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INSURANCE FOR A BETTER WORLD

From Risk Transfer to Risk Prevention

How the Internet of Things is reshaping business models in insurance

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How the Internet of Things is reshaping business models in insurance

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The Geneva Association

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Foreword

Insurance has a long history of protecting individuals and businesses, providing much needed financial relief from natural disasters, accidents and illness. However, with growing access to data and technology, insurance has the potential to become much more.

The industry is approaching a point of inflection. On the one hand, risks are becoming more unpredictable and complex, while on the other, the availability of data should give greater insights and opportunities to influence behaviours and risk. This ability to offer actionable advice and develop risk prevention services will open new markets for insurers, and reinforce the industry's role as an economic and social facilitator.

It is still early days for the Internet of Things (IoT) in insurance. But scratch beneath the surface and there is a lot of work already underway that puts the industry in a strong position to harness potential for a new generation of risk prevention services. There is much to be learned from these early innovations.

The research for this report uncovered an impressive number of successful IoT projects in insurance. These working examples offer valuable lessons from trailblazers in the industry and emphasise how IoT can take risk prevention and mitigation to the next level and find its place in the future of insurance.

What is clear is that there is more to successful solutions than technology alone. Our analysis finds several common threads for success, namely sustainable business cases that effectively reduce risk for consumers and businesses. But the secret behind the most successful stories rests in treating data-based prevention services as a whole business transformation.

We are pleased to present this groundbreaking report to the insurance and risk communities. We trust that our recommendations will pave the way for embracing new IoT technology in insurance and translating it into services that can offer tangible benefits to society.

Jad Ariss
Managing Director

1. Executive summary

Immense growth in the use of sensors and smart devices in almost all areas of life and the gradual roll-out of 5G technology are fuelling the generation of an increasing amount of data, much of it in real time. For insurers, such data can provide valuable insights. While it improves risk assessment and transfer, it creates the potential to predict and prevent risks, as well as offer wider insurance coverage.

IoT is a key driver of data generation. Such data can provide insurers with valuable insights, with the potential to predict and prevent risks, as well as offer wider insurance coverage.

A key driver of this development is the Internet of Things (IoT), the growing network of connected devices ranging from consumer wearables to industrial control systems. This report looks at how insurers can translate these IoT applications and corresponding data into risk prevention and mitigation services.

IoT-enabled services of the insurance industry also support the implementation of the UN Sustainable Development Goals (SDGs) in several respects: fostering innovation and building resilient infrastructure, promoting good health and well-being, supporting sustainable cities, and fighting poverty by offering affordable insurance coverage and enhancing financial wellness.

This report first looks at why it is important to understand this megatrend and why insurers must embrace it. Prevention services are not new in the insurance industry; for years, insurers have provided individual consumers with loss prevention advice and risk engineering teams advise businesses in commercial lines. Ways to prevent risk, however, are changing.

IoT-driven risk prevention services are at an early stage of maturity. Knowledge is limited to a few experts and most companies are still at the experimental stage – there is evidence of only a handful of commercially successful approaches internationally. Nevertheless, the wide variety and impact of these early services demonstrate the enormous potential for the insurance industry to promote safer and healthier workplaces and lifestyles for the benefit of society as a whole.

The variety and impact of early IoT-driven risk prevention services demonstrate the enormous potential for the insurance industry to promote safer and healthier workplaces and lifestyles for the benefit of society.

Two approaches to risk prevention are examined: real-time risk mitigation and the promotion of less risky behaviours.

In many cases, the technologies behind prevention services are tried and tested and offered by other industries. The use case for the insurance industry – namely how IoT could be used for risk mitigation – is also well established. The missing piece of the jigsaw, however, is how to translate the use case into a sustainable business case that benefits insurers, technology providers and customers alike.

For real-time risk mitigation, approaches and services vary widely between insurers but all successful services are based on a multi-year journey. Through numerous examples, the report illustrates the journeys, success factors and outcomes of applications to date to provide inspiration on how to approach the development of such prevention services.

A three pillar concept can be distilled from the successful experiences:

Pillar one: Create awareness of the current risk level

Pillar two: Suggest a change in behaviour

Pillar three: Incentivise the change in behaviour

Source: The Geneva Association

The sustainable adoption of safer habits hinges on reward systems that incentivise and reinforce positive behaviour.

The sustainable adoption of safer habits for the benefit of all stakeholders can only happen when all three pillars are successfully implemented. Reward systems that incentivise and reinforce positive behaviour are the most important aspect. The customer's perception of the value of the rewards, their cultural context and frequency, and the intersection with behavioural economics are all integral. Agents and brokers must also be included in the process.

The integration of technology into prevention services greatly increases complexity. As a result, the enablers for success are effective business transformation, successful cultural change and a good understanding of the complexities around financial management rather than the technology itself.

Five recommendations are offered for insurers, regulators and tech companies:

1. Insurers, their technology partners and regulators must improve their insurance IoT literacy and understanding of IoT translation into insurance prevention services to provide the best service to customers.

2. Insurers should consider the development of technology and data-driven prevention services as a form of holistic business transformation.

3. Insurance regulators should adapt regulatory frameworks to be more conducive to the implementation of large-scale prevention services.

4. Tech companies should go beyond simply acting as technology vendors by co-creating technology-driven prevention services with insurers and being actively involved in the corresponding business transformation.

5. Tech companies should engage in a dialogue with the insurance industry to better understand its value and leverage it to benefit consumers and society.

This report is the first of its kind to study the shift towards IoT risk prevention in insurance. It is based on interviews with over 60 insurers, technology companies, start-ups, global organisations and leading academics across all insurance business lines and geographies. The interviews focused on insurers that have already developed successful IoT-driven prevention services and, as such, are biased towards successful applications. They need to be contextualised to reflect the general state of different insurance markets. The examples included also represent IoT-driven prevention services with above-average maturity compared to the insurance market in general.

2. Synergising risk transfer with loss prevention

2.1 Research approach and intention

Prevention is inherent to insurance. Recent developments in technology and the corresponding availability of data, however, are catalysing change in this space. In light of this progress, this report examines the prevention services already in place in the insurance industry. Given that IoT applications are currently driving technology, the report will focus on IoT and its generated data.

The report is based on the findings of approximately 60 interviews with insurers, technology companies, start-ups, global organisations and leading academics. The interviewees were selected based on preliminary research on prevention products and services offered or in development by insurers. The interviews are therefore biased towards successful IoT prevention applications and offer insights into what any market can aim to achieve. They are not representative of the current maturity of the insurance market in general.

Interview questions have been tailored to understand the key drivers of successful implementation of the prevention service. While following the same interview guide, questions were adapted to the context of the business line, the geographies and the maturity of a prevention service.

This report is the first to cover the shift towards IoT-driven prevention services in the insurance industry, addressing all lines of business, and across multiple markets. Its ambition is to support the insurance industry's transformation to IoT-driven prevention services towards a safer and healthier society.

2.2 The Internet of Things

Technology is transforming people's daily lives as well as businesses. Machines, devices and sensors generate data that can be translated into actionable information and make prediction and prevention of incidents possible.

This trend could shift, or even eliminate, some of the risks faced by insurance customers[1] by providing real-time risk mitigation solutions, or enabling insurers to encourage less risky consumer behaviour.

1 Møllegaard 2018.

Data is key to real-time prevention services and promoting behavioural change among insureds. This data is being generated by physical objects and people. IoT, or smart connected products,[2] allow remote transmission and usage of information about these objects and people.[3] IoT solutions have an increasingly pervasive presence in both our personal lives and the commercial world.

