Connected Insurance Report

INSURANCE NEXUS

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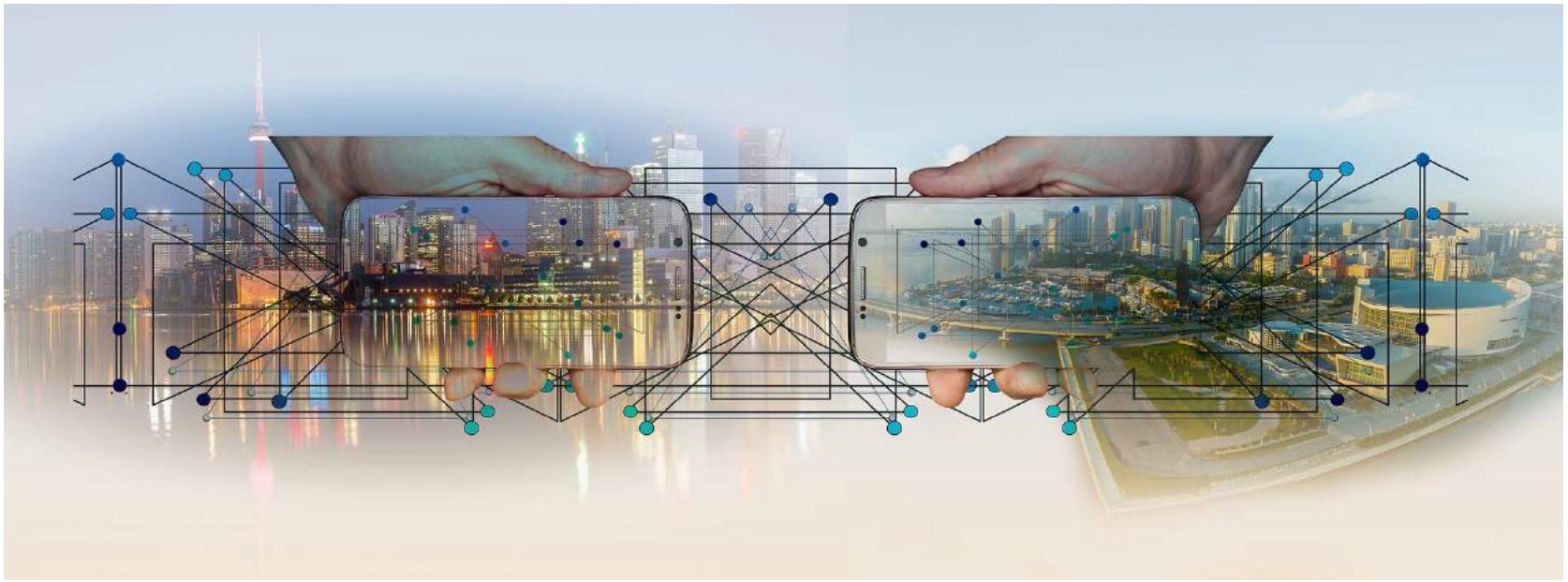

One of the general principles of the insurance industry is that large amounts of historical data and accumulated experience can be used to assess both risks and claims. The peculiar magic of the industry is that in most cases, the insurer knows relatively little about the individual or company for which they are writing the policy. Often there will be nothing more than an underwriting questionnaire, but it can still make a decent prediction about what will happen to it, because it has a great deal of data about what has happened to similar entities in the past, be they; people, automobiles, houses or consignments of frozen fish. And when they are notified of a claim, they can pay, or dispute the claim based on little more than the notification, a few bits of paperwork and, occasionally, a visit by a loss adjuster.

In the past 15 years or so, that picture has been radically altered by the arrival of the Internet of Things (IoT): a catch-all title for technologies that collect, record and transmit fine-grained physical data about what is happening in a particular place and time. Although estimates and forecasts vary wildly, we're at the beginning of an IoT revolution: the number of devices that make and send data to other devices seems to be doubling every couple of years and are estimated to reach something like 30 billion by 2020.[1]

The quantity and quality of this information means that the business of writing policies has lost some of the asymmetry between what's known about the claims generated by a class of risk, and what's known about the present level of risk of each individual member of that class. It is inconceivable for such a transformation not to lead to significant changes in how companies interact with their clients both before and after a claim is made. This includes the possibility of offering services that ›

[1] https://spectrum.ieee.org/tech-talk/telecom/internet/popular-internet-of-things-forecast-of-50-billion-devices-by-2020-is-outdated

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INTRODUCTION

› prevent claims arising, as well as the opportunity to assess those that do arise based on high quality, objective data. It is also likely to disrupt their underlying business models and their internal organisations.

Our report is based on the knowledge accumulated by our survey, the IoT Insurance Observatory and Insurance Nexus' network of thought leaders, 23 of whom have given us in-depth interviews in which they discussed their organisation's IoT strategy.
One of the striking findings from these interviews is the scale of the task they face and for several reasons:

FIRSTLY the stakes are extremely high: companies that get their IoT strategies right may have the chance to grow their market share in leaps and bounds.

SECONDLY changes in IT can lead to rapid change in other industries: the obvious examples are Amazon, Uber, Airbnb and Netflix, to which we can add the rise of fintech in the past few years – and beginnings of an insurtech "revolution". Matteo Carbone, the founder and director of the IoT Insurance Observatory, titled his book on the sector 'All the Insurance Players will be Insurtech' and Ty Sagalow, the founder of New York-based Innovation Insurance Group commented at a recent Insurance Nexus event in Chicago, that in five years nobody will talk about insurtech, because everybody would be practising some form of it. This whole debate is taking place against the clock.

THIRDLY this is largely a journey without maps: the industry's conversations about connected insurance is characterised by a great deal of speculation and conjecture, a few generally accepted "truths" and little hard data to back any of it up. This lack of information is compounded by the wide variety of possible "plays" that companies can make, most of which have outcomes that are hard to predict with confidence.

In this context, the opinions and experiences of our interviewees are of interest to anyone looking to get a sense of where the market and its individual segments are going in the next five to 10 years. The report looks at how their peers are framing the problems and issues thrown up by the IoT, the kinds of solutions that they are considering, and the thinking behind those solutions. We present this analysis over five sections, which together add up to one of the most in-depth investigations yet written into the future of the insurance industry. ■

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OUR INDUSTRY LEADERS

MATTEO CARBONE
Founder and Director of the IoT Insurance Observatory, Co-founder of Archimede Spac, Global Insurtech Thought Leader, and Investor

He is internationally recognised as an insurance industry strategist with a specialisation in innovation. Matteo is an author and world-renowned authority on insurtech, ranked among top international insurtech influencers, and he has spoken to audiences in twenty different countries. In 2017 he published the first bestseller dedicated to insurtech: "All the Insurance Players will be Insurtech".

Matteo has advised more than 100 different players in more than 10 insurance markets around the world and has wide insurance experience which includes setting up industrial and commercial plans, growth strategy definition. He has given support to new initiatives, digital strategy development, insurance products innovation, channel strategy and commercial model definition, start-ups mentorship and advice M&A deals. He has worked directly with players which account for more than 80% of the international IoT insurance.

Before creating the IoT Insurance Observatory and co-founding Archimede, he spent 11 years in Bain & Company's Financial Service practice.

IoTinsObs

ALLISON WHITTINGTON
Head of Housing at Zurich Municipal

A Senior Insurance Executive, Allison has over 20 years industry experience, working within Zurich Municipal for more than 5 years.

She has an in-depth knowledge of the housing sector, stretching across a wide range of the risks faced, including modern methods of construction and connected homes. Her role as a board member of a Surrey based housing association means she understands, first hand, the issues organisations face and her Chartered Management Accountant background gives her a keen appreciation of financials. She has lead a multi award winning Internet of Things project exploring the opportunities within the housing and insurance sectors.

ZURICH

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OUR INDUSTRY LEADERS

ANDREAS BRAUN
Head of Data & AI,
Accenture Europe/ ASGR

Dr. Andreas Braun joined Accenture in October 2017 as the Managing Director heading up Accenture's Data Powered Enterprise (DPE) capability in Europe. DPE supports Accenture's clients to build and run end to end data supply chains to deliver actual business value from data and analytics, considering all related aspects, such as compliance, data management and quality, protection/ GDPR etc. In addition, Andreas also heads up Accenture's Applied AI business in Germany, Austria, Switzerland.

Previously, Dr. Braun worked for Allianz SE, the holding company for the Allianz Group. At Allianz, he conceptualized, built, and led the group competence center for Global Data & Analytics (GD&A) and Advanced Business Analytics (ABA), reporting into the group's COO and Chief Digital Officer respectively.

accenture

ANTON FATTI
Chief Digital Officer at Discovery Limited

Anton leads Discovery's digital transformation strategy, leveraging his experience in technology management consulting and product management.

Anton Fatti is the Chief Digital Officer for Discovery, leading the enterprise-wide digital transformation strategy, incorporating disruptive technologies and approaches to enhance Discovery's business model and create new competitive differentiators. Anton has a background in technology, management consulting and product management.

Discovery Insure

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OUR INDUSTRY LEADERS

BORIS COLLIGNON
VP Strategy, Innovation and Strategic Partnerships at Desjardins General Insurance Group

Boris Collignon is Vice-president Strategy, Innovation and Strategic Partnerships with Desjardins General Insurance Group, the Property and Casualty arm of the Mouvement Desjardins, the largest Canadian cooperative financial group. Desjardins General Insurance Group is the 3rd largest P&C insurance company in Canada, present across Canada with various brands and distribution models (direct and exclusive agents).

Before joining the company, Boris worked as a strategy consultant for leading consulting firms, both in Europe and Canada, with a specialization in the financial industry in Canada. Boris is a Chartered Financial Analyst and graduated from HEC School of management in Paris with a specialization in Strategy.

Desjardins

CECILIA SEVILLANO
Head Smart Homes Solutions at Swiss Re

Cecilia is Head Smart Homes Solutions at Swiss Re. During the past 15 years, she has been leading innovative growth-related strategies within the financial sector, bringing them to market through partnerships with alternative distribution channels. In the rise of IoT and data-driven environments, Cecilia has been engaging with insurtech and leading emerging business opportunities within Swiss Re.

Cecilia holds an MA in Financial Marketing from the Toulouse University as well as an Executive diploma in Strategic Marketing from INSEAD.

Swiss Re

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OUR INDUSTRY LEADERS

DAN CAMPANY
AVP Innovation at The Hartford

Dan Campany has been with The Hartford since 2004. Dan is responsible for creating and executing The Hartford's long-term innovation agenda working with leaders across the enterprise to uncover, explore, and launch new technology and capabilities to accelerate The Hartford's strategic priorities.

Prior to leading Enterprise Innovation, Dan most recently served as Head of Business Development, Strategy and Marketing for alternative distribution partnerships in The Hartford's Small Commercial Business segment. Prior to that Dan held various leadership positions in Small Commercial Sales and Underwriting. As well, Dan was the Strategy Lead for the invest project that built and launched Hartford's industry-leading agency quoting portal.

Dan holds a bachelor's degree in Economics and Mathematics from Hamilton College.

DAVIDE DEVIETTI GOGGIA
Direction Auto-Planning / Products and Scenarios in Auto at Reale Mutua Assicurazioni

Davide is currently in charge of Reale Mutua Assicurazioni Auto business, the area where he spent most of his working background having begun back in 1998 as a junior motor underwriter for Axa Assicurazioni. Davide followed his career within auto insurance dealing with all the disruption that occurred in the Italian Market, then joined the start-up team for Quixa, Italian Axa Assicurazioni's direct motor company, acquiring a new perspective of the trade.

He then went back to company headquarters in 2011 to lead the overall motor business, mainly in product development, where telematics was heavily involved.

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OUR INDUSTRY LEADERS

ENRICO MASTRANGELI
Director, Business Innovation and Product Owner at The Commonwell Mutual Insurance Group

With over 20 years in the insurance sector, he has developed diverse experience spanning all distribution verticals with roles in sales, product development, distribution management, pricing and corporate underwriting. An innovation thought leader, he challenges the status quo to drive clarity and perspective for all impacted stakeholders. In his current role, he is leading the technology and organizational transformation and enablement of long term strategic direction at a mutual insurer in Ontario, Canada.

FRANK FRIPON
General Manager Life & Health at KBC Bank & Verzekering

Franz has a wide range of responsibilities at KBC Bank, a subsidiary of KCB Group, the second largest bank and insurance company in Belgium. As well overseeing business development and actuarial processes, he is in charge of customer services and operations. Before taking up those responsibilities, he was general manager for strategy and support, a role that required him to become familiar with the KBC's strategy for innovation and transformation. Franz has gained experience in a number of European markets. A graduate of the IESE Business School in Barcelona, he has worked for Polish insurance and reinsurance company Warta, and Head of Customer Services at the Prague office of KBC.

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OUR INDUSTRY LEADERS

JAC AMERELL
Corporate Controller
at Blue Cross Blue Shield of Michigan

Jac is an accomplished Senior Executive and Board Member with more than 25 years of success across the financial services, insurance, and investment management industries. Throughout his career, Jac has held various leadership positions including Senior Manager at PricewaterhouseCoopers LLP, Finance Director at Northwestern Mutual, and Senior Vice President and Controller of Genworth Financial.

Jac has had tremendous success over the years serving as a key strategist and contributor to numerous organizational achievements including developing and implementing technology, increasing and driving organizational alignment and operational processes that resulted in significantly better efficiency and enhanced internal controls at Northwestern Mutual and Genworth Financial. In his current role at Blue Cross Blue Shield of Michigan, Jac is spearheading an enterprise wide finance initiative involving cloud technology and intelligent automation that will have a major impact on the company's internal and external reporting, forecasting, capital planning, and regulatory reporting.

Blue Cross Blue Shield Blue Care Network of Michigan

JENNY TRUEMAN
Head of Connected Homes & Product Innovation at Direct Line Group

As Head of Connected Home and Product Innovation for DLG, Jenny is responsible for defining and delivering product innovation through the Connected Home strategy. With almost 20 years' experience of working in the insurance industry, most recently in insurance product development and trading performance management, Jenny brings an unrelenting focus on the customer and how to deliver value in a relatively unknown area of opportunity. She has an eye on the future, monitoring consumer trends and market insights, analysing how these create opportunities for DLG.

Working across all functions within the organisation and externally with technology partners, Jenny is passionate about driving the strategic focus on the future of connected home technology in insurance.

Direct Line Group

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JONATHON VALENTINE
Chief Technology Officer at ThingCo

Jonathon Valentine is Chief Technology Officer at ThingCo, a new insurtech focussing on developing the next generation telematics, to offer a customer-centric solution, built with a telematics focussed FNOL eco system.
Previously Jonathon was a founding member and Head of Innovation at Insurethebox, the UK's first telematics only car insurance offering. They sold over 800,000 policies, and during his time there, was POST magazine's Rising Star as well as winning multiple industry awards for CARBS, the world's first telematics fraud detection platform.

JULIEN COMBEAU
Industry Services Lead Europe, Client Risk Solutions at AIG

As the Head of the Client Risk Solutions (CRS) Industry Services Group in Europe, Julien's mission consisted of commercially developing and harnessing all of AIG risk consulting, risk engineering and analytics capabilities across Commercial Lines (Property and Special Risks, Liability and Financial Lines) to bring holistic and comprehensive risk management solutions to clients to help improving their total cost of risk.

Julien most recently contributed to AIG's white paper series on the Internet of Things (Evolution or Revolution?) and plays an active part in the deployment of risk management pilots combining data mining, engineering expertise and technological innovation with key Commercial Lines customers across the UK and Continental Europe.

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OUR INDUSTRY LEADERS

LEIGH CALTON
Senior Consultant, Advisory at Consumer Intelligence

Leigh is an experienced insurance industry marketer and strategist, specialising in future-proofing organisations by providing strategic and operational frameworks for dynamic and sustainable growth. He has worked across life and pensions, private healthcare and general insurance, holding senior roles in digital strategy, customer segmentation, marketing, data analytics, research and proposition development.

Leigh is a frequent speaker at leading business conferences on topics including artificial intelligence and the role of insurance companies in the smart home and has worked for several blue chip financial service companies. Leigh now works as a Senior Consultant for Consumer Intelligence.

consumer intelligence

MICHAEL LEBOR
Chief Marketing Officer / SVP, Strategic Innovation: AmTrust Financial Services, Inc.

Michael sits as the CMO of AmTrust Financial Services. AmTrust Financial Services is a Fortune 500 global insurance corporation offering Commercial Property and Casualty, Warranty, Specialty Risk and Program Insurance products for small- to medium-size businesses. He leads his team to maintain and develop company's web presence and oversees all online assets, digital commerce, and traffic generation platforms. His current initiatives include building consumer-facing platforms that allow policyholders and new customers to interact with AmTrust in a seamless and efficient manner. Michael is working to bridge the start-up creativity and innovation, at the scale and efficiency of an international corporation. Early in his career, Michael acquired Flower.com and began creating what was then a revolutionary ecommerce platform.

AmTrust FINANCIAL

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OUR INDUSTRY LEADERS

NICK AYRDON
Head of Aviva Futures at Aviva

Nick Ayrdon runs Aviva Futures which looks at the development and launch of next generation propositions for Aviva's UK general insurance customers. His team harnesses insights from consumer R&D to understand emerging demand across mobility, connected technology and services to drive changes to existing and new products.

Nick has held a variety of positions within Aviva, across procurement, business change and strategy and previously worked for Exxon Mobil having graduated in history from Nottingham University.

SHAUN WILSON
Business Development Manager at American Family Insurance

Shaun Wilson joined the American Family Insurance business development division in early 2016. He brings over 18 years of experience starting and growing businesses across a number of industries, including finance, real estate, healthcare, and technology. Shaun has experience developing commercial real estate in the multifamily and healthcare sectors as well as residential and commercial construction. This background, combined with his roles with data and technology start ups, positioned him well for the role of Business Design Manager, with a focus on building connected home business models at American Family Insurance. He brings a ton of curiosity and optimism to his work as he grapples with how technology and data can help create great experiences and a better future for American homeowners.

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OUR INDUSTRY LEADERS

SIMONE MACELLONI
Marketing R&D at BNP Paribas Cardif

Passionate for Innovation, with a strong Marketing & Sales orientation consolidated in many transversal engagements. I strongly focused on product and service innovation in the Financial Services Sector, identifying market and client needs, driving organizational change, developing methods and building strong internal and external (cross-industry) network of relations. My orientation to transform businesses through digital and technology is supported by a strong IT and Operations background matured as business consultant at IBM and leading International projects at Cardif. Managing several complex projects, I enhanced soft skills to drive people, work with complexity and manage cross-organization teams. Now I'm leading a Unit dedicated to generate Cross Selling opportunities for the BNP Paribas Group in Italy.

BNP PARIBAS

TONY LAUDATO
Vice President of Partnership Solutions at Hannover Re, and Founder of TDJ Systems LLC

Tony joined the Hannover Re Group in July 2012 and is currently leading the Partnership Solutions Group, which supports carriers' web, mobile and digital strategies. In addition to working with carriers, Tony's team works with high-tech distribution companies and insurtech players, vetting their technology and helping them gain access to insurers.

In his 25 years in the insurance industry, Tony has worked in product development, pricing, risk management, distribution, consulting, and strategic planning. Prior to joining Hannover, he served as Chief Actuary for The Newport Group and as Chief Product and Innovation Officer for Transamerica's Clark Consulting business. His additional industry experience includes roles such as lead pricing actuary for Lincoln Financial Group's MoneyGuard product and Chief Actuary of Lincoln Financial's Executive Benefits business.

Tony graduated from the University of Hartford with a degree in applied mathematics. He is a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries.

