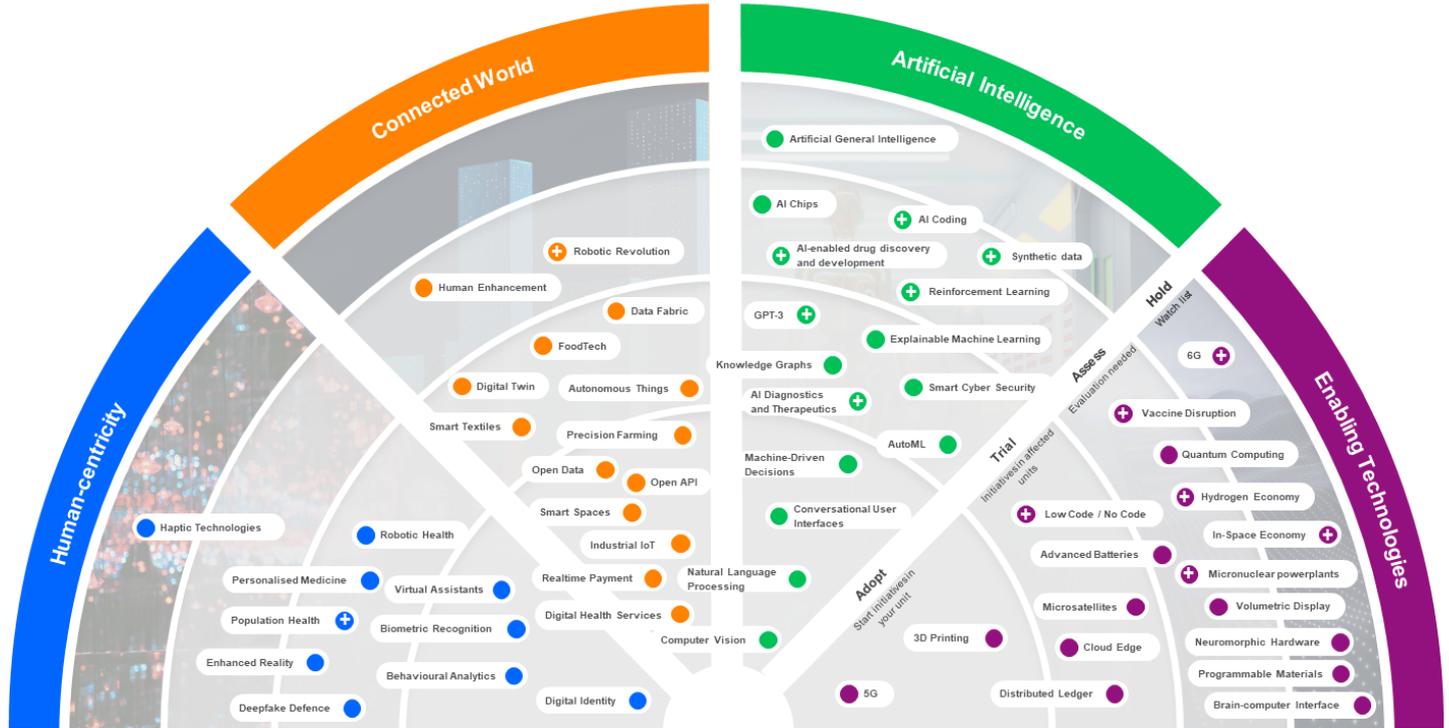
Tech Trend Radar 2021 Introduction



The Tech Trend Radar 2021 provides information about technology-driven trends in 2021 that are relevant to Munich Re, ERGO and the global insurance sector. It is a collaborative initiative by Munich Re Business Technology and ERGO IT Strategy.

The Tech Trend Radar 2021 aims to sharpen awareness, provoke discussion and initiate new business opportunities that appeal to all insurance clients and 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 Arthur D. Little and the Institute of Electronic Business, future trends have been gathered, aggregated and rated in order to provide a comprehensive view of technology trends, their maturity and relevance for the Munich Re Group and the insurance industry.



Images: Getty Images

Turning challenges into opportunities

Challenges keep coming our way – this holds true for our society, our private lives and for the corporate world and the impact to these aspects are all interlinked together. COVID is reshaping our lives today and the impacts will prevail. Even if we can get the pandemic under control or perhaps over it altogether, there are even bigger challenges like climate change to be tackled. In the light of these developments, we can conclude that fast paced change of our everyday lives, our behaviors, and our visions and goals for the future is guaranteed.

From the recent past we see that new ways to use technology are helping us cope with this change and mitigate the impacts – be it through rapid development of vaccines, shifts of business to online channels at an unprecedented rate, or the transition of company life to virtual reality and home office.

We need to be prepared for this high paced shift of business models and whole industries to tech driven solutions – especially in the insurance industry. We believe our future is full of opportunities to transition our business and make it a success in the future. That is why we prepared the 2021 version of our Tech Trend Radar with particular emphasis on technologies that become increasingly relevant for our industry in the near future.

We hope we can inspire you and your organizations to see the opportunities ahead!



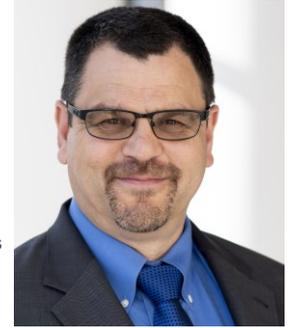
Dr. Olaf Frank
Head of Business Technology
Munich Re Group

Insurance is a technology business

Insurance is as much a technology business as it is customer relationships given our products are all digital in nature. Thus, staying on top of the latest technologies and leveraging the benefits for our staff and customers are essential for success. We have experienced how technology provided resilience to our organization against the challenges of COVID and successfully enabled a distributed work mode. Demographics are changing as are the expectations of our customers.

With the Tech Trend Radar we explore the emerging technology opportunities and assess what is ready for large scale adoption. We also consider what insurance companies should keep in mind from a strategic perspective, be it competitive behavior, emerging market opportunities or changing customer expectations. As a perfect example, many AI use-cases sounded like science fiction a short while ago - now we are using them in daily business to understand our customers' needs and provide them with swifter service. In our Ambition 2025, Munich Re and ERGO will take that to the next level.

Now use our insights to scale good ideas, shape the business and succeed in the marketplace!



Paul Spiteri
Member of the Board
ERGO Technology &
Services Management

Tech Trend Radar 2021 with exponential mindset

The profound consequences of the current pandemic are not yet foreseeable, but it has once again brought it home to us: Humanity's greatest strength is also our greatest weakness: social coexistence on a global scale and global cooperation. Without human closeness through social contacts, we become lonely in a very short time. Just as bad, of course, are the necessary closures of schools, restaurants and stores and the bans on sporting and cultural events that threaten professional livelihoods and careers.

But the pandemic has also opened our eyes wide to the benefits of technology: The rapid development of corona tests as well as the new vaccines would have been impossible without technology. Home offices will be maintained as the new normal, providing a tremendous benefit to commuters and families. And implicitly will reduce congestion and relieve public transport. Not to mention company savings if they need less office space in expensive cities.

The new Tech Trend Radar has been intensively discussed and compiled completely remotely with additional great insights from our Munich Re venture colleagues in San Francisco, HDFC ERGO in India and the Si Tao innovation team in Beijing to only name a few. We've discovered that circular economy enabling technology is gaining

momentum and we've additionally put a new focus on health-related trends like AI-enabled drug discovery, AI diagnostics and population health.

The technology mega trends like machine learning, cloud computing, robotics and cellular technology (5G/6G) continue to accelerate with exponential speed. For insurance, technology is not only an enabler, but insurers must become technology businesses at the heart. Due to the huge number of emerging solutions and services insurers cannot hope to adopt everything themselves but need to establish digital ecosystems with partners. To foster an exponential mindset also in the insurance industry the organizations need to bring business and technology teams together so that they can learn from each other quickly and implement the most effective business cases.

Our Tech Trend Radar helps navigating within these business initiatives and to differentiate future ideas from trends with immediate benefits.

We clearly see that it's not the technology that drives success or failure, it's the people who decide which need to address and who execute the implementation and growth.

Let's develop our future – **together**

ERGO

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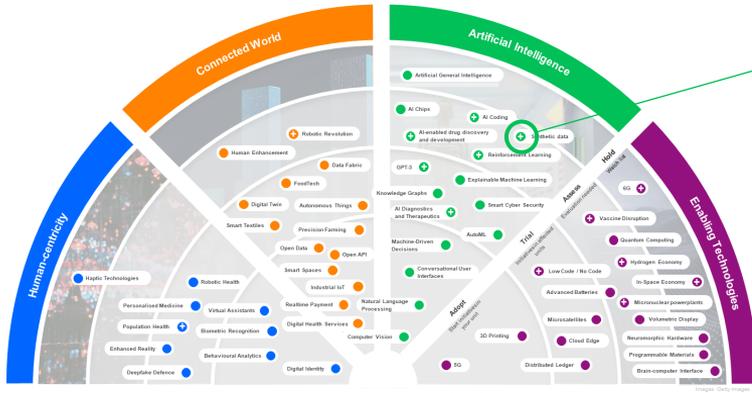


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Tech Trend Radar 2021

How to read this report



New trends 2021

- Population Health
- Robotic Revolution
- AI Diagnostics and Therapeutics
- GPT-3
- Reinforcement Learning Techniques
- AI-enabled drug discovery and development



Adopted or expired trends 2021

- Location-based services (adopted)
- Digital Ecosystems (adopted)
- Cloud Enablement (adopted)
- Swarm Intelligence (adopted)
- Deep Mapping (expired)
- Smart Dust (expired)



Trend fact sheets and use cases

Each of the 52 trends is introduced with a dedicated fact sheet including its anticipated impact along the insurance value chain and supported by cross-industry use cases.

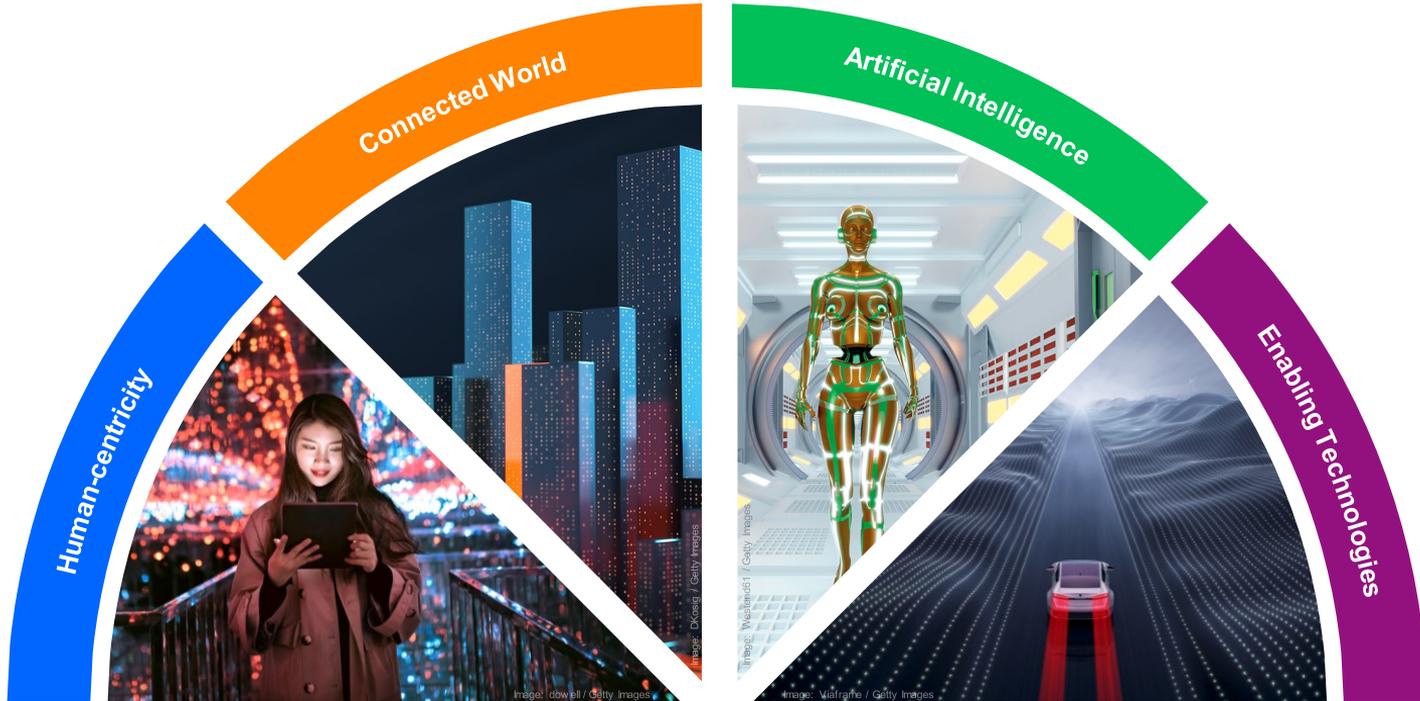
Tech Trend Radar 2021

The Tech Trend Radar began in 2015 as a collaborative initiative around trend monitoring between Munich Re and ERGO. Our aim is to promote innovative initiatives around each tech trend with our clients and develop the best solution for the challenges of tomorrow.

This year's report contains 58 trends that have strategic and operative relevance for the insurance industry. The trends are categorised into four trend fields: Human-centricity, Connected World, Artificial Intelligence and Enabling Technologies.

14 new trends have entered the Tech Trend Radar 2021, especially in the field of Artificial Intelligence. Additionally, health-related trends have been drawn attention due to the pandemic. Some 2020 trends have been fully adopted or are to be perceived as expired, e.g. when no relevance use cases have appeared in the course of the year 2020.





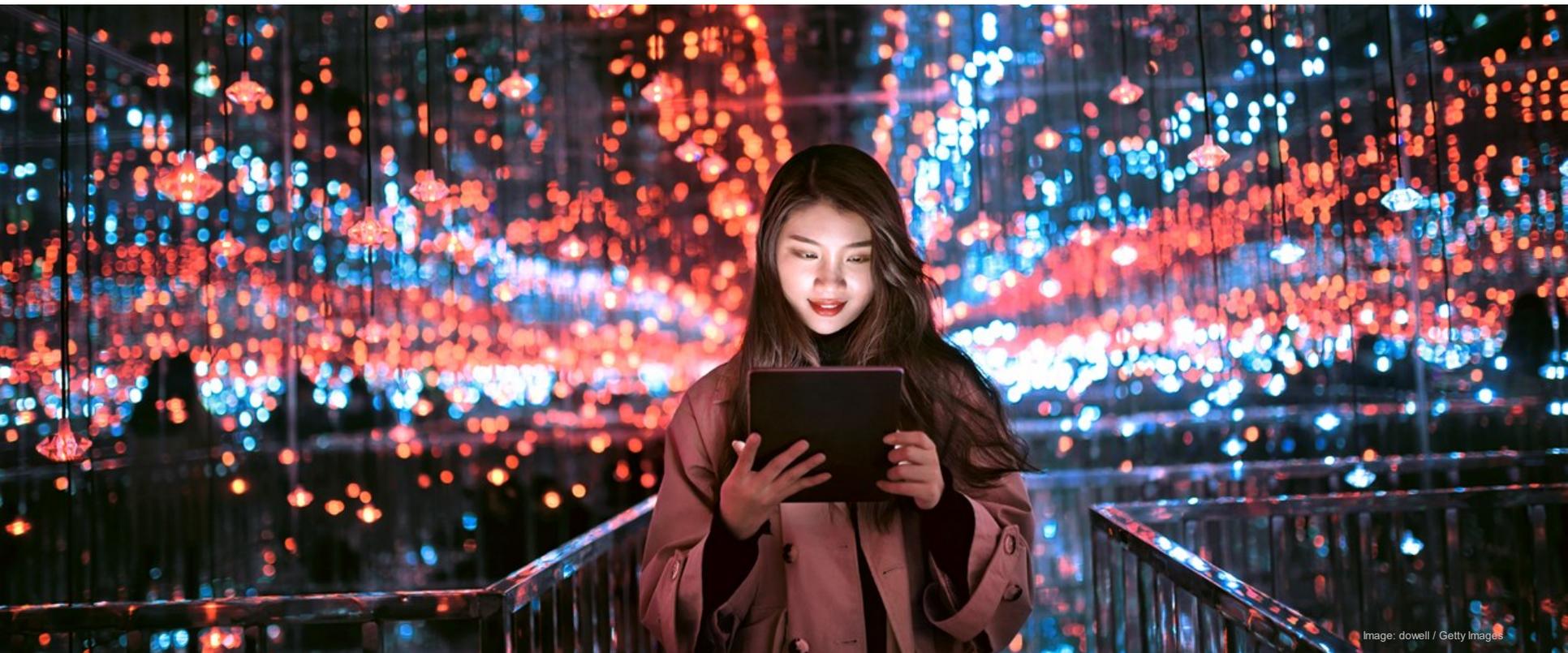


Image: dowell / Getty Images



Human-centricity

In an increasingly transparent world, companies must focus on their customers' needs and expectations to maintain their market position. Consumer habits are changing rapidly through unlimited streams of information sent back and forth via social media, smart devices and the Internet of Things. Today's customers expect services, not products, and information that speak to their individual needs. Anything perceived as irrelevant will harm the customer experience. (Behavioural) Analytics provide companies with information masses to fulfil these demands. New ways of working influence the interaction between human and machine.

Health related technologies are in the spotlight of entire economies. Enhanced realities and haptic technologies are still waiting for the human user to be ready to create real value. Business leaders must show radical openness and agility to deliver human-centric services. They have to be willing to question old beliefs and structures in order to develop convincing answers in times of rapid technical development and change.

Adopt – Start initiatives in your unit



Behavioural Analytics

Behavioural analytics monitor, analyse, measure and interpret people's actions, intentions and characteristics from users' digital footprint



Biometric Recognition

Biometric recognition systems can identify and verify individuals by detecting physiological and behavioural characteristics.



Digital Identity

A digital identity is a body of information about an individual or organisation that exists online.



Virtual Assistants

Virtual Assistants execute trained and automated administrative tasks and deliver results directly to its users.

Trial – Initiatives in affected units



Deep fake Defence

Technological solutions to combat the spread of manipulated information. Semantic techniques help detect and remove highly sophisticated AI-manipulated media known as deep fakes.



Enhanced Reality

Real, augmented and virtual worlds are increasingly merging and changing people's perception of their environment.



Personalised Medicine

New ways of managing population health data such as health records and Covid-19 status are emerging



Population Health

New ways of managing population health data such as health records and Covid-19 status are emerging.



Robotic Health

Cognitive AI in robotics looks promising for the use of robots in care, rehabilitation and prosthetics and surgery

Assess – Evaluation needed

Hold – Watch list



Haptic Technologies

Haptic technologies enable users to touch things inside a virtual world, thus opening up a new dimension in mixed realities.

 = new in 2021



Behavioural Analytics monitor, analyse, measure and interpret people's actions, intentions and characteristics from users' digital footprint in various digital devices.

What has started as Social Analytics now transforms to the Behavioural Analytics as analytics can process more and more contextual information and cloud-enabled platforms become more integrative data fabrics.

Behavioural data can, for example, show how consumer habits and expectations have changed over time, and so analyse the effectiveness of marketing activities, understand a customer's pains, respond with personalised offers and increase customer retention. Data analytics tool that support a 360 degree customer view are enabling technologies for marketers.

Insurance Value Chain



Opportunities

- Higher profitability due to more precise risk assessment by taking personal profiles into account.
- Usage of key information about lifestyle and (existing) coverages to smoothen application and underwriting process.
- Fraud prevention by recognizing risky sports that were not disclosed in risk questionnaire.
- Support sales agent with relevant customer data
- Creation of new distribution channels as data can indicate the need for certain life insurance cover (e.g. information on marital status and/or homeownership can show need for term life).
- More effective marketing measures due to knowledge about customer's key pain points.

Risks

- Change in data security and data usage regulation.
- Abuse of data for manipulations (e.g. purchase decisions).
- Discrimination against people based on their preferences.
- Requires companies to protect personal data and privacy.

Trend Evolution



Behavioural Analytics is a form of Analytics that is based on the usage of Big Data to better understand customer preferences and improve customer services. When evolving from Social Analytics to Behavioural Analytics, this trend has gained relevance to be implemented across the entire organisation.

Related Trends

- Digital Identity
- Data Fabric
- Virtual Assistants
- Open API



Biometric recognition systems can identify and verify individuals by detecting physiological and behavioural characteristics.

In 2020, recognition systems based on machine learning are focusing on facial recognition. Live Facial Recognition (LFR) allows individuals to be recognised and located. Amazon is selling its facial recognition system *Rekognition* to governments. After facing severe criticism by human rights groups, Amazon defined guidelines for policymakers to consider in terms of facial recognition, demanding human review and recommending a 99% confidence score threshold.

Other physiological characteristics for recognition systems are body constitution, fingerprints, handshape, ear shape or retina. Behavioural characteristics that can be detected are vocal imprint, body movement and gait, writing or typing style on keyboards.

Insurance Value Chain



Opportunities

- Reduction in fraud through advanced fraud detection and increased efficiency in claims management as facial recognition reduces the amount of time it takes to identify objects and people in images and videos.
- More accurate risk detection, e.g. body scanners used for personal health risk assessment.
- Whereas the opportunities of voice recognition, prominently used as Amazon Alexa Skills, lie in increasing customer convenience, object and face recognition systems offer great opportunities in risk management.
- Reduction of claims caused by machine-related failures. Low-cost sensor solutions originally applied in consumer electronics are making their way into industrial applications where they optimise manual quality-control processes and provide machine-based insights on failure rates.

Risks

- Severe civil risk of manipulation, ethical abuse and spread of fake identities. Products such as Amazon Rekognition are heavily criticised by civil rights groups for being sold for the purpose of law enforcement, delivering poor accuracy and thus, encouraging discrimination.
- Public concerns about privacy are rising and civil rights movements are legally fighting against the installation of facial recognition systems in public spaces.

Trend Evolution



Biometric Recognition has been watched carefully, e.g. in relation to NLP or Computer Vision. Since 2020, Biometric Recognition appears as a dedicated trend that leverages image recognition and machine learning techniques.

Related Trends

- Computer Vision
- Deepfake Defence
- Natural Language Processing
- Automated Machine Learning (AutoML)



A digital identity is a body of information about an individual or organisation that exists online.

Digital identities arise organically from the use of the web, with the collection of our online behaviours constituting a digital fingerprint. As more online applications become part of our daily lives, digital identities become increasingly more detailed. They reflect behaviours, attitudes and preferred interactions.

At the same time, public institutions are creating digital identities such as national eID programs for their citizens. Security and privacy remain key areas of concern. The World Economic Forum, United Nations, and some Big Tech have been working together to create global digital IDs since 2014, in an effort recognised by the World Bank as important for sustainable development. The Corona virus has pushed this development further. To inhibit the spread of the virus governments in partnership with software developers have made efforts to bring upon app solutions that fulfil high privacy standards.

With a revenue forecast of \$8.1bn in 2025 from \$1.3bn in 2020, Digital Identity solutions are considered to be a growth market for mobile network operators. They are going to be key enablers in providing solutions for identity verification via smartphones.