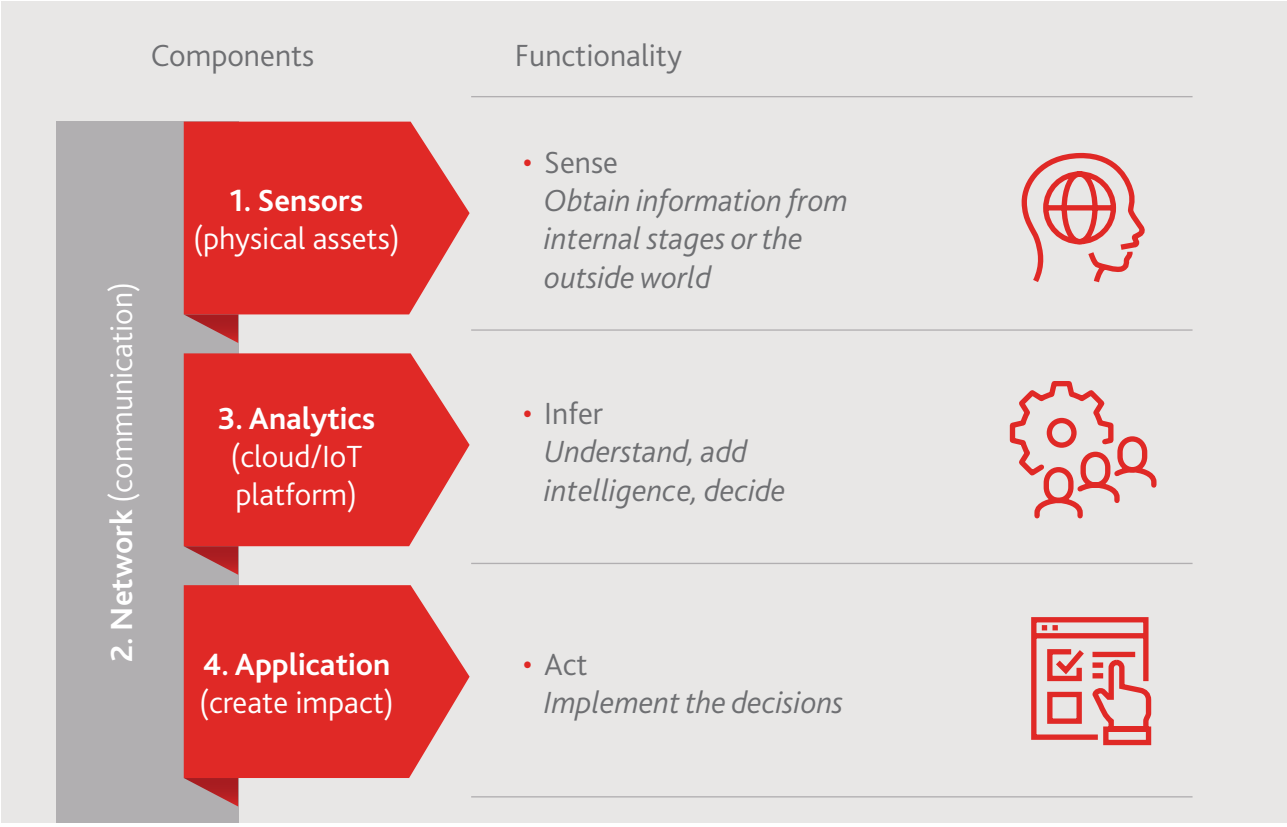
Data is key to real-time prevention services and promoting behavioural change among insureds.

An IoT solution consists of four key components: sensors, a network (communication), analytics (cloud) and applications. All components sense, react and make decisions for our benefit (see Figure 1).[4]

These four components allow information to be used in order to take smarter actions that would otherwise be impossible in the traditional, disconnected, physical world.

IoT provides new opportunities for the insurance industry to use data, not only for the traditional insurance business but also for the prevention of incidents and claims. It also offers an opportunity to connect directly and more frequently with clients.[5]

Figure 1: The four components of an IoT solution



Source: Adapted from the IoT Insurance Observatory based on the interview with Prof. Ahmed Banafa

2 Porter and Heppelman 2014.
3 Hari Balakrishnan, interviewed by Isabelle Flückiger and Matteo Carbone, 7 September 2020.
4 Ahmed Banafa, interviewed by Isabelle Flückiger and Matteo Carbone, 1 September 2020.
5 Carbone et al. 2016.

IoT usage is maturing in both corporate and consumer environments. The adoption of IoT is steadily growing in all industries and, according to a recent report by Kaspersky,[6] 61% of enterprises already use IoT applications. This gives insurers the opportunity to integrate the data generated into insurance services for corporate customers.

61% of enterprises already use IoT applications, giving insurers the opportunity to integrate the data generated into insurance services for corporate customers.

There are many different estimates about the size of the IoT market, ranging from 10 billion[7] to 22 billion[8] connected devices at the end of 2020.

The hyperconnection between people, machines and organisations is a prevalent megatrend that we see at almost all levels of society and around the world.[9] A recent study by Aviva revealed that the average U.K. home has over 10 internet-enabled devices, an increase of 26% in the last three years.[10] IoT applications are expected to increase year by year as sensors evolve and become smaller, combined with greater computing power and connectivity (5G) and the use of artificial intelligence (AI) applied to the data generated by connected devices.

These developments can neither be ignored nor prevented, and the insurance industry has to adapt to this new world. Insurance IoT represents a new paradigm that impacts strategy, business cases and models, and technical and leadership capabilities along the insurance value chain and in the societal risk landscape at large.

The average U.K. home has over 10 internet-enabled devices.

6 AO Kaspersky Lab 2020.
7 GSMA 2020.
8 Lueth 2020.
9 Wellman 2001.
10 Aviva 2020.

3. Two approaches to risk prevention

The reduction of risks faced by insurance customers can either be achieved directly – through real-time risk mitigation solutions – or indirectly – by promoting safe behaviours over a longer period.

IoT allows risks to be better managed. This can be seen as the very essence of the evolution from pure risk transfer to a 'prescribe and prevent' scenario.[11]

There are several concrete examples in insurance where risk prevention successfully provides value to clients. Although at different levels of maturity – many launched services are quite recent – cases are now present in all geographies and across all lines of insurance business.

These stories should motivate insurers in different business lines and geographies to question which of their clients' risks should be mitigated and what is the best approach for doing so.

The examples provided also show the contribution of IoT and the insurance industry to the UN SDGs.[12] According to a World Economic Forum study,[13] 84% of IoT applications can address the SDGs. The IoT-enabled services of the insurance industry support the implementation of the UN SDGs in several respects: fostering innovation and building resilient infrastructure on a corporate level (SDG 9), promoting good health and well-being for all individuals (SDG 3), supporting sustainable cities and communities (SDG 11), and fighting poverty (SDG 1) by enabling affordable insurance coverage and financial wellness.

> *"When we have detailed IoT-based information about the claim, we have the data to predict the claim so we can take actions to prevent the claim at all."*
>
> *– Andrea Pezzi, Direttore Generale, Poste Assicura*

11 McKinsey 2020.
12 United Nations. Department of Economic and Social Affairs. Sustainable Development.
13 World Economic Forum 2018.

3.1 Real-time risk mitigation

Real-time risk mitigation can either involve automated actions by IoT actuators that impact the risky situation without any human intervention, or a warning to trigger it.

Real-time risk mitigation results from the direct use of IoT technology through the capabilities of sense, infer and act (see Figure 1). It can either consist of:

- **Automated actions by IoT actuators** that impact the risky situation without any human intervention, like autonomous driving systems (ADAS) in cars, or
- **A warning to trigger** some kind of human intervention, such as a water leakage alert that activates an emergency repair service.

Both approaches aim to minimise losses and effort for the client, and thus, claims.

These risk mitigation actions can be triggered by the detection of three different situations:

1. Missed safety tasks, such as scheduled equipment maintenance, a scheduled inspection or equipment that needs preventative maintenance; a diabetic patient who has left insulin at home or missed a blood sugar level check; or an out of order or absent risk mitigation system, such as low pressure in a sprinkler system or a smoke alarm that is out of battery power.
2. A risky situation, such as a frozen pipe; a cold-storage door that has been left open; spilled liquids on a supermarket floor; workers without adequate equipment in the workplace; unsafe lifting by an employee; a distracted driver; a forklift speeding in a warehouse; high temperature or anomalies in an electrical control panel; or early detection of abnormal conditions or complications in a person or animal.
3. The consequences of an event that has already happened, such as a water leak; an unsafe worksite; an injury; or the failure of a patient to adhere to a treatment. A mitigation action is then initiated by the IoT system.