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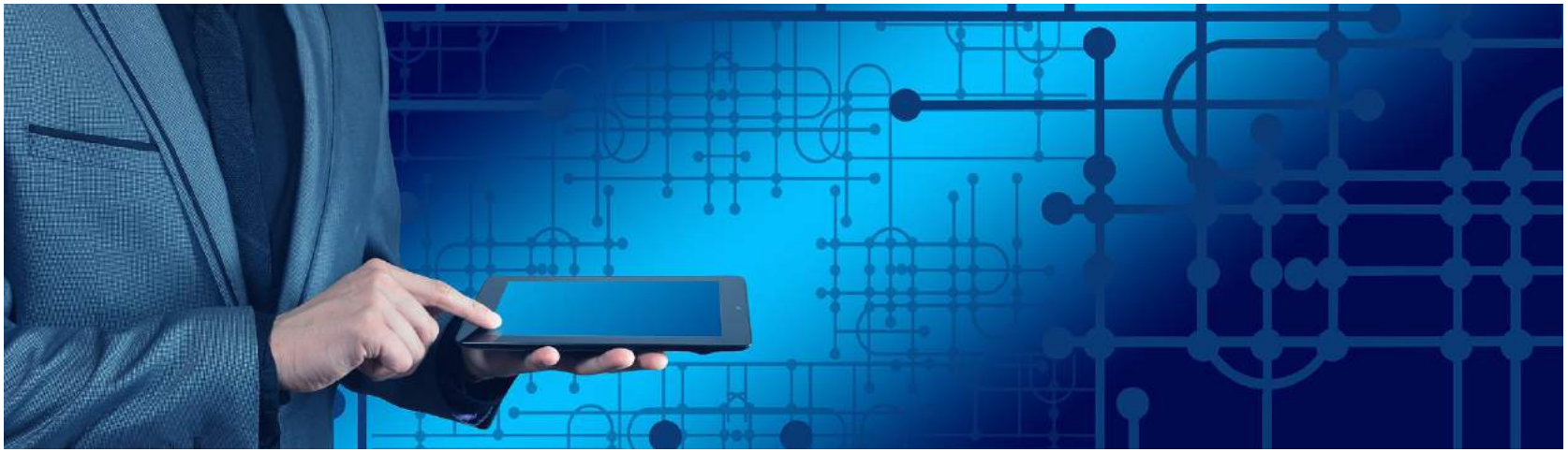

500 RESPONDENTS WORKING IN INSURANCE AND RELATED INDUSTRIES

This report was partly based on a survey of 500 people working in insurance and related industries. Our respondents deal with the issues thrown up by connected insurance daily, and their responses give an up-to-date picture of the industry as it enters the digital maelstrom that is reshaping one industry after another across every sector of the global economy. ›

Figure 0a

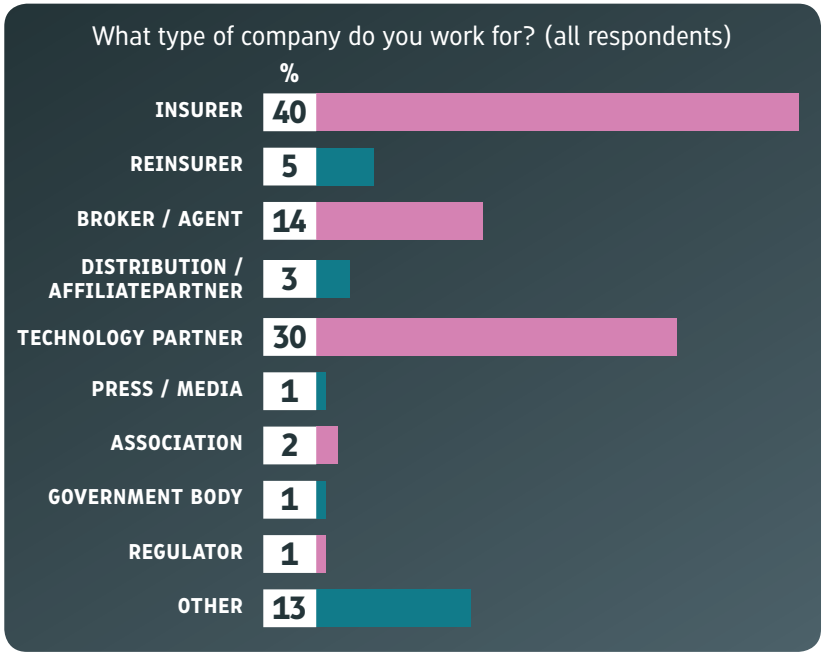

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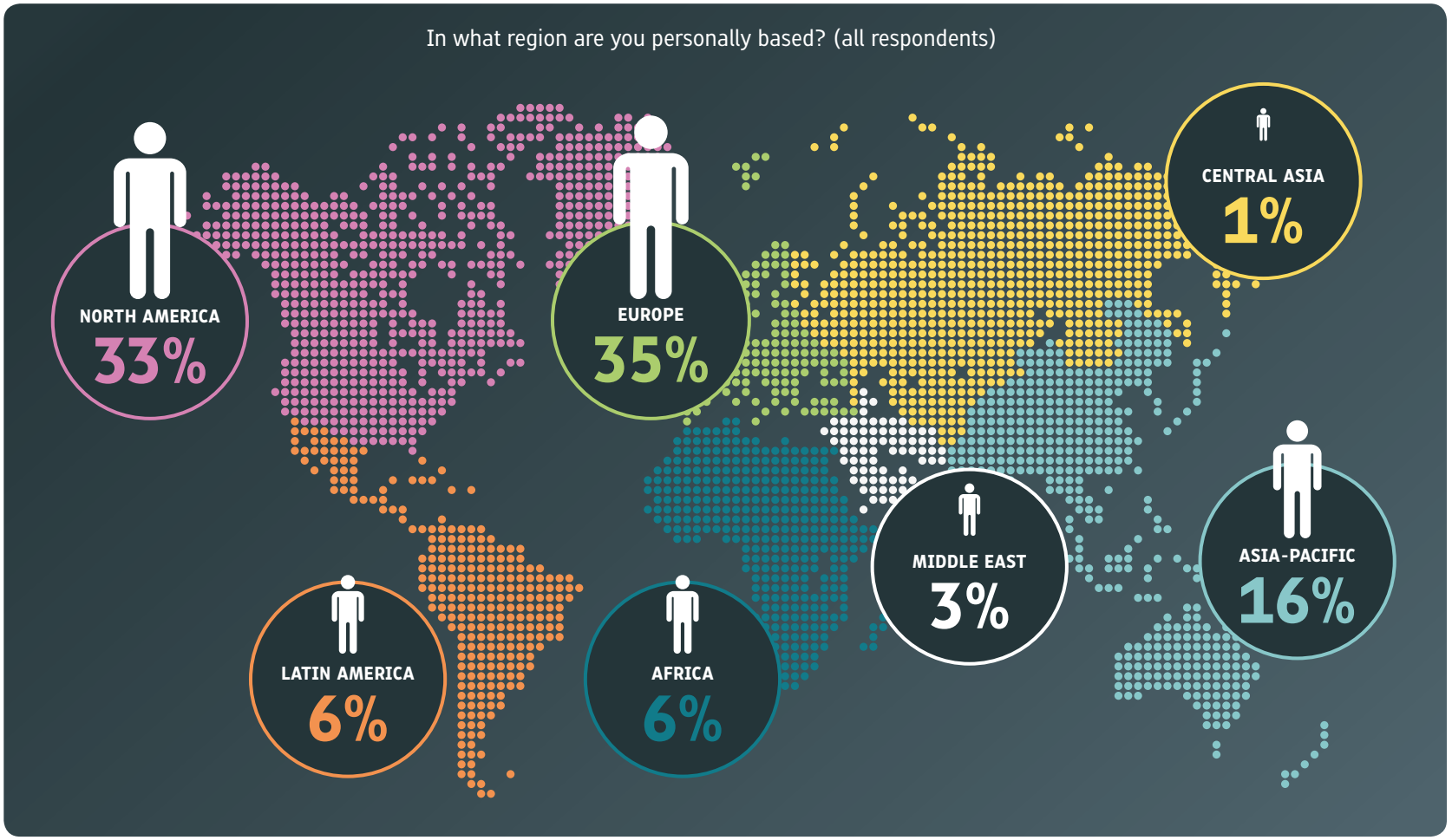
Figure 0b



› NORTH AMERICA, EUROPE AND THE REST OF WORLD

Connected insurance is developing first in the markets of Europe, North America and North East Asia, with important branches in Australasia and South Africa. This is where the value of premiums, the breadth of demand, the expectations of customers and the availability of technology are aligned, and so it is where companies are beginning to compete on the new terrain. This was reflected in the geographical scope of our survey: a third of our responses came from people working in the North American industry, a third from Europe and a third from the rest of world. ›

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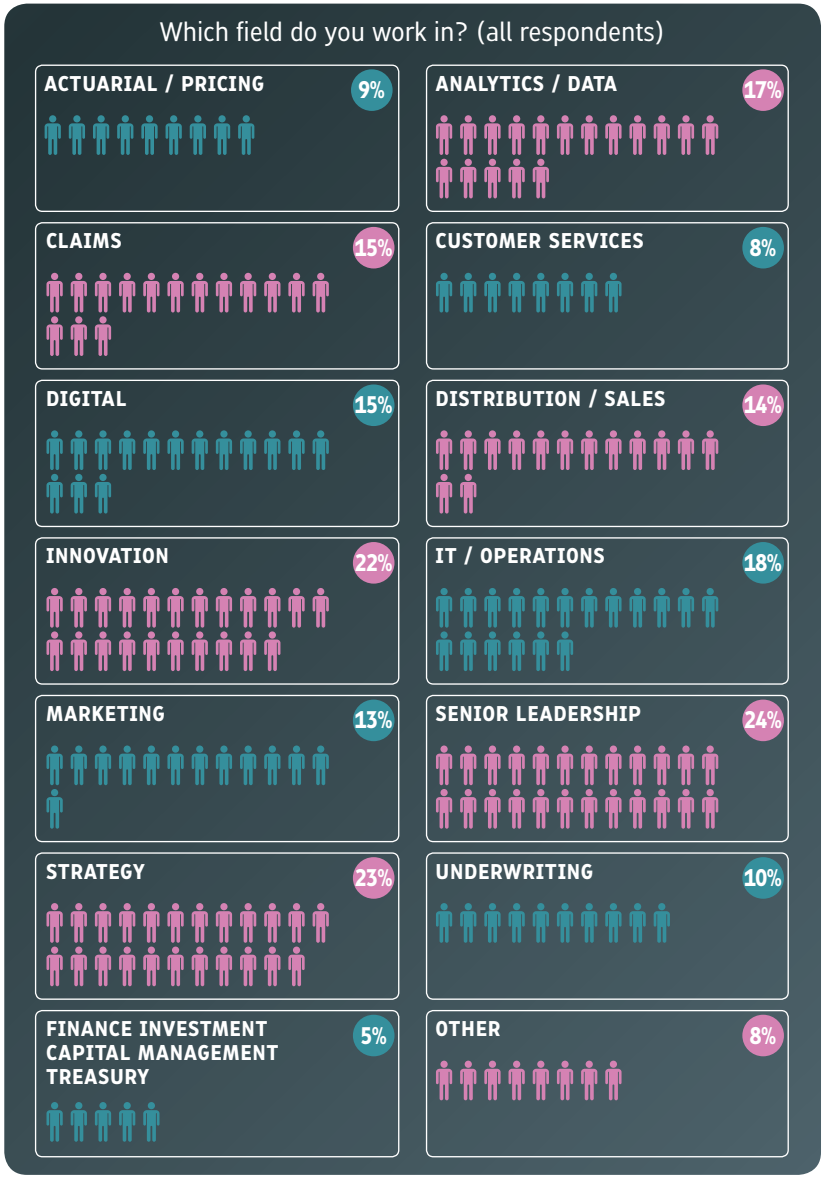
› PERSPECTIVES FROM THE INSIDE AND OUTSIDE OF THE CHALLENGES FACED

The largest group surveyed are, naturally, those working in insurance and reinsurance, who make up more than 60% of our sample; the other main category, almost a third, is accounted for by insurers' technology partners, who see the industry from the outside. They can measure the gap between what companies would like to know about their customers, and what they can find out given the present state of sensors and networks. The technology and systems people are well placed to say what the latest software and architecture can do with companies' stock of static, archival data and the influx of dynamic data they are dealing with now, and increasingly, in the future.

DIVERSE VOICES FROM ACROSS THE ORGANISATIONAL STRUCTURE

One of the striking features of digitalisation in general, and particularly connected insurance, is that it is a cross-company process. In a sense, everyone potentially has something to gain and to lose from the transition to new technology, so everybody is involved, whether they realise it or not. Although some people are expected to make strategic decisions as part of their job description, in practice connected initiatives can come from any department, and any grade of management. Often it comes from enthusiastic advocates who are seized by the possibilities or can see advantages that will make their department's work easier. Sales, marketing, claims, underwriting and the actuarial sectors are all likely to operate in new ways, and should each have a voice in the discussion about the company's digital/IoT strategy. The spread of respondents horizontally (by department) and vertically (by management hierarchy) reflects this fact. ›

Figure 0c



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› INSIGHTS FROM SECTORS AT ALL STAGES OF THE INNOVATION JOURNEY

Motor

Another peculiarity of connected insurance and a theme that runs through this report, is that lines appear to face diverging futures. Vehicles were one of the first kinds of insurance risk to be controlled using continuously recorded data, and the employment of telematics is further advanced here than anywhere else (although still a small proportion of the total number of policies sold, outside Italy). So, it is not surprising that the largest single grouping among our insurance-based respondents were from auto.

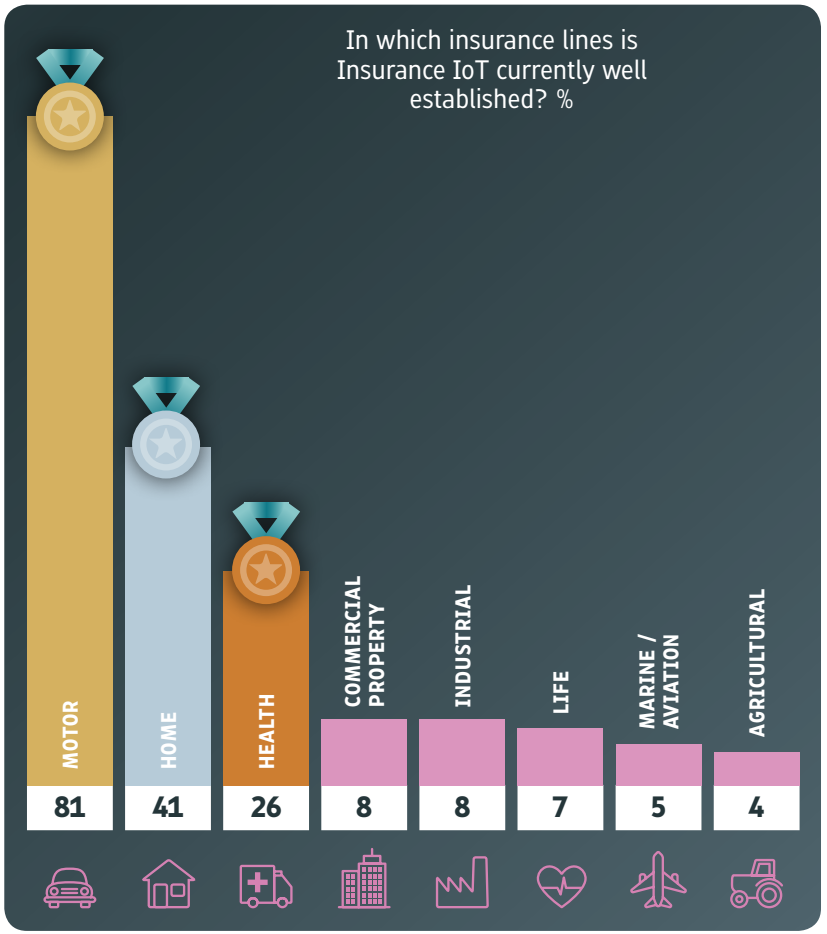
Home

The second largest group is made up of people working in the homes line. Whereas auto insurance is expected to dwindle as the IoT makes cars safer, demand for services in this sector is expected to grow as sensors are adopted in the home, and insurers work out what that means for their business models. Unlike vehicles, where most of the data relates to their velocity, location and condition, much of the homes data is vaguer and more "sociological", and therefore harder to turn into actionable intelligence. The report looks at how companies are seeking to fit the connected home into an adapted business model and a wider ecosystem of services.

Health and Life

The health and life groups have been relatively slow to respond to IoT, but we expect these lines to be one of the most deeply affected as the technology, social trends, economic forces and demographics all converge. For example, the maintenance of wellness is likely to become an ever more important goal, shared equally by insurers and the insured, as populations age and the cost of healthcare provision increases. It was therefore important ›

Figure 0d



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ABOUT OUR RESPONDENTS

› for the balance of the survey that we captured the views of both groups.

This report brings together our survey data and our in-depth interviews to create a 360° picture of the insurance industry as it begins its transition from a 20th-century industry that relies on analogue systems and manual processes to one that is based on digital system, enhanced by automation, AI and machine learning, and based on access to a quantity and quality of data that would have been unimaginable 20 years ago. Clearly, digital insurance is going to create digital insurers, and they may not look much like the companies that we have become familiar with over the past several hundred years. This report seeks to explain the scale of the challenge posed by this transition, and the ways companies can adapt themselves to meet it. ■

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1

A Theoretical View of IoT in Insurance

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1.1 IOT MEANS MORE DATA, LESS CLAIMS & LESS COSTS

When changes in technology improve productivity, the question inevitably arises as to how those gains are going to be shared out between an industry's value chain and its customers. In the case of insurance, this boils down to the extent to which access greater volumes of better data will translate into a fall in the cost of claims, a shrinking of premiums and a reduction on the insurance "float" (that is, the reserves of customers' money that a company holds).

Amid the uncertainty over the impact of IoT on insurance, there is general agreement that it will lead to a reduction in the number and the average size of claims for those players who are able to make business sense out of the data they collect from connected devices. For example, smarter cars, homes and workplaces are going to be safer, so the volume of claims will fall; and the more accurate data there is about how an accident, the less likely it is that a claim will be inflated. That said, there is significant disagreement over how that fall will affect the entire industry, and how the experience will differ depending on the line of insurance being offered.

Often the insurer could act without the clients even filing a claim

Cecilia Sevillano, Head Smart Homes Solutions, **Swiss Re**

1.1.1 IoT data doesn't lie: quick, objective claims management

One consequence of the spread of IoT-enabled policies is that the insurer will often know what has gone wrong before the client does, which reduces the possibility of claim inflation. Cecilia Sevillano, Head of Smart Homes Solutions at Swiss Re, gives the example of an escape of water or a burglary in a house that has a leak detector and sensors that detect intruders.

Cecilia Sevillano: "This opens the possibility of what we call 'active claims'," she says. "Often the insurer could act without the clients even filing a claim, because it would know everything in advance. We know that the longer it takes people to file, the higher the probability of fraud, because they get time to think about how to build it up. When it's immediate, it's genuine and spontaneous. If I spill some coffee or wine over the carpet, I'm going to take a short film or picture, message it to the insurer and get my money immediately."

Sevillano's point is backed by empirical evidence from BNP Paribas Cardif, which launched a home telematics product in the Italian market back in 2013, alongside its traditional offering. Simone Macelloni, Head of Marketing R&D at the company, says a comparison of telematics and non-telematics claims shows that the former is up to 20% lower.

What is true of the connected home is even more true of the connected car. The modern automobile is something of a best-case scenario for connected insurance, largely because it is a much simpler and more controllable environment than a house, and the quality and quantity of its telematics allows a much higher-resolution picture of it to be built up.

Carbone's data backs up this point.

Matteo Carbone: "Over the past five years or so, I've been lucky enough to work directly with insurers and telematics service providers who together account for more than 80% of the 14 million telematics based policies (size of the global insurance telematics market at the end of 2017). Of course, I've seen many pitfalls but also extraordinary successes. There are some Observatory members that have been able to reinvent their claim process to exploit the full potential of telematics data. These insurers are sending near real-time data to their claims ›

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› handlers showing precise reconstructions of the crash dynamics through telematics enriched with contextual data."