Insurance Value Chain



Opportunities

- Digital identities reduce fraud risk, since they are much more difficult to copy or fake than paper-based documents.
- Consumers can save time and effort, since customer on-boarding and identity checks (particularly in the financial industry) only need to be done once.
- Consumers may command their own digital identity and decide which elements of it are disclosed to which counterparties. Health insurers e.g. only need access to the health information of the customer, but not his or her overall financial situation.
- Risk assessment for insurance coverages may be completely based on digital identities. In health insurance, a complete health record of the patient would make extensive questionnaires obsolete, for example.

Risks

- Privacy: although conceptions of privacy differ from culture to culture, countries require a stable framework for data protection that covers the storage, linkage and use of data.
- Digital identities need to be protected from theft and abuse.
- Digital authentication requires high privacy protection by mitigating risks of unauthorised access to individuals' information.
- Digital identities may be faked in order to pretend to be someone else or will be hijacked as a type of security attack to control identity.

Trend Evolution



Digital Identity has already spilled over to other areas. As a trend, Digital Identity is more than ready for adoption.

Related Trends

- Real-time Payment
- Deepfake Defence
- Behavioural Analytics
- Distributed Ledger

Human-centricity Virtual Assistants

Adopt



Virtual Assistants execute trained and automated administrative tasks and deliver results directly to its users.

Progress made with Behavioural Analytics and Machine Learning enables Virtual Assistants to perform more complex tasks and evolve to more collaborative task agents. Virtual Assistants can organise a user's inbox by themselves or even trade stocks on behalf of their user.

In financial services, robo-advisors gained popularity as they advise on investment allocations at hand. These tools have been applied and elaborated for the usage of investment and wealth management companies for decades. In contrast to these digital advisors or even to smartbots or Amazon Echo, Virtual Assistants do not need to be asked explicitly by the user to perform a task. They learn from user behaviour and act on behalf of its user. Virtual Assistants do not even need a Conversational User Interface (CUI).

Insurance Value Chain



Opportunities

- Virtual Assistants help users to focus on high-impact work by taking over time-consuming administrative tasks.
- New service channel with boosted lead generation as Virtual Assistants know their users best. In insurance, Virtual Assistants could greatly improve the customer experience in on-boarding, underwriting and claims handling. They are available around the clock and interact with the consumer in a familiar interface - an important step toward invincible insurance.

Risks

- Virtual Assistants have to be able to provide just the right amount of information and be transparent to serve as a trustworthy task agent.
- Insurance customers are becoming more aware of digital tools to help them plan their financial future, and also more demanding of useful features. Adoption of Virtual Assistants might differ from user to user depending on their digital habits and trust in algorithms.

Trend Evolution



Enabled by other trends in the field of Machine Learning, Virtual Assistants catch up in relevance in the field of Human-centricity.

Related Trends

- Open API
- Natural Language Processing
- Digital Identity
- Automated Machine Learning (AutoML)



Technological solutions to combat the spread of manipulated information. Semantic techniques help detect and remove highly sophisticated and believable AI-manipulated media known as deepfakes.

It is predicted that in 2020, the costs arising from deepfake scams will exceed \$250m according to Forrester ("Predictions 2020", 2019). The spread of deepfake tools and their advanced capabilities to produce fake media based on GANs raises some concerns over what is actually "real". Deepfakes are often found on social media websites. With the viral spread of deepfakes, the need for scalable systems to recognise fake information is rising. Fraud cases have been reported in which thieves used fake voices to imitate humans, incl. tonality and accents on interactive phone calls. A CEO of an energy supplier in the UK has been tricked into paying €200k to a fraudster as he believed a company executive was calling and requesting him to transfer the money.

Researchers pin hopes on semantic inconsistency detectors as deepfakes often show inaccuracies in visual details such as mismatching earrings in a faked person's portrait.

Insurance Value Chain



Opportunities

- Increased accuracy in claims management using recognition systems.
- Better fraud detection.
- Emphasis on veracity safeguards can create a company culture where people are more aware of threats and less likely to fall prey to false information.

Risks

- Statistical methods to validate a fact are overruled by deepfake manipulation techniques. Even (untrained) human review is not reliable when it comes to detecting deepfakes.
- Deepfakes have made their way from humorous fake news and a potential national security concerns to faked corporate or client communication. Dedicated and regular training not only for IT security staff but also for client, key account or demand managers is essential.
- Training material and professional deepfake detection is still not widely available in 2020.
- The scalability of semantic deepfake detection techniques for data-rich systems such as social media are still in their infancy.

Trend Evolution



Enabled by "Truth identification" on the radar 2019 and enhanced by advancing AI technologies, deepfakes and how to tackle them is an own field for action since 2020.

Related Trends

- Biometric Recognition
- Behavioural Analytics
- Automated Machine Learning (AutoML)

Human-centricity Enhanced Reality

Trial



Real, augmented and virtual worlds are increasingly merging and changing people's perception of their environment.

Smart devices are delivering increasingly insightful digital services everywhere. They are creating a mesh of interconnected people, devices, content and services, and are adding a virtual dimension to reality.

In the future, physical and graphical objects will interact more and more naturally, creating a mixed reality. A person who looks at a product will e.g. see contextual information visually integrated or overlaid with that person's view. The advances in technology are so rapid that we can expect AR/VR devices will soon have sensors that monitor brainwave activity, heart rate, and cortisol levels in the blood.

Virtual and augmented worlds are often used as a novelty for customer engagement, e.g. using Head-Mounted Displays (HMDs). VR and AR products and services are becoming more widely accepted by society. By swiftly addressing growing customer concerns, the insurance industry has a potentially significant revenue and risk opportunity.

Insurance Value Chain



Opportunities

- Insurance customers can experience claims scenarios first-hand – in an augmented real-world environment – to illustrate how important and valuable insurance coverage is.
- In the field of car insurance, virtual reality can provide a range of personal driving-assistance functions including augmented driving, collision warnings and “black-box” services such as video recording.
- Assist insurance brokers in the selling process by visualising loss scenarios in the surroundings.

Risks

- In an enhanced reality, unreal objects can appear and real ones disappear. Mixed reality's health risks for all ages can include the physical and the psychological. There is the prospect of purposely harming or instilling fear in an AR/VR user and risk of property destruction and injuries in the real world while being active in a virtual-world scenario. In combination with haptic interfaces, virtual-reality can lead to motion sickness, extreme stress reactions and loss of the sense of reality.
- The potential is high, but adoption rates are still slow as overall awareness grows. As Second Life or Google Glass have shown, to date customer never fully accepted mixed forms of reality.
- Malicious application can lead to data leakage regarding the user's field of view and current location.

Trend Evolution

Adopt Start initiatives in your unit	Trial Initiatives in affected units	Assess Evaluation needed	Hold Watch list
	2020	2019	2018

As the trend has matured over time, it is now recommended to get to know AR and VR technologies better to improve the effectiveness and efficiency of insurance businesses.

Related Trends

- Computer Vision
- Smart Spaces
- Haptic Technologies
- Human Enhancement

Human-centricity Personalised Medicine Trial



A tailored medical therapy based on an individual's disease pattern, body constitution, gender, etc. that is enabled by biotechnologies like Next Generation Sequencing (NGS) of DNA strings, organ-on-a-chip (OOC) applications, cell sorting or 3D-printed substitutional materials.

Immunotherapy for precise cancer treatment (e.g. Herceptin) has been one of the first treatments for personalized medicine, which has now moved to ultra-targeted therapies such as CAR-T. Personalized therapy has now moved out of the realm of cancer and into genetic diseases such as sickle cell anaemia or SMA. Zolgensma approved in 2020 is the most expensive treatment available to date and has brought alternative payment models (outcome based care) into focus.

In addition the trend towards personalized medicine in cancer continues and will require rethinking of the entire healthcare and value chain. Cancer will likely lead the way here, but other diseases will likely follow especially with the adoption of cell and gene therapies, which can be augmented by mRNA technologies.

Insurance Value Chain



Opportunities

- Enable personalised therapies for critical and complex illnesses, thereby reducing follow-up treatment costs.
- Cell and Gene therapies offer the potential for curative treatments for lifelong diseases with significant savings for the healthcare systems.
- Risk mitigation to lower insurance premiums based on tailored treatments and higher treatment success projected.

Risks

- Device failure and data breaches could have dangerous consequences for patients.
- Personal information could be used to the disadvantage of the insured person.
- The cost of treatment could be substantial and thus not available to everyone.

Trend Evolution



Personalised Medicine is boosted by recent research success stories in biotechnology and will benefit from advancement in the fields of analytics and artificial intelligence.

Related Trends

- AI Enabled Drug Discovery and Development
- Human Enhancement
- Vaccine Technologies
- Population Health



New ways of managing population health data such as health records and Covid-19 status are emerging.

The Covid-19 crisis has impacted travel, tourism and movement of people. New systems, often called health passports or health passes, have been created with which the health status of a person can be tracked, such as when a person has already had Covid-19, has it now or has a negative test result. If individuals can prove their Covid-19 status via an app, it could allow people to board flights, cross borders, enter schools, etc. more easily. The solutions must also be balanced against privacy however. IBM Watson Health's tool shows health status without revealing the data used to generate it.

Beyond Covid-19 applications, solutions for managing health data on a large scale are on the increase, where blockchain-based systems represent one solution. A blockchain is a decentralised database where the data within is validated by members of the network. Blockchain can be applied to healthcare for the administration of prescriptions, insurance coverage and medical record management. For example, it enables healthcare professionals to access patient data from different hospitals, regions and/or type of care if approved by the patient.

Insurance Value Chain



Opportunities

- Health insurance services can be adapted on a large scale to meet the needs of the population and specific sub-groups based on population health data.
- Treatment costs are expected to fall through improved population health services that require more attractive insurance products and pricing.
- Population health topics foster partnerships with public and private healthcare providers as well as more engagement with patients/customers, as they are perceived as additional services by healthcare providers

Risks

- Population health initiatives are national programmes that need long-term planning. The diversity of stakeholders and their interests often hamper the decision-making process.
- National political interests and regulatory specifics of national healthcare systems are key for population health programmes. Who will be the winners and losers in the system?

Trend Evolution



Population health has become a topic of public reconsideration in the debate about Covid-19 vaccination. Different national vaccination strategies are giving rise to a rethink of healthcare system related issues beyond Covid-19.

Related Trends

- Data Fabric
- Digital Identity
- Digital Health Services
- Personalised Medicine



Cognitive AI in robotics looks promising for the use of robots in care, rehabilitation and prosthetics, as well as surgery.

Care robots today fail in regards to accuracy in haptics and empathy in their responses to patients. The reason why robotics in healthcare is back in the spotlight is the investment in improving their abilities for soft grip and decision-making. Machine learning and cognitive automation in combination with hydraulic systems and Natural Language Processing (NLP) are key technologies in this field. Exoskeleton robots that assist paralysed patients are examples here. With the help of conversation interfaces and NLP, robots can interact on an emotional level, e.g. by making the elderly feel less lonely while taking care of medication, or monitoring their insulin level or blood pressure.

Moreover, robots are continuing to improve surgery. As robotic instruments become more accurate, and reach more areas of the body, minimal invasive procedures in surgery (MIS) can be applied more widely and thereby replace risky surgery.

Insurance Value Chain



Opportunities

- Faced with an ageing population, (elderly) care is one of the markets that most needs valuable digital solutions and workforce support. Insurers must adapt insurance products and create offerings for robotic care.
- By monitoring vitals more rigorously and with increasing reach, robots can report household accidents earlier and replace 24/7 home care. Health status data can be leveraged for risk and claims management.
- In microsurgery, the aims of robots are to be safer by reducing the risks of human failure during an operation, to perform more interventions and to attain even more precise results. By doing so, they also contribute towards the speedier recovery of patients.
- In remote surgery, medical experts can perform operations independently from where they are located. Health insurance can compensate the costs of patient transportation between hospitals. Patients in remote areas who require specialist surgery will have access to expert-led surgery.

Risks

- There is a potential risk of liability when robots start to make medical decisions or provide unsupervised assistance – Who is accountable for the robot's decisions and who bears the risk? The doctor, the programmer or the AI itself?
- There is a strong technological co-dependence with other technologies - that include sensors, computer vision, machine learning and cognitive AI.
- Studies need to prove that surgery robots are indeed more effective and efficient.
- The adaptation of robots by humans is still diverse and strongly market dependent. It is the design and interaction with real patients that will decide. Humanoid robots have not made their way out of Japan or China. Western cultures often perceive humanoids as "weird" – a phenomenon known as "uncanny valley".

Trend Evolution



Formerly subordinated to Digital Health Services (2019), robotics applied in healthcare is gaining significance with increasing adoption across the globe. Drivers for robotic health are advancements in machine learning and sensor technology.

Related Trends

- Digital Health Services
- Computer Vision
- Autonomous Things
- Natural Language Processing



Haptic technologies enable users to touch things inside a virtual world, thus opening up a new dimension in mixed realities.

While visual and auditory sensations are quite easy to replicate in computers, developers have struggled to transfer the sensation of touch into virtual-reality systems. However, they have succeeded in building touch-screens, which today offer complex touch experiences, such as pressure-sensing technology. But that might only be the beginning. Scientists envision technologies which enable users to touch things inside the virtual world, e.g. the computer player feeling the steel of his character's weapon.

Although several companies are incorporating haptic interfaces into mainstream products, cost is still an obstacle. Today, sophisticated touch technology is mostly found in industrial, military and medical applications.

Insurance Value Chain



Opportunities

- Haptic technologies could improve the claims process of insurance companies by allowing claims adjusters to assess damages from a distance. The possibility to gather a haptic impressions could complement imagery (e.g. taken by drones). Thus, costly on-site visits may become less central for accurate claims handling.
- Touch interfaces could aid several e-commerce business models by allowing online shoppers to touch the products before purchasing. An example are fashion web shops, which could offer consumers the possibility of touching the fabric in order to assess its quality.
- Scientists are incorporating haptic technology into touchable maps for the blind. Using a haptic interface device, a blind person can feel, along with audio cues, a city's or building's layout.

Risks

- Haptic technology is in the early stage of development in financial services.
- It is still unclear what the human haptic capabilities and limitations are.
- Because of today's technical limitations and the complexity of the sense of touch, compromises in the development of electro-mechanical haptic devices need to be considered.
- In combination with virtual-reality and augmented-reality, haptic interfaces could lead to more frequent cases of motion sickness and loss of the sense of reality.

Trend Evolution



Haptic technologies are deeply intertwined with the development of virtual worlds and mixed reality applications. Watch for further developments and use cases in the near future.

Related Trends

- Enhanced Reality
- 5G
- Robotic Health
- Smart Spaces



Munich Re Data Risk Intelligence



Source: Wavebreak Media Ltd / Alamy Stock Photo

Solution for data protection (GDPR) and IT risk management

The comprehensive and modular cloud solution for risk-based data protection and IT security management (incl. third-party risk assessment) enables organizations to simplify and accelerate their data and information protection processes.

Data risk intelligence delivers risk-reducing individual recommendations. As a simple to set up cloud-based SaaS solution, it provides an automatic documentation of all relevant business processes, identifies vulnerabilities and documents individual technical and organizational measures.

Data breaches can also be recorded, documented and reported to the supervisory authorities in compliance with the GDPR.



Munich Re Solution for location risk assessment



Source: Munich Re

Assessment of physical risks associated with climate change and natural hazards

This cloud-based platform provides organizations with a comprehensive solution to analyse physical risks associated with climate change and natural catastrophes.

Users can access risk and hazard assessments (from single assets to an entire portfolio) in the form of risk scores for a variety of natural hazards and/or climate change risks, visualise them and save or download them as comprehensive reports. The scores, data and the application services can be accessed via an API and integrated into an existing infrastructure or application.

Users can buy assessments for individual locations and download the report on-demand without a contractual obligation.



Munich Re Infrastructure Risk Profiler



Source: Munich Re/Daniel Grzeg

Holistic risk assessment for infrastructure investments

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 weighs relevant risks individually and holistically.

Benefits at a glance:

- Holistic, objective and transparent 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 CLARA plus



Source: Munich Re/Daniel Grizelj

Automated calculation of degree of disability

Until recently, it was common understanding that there is no way to digitalize the claims handling process for the disability insurance. The traditional process which calculates the degree of disability manually, is time consuming and requires in-depth medical expertise and is therefore less efficient. With the introduction of CLARA plus software, Munich Re now empowers its clients to calculate the degree of disability automatically, leveraging the following benefits:

- Enhanced resource management
- Cost reduction for claims administration and processing
- Transparency and reproducible decision making
- Improved reactivation rate
- Data Analysis



Munich Re MIRA go



Source: Munich Re/Daniel Grizelj

Easily understand complex risks and their correlation

MIRA go allows users to tap into knowledge, formulated by Munich Re's experts on medical, professional, pastime, residential and financial sectors. The underwriter needs to only focus on essential information for an individual risk assessment. MIRA go empowers users to easily understand complex risks and their correlation and to offer risk adequate, competitive biometric insurance products for individuals.

Benefits at a glance:

- Provides access to Munich Re's extensive and outstanding Underwriting know how
- Enable successful portfolio risk management
- Tailored to needs of both experienced and novice users



Munich Re MIRA Chatbot



Source: Munich Re/Daniel Grizelj

User Interface for Munich Re's MIRA Digital Suite to support underwriting process

Life Insurers in Europe are heavily expanding their Sales & Underwriting back-office services to support agents, brokers and IFAs in the best way. These services are mainly driven by human interaction and therefore very costly and often limited to office hours.

In a co-creation project with a German client, Munich Re has integrated the chatbot user interface of e-bot7 with Munich RE's MIRA Digital Suite API, to enable sales agents access to required information in a more convenient way and whenever they need it. With this solution, agents are now able to prepare themselves faster for upcoming advising sessions with their customers. Early feedback from sales agents show a high level of interest and a lot of advantages, e.g. the 24/7 service option.



Munich Re One Cat



Source: Wavebreak Media Ltd / Alamy Stock Photo

Comprehensive and rapid response to natural catastrophes

When a devastating natural catastrophe strikes, companies and organisations need their insurance claims to be settled quickly in order to avoid cash flow problems. Traditional covers often only respond after lengthy claims adjustments, and leave gaps in costs associated with restoring to the pre-event level. To close these gaps, Munich Re has designed “One Cat”, a tailor-made solution concept with an unprecedented level of transparency and a very simple payout process.

Benefits at a glance:

- Parametric triggers ensure rapid recovery
- Covers previously uninsurable risks from natural catastrophes
- Unprecedented level of transparency
- No deductibles
- Reduced claims-related expenses



Munich Re SMAART & Visualizer



A comprehensive toolset to monitor, steer and grow the health portfolio

Specialized portfolio steering tools developed by Munich Re to provide key insights which can be leveraged by our clients. The toolset includes:

- Portfolio Tool – Monitor KPIs of entire book of business
- Group Tool – Analyse and renew group policies with all the details
- Individual Tool – Analyse and renew individual policies
- Policy Performance Monitor – Detailed analysis on policy level
- Visualizer – a segmented portfolio approach to enable a deep understanding of performance to devise and adjust an optimal profit-making strategy.



Munich Re Iq2health



Designed to streamline the underwriting process while enhancing speed and consistency

Iq2health is designed to support an A-to-Z solution. From receiving a health quote to issuing a quotation, Iq2health goes through the automated process of individual and group quotations for new and renewal business (for all product types).

Benefits at a glance:

- Automated medical underwriting decision making based on a member's medical history for new and renewing policies
- Automated administrative/technical underwriting decisions for new and renewing policies (e.g., enrolment eligibility, etc.)
- Automated risk pricing (premium setting)
- A consistent and faster underwriting process
- Higher hit ratios and lower operational expenses





ERGO Germany Next Best Offer (NBO)



Source: ERGO

Product relevance instead of advert overload

ERGO develops a predictive analytic tool to ensure “next best interaction” with the customers. Advanced analytics is used to better understand customers and recommend products that they really want based on the calculation. The product suggestions are determined based on numerous customer and market features, such as customer age and gender. The analysis considers external data such as the customer’s living environment. Recently, using modern speech analyzes, we have been able to further expand our database in order to generate even better customer insights.

Benefits at a glance:

- Next Best Offer (NBO) shows the sales partners the products for which the customer has an especially high purchase propensity or affinity
- Mentioning the products when arranging or conducting customer talks has significantly increased the chances of purchase in the pilot phase
- Development of a real time analytic in customer interaction

ERGO Mobility Solutions Integrated SAP IT platform solutions



© PantherMedia Stock Agency / Kheng Ho Toh

Principles from the automotive industry adopted in the insurance industry

New mobility formats such as car sharing, CaaS or insurance-on-demand call for digital platform approaches in the automobile insurance segment. Taking SAP S/4 Insurance as a technical basis, ERGO Mobility Solutions created the conditions to take the automotive insurance business to a new level in collaboration with the automotive industry, its financial services units and trade organisations and providers of new mobility solutions.

Benefits at a glance:

- Consistent simplification of all core processes in the insurance value chain
- High degree of independence from standard release cycles
- Technological aspects such as new driver assistance systems can also be smoothly integrated into the insurance offers and thus help to keep total cost of mobility down



ERGO Mobility Solutions Volvo Car Protection



© Volvo

An app that provides insurance on the road

A cooperation between ERGO Group and Volvo Car Germany to develop digital services that help secure risks arising from 'New Mobility'. It is an on-demand coverage when driving abroad, for rental cars, luggage or additional drivers in only a few minutes via the app. The “Volvo Car Protection” insurance coverage offers a selection of tailor-made options with coverage for business or private travel and with coverage commencing within minutes. The duration of the insurance cover can be selected individually.

Benefits at a glance:

- On-demand protection such as 3rd party driver protection, travel & sports luggage protection and much more
- Dealer contact: personal advice & appointments
- Volvo Test Drive Protection to insure the excess for test drives and garage replacement cars





ERGO Germany PhoneBots in Customer Service



© PantherMedia / davincidig (YAYMicro)

Automated handling of customer service calls via a conversational AI platform

ERGO Germany takes advantage of the very same tech and capabilities used for voice assistants such as Amazon Alexa and Google Assistant to automate inbound customer service phone traffic. ERGO has already developed a variety of phonebots for meaningful and high-frequency customer service requests such as filing new claims, receiving status of a health claim or finding the right service agent for a specific customer request.

Benefits at a glance:

- Customers can avoid waiting times in service lines
- Directly solve many frequent customer enquiries
- Free up capacities for more value-adding (for the customer and for ERGO) service activities and thus increase efficiency and quality

ERGO Germany Training with 360° videos



Source: ERGO

Put your users / employees in a real situation with VR and 360° video

ERGO Germany offers its employees an interactive 360° video training in virtual reality on the topic of digitalisation at ERGO. Employees can be given a unique view of ERGO's digital products and services from the customer's perspective. In this way, the training participant directly recognises the benefits for the customer behind ERGO's digital service. The solution is built on a scalable platform and can be used by ERGO for other cases.

Within ERGO there are still a lot of other possible VR solutions, e.g., giving a new employee an understanding of other departments and processes.

Benefits at a glance:

- Inspiring and motivating learning experience
- Creating a unique "first-person" user perspective
- Higher engagement and focus on the training

ERGO Singapore Ella



Source: Crown Digital

A robot that makes coffee and sells insurance

ERGO Singapore has recently partnered with 'Crown', Singapore's first fully robotic coffee chain. Crown uses an app-based insurance wallet where individuals can pre-order coffee and pick it up at a set time from the robotic kiosk where the robot "Ella", keeps your coffee ready, piping hot.