Real-time risk mitigation in these situations enables insurers to cover previously 'uninsurable' risks either because there was not enough information on the risk available to price it, or the consequence of a risk is too high, resulting in an unaffordable premium. Therefore, IoT-based services enable affordable insurance and contribute to closing the protection gap across all lines of business.

Still in the early stages of maturity, the industry is mainly experimenting with the intersection of finding valuable services for customers, technological solutions and economic feasibility. Successful examples can be found across all lines of business, with the strongest trend for detecting higher risk situations and the prevention of corresponding incidents.

The case studies below are in descending order of maturity. In addition, the examples have been split between property and casualty and auto insurance to reflect the current view of insurers on these use cases.

Commercial property and casualty (excluding auto)

Real-time risk prevention is most mature in commercial lines, driven by the loss control culture present in commercial insurance. Field inspections by engineering teams are well established and enhancing this work with new technologies seems like a natural step. In addition, the higher costs of commercial claims makes investment in risk prevention more effective than in personal lines.

Real-time risk prevention is most mature in commercial lines. The higher costs of commercial claims make investment in risk prevention more effective than in personal lines.

A very mature but simple example is provided by Church Mutual, which began testing an IoT risk prevention prototype in 2014. Today the company offers a scaled solution for its largest client segment as a free loss mitigation service. Church Mutual's approach is based on the detection of water leaks and frozen pipes, and real-time alerts to the insured in order to mitigate non-weather water losses. The result is an above-average renewal rate, which reflects the perceived value for customers. The loss mitigation service, which has cost the insurer USD 8.9 million since October 2016, had yielded savings of about USD 31 million by the end of 2020, with more than 9,000 connected properties.[14]

14 Dawn M. Bernatz and Guy A. Russ, interviewed by Isabelle Flückiger and Matteo Carbone, 10 October 2020.

Case study: Church Mutual

Church Mutual uses a sensor kit consisting of three sensors for temperature and water leakage. Its customers are worship centres and related organisations in the U.S. The wireless sensors detect risky situations such as frozen pipes and water on the floor. The data is transferred directly to the cloud where it is centrally managed.

Based on the data, algorithm-based alerts are generated and sent to the customer, who can evaluate them and respond. When there is no response, an automated call goes to the customer's contact person. If there is still no reaction, Church Mutual calls the defined emergency contact. With this cascade, they are able to confidently estimate the value of preventing losses.

After 2016, and based on progressively more robust evidence on the value of this risk prevention approach, Church Mutual began to scale up its portfolio of insured properties.

Church Mutual does not discount the premium for implementing its prevention programme, but it does provide the sensor kit for free. Worship centres are typically staffed only a few days per week and a water leak could be discovered days after occurrence. Clients perceive value from this service as it can prevent subsequent losses, cleaning and repair efforts.

The majority (70–80%) of sensor recipients install the sensor kit within a given timeframe. Only 2% do not install the sensors at all. Many buildings are run by volunteers who are there only once a month. This is a barrier to fast action, and a significant amount of communication is needed between the insurer and the customer.

To make such a case successful, it is first important to understand what exactly can be prevented, and second that setting up a successful business case takes time.[15]

This case study illustrates the necessity of a multi-year commitment and the need to proceed step by step through all the necessary activities in order to build robust evidence on the effectiveness of risk mitigation before entering the scaling phase.

A more complex case study from The Hartford combines several technologies to reduce risk in the construction sector.

In 2018, The Hartford created a dedicated IoT Innovation Lab responsible for the group's IoT projects in commercial lines. After successful experimentation phases, a set of real-time IoT-based risk mitigation solutions are currently offered by The Hartford's loss control teams to clients in the construction sector. The company's journey has seen it build knowledge of the impacts and perceived values of the different IoT solutions. Based on who has what share of value from the service, the cost of the technology is allocated between the customer and the insurer.

Compared with the previous example, this case study involves additional, more complex steps and considerations:

- Properly analysing the data and knowing the impact and benefit of services enables effective communication and a fair allocation of technology costs.
- Real-time risk mitigation data is used for additional services, providing additional value to all involved parties.
- The combination of several technologies and services allows for the prediction of incidents and interventions before a loss happens.

The above examples demonstrate that there is no 'one size fits all' approach; each service needs to be developed on a case-by-case basis.

15 Dawn M. Bernatz and Guy A. Russ, interviewed by Isabelle Flckiger and Matteo Carbone, 10 October 2020.

Case study: The Hartford

The Hartford had identified a specific business need around water damage prevention in the construction sector. On that basis it piloted different solutions, measured risk mitigation performance and defined a sustainable approach. The cost of IoT devices is shared between the insured and The Hartford according to the benefits received.

This IoT approach is based on:

1. **Early detection of risky situations** (for example, flow monitoring sensors for early detection of unusual flows indicative of a leak, temperature and humidity monitoring sensors for the detection of freezing conditions).

2. **Detection of incidents to mitigate their consequences** (e.g. sensors to detect escaped water) based on alert dispatch, combining human intervention and automation such as automatic shut-off valves.

The Hartford is currently expanding into additional technologies such as wearables and computer vision (a computer-based technology used to understand the content of images and videos) for real-time alerts, such as monitoring whether workers are wearing protective equipment and lifting using ergonomic techniques for workers' compensation insurance. The goal is to understand the dynamics of risks in real time, i.e. how a risky situation develops and at what point a real-time interaction is required to prevent an incident.

All information, from sensors and computer vision, are passed to the risk engineering team as part of the risk advisory to customers. Based on the IoT data, customers get a tailored list of issues identified and places where potential incidents could happen, including prescribed actions. In the past, it was a 'see and react' exercise. Now, problems are identified in advance based on data analytics, with a focused view on the main issues.[16]

A different approach has been followed by Intact Canada, whose loss prevention team proposed a fire prevention solution for farms. The customer buys the hardware and services from the technology vendor – which continuously monitors anomalies and faults on the building's electrical network and dispatches alerts to nominated contacts – and receives a discount on the property coverage for the monitored farm building.[17]

AXA XL in Europe uses real-time mitigation of property risk in its 'Digital Risk Engineer' service, where alerts are dispatched to business owners after a critical situation is detected.[18]

StrongArm Technologies has developed workplace injury real-time risk mitigation using wearable technology, which monitors more than 20,000 employees and could reduce injuries by 40% year-on-year. The wearable sets off an automatic vibration felt by the employee when it is exposed to a risky situation.

IoT-based risk prevention has also been used to reduce liability risks. People's Insurance Company of China (PICC) developed IoT prevention services for its elevator insurance business, which are included in the insurance premium. The IoT-based approach uses continuous monitoring to alert the provider responsible for maintenance, which results in improved maintenance quality and reduced failure rate.[19]

Munich Re/HSB has partnered with technology company Augury, which specialises in technology and software for malfunction diagnosis of machinery, to provide diagnostic services in equipment maintenance. An IoT

16 Dan Campany,Paul Drennan and Eric M. Goldberg, interviewed by Isabelle Flückiger and Matteo Carbone, 2020.
17 Intact 2019.
18 Ritchie 2020.
19 Xinyu Gong und Zhao Xiaopeng, interviewed by Isabelle Flückiger and Matteo Carbone, 18 August 2020.

device is retrofitted to machines to predict failure based on a subscription model per machine. The performance of the services is guaranteed by insurance coverage, which includes a contractual liability protection for the service provider and warranty protection for the customer.

IoT-based prevention services allow insurers to expand coverage, protect against previously uninsurable risks and provide coverage solutions at affordable rates.

IoT-based prevention services also allow insurers to expand coverage and protect against previously uninsurable risks. Where corporates have found it difficult to secure insurance coverage at an affordable premium, or indeed at all, insurance based on real-time risk mitigation provides coverage solutions at affordable rates. All commercial property and casualty insurers interviewed for this report either already provide such an option or intend to offer it.