Among the advantages Carbone has observed are:

- The increased use of preferred body shops for car repairs
- Reduced claims settlement time and loss adjustment expenses
- Improved claims evaluation and more accurate "reserving" of money to settle them
- The minimisation of inflated claims and fraud

Carbone adds that these players are also delivering a better experience to their claimants and can offer enhanced support after an accident, including faster settlement of claims, partly because they are able to have more confidence that they are accurate. This last point was underlined by Insurethebox, a subsidiary of insurer Aioi Nissay Dowa Insurance Europe, which was founded in 2010 to bring telematics to bear on the auto line. This company demonstrated what telematics could do in 2016, when it used data collected by black boxes to expose a £500,000 insurance fraud.[2]

1.1.2 Prevention and change of behaviour

One of the most controversial issues to crop up in our interviews was the newfound ability of insurers, to not only continuously monitor the risks they are managing, but also influence them in real time, reducing the likelihood of claims occurring. The IoT Insurance Observatory has identified two main ways that companies are doing this: one is to intervene in real time if IoT data indicates that a client is getting into a risky situation, and the second is to adopt a more indirect, educative approach to promote safe behaviours.

> Some people call it prevention. I see it as empowerment of customers
>
> **Nick Ayrdon,** Head of Aviva Futures, **Aviva**

Regarding the first category, Nick Ayrdon, now Head of Strategy & Development at Aviva, puts the case like this:

Nick Ayrdon: "In the home, IoT is already enabling customers to avoid bad things happening to them. Some people call it prevention. I see it as empowerment of customers. In the past, that's only been available to big businesses: sprinkler systems and CCTV systems for example. IoT is shrinking that down to make it affordable and mass-market."

Swiss Re's Sevillano goes even further. Safety, she says, is the "bonding element" in IoT's emerging value propositions.

Cecilia Sevillano: "We are shifting from a claims-handling business to a prevention one. And the willingness to pay for actually preventing things from happening is much stronger than buying insurance that just pays out when there's a claim and maybe there will never be a claim."

Some of our interviewees have given compelling examples what can be done in the second category. South African insurer Discovery Health developed the seminal Vitality health insurance programme, which takes into account clients' activity levels, as measured by their fitness tracker. One of Discovery's products actually gives its clients an Apple watch at no upfront charge, and then sends them weekly performance targets to offset some or all of their repayment costs.

The idea is to use the watch to measure the client's weekly "Vitality Active Rewards goals". If they meet all four of their weekly goals in a month, that month's payment for the watch will be refunded in full. Discovery has found that these targets work best if they are "personalised and dynamic", as the company's ›

[2] https://www.ft.com/content/a1b082b8-2d80-11e6-a18d-a96ab29e3c95

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› website puts it. When members miss goals, the weekly goal will start to drop, thereby nudging them to get active. And when they meet their targets, the bar starts to rise, to maintain the sense of challenge and improve fitness even more.

Another company that has successfully launched a product that seeks to influence as well as indemnify is Insurethebox. Jonathon Valentine, the company's Head of Innovation, says it is already using telematics to make driving safer.

Jonathon Valentine: "We've got real-time monitoring in terms of accidents but we're taking it a step further to driver coaching, making sure that you're aiding that driver in real time, rather than waiting several weeks before sending them an email or a text message. That's where this whole new 'telematics 2.0' comes in, in terms of actually using them not to just price customers but actually to change their behaviour."

1.1.3 Self-selection bias

The IoT Insurance Observatory keeps a record of case histories that show how companies have demonstrated the material benefits from the self-selection of risk. One clear fact to emerge from this is that, at any pricing level, clients attracted by IoT policies are those with lower risk profiles, and the more comprehensive the monitoring, the greater is the self-selection effect. This is, of course, also testament to the extra help that IoT gives to marketing departments when it comes to highlighting a product's features and the kind of storytelling that can be woven around it.

Leigh Calton" "The people that are happy to share data with the insurer are the good risks anyway."

So, good drivers will opt for a telematics-based policy that monitor how quickly they accelerate and decelerate, how often they break the speed limit, as well as the physical dynamics of a crash. On the other hand, bad drivers will stick with a traditional, "not connected" policy. Similarly, people who prefer the gym to the pub will seek rewards for their healthy behaviours, and will opt for life insurance products that takes their resting heart rate into account, and people who make a point of checking that all their doors and windows are locked before they go to bed, have their heating, ventilation and plumbing systems regularly serviced, have fire alarms upstairs and down and fit their own leak detectors will be happy to share their peace of mind with their insurer. ›

The people that hare happy to share data with the insurer are the good risks anyway

Leigh Calton, Senior Consultant, Advisory, **Consumer Intelligence**

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› 1.1.4 Challenges in acquiring the data

It is perhaps not surprising that the successful stories in reducing risk with IoT solutions seem to have occurred with automobiles and home. For these lines, insurers can focus their attention on a few well defined KPIs, which they can plug into actuarial models and test against real life. The process of gathering data and using it to offer an enhanced service is clear with the home line. In the French market, many insurers are selling professional security and safety services to their home insurance clients even though the annual fee for the service and cost of renting the devices is frequently higher than the annual premium. In this way, the French insurance sector has shown that several approaches can work, from comprehensive bundles of services to more targeted offerings, and have been able to influence the home safety and security market.

Many insurers in other markets we talked to have given home sensors to their staff as an initial move, and others have gone on to set up volunteer pilot schemes, although here, as already noted, there is a need for control of self-selection effects and the reliability of preventative actions. Then there is the example of Neos, the first mover in the UK market; its progress is being tracked closely by other companies (partly because it operates in English rather than French). Although opinions on its significance vary, it has already attracted a £5 million investment from Aviva, the UK's largest insurance company.[3]

Several interviewees expressed the view that the home line was lagging, and that the value proposition was "just a hypothesis". One issue that cropped up in many discussions was the cost and reliability of IoT sensors, and the question of "who would pay for them". Then there were doubts about whether the devices were able to warn insurers and homeowners about an event before it occurred. On top of this, there are lively concerns about the "Big Brother effect" of allowing an external company to "know how often you go to the toilet in the night", as one interviewee put it.

A huge part of smart home technology, for us, is that is just has to work

Shaun Wilson, Business Development Manager, **American Family Insurance**

You could take the view that these objections reflect the relative immaturity of the home and property line. After all, the smart home industry is itself in its infancy, and is suffering the usual teething troubles with the interoperability of devices and the unfamiliarity of buyers with what is being offered to them. It is also apparent that there is a definite appetite for smart speakers, the industry is forecast to reach annual sales of $12 billion by 2023[4] We will be examining the complex question of insuring a connected house in later parts of this report, but here we would like to point out some of the issues that insurers must take into consideration.

One point is that companies will have to take their place in a smart home ecosystem, rather than offering an independent, standalone product, so they will be relying, to some extent, on other companies to keep the promises they make to their customers.

Shaun Wilson: "If we're going to deploy devices, customers are unlikely to call the device maker if they have a problem with their device; instead, they're going to call American Family Insurance. And tech support isn't something we've traditionally done. A huge part of smart home technology, for us, is that it just has to work."

He adds: "Three quarters of what it takes to get a good connected home insurance solution deployed is not inside a carrier's wheelhouse, so you have to partner with people. And then you must be very mindful of service levels, because you're trying to make a customer safer and happier, so they stay with you longer."›

[3] https://neos.co.uk/neos-series-funding-announcement/

[4] https://www.prnewswire.com/news-releases/118-billion-global-smart-speaker-market-forecasts-to-2023---issues-related-to-connectivity-range-compatibility-and-power-300587621.html

› Another consideration that insurers must keep in mind when deciding what to offer customers is that it must have "depth". What it should not be, according to Consumer Intelligence's Calton, is a traditional home and contents package with added sensors.

Leigh Calton: "If I'm critical, I think that's still probably where a lot of insurers' heads are at. They kind of think that's what connected home insurance means. Whereas, for me, in my experience and in all the research that I've done, talking to customers as well, it must be something fundamentally different that really creates value for their lives. Because if we're just going to badge traditional insurance 'connected homes' and send someone a sensor, then it's not really going to work."

Matteo Carbone: "We've already seen many trials in which a company has given a basic device for free," he says. "Well, this doesn't work in the home line, just as fitness riders haven't worked in health contracts: people don't turn on the device or they stop using them after a few weeks. Insurers have to focus on the services; the device is only an instrument to make the services work better." ›

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› 1.2 REINVENTING THE CUSTOMER RELATIONSHIP

Calton and Carbone's comments prompt questions as to how an insurer might change its offering to add value, particularly when it comes to home insurance. The balance of opinion among our interviewees was that more data is needed before the worth of home sensors as a means of preventing claims for water, fire and theft can be ascertained – particularly when it is the insurer that is paying to have them fitted.

Matteo Carbone: "We need to consolidate experiences with different data sources and different processes in different geographies to address the insights. We must compare like with like if we're going to be able to quantify the benefits. But we have been demonstrating that a professional security and safety system with 24/7 service is able to deliver value to the homeowner, and so we can charge fees for delivering it. This has been demonstrated in the French home insurance market."

However, insurance is not just about offering the most comprehensive cover at the keenest price point. As Enrico Mastrangeli, Business Innovation Manager at Ontario insurer Commonwell Mutual, explains, there are three axes to an insurer's differentiation strategy.

Enrico Mastrangeli: "You typically have your low-cost leader as one, then you've got your product superiority or niche as another, and then the third is customer intimacy. So, when you look at that spectrum, it's quite admirable if you want to be an expert in all three, but that's not realistic – for example, sometimes customer intimacy costs a bit more, so that comes into conflict with being a low-cost leader."

So, what does IoT have to offer a company that is looking to establish the superiority of its offering and to become closer to its customers in ways that they genuinely value?

1.2.1 Changing expectations

How many of the additional services that are being made possible by the IoT should be provided by an insurance company? If so, how does that company make a return on its investment? And a more fundamental question still, does a deepening of the relationship with customers imply that an insurance company should become something more than a provider of cover on a periodic, arm's length basis? These questions are being debated within the insurance community, and it's fair to say there is a wide spectrum of opinions.

1.2.2 New ways of interacting

One company that may give a clue as to the industry's direction of travel is Canadian insurer Desjardins, which has launched a service called "Alert" that is offered to all home policyholders. This consists of a single detector from Californian company Roost that combines a water, temperature and humidity sensor. ›

A THEORETICAL VIEW OF IOT IN INSURANCE

› Boris Collignon, the Vice President of Strategy & Innovation at Desjardins, describes it as a very small device, easy to install, that can be attached to the home Wi-Fi network and positioned close to a washing machine or toilet.

Boris Collignon: "if the humidity level is too high, or if there is a leak, then you receive an SMS or an Alert on your app. Our own perspective is that we're trying to increase customer engagement and at the same time reduce claim expenses in terms of their severity and frequency. But currently our major focus is on customer engagement, especially with Alert, because we wanted to bring peace of mind to our members and clients. We hope that Alert will also translate into a reduction in claims, but for the time being we do not have the data to prove it. But we didn't want to wait to see if these kinds of devices have an impact on the claims side before entering. So, firstly, it's about client engagement and the peace of mind of the customer, and then we'll see if there's an impact on the claims side."

Not everyone agrees. A spokesperson for the sceptics is Andreas Braun, Head of Global Data and Analytics at Allianz, who adopts an attitude of icy realism to IoT-enabled insurance.

What we see is IoT being a desolate collection of failed proofs of concept

Andreas Braun,
Head of Data & AI,
Accenture Europe/ ASGR

Andreas Braun: "We started developing connected homes, car, and health back in 2014, but until now it's more marketing and data collection than anything else. So far, it remains a quite significant investment with little returns. Thinking backwards from the customer, two obvious use cases were home security (e.g. intrusion and hydrocele detection) and support for care-dependent people (such as the elderly). We soon identified prevention and mitigation as the upcoming theme in insurance, as pure UW doesn't give you relevant uplift. But we found many problems, plus data protection and GDPR became an issue. Moreover, we found big competition from major tech players (Apple, Amazon, and many others) who are active in the connected home. So what we see across the board today is IoT being a desolate collection of failed proofs of concept."

Jac Amerell, Corporate Controller at Blue Cross Blue Shield of Michigan, is less categorical than Braun, but makes a similar point.

Jac Amerell: "It's nice to have home devices that can monitor your elderly parent and tell you when you're driving too close to somebody or turning too fast. That technology is phenomenal, but when you try to put it in the context of a larger business model with an end-to-end perspective, how does it fit in? How do you connect all the pieces? How do you drive the greatest value for the enterprise as well as for your shareholders from that technology?"

On the other side of the argument are companies that believe intuitively that insurance companies ought to be able to find new ways to offer customers peace of mind and accept Mastrangeli's argument that this can act as a differentiator in the market place, build customer loyalty and ultimately allow companies to create a platform from which to offer further services in the future.

The champion for this viewpoint is Carbone.

Matteo Carbone: "The Observatory has done a deep dive into all the success stories based on the sensor usages in the insurance sector, from auto insurers with millions of devices on the road, to the niche players who are scaling up their pilots on workers' compensation. I would argue that we've discovered things that are impossible to understand with a superficial outside–in ›

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› perspective. The source of success that is common to all these experiences has been the ability to sell services to policyholders. A few insurers have been able to put in place a platform strategy that is providing them with additional revenues from third parties. It is unbelievable, the negotiation power an insurer can have. It can obtain services at a fraction of the price customers can, partly because suppliers are of course very happy to be introduced to its customer base. So, by combining fees paid by the customers and partners' contributions, these insurers are offsetting all their IoT costs, and in some cases realising positive margins."

1.2.3 Managing the customer relationship

Carbone's insights are particularly interesting given the general lack of agreement on the best way to install IoT equipment in the home. Frank Fripon, the General Manager for Strategy at Belgium's KBC Insurance, gives the "astonishing" example of a Dutch company that became so frustrated with its customers' unwillingness to buy their own sensors that it decided to spend €1 million and provide them with free units, on the understanding that it would have access to the data generated.

Frank Fripon: "What that experience teaches is that, even if a customer gets it for free and engages them self to exchange the data from the sensors, 50% didn't activate the package. And the Dutch market is an even more digitally driven market today than the Belgian market."

This illustrates the truism that people attach less value to things they get for free, but it also poses the question of how sensors will be fitted if you can't give them away.

Shaun Wilson of American Family Insurance is clear that the nameless Dutch company's approach was wrong in principle.

Shaun Wilson: "We've learned from our pilots that it is not a good idea to give these things away. The customer must have some skin in the game, otherwise they ascribe much less value to it. On the flipside, they're not going to pay full retail just because you tell them that we can do good things from an insurance and protection standpoint."

Wilson's solution is to look for discounting deals with device makers, and to then pass on some or all that price reduction to the customer along with a "compelling offer" of extra services that are enabled by the devices. This is a solution that Fripon endorses, partly on the belief that the presence of IoT devices, together with a smart hub, will generate demand for services that do not exist now, but will emerge as people adjust their lifestyles in response to the new technology, as has already happened with, for example, smartphones and ride hailing services.

Simone Macelloni of BNP Paribas Cardif brings an alternative viewpoint. As mentioned above, his company's home telematics product is enjoying first-mover benefits in the Italian market. He says BNP has built up a business model that embraces the ecosystem idea by teaming up with other companies that want to bundle an insurance offering with their own products.

Simone Macelloni: "We have a business model that I think, personally, gives us an advantage, because it's linked and integrated in other business models," he says. "We want to be the partner selected by other innovative industries selling our products. We are a good partner for companies that want to grow their set of services, so their value proposition can include insurance." ›

› 1.3 NEW PRICING MODELS: THE AUTO EXPERIENCE

1.3.1 Individualised policies

The pricing of IoT-based insurance has been like a ghost following us through all the interviews. It has been always present but difficult to photograph from a value creation perspective. On the one hand, the availability of abundant data about the risk insured ought to allow underwriters to calculate a unique price for that risk based on objective criteria. But how should they choose the criteria? What weight should be given to each factor? And how should changes in premium be implemented?

1.3.2 Risk scores

As usual, the clearest case is presented by the auto line, which has the best telematics, the most abundant data, and – in theory – the clearest correlations between that data and the risks covered. The IoT Insurance Observatory puts the case like this:

Data doesn't lie

Michael Lebor, Chief Marketing Officer / SVP, Strategic Innovation, **AmTrust Financial Services, Inc.**

Matteo Carbone: "The only mature approach on pricing based on IoT is auto. There are six or seven players at global level that have been able to obtain a decent new risk model integrating IoT-based risk factors on the traditional model. Those more granular risk models are better at assessing the risks and are more accurate in predicting the losses."

Davide Devietti Goggia, the head of Turin-based Reale Mutua's automobile division, explains insurers' starting point.

Davide Devietti Goggia: "By behaviour I mean the usual five KPIs: acceleration, cornering, braking, the kinds of roads you drive on, and when you drive on them. I collect that data on an aggregated basis every week, and I can use to discount or to increase your premium. You can do it quarterly, weekly, monthly, once a year."

There is more to it than that, of course. Michael Lebor, Head of Marketing and Innovation at US insurer AmTrust International, says insurers face two types of risk: one is based on events and the other is based on the claims, by which he means fraud, both in the application for a policy and any claim later made on it.

Michael Lebor: "It used to be, when you wanted to get personal auto insurance, you'd call up your carrier and they'd ask you a bunch of questions such as, how many miles do you drive every day? And you would say 'I drive three miles every day'. But in fact, you drive 30, through urban areas. So, pricing had to be increased as part of the actuarial calculation to account for lies and inflated claims. But data doesn't lie; phones don't lie. GeoTelematics and all the diagnostics, they don't lie. So, we can price it better because we don't have to deal with the lies anymore. One of the two types of risk have become de-risked using these IoT devices, and I think that's going to be transformative over the next couple of years."

1.3.3 Value creation and renewal pricing

The assumption underlying the discussion so far that that there is a positive correlation between accuracy in price determination and the creation of value, both for insurers, who will have lower costs, and for customers, who will have lower premiums.

Matteo Carbone: "This approach hasn't worked as of today because people would like to know the exact premium they will pay to insure their car; they don't want a formula. They don't want a fair price. They want to save money. This has been the experience of those insurers who are offering a telematics-based policy with an up-front discount and a usage-based policy with a ›

› variable premium depending on how the customer drives. They have found that it is the guaranteed up-front discount that attracts the business, not the usage-based one. All the players with a mileage-based tariff have been able to acquire only the customers that almost never uses their car. It may be that a niche approach may be more interesting for a start-up looking for an unique selling point than for an incumbent."

A second way to make those risk models generate some value would be for an insurer to assess the telematics data at the underwriting stage. This approach means treating a driver's "score" the same way loan companies treat an applicant's credit rating. This may allow a more accurate risk model to be used when calculating the quote. This way, the value is created through:

- Positive selection, because the insurer can attract the best risks for each pricing level and send more risky clients to competitors with less accurate rating systems
- Premium leakage minimisation, because each policy is priced more accurately. This effect would be lower than in the previous use case, but it allows the client to be offered a individualised price.

As of today, this approach has remained wishful thinking, owing to a number of factors, such as the difficulties of establishing the basis of cooperation between insurers and car makers, the absence of a market standard, and technical problems in handling the data. On the other hand, we can expect these difficulties to diminish as the market becomes more mature.

A more effective way to use the new possibilities in compiling the risk model may be to adjust the price at renewal. Insurers simply proposing a renewal price to each customer based on the data collected on the previous year. This is typically a discount for good drivers and a promise to not to add surcharge for bad drivers.

Matteo Carbone: "Compared to a product with only an up-front discount, this approach create additional value and increase the retention of lower risk clients at any pricing level. The Observatory carries out periodic mystery shopping exercises in the various markets and it looks as though the sale of the product is more relevant to the first-year price (which attracts the up-front discount) than the promise of potential saving at the renewal.