ERGO Singapore launched a simplified version of travel insurance as the first product which can be bought from the Crown app as well as the kiosk in 3 easy steps. ERGO Singapore is planning to sell more simplified products using this channel.

Benefits at a glance:

- Customer convenience via a short and seamless journey
- Low-touch, instant sales process for the customer
- Simplification and product innovation by the insurer





ERGO China Life Behavioural data tracking & analytics



© Bildagentur PantherMedia / Andreus

Providing insights for agents and customer management

User behavioural data tracking is important for meeting user demands. That's why ERGO China Life has developed and implemented an in-house behavioural data tracking app for social media and agent management that records every click, time on site, page views of the users, etc.

The collected data has built up a foundation for more big data applications, provided useful insights for agent and customer management, and guaranteed a well-rounded analysis of customer experience.

Benefits at a glance:

- Turn data into a real asset
- Behavioural analytics help us know the users better and drive UE improvements
- Correlation analytics help reduce costs of lead generation and the allocation of customers

ERGO China Life Big Data Sales and Service



© Bildagentur PantherMedia / violetkaipa

Business model targeting digital natives

ERGO China Life's Big Data Sales and Service (BDSS) engages "digital natives via innovative big data marketing and digitalisation – making it possible for the online selling of long-term "value" business.

Customer acquisition via social media in-feed ads generates traffic which can be precisely converted into a potential customer list that can be analytically customized to build an algorithm model. After data iteration, optimisation, and dynamic customer and online sales representatives (OSR) matching, customers are then assigned to the most suitable OSR for product customisation, customer service, and health management completely via WeChat.

Benefits at a glance:

- Precision customer/OSR matching improves service quality and customer stickiness
- Generate long-term value by customer touchpoint management such as cross-sales and consultation

ERGO China Life Face ID application



© PantherMedia / Sergey Nivens (YAYMicro)

Solution of precise customer identification

In order to ensure the true identity of each customer in the transaction process, ERGO China Life introduced face identification technology for insurance application, policy receipt signing, online return visit, online policy service, etc.

The applicant's face is compared with the ID card photo retained by the Ministry of Public Security. The business can be handled only after the ID is confirmed. This technology has benefited more than 300,000 transactions thus far.

Benefits at a glance:

- The automatic identification makes online and direct transaction possible (and safer), which improves efficiency and reduces costs
- The endorsed identity authentication reduces the potential risks of disputes



HDFC ERGO India

Sales Panda- Agent's own website



Source: HDFC ERGO

Providing Digital identity to agents - Their own website for lead generation and client engagement

HDFC ERGO has launched the agent's own website, Sales Panda, for lead generation and client engagement. With features like integrated channel sales and marketing platform, and modules for content, email, social, pipeline and analytics, agents can improve efficiencies across the board.

Benefits at a glance:

- Increase in prospect pipeline and revenues
- Upsell and Cross sell opportunities
- Improvement in agent's productivity
- Increased brand visibility for agents

HDFC ERGO India

DIA - Chatbot for customers



© PantherMedia / everythingpos

More efficient response to customer queries

Digital Insurance Assistance (DIA) is an AI enabled chatbot that tenders 24/7 customer assistance and instant solutions to queries, thereby offering a seamless customer experience. DIA is able to register claims and complaints as well as providing information on products offered by HDFC ERGO and gathering customer feedback. The chatbot is extended onto the Amazon Alexa, Google Assistant and on the HDFC ERGO website.

DIA enables customers to reach out for services related to HDFC ERGO, such as:

- Key insurance and HDFC ERGO product related information
- Handle requests to email customers copy of their policies
- Procedure to register complaint and claims
- Locators for HDFC ERGO branch / hospital network / Workshops and contact details of registered offices



DIA – Chatbot for customers

HDFC ERGO India

NLP based motor claims intimation



© PantherMedia / Illia Uriadnikov

Cyber security information and guidance via virtual assistants

HDFC ERGO has launched WhatsApp (NLP based) based claim intimation for motor claims, where customer can simply chat and intimate claims. For example, customers can intimate motor claims using WhatsApp. WhatsApp communication has been found to have higher impact on customer experience as compared to regular SMS, which often gets buried or lost underneath the countless marketing spam messages. Moreover, HDFC ERGO communicates the claim registration on WhatsApp, the registration message shared has a claim status tracker link, which all customers need to stay updated on the claim progress.

Benefits at a glance:

- Reduction in turnaround time and less manual dependency in claims intimation process.



ERGO Baltics ERGO Smart



© PantherMedia / Illia Uriadnikov

System for clients to register transport and property claims using just a smart device

ERGO was the first in the Baltics to introduce ERGO Smart solution – a tool that automates the transport or property damage administration process, allowing customers to receive insurance benefits much faster.

After contacting an insurance company, a customer simple instructions for providing photos and other damage-related information that goes directly to ERGO claims management program. Algorithms to help assess and administer damages also facilitates the work of company experts, saving time and allowing them to operate more efficiently.

Transport registration and property claims only take a few minutes and can be done at a customer's convenience. The procedure is quick, simple, and payment can be received in one day.



DAS UK Self-service legal hub



Image: Farillio

Cooperation with Farillio targeting SMEs and personal lines clients

DAS UK is cooperating with Farillio to offer a comprehensive self-service portal to its small- and medium-sized enterprise clients and to its personal lines clients. The online legal hubs are branded DASBusinessLaw and DASHouseholdLaw respectively. They offer in-depth multi-media guides, smart letters and contract templates, along with e-signature capabilities. The portal covers a wide variety of topics, ranging from late payment and employment matters to compliance with data protection rules.

Benefits at a glance:

- Clients self-serve minor issues, which otherwise could have resulted in a claim
- Increased client engagement and greater range of services
- Improved claims performance through clients' legal risk management



DAS Italy Hearing you better



Source: DAS Italy

Voice technology delivers fast support with human touch

DAS Italy has launched "DASy": the NLP-based VOICEbot on the company's website to deliver fast 24/7 customer-based support with a human touch. The implementation avoids customers' long waiting times and better utilises the time of customer service representatives for more consultation-intensive customer conversations.

The VOICEbot is able to register claims, give contractual support, provide information and prices on products offered by DAS and gathering customer feedback; all this by choosing between written or oral communication. DAS Italy has the vision to train a voice-virtual assistant only once and use it across all communications channels - website, whatsapp and the smart speakers - with the same high level of quality and brand personality.





DAS Spain Open Banking



© PantherMedia / putlich

Incorporates **Open Banking** technology into its **insurance** underwriting process.

D.A.S Spain incorporates **Open Banking** technology into its **Legal Protection & Non-payment of Rents insurance** underwriting process.

This new technology significantly improves the risk-valuation process (tenant solvency) since it facilitates direct access to financial information of tenants through the direct connection with their bank accounts. This process is done online, with the permission of the tenant and by applying the European PSD2 regulations.

In addition, Open Banking improves customer & broker experiences and generates high-level efficiency by digitalising the entire UW & policy issuances process, eliminating all the paperwork and reducing the previously required time to review the validity of the tenant's financial solvency documentation.

DKV Spain Emotional welfare app



© PantherMedia / DragonImages

Set of tools and contents to help our customers in **COVID-19** confinement

In 2020, the extended periods of confinement, isolation and work/family crossover for many individuals made the importance of addressing psychological health extremely relevant

DKV Spain launched a set of tools, videos and features to help customers in facing the situation, as a part of its prevention and healthcare strategy. The goal is to improve a customer's mental health on a daily basis and help them create a healthier lifestyle as well.

The tools are part of the e-Health ecosystem and were designed together with psychologists, mindfulness coaches and several other experts.

DKV Spain Customer digitalization index



© PantherMedia / agsandrew

Boosting the adoption of service digital assets amid our customers

One of DKV Spain's challenges is to help customers in their adoption of self-service tools. The level of acceptance of these channels depends on every single customer. For that reason, a team of data scientists developed a model that predicts the acceptance of every customer to make use of the digital channels.

This case was developed by combining internal and external historical data, such as standard of living and geographical location (in respect of culture and social public info). As a result, the customers can be rated with two indexes: real digital level and maximum potential rate. Today, the customer experience team is using this gap to design actions that allow for better channel-specific targeted promotions.



DKV Spain

Whatsapp Business API integration



© PantherMedia / Illia Uriadnikov

Interaction capabilities via Whatsapp for customer support and lead management

DKV Spain has worked since 2020 with a Spanish startup (one of the first certified partners of WhatsApp) to include WhatsApp Business API as a part of its customer support and lead management. The rollout was a real success and helped in dealing with the confinement situations during the pandemic.

The platform allows for bot interaction, the automation of several cases such as claims information or requests of duplicates.

So far, three use cases have been set up: customer care, payment in Spanish healthcare marketplace and lead management for Facebook campaigns.

Benefits at a glance:

- Increase in productivity of our customer support teams, as several conversations can be managed in parallel
- Positive impact in NPS
- Improvement in engagement of customers and leads (during the commercial lifecycle)



Image: DKosig/Getty Images



Connected World

How we connect and communicate with each other has changed drastically. In today's digital age, communication takes place not only among people, but also between humans and machines. Wearable devices are tracking body data thus supporting digital health services. Owners of smart homes control lighting, heating etc. IoT has evolved from smart homes to smart buildings and smart spaces. Machines are getting better at recognising their environment and responding to it. This enhances technologies such as autonomous objects such as self-driving vehicles, robots and

drones. Drones can already transport a defibrillator to a patient at a speed of almost 100 kilometres per hour. Commercial application of autonomous objects will become the norm in other industries, such as construction, agriculture, transportation and of course claims management. On the data side of things, open data, APIs and data fabric make data integration of multiple sources more efficient. Enhanced by biotechnologies, today's connected world enables organisations to test geological and biological limits and find new ways of creating and bringing value to people.

Adopt – Start initiatives in your unit



Digital Health Services

Advanced technologies enable monitoring of health indicators, anamnesis and initial diagnoses



Industrial IoT

The integration of intelligent and connected systems in industrial processes resulting in smarter manufacturing and factories



Open API

A proprietary software or application programming interface that is publicly available to developers



Open Data

The idea is to share data freely and allow everyone to use them as they wish, without copyright or patent restrictions



Precision Farming

Increasing efficiency and quality of agricultural products by applying IoT and AI-related technologies



Realtime Payment

Advances in mobile and computer technologies are creating various digital payment models towards a cashless society



Smart Spaces

A system of sensors, interconnected devices and services ranging from communications to healthcare, security and task automation from private homes, etc.

Trial – Initiatives in affected units



Autonomous Things

Autonomous Things are machines that are designed to work independently and without active human supervision



Data Fabric

Fabric-like data management infrastructure for distributed networks that unify and enable sharing of formerly disparate, inconsistent data



Digital Twin

A virtual counterpart of a real object that enables IT systems to interact with it rather than the real object



Food Tech

Technologies like IoT or AI applied for the production of healthier food and a more sustainable food production and consumption



Smart Textiles

These textiles can do many things that traditional fabrics cannot, such as communicate with their environment.

Assess – Evaluation needed



Human Enhancement

Soon, people may have the possibility to change themselves in ways that, up to now, mostly existed in science fiction.



Robotic Revolution

From manufacturing and IoT coupling to household helpers robotics development has been long ongoing, but the world is now seeing novel technologies and application areas

Hold – Watch list

= new in 2021



Advanced technologies enable monitoring of health indicators, anamnesis and initial diagnoses.

Game-changing technologies and digital services offer more innovative ways of monitoring health and well-being. Digital platforms will increasingly develop into the first port of call for initial health consultation before a physical doctor is actually consulted. These digital health managers might restructure the entire health and insurance infrastructure.

Major advancements in home care are being developed which will enable people to continue living relatively independent lives at home in spite of medical need. Soon, new care products will emerge, such as care robots and virtual reality devices that enable the experience of 3D/4D body insights, and which provide new therapy approaches such as anti-phobia training.

Insurance Value Chain



Opportunities

- Digital Health Services enable personalised therapies for critical/complex illnesses, and thereby reduce follow-up treatment costs.
- Data can speed up claims handling, since illnesses and the corresponding treatments are detected and reported automatically.
- Insurance premiums can be adjusted to reflect the altered risk situation due to digital health services monitoring.
- Ready-to-use applications for the "Digital Patient", like symptom checks via apps and online appointment management, will be connected to create real value for patients.

Risks

- Digitally shared health data needs strict protection against data leakage and hacking attacks.
- Personal information could be used to the detriment of the insured.
- Device failure could have dangerous consequences for patients.
- Reduction of contact with human medical experts may have unanticipated mental consequences due to a lack of empathy.
- Continuous patient data input is needed, and incentives for patients to feed their data into applications are to be implemented.

Trend Evolution



The landscape of Digital Health Services is broad. Startups and big tech companies are dominating the markets. It is high time for insurers and healthcare providers to catch up.

Related Trends

- Personalised Medicine
- AI Diagnostics and Therapeutics
- Robotic Health
- Population Health



The integration of intelligent and connected systems in industrial processes resulting in smarter manufacturing and factories.

AI is driving advances for new intelligent things, such as smart machines and robots, and thereby delivering enhanced capabilities to industrial systems. These intelligent machines can process vast amounts of data, communicate with each other and make autonomous decisions.

With the industrial use of IoT (IIoT), also referred to as Industry4.0, global supply chains, production processes and logistics will become more efficient and transportation and communication costs will reach an all-time low, all of which will open up new business opportunities and diminish trade costs. There is no doubt that the industrial use of IoT will redefine competitive landscapes and will have major effects on global economies and foster economic growth.

Insurance Value Chain



Opportunities

- In-built sensors can communicate the current condition of a product or machine and help the insurer to optimise the risk/ premium calculation (renewal business), or to handle claims faster.
- Based on information submitted by IoT machines, insurers might also provide risk mitigation, prevention and assistance services to their clients.
- Connected and smart machines that interact with each other could report key risk or safety indicators to the insurer and automatically add coverage if needed.
- IIoT is likely to significantly increase the demand for cyber security and insurance.

Risks

- Industrial IoT requires high investment upfront and an adequate infrastructure (e.g. big data analytics hardware and software) that is able to process the collected data quickly. Speed is critical since it should not take long to automatically shut down a machine once a sensor detects a failure in the system.
- Particularly companies that operate production plants globally face the risk of cyber attacks that could hamper their processes and steal critical data.

Trend Evolution



Industrial IoT has matured over time and finally arrived in the ADOPT stage. It is therefore recommended to design new business models based on IIoT.

Related Trends

- Automated Machine Learning (AutoML)
- 5G
- Digital Twin
- Smart Spaces



A proprietary software or application programming interface that is publicly available to developers.

Basically, an API allows one piece of software to interact with another piece of software, whether in one system or in a network or distributed environment. Open APIs are published on the internet and shared simply. A company might publish the API of their software to encourage external developers to figure out new ways of using it.

Ideally, this creates a win-win situation: The external developer can make money by licensing a new service with advanced functionalities, such as an innovative use of the service in ways the originator hadn't thought of. And the company benefits from more widespread use of their service.

Insurance Value Chain



Opportunities

- Open APIs increase competition between providers, since everyone can integrate their systems and contribute to better products and services. Consumers are thus likely to benefit from cost-effective services that are tailored to their demands.
- Open APIs enable the growth of a digital ecosystem, allowing for complete and seamless integration with service providers.
- Open APIs decrease the need for individual development of certain digital solutions, since the software and systems from specialised providers can be integrated into the existing IT architecture. Open APIs can be used to access the large community of freelance developers to create innovative applications.
- Open APIs increase the production of new ideas without investing directly in development activities.

Risks

- Individuals may lose control of their data and cannot trace it to see whether it is used for fraudulent activities.
- Third parties providing the actual services related to the open API might push insurers into the background and dismiss them as mere transaction providers.
- Loss of competitive advantages due to lock-in effects.

Trend Evolution



After remaining in the TRIAL stage from 2015 onwards, Open API is recognised as adoptable since 2019. Accordingly, initiatives in that field should be launched now!

Related Trends

- Behavioural Analytics
- Digital Health Services
- Open Data
- Distributed Ledger



The idea is to share data freely and allow everyone to use them as they wish, without copyright or patent restrictions.

Open data platforms are primarily used by public institutions or by certain political and scientific entities to make information accessible for everybody. The goal of these platforms is to enable users to gain insights and knowledge about activities that are relevant to the public, thus guaranteeing transparency.

However, Open Data is also becoming more and more interesting for businesses. Platforms that are specially maintained by the users themselves also present a promising source of insights and ideas from the public – e.g. to fuel innovation processes. Furthermore, Open Data platforms are a two-way communication and service tool to establish direct contact with target audiences, enabling users to participate, give feedback and express their opinions about services and products.

Insurance Value Chain



Opportunities

- Open and accessible public data can benefit individuals, companies, communities and government by unleashing new social, economic, and civic innovations and improving government accountability and transparency.
- In the context of the health care system, Open Data enables recommendations for services for medical institutions and for customer treatment from the insurance side.
- Greater access to data fosters and improves competition.
- Open geo-spatial information is fundamental to planning and decision-making in most situations, including disaster and risk management.

Risks

- Open data can also pose substantial privacy risks for individuals whose information is collected and shared by the city.
- Open data sources could provide incorrect figures and correlations.
- Open data can be unreliable because of the potential for respondents to self-select. Data quality issues arise and a good understanding is required.

Trend Evolution



Open Data has reached ADOPT stage. Explore available data sources and integrate this data into your decision processes

Related Trends

- Distributed Ledger
- Machine-driven Decisions
- Open API
- Explainable Machine Learning



Increasing efficiency and quality of agricultural products by applying IoT and AI-related technologies.

After crop breeding has reached peak efficiency and there are ethical doubts to overcome with factory farming. Digital technologies in agriculture promise a future with the best of both worlds – high-yield ecological farming.

Technology has been applied to increase production in agriculture since humans first began farming. Nowadays, sensors make it easier to capture relevant data from optical, thermal and biomolecular metrics such as soil and nutrient status, process the data in long-range protocols and deliver more reliable information in comprehensive formats directly to farmers in even the most rural areas thanks to 5G and micro satellites that provide broader connectivity.

The global precision agriculture market is expected to double, reaching \$14.09bn by 2026 (Statistics, "Precision Farming - Global Market Outlook", 2019). Faced with the challenges of overfarming, exploitation and climate change, precision farming is an opportunity to rebalance the economic agriculture system, conserve water resources and fight the global food crisis.

Insurance Value Chain



Opportunities

- Improved underwriting for agriculture insurances and lower claims rate thanks to improved predictability of natural risks from extreme weather or natural catastrophes and monitoring of natural assets.
- The technological solutions are still expensive for farmers in rural areas facing industry-typical financial pressure. Insurers have the chance to build insurance products that make the technology more affordable.

Risks

- Slow adoption by farmers, especially in European farming markets where connectivity is still underdeveloped.
- The initial cost of implementation may discourage smaller farmers.

Trend Evolution



Previously, Agricultural Biotech has been considered in IoT use cases. In 2020, Precision Farming has made it into the radar as a discrete trend.

Related Trends

- Autonomous Things
- 5G
- Machine-driven Decisions
- Computer Vision



Advances in telematics and IoT enable immediate monetary transactions – another step in digital payment towards a cashless society.

Markets for new payment models have grown quickly. Smartphones and watches are using wireless technologies to process payments with the “tap and go” method. PayPal allows users to make peer-to-peer payments to friends. Real-time payment allows instant payment available 24/7. This is highly relevant for financial institutions as communication only takes place between payer and payee – there is no need to compensate lag times with communication to payment providers.

To boost digital payment even further, China is in the process of testing Digital Currency Electronic Payment (DCEP) and is launching the first national virtual currency. In the EU, digital payment systems even received a boost from regulatory authorities with its Payment Services Directive 2 (PSD2) legal framework, effective for all businesses since 2019 to enable digital payments to be saved and customer data to be protected. In 2020, just one per cent of Sweden's GDP circulated as cash.

Insurance Value Chain



Opportunities

- Real-time payment models can reduce response times for claim processes and other insurance-related services, that normally cause overheads in follow-up and exception processes, as well as delays. This improves productivity and customer satisfaction.
- New payment models create the need for new insurance products, such as the protection of online wallets and transactions.
- If transactions can be conducted on a globally recognised payment system with a single token of value, exchange rates and capital transfer restrictions become less of an issue.

Risks

- The technological infrastructure and regulatory environments are too inconsistent to support electronic payments in developing markets.
- With payment security a key concern in today's risk-averse environment, and a prime factor in consumer receptiveness to mobile wallets, risk mitigation has been a particular focus for innovation in this area.
- Payments based on cryptocurrencies are currently not very reliable for large-scale applications, since their exchange rates with fiat money are highly volatile.
- Real-time payments may result in more and less transparent transactions, that might be abused for criminal activity.

Trend Evolution



The large number of business models and partnering ecosystems reflects the maturity of Digital Payment. Real-time payment is a new facet in the evolution of digital payment. This trend will be applied in all industries to meet the service standards at the customer's convenience.

Related Trends

- Digital Identity
- Distributed Ledger
- Behavioural Analytics
- Open API



A system of sensors, interconnected devices and services ranging from communications to healthcare, security and task automation from private homes, public buildings and urban spaces.

The market for smart systems is growing and the interaction with building systems and household devices via mobile apps is slowly becoming the norm. Smart devices are becoming household managers, linking different systems (e.g. water, lightning, heating, entertainment) and managing and operating them in accordance with the homeowner's needs and requests. Application of deep learning techniques and other technologies have led to rapid advancements and better integration of these devices in smart systems. Additionally, breakthroughs in speech recognition are leading to the rapid adoption of virtual assistants, such as Amazon Echo and Google Home. Aside from Smart Homes, IoT has made its way into commercial buildings and public spaces. Airports and cities are implementing biometric recognition system for security purposes. Traffic can be optimized in real-time using smart traffic lights.

Insurance Value Chain



Opportunities

- The installation of IoT technology may substantially increase property value and provide damage reduction and prevention.
- Smart devices can track and learn individuals' daily routines and therefore allow people to monitor their elderly relatives without invading their privacy.
- Insurers benefit from smart devices since they lower an owner's risk profile, deliver big data for underwriting purposes, and improve the efficiency of claims settlement processes.
- Smart technology will lead to a wide range of new products, e.g. flexible household insurance based on tracked (and shared) application data.

Risks

- IoT systems create a back door for hackers to steal data, control important functions such as opening the front door, adjusting the heating system, etc.
- Only a few private technology companies are likely to serve the smart space market in the future and must therefore be strictly controlled to avoid data misuse, such as monitoring behaviour, purchase decisions, etc.
- Smart systems increase the dependency on a provider (lock-in effect). Furthermore, an electricity supply is constantly needed to keep the system "working".
- 360-degree monitoring by sensors may raise privacy issues, especially in public spaces.

Trend Evolution



Smart Spaces arrived in the ADOPT section in 2016 as "Smart Living". Now extended to "Smart Spaces", it is recommended to design new business models based on the trend, especially for the usage in urban spaces.

Related Trends

- 5G
- Industrial IoT
- Open API
- Biometric Recognition



Autonomous Things are machines that are designed to work independently and without active human supervision. As AI improves their functions are becoming more accurate and effective.

AI is driving advances for new intelligent things such as drones or autonomous vehicles. The technologies are undergoing significant evolution, powered by new machine learning models and algorithms. These intelligent things can operate without human interaction for a defined period.

Enabled by IoT, autonomous things will likely take over parts of digital business, data collection, manufacturing, medical diagnostics and performance analysis.