Commercial auto

Commercial auto insurers have taken the opportunity to introduce telematics-based, real-time solutions. Heavy vehicle auto insurance is often expensive, reflecting large losses. As a result, investment in technologies balances well with the potential for reduced claims costs. For buyers, using telematics-based technology will increase the safety of their drivers and vehicles,[20] again demonstrating a win-win situation for both customers and insurers.

In 2020, Nationwide successfully scaled-up a telematics referral programme in its U.S. auto portfolio. The loss control teams offer different telematics fleet management systems to middle and large fleets. Nationwide subsidises the fees for these solutions and has the right to use the telematics data in its processes, including loss control activities and claims management.[21]

Among the solutions offered to clients, Samsara's dashcam with AI at the edge uses cameras that both face the driver and look outward to the road. The camera provides real-time alerts to the driver thanks to forward collision warnings and traffic sign recognition. The camera looking inward detects if the driver is distracted or tired and triggers a real-time risk mitigation action in the form of an alert to the driver's supervisor. The supervisor can then contact the driver and decide on the action, e.g. advise a rest period. A study shows that dual cameras can reduce the number of accidents by 60% and cut related costs by 86%.[22]

Since 2017, Munich Re has collaborated with Mobileye to mitigate fleet collisions.[23] Mobileye offers collision avoidance technology for heavy vehicles. It is an AI-driven system based on deep neural networks and gives real-time alerts either with audio or visual warnings to the driver to prevent or mitigate collisions. The performance of the risk mitigation solution is also guaranteed by insurance coverage from Munich Re.

20 Nationwide 2020.
21 Pete Frey, interviewed by Isabelle Flückiger and Matteo Carbone, 8 August 2020.
22 Bell et al. 2017.
23 Intel 2017.

Personal auto

Proactive roadside assistance triggered by telematics-based crash detection has proved to be an effective form of risk mitigation in personal auto insurance. In rural areas in particular, this can be a life-saving service, helping to 'make the world a safer place'.[24]

In the Italian market, Generali leveraged its multi-year experience of personal auto telematics to introduce a proprietary and patented hardware-based approach, which provides feedback to the driver about her/his driving style in real time. Based on a traffic light alert system, drivers receive real-time indications about their behaviours while driving. The data insights showed that more than 80% of customers who started in the 'red area' (i.e. more dangerous behaviour) moved, over time, to the yellow zone and 10% even moved into the 'green zone' within one year, thanks to improved driving skills and habits. The impacts include:

Fewer accidents by the customer, meaning less subsequent health issues

Fewer claims for the insurer

Safer roads in general, which benefits society as a whole

In Japan, Tokio Marine sells a telematics service to its auto policyholders based on a camera with AI at the edge. The device offers automatic warnings to the driver when a risky situation is detected. This approach reduces the probability of a car crash and prevents risks for customers. Fewer claims against the auto insurance portfolio justify the insurer's investment in the technology while the customer benefits from competitive rates. This value sharing mechanism supports the scaling up of this initiative.

Case study: Tokio Marine – Drive Agent

Since April 2017, Tokio Marine has built up a few hundred thousand users of its camera-based auto telematics service in Japan. Consumers rent the device for a monthly fee of USD 6. The telematics solution combines several functions to improve safety for the consumer. The sensors used by this solution include the camera, GPS and the accelerometer to detect impacts.

The device has integrated alerts for real-time risk mitigation. It warns the driver of risky situations using a voice and a display located near the rear mirror. To balance the prevention of risky situations against distracting the driver, the alerts are limited to very risky situations that include departure warnings, forward collision warnings and risky area warnings.

Tokio Marine has not yet built robust actuarial evidence on the magnitude of risk mitigation within their auto portfolio. However, it has seen lower accident frequency and anecdotal evidence of risk improvements at the customer level. The renewal rate in the portfolio is significantly higher than in the portfolio without the telematics service, which mirrors the perceived value of customers.[25]

Personal property and casualty (excluding auto)

Water leakage sensors are one of the most cited prevention services in home insurance. However, as of today, insurers have struggled to introduce approaches that generate substantial demand and a sustainable business case.

Finding a sustainable business case in the smart home insurance market is challenging, but ongoing innovation will make homeowners the ultimate winners.

A recent study assessed the effectiveness of non-weather water prevention on more than 2,000 U.S. homes with a Flo by Moen smart water shut-off device. This automatic risk mitigation approach is able to reduce the frequency of non-weather water claims by 96% and cut

24 Chris Dolman and Ben Prangell, interviewed by Isabelle Flückiger and Matteo Carbone, 22 September 2020.
25 Kei Kato and Shigeru Shimizu, interviewed by Isabelle Flückiger and Matteo Carbone, 27 August 2020.

the severity of remaining claims by 72%.[26] However, considering the economics of an average U.S. homeowner insurance portfolio and the current tech costs (including installation), almost 10 years of cumulated annual risk reduction would be needed to repay the IoT costs.[27] In niches with higher expected claims frequency or insured value, the business case becomes more appealing. Further, expected cost reduction of technology will make the solution applicable to larger parts of the homeowner insurance portfolio.

Bundling risk prevention with other customer services, such as security, has been the most successful approach to date. With its LeakBot device in the U.K, Neos saw a 20% reduction in the incidence of non-weather water claims for policies. This IoT-based approach is able to detect early pipe issues and delivers a warning to the policyholder, saving disruption to the customer. But the insurer's savings alone would not justify investment in the technology. The sustainable business case is built on a bundle of different services – some sold after the purchase – and on the reduced churn rates built through customer engagement.[28]

Life and health

Life and health is the least mature field for real-time risk mitigation services. There have been many insurance pilots over the past few years around early detection, care optimisation and medication adherence but only a few examples have scaled to market level.[29] There are several reasons for the slow pace of adoption in the life and health space:

- Health costs in most countries are not fully covered by insurers, but by a public health system. Real-time risk mitigation would not, therefore, mainly benefit private insurers but the public health system, which has government-driven health budgets independent of prevention.
- Entering into the medical device space means entering into the medical regulatory field and dealing with different regulatory authorities.
- Giving medical advice comes with significant responsibility and requires deep and specialist knowledge.
- To execute at scale, insurers would need to deal with many different stakeholders, i.e. medical service providers inevitably involved in policyholder care (from general practitioners to specialists and hospitals).

Case study: Neos

Neos is a five-year-old U.K. start-up that offers smart home insurance, focusing on security and home services. It has attracted more than 200,000 customers in a few years. Aviva is the majority company shareholder. Its home insurance product is enriched by a smartphone app connected to a camera and other sensors offered to the policyholder, who, as an added benefit, can also monitor their cat at home on a smartphone and is happy to pay for the service and interaction. This approach has developed superior customer engagement and retention levels.

The prevention solutions embedded in the coverage have afforded Neos a loss ratio of 10 percentage points below the market average. Policies with more sophisticated leak devices, which deliver an early warning about pipe issues, record a 20 percentage point reduction in the incidence of non-weather water claims.

The frequent customer interactions with the camera provide the basis for cross-selling additional services. This approach started in 2019; introducing a boost function allowed customers to enhance the camera performance and usage. The offer has been progressively enriched, with some parts delivered by an ecosystem of partners.

Neos is also a tech partner to Dutch insurer Unigrant and American Family Insurance on their smart home programmes. It is also piloting an IoT-based insurance offer for small businesses. Business owners of restaurants and shops receive IoT-based services that mitigate their risks, such as detecting when fridge room doors are open to avoid food spoilage.[28]

26 LexisNexis/Floe by Moen 2020.
27 IoT Insurance Observatory 2017–2020.
28 Matt Poll, interviewed by Isabelle Flückiger and Matteo Carbone, 14 September 2020.
29 Carbone 2020.