"When there is an intermediary – the dominant channels for the purchase of auto insurance in many western countries excluding UK and The Netherlands – the renewal mechanism is frequently not mentioned at all. So, I have a lot of doubts about the ability to generate a positive return on investment by any premium discount of 20-30% at renewal for lower risk clients in markets where the annual churn rate is 15% or lower. Those clients are not going away, and you don't need to shrink your premium so much to retain them." ›

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› 1.4 SHARING THE VALUE BETWEEN EVERYONE

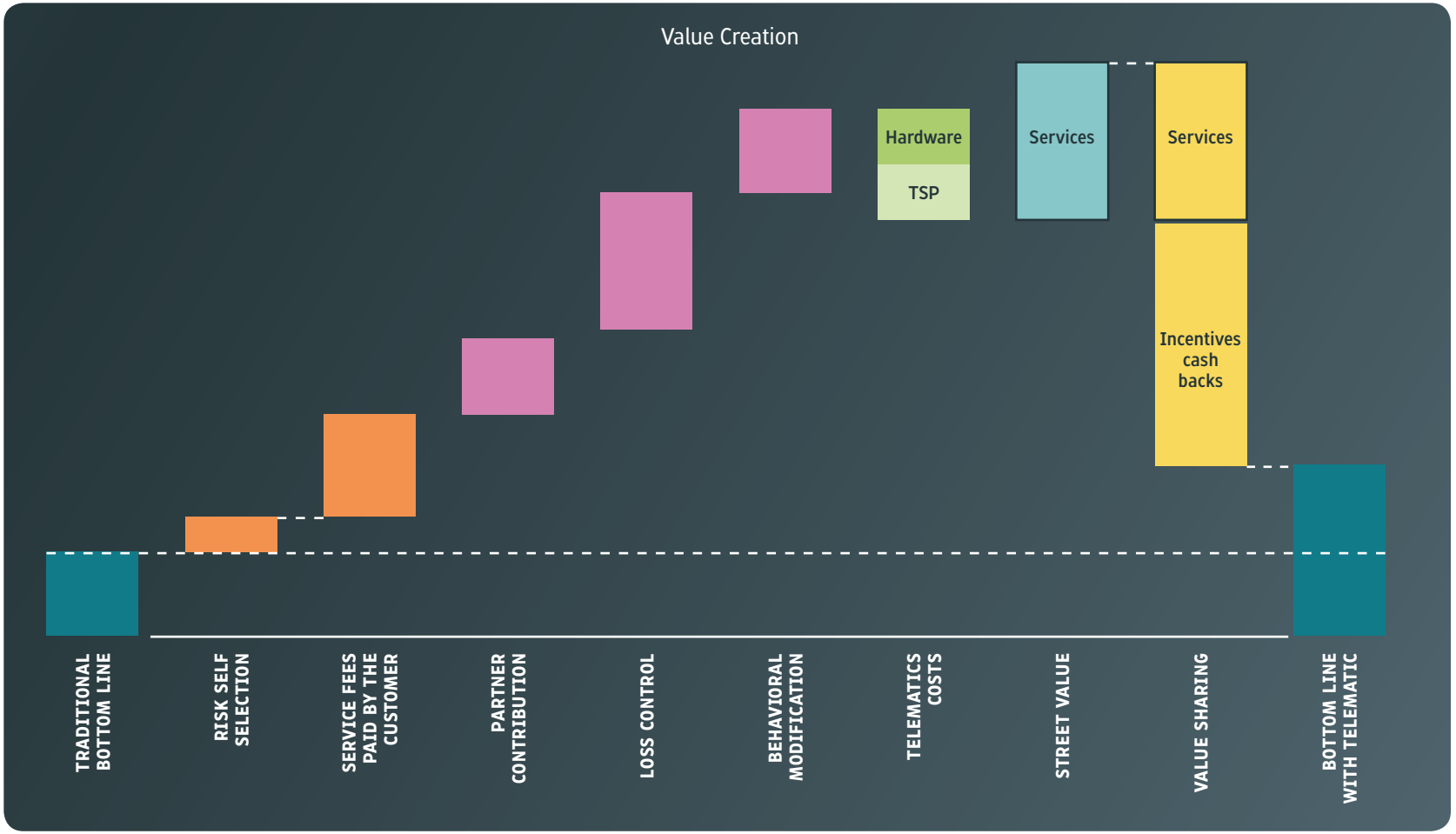
If there was one universal principle to emerge from Insurance Nexus' interviews, it was that for a business strategy to succeed, it has to offer something to everyone. Ideally, a company's strategies should aim to benefit the insurer, its partners in other industries, the consumer and regulators concerned with the wider public good. At the most basic level, a successful marketing campaign must convince customers that they stand to benefit by accepting an IoT devices into their home, car or office. This point is even clearer if expressed in the negative: if clients develop the impression that the sensors are there to give the insurance company grounds to disallow a claim, they are unlikely to be enthusiastic about fitting them.

A guiding principle for carriers looking to grasp what this means in practice is offered by Jenny Trueman, Head of Connected Homes and Product Development at Direct Line Group (DLG). The key is to look at the question from the customer's viewpoint, and to look for ways to tailor an offering to the individual needs of each customer, or potential customer. As with Fripon and Wilson, she argues that the most likely outcome is a reduction in premiums and a growth of services. What DLG has found in the pilot schemes it is running is that the focus is going to be on "how can we help you to understand more about the way you use your home that makes you safer" and any technology installed should be about "improving their experience of their homes rather than just giving them a different price".

Some of the specific initiatives discussed by our interviewees demonstrate this "everybody wins" approach: Discovery Healthcare's Vitality programme cuts the cost of claims, improves the health of policyholders and brings multiple benefits for the wider society by enabling more people to lead productive lives. Much the same is true of auto policies that encourage safe driving. ›

A THEORETICAL VIEW OF IOT IN INSURANCE

Figure 1a



› This point is underlined by data collected by the IoT Insurance Observatory, summarised in *figure 1a* above. The black bars show how much money accrues to the insurance company by such things as risk self-selection and the reduction in claim inflation, and the yellow shows the cost of adding incentives.

Matteo Carbone: "The opportunities to enhance the interaction frequency with customers, to compile knowledge about the customer base and its risk profiles, and the positive effects on society, are all great. But honestly, IoT insurance is all about value creation, improving the insurer's profit and loss, and the sharing ›

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› of this value with the customer to deliver a superior value proposition."

He adds that the Observatory's experiences across the sector has shown that:

- Successful IoT value propositions bundle insurance with services based on IoT data
- The data needed to deliver services also "naturally" improves assessment, management and risk transfers, and thereby create value
- This value can be shared with the client through discounts, incentives, enhanced and additional service delivery and "cashback" offers

This unique competitive advantage for the insurers compared with any other service provider, according to Carbone, is linked to the amount of risk insured. The bigger the difference between insurance premium and service cost, the higher the potential of the insurance IoT solution.

He also underlines the point that this can work in the home line.

Matteo Carbone "If we think about the average cost of home insurance in Europe, around €300 a year, it's clear that this is the toughest challenge to European insurance strategists. To compete when the annual cost of IoT services is at the same level as the insurance premium is difficult, but it can be done, as has been demonstrated by the French smart home insurance market. What's more, there is a terrific opportunity to go further when you have homeowner insurance premiums at more than $1,200 as it is in today's US market. I'm bullish about the chances of smart home insurance take off in the next five years in the US." ■

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CASE STUDY: VIVID AND ZURICH MUNICIPAL (PART 1)

Allison Whittington: "One concrete example of how an insurance company can improve the lives of its customers came from a rather unexpected source,"

This was Allison Whittington, Head of Housing at Zurich Municipal, who has just conducted an experiment in partnership with Hampshire housing association VIVID.

The idea was to fit a range of sensors in the homes of volunteers, as well as some flats that were being refurbished prior to being let. This was an example of blue sky research, since all parties to the experiment were simply curious as to what they would find out. ›

› Allison Whittington :"We used leak detectors, motion detectors, temperature sensors, humidity sensors and another one fitted on windows and doors to monitor if they open,"

Among the findings that emerged from the experiment were a number that were early indicators of problems that could lead to claims. For example, one type of leak detector showed that some flats had leaks in washing machine connections, which might eventually turn into a claim if the structural integrity of the building were to be affected. The detectors also showed up toilets that were continually running water into the cistern.

Allison Whittington: "We're talking about the poorest in society in social housing. So, if they're on a water meter and they're continually pouring water down the toilet, that's a waste of their money. There is a wider issue that, if a toilet is blocked for some reason and the home is vacant for a period, then the water can't drain away and so may flood a bathroom."

Another finding had a less direct link to insurance claims but had a significant impact on the welfare of tenants and duties of housing associations. A combination of temperature and humidity sensors showed that some residents were living in low-temperature, high-humidity environments.

Allison Whittington: "That's perfect for damp and mould conditions, which is unpleasant to live in and damages the property." One flat belonged to an elderly lady whose heating system wasn't working properly. VIVID replaced a radiator and the double-glazing, rebalanced the radiators, and the result was "a warm, damp-free happy home. So that elderly lady is now living in much better conditions and actually has a lower fuel bill because she's no longer trying to run her heating in a way that doesn't work."

A final unexpected finding was that the unoccupied flats that were being refurbished were completed more quickly than expected. The reason seems to be that once the contractor carrying out the work found out that motion detectors were in the property, tradespeople arrived earlier, had shorter breaks and left later in the day. This resulted in flats being finished ahead of schedule which meant they could be let sooner than would otherwise have been the case.

In principle, some of these results could be replicated at owner–occupied properties, if residents were willing to share their data and at least some of the cost of fitting sensors with their insurer-cum-facilities manager. Now, this degree of "intimacy", as Mastrangeli puts it, seems a bit of a leap for many homeowners. However social attitudes are as subject to change as anything else that encounters IoT, and it may be that having one's domestic systems monitored by a third-party, will be just another Spotify-like service to be opted into using one's smart speaker or home hub. ■

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2 The State of Play

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THE STATE OF PLAY

This is the second of our five reports on how the coming of the Internet of Things is changing the global insurance industry. In this part we look the effect telematics is already having on the industry's four main lines, auto, home, health and life and commercial, and we include four detailed case studies of a pioneering programme in each of these areas. All face a fundamental change in their environment, but each seems about to follow divergent evolutionary paths. We conducted more than 20 in-depth interviews, a global survey and detailed case studies to find out which.

2.1 AUTOMOTIVE

The idea of putting devices in vehicles to record what happened to them began some 40 years ago with the so-called "spy in the cab": disks of wax that were fitted to commercial vehicles to check that long-distance drivers were keeping to the rules on taking rest breaks. These analogue devices, which became mandatory for certain classes of European vehicles as long ago as 1986, were replaced 20 years later by equally mandatory digital data loggers, and the age of vehicular telematics had dawned.

Those primitive beginnings have evolved into a sophisticated suite of sensors and chips that detect, record and transmit a vehicle's speed and acceleration, its location in time and space and other relevant little details, such as whether a driver is attempting a dangerous manoeuvre, such as trying to operate a car and a smartphone at the same time. And speaking of smartphones, much of the same information is automatically recorded by their GPS sensors and accelerometer chip. The data from these sources, once cleaned, normalized, and interpreted, can be accessed by remote computers. In the future that data may be part of an environmental network that includes street furniture such as overhead lights, other cars and other phones, and anything else that ends up being part of the Internet of Things (IoT). Technology is redefining everything.

2.1.1 Survey statistics for auto insurance

The automobile industry is where connected insurance started earliest and has made the greatest inroads. Some 78% of motor insurers who responded to our survey said they had a connected product on the market: 10 percentage points more than life/health or home, and 28 more than commercial. Only 13% of respondents said their company had yet to make its mind up about whether to proceed with a project, whereas 31% were at the pilot stage, 25% had begun to wire up their customers and another 31% were up and running. ›

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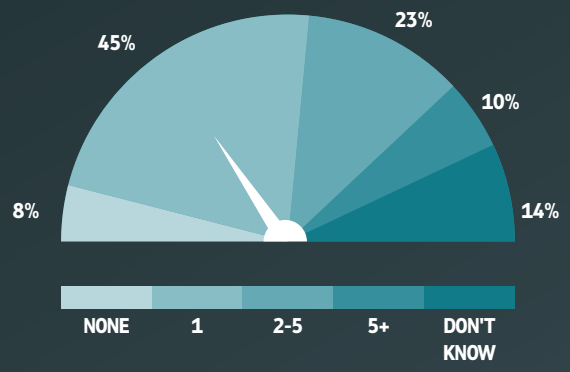
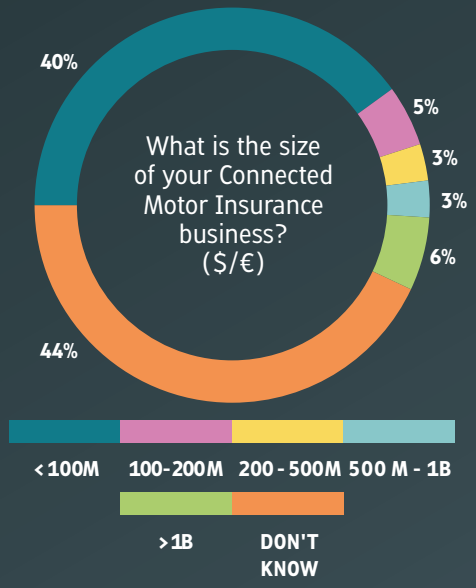
Figure 2a

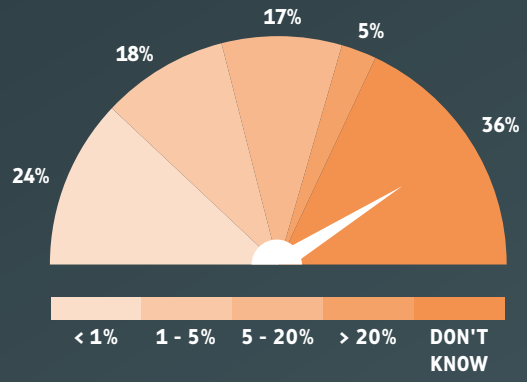
AUTO INSURANCE

How many Connected Motor Insurance Products do you have?

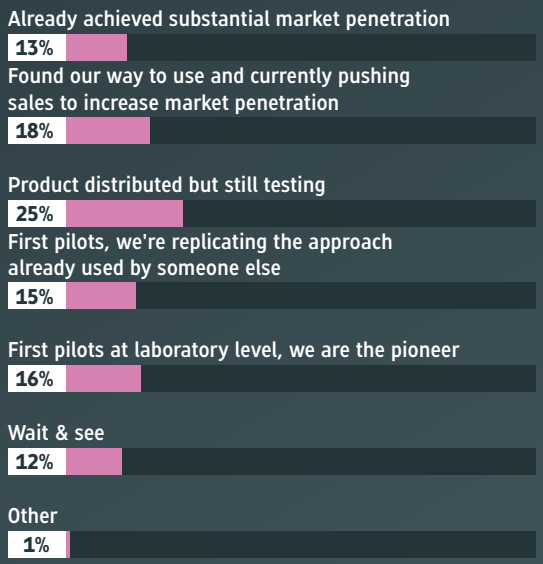




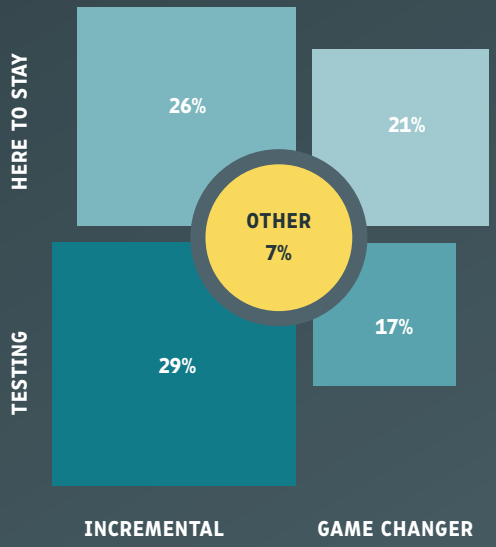
How much does this make of your total Motor Insurance line?



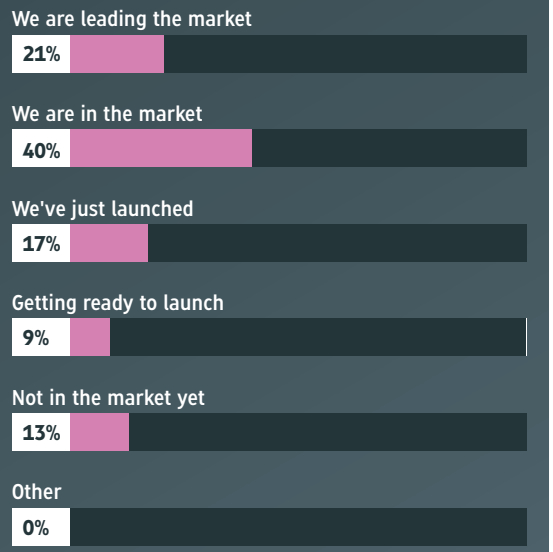
What level of maturity best describes your current Connected motor Insurance activity?



Is this product an incremental solution or a game-changer?



What is your maturity level compared with your main competitors?



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› That result reflects an industry consensus that the risks of not joining the telematics race are greater than those of taking part, particularly given the fact that 13% said their company had already achieved market penetration with a connected policy, easily the largest "success set" in our sample, and a powerful encouragement to their competitors.

Of those respondents who were able to comment on the absolute and relative size of their company's connected business, 9% said it had a revenue stream greater than $500m and 22% said this accounted for more than 5% of business (with 5% adding it was worth more than 20%). The finding suggests that the first movers in auto have been the ones best able to grow their connected product, and that telematics have already had an impact on their business models.

These responses give a statistical snapshot of the industry during this early stage of its accommodation with IoT. Two further questions tried to gauge the industry's subjective view of the overall importance of connected insurance, and the impression of individual companies as to their maturity level relative to main competitors.

When it came to whether the IoT had permanently established itself, the insurers' reply was "definitely maybe". Some 47% said it was here to stay and 46% thought there was still some doubt, only 7% being without an opinion one way or the other. In some ways, this result is surprising, given that insurers in Italy seem to have proved the business case in their domestic market (see below). The explanation may be the industry's opinion on whether telematics-based services will lead to an evolutionary transformation of the industry, or whether they are simply going to extend the playing area. Interestingly, 55% of those who responded thought that telematics would lead only to incremental change, compared with 38% that believed it would be a game changer.

That result is even more important based on the answers we received to our second question. We probed companies' sense of their own maturity with respect to IoT, 61% said they had brought a policy or policies to market, out of which 20% said they regarded them as being at the front of the pack. This is rather more than second placed health/life, where only 53% said they were operational, and comfortably above commercial, where only 43% of those who replied said their company had an IoT product in the market.

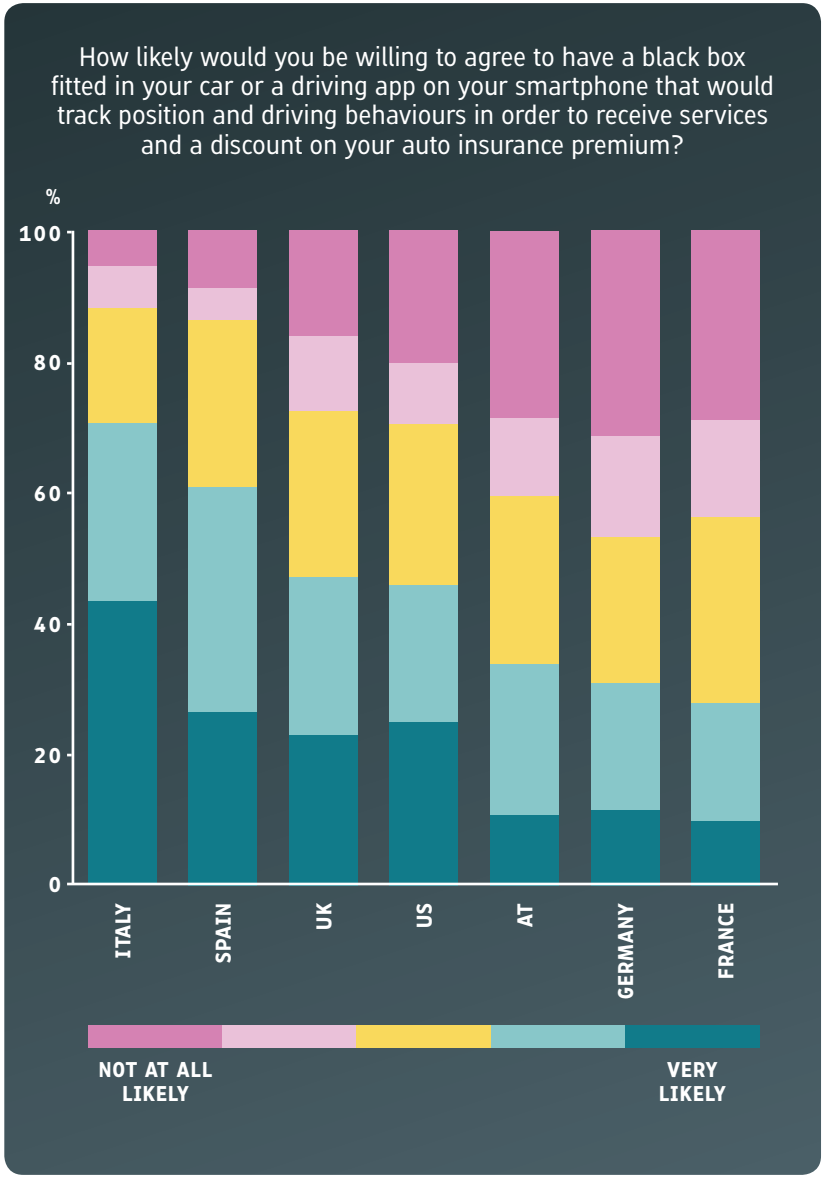
This suggests that the more companies in this line become acquainted with connected insurance, the more it seems like an enhancement of their existing business rather than its replacement; for health, by contrast, the opposite conclusion emerged from the figures.