The autonomous car is considered to be the future of the automotive industry. These vehicles are using sensing and localisation technologies, such as LiDAR (light detection and ranging), radar, cameras, GPS and map data, in combination with AI-based decision-making. While self-driving cars are getting most of the attention at present, autonomous vehicle technology has a variety of potential applications in smart mobility, shipping and logistics, mining and agricultural operations, industrial, and security and military operations.

Insurance Value Chain



Opportunities

- For travel and transportation, autonomous trucks and driver-less passenger cars drastically reduce time and open the possibility of 24/7 long-distance transportation.
- Autonomous Things are particularly helpful in tasks that are dangerous for humans, such as working with hazardous objects/substances, at extreme heights, etc. By taking aerial photos and videos, drones provide insurers with accurate data that can be used to calibrate their risk models accordingly.
- Autonomous Things that share their workplace with humans, e.g. in warehouses, require innovative liability insurance solutions. Similarly, new insurance solutions are required since both soft- and hardware for objects could be subject to malfunctions.
- Autonomous Things allow insurance companies to improve their underwriting of property & casualty risks through upfront inspections. Moreover, periodic inspections indicate whether the current coverage is still appropriate.

Risks

- If Autonomous Vehicles cause an accident or drones fall from the sky, there is a significant risk of property damages and bodily injuries. The question of insurability of algorithms becomes a practical challenge in claims management.
- Autonomous Things interacting with the physical world around them are critical to danger since they could make decisions with irreversible consequences without any human control.
- Drones taking aerial pictures might intrude on individual privacy.

Trend Evolution



Autonomous Things have evolved from drones and the hype of driverless vehicles. It finds itself back in the TRIAL phase, as further evaluation is needed in respect of new insurance models.

Related Trends

- Robotic Revolution
- Robotic Health
- Industrial IoT
- 5G



Fabric-like data management infrastructure for distributed networks that unify and enable sharing of formerly disparate, inconsistent data.

Data fabrics are designed to enable applications and tools to access different types of data regardless of their storage location using interfaces such as NFS, Hadoop or ODBC and supporting established data standards and systems. Data fabrics create unified data environments in distributed computing networks – even among reinsurer, insurer, agents and third-party networks. They provide a solution to the ever-growing data quality problem (“garbage in - garbage out”) which is a key challenge for the successful implementation of AI technologies.

Insurance Value Chain



Opportunities

- Improve the value of data by providing seamless data access and sharing data in one consistent distributed data network.
- Manage fast growing data generated by the rise of AI-platforms for insurers and network ecosystems with a variety of applications.

Risks

- High implementation costs for bespoke data fabric forces to re-design static infrastructure and enable a mesh network environment.
- Strong data security and access policies and technologies are needed to ensure the proper sharing of data.

Trend Evolution



Supported by related developments like AI and sensor-based data, data fabric is on the rise to connect data from real world and legacy systems. It has entered the Tech Trend Radar in 2020.

Related Trends

- Enhanced Reality
- Cloud Edge
- Open API
- Machine-driven Decisions



A virtual counterpart of a real object that enables IT systems to interact with it rather than the real object directly.

Basically, a digital twin helps to improve maintenance, upgrades, repairs and operation of the actual object. For example, it could be a model of a sound system that enables a remote user to control the physical system with buttons on a mobile device.

Furthermore, digital twins can be used for product development as they enable product testing and simulations without having to actually construct a physical object, thus driving innovation efficiency.

Even though the idea of the digital twin is still in an early development state, strong development figures are expected. Hundreds of millions of things will most likely have digital twins in the future.

Insurance Value Chain



Opportunities

- Digital twins allow exploration and improvement in production processes without expensive physical prototypes, something that will be particularly important in the Internet of Things (IoT) era.
- Companies can use digital twins to show their products to customers or other third parties during the manufacturing process.
- Insurance companies could maintain a digital counterpart of the computer system in an insured's car in order to monitor usage-based (mileage-based) car insurance contracts (through sensors in the physical product).
- Digital twins may be created on a Blockchain to reflect ownership rights of physical objects. This could replace comparable existing ledgers such as land registers.

Risks

- Particularly for products with long lifetimes, such as buildings, aircraft, ships, etc., digital twins might become unusable at some point (due to software issues).
- Firms employing digital twins provided by third parties face a lock-in risk with their vendor, since switching to other vendors may become very costly at some point.
- A digital twin could be hacked in order to fake damage, which, in turn, triggers a claim payment from the insurer.

Trend Evolution

Adopt	Trial	Assess	Hold
Start initiatives in your unit	Initiatives in affected units	Evaluation needed	Watch list
	2020, 2019	2018, 2017	2016

Digital Twin appeared in 2015 and evolved quickly in the field of IoT. Initial insurance-relevant initiatives and partnerships have been started early. It is now time for prototypes to prove business impact.

Related Trends

- Synthetic Data
- Enhanced Reality
- Industrial IoT
- Open Data



Technologies such as IoT and AI applied for the production of healthier food and more sustainable food production and consumption.

As with other research and industry fields such as agriculture, life sciences and biotech, food production is now being enhanced with technologies such as AI, Computer vision and IoT. Foodtech ecosystems are evolving around agrifood, foodscience and food delivery entrepreneurs - that share the ambition of revolutionising the food industry.

Agtech startups are working on sensor and cloud technology to foster urban farming and precision farming. Food scientists are creating designer proteins to replace harmful food ingredients such as industrial sugar, and are reinventing the chocolate bar to make it a healthy and nutritious snack.

The latest feat in foodtech is the production of cellular meat based on 4D-printed tissue - as an alternative to mass livestock farming.

Insurance Value Chain



Opportunities

- The aim of foodtech is to improve human health by replacing harmful chemical components in food or medicine, and thus reduce long-term side effects that often result in cancer or other chronic diseases. Expected health benefits in the prevention of diseases and a healthier life have an impact on risk calculation for health insurance.
- With the rise of meat substitutes in the food industry, agricultural companies are following and shifting from livestock to plant-based production. Agricultural insurance services need to adapt.
- With less demand for livestock farming, incidentally the number one source of CO² pollution, foodtech has the capability to reduce the carbon footprint of the food industry.

Risks

- Foodtech products are often costly in production and therefore not scalable enough to reach a mass market. More cost-effective production systems, such as for protein expression, will be established.
- A mindset change in behaviour in global markets is required to increase demand and reach a critical mass of consumers.

Trend Evolution



Fostering a variety of trends in the field of biotechnology and AI, the term "White Biotech" appeared on the tech trend radar in 2020. White Biotech is understood to be industrial biotechnology replacing industrial goods, sources and processes with sustainable components. In 2021, foodtech appears to be the most promising field of biotech.

Related Trends

- Machine-driven Decisions
- AI Chips
- Precision Farming
- Digital Health Services



These textiles can do many things that traditional fabrics cannot, such as communicate with their environment.

Smart textile research represents a new model for generating novel and creative solutions for integrating electronics into unusual environments. These textiles will improve people's everyday lives to a large extent. Innovation teams focus mainly on the areas of health, medicine, sports, sustainability and interiors. So, it can be either aesthetic or performance-enhancing.

Aesthetic examples gather data from the environment and react to this input. Some models at the New York Fashion Week, for example, were able to change the look of their textiles using a smartphone app. Performance-enhancing smart textiles can help regulate body temperature or control muscle vibration. The health industry is also taking advantage of the technology by creating drug-releasing textiles.

Insurance Value Chain



Opportunities

- Just like other wearables, smart textiles provide the opportunity to collect data on the insurance holders well-being, which can help to personalise insurance products.
- Smart clothes open up new service potential based on vital checks (heart rate, etc.) and can be used for medical and healthcare monitoring and diagnostics.
- Gesture recognition through smart textiles enables consumers to operate smart devices such as smartphones, laptops, IoT devices, etc.
- Smart textiles can be used in nursing homes to detect when a patient's health condition or hygienic situation deteriorates.
- Data collection and statistics on professional athletes in sports can be improved.

Risks

- It is unclear how practicable such sensitive textiles are for the consumer, particularly with respect to their robustness (e.g. how often can they be washed, etc.).
- When wearing smart textiles on a regular basis, consumers become completely transparent to data collectors.
- The General Data Protection Regulation (GDPR), the new European privacy regulation, also treats health data as a "special category" of personal data, one that is considered intrinsically sensitive.

Trend Evolution



Still in the ASSESS phase, it's worth analyzing existing state of the art products in smart textiles and exploring possible use cases.

Related Trends

- Behavioural Analytics
- Digital Health Services
- AI Diagnostics and Therapeutics
- Programmable Materials



Soon, people may have the possibility to change themselves in ways that, up to now, mostly existed in science fiction.

People have always been trying to enhance their capabilities, be it mental or physical – in other words: the idea of human enhancement is at least as old as humanity. So it's no surprise that today's science fiction movies feature superheroes with extraordinary technological abilities, such as Iron Man.

But soon, Iron Man might become reality: technological development has the potential to take human enhancement to another level. Some experts speak of "humanity plus" or even "post-humanity", meaning that advances in genetic engineering and machine technology may allow people to become more and more machine-like.

Insurance Value Chain



Opportunities

- One of the most important developments involves a gene-splicing technique called "clustered regularly interspaced short palindromic repeats" (CRISPR). This method improves scientific capabilities of editing the human genome in both embryos and adults.
- An exoskeleton looking pretty similar to the "Iron Man suit" may soon make soldiers much stronger and largely impervious to bullets.
- Enhanced humans may pose lower risks and therefore obtain cheaper insurance coverages. Human enhancements could even be used to cure severe sicknesses or chronic health conditions.
- Improved reactions and reflexes may lead to lower frequency and severity of accidents and, in turn, insurance claims.

Risks

- Long-term side effects of such enhancements may be hard to anticipate. Substantial health risks and associated costs for insurers could be the consequence.
- Diversity of human life may slowly be reduced due to standardised human enhancements employed by the majority of people. Those who are not prepared to accept an enhancement could be isolated from the larger society.
- Human enhancement may completely change the way professional sporting competitions are carried out today. A fair tournament may be very hard to organise if participants exhibit different levels of body enhancement.
- Additional questions arise around potential enhancements of the brain. Would this entail the risk of altering the subject's personality and mind?

Trend Evolution



Still in the ASSESS phase, it is necessary to build a stronger opinion about the current state of development.

Related Trends

- Digital Health Services
- Brain-computer Interface
- Smart Textiles
- Robotic Health



The application areas for robotics are broad, from manufacturing and IoT coupling to household helpers. Robotics development has been ongoing for some time, but the world is now seeing novel technologies and applications.

Developments in technologies that are applied to robotics include microrobots with legs that enable them to move over bumpy surfaces. Exploration into bat echolocation, to help robots navigate with sound, is also ongoing.

2020 saw the use of disinfection robots for cleaning increase due to Covid-19. Other robotic application areas being developed include bionic jellyfish that take measurements of ocean conditions, such as temperature, acidity, oxygen levels, nutrients and microbial communities. There are also robots that can perform inspection tasks in hazardous settings, such as nuclear plants and chemical factories.

Mitsubishi Heavy Industries (MHI) is using robots to fight fires with full autonomy, delivering 4,000 litres of foam or water per minute. RoboBees, tiny Harvard-developed bots, use electrostatic adhesion to 'perch' on walls and ceilings to evaluate structural damage after an earthquake. Robots are also being developed for earthquake search-and-rescue missions.

Insurance Value Chain



Opportunities

- In industrial and private contexts, robots require insurance coverage – opportunities for insurers to design robot insurance products.
- Robots can serve as remote claim detectors for insurers.
- Robots replacing a human workforce reduce the risks of severe accidents in tasks posing a high risk to life, such as bomb defusing and window cleaning for skyscrapers.

Risks

- Modelling risk related to robots causing accidents is a new field for insurance risk management. It is strongly related to the question of insurability of algorithms, which represent the fundamentals for robot actions.
- In the event of an accident caused by a robot. Who assumes the blame? The owner of the robot? The vendor of the robot? Or the company developing the "AI"?

Trend Evolution



Robots have been around us for a long time. Improved sensor technologies and artificial intelligence make them more capable of interacting with humans and the physical world around them. Thus, robotic systems and their potential benefits for new and existing insurance services are to be evaluated.

Related Trends

- Autonomous Things
- Industrial IoT
- Robotic Health
- Smart Spaces



Munich Re Parachute 2.0



A fully digital, end-to-end platform, hosting an array of insurance and protection solutions

Parachute 2.0 provides carriers, brokers, employers, and associations all the tools and tactics they need to future-proof their business and offerings. It is a scalable, turnkey online platform that makes it simple to provide products in an easy-to-use, secure, and streamlined digital environment. Members can complete a purchase in a matter of minutes online. That means immediate coverage from any device, anywhere, at any time.

Benefits at a glance:

- Product (Life and Non-Life) and carrier agnostic
- Automated underwriting and instant-issue
- Customized marketing strategies
- Cross-selling functions
- An intuitive self-service member portal for end consumers



Munich Re Realytix Zero



Source: iStock

Next level automated underwriting solutions

Realytix Zero is a global, scalable technology platform for primary insurers, brokers and MGAs that want to digitalize and automate the underwriting of single-risk business. Realytix Zero is set up as a No Code and Software as a Service platform offering UI and API capabilities and therefore it opens whole new opportunities in development and distribution of non-life insurance products. Its unique self-configuration capabilities allow quick implementation and adaptation of products.

Benefits at a glance:

- Significantly reduced time to market
- Customizable, flexibly implementable platform
- Digital distribution
- Increased (process) efficiency, cost and time savings



Munich Re cert2go



cert2go – speed up your reinsuring process of single risks

cert2go is a cloud-based underwriting platform for cedants seeking rapid, efficient and automated capacity from Munich Re. Our target group consists of clients who turn to Munich Re in search of cover for their small and medium-sized single risks. The platform provides clients with tailor-made solutions for many lines of business and markets and covers the whole UW process. The core of the platform is Munich Re's pricing engine, based on decades of underwriting expertise.

Benefit at a glance:

- Accelerating the UW processes
- Minimizing the administrative workload.
- Fully digitalizes the UW process
- Customizable for different LoBs and markets





Munich Re IMPROVEX™



Source: bestbrk / iStock / Getty Images

Data driven excellence for your portfolio

IMPROVEX is Munich Re's innovative data pooling platform with a unique approach to boost selected insurance clients' profitability in a challenging industrial risks environment. As one of the world's leading reinsurers, Munich Re combines its own and participating clients' exposure and claims data in a comprehensive database. This is enhanced with Munich Re's well-known actuarial know-how and advanced data analytics to create unrivalled market insights.

With our solution our participants can ...

- permanently improve their underwriting and growth strategy
- strengthen their competitive position
- open-up new possibilities to identify attractive business potentials



Munich Re What the Hack!? Cyber Solutions



Source: Munich Re

A new kind of cyber insurance – beyond traditional reinsurance

Cyber threats are one of the biggest security risks of the 21st century. Cyber insurance is no small matter and the cyber covers available on the market differ greatly. Munich Re offers insurers holistic solutions that go well beyond pure insurance coverage. The one-stop solutions offer a clear cost advantage and take up significantly fewer of insurers' resources.

Co-operation and underwriting services include:

- Legal advice and wording analyses
- Workshops, training and client seminars
- Technical risk assessment support
- White-label concept design for cyber products
- Threat intelligence sharing and cyber-claims information exchange
- Innovative cyber products & co-creation in the cyber network



Munich Re IoT Solutions



Source: Munich Re

Integrating tech, risk management & financing

Munich Re helps you to facilitate the transformation of your current business model into an Equipment- or Digital-Production-as-a-Service model by offering the right mix of technology, risk management and financing according to your business needs. Our IoT solutions allow you to safely grow your business and win new customer segments without having to significantly tie up resources or face all of the technology, investment and economic risks yourself.

Benefits at a glance:

- Cutting edge technology (hardware, software and analytics)
- Insured business outcomes with IoT solutions
- Reducing risk and guaranteeing performance
- Ecosystem partners





Munich Re

Insurance Analytics Market Place



From data to decisions

Munich Re has created a market-place for data analytics solutions that enables their clients to get the most out of their portfolio data without building up an own data analytics team and IT infrastructure. The offering covers the whole primary insurance value chain. Two examples of products are Building Insurance Analytics (ImRiSc) and Customer Analytics in the German market.

Benefits at a glance:

- Strong commitment to improve your performance
- State-of-the-art analytics services with highest IT security standards for GDPR relevant data
- Service offerings in various areas like Underwriting Monitoring, Claims, Customer Analytics, Big Data and Artificial Intelligence, see e.g. ImRiSc and Customer Analytics offering
- Easy web-based access to your customized analytics results



Munich Re

Building Insurance Analytics



Data Analytics for homeowner and commercial building Insurance (ImRiSc)

This data analytics solution provides evaluation of homeowner and SME-building risks by combining internal and external data, advanced analytics, and Munich Re's expertise. The solution covers water leakage and fire risks, identifies single risk drivers and displays its regional distribution – supporting a client's portfolio steering and the writing of profitable new business.

Benefits at a glance:

- External data enriches the integrity of internal data
- Possible automatization of underwriting process solely based on external data
- Risk score can be benchmarked against existing tariffing
- Illustrative and interactive dashboard to identify individual risk drivers



Munich Re

Customer Analytics



Sales professionals can increase the value of each customer

Customer Analytics generates insights into the different customer segments by creating a holistic view of the insureds by modelling customer behaviour analytically.

Benefits at a glance:

- Customization of solution to the clients' lines of businesses and system landscape
- Combining a retention, a cross-selling and an overall customer experience module
- Holistic picture of the entire customer relationship through Customer Value Score
- Interaction of a data-based complete picture of the customers and a whole range of predictive models
- Constant further development based on new methodologies, findings and clients' needs
- Illustrative and interactive dashboard to identify high-value customers





Munich Re Automation Solutions

INSIGHT



Source: d3sign / Getty Images

Data integration and decision making in the Life UW Process

Life insurers looking to exploit their data resources and to operationalize data driven decisions within their business use Insight Analytics to make their data accessible with targeted analytics aligned to business goals.

Insight Analytics provides a deep and wide view of underwriting processes, data and technology, combining raw data from multiple sources, enriching it with structure and making it accessible to the business. It supports customers at all stages of their analytics journeys from "out of the box" capabilities to curated data that can be leveraged by business users to build, share, interrogate and collaborate on data Insights relating to their business.



Munich Re

Flexisafe 2.0



Embedded into WeChat™

Flexisafe 2.0 China is a primary insurance solution with a pre-set bundle of private lines covers. It offers the flexibility to adjust the limits of the covers during the period of insurance with unchanged premium. It also covers the privately owned multiple properties of the insured across China in one policy without need to disclosing the details at the time of application.

Benefits at a glance:

- The combination of multiline and multi-location coverage with flexible adjustment of sum insured is a new primary insurance solution for personal lines business in the China NL-market.
- It is an API-based solution and can be easily embedded into WeChat or other online distribution platforms, as well as to be used for offline distribution by agents.
- We help the client design the product brochure, advertisement and training materials for their agents.



Munich Re

SRI Digital



Digital white label platform for savings, retirement and investment products

SRI Digital is a 100% digital white label platform to facilitate Munich Re Markets' new product business and our client's business growth.

The platform is developed in-house and provides modular software-components which enable our life insurance clients to explain, sell and operate modern Savings-, Retirement- and Investment (SRI) products more efficiently.

Benefits at a glance:

- Modular ready-to-deploy white label platform
- Minimum integration efforts due to IT chosen technology stack
- Digital tools are optimized both for direct-to-consumer distribution and traditional sales channels via brokers and agents





ERGO Germany Safe Home



© PantherMedia / aa-w

ERGO Safe Home in cooperation with Deutsche Telekom

ERGO is cooperating with Deutsche Telekom in providing a virtual product bundle consisting of insurance, service and smart home technology. In case of emergency (such as water leakage detection, smoke alarm or burglary alert), an automatic alert chain ensures someone is taking care of the customer's home, even when the homeowner is not able to react immediately. This fully automatic process is in place between ERGO's customer service department and Telekom's Magenta SmartHome backend.

Benefits at a glance:

- Home emergency are detected as quickly as possible
- Assistance is initiated if necessary
- ERGO Household Insurance provides financial security in case of damages



ERGO Germany Meetings in virtual reality



© PantherMedia / putlich

Meet your colleagues for a remote workshop or meeting in virtual reality

A strong trend towards virtual collaboration (not only driven by the pandemic) can be seen globally, but video telephony solutions, such as MS teams, don't always meet all requirements. Virtual reality allows us to further exploit the possibilities of virtual collaboration and move closer to classic on-site meetings. Virtual meeting participants can move and interact with each other in the room, stick Post-Its, write on a whiteboard or watch a presentation together. If you leave the meeting and come back into the room after a while, all the materials are still on the wall, which is particularly suitable for meeting formats that build on a previous meeting.

Benefits at a glance:

- Feeling of spatial presence and proximity
- Higher focus and engagement compared to videotelephony
- Three-dimensional listening

ERGO China Life Digital Health Service



© PantherMedia / HASLOO

Health management based on wearable device and PAI algorithms

ERGO China Life provides customers with digital health service based on wearable devices and the core algorithm PAI (Personal Activity Intelligence) certified by the American Heart Association (AHA). The wearable device monitors the customer's heart and lung conditions in real time according to the customer's physical movements, calculates the relevant PAI score and uploads it to the backend system. The backend system generates a customer health analysis report based on the accumulated PAI scores within a certain period. With this report, customer service personnel provide customers with health management suggestions, help them make a habit of exercise and physical training, thus reducing the risk of disease.

Benefits at a glance:

- Real-time and convenient health services to increase customer stickiness
- Help clients plan the mid/long-term health management



ERGO China Life

Open API to facilitate deployment



© PantherMedia / putlich

Shaping an essential role in Package Business Capability

ERGO China Life incorporates open API to facilitate the connection between the ERGO China Life core system and third party sales distribution platform. The system connection time is thus reduced from 2 weeks to 3 days.

Open API shapes an essential role in ERGO China Life's Packaged Business Capability, lays a foundation for effective data interaction between all portals and applications, improves recourse mobility and achieves systemic service standardisation.

Benefit at glance:

- Reduce time and manpower cost for system deployment
- Enhance collaboration efficiency between two parties

HDFC ERGO

Teleclinic



Source: HDFC ERGO

Providing online doctor consultation free of cost

HDFC ERGO has facilitated online medical consultation to all users of the mobile app 'HDFC ERGO Insurance App' (including policyholders and guest users). Teleclinic access is also provided to non-customers as well, targeting up-sell.

Key points at a glance:

- This is an add-on service in which customers can receive free consultation from general practitioners
- The services can be used from anywhere and as many times needed
- Convenient mode of consultation via text, phone call and video calls

ERGO Latvia

Robotics



© PantherMedia Stock Agency / Andriy Popov

Anti-money laundering checking

Based on legal requirements needed to perform due diligence on the LV LIFE portfolio, the AML robot checks our whole Life portfolio from those portals, saving the data in a structured way with timestamps and additionally saving the request responses as PDFs for legal purposes. This consists of multiple different checks from multiple different portals.

Benefits at a glance:

- Quick and efficient way of fulfilling obligatory legal requirements



ERGO Estonia Robotics



© PantherMedia Stock Agency / Andriy Popov

Claims Robot

In claims processing with Robotic Process Automation (RPA), we are now automating claim creations from private property web forms.