In Japan, Dai-ichi Life offers dementia insurance coverage that pays a lump sum when dementia is diagnosed. The company introduced a preventative service in the form of an app for buyers of the product, with early detection capabilities provided by Silicon Valley start-up Neurotrack. The goal is to "prevent worsening of the cognitive health condition". The app recommends preventive behaviour but the customer is responsible for performing the activities. Neither Dai-ichi Life nor family members have access to the results. This means that Dai-ichi Life is not yet able to take active intervention measures, even though they may be of interest to the public.[30]

Medical devices that prevent risks related to blood pressure or glucose levels are in the very early stages of development. In the U.S., early detection solutions for diabetes use identification of pre-diabetes factors and the costs are reimbursed by insurers. Unlike other regions with national healthcare systems, health insurers in the U.S. incur increasing costs for diabetes treatment. Early prevention helps cap costs for insurers while potentially improving the health and lifespans of individuals.[31]

Health insurers in the U.S. incur increasing costs for diabetes treatment. Early prevention helps cap costs for insurers and potentially improves the health and lifespans of individuals.

3.2 Promoting less risky behaviour

The second way to prevent risk is to encourage less risky behaviour. Insurers have a role to play in creating a positive safety culture and raising awareness in society. Expected losses can be modified by human behaviours.

It is clear from the interviews that simply introducing an IoT device – from a camera that records driving behaviour to wearables that monitor physical activity – is not enough to generate long-term and lasting safer behaviours. Instead, a structured approach that engages the customer to achieve a sustainable change in behaviour is necessary.

To formalise this structured approach, a three pillar concept has been distilled from the successful case studies in this report.

A three pillar approach to achieving behavioural change

Pillar one: Create awareness of the current risk level

Pillar two: Suggest a change in behaviour

Pillar three: Incentivise the change in behaviour

Source: The Geneva Association

The adoption of sustainable and safer habits can only happen when all three pillars are successfully implemented.

Pillars 1 and 2: Creating awareness and suggesting a change in behaviour

The first two pillars are closely interlinked and depend on feedback to customers. From a rational perspective, awareness of the current level of risk leads to the question: what change will make the activity safer? Before changing our behaviour, we need to be aware of our current behaviour.

However, changes in human behaviour are also instinctive; a combination of behavioural economics and gamification is therefore needed to engage individuals and help drive behavioural change.[32]

Taking personal auto telematics as an example, customers often receive a detailed analysis of their driving style via a dashboard in a mobile app. Many insurers also automatically display tips for improving the driving score, or introduce contests on specific

30 Noriyoshi Hosokawa, interviewed by Isabelle Flückiger and Matteo Carbone, 21 August 2020.
31 Amanda Hosken, interviewed by Isabelle Flückiger and Matteo Carbone, 11 September 2020.
32 Patel et al. 2019.

'issues' – so-called leaderboards. The main behaviours addressed are phone distraction, risky speeding relative to traffic and environmental context, and the driver's anticipation thereof.[33]

Many health and life insurers offer online tests to help insureds understand their current state of well-being. Christian Wards, Director of Group Health & Wellness Transformation, AIA, highlighted how AIA's Vitality Age tool presents the risk and impact level to the policyholder. It develops awareness through a call to action and a subsequent behavioural change and personalises suggested changes to the individual.

EVŌ, based in the U.S., is one of the pioneers of personalisation focus. Based on the customer's profile and activity data, e.g. steps registered by their mobile phone or physical activity data from wearables, EVŌ provides fully individualised suggestions and challenges. Using data collected on one million policyholders from different insurance carriers around the world, including Prudential in the U.S., EVŌ identified effective ways to promote healthier behaviours in any age group and how different types of people react to different stimuli.

This case study demonstrates that health and wellness is a personal journey and every person needs an individual awareness programme and fully individualised suggestions before changing their behaviours.

American Family was one of the first to look at awareness creation and behavioural suggestion through maintenance services integrated into smart homes. Compared with other insurance business lines, it seems that insurers still need to identify which behaviours are the root causes of home hazards, as well as ways to influence these behaviours.

"Most important for the consumer is the illustration of how they are performing relative to how they could perform, gamification of sorts. Perhaps this comes in the form of customised feedback for the user with specific recommendations, or it is something like a 'safe home score.' Creating a sense of what could be achieved and why, and then encouraging positive behaviours is critical."

– David Wechsler,
VP Growth Initiatives, Hippo Insurance

In commercial lines, approaches are set up slightly differently because there is a separation between the policyholder and its employees with whom a behavioural change must be implemented.

Case study: EVŌ

EVŌ defines fully individualised personas to create awareness and suggest changes in physical activities and food habits.

When analysed further, the following behavioural characteristics were observed:

- The 20+ age group adopt and download the app, but there is a high level of abandonment.
- The 30+ age group has the least healthy lifestyle, with the dual demands of career and family taking priority over personal health.
- People aged 40+ regain awareness of their health. They are intrinsically motivated to improve their health and change their behaviour. In this age class, EVŌ records an 80% retention rate.

Having partnered with many different insurers around the world, EVŌ identified a link between the length of time that consumers have been part of the portfolio and the uptake of a new programme. Interestingly, customers who have been with the insurer for 7–10 years show an uptake rate of 1–3% in a physical activity contest. This increases to 5–7% for policyholders of 3–5 years buts runs as high as 37% for new buyers of the insurance product.[34]

33 Hari Balakrishnan, interviewed by Isabelle Flückiger and Matteo Carbone, 7 September 2020.
34 J Patrick Bewley interviewed by Isabelle Flückiger and Matteo Carbone, 10 October 2020.

Case study: StrongArm Technologies

StrongArm Technologies provides IoT-enabled, data-driven loss prevention services to create safer workplaces.

With its FUSE risk management platform, StrongArm Technologies impacts behaviour in three ways:

1. Leading-edge IoT-enabled wearables collect 25 inputs of physiological and environmental data every second. The data insights are delivered directly to employees in the form of escalating haptic, auditory and visual alerts to prevent risky behaviour in real time.

2. SmartDock acts as the hub of the platform, delivering safety performance metrics and coaching messages directly to each associate. The pre-shift dock engagement occurs daily and promotes awareness of safe behaviour and continuous improvement.

3. Its cloud-based analytic dashboard provides management with near real-time safety data used to identify, measure and manage risk across an employer's workforce. This data dashboard is used by risk management to strategically coach, correct and implement actionable safety-forward interventions.

From the data, leading indicator risk factors such as bend, twist and tilt movements are identified, which are more granular and predictive than usual loss indicators. Leading indicators are not only used to identify and correct risky behaviour before an injury, but are subsequently leveraged to optimise the relationship between safety and productivity.

The platform also monitors proximity data to significantly mitigate the risk of COVID-19 in the workplace. It provides real-time physical distancing alerts, interaction frequency and duration data, and accurate contract tracing reports for management.

StrongArm Technologies does not automate risk management; rather, it empowers organisations to strategically allocate their capital and time to the most impactful safety initiatives. Risk managers have a tool to impact the behaviour of all employees, at all times, and to measure the impact continuously.

StrongArm Technologies has collected millions of hours of safety data, across thousands of industrial workers worldwide, generating a 45% reduction in injuries on average. Workers' compensation partners are using this technology across the globe to differentiate risk, reduce injuries and empower their loss prevention services.[36]

StrongArm Technologies provides workers' safety prevention services. The wearables not only provide real-time feedback to the worker, they are also used by the company to generate a detailed picture of risks in the workplace. The StrongArm Technologies IoT platform shows those risks and their evolution to risk managers and loss control consultants. This IoT-enabled awareness of the risks in employee activities – impossible in the old analogical world – allows the company to introduce the necessary changes to reduce those risks.[35]

Pillar 3: Incentivising individuals to change their behaviour

Raising awareness of risky behaviour and identifying ways to change it are not enough. There is a need to proactively incentivise people to instigate real and sustainable changes in their behaviour. Data is the foundation for developing these incentives.[36]

Premium discounts at renewal are the most basic form of incentivisation, but data show that they only influence a third of auto telematics policyholders to change their behaviour.

35 Oliver Wyman 2019.
36 Matt Norcia and Sean Petterson, interviewed by Isabelle Flückiger and Matteo Carbone, 8 August 2020.