2.1.2 The customer perspective

Before analysing the future possibilities for auto insurance, we should begin by looking at where the market is now, in terms of customers' expectations and motivations. The IoT Insurance Observatory carried out a survey of 3,500 customers in seven national markets to find out how they approached the problem of buying automobile cover.

Most drivers are accustomed to choosing insurance cover on a price basis: 56% of those interviewed said this was the most important factor in choosing an insurer, compared with 21% who nominated additional services and 5% who were influenced by the company's image ›

Figure 2b



› The graph above gives a breakdown of the willingness of drivers to opt for a telematics-enabled policy in return for a discount on the premium and the offer of additional services. The geographical differences are striking, with a clear majority of Italian drivers likely or very likely to sign up to a policy that allowed their insurer to access data from their car – a testament to the effectiveness of UnipolSai in selling telematics policies to its 10 million auto customs over the past eight years or so. However, we should note that even in countries where little has been done to prepare the market for telematics, as is the case in France and German, around a third of drivers are likely or very likely to accept a loss of privacy to gain the lower premium and extra services offered by telematics.

The result also reflects the initial degree of familiarity each market has with telematics, and indicates that customers' willingness to accept the bargain varies according to how well they understand what that bargain is. This then forms a virtuous circle, because the more data companies can collect from their customers, the better they are able to turn that data into improved or additional services. The provision of extra services then stimulates a growth in policies taken out, and increases the flow of data.

When it comes to pay-how-you-drive policies, the survey established some reference points for the level of reward necessary to incentivise customers. For example, 38% would go for a monthly discount, 26% would be content with a no-claims cashback deal, 11% would opt for a system whereby their good behaviour was tallied up and translated into a discount at renewal.

The lesson here seems to be that drivers appreciate immediate rewards for good driving but may not wish to feel as if their insurer is micro-managing them – the possibility of a small reward for going 100km without breaking the speed limit was attractive to only 7.5% of the survey. ›

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› It is, however, a different story with micro-marketing. Companies such as Neosurance are pioneering "sachet" policies that cover individual events in the life of a vehicle. For example, a customer may park their car in an unusual place in the evening, whereupon Neosurance sends a text offering enhanced coverage for the next few hours. This can be ignored or accepted with no more than three clicks on the smartphone screen. We can surmise that this kind of smart, personalised, situationally aware service will be attractive to customers who, because they own a smartphone, are coming to expect and appreciate all these things from service providers. Time will tell.

2.1.3 Early adopters: the Italian experience

In 2017, there were more than 7 million black boxes fitted to Italian cars as part of 38 distinct products. The result has been that one in five policies sold in Italy in the last quarter of 2017 involved telematics. UnipolSai, the largest auto insurer in Italy, has now achieved a 40% telematics rate on its portfolio, and it has pushed the entire market forwards in a remarkable way. To understand how remarkable, one must consider that country with the second highest rate of telematics penetration is the UK with 3.5% and the third is the US market with 1.4%. So, it is to Italy that we should look for a preview of how other areas will to react to the coming of auto-telematics.

A pay-per-use telematics offering overwhelmingly attracts people who don't use their cars much

Davide Devietti, Direction Auto-Planning/ Products and Scenarios in Auto, **Reale Mutua Assicurazioni**

The first result to be noted from this is that it is possible to achieve a significant reduction in pay-outs. Research by the Italian Association of Insurance Companies (ANIA), carried out in 2014, showed that companies' telematics portfolio had a 20% lower risk adjusted claim frequency rate than the non-telematics portfolio. This is partly because self-selection effects improved customers' risk profiles, and partly because insurers were able to offer other services on top of coverage against accident, which allowed a new level of customer engagement. What's more, the service fees paid by clients in return for these extra services offset the discount on premiums used to persuade customers to take up telematics policies: ANIA's data suggested that almost 40% of policies showed no top-line shrinkage.

Then there is the ability to introduce "pay how you drive" policies. Like many Italian insurers, Reale Mutua Assicurazioni relies on bespoke boxes developed by Octo Telematics, which also make it possible to offer theft and recovery, roadside assistance and a crash-recording services. The main commercial advantage, however, is that it allows the company to collect enough raw data to craft "money off for good behaviour" offerings by rewarding careful driving and awarding discounts to those who keep their vehicle in good shape by, for example, fitting snow tyres in the winter. Davide Devietti Goggia is the Director of Auto-Planning Reale Mutua. He points out that without the option of offering extra services, there is a danger that price becomes the main attraction for the consumer.

Davide Devietti: "Experience has taught Italian insurers that a pay-per-use telematics offering overwhelmingly attracts people who don't use their cars much, and like the idea of making large savings on their premiums. This raises the prospect of an insurer having to fund the high costs involved in moving to an IoT solution to sell its policies for less than it would have otherwise."

Finally, there is an increased ability to analyse accidents, establish the truthfulness and accuracy of claims and control the way repairs were carried out. Statistics compiled by the IoT Insurance Observatory showed a doubling of body shop use, an 11% fall in ›

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› material damage costs and an 18% lower incidence of injury claims.

As Carbone maintains, the basis of a successful IoT product is value sharing, so most of those wins for the insurer are returned to the customer in the form of the up-front telematics discount, with another slice going to the agents to compensate them for the loss of commission caused by that discount. The net result is a clear superiority of the telematics product for the insurer and their clients, and this in turn offers a kind of hidden bonus, in that companies that get their telematics offer right have a higher customer retention rate than their competitors.

2.1.3 The new relationship

As noted above, the principal motivator to take up a telematics policy is that they come with a discount. The evidence from Italian studies is that the higher the cost of the vehicle being insured, the more willing the customer is to opt for telematics, presumably because the percentage discount is higher in absolute terms. However, a study by Swiss Re, Unveiling the Full Potential of Telematics, found that for policies priced below €400 represented almost half of the Italian telematics portfolio for third-party liability insurance.[5] For these deals, the value of discounts is likely to be small (lower than the annual cost of the services), and it is the bundle of extra services that provides the incentive to take up the deal. The means that the provision of extra services is essential rather than optional

However, once the insurer takes on that challenge, it finds it has to manage a new kind of relationship, because rather than interacting with the customer only when the time comes to renew, or deal with a claim, it is continually "in touch" with them. Clearly, the opportunity is there to leverage that closer relationship to differentiate the company's offering, build brand loyalty, reduce the value and frequency of claims, market additional services

and "upsell" the ones it's already providing. But how should companies go about doing all of this?

Customer surveys in Italy, such as the one mentioned in section 2.1.2, suggest that the most attractive offerings are theft prevention and detection, car finding and maintenance reminders. Other possibilities that were looked on with favour included fuel efficiency recommendations, help with claim processing, location-based weather alerts and the automatic payment of parking fees and road tolls.

It is likely that some of these services will become standard elements in the telematics policy, particularly those such as car ›

[5] http://media.swissre.com/documents/unveiling_the_full_potential_of_telematics_italy_case_study.pdf

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› location that do not require much extra effort on the part of the insurer.

What is likely to catch the customer's eye are services that go beyond what the telematics do automatically. For example, an insurer can commission algorithms that squeeze more value out of the data that it has by doing such things as identifying who is behind the wheel from their style of driving. Another option for companies is to seek to combine specific data from an individual vehicle with general information about the environment. If the insurer knows that a customer's car is parked in an area that is about to be swept by the municipal authorities, it could send out an alert to inform them of the fact. Then there is the opportunity to partner with related companies, such as those providing roadside assistance. An insurer that wanted to prioritise that aspect of its offering might dispatch help to a car that has broken down, and handle all of the paperwork and logistics that ensue. A client in distress who is called by their insurer as soon as a breakdown occurs is likely to earn that client's gratitude when the problem is dealt with.

In the future, as cars become more autonomous, these services could be extended to include features based on "mobility as a service", such as car sharing. This aspect is discussed in more detail in section 5 of this report.

2.1.5 Choosing between a mobile solution or a telematics box

Many companies have adopted the smartphone as the provider of telematics data. This avoids the hassle and expense of fitting a bespoke "flight recorder" to the car, but it doesn't allow it to reconstruct crash dynamics. It also ignores the vehicle's integral telematics, which are comprehensive and sophisticated, and are on a development path of their own. A decision like this, one of the first that an insurer makes when designing a strategy, can have important consequences for how a system is able to develop in future.

One obvious issue with an app-based approach is whether it can offer real-time assistance in the event of an accident. Smartphones may not be well suited to this role, for the simple reason that they may generate false positives when they are dropped.

We needed to rely on that data

Jonathan Valentine, Chief Technology Officer, **ThingCo**

One of the insurers that has been most convinced of the advantages of fitting a flight recorder rather than relying on an app is Insurethebox, a subsidiary of Aioi Nissay Dowa Insurance Europe that was founded in 2010 specifically to exploit the possibilities of vehicular telematics.

Jonathon Valentine, its Head of Innovation, says the decision to go down the fitted-box route determined much of his company's offering. The key, for him, was to ensure the quality and reliability of the data, and the company was willing to pay whatever it cost to achieve that.

Jonathon Valentine: "We took the hit and went for the longer route, the more expensive route, because we needed to rely on that data. So, we fit the box onto the frame of the car so that we can guarantee the lack of vibrations and its tamperproof-ness. That allows us to provide accurate data to customers; it allows us to do accurate scoring. As soon as you can't guarantee the quality of your data, you start to second-guess your data, which means you might not use it to a full extent.

Valentine contrasts that with an app-based solution. "I think some companies have gone down a route where they fit the cheapest, ›

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› which is an app. For some approaches, apps might be okay. If you want to teach someone about telematics, an app is perfect because you're not really relying on the results.

That reliability is key if you expect to be relying on it in court one day. We found that if you want to be a full telematics player, you need to have a fitted solution. Because customers lie, they try and get out of things. Within a few weeks of Insurethebox going live we had people on the internet talking about how they get this box out of the car without anyone knowing. So, you need to make it as hard as possible to do that."

Insurethebox has already demonstrated Valentine's contention in a landmark legal case. This involved two motorists, one of whom claimed after he was rear-ended by an Insurethebox policyholder on a quiet country road in South Yorkshire in March 2013. The drivers denied knowing each other, but telematics data showed that the policyholder had visited the other claimant's home on more than 50 occasions. The case went to court in October 2015, and the claimant was ordered to pay Insurethebox £14,400 in costs.

Other claims disallowed since include a man whose car was in London when he claimed for an accident in Bristol, and a case in Dartford that showed a car circling the same two roundabouts several times before the brakes were slammed on, causing another rear-end collision. This claimant in this case was the director of an accident management company.

Insurethebox is so confident of the efficacy of its telematics that it claims to be about to detect the "vast majority" of fraudulent activity – a highly important fact for honest motorists, who pay around £50 a year to cover the cost of cheats, according to the Association of British Insurers.[6]

Insurethebox went live in June 2010, and is the UK's largest telematics (or black box) insurer. Its brands include Insurethebox and drive like a girl, and it also administers the Tesco Bank Box telematics offering.

The Japanese insurer ANDIE (Aioi Nissay Dowa Insurance Europe) acquired a majority stake in Insurethebox in March 2015. Together they are taking a leading role in the development of technologies that will change the face of motor insurance and the way we view the car.

2.1.6 OEM telematics

Another approach to vehicle telematics that avoids the app vs box dilemma is to use the systems that are fitted as standard on all new cars. The hope is that, sooner or later, insurers will not need to add another set of telematics to cars that already have hundreds of embedded and connected sensors as standard and can obtain the customer's aggregated and certified driving score at the instance of policy quotation. This scenario would solve many strategic problems with telematics, because the driving score would already be known up front by the insurer. The data management problem would also be simplified, because the insurers would receive a composite score that could be easily stored and would follow the driver in the manner of a credit reference.

One particularly convinced partisan of this approach is Andreas Braun, Head of Global Data and Analytics at Allianz. He argues that insurers should not even think about installing telematics.

Andreas Braun: "Car manufacturers build that into their car systems, into their car platforms. As it's in the car, it is much closer to the problem. You don't need to share the data at huge cost with an insurer, the car just avoids an accident". ›

[6] https://www.insurethebox.com/ground-breaking-victory-for-telematics-data-as-court-rejects-fraudulent-insurance-claim/

› The issue for insurers is that they could find themselves "disintermediated" by the car makers, who have large financial services arms to handle purchase loans, and now have direct access to data relevant to insurance pricing. BMW, says Braun, has been fitting sophisticated telematics systems since 2007 and it therefore has a data reservoir the size of Lake Garda. Now it sells insurance through Allianz, but clearly there is a possibility that it will at some point seek to monetise its data.

Currently there is little visible sign that car companies really want to become insurers – an experiment by the Ford Company back in 2000 did not go well – but rumours say some OEMs are thinking about it. However, insurers and manufacturers are both interested in the data, and it may be in both their interests to use it as the basis for collaboration rather than competition. Theoretically, car makers could make their real-time telematics, and their data lakes, available to insurers in return for fees. Yet few of the partnerships between OEMs and insurers trailed in the past few years have got as far as the market, and the few that have do not seem to have acquired much traction.

2.1.7 Conclusion

So, the technology is out there, and the customers are probably happy to go where it is leading, with a little explanation and persuasion. So, what does this mean for auto insurers? On the one hand, it should be possible to build up a picture of a person through hard data in a way that would be more difficult, and more intrusive, in other contexts. On the other, insurers find themselves somewhat behind the curve, both in terms of their own capability for collecting and processing data, and in the strategic know-how needed to design an approach to create value through this data.

One problem is the range of potential objectives. Careful drivers don't want to pay higher premiums because of "all the lunatics" they share the road, and the risk pool, with. And insurers want to offer more transparent pricing. But they would also like to reduce the likelihood of accidents, prevent fraud, engage with their drivers and sell more services by broadening their range of products or adding value to those they already offer.

In the next case study, we look at some of the choices, and the strategies, that are available to companies. We start with the best practices on the most mature market, Italy and afterwards focus on some of the recent innovations around the globe that provide the perspectives of players which are exploring different ways to make telematics come of age. ■

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CASE STUDY: DESJARDINS' AJUSTO PROGRAMME

North American insurance companies began using GPS data in their actuarial calculations about 10 years ago, when the General Motors Assurance Company offered discounts to drivers based on how many miles they covered. Over the years, many auto insurers have followed suit, and usage-based insurance (UBI) is now a normal part of many company's risk assessment systems – but it still represents a tiny fraction of the insurance book of businesses in Canada and US.

Quebecois financial services group Desjardins has been one of the first companies to fashion a product around telematics, rather than simply using data to enrich its existing policies. This was Ajusto, launched in May 2013. As the name ›

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› implies, an individual driver's payments can be increased or decreased depending on what they do in their car.

Initially, Ajusto depended on a small recording device that plugged into a vehicle's on-board diagnostics port. In 2016, however, Desjardins later switched to an app, developed in partnership with a company founded by two professors from the Massachusetts Institute of Technology. This uses the smart phone's integral systems to "score" a driver, based on how hard they brake, accelerate and corner. It also tracks their speed relative to the speed limit of the road they're on, the time of day and the distance travelled. There is no upfront discount, but the programme is free to join; once a driver has completed at least 100 days and covered at least 1,000 km, the data is used to award them discounts of up to 25%, which is applied immediately and retained forever, or until the client makes a change, such as buying a new car or changing address, which will then require a further period of analysis.

We wanted to increase value-added interaction with our customers

Boris Collignon, VP Strategy, Innovation and Strategic Partnerships, **Desjardins General Insurance Group**

The switch to an app has a few advantages for Desjardins. Firstly, the customer bears the capital cost of his smartphone, the operational costs of running and maintaining it, as well as the responsibility of connecting it to a data network. Secondly, there is the question of convenience: the insurer does not need to worry about delivering its own device, installing it, or getting it back if the customer breaks the contract.

A third advantage is that all interaction between customer and company is carried out through the app. For Desjardins, it is the app rather than the website that provides the main channel for interacting with the customer. This comes with the benefit that additional features can be rolled out with great efficiency, simply by updating the app.

Boris Collignon: "Our app, a 100% mobile-based UBI program, was the first of its kind in Canada, and one of the first of its kind in the world. We were convinced by the need to be mobile because we wanted to increase value-added interaction with our customers. Everything in our app was related to that."

Desjardins has been collecting data from smart phones for three years now, and Collignon says the experience has been a happy one: there are no concerns with the ability of a smartphone to supply data and the company's actuarial department has found it "very powerful".

How about the principal aim: increasing "value-added interaction"? In some respects, this has also been successful: drivers can check their app after every journey and find out how they did, which creates a continual relationship. They can also be alerted to potentially dangerous behaviour, such as checking their mobile while driving, which the app detects but doesn't score them on. ›

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› In other respects, Collignon says, Desjardins is still feeling its way.

Boris Collignon: "In terms of customer engagement, I don't think we have found the right recipe yet. We tried a few things that did not work, we will try others in the coming months and years. The company tested a couple of ideas borrowed from other parts of the digital universe. One was to set up a system whereby drivers could share their driving scores on social media, thereby establishing a friendly rivalry with other Ajusto members in the manner of fitness apps that record users' step counts. Another try was to award video-game-style "badges". These ideas did not appeal to a large part of the population. "We had some very hard gamers who were willing to earn badges, a lot of people were not that convinced of the potential."

Nevertheless, it has found that it is enjoying certain "first mover" advantages. One is that Desjardins has been able to collect more data than its competitors, which should lead to a better statistical picture of how variables are interrelated, and puts it in a better position to offer regular updates to the app. This, says Collignon, is how you stay ahead of the game. Boris Collignon: "That's why we went from the device to the mobile," he says. "What we learned with Ajusto was that we are not in a period where you can launch a product and then, after three or four years, launch a new version. We are constantly updating it. We regularly make changes to the algorithm." ■

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2.2 HOME

2.3.1 Survey statistics for home and contents insurance

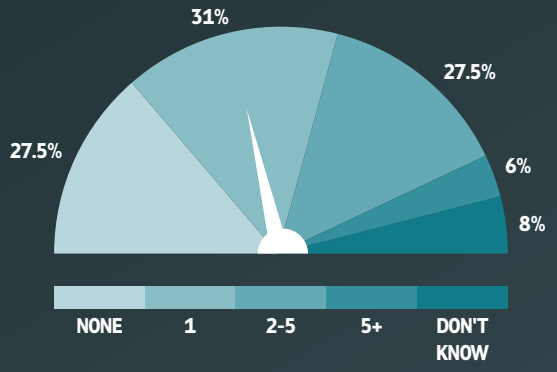
The survey results for home insurance tend to confirm what our interviewees told us: this sector of the industry is in full R&D mode, and few among them have arrived at hard and fast answers.