Each day, claim department employees are checking the web notices sent from the ERGO homepage and creating a claim in our system. To reduce their workload, the RPA will check the notices and create the claim by itself.

Benefits at a glance:

- Quicker claims process
- Improvement of customers' satisfaction

DKV Spain Digital Doctor



© Bildagentur PantherMedia / apid

Digital health services manager

The app Quiero cuidarme+ gives fast and reliable answers to medical needs of the user. Easy, safe and confidential. It offers a symptom checker (mediktor algorithm): orientation on diagnostic and urgency level. There are 1516 monthly users and 2.8 e-consultation sessions per user on average. In March 2020, DKV Spain opens up the e-consultation services to the Spanish population for free to stop the expansion of the COVID-19. Since then, more than 10,500 people have received clinical advice through the app during the COVID-19 crisis.

Benefits at a glance:

- Digital doctor visits (video call, chat and call me back function)
- Digital health services based on the user's personal health records (e.g. access to health diaries and documents, digital doctor specialists, health indicators and health tips)

DKV Spain Subscription models for payments



© PantherMedia / bacho123456

New TPV tools for subscribing frequent payments in customer credit cards

New digital customers demands different types of payments apart from direct debit. For that reason, DKV Spain has just implemented, as a first step, periodic payments by subscribing the premium in customer credit card.

An agreement with Paycomet (from Banc Sabadell) allows for this integration using DKV API framework, the monthly billing with subscription capabilities that Paycomet provides (card store, periodic charges, card errors in charges, due dates on cards, etc.). This agreement provides DKV with new payment methods without dealing directly with all the requirements related to these processes, that are assumed by Banc Sabadell.

Benefits at a glance:

- Improvement in customer convenience
- Increase of customer loyalty



DKV Spain

APIs, a link with stakeholders



© PantherMedia / putlich

Set of connectios to integrate DKV operation in third party processes and tools

Four years ago, DKV started a digitalisation process based on the optimisation of every process within the company. The goal was to generate a set of connections to open these processes to the interactions with every stakeholder through APIs and microservices.

Today, brokers, banks, malls, physicians, and hospitals are using their own tools and, at the same time, integrating into flows and activities of DKV by API services: quotations, customers, endorsements, claims, invoices, commissions, policy info, etc. 2021 will be the year of a massive use of the new set of APIs available.

Benefits at a glance:

- Key lever in third-party distribution agreements
- Reduction in costs of operation with brokers and suppliers

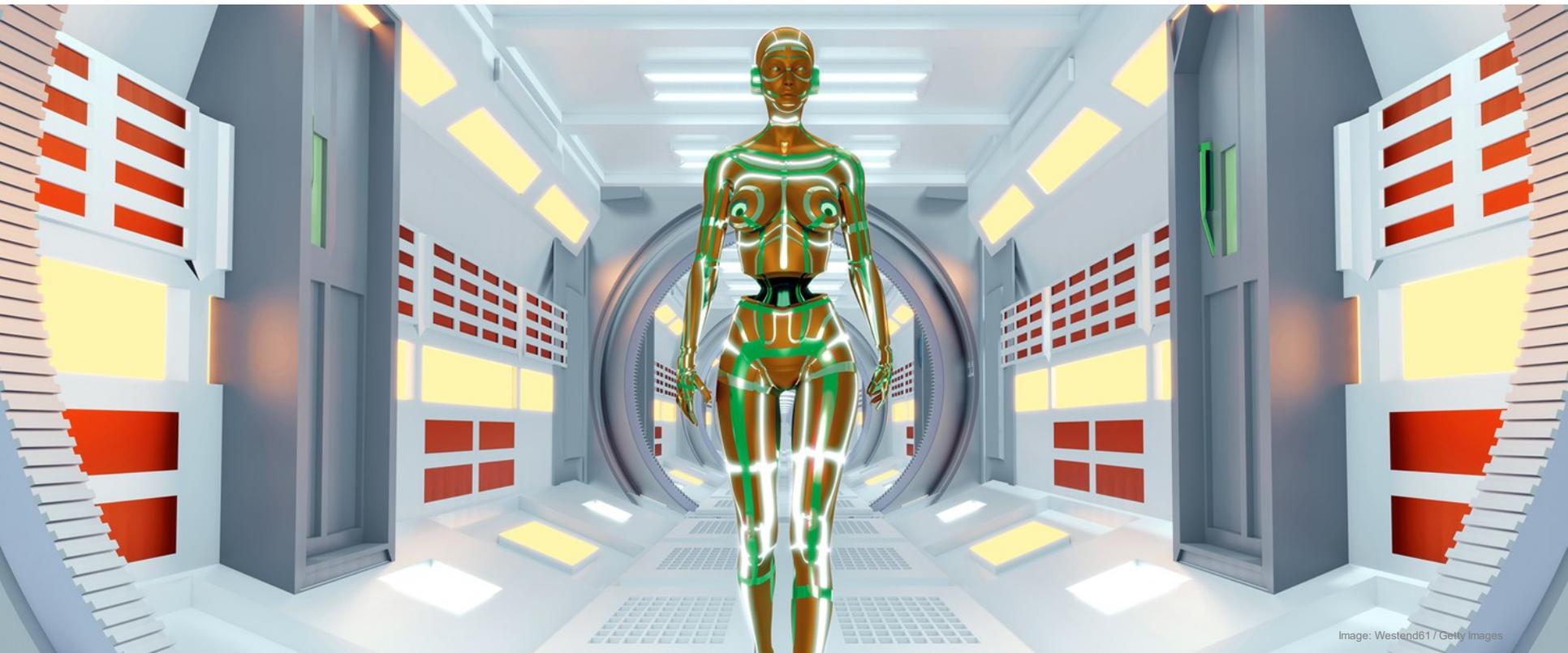


Image: Westend61 / Getty Images



Artificial Intelligence

Using AI means creating systems that learn, adapt and react autonomously. Computer vision allows machines to read and understand images or videos – a promising achievement in medical diagnosis.

Conversational User Interfaces create a new intelligent layer between people and systems. Machine learning is fueled by the availability of massive amounts of data as well as advanced hardware and algorithms. Synthetic data provides data when there are not enough data points from real data to feed into a learning machine. Businesses have also started to unpack the black box of technology, making it

understandable. AI coding and low code/no code features make AI more accessible to non-IT users.

More and more applications and services have started to incorporate AI in their services, business processes and data intelligence. Companies are well advised to invest in skills, processes and tools to exploit these techniques. Now it is time for AI to scale.

Adopt – Start initiatives in your unit



Computer Vision

Computer vision enables computers to gain high-level understanding from digital images or videos



Conversational User Interfaces

Conversational User Interfaces (CUI), such as chatbots or personal assistants bring a paradigm shift in how humans interact with the digital world



Machine-driven Decisions

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



Natural Language Processing

Natural language processing (NLP) can ease human-computer interaction and leads to machines understanding and acting on text

Trial – Initiatives in affected units



AI Diagnostics and Therapeutics

AI is used in medicine to detect and diagnose diseases. Cancer, depression, eye diseases and Alzheimer's are some of the application areas



Automated Machine Learning (AutoML)

AutoML creates knowledge from multiple layers of information in automated data processing to solve real-world problems



Explainable Machine Learning

Constantly analysing new data, machine learning algorithms adjust program actions according to recognised patterns and make autonomous decisions



GPT-3

GPT-3 (Generative Pre-trained Transformer 3) is a language prediction model which can be used to translate, take memos and even create computer code



Knowledge Graphs

Knowledge Graphs are used in AI to contextualise data by creating relationships between data



Smart Cyber Security

Leveraging information retrieval capabilities formerly limited to human brains to prevent cyber attacks

Assess – Evaluation needed



AI Chips

The integration of AI into hardware creates smart automation solutions with benefits such as energy savings and cost efficiency, as well as the elimination of human error



AI Coding

AI Coding refers to AI programmes that support the writing of code or directly write code based on a description of the wanted function



AI-enabled drug discovery and development

AI can be used in drug discovery to identify promising molecules and therapeutic targets to develop new drugs



Reinforcement Learning Techniques

Reinforcement Learning (RL) is an iterative learning process in which a software agent employs trial and error to find a solution



Synthetic Data

Synthetic data is artificially created information not based on real-world phenomena or events. It allows users to create data sets for training AI models

Hold – Watch list



Artificial General Intelligence

It may be possible to build a machine with human cognitive capabilities – but we are probably decades away from developing it

 = new in 2021



Computer vision enables computers to gain a high-level understanding from digital images or videos.

Computer vision tasks include methods for acquiring, processing, analysing and understanding digital images, as well as extracting data from the real world. For example, computer vision can aid an AI system, such as a robot, to navigate through an environment by providing information through vision sensors.

Computer vision is a combination of cameras, Edge/Cloud Computing, specialised software as well as AI which enables computers to recognise (real-world) objects. The system is thus able to deduce the observed objects through (a couple of) images. By means of Deep Learning, computer vision generates neuronal networks for the processing and analysis of images.

Insurance Value Chain



Opportunities

- By identifying objects on smartphone pictures, image recognition can offer cross-selling opportunities for insurers. Computer vision allows insurers to improve their risk underwriting since it extracts and analyses visual information (such as images of property).
- This is particularly interesting for small-scale risk coverage, smartphone and pet insurance for example, that requires an accurate premium. If the premium is too high, low-risk customers are likely to switch provider. If it is too low, loss ratios will explode.
- Computer vision can be used to reconstruct accidents or collisions from a smartphone camera and accelerometer data.
- Brick-and-mortar stores can use computer vision to provide their customers with product recommendations during their shopping experience, based on the items already added to their shopping trolley.

Risks

- The computer vision algorithm must be trained to become reliable.
- In insurance claims handling, the application of computer vision additionally needs to be fraud-proof.
- Implementation on a larger scale may require an investment in computing power.
- Training data should be validated.

Trend Evolution



Computer vision appeared on the radar in 2018 and is a significant driver for applications requiring visual data from sensors such as robots, autonomous things and IoT devices. The medical field appears to be one of the most beneficial for Computer Vision, e.g. in remote surgery.

Related Trends

- Enhanced Reality
- Precision Farming
- Explainable Machine Learning



Conversational User Interfaces (CUI), such as chatbots or personal assistants bring a paradigm shift in how humans interact with the digital world.

In CUIs, users and machines interact primarily in the user's spoken or written natural language. These interactions range from simple utterances to highly complex interactions. CUIs have experienced explosive growth with chatbots, messaging platforms and virtual assistants, especially home speakers such as Amazon Echo and Nest Home.

Machine learning technologies have progressed to the point where computer systems understand enough natural human language to respond accordingly. Siri, Google Now, Alexa, and Slackbots are a few high-profile design examples of voice or message-driven experiences that have gained the mass market. Indeed, these and other AI systems are now open enough to allow to interact with customers through natural language. The result is the beginning of a new era in customer relationships. For companies, conversational user interfaces provide several concrete benefits allowing a smart and "app-free" assistant service for their customers.

Insurance Value Chain



Opportunities

- In terms of privacy, CUIs threads are transparent and accessible for the consumer, whereas this does not hold true for apps/websites. The customer can therefore access any information at any time.
- If embedded in a company's website, consumers do not need to install a software or an app in order to use the services. Thus, on-boarding is much quicker and more efficient.
- Since all digitally connected user generations are used to chatting on WhatsApp and WeChat, they may prefer a CUI as a means of interaction with their insurance company as well. The customer files a claim using the chat window by simply sending a picture of the damage, together with a short description of the incident.

Risks

- CUIs are subject to cyber security issues; for example, hacking of a conversation might result in loss of sensitive data.
- Voice-based interfaces such as Amazon Echo are usually installed in the consumer's home and therefore raise privacy concerns, since the providers could theoretically overhear each and every conversation.
- Certain issues may be hard to describe and clarify using Conversational Interfaces in the chat form. This could be mitigated by voice-based interfaces.

Trend Evolution



CUIs gain prominence, as they are being integrated in broader AI solutions. After years in ASSESS stage, it is now time to ADOPT broadly in your units.

Related Trends

- Natural Language Processing
- Digital Health Services
- Machine-driven Decisions
- Smart Spaces



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

A tremendous increase in data has contributed to the rise of a “data-driven” era, where big data analytics are used in every sector of the world economy. The growing expansion of available data is a recognised trend worldwide, while valuable knowledge arising from the information comes from data analysis processes.

Today, algorithms scan every bit and piece of data that has been collected on a specific issue – such as the field of interests of a certain client – and extract all the relevant information. Conclusions are derived and logical decisions made based on this rich set of information. However, the success of data-driven decisions relies on the quality of the data gathered and the effectiveness of its analysis and interpretation.

Insurance Value Chain



Opportunities

- Details about an individual's driving behaviour has been shown to be the most accurate predictor of claims costs; machine-driven decisions therefore allow motor insurance providers to flexibly adjust their premiums if risky driving behaviour is observed.
- High-quality statistical predictions through machine-driven decisions could free employees from repetitive tasks.
- In contrast to individuals, machine-driven decisions stick to clearly defined decision criteria and are not influenced by personal moods that might negatively affect decision-making.
- In combination with smart contracts, machine-driven decisions can automate claims payments in insurance. The machine might measure temperature and decide to execute a smart insurance contract based on a given set of trigger conditions.

Risks

- In order to implement machine-driven decisions, some decision criteria need to be implemented at the beginning, and on-the-fly adjustments are virtually impossible. So wrong decisions at the outset are likely to become expensive over the course of the project.
- Distortions or changes in the informational content of the data underlying the decision algorithm might result in unintentional and, in some cases, even systematic errors.
- In contrast to artificial general intelligence, machine-driven decisions may still be inferior to the judgement of human experts.

Trend Evolution



Machine-driven decisions have reached ADOPT stage. Start implementing initiatives.

Related Trends

- Distributed Ledger
- Explainable Machine Learning
- Virtual Assistants



Natural language processing (NLP) can ease human-computer interaction and leads to machines understanding and acting on text.

The quality of NLP has improved significantly; visible accomplishments include technologies such as Microsoft's Skype Translator, which translates in real time from one spoken language to another, or Google's information cards that offer answers instead of a list of page links. For most enterprises, the simplest and most immediate use cases for NLP are typically related to improved customer service, employee support, and processing claims and policy information.

Insurance Value Chain



Opportunities

- Insurers can use this technology to develop services that help customers understand their insurance contracts, i.e. explain wordings, technical terms, etc.
- NLP can be used by insurers to process claims and policy information, transforming them into structured information.
- Data collected through speech recognition could potentially be applied for other business purposes.
- NLP is likely to significantly accelerate claims handling since documentation can be done much quicker, leading to higher efficiency.
- There are many high quality 3rd party or open source algorithms / approaches which can assist with early gains.

Risks

- The results of NLP are statistical in nature which can lead to errors. There needs to be a retraining process if the type of content being processed significantly changes.
- Unauthorised usage of NLP-enabled applications could lead to the conclusion of contracts or products/services purchases without the necessary legal prerequisites being fulfilled. For example, children or people who are not contractually capable might be able to conduct transactions.
- The provider must ensure that user commands are not misinterpreted and therefore result in erroneous transactions.

Trend Evolution



Similar to last years, Natural Language Processing is classified as an ADOPT trend, implying the need to integrate it in your business!

Related Trends

- AI Chips
- GPT-3
- Behavioural Analytics



AI is used in medicine to detect and diagnose diseases such as cancer, depression, eye diseases and Alzheimer's, as well as infectious diseases such as Covid-19.

Deep Learning is used to analyse X-rays and other medical images to detect eye diseases, skin cancer, breast cancer, other forms of cancers, Alzheimer's disease and more. In a 2019 study, a research team pooled the most promising results from 14 AI diagnostics studies to reveal that Deep Learning systems correctly detected a disease 87% of the time, compared with 86% for healthcare professionals. A study from 2020 of 8,700+ dental X-rays showed that AI diagnostic systems identified tooth decay in X-rays with more accuracy and consistency than human clinicians.

Beyond image analysis, AI is applied to find patterns in the symptoms or behaviours of patients to identify disease earlier and with less invasive methods, or to prevent chronic conditions from worsening. AI can also be used beyond diagnosis to treat patients.

Insurance Value Chain



Opportunities

- AI can help diagnose early severe diseases such as cancer and Alzheimer's, and can even help prevent the outbreak of diseases with early and more accurate detection of symptoms.
- AI diagnostics are aiding research into diseases by linking symptoms-related data and patient health history in a global database. This will improve the development of treatments and increase curability, especially for rare diseases.

Risks

- At the moment, data quality and sources are not sufficient to train algorithms. Rare diseases in particular are often diagnosed too late as no data is available for early detection of symptoms and indicators.
- A diagnosis could be manipulated by deepfakes or other means of image manipulation - which results in fraud for health insurers and the healthcare system.

Trend Evolution



AI diagnostics cover use cases for the application of AI in the medical field, which is one of the areas in which AI will bring the highest value-add.

Related Trends

- AI Enabled Drug Discovery and Development
- Automated Machine Learning
- Computer Vision

Automated Machine Learning (AutoML)

Trial



Automated Machine Learning (AutoML) creates knowledge from multiple layers of information in automated data processing to solve real-world problems

AutoML is a way of deep learning. Each time new data is poured in, its capabilities get better. The technology has transformational and disruptive potential for all industries. AutoML is the automated form of machine-learning that allows intermediate representations to be discovered. These intermediate representations allow more complex problems to be tackled and others to be potentially solved with higher accuracy and fewer observations.

Three factors have led to the rise of AutoML: availability of unprecedented amounts of training data, refinements in models, algorithms and applications to process rapidly growing data automatically and the emergence of better hardware platforms for deep learning models.

Insurance Value Chain



Opportunities

- Thousands of vendors are exploring the applicability of AutoML to a range of fields, such as computer vision, conversational systems and bioinformatics.
- Heavyweights like Google, Apple, Microsoft and Facebook are constantly increasing their deep learning skills. For example, deep learning is behind Apple's Siri, Google's Google Now, Microsoft's Cortana and Amazon's Alexa.
- Data and analytics leaders of modernisation initiatives should revisit previously intractable cognitive problems relating to text, images, video and speech analytics, as well as problems that involve complex data.

Risks

- Many current AutoML applications, once trained, usually work on input data for classification and recognition purposes for an application that read inputs from files or the network; attackers can potentially construct malformed input.
- Image recognition applications take training samples, which can be polluted or mislabelled if training data come from external sources.
- AutoML applications can also be attacked if the developers use models developed by others.

Trend Evolution



As deep learning has matured over time, AutoML shifts between TRIAL and ADOPT stage. Insurance-related use cases need to mature.

Related Trends

- Machine-driven Decisions
- Computer Vision
- Explainable Machine Learning
- Smart Cyber Security



Constantly analysing new data, machine learning algorithms adjust program actions according to recognised patterns and make autonomous decisions. To ease adoption for business functions, Machine Learning models are simplified with explainability frameworks.

Machine Learning aims to extract certain kinds of knowledge and patterns from a series of observations. Machine Learning is one of the hottest concepts in technology, given the extensive range of effects it has on business. The drivers of this continued massive growth and adoption are the growing volume of data and the complexities that conventional engineering approaches find themselves increasingly unable to handle. In the future, advances in transportation, energy, medicine and manufacturing will be impossible without machine-learning.

But to unlock business potential, algorithms and models must be comprehensive and accessible not only to data scientists. Platforms like IBM Watson OpenScale or Google Cloud Platform bridge this gap and install an additional layer of explainability between humans and data.

Insurance Value Chain



Opportunities

- Machine Learning is very powerful if enough data is used as input. In combination with new and large amounts of data, such as is generated by Internet of Things (IoT) devices, insurers can significantly improve their efficiency.
- Insurers could collect usage-based data such as driving behaviour in motor insurance and draw on Machine Learning to improve their risk analysis and pricing models.
- Advanced Machine Learning may allow automated underwriting of risks, saving time and costs in the process. One example is determining quotes for life insurance coverage based on smartphone selfies.
- Machine Learning simplified by explainability tools could also be applied in broader business use cases like claims handling, substantially freeing up the capacity of human claims adjusters.

Risks

- To begin with, since the technology needs to learn in order to improve itself, insurance companies that use it for underwriting and pricing may have to protect themselves against inflated loss ratios.
- In the vast majority of cases, supervised learning is necessary. This binds a lot of resources before any efficiency gains can be made.
- Insurers are required to learn the underlying mechanics and shortcomings of an algorithm. Otherwise, they run the risk of making wrong decisions that are likely to be associated with high costs, fewer customers, etc.

Trend Evolution



After a short peak as Machine Learning appeared in the field of AI, Machine Learning has been diversified into related trends. As advanced, interpretable or explainable Machine Learning the trend is to be observed in TRIAL stage.

Related Trends

- Automated Machine Learning (AutoML)
- Machine-driven Decisions
- Industrial IoT



GPT-3 (Generative Pre-trained Transformer 3) is a language prediction model that can be used to answer questions, summarise long texts, translate languages, take memos and even create computer code.

GPT-3, the third version of the language prediction model, was created by OpenAI, an AI research and deployment company. GPT-3 is designed to take one piece of language as input and transform it into another piece of language that it predicts as the most useful for the user.

GPT-3 is the largest artificial neural network ever created. It was pre-trained on a vast body of text where it identified over 175 billion parameters (mathematical representations of patterns). It employs semantic analysis - where it not only studies words and their meanings but also how the usage of words depends on other words. It is also a form of unsupervised learning as the training data does not contain any "right" or "wrong" response.

The code is not available in the public domain. Selected developers can access it via an API maintained by OpenAI.

Insurance Value Chain



Opportunities

- With GPT-3 conversational interfaces like chatbots, e.g. for claims management, customer service can be improved by delivering more appropriate human-like language responses.
- More customer requests and other customer-facing processes can be automated - something that will save on resources and increase data for tracking customer behaviour.

Risks

- GPT-3 caused a hype around its technology - that is built around a massive text body for training the algorithms. GPT-3 lacks predictive capabilities however.
- GPT-3 is limited in terms of the semantic quality of the output as soon as it is requested to produce more complex or longer outputs.
- The technology behind GPT-3 as a product is a black box. Provider company OpenAI does not reveal any further details.
- GPT-3 is an expensive tool requiring huge computing power.

Trend Evolution



GPT-3 is a product technology that has been hyped in 2020 due to its promising improvements in predicting human language.

Related Trends

- Conversational User Interfaces
- Automated Machine Learning (AutoML)
- Natural Language Processing
- Behavioural Analytics



Knowledge Graphs are used to enhance search results by creating relationships between data from different sources.

There are different approaches on structuring data to generate information. At their core, Knowledge Graphs work by decoding relationships between data to encode information.

In the fields of AI, Knowledge Graphs are in the spotlight as they are capable of contextualising data and providing features for training. In the area of AI solutions, Knowledge Graphs are invaluable as they help create contextualised knowledge systems from unstructured data such as that produced by Natural Language Processing (NLP).

Insurance Value Chain



Opportunities

- Graph-based solution enriches data with missing data. Their capabilities can identify entities, e.g. people, by analysing unstructured data from various sources.
- By building up rich knowledge networks from unstructured data, graph-based technology can compensate for the lack of human reasoning in AI solutions.
- With their contextualising capabilities, knowledge graphs draw connections between data that would otherwise remain distinct, e.g. from individuals.
- Knowledge graphs do not necessarily come as stand-alone AI market solutions. Their potential lies in implementation in broader AI and cloud platforms and services.