"You can combine mobile telematics with behavioural science. You help to close the feedback loop to human drivers by providing incentives and rewards. We are seeing about 54% of the drivers improve their driving behaviour within 6 weeks, and many of these improvements persist."

– Hari Balakrishnan, Professor of Computer Science, MIT

Premium discounts at renewal are the most basic or obvious form of incentivisation, but according to Thomas Koerzdoerfer, Lead Data Scientist HUK, data show that only one-third of auto telematics policyholders are influenced to change their behaviour by a discount on the renewal price.[37]

Our research has found many players in personal lines that are instead focusing on reward programmes to improve behaviours. In personal auto, South African insurer Discovery uses its driver behaviour programme Vitality Drive to promote safer driving habits. Telematics data – registered by smartphone sensors and the sensor installed in the vehicle – monitor individual behaviours and reward improvements. This auto telematics portfolio now has 270,000 customers.

Customers are not offered an upfront discount. On the contrary, there are fees for enrolling in the telematics programme. In exchange, however, is an attractive reward system for safe drivers. The incentivisation is a mix of status-based rewards that include monthly rewards of up to 50% fuel cash back (the most important and relevant for customer engagement) and weekly rewards of points that can be redeemed for partners' products (from a coffee to travel-related products). Vitality Drive has recorded a material improvement in drivers' risks, improving driving behaviour by 12% within 30 days from enrolment in the programme. This level is sustained over time.[38]

Discovery works with leading global behavioural economics experts and once a year integrates the latest scientific results into the reward system.[39]

Such programmes began in its health and life insurance portfolios with the invention of the Vitality programme, aimed at promoting safer habits in personal lines. The insurer acts as a coach to support the customer step-by-step: from knowing one's health (awareness), to improving one's health (suggested behaviours) to rewarding the change in behaviour (incentivisation).

Discovery succeeded in recording reductions in both the health costs and the mortality of policyholders.[40] Moreover, the approach has been replicated in 22 markets through a network of partnerships between Discovery and major global insurers such as Ping An, AIA and Sumitomo Life in Asia; John Hancock and Manulife in North America; and Generali in Europe.[41]

Again, this is a win-win situation that benefits the customer, insurer and society.

Generali uses the Vitality programme in Europe. Even though Vitality retains the same motivation and reward approach at the core, the programme is tailored for each country because of the different approaches to wellness, business models and bundling opportunities, as well as regulatory contexts. In Germany and Austria the focus is on personal lines but in France the programme targets corporates.

Cultural differences and programmes that are tailored at the local level provide the best value to Generali customers but they create a more complex reward programme structure that requires a dedicated effort to manage.[42]

Reducing the risk of the insured portfolio is achieved most effectively by incentivising every policyholder to improve, rather than only rewarding the lowest risks.

37 Thomas Koerzdoerfer, interviewed by Isabelle Flückiger and Matteo Carbone, 12 September 2020.
38 Precious Nduli, interviewed by Isabelle Flückiger and Matteo Carbone, 18 August 2020.
39 Tim Byrne interviewed by Isabelle Flückiger and Matteo Carbone, 8 August 2020.
40 Discovery 2018.
41 Vitality International 2020.
42 Simon Guest and Bruno Scaroni, interviewed by Isabelle Flückiger and Matteo Carbone, 11 November 2020.

Case study: Allstate

Allstate built its business case for telematics over several years in the U.S., inspired by a vision to create an experience based on continuous connections and positive interactions with the customer, in a move away from the old experience where customers only interact with the insurer when paying a bill or making a claim. This vision allows constant alignment and engagement across the organisation on the telematics-based business transformation.

Today, Allstate records 20% telematics penetration in its personal auto insurance portfolio. The three programmes – Drivewise, Milewise and Drivesense – have aggregated a portfolio of 2 million constantly connected policyholders, one of the largest auto telematics portfolios in the world. While Drivewise is the flagship value proposition, the pay-per-mile Milewise programme has grown by over 535% between Q3 2019 and Q3 2020 due to changes in driving behaviours driven by the COVID-19 pandemic.

The Drivewise product is focused on safety, and rewards people for safe driving behaviours. It is based on a constant feedback loop with the driver through the Allstate mobile app.

Drivers can earn cashback and points with good driving behaviours:

- On each trip, a premium saving can be earned – focusing the provision of positive reinforcements to good behaviours – and it is displayed within the app. The saving is earned every six months and is applied either to the customer's policy or received as a cheque.
- The reward system is set up as a gamification tool to drive engagement, where points earned from weekly contests are redeemable for safety and prevention merchandise, discounts on other Allstate products or optional donations to local charities.

This approach increases engagement with the app, resulting in safer behaviours that translate to safer roads.[43]

These real-life case studies offer the following key findings:

1. **The reward system needs to be set up to reinforce positive behaviour.** There is consensus about using the carrot but not the stick, i.e. a premium or deductible increase for risky behaviour. The reachability of the reward is key. The insurer's overall goal is to reduce the risk of the insured portfolio. This is achieved most effectively by incentivising every policyholder to improve, rather than only rewarding the lowest risks. If everybody moves in a positive direction, the whole portfolio improves.

Rewards must be explicit and tangible, and reward systems need to be carefully tailored to the regional culture – what works in one country does not necessarily work in another.

2. **Incentivisation is cultural.** It is extremely important to find compelling benefits and rewards that engage target customers.[44] What works in one country does not necessarily work in another. Reward systems need to be carefully tailored to the regional culture. The rewards must be explicit and tangible. However, there is no correlation between the intrinsic value of the reward and the effectiveness in influencing behaviours. Providing cashback or offsetting existing costs for a customer, e.g. monthly cashback on fuel costs, are effective, but a free weekly coffee also has the ability to materially influence behaviour.

"When you provide positive reinforcement to the human being on a regular basis as opposed to on an irregular basis, it will have a very strong disproportional impact."

– Hari Balakrishnan, Professor of Computer Science, MIT

43 David MacInnis, interviewed by Isabelle Flückiger and Matteo Carbone, 11 September 2020.
44 Precious Nduli, interviewed by Isabelle Flückiger and Matteo Carbone, 18 August 2020.

3. **Frequency is key.** A premium discount once a year is not enough. Positive engagement must be nurtured on a short-term basis. This gives people a reason to come back to the platform. Customers with more frequent engagement with the app, a couple of times a week, improve their behaviour more than others.[45] In North America, Allstate offers its auto telematics clients both cashback earned trip-by-trip and rewards for taking part in weekly contests. In health and life insurance, Discovery's Vitality has demonstrated how weekly active rewards combined with status-based benefits increase policyholders' level of physical activity by 30% compared to the baseline without active rewards.[46]

4. **Advanced behavioural economics represent best practice.** For example, Discovery explores in its programmes whether people are more fearful of losing something than not winning. So, it provides an Apple Watch for free but when personal health goals are not met, the customer has to pay back parts of the watch. The implementation of this changed approach led to a more effective reduction of customers' risk. This mechanism, integrated with active rewards, also increases customers' levels of physical activity by about 70% compared with the baseline without active rewards.[47]

Insurers must adjust rewards systems on an ongoing basis and evolve them year by year. They must constantly monitor the costs of the different elements of the programme and their contribution to reducing risks.

5. **Incentivisation is not a one-time exercise.** Insurers must be prepared to adjust the rewards system on an ongoing basis and to evolve it year by year.[48] They must also constantly monitor the costs of the different elements of the programme and their contribution to reducing risks.

"We are constantly changing and improving the programme as we gain more insights and data on our clients' driving habits. Each year we add new and exciting rewards to keep incentivising driver improvement."

– Precious Nduli, Head of Technical Marketing and Vitality Drive Engagement, Discovery Insure

6. **Support from agents and brokers helps manage customer expectations and enhance understanding of incentivisation mechanisms.** Close involvement and education of brokers and agents is crucial. All insurers that have successfully launched an incentivisation service substantially invested in the inclusion and training of agents and brokers, in recognition of their important contributions to effective risk reduction.