No fewer than 58% of respondents told us that they were engaged in a pilot project, of whom 55% said they were blazing their own trails. Another 14% had got as far as sending out sensors, but were still configuring, and only 14% reported that they'd found their feet in the market. Interestingly, only 2% of companies thought they'd really got on top of the process, only a quarter as many as the health/life line and less than a sixth as many as the motor line. ›

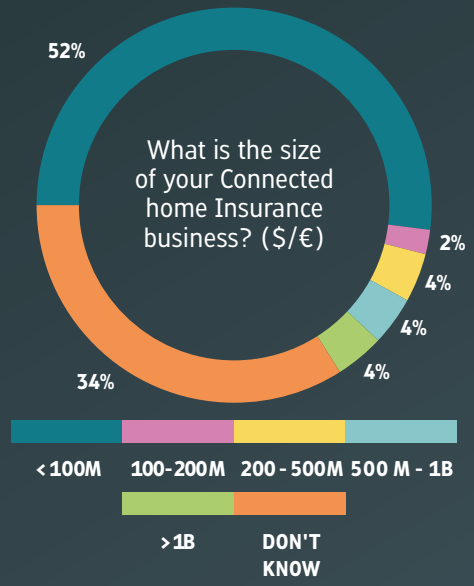
Figure 2c

HOME INSURANCE

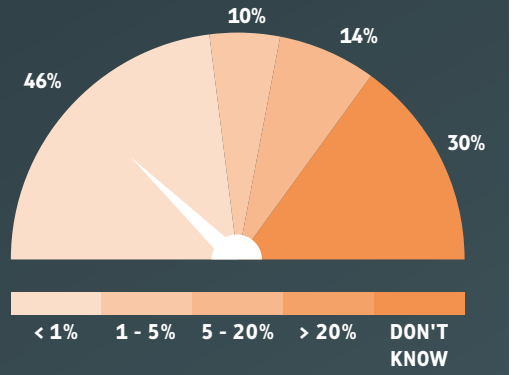
How many Connected home Insurance Products do you have?



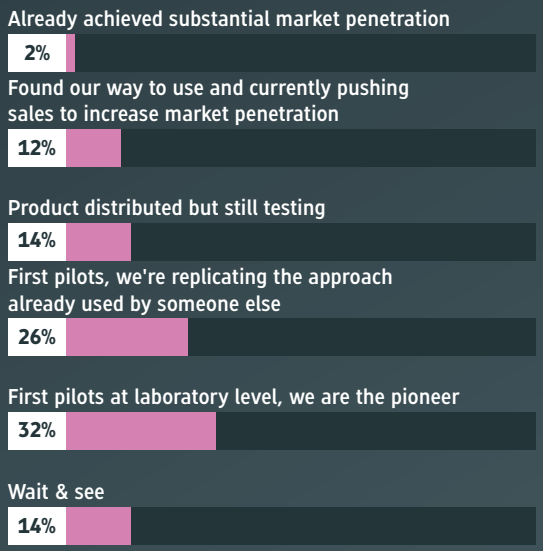
What is the size of your Connected home Insurance business? ($/€)



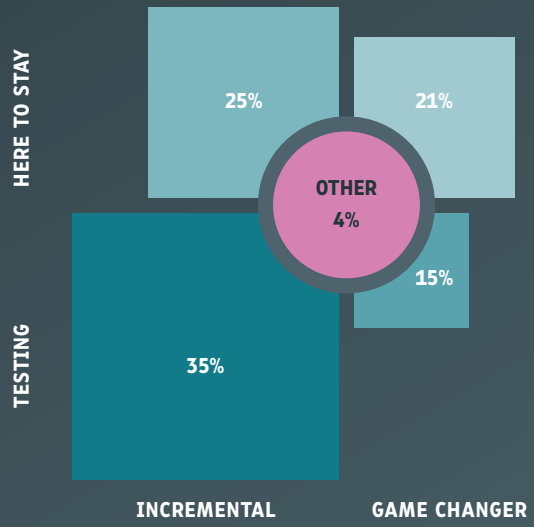
How much does this make of your total Home Insurance line?



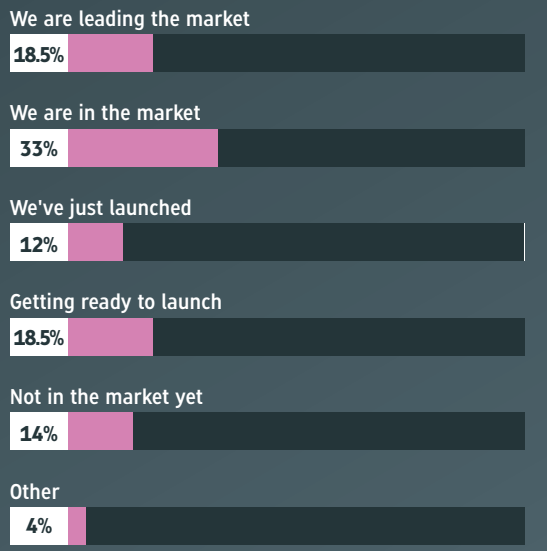
What level of maturity best describes your current Connected Home Insurance activity?



Is this product an incremental solution or a game-changer?



What is your maturity level compared with your main competitors?



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› This suggests that there is an overhanging wave of companies who are going to be coming to market in the next year or so, and the result may be a sudden rush of products being offered. This then poses the question of how ready the market is to absorb them, either technologically or psychologically.

Of all the insurance lines we looked at during the report, home was the one most tantalised by the potential and elusiveness of the IoT. This is also suggested by the research we did into attitudes to connected insurance. Firstly, respondents were the most likely of any line to see the IoT as leading to an incremental, rather than a transformative, change in their business: 60% felt that way, almost 22 percentage points more than in the health and life sector, however a substantial minority, 46% has made up their minds that it was here to stay.

I see a lot of new sources of data

Dan Campany, AVP Innovation, **The Hartford**

When it comes to how many companies are making headway in the market now, the survey reveals the existence of a breakaway group who have built up a substantial business based on connected policies. So, as with the more advanced sector of motors, 4% of respondents said they had revenue streams greater than $1bn associated with a connected product, and 14% said that between 5% and 10% of their total turnover was accounted for by one or more IoT policies.

On the other hand, the bulk of companies are somewhat behind the industry when it comes to percentage revenue: 46% said they earned less than 1% from an IoT product, 7 percentage points more than health, 13% more than commercial and 22% more than automobiles. This, of course, reflects the large number of small scale trials and pilots that are out there. Nevertheless, as already pointed out, the fact that there are so many small, but scalable, projects in development creates the conditions for a spectacular change in the industry in the future.

2.2.2 The main considerations for big data and home insurance

Dan Campany, Assistant Vice President for Innovation at Connecticut insurer The Hartford, puts forward the general case for insurers to take an interest in the connected home.

Dan Campany: "When I look at IoT from the perspective of an insurance carrier, I see a lot of new sources of data. And what insurance carriers do that differentiates us from other people is we crunch data and we understand how to connect that data back to risk."

What insurers have been struggling with, is what risks they can mitigate with that data. There are several related issues:

1. Homes are a lot more difficult to understand than cars or fitness trackers, which both supply a few KPIs in a reasonably structured way, making them easy to deal with from a statistical point of view, and amenable, in theory, to processing with artificial intelligence enhanced by machine learning. Home data tends to capture life in all its ordinary variety, and it can be hard to locate the signal amid the noise.
2. Very few homes have devices that collect data about their ordinary functioning, so the insurer must think of ways to get those devices into position, and how the cost can be justified.
3. The home is a private, intimate space in a way that a car is not. People do not, generally, like the idea of an insurers' computer logging their bathroom use.
4. There is a question mark over how the data collected can best be put to use, and whether there is any use for it at all in a conventional insurance product. ›

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› 2.2.3 What do sensors tell you?

The main selling point for Alert in Desjardins' marketing (see the case study at the end of 2.2) is enhanced peace of mind. At no extra cost, its customers can reassure themselves that their homes are safe when they are not present to look after them. This is a significant issue for many people.

However, in terms of claims prevention, the utility of the Roost sensor may prove to be limited. Firstly, it probably has no role to play in fire and theft. Secondly, it is not clear how effective it is in limiting or preventing water damage, which makes up roughly half of home claims in Canada; opinion among insurers is divided.

Leigh Calton, Senior Consultant at Consumer Intelligence, argues that insurers in the past have been a little naïve about what water sensors could do. For one thing, by the time most of them detect water, a leak has already happened, so although it may limit the severity of a claim, it won't prevent it. For another, it has struck some people that a simple sensor wouldn't really differentiate an insurer in the marketplace, or not for long.

Leigh Calton: "Insurers need to move on in their thinking to acknowledge that they need to be a bit smarter about this. I think the next stage that insurers need to reach is, can we use connected home devices to try to get all this new data on customer behaviour? And will this allow us to be able potentially to predict events before they happen? Now that's just a hypothesis."

One of the problems with this approach is that, in an ordinary house, it can take a long time to build up a picture of what everyone's routine is in sufficient detail to determine with any confidence what counts as a significant varying of those routines; and to build up that picture, an insurer would have to collect a lot of data, which is very likely to be an issue for its customers.

Against this, Calton argues that much can be deduced from a few sources. He gives, as an example of a flow meter rather than an escape-of-water sensor. This would tell an insurer when a house was occupied, an estimate of how many people were living there, and when they do something that involves water. And from that, it might be possible to deduce their working patterns, and how long they spend in the property. And all these things, which can all be derived from one sensor, might have a bearing on the household's risk profile.

Calton's argument is backed up by an experiment conducted by Zurich Municipal, based on a block of social housing in London. What it found was that the combination of temperature, humidity and water sensors could produce good indications that something was going amiss in a house, leaking toilets and washing machine couplings and malfunctioning heating systems all showed up in the data, and all might have led to claims in the future.

So, when we're looking at, for example, water sensors, on one hand they may be able to prevent some claims from happening because we can notify a homeowner that they've got a leak, and they can call a plumber and get it fixed and we don't get a big loss. On the other hand, we may be able to use data over time to understand which types of home and which kinds of area are having leaks, how those leaks manifest in claims and understand the characteristics of loss before that loss even happens.

The need to understand the value proposition is important for companies if they are to understand what kind of money should be spent on connected devices. Calton points out that the annual profit on a home policy without a claim is about £20, so a sensor that costs £60 will wipe out three years' profit, if the customer remains with the insurers. Nonetheless it can be done. Simone Macelloni, Head of Marketing R&D at BNP Paribas Cardif, says its policy is 20% higher than the non-telematics product, but ›

› cheaper than its rivals. That modest cost bump pays for two water-leak sensors, the cost of the delivery and will go towards the cost of the back-end platform that will manage them.

Now, there is room to look at what we know and draw different conclusions. This issue will probably have to wait until the situation develops before a consensus emerges. Dan Campany, the Assistant Vice President for Innovation at Connecticut insurer The Hartford offers a good summation of the state of play.

Dan Campany: "There's a whole category of IoT-related services that add value but aren't necessarily related to loss mitigation, like being able to manage and monitor your home. That's probably a bit more tangential to the insurance product, but maybe there's data that it would be useful for an insurer to have and in return we would subsidise some portion of the cost. It's not as strong of a connection point as, say, water sensors correlating with $100m of water losses every year on our homes book."

2.2.4 What do customers want?

Matteo Carbone, the founder of the IoT Insurance Observatory, provides a different perspective.

Matteo Carbone: "I have spent more than 200 hours in the past 18 months with the Observatory's members, discussing how the data from these home devices can be used, and what is happening in the different markets. From a customer perspective, many of the value propositions which appeared in the market in the last 18 months are not compelling in the home line." Some start-ups have shared their figures about the number of customers who turn on devices that they received for free, and they are not encouraging. "My view is that these don't solve the customer problem."

The Observatory has found that, for home insurance, the French market has established a best practice through its "telesurveillance". Here, some insurers have been able to sell additional services to more than 15% of their policyholders. One key value proposition is a professional safety and security system, sold to the customer for between €200 and €400, which includes the renting of the devices. These insurers provide a professional 24/7 remote monitoring service and an assistance service that can intervene if there is an alert.

Matteo Carbone: "At the Observatory, I did a survey recently which looked at the experiences of almost 5,000 customers in seven different markets, and it showed how the French value proposition could fit with other Western insurance markets."

The potential is particularly big in the US and Canada because the size of the homeowner insurance premium allows insurers to use the same data needed to deliver services to obtain quick wins through loss control that is, prevention, mitigation, and the improvement of the claim management process. There is also the chance to influence behavioural change, as discussed in the first part of this report. According to Carbone, this value creation approach will allow insurers to share part of the value with customers and intermediaries to speed up the adoption of home IoT policies. ■

CASE STUDY: DESJARDINS AND THE ALERT PROGRAMME

Earlier in this report we described Canadian insurer Desjardins' pioneering programme to create an engaging motor insurance offering based around a smartphone app. It has also fashioned a complementary scheme based on connected objects, in which policyholders are eligible for a free water, humidity and temperature sensor.

The Alert system is intended to both offer customers increased peace of mind and reduce the frequency and severity of claims. Desjardins decided at an early stage not to go for a "fast-fail," toe-in-the-water approach. Instead, it took the plunge and offered the service to all its policyholders, but only if they asked for it. The cost of the programme was limited by offering a relatively inexpensive sensor, made by Californian company Roost, and one that was easy to fit without calling in a tradesperson. This meant that there were certain limitations, such as no automatic shut-off valve in the event of a leak. And, as with the Ajusto car insurance programme, all communication is channelled through an app.

The scheme went live in March 2017, and so far, Desjardins is gauging its impact. Yet, the jury is out on how much the system affects the number of claims, relative to the control group who did not fit the sensor. However, Boris Collignon, the Vice President in charge of Strategy, Innovation and

Strategic Partnership, says the company's polling of its customers suggests that Alert has added lustre to the Desjardins brand.

Boris Collignon: "The uptake is very good; we're very satisfied with it. Nevertheless, it's a massive deployment and we are learning a lot on that. One interesting thing, it has had a very positive impact on our image." ■

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Our industry leaders

About our respondents

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A theoretical view of IoT in insurance

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The State of Play

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Practicalities

SECTION 4
The Insurance Tech Stack

SECTION 5
Long-Term Future Opportunities

SECTION 6
Conclusion

2.3 HEALTH AND LIFE

2.3.1 Survey statistics for health and life insurance

The statistical picture of the health and life region of insurance is, in some ways, diametrically opposed to that of auto insurance. Whereas 78% of auto insurers have at least one IoT product in the marketplace, and 6% of them have already built up revenue streams worth more than $1bn a year, no health or life company has broken the billion-dollar threshold, and only 8% are taking in more than $100m. And although 30% of companies do have an IoT product in their portfolios, this is 20 percentage points fewer than the auto line. ›

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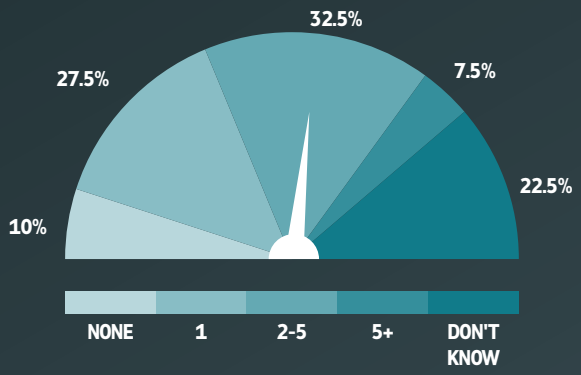
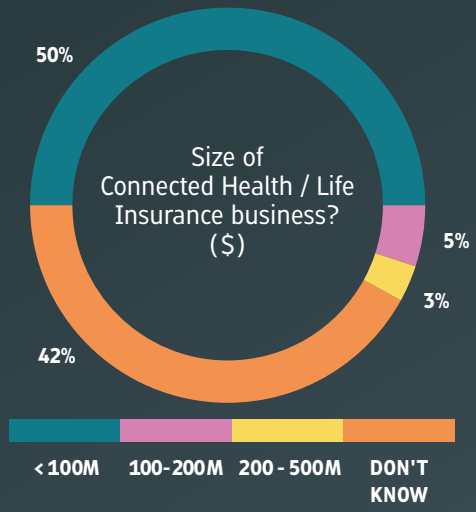
Figure 2d

HEALTH AND LIFE

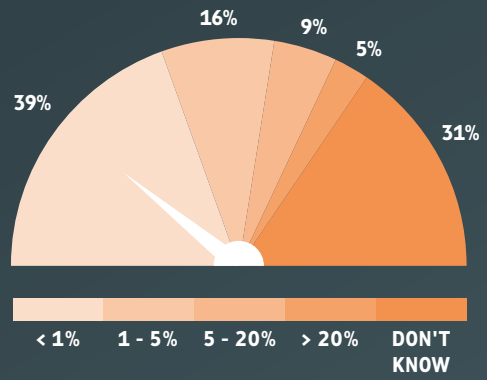
No. Connected Health / Life Insurance Products Owned



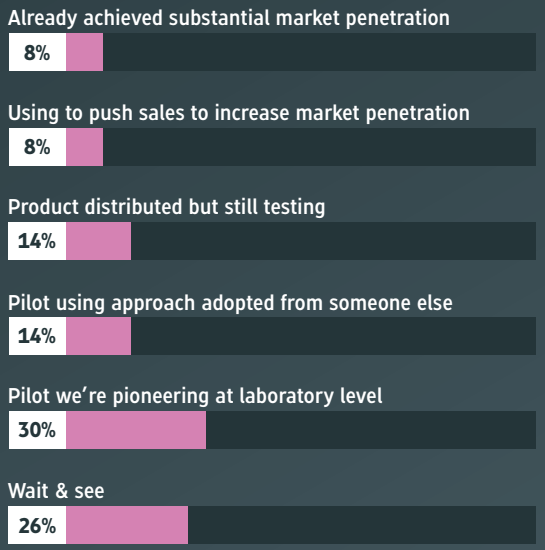
Size of Connected Health / Life Insurance business? ($)



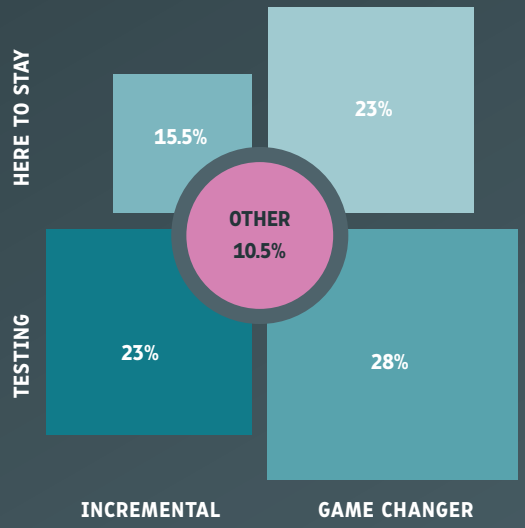
% of Health / Life Insurance Line is Connected



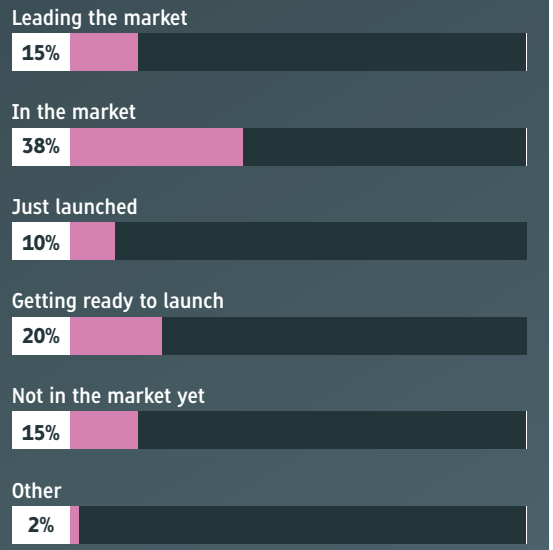
How Mature is your Connected Health / Life Product?



How do you Rate your Connected Life / Health Product



How Mature are you Compared with your competitors?



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› The psychological attitude to IoT in this sector might be summed up as: it might very well not be here to stay, but if it is, it's really going to shake up our business models. So, 51% of respondents commenting said IoT was likely to be a game changer, compared with only 38.5% who said it wouldn't be. On the other hand, only 38.5% thought it was here to stay, compared with 51% who were keeping an open mind.

It may be that this increased excitement around the potential of IoT reflects the fact that, overall, firms in this area are less familiar with connected insurance, only 14% of respondents said that the IoT accounted for more than 5% of their total business, compared with 22% for auto. However, it may also be influenced by how people see the future of the two lines.