Risks

- The fate of Knowledge Graphs is closely tied with the platforms they are implemented into.

Trend Evolution



Approaching in 2019 in the field of AI, Knowledge Graph have reached TRIAL stage. Evaluate their potential and implement them in your AI initiatives.

Related Trends

- Natural Language Processing
- Cloud Edge
- Industrial IoT
- Deepfake Defence

Artificial Intelligence Smart Cyber Security

Trial



Leveraging information retrieval capabilities formerly limited to human brains to prevent cyber attacks.

With the increasing complexity of IT systems, cyber criminals are adapting to become highly skilled experts. Cyber security solutions must therefore always be one step ahead. From cognitive to AI-powered, the range of technologies ready to be leveraged for cyber security is broad.

Cognitive capabilities integrated into cyber security systems enable them to “understand” information from external sources such as blogs, social media and publications, as well as internal systems to identify cyber security risks. They work by identifying human behaviours and are based on technologies patterned on human thought processes.

Machine learning mechanisms not only help to detect attacks, they also speed up the examination process to make the right decisions after notification. The average time to identify and contain a data breach case is still 280 days, according to IBM’s 2020 Cost of a Data Breach Report.

Insurance Value Chain



Opportunities

- Cyber security systems that use cognitive technologies enhance the early-warning systems of IT security departments.
- Smart cyber security enriches and strengthens the service portfolio of organisational and industry related cyber security.
- Smart cyber security systems may enable insurers to better understand and control cyber risks and therefore underwrite larger limits of cyber coverage.

Risks

- As cyber security solutions mature, they will become vulnerable to next generation hackers.
- Reliance on cyber intelligence may give institutions a false sense of security against cyber attacks.
- New technologies like cognitive featured in security software is not yet established as a reliable and trustworthy cyber security solution. Highly specialised resources that combine the fields of cognitive technologies and cyber security first need to be built and convincing investment plans drawn up. Operational costs may increase substantially.

Trend Evolution



AI for cyber security has been a field of high interest and business value ever since. Whether semantic, cognitive or augmented, cyber security is an optimal playground for complementing existing security systems with state-of-the-art solutions.

Related Trends

- Quantum Computing
- Distributed Ledger
- Automated Machine Learning (AutoML)
- Machine-driven Decisions



The integration of AI into hardware creates smart automation solutions with benefits such as energy savings and cost efficiency, as well as the elimination of human error.

An artificial intelligence system can exist solely as software. However in most cases, AI requires the use of hardware components. Recent years have seen AI find its way into everyday devices. For example: A smart home lighting system that automatically turns lights on and off based on whether someone is in the room.

In the near future, the convergence of AI and embedded systems will lead to huge improvements in many areas. Take the field of image and video recognition: Such systems are already being used in Amazon's grocery store, where highly intelligent cameras identify each product picked from the shelves. Tasks like this require immense computing power. On the hardware side, there is a special class of AI chips for AI applications, also called AI accelerators, They have higher bandwidths and enable parallel processing - something that is needed for AI to be efficient. They are also designed to consume low power.

Insurance Value Chain



Opportunities

- Based on their ability to recognise and interpret patterns, machines with hardware-embedded AI could perform more complex tasks than simple smart devices in the area of IoT.
- An advanced insurance product could rely on AI embedded in wearables or smart textiles that evaluates data from the customer's environment in real-time and automatically adjusts coverage based on certain patterns.
- AI chips contribute towards solving the dilemma that the more powerful AI applications are, the more computing power they need. Low-power AI chips can help to reduce the carbon footprint.

Risks

- AI chips need to prove their processing performance and system stability, especially when implemented on a large scale.
- Providers like Nvidia create lock-in effects that limit flexibility and scalability of AI chips for different business purposes.

Trend Evolution



AI chips evolved from hardware-embedded AI. For each IT department, questions about how to enable their system performance get closer the more "intelligent" AI applications become.

Related Trends

- Smart Spaces
- Brain-computer Interface
- Autonomous Things
- Smart Cyber Security



AI coding refers to AI programmes that aid with the writing of code or write code directly based on a description of the function required.

Several programmes for AI coding have been developed and are already in use. AI coding can improve the productivity of software teams and enable businesses to build custom software faster.

Google's TF-Coder helps users write TensorFlow code. Users provide input-output examples of the transformation required. Then the programme finds the TensorFlow that performs the transformation and gives the TensorFlow code as output.

DeepCode is an AI software platform that learns from open-source programmers. It uses acquired knowledge to review code and give users alerts of bugs and suggestions on how the code can be improved.

Kite is a Python-based AI-powered code completion tool. It uses machine learning to provide code completion suggestions for Python that speed up the code writing process. Pylint is a Python static code analysis tool. It looks for programming errors, helps enforce a coding standard, offers simple refactoring suggestions, etc. Other examples include Bayou, Clever-Commit, Embold, PyCharm, Sketch2Code and GPT-3.

Insurance Value Chain



Opportunities

- Having AI programmes in place that support coding can automate or speed up the performance of any business processes.
- In policy writing, automated text suggestions can improve policy wordings. These text suggestions are trained to an algorithm based on previous policy texts that have been fed into the database.
- AI can improve existing code. Mozilla and Ubisoft for example have released an AI coding agent called Commit-Clever that detects buggy code based on previous bugs and their corrections.

Risks

- AI for coding can only learn from previous code and needs quality data as input and output.
- Code provided by an AI agent needs quality control. AI-generated code is only suitable for simple coding tasks and programmes.
- AI coding agents will not replace the job of developers. Developers need to provide the AI coding agent with input and output that will be processed into code. AI coding is there only to speed up the coding process.

Trend Evolution



AI coding is a new trend appearing on the radar in 2021, empowered by technological advancements in machine learning and the ever-growing need for code development for more and more business applications.

Related Trends

- GPT-3
- Automated Machine Learning (AutoML)
- Low Code / No Code



AI can be used in drug discovery to identify promising molecules and therapeutic targets to develop new drugs.

Advancements in machine learning, increases in computing power and the acceleration and democratisation of DNA sequencing mean there is more genomic data available, as well as tools to manage and manipulate these very large datasets. Companies are emerging that utilise AI in drug development, in particular to speed up the initial steps of drug discovery.

For drugs to be efficacious, they need to fit like a key into a lock to shut down the disease protein. At the same time, they need to be safe as well as efficacious and not interact with other molecules in the body. In essence, scientists must figure out if the drug would affect the right things. Here, machine learning can be used to run 3D models to predict the effects of the drug, and thus limit the time in discovery. Algorithms can also be used to identify new potential drugs - by analysing the structure of thousands of human proteins and creating novel protein sequences which could form the basis of new treatments. In addition, similar algorithms can be used to model complex production processes (digital twins, AI in operations) or clinical datasets (RWE/virtual trials).

Insurance Value Chain



Opportunities

- The drug development process takes about ten years. The power of data and algorithms is beneficial to speed up this process.
- Existing disease drugs can be screened for use in new ways to develop more effective and cheaper drugs. Non-curable diseases can become curable.
- Development processes including the more complex CMC processes (operations) as well as clinical trials can increasingly make use of these datasets to optimise processes and data generation.
- Modelling data in operations can also help to identify potential quality or process issues early, and thus prevent loss of production batches for high cost drug substances or drug products.

Risks

- Drug development is a competitive business. The sharing of data and open data initiatives are to be promoted to create a data-rich environment that provides enough data to run machine learning algorithms
- Stable algorithms need to be in place in order to increase efficiency in the drug discovery process.

Trend Evolution



The power of data and algorithms is beneficial to speed up drug discovery.

Related Trends

- AI Diagnostics and Therapeutics
- Personalised Medicine
- Population Health
- Vaccine Technologies



Reinforcement Learning (RL) is an iterative learning process where a software agent faces a game-like situation and employs trial and error to find a solution.

In reinforcement learning, a machine learning model is trained in an interactive environment by trial and error, in which the model is rewarded for being right. Although the designer sets the reward policy, i.e. the rules of the game, the designer does not give the model hints or suggestions for how to solve the problem. Instead, the model uses feedback from its own actions and experiences to improve. Its goal is to maximise the total reward.

The models are designed to solve specific kinds of learning problems. Fields of applications include self-driving cars, industry automation, trading and finance, NLP, healthcare etc. Although significant progress has been made in the field, reinforcement learning is still mainly a research area.

Insurance Value Chain



Opportunities

- Reinforcement Learning improves the quality of outputs from AI and data-based applications such as speech recognition for customer services.
- For insurers, claims management and underwriting are major fields that benefit from improved learning algorithms connecting real-world events such as accidents to claims-relevant data. In this way, manual processes involving a large amount of previously unstructured data such as claims and contracts can be automated to a higher degree.
- Like other deep learning technologies, reinforcement learning can be leveraged to prevent cybersecurity attacks and threats associated with persuasive computing.

Risks

- Applications for reinforcement learning have previously been limited by weak computer infrastructure.
- Reinforcement Learning needs advanced computational capabilities to be processed.
- Reinforcement Learning is still a topic of research. We still await use cases with a relevance for insurers.

Trend Evolution



Generative Adversarial Networks (GANs) paved the way for Reinforcement Learning techniques. Just like other deep learning techniques, Reinforcement Learning is on the rise but still in the early development stage.

Related Trends

- Knowledge Graphs
- Explainable Machine Learning
- Automated Machine Learning (AutoML)



Synthetic data is artificially created information not based on real-world phenomena or events. It allows users to create datasets for training AI models.

Synthetic data is created with machine learning techniques, e.g. decision trees or deep learning, from some input, or seed, data. It is useful when there is a lack of data or there are privacy barriers. A synthetic dataset can be used to validate mathematical models and train AI algorithms.

To be effective, a synthetic dataset must have the same mathematical and statistical properties as the real-world dataset it is standing in for. However, if it is based on a real dataset, a fully synthetic dataset should not contain any of the information from the original dataset.

Insurance Value Chain



Opportunities

- Security and fraud protection are common use cases in which synthetic data helps improve AI-enhanced applications.
- By generating synthetic data, there is less need to capture a vast amount of data from insurance-relevant real-world events (like accidents) to process a claim.
- Privacy-restricted or regulated data that insurers do not have access to, such as a patient's health history, can be replaced by synthetic data to improve algorithms.
- Synthetic data is based on similarities in attributes and is less sensitive and so can be shared more openly between stakeholders and third parties, e.g. with telecommunication providers for improving smart home insurance products.

Risks

- The quality of data varies with respect to the lack of outliers you would find in a real-world dataset - that makes data outputs less accurate and less reliable.
- Synthetic data can easily be faked for malicious purposes. The Tesla case shows that autonomous vehicles can easily cause accidents when stickers are placed on a road that make the vehicle go in the wrong direction.
- Synthetic data is only complementary and does not fully replace real-world data. Real-world data is still the base needed for creating accurate outputs.

Trend Evolution



Synthetic data is one of the new trends of 2021 driven by the need to make AI applications more scalable for business purposes.

Related Trends

- Automated Machine Learning (AutoML)
- Conversational User Interfaces



It may be possible to build a machine with human cognitive capabilities – but we are probably decades away from developing it.

Expressed concisely and simply: artificial general intelligence (AGI) – also called “strong AI” – does not yet exist, since today’s AI technology cannot be proven to possess the equivalent of human intelligence. It lacks common sense, intelligence and extensive methods for self-maintenance or reproduction. So today, AGI is only a subject for science fiction and “what if” discussions.

Progress on Artificial Intelligence has so far been limited to so-called “weak AI”, in other words special-purpose AI limited to specific, narrower use cases. Even though it may be possible to build a machine that approximates human cognitive capabilities, we are likely to be decades away from having the necessary research and engineering.

Insurance Value Chain



Opportunities

- In contrast to other technologies, AGI does not require any technical know-how or highly-trained employees with particular IT skills.
- In theory, it could fully replace human employees throughout the organisation.
- By combining advanced computing capabilities with human-like self-reliant cognitive skills, AGI could help companies solve the most complex and demanding tasks.
- Take cyber risks: AGI might be the appropriate technology to autonomously prevent attacks, detect and fix security leakages in software, and evaluate and apply potential countermeasures, etc.

Risks

- Since AGIs do not exhibit any human feelings like love or hate, they only aim to achieve their goals, which, in turn, may not be in line with human goals.
- Even for beneficial ends, an AGIs might be prepared to use malevolent means.
- AGIs might be misused by unscrupulous organisations, countries, etc.
- Depending on its development, AGI might be incomplete and misinterpret or ignore contexts and commands.
- Several open questions remain with respect to privacy, data security, legal responsibilities, etc.

Trend Evolution



Artificial General Intelligence has not fully reached maturity and thus is back on HOLD. Watch its evolution!

Related Trends

- Industrial IoT
- Brain-computer Interface
- Autonomous Things
- AI Chips



Munich Re

Epidemic Risk Solutions



© Tom Merton / Getty Images

Holistic solutions saving lives, protecting economies - financial protection from catastrophic disease outbreaks

Epidemics and Pandemics cause severe economic impact to all business sectors. As epidemic and pandemic risk has been increasing over the last six decades and outbreaks are becoming more frequent and severe, Munich Re has designed a risk transfer solution to cover financial losses caused by disease outbreaks. The payout to the insured is based on an epidemic/pandemic trigger (e.g. PHEIC + Civil Authority Restriction) as well as an economic trigger (e.g. loss in gross profit).

Benefits at a glance:

- Worldwide & regional covers adapted to fit the client's risk exposure
- The policy covers both known and unknown diseases and can be structured to trigger at different levels of outbreak severity
- Possible coverage extensions: Affidavit Proof of Loss (APL) approach and Crisis Management



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 that combines 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 utilisation.

Benefits at a glance:

- Access to a selection of quantitative investment strategies
- Better risk transfer by sourcing complete investment solutions directly from Munich Re
- Attractive payouts of guarantees and insurance covers





Munich Re aiSure™



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Guaranteeing the performance of Artificial Intelligence systems

aiSure™ is an insurance product for AI providers who wish to offer insurance-backed performance guarantees. Available for AI start-up or corporates, the guarantees assure users that the AI service will perform as promised or provide compensation in the event that it does not. More than simply protecting users against underperformance, aiSure™ signals the provider's confidence in the ability of its AI to perform, which increases the AI's attractiveness to customers.

Benefits at a glance:

- The AI provider benefits in its sales efforts as aiSure™ adds a competitive advantage to its AI service.
- The AI user gets a monetary indemnification that mitigates a potential system underperformance.



Munich Re Vahana AI



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Making motor claims assessment effortless, fast and user friendly with Artificial Intelligence

Vahana AI is an AI-based Damage Assessment tool developed by Munich Re, which helps increase efficiency in the claims reporting and settlement process along the traditional manual claims processes which impact claimants and assessors in the motor insurance industry.

Benefits at a glance:

- We are the leader in providing end-to-end insurance AI & Machine Learning services and expertise
- We have the network of over 300 AI & ML, actuarial and IT Experts with in-house capabilities to create AI solutions
- Vahana AI offers customers and surveyors an easy-to-use mobile app



Munich Re DRIVE



Dynamic Risk Intelligence in Virtual Environments

The SaaS (Software as a Service) cyber risk management solution provides a one-click cyber risk assessment. Building on technical data of existing cyber systems, DRIVE enables integrated cyber risk management. Our AI-driven and event-based risk engine identifies critical situations and predicts risk mitigations actions.

Benefits:

- Jumpstart your cyber risk management journey with automated contextualization of world class impact data
- Automate cyber risk assessments to reduce auditing and certification efforts
- Keep constantly track of your cyber risk exposure, key cyber risk drivers and prioritize actions for efficient cyber risk mitigation
- Trusted partner on your journey towards cyber resilience





Munich Re Automation Solutions

Predictor



Source: Gettyimages

Artificial Intelligence - Use of predictive models in Life underwriting

Life insurers looking to evolve their underwriting beyond simple underwriting rules and combine traditional tree-based approaches and emerging AI predictive models can accelerate their underwriting innovation with Predictor from Munich Re Automation Solutions.

Predictor allows forward-thinking insurers to operationalize, monitor and manage predictive models within their underwriting process. It removes many of the barriers that have prevented carriers adopting predictive underwriting to date. It opens a clear path to lower referral rates, reduced evidential burden and improved customer journeys.



Munich Re Automation Solutions

ALLFINANZ SPARK



Source: Andrey Onufrienko

Life insurance's new generation of digital underwriting

Munich Re Automation Solutions (MRAS) help life insurers all over the world to create up-to-date solutions for different parts of the insurance value chain.

For example, ALLFINANZ SPARK is a new cloud-based business, digital life insurance underwriting and analytics solution designed to deliver everything an insurer needs quickly. With its automated underwriting system and capabilities, life insurers can reduce many of the routine cases that take up so much of their underwriters' valuable time. With access to new sources of data and insights, you can make better decisions much faster. Improving the efficiency of automated underwriting processes by digitalization and the use of artificial intelligence the next step moving to an augmented automated underwriting is not far away.





ERGO Germany Robotics



© PantherMedia Stock Agency / Andriy Popov

Bots relieve workers from repetitive tasks

Repetitive and time-consuming tasks setting a high incentive for robotic assistance. The Robotics Competence Center at ERGO develops new bots in close cooperation with relevant departments. On average there are two new bots “going live” each month since 2019, resulting in 63 bots launched in Germany so far handling about 100,000 transactions per month.

Benefits at a glance:

- Use Case Broker Sales: “Roberto” assists in creating policy copies for broker portals.
- Use Case Bike leasing: the bot registers claims individually that are transmitted to ERGO by leasing companies in bulk.
- Use Case AMNOG: the bot facilitates claiming quantity discounts from pharmacies by collecting and clustering prescriptions supplied by health insurance customers

ERGO Germany Mailbox sorting and task assigning



© PantherMedia / Olivier Le Moal

Optimising and organising work processes efficiently

As a cooperation between the Operations and Advanced Analytics Departments, an AI application is used with text recognition models, each word is translated into a number or multidimensional vector. Words with similar meaning are represented as vectors in proximity to each other. This method, the so-called word embedding (Word2Vec), was applied to all e-mails over a span of two years, generating a set of data to train an artificial neuronal network. This neuronal network is now able to recognise syntax and semantics, as well as text patterns. It forms the centerpiece of our so-called AI classifier.

Benefits at a glance:

- Incoming emails are automatically filtered and forwarded to the responsible departments across ERGO in Germany.
- Work processes are optimised and organised efficiently

ERGO Germany Sales trainings with VR avatars



Source: ERGO Germany

Preparing our sales agents for consultations with various customer types in virtual reality

Due to the limited time available for classroom training, it is often only possible to train new sales partners in a limited number of customer meetings using role play scenarios. Therefore, ERGO Germany will include the use of VR training for its sales partners. Here, sales tactics can be trained and tried out on different types of customers for an unlimited period. Using NLP to detect the trainees' input, the virtual customers react differently to the conversation with the sales partner and realistically express the different customer characters.

Benefits at a glance:

- Improving the communication and soft skills of new sales agents to improve early sales performance
- Time- and location-independent training on various types of customers and practical scenarios
- Tracking of own performance and comparison with other trainees



ERGO Austria

Input Management Goes AI



© PantherMedia / garagestock

Classification of and data extraction in incoming documents with the help of AI

In case of postal mailings, an OCR-module (Optical Character Recognition) interprets printed text into a machine-readable format. By Using AI-based algorithms, documents from different input channels (postal mail, e-mail) are classified by their request-types (e.g., relocation-announcement) and relevant data is extracted.

This innovative digital process was developed in an agile project jointly with the AI-unit of ERGO Digital Ventures, leveraging their advanced know-how.

Benefits at a glance:

- Improved service quality and efficiency
- Speed up of processing times
- Analytical learnings can be leveraged for other products and use cases

ERGO China Life

AI customer service



© PantherMedia / tampatra@hotmail.com

AI empowered interaction in outbound call and online text dialogue scenarios

ERGO China Life has applied the AI-based technology into customer service scenarios such as outbound calls and online text dialogue. It leverages NLP, speech recognition, knowledge mapping and deep learning to identify customer intention and build the knowledge base, which realised multiple rounds of dialogue between the service BOT and customers and offered a quick response.

Benefits at a glance:

- Save labour costs
- Outbound calls in batch mode significantly improve efficiency
- 24/7 quick response with high efficiency
- Standardised and high-quality services

ERGO China Life

AI customer service assistant



© Bildagentur PantherMedia / kbuntu

AI quality control of 100% inbound calls

By leveraging NLP & speech recognition, ERGO China Life's AI customer service assistant is able to identify the customer intention and provide real time suggestions to the customer service representative. All inbound calls in the call centre are covered by the AI assistant. The bot analyses the conversations during recording and an alert is activated once a risky interaction is being spotted. The interaction is analysed by big data afterwards to identify potential similar cases and improve customer service quality.

Benefit at a glance:

- 100% AI assistance coverage of all inbound calls and AI quality control coverage on recorded call
- Improve service quality and efficiency
- Reduce labour cost



HDFC ERGO India

WhatsApp BOT for Agents



© PantherMedia / Iliia Uriadnikov

Industry 1st Agent WhatsApp BOT to drive digital adoption by agents in Bharat

HDFC ERGO has launched the WhatsApp BOT for agents to offer an automated conversational servicing mode. This implementation now empowers 100K+ agents and it will help to bring those agents who are not so active on the portal onto the digital platform.

Major services:

- Commission statement
- Policy copy
- Proposal status
- Product brochures
- Proposal form/policy wordings
- Cashless hospitals/garages

HDFC ERGO India

WhatsApp BOT for Customers



© PantherMedia / Iliia Uriadnikov

WhatsApp emerging as a prominent channel of servicing in Bharat

HDFC ERGO has launched the WhatsApp BOT for customers which is NLP-driven and customer friendly. More than 14 services are now live and covering 70% of total scenarios.

Major services:

- Buy new policy
- Policy copy
- Renew Policy
- Policy services
- Claim services
- Cashless hospitals/garages
- Know your policy coverage
- Free teleclinic services

HDFC ERGO India

AI for Motor Claims



Source: HDFC ERGO

Self service claim adjudication experience to customers

HDFC ERGO has integrated self-service auto assessment of external damages using AI for private car and two-wheelers along with the auto generation of survey reports, including damage assessment and claim cost (labour + parts). It will empower customer for STP claim approval once desired maturity level is achieved.

Benefits at a glance:

- >30k private car claims processed since launch in June 2020
- Claims are getting processed with increased accuracy thanks to AI model learning



HDFC ERGO India

Robotics Process Automation



© PantherMedia / tampatra@hotmail.com

Automation of manual journeys with accurate and efficient results

RAMBO, HDFC ERGO's very own Robotics Automation Management BOT has the ability to carry out heavy duty tasks of others. It handles high-volume, repetitive tasks that used to be a part of agents' workload. RAMBO currently handles processes from policy issuance to claims to improve process efficiencies.

Benefits at a glance:

- To minimise process time and improve accuracy with automation of repetitive processes across all departments.

HDFC ERGO India

ERA the email bot



© Bildagentur PantherMedia / Gajus-Images

Customer satisfaction with correct responses

The HDFC ERGO Email Bot reads, understands, categorises and responds to queries. Leveraging on NLP capabilities, the bot interprets queries and requirements and provides swift solutions in real time.