All of the success stories on the third pillar in this report come from personal lines. However, there is a clear opportunity to integrate this pillar in commercial lines to increase the effectiveness of risk reduction initiatives. It should contain:

- A rational incentive for the corporate: a dynamic deductible or a premium discount can motivate risk mitigation programmes
- A structured incentive, using the same logic as in personal lines, to promote safer behaviours among employees.

Discovery is one of the first insurers to extend incentivisation programmes to commercial lines, leveraging its knowledge developed in personal lines. In commercial auto insurance, it introduced two-fold incentives to drivers, who are ultimately responsible for their own driving behaviours, and to the corporate. In the U.K., AXA recently joined forces with start-up Brightmile to incentivise fleet drivers through its commercial auto product.

Many of these developments will contribute to the prevention of risks and further enhance insurers' potential to introduce effective ex-ante loss prevention solutions in the near future. In addition, similar to real-time risk mitigation cases, insurance coverage could potentially expand and facilitate the insurability of hitherto uninsurable risks.

45 Hari Balakrishnan, interviewed by Isabelle Flückiger and Matteo Carbone, 7 September 2020.
46 RAND 2018.
47 Ibid
48 Tim Byrne interviewed by Isabelle Flückiger and Matteo Carbone, 8 August 2020.

4. Enablers of prevention services

Rolling out IoT initiatives across the insurance organisation allows for smarter actions, such as preventing risks.

The main obstacle in the adoption of ex-ante loss prevention is not technology but people.

The main obstacle in the adoption of ex-ante loss prevention is not technology but people. As for other financial service innovations, "cultural, structural, legal, political and practical factors will converge to work against major shifts in a world that is, again, designed by intent to be resistant to rapid change".[49]

From the interviews, the following main success factors are identified:

- C-level commitment
- Development of vision and strategy
- Development of culture and capabilities
- Finding an effective value-sharing scheme with the customer
- Management of new and complex financials

"We spent six months meeting all the relevant people, explaining how telematics works and how the data is used; without the sponsorship of the CEO, this would not have been possible."

– Pedro A. Bernardo Santos, Founder & Managing Director, G-Evolution

49 Barefoot 2020.

C-level commitment

There is a strong consensus amongst all interviewees that the basis for success starts at the top. The launch of IoT-based prevention services must be viewed differently to the launch of other insurance products with a three to six months launch time; they require continuous portfolio monitoring. IoT usage is about deep business transformation.

Vision and strategy

A vision about the future of such services that does not conflict with the purpose of insurance and will fit coherently into its aim of providing protection and financial wellness is crucial. The following corporate vision statements are examples:

- "We want to create safer roads."
- "We are your partner to get you healthy."
- "We want to help customers live longer, healthier lives."
- "We want to prevent bad things from happening."

Culture and capabilities

All interviewed insurers with successful prevention services highlighted the importance of a wide set of capabilities that have supported their journeys. Embracing the new insurance paradigm and exploiting its full potential requires a cultural shift in business functions.

"Telematics is not a technology solution, it has to be viewed as a business capability."

– Pete Frey, Commercial Telematics, Nationwide

The top capabilities mentioned are:

- **Engagement of the organisation:** All functions are needed (business, actuarial, finance, distribution, risk and compliance, etc.)
- **Culture:** A change in mind-set across all functions, including distribution partners, is required.
- **Data:** The organisation must master data usage. The same data should be leveraged for several business cases. Using data for only one business case makes finding a sustainable business model difficult.
- **Skills:** Insurance IoT and IoT economics literacy is needed across the whole organisation, as well as a deep understanding of the core insurance processes impacted.

The same data should be leveraged for several business cases. Using data for only one business case makes finding a sustainable business model difficult.

From a cultural perspective, loss prevention has always been part of insurance companies' DNA. For individuals, insurers provide a lot of advice on home protection or safer driving. In commercial lines, insurers conduct field visits and develop bespoke loss prevention reports, vulnerability analyses, risk management programmes or human factors programmes to prevent losses.

The philosophy is not new and it has worked well for decades. This principle does not need to be changed. What is changing with technology, and particularly insurance IoT, is the approach to preventing risks faster, more effectively and with more precision. In a nutshell, IoT-based prevention services are an insurtech enabler for improving existing services offered by insurers.

IoT-based prevention services are an insurtech enabler for improving existing services offered by insurers.

"We want to improve wellness and quality of life with our life insurance offer. Preventative health and early detection reduce medical costs and extend healthy life expectancy."

– Noriyoshi Hosokawa, Innovation Strategy, Dai-ichi Life

Sustainable business model and effective value sharing

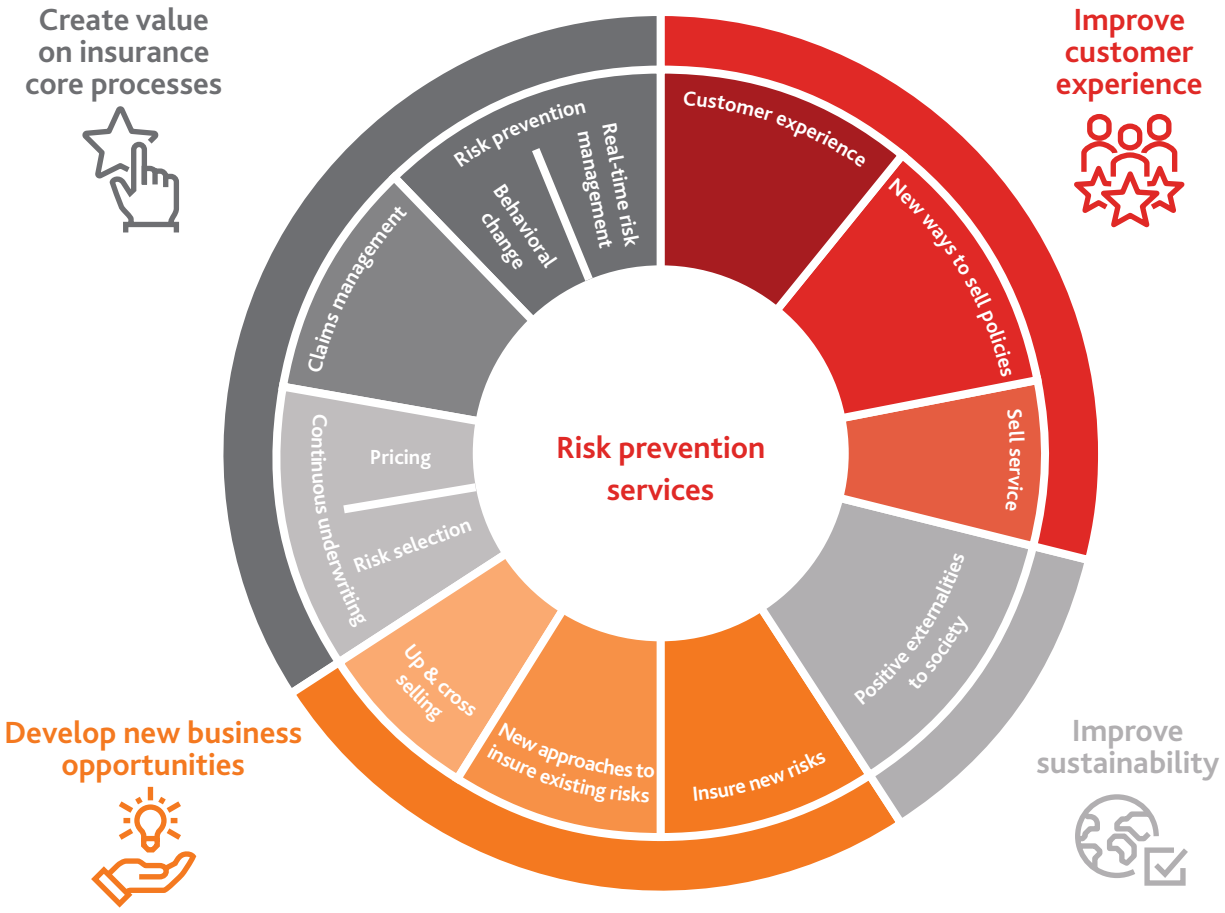
For a sustainable model, the costs of delivering IoT prevention services should be lower than the expected reduction of losses. A multi-year journey will build robust actuarial evidence to measure the scale of the impact. Some successful insurers like Church Mutual have found that a standalone prevention service can generate a positive impact large enough to justify the investment, without the need to combine it with other use cases.