There is a natural similarity between cars and people, in that a lot of the data produced by telematics is used to measure the changing position of a physical body. There is also a natural congruence in the role of the IoT in affecting the car or the person's risk profile. Again, the situation is reversed: the more cars move, the more risk they accumulate, whereas the more people move, the safer they become. However, there are also striking dissimilarities in the way that the two classes of risk profile is expected to change over time: for cars, the gradual imposition of sensor control and inter-vehicle connection may eventually mean that drivers could not have an accident if they tried; for people, risks inevitably increase with age and require more effort and more insurer-supplied services to deal with them.

Another factor that may make managers believe that they are living through interesting times is the number of companies that are working on the connected product: 44% for health and life, compared with 31% for motor. That said, not all health and life companies take the same view of the situation, with an extraordinary 26% of them saying they are adopting a wait-and-see attitude: 12% more than is the case in home or commercial, and 14% more than motor.

2.3.2 Human telematics

The basic division in health and life is between maintaining the health of people who are already well and offering targeted services to people who are living with health issues. Both stand to benefit from IoT in different ways.

In the case of health maintenance, the rise in the popularity of wearable devices that keep a record of the user's activity and their vital signs mean that it is theoretically possible for insurers to gain continuous data about their customers' lifestyle and they can use that data to encourage and reward good behaviour.

The insurance industry naturally focuses on activity as a key metric for predicting health outcomes. It is not the only criterion, of course, but is the one that people seem willing to share information about that, especially if there is a reward involved. And the collection of data on health and fitness has become a kind of hobby for many around the world. The Apple Smart Watch, which initially struggled to find a market, eventually became defined as a fitness, health and well-being device, and it has many rivals in the world of wearable fitness trackers. What's more, the devices and their apps connect to websites, online competitions, workplace challenges and so on, thereby priming the pump for insurers looking to compete on the engagement axis.

2.3.3 How can telematics create value?

There is clinical evidence to support Discovery's approach to incentivised health. A five-year study, reported in the American Journal of Health Promotion in May 2011, looked at more than 300,000 people who had a Discovery health plan, including 192,467 of the 2 million participants in Vitality. This found that hospital costs were 6% lower for members who were inactive ›

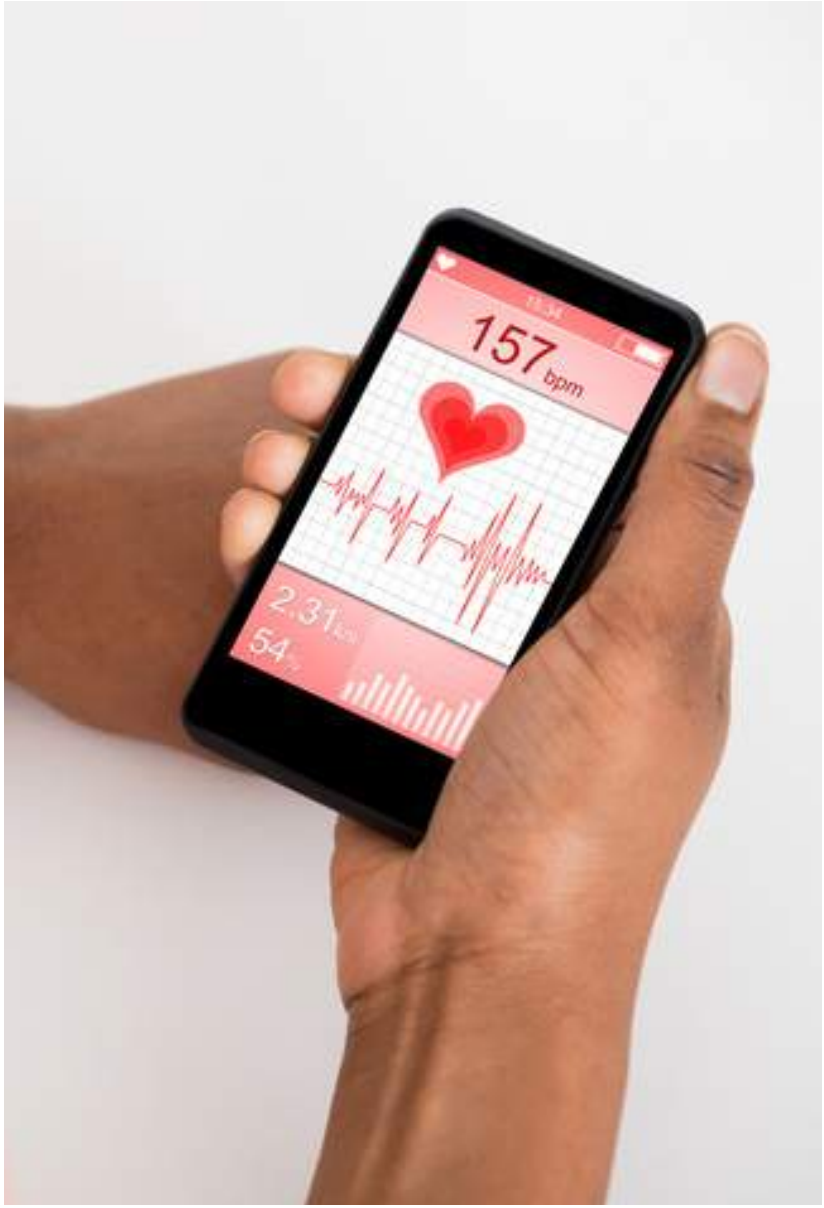
› and became active, and 16% lower for members who were active throughout the study, compared with those members who remained inactive.[7]

On top of this, Vitality is evidently a powerful differentiator for Discovery in the health and life marketplace. Some insurers have rolled out similar schemes, Boston-based insurer John Hancock partnering directly with Discovery, for example. But why don't more follow suit? In 2017, the IoT insurance Observatory looked at this area. It found more than 20 cases globally in which policies considered wearable data, but large part of them were fitness riders added to a traditional product, rather than emulating Discovery by making it a core element of the value proposition.

The answer seems to be that, despite peer-reviewed research papers and Discovery's own claims, other companies are still sceptical about the actuarial calculations behind it. It is also, in some sense, the kind of thing more suited to younger, smaller, more agile companies.

For example, Andreas Braun, Head of Global Data and Analytics at Allianz, says that although Vitality is a good way to break into a new market, it doesn't necessarily offer big benefits for big companies.

Andreas Braun: "What Discovery does is good to go into a market, but it doesn't give you any benefits or advantage. The interesting fact is that you aggregate higher costs because young people who do a lot of sports are more expensive than young people who don't do any sport, because they have more injuries. It's either illegal in several countries, or it's useless for big incumbents like Allianz. Allianz is probably 1,000 times bigger than Discovery, so it doesn't really make much sense to disturb our huge customer base of tens of millions of insured people." ›



[7] https://www.prnewswire.com/news-releases/new-study-shows-incentive-based-wellness-programs-can-produce-cost-saving-behavior-change-121091999.html

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› Other members of the industry suggest that more companies may follow suit, but as with all attempts to create products that incorporate live data streams, there is a struggle to pin down a value creation strategy, and quite a long period of trial and error before companies succeed.

An overall assessment of where the industry is now offered by Tony Laudato, Vice President of Partnership Solutions at Hannover Re. He says these kinds of schemes are "a work in progress", and that many companies are beginning to experiment with their existing customer base.

Tony Laudato: "What we are seeing is that companies are starting engagement with in-force policyholders. They want to know: how do we start to engage them and understand what resonates with them? And having that, how to set up the test environment. So, there's a lot of experimentation at this point, but a lot of it starts with the in-force policyholders."

The data is the catalyst

Michael Lebor, Chief Marketing Officer / SVP, Strategic Innovation, **AmTrust Financial Services, Inc.**

Alongside this search for "resonance", there is still a need to pin down what the data flowing in from the trusted sources are saying. Michael Lebor, Head of Marketing and Innovation at Amtrust International, makes the point that the data itself is a factor in influencing people's behaviour.

Michael Lebor: "The data is the catalyst," he says. "When we have the data, we can then be informed, and our patterns and behaviours are going to change. It's happened time and time again throughout history. Forty years ago, when someone said they were going out for a run, you'd look at them as if they were nuts. But then, when the data started coming in saying it's healthy for you, lifestyle started to change."

In other words, a company like Discovery, which as long ago as 2011 had 2 million people enrolled in Vitality, are at a big advantage when it comes to accumulating the kind of big data that insurers need to establish categories of risk and make confident correlations between variables.

Michael Lebor: "When we have the benefit of such a large amount of data, suppositions and assumptions and theories that we had will turn out not to be accurate. I think a lot of the algorithms and pricing models are going to change based upon the new data that's coming in. We talk about the exploration of space as a frontier, we talk about the exploration of the ocean, I personally think the people who understand data are really going to be at a huge advantage. To me, data is the next frontier, it's so incredibly complex."

2.3.4 Can telematics reinvent life insurance?

Of all the branches of insurance that seem to be most in need of help from IoT, perhaps the foremost is the life sector. It is a tribute to the insurance industry's 300 years of actuarial data collection that companies are willing to write a 30-year-long policy after a 30-minute-long medical consultation. But now, the basis on which life assurance is given can rest on a much wider set of information.

This is important for many reasons, among which the most pressing might be the growing asymmetry in the information available to insurer and insured, owing to the growing popularity and diminishing expense of genetic testing. There have already been instances of people who send their DNA off to be analysed, find they have the ApoE4 allele that increases the likelihood of developing Alzheimer's, and make a beeline for their nearest insurer.[8] In much of the world, providers can't ask customers ›

[8] https://www.nytimes.com/interactive/2017/11/17/opinion/sunday/What-if-You-Knew-Alzheimers-Was-Coming-for-You.html

› about their genetic predispositions (with odd exceptions, such as Huntingdon's chorea). This could be considered an existential threat to the life sector, which is many places is not, itself, in the best of health.

First and foremost, there is a likelihood that actuarial tables may be increasingly inaccurate, a considerable concern for an industry that has undergone a few shocks in the recent past, particularly in the UK, which experienced the near-collapse of Equitable Life 2000. The fact that Equitable was not only the world's oldest life assurance company, but also the one that had invented mortality-based insurance in the first place, and yet still made the classic banker's blunder of committing itself to fixed pay-outs while relying on variable markets to supply the funds, thereby offering itself as a hostage to fortune.[9] To mitigate the effect, companies naturally wish to build up a better picture of individual risks, and the best way to do this is to gather more data about known unknowns such as diet and exercise.

Tony Laudato: "There's been a lot of talk around how we can start to understand our policyholders better by gaining additional insights into their daily activities and what they are doing. If a policyholder gives their insurer access to their Apple health kit, they could go back and look at their past six months of heart rates, and steps and activities. That gives insurers a far greater insight into who that person is from a risk perspective. One of the things that will need to change, in the life insurance industry, are the ways the products are designed. So right now, most products are underwritten at one point in time and provide benefits through the lifespan of the policyholder. Generally, those rates are not going to change over time based on someone's health. So, do we start thinking about policies that either increase rates or decrease rates depending on someone's health? That's a radically different approach from a product-development point of view. I think a lot of insurance companies need to get their arms around this, most notably the actuaries who've really been doing the same kind of work for the past 30 years."

2.3.5 Telematics for the old and the unwell

When it comes to treating people, who require healthcare on a continual basis, but are not necessarily in need of hospital care, we move into a specific area of the connected home. Even Allianz's Andreas Braun, who is generally dismissive about the utility of the IoT for insurance, allows that it has a use for supporting elderly people who wish to remain independent. And, as we have seen, health insurers such as Discovery have crafted a successful monitor and alert system for diabetics based on connected glucometers.

The role of connected health insurance has a particularly important role to play in the high-cost American context. Jac Amerell, Corporate Controller at Blue Cross Blue Shield of Michigan, says the segment of the population who will be ill for an extended period offers the largest role for insurers to play a part in organising their healthcare.

Jac Amerell: "I'm thinking of the technology and tools around managing medicines, managing the interaction of medicines, managing the doses of medicines, managing the blood pressure, heart rate and temperature of chronically ill patients. Right now, we have nurses and doctors who come to the home, but the technology is available for health insurers to monitor that on an hourly basis and that I think that can change the cost profile dramatically."

And for the elderly, who may be susceptible to a wide range of conditions and accidents, the connected home could present a fine-grained picture of an individual's activity and raise the alarm if there is a significant change in their routine. Cecilia Sevillano, Head of Smart Homes Solutions at Swiss Re, gives ›

[9] https://www.economist.com/node/2908894

› the example of a lonely elderly person opening the fridge too many times, which may indicate anxiety, a proven factor in increasing the risk of fall. This behaviour may also point towards the possibility of pre-dementia, necessitating further analyses through contextualised models and eventually medical check-ups. This presents a much less structured dataset than that generated by somebody with a relatively well-defined condition, such as a diabetes. And the elderly person in this example could benefit from a much higher-value service than the standard house and contents, fire, water and theft cover. Premiums would be much higher, but the possibility of extending their time at home could offer them a huge saving compared with, for example, nursing home costs. ■

Technology is available

Jac Amerell, Corporate Controller, **Blue Cross Blue Shield of Michigan**

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CASE STUDY: DISCOVERY'S VITALITY INITIATIVE

The best-known attempt to bring IoT to bear on health is the Vitality programme offered by Discovery, South Africa's biggest health insurer. This is a feature of the company's insurance policies that tries to encourage members to lead an active life, and to take care of their health by eating wisely and going for medical check-ups.
Anton Fatti, the Chief Digital Office of Discovery, says the idea behind the product was to find a way to influence people's behaviour without changing the level of premiums.

Anton Fatti: "The South African regulatory environment prohibits us from differentiating in terms of policy pricing itself, so we give people rewards back in response to their behaviour," he says. "Through showing certain levels of activity using wearables, whether its heart rate monitors or pedometers or other devices, people can be in line for discounts or other kinds of benefit."

In terms of IT architecture, Vitality works as a central platform to which many kinds of "trusted sources" can be attached. These can be fitness trackers, or gym machines, or even point-of-sale systems that track when customers buy healthy food. The aim is to collect meaningful data from a variety of sources, enabling Discovery to help members get the most ›

› out of the dawning era of personalised healthcare. This model has proven highly repeatable in distant markets, partly because it can readily accommodate diverse local partners and data sources. The platform was designed to integrate with any system that produces reliable data, while at the same time supporting the specific data-privacy requirements of each of Vitality's various international markets.

One of the company's particularly eye-catching programmes has been the offer of an Apple watch to customers for no up-front cost. The insurer than gives the customer a weekly performance target for their physical activity. If they hit it, they receive a push notification and a QR code that allows them to gain rewards such as free coffees and smoothies. If they make the monthly target, they don't pay anything towards their watch. And if the customer manages to keep that up for two years, they end up with a free smart watch, and all the associated benefits of taking two years of regular exercise.

A dramatic change, way beyond what we ever expected

Ryan Noach, Deputy CEO, **Discovery**

Ryan Noach, the Deputy Chief Executive Officer of Discovery Health, says the cohort of customers who have an Apple watch and are engaged on the active rewards programme have increased their physical activity by 81%.

Ryan Noach: "That is a dramatic change, way beyond what we ever expected. It's been by far the most successful initiative in our 25-year history, and there is good evidence-based medicine and science dating back many years that shows that physical activity protects you against cardiovascular arrest."

Discovery has found that the cost of the watch is eventually covered by the fact that there are lower claims as the result of a member being healthier, due to being more engaged over a sustained period. Ultimately, as per the Vitality Shared Value Insurance model, the company, the client and the wider public interest are all served. This, says Discovery, means that the Vitality concept is also valid in jurisdictions where insurers can vary premiums based on some risk factors, so "wellness activities" can be used to vary premium levels.

Discovery is also using connected trackers to help people with diabetes, monitor their blood sugar. This works in a similar way to the Vitality programme, but with connected glucometers, which it part-funds. Here the aim is to create a "diabetic diary" for the patient so they can track their glucose readings through the Discovery app. This information is shared with the client's doctor and can also be used to send alerts if blood sugar readings move outside certain parameters.

Ryan Noach: "We represent that to the clinician, we create alerts and warnings around it and we converge this around the platform so that the doctor and patient can get a similar view and engage with each other as needed, should there be something untoward." ■

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2.4 COMMERCIAL

2.4.1 Survey statistics for the commercial sector

The response we received to our questions about the commercial line threw up a remarkable finding: 43% of our 500+ respondents said their company was in the process of designing its own product, compared with only 5% who said they were following in someone else's footsteps. This is 11 percentage points more than home, the line with the next highest percentage, 13 more than health and 27 more than the motor line, which has largely left the pilot stages behind.

This implies a situation in which companies do not feel as though there is a template they can use to design a product, and therefore have little choice but to take on the work themselves. The extra work involved in this would explain why the commercial sector appears to be the laggard among the four we looked at, with only 5% of companies having brought a non-prototype product to market. If very few firms consider that they have found their way, this would explain the apparently paradoxical result that almost ›

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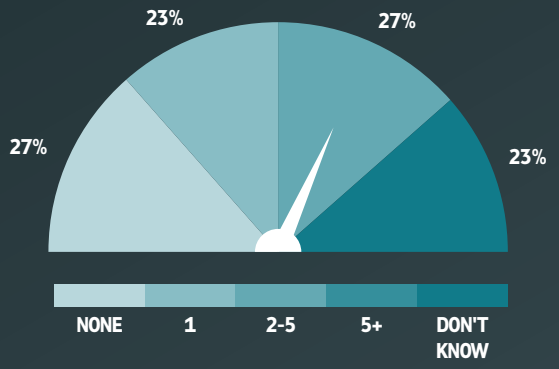
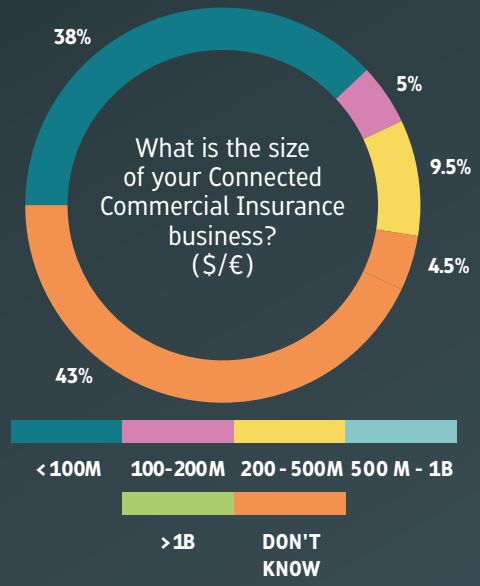
Figure 2e

COMMERCIAL INSURANCE

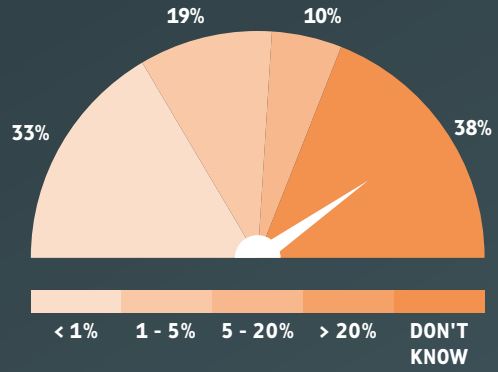
How many Connected Commercial Insurance Products do you have?



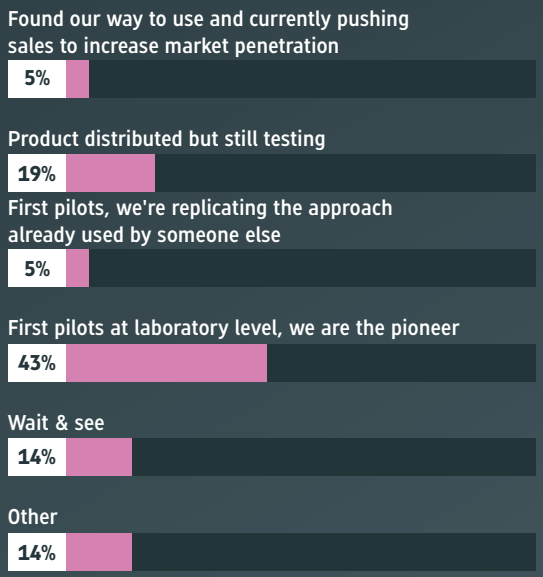
What is the size of your Connected Commercial Insurance business? ($/€)



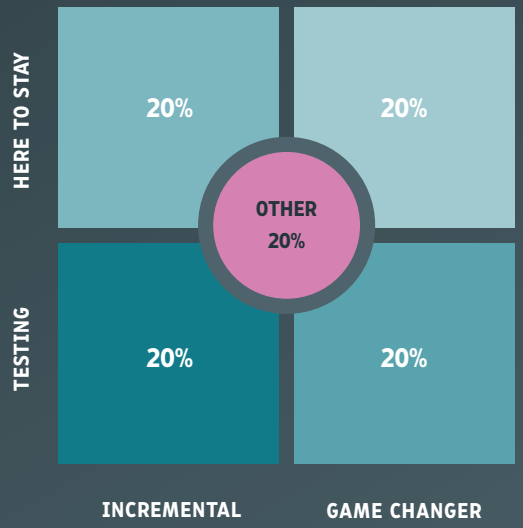
How much does this make of your total Commercial Insurance line?