Benefits at a glance:

- Enhancing customer satisfaction with accurate and swift responses

DAS Spain

Automated risk pricing models



© PantherMedia / Andrew Ostrovsky

AutoML increases the accuracy and speed of pricing models development

By drawing on an autoML tool and combining both tenant-specific information and external data sources, DAS Spain is working on changing its pricing model to a model based on the "actual risk". The software automatically tests a huge number of mathematical models, allowing to perform risk modelling in a fraction of the time. While DAS Spain is currently implementing the solution for evaluating tenants' non-payment risk, the tool is also under consideration for other areas, such as reserving or increasing customer value (retention and cross-selling) amongst others.

Benefits at a glance:

- More competitive prices & better underwriting
- Allowing non-data-scientists to perform modelling
- Analytical learnings can be leveraged for other products and use cases



DKV Belgium

Data-driven diagnosis prediction



© PantherMedia / vilevi

Predictive data model replaces claim declaration forms for inpatient hospital care

Five years of historical data is used to build a predictive model for diagnosis of inpatient hospital care. The input data concerns all detailed medical information available on hospital invoices, e.g., care provider codes, procedure codes, drug codes, etc.

The model is deployed into operational systems to flag hospital invoices which are to be refused or to be investigated by a claim handler (e.g., medical exclusions, accidents, etc.).

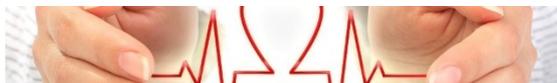
As a result, the insured no longer needs to complete a declaration form for inpatient hospital care. Questionable claims are flagged, and a medical questionnaire is sent out automatically when needed.

Benefits at a glance:

- First insurer in Belgium to remove claim declaration form
- Big impact on operational efficiency in claims handling
- Improvement of the hospital admission process for all parties (insured, care provider, insurer)

DKV in Germany

Medical Claims Automation Optimization



© PantherMedia / fantazista

Improve automation rate in processing health care benefits

When it comes to claims in health insurance, it is important to check the liability very firmly before paying the bills. For this purpose, comprehensive sets of rules have been developed in recent years and are provided to employees for invoice checking. These sets of rules are enhanced by severous AI models to substitute manual checks and drive automation. The AI models have been trained and developed based on experience with previous checks. After a 6 month test phase it is now implemented as real-time decisioning within the automation workflow.

Benefits at a glance:

- The first productive use will be the checking of outpatient medical bills of the DKV. On average, about 5.7 million invoices / year will be submitted
- The automation rate is expected to increase by about 32%
- More document types (e.g. prescriptions, hospital bills) will follow in 2021
- In the sense of scaling the approach is re-used and implemented in EKV's (ERGO Krankenversicherung) dental insurance claims process with additional automation potential

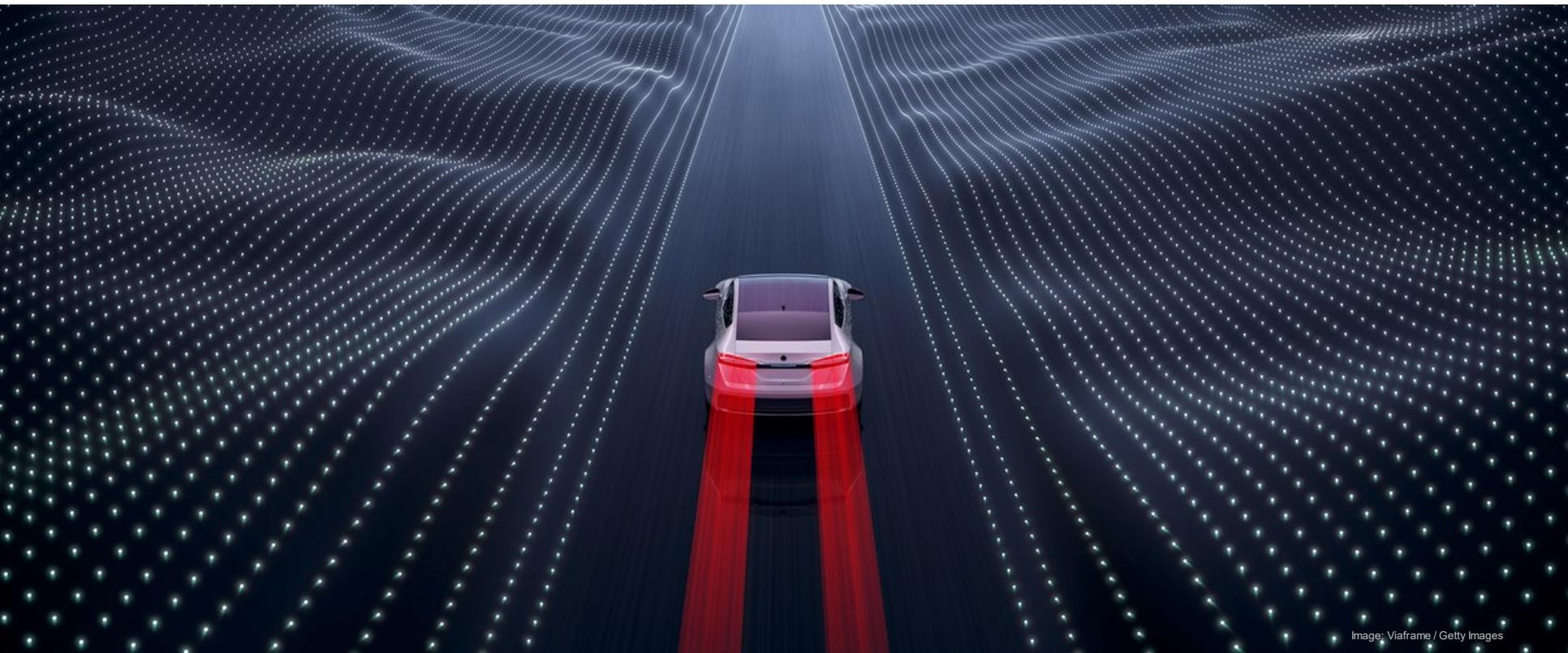


Image: Viaframe / Getty Images



Enabling Technologies

Enabling technologies accelerate other technologies or industry disruptors which might replace established products, change consumer behaviour and reshape market landscapes and players in the future, e.g. advanced batteries for autonomous vehicles and the mobility market. Some suffer from high or unrealistic expectations, e.g. blockchain unfolded as a distributed ledger. Others are in high demand and are being adopted right now. 5G is the next-generation cellular standard being rolled out worldwide – 6G is following rapidly with China as early adopter of this telco standard.

Telecommunications technologies like 5G, 6G, microsattellites and enhanced ways of energy supply like advanced batteries or micronuclear powerplants have a high impact on connectivity and the distribution of IoT in agriculture and smart spaces. It is therefore important that business leaders understand which future technologies will be their business enablers. Moreover, new economies like in-space or around hydrogen technology evolve. New players create these markets. Insurances are in the need to respond with insurance solutions in these new market areas.

Adopt – Start initiatives in your unit



3D Printing

An automated manufacturing process based on digital designs that creates multi-dimensional objects with tailored functions



5G

Ever greater amounts of data volume are being processed on mobile phone networks. This data will be processed on 5th generation wireless systems

Trial – Initiatives in affected units



Cloud Edge

Edge computing processes data as close to its source as possible – at the edge of the network structure



Distributed Ledger

Tool for digital business because of its ability to remove business and technology friction and implement trust models



Low code/ No code

Low code or no code platforms allow people with limited programming knowledge to develop applications



Microsatellites

Miniaturized satellites for communications, earth observation and remote sensing

Assess – Evaluation needed



Advanced Batteries

Next-generation advanced batteries supply autonomous gadgets, smart and any other sensor-equipped object with electric power



Hydrogen Economy

Renewable energy economy based on clean hydrogen technologies



Micronuclear Powerplants

Advanced nuclear reactors that leverage modularity and design simplification to be cost-competitive and safe



Vaccine Disruption

New methods to produce safer and more effective vaccines in a cost-effective way



Volumetric Display

A volumetric display generates an image in three physical dimensions allowing for depth perception



Quantum Computing

Quantum computing stands for unprecedented computing power that could trigger a new wave of technological development

Hold – Watch list



6G

6G (the sixth generation wireless) standard and technology is still under development but will have massive impact once deployed



Brain-computer Interface

Interprets the user's brain patterns to control external software and hardware



In-Space Economy

Space-based services benefiting objects and equipment in earth's orbit



Neuromorphic Hardware

The neurobiological architecture of human brains inspired the idea of developing neuromorphic hardware to improve deep learning



Programmable Materials

Programmable materials designed with a dynamic form and to function on-demand, able to respond to external input

= new in 2021



An automated manufacturing process based on digital designs that creates multi-dimensional objects with tailored functions.

3D printing is a process to make solid objects from a digital model. But new technologies, such as 4D printing, are also emerging. Triggered by heat, moisture, light or other activation energy, the 4D structures are capable of transforming themselves from one shape into another. With this technology, it might be possible to develop materials to repair pipes automatically if they crack or break. This would save billions for homeowners, insurance companies, and incidentally, the positive impact for the environment would be inestimable. Over the next few years, 4D printing research will generate huge interest and hype.

Challenges persist with bringing precision to the objects' transformations after they have been printed. In surgery and medical treatment, 3D-printed human cell tissue and porous implants that release medication after implantation have entered the market. In 2020, 3D printing has been adopted by manufacturing companies within weeks when they decided to join the battle against the Corona virus with the mass production of 3D-printed face masks.

Insurance Value Chain



Opportunities

- 3D printing allows on-demand production of products close to the point of consumption. Thus, shipping, inventory, and logistics costs are significantly lower.
- After a design has been completed, 3D printing allows fast visualisation through prototypes.
- For personalised medicine, 3D printing can be used to produce customised parts or organs of the human body.
- In manufacturing, this technology allows for greater customization of products and reduces production downtime when critical parts can be replaced on demand with 3D prints and thus ensure production line continuity.

Risks

- Although 3D printing has low costs to produce a single unit of a product, it is too expensive and slow for mass production. Moreover, only few materials are available, which restricts its field of application.
- Compared to other current technologies such as injection moulding, 3D printed objects are not of the highest quality, particularly in terms of surface finish.
- An increase in the size of the object to be printed causes an exponential rise in costs. Although the technology allows for printing parts separately, subsequent manual assembly does not necessarily lead to the ideal result.
- Being able to download blueprints for objects may allow criminals to abuse the technology to produce illegal weapons.

Trend Evolution



3D Printing is circulating between ASSESS and TRIAL stage in the Tech Trend Radar. Insurance-relevant use cases can be found in the fields of health and industrial insurance.

Related Trends

- 5G
- Quantum Computing
- Cloud Edge
- Personalised Medicine



Ever greater amounts of data volume are being processed on mobile phone networks. Soon this data will be processed on 5th generation wireless systems known as 5G.

Global mobile data traffic is expected to grow eight times by the end of 2023. There is a need for an efficient tool that can handle the higher data rates and process the spectrum utilisation. Soon these demands will be met by the 5G technology, which is 40 times faster than the current standard LTE (4G). 5G is expected to become an accelerator for radical advancements in existing industries including self-driving cars, healthcare and smart factories. The driving force behind 5G adoption is the global competitive landscape. The digital agenda of the EU has a target of 100 percent broadband coverage with speeds of 30 Mbps (at least) including 50 percent of households having 100 Mbps available subscriptions or higher by 2020. According to Huawei, one of the manufacturers of 5G network supply kit, the roll-out for Europe will be delayed.

Insurance Value Chain



Opportunities

- 5G is more than a new generation of technologies; it denotes a new era in which connectivity will become increasingly fluid and flexible and is a powerful enabler for all related digital services.
- Faster data transfer speed: 10-100x higher speeds. Improvements in bandwidth have characterised every new generation of wireless networks. The goal of 5G is to support 1-10Gbps connections to endpoints in the field.

Risks

- Bandwidth technology in specific areas is not available.
- The current roadmap of 5G will be postponed due to the high investment in infrastructure.
- Exposure to low-level wireless radio frequency radiation may pose a risk.

Trend Evolution



5G moves towards adoption. Find solutions based on 5G, even for collecting data in the field. 6G is ahead.

Related Trends

- Autonomous Things
- 6G
- Industrial IoT
- Smart Spaces



Edge computing processes data as close to its source as possible – at the edge of the network structure.

Transmitting large amounts of raw data over a network or into a cloud puts a tremendous load on network resources. In some cases, it is much more efficient to process data near its source and send only the data that has value over the network.

Edge application services significantly decrease the volumes of data that must be moved, thereby reducing transmission costs. For example, an intelligent Wi-Fi security camera using edge analytics might only transmit data when a certain percentage of pixels change between two images, indicating motion. The move toward edge computing is driven by mobile computing, the decreasing cost of computer components and the sheer number of networked devices in the Internet of Things.

The European Cloud Initiative aims at providing European countries, researchers and economies with a common infrastructure for sharing data with high performance. It is part of the European Commission's program of digitising the European industry.

Insurance Value Chain



Opportunities

- Edge computing can be deployed in a variety of circumstances. Specifically for IoT networks that generate and move massive amounts of data, Edge Computing is considered to be a real game changer.
- Large amounts of data for insurance underwriting and claims handling, e.g. from drones/robots, do not need to be completely transferred to the insurance company.
- It could improve the underwriting of risks based on big data in areas with slow network speeds.
- Edge computing reduces latency as data does not have to traverse a network. This is ideal for situations where latencies of milliseconds can be untenable.
- Local processing enables a better response to local security requirements.

Risks

- Distinction between important and unimportant data is required. If the algorithm that is employed in this context is prone to errors, subsequent business decisions may be flawed.
- For some devices, the local computing power may not be sufficient to distinguish between valuable and unwanted data.
- Cloud Edge generally brings more security risks, as the local device-based edge clouds certainly also require proper protection, e.g. through transport and storage encryption.

Trend Evolution



This trend is still in the TRIAL phase. Find solutions based on Edge, even for collecting data in the field.

Related Trends

- Industrial IoT
- Distributed Ledger
- Autonomous Things

Enabling Technologies

Distributed Ledger

Trial



A powerful decentralized database for digital business because of its ability to remove business and technology friction and implement trust models.

Distributed ledger promises to transform industry operating models. It is a database that is shared between different places and stakeholders. The technology is eliminating the need for a trusted central authority that controls data exchange. It also does not need intermediaries, which makes it a decentralised, safe and transparent data network.

The most known type of distributed ledger is blockchain. Data – the so called “blocks” – are saved, not by single actors, but as a chain of transactions by all actors that are using the data, in a process that can be seen by everyone.

In 2016, the company The Decentralized Autonomous Organization (DAO) was fully running on the blockchain Ethereum. Since then, DAOs have evolved to a term for programs designed for decentralized organizational entities collaborating on an embedded trust system.

Insurance Value Chain



Opportunities

- Cryptocurrencies are the most known field of application of blockchain technology as blockchain is the technology behind Bitcoin.
- Distributed ledgers do not have a single point of failure and are therefore robust in terms of hacking attacks and can be conducted at low cost.
- Distributed ledger technology significantly increases the transparency of transactions for all parties involved. No further alterations or deletions are possible.
- Modern Blockchains such as Ethereum can run smart contracts that allow for the automatic execution of transactions if certain requirements are fulfilled.
- It enables the complete and secure tracking of objects or individuals over their life cycle. An idea is to create a distributed ledger that stores the health history of individuals, which could then grant access to health insurers to facilitate the underwriting process.

Risks

- Since no intermediary is involved, individual parties now face risks that have previously been managed by the central authority.
- The underlying consensus mechanism of certain Blockchains (e.g. Bitcoin) is complex and requires huge computational capacity, which is associated with high power consumption.
- Although private wallets are generally very safe, hackers only need to steal a user's private key. This means that the possession of keys also confers ownership of coins, data, content, etc.
- Due to their decentralised nature, public Blockchains cannot be controlled by single entities.

Trend Evolution



Distributed Ledger is back from ADOPT to TRIAL as business impact has lacked behind expectations in the insurance field. Evaluate insurance use cases and smart contract solutions!

Related Trends

- Smart Cyber Security
- Real-time Payment
- Quantum Computing



Low code or no code platforms allow people with limited programming knowledge to develop applications.

Low code and no code platforms are a visual approach to application development, having point-and-click or other graphical interfaces and model-driven logic. It allows so-called citizen developers, people with no or limited coding experience, to be involved in application development - and new applications can be developed rapidly. Low code or no code platforms can for example be applied on IoT solutions in manufacturing or automating business processes.

According to a Forrester report, the low code/no code market is worth \$4 billion and growing by 50% annually. Furthermore, Gartner reported that low code application development will account for more than 65% of application development activities by 2024. Major tech players such as Siemens (through subsidiary Mendix), Microsoft, Oracle, Google and Salesforce offer no code or low code tools.

Insurance Value Chain



Opportunities

- Low code/no code tools present ways to overcome organically grown complexity of documents and processes that end up in an "excel hell" that is impossible to maintain.
- Prototypes and minimum viable products for applications are produced in higher quality and in a timely manner - that increases their business value.
- Any employee can become a "citizen developer" and take ownership for their application with reduced IT overhead.

Risks

- The challenge for IT and business is to incorporate quick and easy prototypes into sustainable IT artefacts.
- Low code and no code platforms are limited to simple applications. They are not suitable for supporting complex business solutions.
- System legacy debt limits the full potential of low code or no code platforms, especially in terms of data integration.
- Enterprise-specific compliance guidelines and data privacy standards will need to be in place.
- Creating applications that do not require any coding is likely to remain wishful thinking.

Trend Evolution



Low code/no code platforms are evolving from the demand for simpler ways of developing applications. They are arising from the possibilities of using code data and logic to create code.

Related Trends

- AI Coding
- Automated Machine Learning (AutoML)
- Cloud Edge

Enabling Technologies

Microsatellites

Trial



Satellites are becoming smaller and smaller. Microsatellites and even nanosatellites are enhancing the market for communications, earth observation and remote sensing.

Advanced satellites such as “Skysat” achieve a 0.8-metre per pixel image resolution. Consequently, video and images of the earth from space are now cheaper and more accurate than ever before.

Advanced hyperspectral imaging systems (HIS) for remote sensing applied in agriculture monitoring, mining and mineral mapping or environmental monitoring support the increased application of microsatellites.

The commercial interest in microsatellites has been driven by advanced digital technologies and continuous digitalisation as the need for broader internet communications is growing.

The total market for nanosatellites and microsatellites is expected to grow from \$1.5bn. in 2019 to \$3.6 bn. by 2024, as reported by MarketsandMarkets (“Nanosatellites and Microsatellites Market by Component”, 2020).

Insurance Value Chain



Opportunities

- Improved claims and fraud detection for disaster insurances via accurate photos from space.
- Continuous satellite monitoring allows for predictive analytics solutions to enhance AI-based risk assessment tools with image data. Also, AI-empowered image detection can detect abnormalities and report at early stage.

Risks

- The more accurate satellite images become, the more privacy concerns there are
- Increasing space debris. Though nano-sized, obsolete satellites contribute to the amount of space waste in the Earth's orbit. Standards for mitigating space debris as defined by the UN Committee on the Peaceful Uses of Outer Space are expected to become mandatory.

Trend Evolution



Microsatellites are to be considered for specific digital use cases as they are geospatial enablers for new technologies and applications.

Related Trends

- AI Chips
- Computer Vision
- Data Fabric
- 5G



Next-generation advanced batteries supply autonomous gadgets, smart and any other sensor-equipped object with the very thing that has been limiting their performance to date – electric power.

Research on alternative and advances energy production has recently made some strides. The global market for advanced batteries is reported to reach \$1.27bn by 2025 from \$129.8m in 2019, according to a Global Info Research study ("Global Next-Generation Advanced Batteries Market 2020).

Flow batteries are most suitable for grid storage as they can provide large energy storage by just increasing the volume of the battery tanks. To date however, large-scale production of flow batteries is too inefficient for large scale production. Another example of an advanced battery are graphene batteries, which are actually making their way to market. These batteries allow for greater power storage, more recharge cycles and are safer than lithium-ion batteries. This also makes the devices they power more attractive as they can last longer and are more reliable.

Insurance Value Chain



Opportunities

- Equipped with advanced batteries, electrified vehicles, autonomous and smart objects will make their long predicted breakthrough in the mass consumer market. IoT devices will be able to last longer and as a consequence be stored less accessible locations, thereby mitigating risk. Insurance products for smart spaces, IoT and e-mobility need to become more sophisticated.
- Long-awaited sustainable solutions for the energy sector are an attractive investment for insurers' looking to improve climate change resilience.
- (Redox) Flow batteries (example Sodium - Sulfur) do not rely on toxic or rare resources.
- To date, cobalt is a widely used battery in electric vehicles because of its power storage capacity, but it is also one of the most expensive metals. A tonne of cobalt costs \$33,500. Tesla has replaced cobalt with lithium iron phosphate (LFP) as a low-cost alternative to nickel-cobalt-aluminium (NCA) or nickel-manganese-cobalt (NMC) batteries.

Trend Evolution



The market for advanced batteries is primarily driven by the chemical industry, energy and resources and manufacturing. Insurers must watch for relevant use cases!

Risks

- Scalability and efficiency in battery production has to improve. High-cost production with rare-earth metals is not a viable option.
- Battery technology takes longer to get to market than expected.

Related Trends

- Autonomous Things
- Programmable Materials
- Human Enhancement
- Smart Textiles

Enabling Technologies

Hydrogen Economy

Assess



Renewable energy based on clean hydrogen technologies including storage of energy using hydrogen, hydrogen fuel cells used to power vehicles and equipment.

Recent years have seen the demand for hydrogen grow rapidly due to environmental concerns, such as the prevention of climate change. Hydrogen is one possible way to move away from fossil fuels and can ensure clean, emission-free and green energy.

Hydrogen belongs to the sector of renewable energy, and extracted from fuel cells it can be used for the creation of carbon-free energy. It can be used for heat, for hydrogen vehicles, as an energy store or as a long-distance means to transport energy. This means it requires power and transportation infrastructures.

The production costs depend on technical and economic factors (in particular on gas prices and capital spending). In this evolving market, various independent energy providers are developing solutions that can be applied in, for example, aviation, shipping, electric vehicles and other green mobility solutions.

Insurance Value Chain



Opportunities

- The (green) hydrogen economy is anticipated to continue to grow in the future because of environmental / climate change concerns, and can replace the “old” energy market players (like fossil fuels).
- It can be useful for risk prevention - hydrogen can prevent economic losses for the insurance caused by climate change issues.
- In the future, hydrogen fuel cell electric vehicles could become an actual alternative to electric vehicles currently being used because of their quick charging times, longer ranges and environmentally friendly engines. They are currently still under development.

Risks

- Green technologies like hydrogen need tailored insurance because of their difficult financing models or ownership issues.
- There is currently a safety risk: Because a “new” technology is being used, there is no long-term evidence right now (as regards maintenance, repair, etc.).
- Expensive manufacturing costs, storage costs (it is highly flammable) and high transportation risk (and supply chain interruption involving high financing loss) are current downsides.

Trend Evolution



Increasing demand in hydrogen technology/ energy due to the rise of environmental awareness.

Related Trends

- Advanced Batteries
- Micronuclear Powerplants
- Smart Spaces



Micronuclear powerplants are advanced nuclear reactors that leverage modularity and design simplification to be cost-competitive and safe. They represent the next step in the evolutionary chain of commercial nuclear power plants and can contribute towards a zero-carbon energy supply.

Micronuclear powerplants, also known as small modular reactors (SMR), are defined as advanced reactors that produce electricity of up to 300 MW(e) per module. They are characterised by an innovative and advanced design, including state-of-the-art safety and accident prevention measures, that can be produced in series and the major components of which can be built and replaced in a modular way.