> *"Technological possibilities are there but not used beneficially for preventing risks."*
>
> *– Andrea Keller, Head Automotive & Mobility Solutions, Swiss Re*

However, our research shows that the majority of success stories needed to combine loss prevention services with other use cases based on the same data. Leveraging the same data for other use cases was more likely to create a sustainable business model for all stakeholders. These use cases feature (see Figure 2):

- The improvement of core insurance processes like claims management or underwriting
- The development of new business opportunities like up-selling or cross-selling, new approaches to insure risks or the insurance of new risks
- Enhanced customer experience through better customer engagement, new ways to sell policies or selling pure services, or
- Improved sustainability by providing positive externalities to society.

Figure 2: Leveraging IoT data for multiple use cases



Source: IoT Insurance Observatory & The Geneva Association

Sharing the value of new services with customers has proven to be the key driver that makes or breaks the acceptance of these new technologies and data-driven services.

New technology comes with a cost that will impact the business case for the insurance company and is part of the economics behind the value-sharing concept. The most obvious value-sharing element for consumers is a decrease in premiums. When the risk decreases, the risk premium decreases, too.

Value sharing with consumers comes in various forms and structures, and the benefits can be greater for customers with safer behaviours. Several examples were identified in the interviews, including:

- Premium discounts and cash back (personal lines and commercial lines)
- Rewards in the form of vouchers (personal lines)
- Reduction of costs such as monthly rebates on fuel spending (personal lines) or cost-saving services for corporates
- Home security or proactive roadside assistance (personal lines) and fleet services at competitive prices (commercial lines)
- A free device, such as an Apple Watch or a camera (personal lines) and safety equipment for corporates, or the free use of an IoT SaaS platform (commercial lines).

Simply indicating ways in which driving can be made safer is not considered as shared value by customers. The offer of a water damage mitigation device did not drive the adoption of smart home insurance offers; however, smart home insurer Neos succeeded by providing customers with a free camera. This service is interesting and engaging enough for consumers to buy it, share their data and even buy additional services.

> *"Points and rewards do not appeal to all; so, we have different personas, such that we have something to engage each individual."*
>
> *– Gina Minick, Product Director, Arity*

In addition to consumers, value sharing must also include agents and brokers. Incentivisation based on the pure premium amount does not work for agents and brokers because a reduced premium means less commission for the distributor.

Added financial management complexity

Successful financial management of prevention services is far more complex than with traditional products. A comparison of the financial elements of traditional and prevention services is shown in Figure 3; additional financial components for the latter are highlighted in red.

Figure 3: Increased financial complexity of IoT-driven prevention services

Traditional product economics	IoT-driven prevention services economics
+ Premium income	+ Premium income
	+ Service fees
	+ Partner contributions (products, cash back to insurer)
- Claims	- Claims
+ Deductibles (notably in commercial lines)	+ Deductibles (notably in commercial lines)
	+ Risk reduction
	+ Self-selection
	- Net IoT costs (software, hardware, installation, operations, maintenance, discounts and subsidisation)
- Insurers' costs and expenses	- Insurers' costs and expenses
	- Insurers' costs for ecosystem management
- Commissions to distribution	- Commissions to distribution
	- New products' incentivisation
	- Cash back
	- Rewards

Source: The Geneva Association

The interviews highlighted the fact that several new elements need to be considered in the financial management of technology and data-based services. It is difficult to fit these into traditional insurance product economics.

"Our reward partnerships are a key factor for the sustainability of the business model."

– Precious Nduli, Head of Technical Marketing and Vitality Drive Engagement, Discovery Insure

Beyond finding a sustainable business model, insurers must also open dialogue with regulators. In some cases, insurers have found themselves at a competitive disadvantage versus non-insurance players in providing prevention services to customers.

Current insurance regulations sometimes pose a barrier to leading experiments in prevention solutions, leaving insurers at a competitive disadvantage.

"There is a necessity to balance sustainable economics and driving the right behaviours. It's a trade-off between a target per member spend and balancing daily/weekly/monthly rewards."

– Christian Wards, Director of Group Health & Wellness Transformation, AIA

Current insurance regulations sometimes constitute a barrier to leading experiments in prevention solutions. For example, the anti-rebate law in the U.S. prevents insurers from sharing value in the form of rewards, such as wearables.

5. Conclusions and recommendations

IoT and IoT data will be game changers in all industries and will increasingly affect our everyday lives. IoT technology, data capabilities, real-time remote processes, incident steering and proactive customer interactions for prevention will become the new normal. This paradigm change to 'preventing bad things from happening' cannot be ignored and the insurance industry must embrace it.

Insurers, their technology partners and regulators must become more literate in Insurance IoT and improve their understanding of its translation into insurance prevention services.

IoT maturity in the insurance market is evolving. Knowledge about insurance IoT and translation of the data into a sustainable business case are still in the early stages of development. Prevention services and value sharing are complex and require a multidisciplinary approach. To best serve customers and society, insurers and regulators need to become more literate in insurance IoT and develop a deeper understanding of how to translate it into prevention services.

Insurers should consider the development of technology and data-driven prevention services as a form of business transformation.

The implementation of successful risk prevention services will require much more than the launch of new products. It will necessitate fundamental changes in business operations across the whole insurance organisation, and the proactive involvement of both management and frontline employees will be needed. All functions across the insurance value chain need to be integrated and engaged; standalone prevention services are rarely successful, either from an economic or from a customer engagement point of view. Insurers should view this as a journey of business transformation. The capability perspective should give insurers a sense of urgency; a competitor's product can be replicated in a few months, but capabilities require time to build.

Insurance regulators should adapt regulatory frameworks to be more conducive to the implementation of large-scale prevention services.

Regulations that are adequate for traditional insurance products can act as barriers to large-scale prevention services.

Insurance regulators need to understand these peculiarities to allow for value sharing and to enable insurers to set incentives that prevent incidents and subsequent costs that are not covered by policies. To do this, insurers need access to customer data. They also need to be able to provide IoT technology at no charge

to policyholders. Otherwise the insurance sector risks being put at a disadvantage compared to other, less regulated sectors.

Why should a tech company have fewer restrictions on the use of data for their business model than an insurance company that wants to share value with consumers and benefit society with improved safety and/or better health? Why should a tech company be allowed to give their customers a health wearable for free, but not an insurer? Regulators need to adapt current frameworks to ensure a level playing field.

Tech companies should co-create technology-driven prevention services with insurers.

Insurers have established teams with technology expertise that build integration applications for technology and data, but incumbents are now actively seeking partnerships with technology companies. However, tech companies need to go beyond just delivering a technology; simply providing the best hardware or algorithm does not reflect a successful collaboration. This will be enhanced by the ability of tech companies to co-create with insurers a technology-enabled bundle of risk transfer and risk prevention services for customers.

Tech companies should engage in a dialogue with the insurance industry to better understand its value and leverage it to benefit consumers and society.

The insurance industry has access to a large customer base to which it provides protection and financial wellness, it also contributes positively to society by encouraging healthier and safer behaviour. Technology companies need to better understand the insurance industry's unique contributions to individuals, businesses and society, and the benefits of working with insurers to better serve customers with a wider range of services. To do this, tech companies should engage in an open and extensive dialogue with the insurance industry.

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Data from IoT devices are providing insurers with new approaches to insuring existing risks, as well as the opportunity to extend coverage to new or previously uninsurable risks. Such data are also changing the ways in which insurers are able to prevent and mitigate risks and corresponding losses. This report examines the shift towards IoT-enabled risk prevention and mitigation services in the insurance industry. Using several case studies to identify the key drivers of successful implementation of such services, it aims to support the industry in its transformation and in promoting a healthier and safer society.

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