The U.S. are expected to re-enter the Paris agreement and put efforts into reducing carbon emissions. One focus area of the U.S. climate and energy political programme is “small modular nuclear reactors at half the construction cost of today’s reactors”. Furthermore, a consortium led by Rolls-Royce has announced plans to build up to 16 mini-nuclear plants in the UK. The UK government says new nuclear is essential if the UK is to meet its target of reaching net zero emissions by 2050.

Insurance Value Chain



Opportunities

- Building power plants on micronuclear level is a new way of decentralising power generation, and thereby reducing risks and increasing safety, e.g. of major power outages. Industrial insurance products can benefit.
- As part of the U.S. political programme, micronuclear power plants are expected to contribute towards the global reduction of carbon dioxide emissions.
- Creating new ways of power supply is a major challenge that accompanies the growing demand for IoT devices, autonomous things, programmable materials and hardware-embedded AI, and their need for electric power.

Risks

- Being in the research stage, the performance of micronuclear power plants still needs to be optimised so as to be competitive with established sources of power.
- The nuclear component remains a critical factor for the acceptance and distribution of micronuclear power plants.
- Miniaturisation does not mitigate nuclear pollution. Technologies need to address the problem of nuclear waste, not just cost-efficiency of energy production.

Trend Evolution



Micronuclear power plants are a new trend in 2021, promoted by the political programme of Joe Biden in the U.S. 2020 election, and complementing other enabling technologies such as advanced batteries for autonomous vehicles.

Related Trends

- AI Chips
- Smart Spaces
- Advanced Batteries
- Autonomous Things

Enabling Technologies

Vaccine Disruption

Assess



New methods to produce safer and more effective vaccines in a cost-effective way using mRNA, subunit vaccines and nanoparticles.

Vaccines have been successful in the elimination of diseases such as smallpox, diphtheria and polio. But vaccination against pathogens like influenza, tuberculosis, measles, malaria and HIV is not effective or widespread enough, due for example to the nature of the pathogen or anti-vaccine movements. The Covid-19 pandemic has resulted in a significant boost for new and potentially disruptive technologies for developing vaccines

Until recently, the majority of vaccines have relied on attenuated live or denatured dead viruses often produced in chicken eggs. This has resulted in lengthy processes of limited capacity and limited effectiveness, for influenza vaccines for example. Recombinant subunit vaccines have been slow to enter the market and nucleotide vaccines have been niched.

Covid-19 has brought these technologies and the faster timelines for development into focus and has opened up new opportunities for treating infectious diseases more effectively, and for developing these technologies beyond the realm of infectious diseases.

Insurance Value Chain



Opportunities

- Traditional vaccines based on whole organisms are more expensive to produce and less safe, as they can cause diseases in the host and be transferred to the vaccine. New vaccine technologies represent cost-effective alternatives.
- Subunit vaccines are more tolerable in the human body and cause fewer immunogenic reactions. >
- Vaccines have made their way from prophylactic to therapeutic use, e.g. in cancer treatment.
- Cross-industry partnerships help in vaccine manufacturing, distribution and raising awareness about eliminating diseases through vaccination. The Bill and Melinda Gates Foundation is one of the leading NGOs to foster Universal Health Coverage (UHC), one of the Sustainable Development Goals of the World Health Organization.

Risks

- Social acceptance of vaccines is crucial. One of the major reasons why measles is not yet eliminated completely is criticism surrounding the vaccination on the grounds of potential side effects.
- Large-scale vaccine manufacturing and distribution for entire populations remain a challenge for logistics. Some mRNA-based vaccines like Pfizer's COVID-19 vaccine are shipped and stored at sub-zero temperatures, entailing special containers and delivery risks.
- Access to vaccines remains a privilege of developed countries.

Trend Evolution



There can be no doubt that the appearance of vaccine technologies as a technology trend and an industry disruptor is driven by COVID-19 and the urgency to fight the SARS-CoV-2 virus as a united force across economies across the globe.

Related Trends

- Population Health
- AI Enabled Drug Discovery and Development
- Personalised Medicine
- Digital Health Services



A volumetric display generates an image in three physical dimensions allowing for depth perception.

Volumetric displays create visual representations of objects in three dimensions, with a 360-degree view that changes as the viewer moves. Unlike most 3D planar displays, volumetric displays create life-like images. By projecting coordinated laser beams precisely onto a medium containing rare earth materials, for example, the materials are displayed as three-dimensional colour image in free space. The image is so convincing that it looks like you could reach out and touch it. The physical volume of data required to generate a volumetric image is considerable, which will limit its advancement in the coming years.

Insurance Value Chain



Opportunities

- Volumetric displays in combination with x-rays can significantly speed up security checks at airports, national borders, high security areas, etc.
- In the field of flight security, 3D volumetric displays provide a detailed and comprehensive view of an aircraft's position.
- In insurance, volumetric displays can help underwriters assess insurable objects, and help claims handlers to inspect damage without being physically present.
- The consequences of damages or losses could be illustrated with volumetric displays to insurance customers to improve their understanding of risks.

Risks

- Though new ways of working remotely due to COVID-19 would drive the need for 3D video conferencing and other applications of volumetric displays in virtual communications, use cases have not yet made it into practicability.
- Resolution needs to be sufficiently high to avoid incorrect decisions.
- The illusion of "realness" would be improved with haptic feedback.
- In cases where a detailed assessment is necessary, a classical 2D illustration may actually be more useful and less costly.

Trend Evolution



Volumetric Display is still located in the HOLD stage as use cases with real-world evidence are still missing. Keep it on the watch list! Remote work might give this technology a push in 2021.

Related Trends

- Smart Textiles
- Computer Vision
- Industrial IoT



Quantum computing stands for unprecedented computing power. It could trigger a new wave of technological development over the next five to ten years.

An ordinary computer uses bits, represented by of 1 or 0. Double the bits means double the processing power. Quantum computing on the other hand, uses so-called qubits, which can be both 1 and 0 at the same time. Not only that, a process called 'entanglement' allows some extra qubits to exponentially increase the processing power of a quantum computer. A quantum computer can solve problems in a fraction of the time it takes conventional computers. They may soon even be able to handle more complex tasks.

Google's quantum computer Sycamore achieved its first real-world success in 2020 when simulating a chemical reaction of a molecule at a speed level of 12 qubit. But China claims to have the fastest quantum computer that is ten billion times faster than Sycamore. China has invested \$10bn to date in its National Laboratory for Quantum Information Sciences.

Insurance Value Chain



Opportunities

- Quantum computing is particularly useful for training and teaching AI devices since it can handle large amounts of data in a short time. Furthermore, AI could learn from experience or correct itself once a false decision is likely to be made.
- Quantum computing could improve drug development through analysing an almost infinite number of molecule interactions in a second. Moreover, it could develop drugs tailored to the individual by analysing human gene sequences much faster and more efficiently than is possible today.
- Full automation of business processes in insurance (underwriting, claims handling) based on data from sensor measurements gathered on smart devices (smartphones, smart home devices, wearables, etc.) may require quantum computing.
- In order to define joint standards and drive research and development of quantum solutions, also European governments are promoting centres of excellence, e.g. the Munich Quantum Center.

Risks

- The current standards of data security will no longer be sufficient once quantum computing becomes available, as current encryption systems could easily be cracked using quantum computer.
- A substantial leap in computing power may be especially problematic for technologies such as Blockchain, whose security features rely on the limitations of current generation computers.
- General purpose quantum computers may be a distant dream, but special purpose accelerators capable of running a limited number of simulations are reality, and could create considerable value.
- The quantum race of big tech companies like Google building yet another, even faster quantum computer has led to Quantum Computing becoming a buzzword. Use cases are often either too specific and/or not value-adding enough to make a business case for Quantum Computing. This need to be considered when deciding where and how to invest in Quantum technology.

Trend Evolution



The evolution of Quantum Computing has been observed in the Tech Trend Radar since 2016. Use cases still lack of relevance for the insurance industry but this might only be a question of time.

Related Trends

- Neuromorphic Hardware
- Distributed Ledger
- Artificial General Intelligence
- Smart Spaces



The 6G (sixth generation wireless) standard and technology is still under development but will have a massive impact once deployed.

With the future 6G, the capacity and speed of data transfers will increase, with peak data rates of up to 1 Terabyte per second, and broadband connectivity at railway speeds of up to 1000 km/h will be supported. This will enable new services, such as 3D cameras that allow self-driving cars to scan the immediate vicinity, mobile holograms and truly immersive extended reality (XR).

However the 6G standard and its supporting technology, electronics, antennas, etc., are still under development and deployment is not expected until 2030 at the earliest.

Insurance Value Chain



Opportunities

- An even more powerful data transfer than 5G will bring new dimensions of connectivity and speed of data transfer.
- Applications in the fields of smart spaces, autonomous things and enhanced reality will become more efficient.
- The market for precision farming applications will be boosted as soon as applications work effectively without network interruptions, not even in the most remote fields.
- Data transfer in remote areas will be sped up. Remote working will no longer be a question of WiFi availability.

Risks

- New security concerns will arise as the technology is still immature.
- Exposure to low-level wireless radio frequency radiation might pose health risks.
- The anticipation of wireless standards is subjected to political factors, as the rollout of 5G has proven. Having two or three available standards is the expectation.

Trend Evolution



6G will succeed the 5G standard within the next ten years, with China being a leading country in rolling out 6G first.

Related Trends

- 5G
- AI Chips
- Precision Farming
- Autonomous Things



A brain-computer interface interprets the user's brain patterns to control external software and hardware.

Brain-computer interfaces are already used as spelling/writing devices by people with paraplegia to communicate. Current projects aim to extend the scope of these devices to enable greater brain-robot interaction. These hybrid techniques combine brain, gaze and muscle tracking to offer hands-free interaction. Even though it is already possible to control virtual objects (the world's first mind-controlled drone race was held in 2016), there are still major challenges. The need to wear a headband or cap to interpret signals is a serious limitation in most consumer or business contexts. As a result, there is no significant market yet for the use of these devices.

Insurance Value Chain



Opportunities

- These kinds of devices would mostly benefit users with limited motor abilities, providing them with greater mobility, independence, and a better quality of life. Manufacturers of medical devices will be able to apply brain-computer interface hardware to a wide range of projects. One such project is bypassing damaged nerves to reconnect brain and body. It may even be possible in the distant future for a paraplegic to put on an exoskeleton and go for a walk.
- Brain-computer interfaces to robots have the advantage that users will not be limited by communication as they are able to control the devices with their mind.
- Brain-computer interfaces could allow for a more nuanced control of complex systems like air traffic control.
- It may also be possible in the future to write an e-mail just by thinking of the text. Facebook is building brain-computer interfaces for typing.

Risks

- There are fears of invasion of privacy.
- Using brain-computer interfaces to steer robots or drones may have unexpected consequences for human users in the long term, such as a loss of the sense of one's own body.

Trend Evolution



Keep the development of brain-computer interfaces on your watch list!

Related Trends

- Human Enhancement
- Neuromorphic Hardware
- Industrial IoT
- Artificial General Intelligence



Space-based services for objects and equipment in earth's orbit including orbital refuelling, satellite deployment and inspection.

Given the ever-growing volume of data sent through orbit via satellites, in-space services for objects in orbit are evolving into a whole economics system.

The market is currently dominated by private companies (especially by Elon Musk's SpaceX) and public institutions / governments that are opening up the market for (private) companies. But the overall global space sector is growing rapidly and opening up a broad range of business opportunities, such as the manufacture of reusable rockets/satellites that can be refuelled/repaired, on-orbit servicing for satellites via robotics and/or AI, satellite communications for IoT, and low-cost miniaturised satellites able to collect data or monitor larger satellites. This is why the expectation in the future is that there will be access for a broad range of commercialisation (e.g. satellite broadband, (private) space tourism for everybody and high-speed delivery of packages)

Insurance Value Chain



Opportunities

- Space insurance is tailor-made for clients given the growing market and special requirements. The human race is striving for unlimited access to space in the next few years.
- There is a growing need for insurance with increasing commercialisation of the in-space economy through the rising establishment of (currently private) companies.
- Opportunity to have direct influence over space technology development to anticipate (economic) loss.

Risks

- Currently, there is only limited access for just a handful of (mainly) private companies or governmental/public institutions.
- Space-based services and technologies are highly expensive.
- There is more equipment in space due to the growing demand and deployment of space-based technologies. This is resulting in higher risks and probabilities of collisions.
- Uncertainty: Broad range of insurance issues (damage of technology on the ground / in production / in orbit) or, in the worst case, total loss in orbit. These failures at launch could drive insurers out of the space market.
- There is a fear of militarisation/spying or governmental abuse through the use of space technologies.

Trend Evolution



Further growth of the space sector is anticipated by the efforts of private companies to commercialise this economy.

Related Trends

- AI Chips
- Artificial General Intelligence
- Microsatellites
- Robotic Revolution



The neurobiological architecture of human brains inspired the idea of developing neuromorphic hardware to improve deep learning.

With improved methods to process a detailed map of the human brain and material design it is now possible to design a model of a single synapse. This knowledge is used to design neuromorphic chips modelled after the neural brain network of humans. One of the essential properties of neurons and synapses is that they can change over time, in particular as a result of learning.

Neuromorphic silicon material possesses similar abilities, but it is able to adapt much faster. At the moment, neuromorphic systems are in their infancy. The hope, however, is that they will eventually allow deep learning models to train faster. Programming neuromorphic hardware will require new programming methodologies.

Researchers at the Swineburne University of Technology in Australia have presented the world's fastest optical neuromorphic processors for AI in January 2021. The processor consists of optical micro-combs of ultrasmall, light, fast, quality at low-cost infrared lasers on one single chip.

Insurance Value Chain



Opportunities

- Neuromorphic computers could dramatically improve data mining and pattern recognition systems.
- Successful application of neuromorphic hardware could result in machines being able to tag, contextualise and react to language, content and people's behaviour, and improve on some things we used to think only people could do (drive automobiles, for example).

Risks

- The human brain has a series of unique characteristics that cannot yet be replicated by even the most advanced computer.
- Consider with due responsibility the implications of developing machines that are in direct competition with humans.

Trend Evolution



Neuromorphic Hardware reaches ASSESS stage in 2020. Evaluate its potential for your (future) initiatives!

Related Trends

- Quantum Computing
- Brain-computer Interface
- Artificial General Intelligence



Programmable materials designed with a dynamic form and to function on-demand, able to respond to external input.

A number of technologies, such as 3D/4D printing, have provided a breakthrough in the performance of a number of materials including carbon fibre, wood, plastic and textile. These intelligent materials can change shape according to instructions that are programmed into them. This opens up unprecedented opportunities, such as adaptive aerodynamics, flat-pack shipping and self-reconfiguration. One example is smart fashion, e.g. self-assembling shoes that change from a flat sheet into a fully shaped shoe. Or flat-pack coffee tables that pop into shape after they have been unboxed. Researchers at MIT have also developed a smart material that works just like the pores on human skin, expanding and contracting depending on the surrounding temperature.

Insurance Value Chain



Opportunities

- May be useful for risk prevention. For example, roofs or certain building components could be programmed to change their structure to reduce exposure to high wind speeds in catastrophe risk scenarios.
- Material could be used for theft prevention by transforming into useless shapes if an unauthorised user is detected.
- Researchers are working on paper-like robots that can fold themselves origami-style. Similar robots could be useful in larger forms, e.g. a tool capable of turning into a number of basic tools found in a home tool kit.
- Programmable materials will be highly advantageous in environments where packing efficiency is important, such as outer space or combat zones.

Risks

- Depending on the size and use case of the programmable material, errors in the source code could lead to severe damage, injury or loss of life.
- Abuse of programmable materials may simplify sabotage and cyber attacks. Hence, a wider application of programmable materials calls for high-end cyber security measures.

Trend Evolution



Keep the development of Programmable Materials on the watch list, since it is still in the HOLD stage.

Related Trends

- Industrial IoT
- Artificial General Intelligence
- Smart Textiles



Munich Re Remote Industries



Source: Mark Downey / Radius Images

Next-generation claims reporting is here – introducing the Remote Inspection Solution

This solution speeds the process of recovery for policyholder's property losses. A smart phone and simple-to-install software is all that is needed to get started. When a policyholder calling in a claim, whether it be property or automotive related. Within minutes, the policyholder is connected to a customized app with the help of a claims adjuster. The app lets the policyholder record damage on the spot, enables a claims adjuster to view the video or photo(s)–as well as capture inspection report notes–and even fully settle a claim the same day, in many cases. Underwriters could use this tool to expedite the underwriting inspection process and eliminate the need for third party inspection services.

Benefits at a glance:

- **Elevating the customer experience**
- Expediting the claims/underwriting inspection process
- Reducing overall claims/underwriting costs



Munich Re TreeTrust



Providing trustworthy and easy-to-invest carbon removal projects

Tree Trust is a carbon forestry service provider who enables cooperate clients to achieve their net-zero carbon goals through investments into afforestation projects.

We offer easy-to-invest long-term forestry projects – generating negative emissions at stable prices. Every project is checked based on verified criteria. A continuous monitoring and quantification through remote sensing regularly tracks and ensures project progress. Technology-enabled verification steps increase transparency, reduce valuation risks and boost process efficiency.





ERGO China Life Cloud-based core system



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Processing fluctuating workload and guarantee stability of transactions 24/7

As e-commerce business increases rapidly, over 4.7m policies are issued per year which creates a large workload for the traditional core system. In order to guarantee smooth business processes, ERGO China Life has moved the core system of e-commerce business onto the financial cloud. Compared with traditional core system, the new cloud-based core system is able to process fluctuating workload and guarantee stability of transactions 24/7. Duration of basic computing resources deployment and expansion has reduced from 3 days to several seconds. Traditional operation and maintenance cost has been saved.

Benefit at a glance:

- Elastic enough to process high concurrent traffic
- Providing services 24/7
- Minimise duration of basic computing resources deployment and expansion

ERGO China Life Digital policy escrow



© PantherMedia / Andriy Popov

Blockchain empowered electronic insurance policy

Leveraging alliance-chain technology, ERGO China Life issues insurance policies to policyholders and at the same time, entrusts them to the Insurance Exchange. The Insurance Exchange is responsible for ensuring the security and non-tampering of the entrusted policies. It also allocates real-name insurance accounts to policyholders, registers the entrusted policies in the account in the form of electronic records, and provides the policyholders with services of online queries and verification of policy information.

Benefits at a glance:

- Increase the security of electronic insurance policies and prevent tampering
- Improve the credibility of electronic policies, reducing the number of paper-printed policies thus save costs

ERGO China Life Cloud-native App platform



© PantherMedia / Wavebreakmedia (YAYMicro)

App DevOps in the cloud-native way

Following the digital-empowering strategy, ERGO China Life launched the Digital Mid-platform project with the goal of optimising business expansion. It introduced the app cloud platform based on Linux Container technology, and relevant DevOps approach.

The approach leverages cloud computing techniques such as OpenAPI, Microservice and Kubernetes, to develop and operate software applications. This technology helps to quickly build business systems with high flexibility, scalability, and robustness.

Benefits at a glance:

- Improve the efficiency of software development and operation
- Reduce the cost and risk of software development



ERGO China Life

5G+SDWAN networking



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Leverage 5G+SDWAN technology to build the efficient and smart WAN

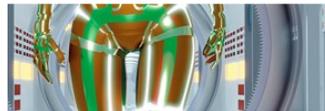
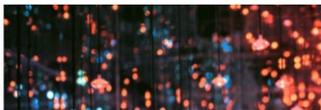
With the branches expansion, the Ops workload in the traditional tree-type networking mode has significantly increased, and a single node failure can impact larger scale in the entire network. In order to ensure smooth network access to branches, ERGO China Life's WAN was switched to the star network, branches are directly connected to the network center.

At the same time, the 5G+SDWAN technology was piloted to further increase network bandwidth and to improve efficiency. Compared with traditional networking, the star networking based on 5G+SDWAN increases the network bandwidth by 2-5 times, reduces the networking time for new branches from 15 days to 1 day, and greatly reduces the cost of private line service and Ops.

Benefits at a glance:

- Provide a low-latency, high-bandwidth network experience
- Provide flexible network access methods
- Improve Ops efficiency and reduce networking costs

Start
now!



Images: Getty Images

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Arthur D. Little has been at the forefront of innovation since 1886. We are an acknowledged thought leader in linking strategy, innovation and transformation in technology-intensive and converging industries. We navigate our clients through changing business ecosystems to uncover new growth opportunities. We enable them to build innovation capabilities and transform their organizations.

In dedication

This year's Tech Trend Radar is dedicated to our colleague Roland Braun who built the Trend Radar for ERGO in 2013 and had always been driving the project with a profound passion for technology and an acute attention to detail until last year. He also brought ERGO and Munich Re together to redefine the project boundaries across the Group and internationally. He passed away in 2020 and will certainly be missed.



The Institute of Electronic Business (IEB) is an affiliated institute of the Berlin University of the Arts and has been supporting the development of the Tech Trend Radar since 2013. With the help of its scientific network of renowned institutions, such as the Alexander von Humboldt Institute for Internet and Society, it attempts to identify market-related trends at an early stage and thus develops innovative ideas and solutions for its partners.

Tech Trend Radar 2021

Our approach

STEP 1: SCREENING

Analysis of trend developments

Compiling developments and new trends for 2021 with external analysts' reports, internal market know-how following **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 an influence on RUN, GROW and TRANSFORM.

STEP 2: AGGREGATION

Definition of trends

Aggregating data from screening processes and defining the most relevant trends categorised in four primary fields – and screen for “outdated” trends

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

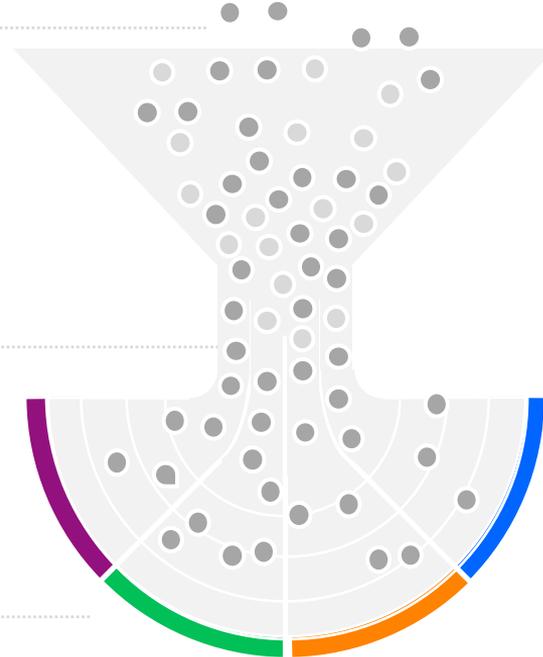
Disclaimer: References to companies do not constitute or imply endorsement of any company or organisation.

STEP 3: EVALUATION

Assessment of impact and relevance

Classifying trends according to their level of relevance for ERGO and Munich Re

Analysing trend impact along the insurance value chain and derive opportunities and risks



Result:
Total Trends

Result:
Aggregated Trends

Result:
**4 Trend Fields with
58 Trends
(14 new trends)
(6 adopted or
expired trends)**

Imprint

TECH TREND RADAR 2021

ERGO

Munich RE 

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2021 Münchener Rückversicherungs-Gesellschaft

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