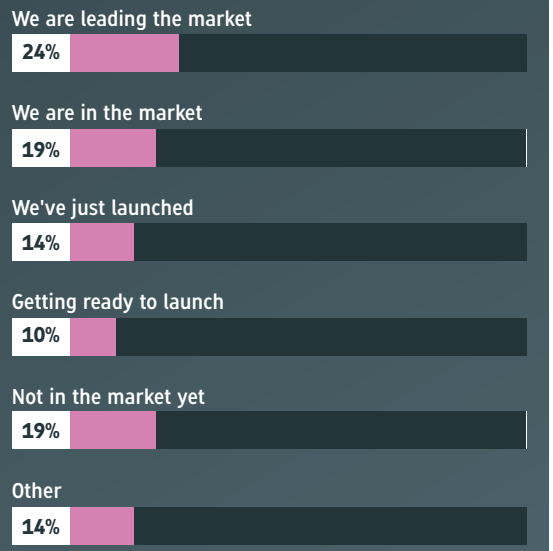
What level of maturity best describes your current Connected Commercial Insurance activity?



Is this product an incremental solution or a game-changer?



What is your maturity level compared with your main competitors?



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› one in four believes that it is the market leader. In the kingdom of the blind ...

This sense of being in the dark may also explain another remarkable result: when it comes to a strategic evaluation of the sector's future, respondents are perfectly divided, with one in five each believing it will be transformative, incremental, here to stay, too early to say, or without a settled opinion in any direction. At the same time, it should be remembered that the commercial sector is much more diverse than the other three we have considered. The risks covered by a commercial underwriter come in many, many forms, including some highly specialised, and it may be that there are certain kinds of subcategory to which the IoT is particularly well suited, and companies operating in them have managed to get ahead of the pack.

The linking of prevention to premium is already a habit

Frank Fripon, General Manager Life & Health, **KBC Bank & Verzekering**

2.4.2 Why offices are telematics-friendly

So far, the commercial sector has been somewhat behind auto and health in the IoT maturity rankings.

Matteo Carbone: "to deliver concrete value to a business owner, an insurer needs in-depth knowledge of the characteristics of the business and its processes. Personal lines are easier and mass-market approaches tend to work. In commercial, by contrast, there are thousands of sub-sectors, and it is difficult for a large insurer to work out the correct approach for each."

All the same, the commercial line also offers some natural advantages, particularly when compared with the home line. The clearest example of this is probably the office building. Whereas most homes have no connected systems beyond their broadband, Wi-Fi and television, a new build A-class office will almost certainly come with a sophisticated building management system and a wide array of features that control the building's mechanical, electrical and plumbing (MEP) services. A non-exhaustive list would include occupancy sensors, smart thermostats, demand-controlled ventilation, electronic films for windows, automatic shading, tenant feedback loops, sub-metering for electricity use, smart plugs and cloud-based energy management information systems. All of which come with professional building services engineers already on the premises.

A second factor is the social and psychological difference between the workplace and the home. Although companies will have stringent requirements for safeguarding commercially sensitive information, that does not include the mundane details of building operation. Usually, a corporation will be happy to sign a contract sharing this data with a third party if it will prevent disruption caused by, say, water leaks. Frank Fripon, General Manager for Strategy at Belgian company KBC Insurance says the linking of prevention to premium "is already a habit" with commercial clients.

Frank Fripon: "Having the sensors is just one of the new possibilities in prevention."

2.4.3 The long and winding road to market

Zurich Municipal's research experience might be characterised as an exciting picture that has not quite come into focus. This is replicated by many other insurers we talked to in the commercial space, most of which are engaged in intensive research and development with the aim of moving to the proof-of-concept stage soon. For example, Fripon's KBC, which hopes to have a product on the market within two years, has teamed up with a business ›

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› school and is running pilots to see what added value sensors offer, and whether it justifies a premium reduction.

Frank Fripon: "We see great potential in this direction, but there is not yet anything concrete."

Many companies are still wondering what the business model might be. Julien Combeau, Industry Services Lead Europe at AIG, says his company is gathering information on two distinct problems.

Julien Combeau: "First of all, we must understand what the IoT is all about and the type of risk that our clients are either ticking on their balance sheet or ticking physically when deploying IoT technologies as part of their business model, and how can we respond to it from a risk management and risk transfer basis. The other stream is more on how we can leverage IoT technology ourselves, as part of the service that we're providing; that could enhance our customers' experience when it comes to loss prevention and loss control, as well as claims management." Combeau foresees four potential benefits for insurers in the commercial space:

1. Gaining better control over risk and thereby improving loss ratios.
2. Retaining customers by providing a better experience, which may extend to adding a fee-based consultancy service that shows clients how they can use IoT to minimise risk. ›

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3 Insuring risks that are presently uninsurable. For example, in Australia, energy distributing company cannot obtain insurance for bush fires caused by failure of a line, because of the difficulty in inspecting and maintaining all the lines that could fail. With IoT systems and AI, it may be possible to predict failures before they occur.

4 Increasing premium by offering to vary coverage in real time as the risk environment changes. So a company with several million dollars of delicate equipment on a container ship might get an alert from its insurer saying the vessel was likely to be hit by a typhoon, and asking if they'd like to improve their coverage.

2.4.4 Teething troubles

The lengthy R&D period is partly explained by the need to explore scenarios created by the new relationship with insurers and their clients. For example, what happens when an insurable event occurs, the insurer sends an alert, and the client, or the contractor handling its facilities management, does not respond? The obvious answer is that the claim would be disallowed – but what if there is a dispute over whether the alert was sent? Fripon gives the example of a German insurer that is blockchaining data from sensors so that it has conclusive proof of what happened when, a solution that, despite its inherent complexity, is likely to be an ever more important element in IoT insurance in the future (see section five of this report for more on that).

Another issue, which affects older offices that have been retrofitted with IoT-enabled MEP systems, is the relative immaturity of the technology available, particularly when it comes to interoperability, common protocols and standards. Chris Perry, a researcher with the American Council for an Energy-Efficient Economy, who has looked into this question recently, comments:

Chris Perry: "What we want is for all the equipment to be able

› to communicate with each other, and we're not there yet. If you get an alarm because a damper is stuck open, you might also get other alarms because it's too cold and humidity has gone up, so you get two or three alarms for one incident."

2.4.5 Workers compensation

Finally, the case of the workers compensation subsector, insurers who specialise in this area are in a similar position to their colleagues in health, in that they can potentially tap into smartphone data to build up a picture of what's going in a place of business.

The value of IoT in the workplace, seems to break down into two main areas: accident prevention and fraud prevention.

The Hartford's Campany puts the emphasis on risk control.

Dan Campany: "I think in workplace safety, it's more of a risk-prevention play, at least for now, not a pricing play. So, I think this really is about driving better awareness and better safety practices, better compliance practices, making sure that people who are working are working safely, are lifting properly, aren't lifting things too high or too heavy, aren't working under unsafe structures, aren't working at heights when they're not tied off. So really, we're just focused on the worker and using technology to make them safe."

He adds that this is one area where technology is furthest advanced: the modern construction site, for example, which used to be an entirely analogue environment, is now highly digitised. Workers have access to wearables that can help prevent "hit by" accidents, and soon workers may be sent an alert when they may be moving into a dangerous situation.

Dan Campany: "It'll be drones and be an orchestration of a

portfolio of devices that all work in tandem to give you as much information about that job site and the workers on that job site as you can get. All that data is going to flow into a platform and insurers and safety managers are going to need ways to make sense of it and to take action on it."

On the issue of fraud prevention, Amtrust's Lebor says his company is looking at how to use smartphone data to build up a picture of the company that is sharp enough to compare with the information given on the application form.

Michael Lebor: "We're one of the largest work comp writers in America for small business and we're looking at wearables and field-force management systems. If there's one thing we all have in common, we all take our cell phones with us wherever we go. Everyone at the company, whether they are the CEO or the forklift driver, they have their cell phone on them all the time. Now that cell phone has a Wi-Fi signal and a Bluetooth signal and that's connected in the hub-and-spoke model, it is now a bona ›

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›fide IoT application. Think about small commercial, if I have an employer or a company that has 100 employees and 90 of them are clerical but I can see from the IoT that 90% of the employees spend 90% of their time in the warehouse, there is a claims and loss application."

Matteo Carbone: "the perfect use-case for the value sharing approach, which has characterised the successes in the IoT insurance story on personal line".

The key is to create value that can be shared with employees (instant rewards for safe behaviour), policyholders (discounts and cashback) and intermediaries (additional commission). And, of course, the whole society benefits in multiple ways from the reduction of injuries.

These are the concrete use cases discussed with the Observatory's members in the past months:

- **SERVICES**. There is room for selling services to business owners that can save them a large part of the compliance costs linked to the monitoring of safety procedures. The fees for those services will offset the IoT costs for the insurer.
- **RISK SELECTION**. A business owner who has chosen to install IoT devices and shares the data with his insurer, has nothing to hide. So, we can expect that his risk profile will be superior to the average policyholder with the same characteristics.
- **LOSS CONTROL**. This represents a blue ocean of opportunities. The first and most obvious advantage is the opportunity to intervene to prevent injuries and mitigate the consequences if they do occur. But a lot of value can be generated by providing real-time information to the claim handler about the incident. It will also enable an insurer to begin the claim management process without having to wait for the notification of loss, which can increase the usage of the preferred network and reduce the claim settlement time. At the same time, the availability of objective information about the dynamic of any claims will reduce the possibility of fraud and inflated claims.
- **CHANGING BEHAVIOUR**. The insurer has the opportunity to act indirectly in order to improve the safety culture within an organisation. The employer can be advised and incentivised to address risks that have been detected but have not yet caused any incident. The employees can also be incentivised to follow safety best practice, such as always wearing their personal protective equipment. This can be done on the model established by Discovery's Vitality model.
- **RISK-BASED PRICING**. Workers' compensation is priced depending on the number of employees on the payroll, or the company's revenue. Innovative pricing mechanism based on the number of days worked and number of employees present in the workplace would be attractive for medium-sized companies that could transform insurance from a fixed to a variable cost This would also allow the insurer to minimise the premium leakage due to that volatility in revenue.

Matteo Carbone: "Thus far, the barriers to adoption have been the need to tailor the solution to the specific process of each subsector and company within that subsector. I'm not positive about the possibility of large incumbents to address these barriers in the short terms, but I know a few forward-looking players that have started their journey." ■

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CASE STUDY: VIVID AND ZURICH MUNICIPAL (PART 2)

Allison Whittington: "This was a test-and-learn project, so we used as wide a variety of sensors as we could. We used leak detectors, motion detectors, temperature sensors, humidity sensors and contact sensors for doors and windows, and we didn't stick to one manufacturer. We put them in volunteers' homes, as well as some flats that were empty."

This is how Allison Whittington, Head of Housing at Zurich Municipal, describes a recent experiment that her company conducted in collaboration with the VIVID Housing Association in a small number of properties in Hampshire, in the south of England. The project shows why companies should adopt an open-minded, empirical approach to working out how IoT might fit into new products, because real life tests tend to throw up results that would have been hard to predict in advance. ›

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› Whittington says these results fell into three categories:

1. Water detection. Here the results showed that water and humidity sensors can, from an insurance company's point of view, do much more than simply detect sudden leaks. She says: "We had a property where, when we installed one type of sensor, we found a drip-drip-drip topping up of the central heating system. That sensor gave us visibility over something that we wouldn't otherwise have had, so that's a big tick." Similar slow leaks were discovered at the back of washing machines, and this meant that VIVID were able to intervene before they became bigger, and before the accumulation of damp led to any weakening of the building structure.
2. Flow meters provide different, and richer, data than water detectors. Whittington's example is the flat where it was found that toilets were leaking from cistern to bowl, wasting money in homes where water use is metered, and creating a highly unpleasant overflow situation if the toilet ever became blocked. Whittington says: "I've spoken to a number of people whose little toddlers, just before they go away for the weekend or for a fortnight or whatever, have put a nappy down a toilet bowl. Now, if the system's continually running, there's a nappy in the toilet bowl, then the water can't drain away. It goes over the top of the toilet and could create a flood and that's potentially an insurance claim."
3. Information from more than one sensor can be combined to build up a sharper picture. One example from the VIVID experiment where the temperature and humidity sensors showed that some residents were living in a low temperature, high humidity environment, ideal for damp and mould, and a sure sign that the home isn't being heated or ventilated properly.

The experiment also showed that Zurich, as a commercial insurer to VIVID, could understand what was happening without compromising the tenants' privacy. VIVID handled all the client-facing interactions while the insurer sat in the back room, looking at anonymised data, which was good enough from its perspective.

The next steps for Zurich are to work out how what all of this means in commercial terms. Whittington's view is that the company should try to replicate its findings on more, and larger projects.

Allison Whittington: "We've got a number of customers that are keen to engage with us. We are looking to work with them on a wider scale. I don't think we should keep things small then go to a big bang, with a certain delivery date; this is an evolution and we must change our approach as we find new things that work. A much more agile test-and-learn mindset than the predictable waterfall methodology that insurers are so comfortable with." ■

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3 Practicalities

INSURANCENEXUS

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3.1 MAKING A BUSINESS CASE FOR IOT

There is no question as to whether the global insurance industry is going to go digital, and most of the industry understands why it will. The real problem for most companies is how it should happen.

As we have seen in the earlier parts of this report, there are several basic strategies for incorporating the Internet of Things into an insurance provider's range of offerings.

One is the visionary approach adopted as a matter of course by insurtech start-ups, as well as outfits such as Neos and Box Innovation Group (BIG) in the UK, Discovery Health in South Africa and Italian auto insurers. These companies use data as the organisational principle for the entire company, which naturally focuses everyone's attention on that product, and this brings with it several organisational efficiencies.

Established insurance companies, by contrast, have the option of forming their own IoT subsidiary, buying someone else's, or incorporating connected products into their existing range. Some firms have already gone down the second of these routes, the Aioi Nissay Dowa Insurance Europe this year bought a majority share of BIG from the Mitsui Sumitomo Insurance Group and last year Aviva took a £5m shareholding in Neos. Most, however, have chosen the option of adding a connected product to their existing portfolio, and are proceeding along it in an empirical, step-by-step fashion. ›

› An account of how this is commonly carried out in the homes line is given by Leigh Calton, Senior Consultant at Consumer Intelligence, and an insurance industry futurologist.

Leigh Calton: "Companies have given sensors to people who work in their team and said, tell me what you think of this, is it easy to use? Easy to install? And they are now moving on to testing that with their customers. I think certainly you need to have a large enough sample size that's representative of your customer base, and you have to run it across the course of the policy year."

It's all about value sharing

Matteo Carbone,
Founder and Director,
IoT Insurance Observatory

Matteo Carbone: "It's all about the value sharing. I've worked on Insurance IoT projects in more than 10 countries with more than 80 organisations that account for more than 80% of the IoT insurance policies existing worldwide, and this is one of the key lessons learned. Let's consider a concrete aspect, frequently missing in the IoT insurance discussions. When the storytelling around an IoT product is focused on monitoring, not everyone will accept it, but even if two customers seem otherwise identical, the one who accepts the telematics value proposition is less risky. I've seen robust statistics that bear this out, and it contains terrific information for underwriting risks. Risk self-selection represents an additional value on the insurer's bottom line, so the insurer can share part of this value with the customers to create a superior value proposition for them."

One insurer that is adopting this approach in the UK is DLG. Jenny Trueman, Head of Connected Homes and Product Development, says the advantage is that a safety-conscious company can keep control of the process and "establish the right value exchange" for customers, that is, what services should be offered in exchange for information about a household's daily life.

Jenny Trueman: "We want to learn, and we want to understand our customers, but we have to do it in a way that really makes them feel comfortable with what we're doing and makes sure that we don't damage that trust, particularly when you've got brands, very trusted brands, in the insurance space."

At the same time, companies can work out what kind of relationship they need to build with the other industries that are occupying the space: car makers, data miners and the tech giants that are competing to supply sensors and AI systems, as well as their own reinsurers and brokers.

One disadvantage of the empirical route is that it probably requires a year or more to implement, and as Trueman remarks, "There's many people in this marketplace and it feels like there's a bit of a race for the home."

Another issue is that developing a fundamentally different type of product requires time, resources and commitment from senior management and the many departments with a role to play in delivering it. One consideration that emerges from our interviews with managers who are acting as change agents within their organisations is that institutional inertia should not be underestimated.

Jac Amerell: "I'm not finding many people in the finance space in any type of industry, let alone insurance, that are really leveraging IoT and other innovative technology to drive a much lower price point. I sit back and wonder: how do you start? How do you tackle transforming a brick-and-mortar organisation with legacy systems? Yes, Lemonade is cutting-edge. But I'm sure the next generations are going to make Lemonade look like my own Blue Cross organisation in a couple of months and years. Many ›

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› organisations don't have transformation teams, they don't have innovation teams. It's the old brick-and-mortar organisation, and maybe it's one person, like myself, who is the champion trying to drive the thought-leadership in the organisation. For us to have a chance of being competitive, let alone existing, in 10 years, we have to dramatically transform our organisation."

3.1.1 The no-hassle revolution

The key consideration in thinking about how digitisation fits in to front-end marketing is suggested by Frank Fripon, General Manager in charge of Strategy at Brussels-based KBC Insurance. Frank Fripon: "On the other hand, we see that the customer, and society is evolving towards a more individualised society, into more time pressure and more requests for free time. If you take all that together, then you can see that there is a new direction where the question is: don't deliver me a product, deliver me a solution."

"The efforts and investment necessary are often overestimated

Matteo Carbone, Founder and Director, **IoT Insurance Observatory**

Matteo Carbone maintains that value creation depends on the ability to transform raw data into actionable insights and the process may not be as laborious as some expect.

Matteo Carbone: "The efforts and investments necessary to make it work are often overestimated. I've seen many players obtain material results without changing their legacy systems. Sometimes you can make progress by adding a cloud platform and providing to the claim department the information needed to make claim handling more accurate. Then you must work towards exploiting the full potential of the IoT data, and some companies have already developed processes that internalise some parts of the connected insurance value chain and develop their own unique intellectual property, which is really building the foundations of future competitive advantage."

At the same time, digitisation of the back end is insurance's contribution to the so-called fourth industrial revolution, in which connected machines can improve their own algorithms over time. Allianz is one player that is showing what can be gained from bringing together a 4.0 back-end and a plug-and-play front-end. Indeed, Andreas Braun, Head of Global Data and Analytics at the company, argues that the case for adopting big data, AI and machine learning is more compelling than that for IoT.

Andreas Braun: "With telematics-based car insurance, now we ›

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› lose money, and we don't know how we will ever get it back. But in productivity gains using machine-learning to improve internal processes, we saved two-digit millions in the first year. The other thing is to use data and analytics for new products. One example we will go live with in the UK soon, is a completely digital insurance offering. So, you download an app on your phone, and by downloading the app you become a customer, because the Apple Store knows everything we need to know."

The idea is to use GPS data from a smartphone to slice whatever the insured person does into a back-end offering.

Andreas Braun: "If you walk, it's an accident insurance; if you drive, it's a motor insurance; it you have a rental car, Allianz has a product where you can bring your insurance to the rental car or the car-sharing, and it slices that into the offerings. Similarly, we have living and health in that app and it's all based on behaviour and data and what you do, and it always gives you the best offering."

Allianz can do this because it can bring together real-time information about the policyholder with vast amounts of existing data about the holder's environment, and thereby calculate the risk depending on what they're doing, with the help of machine-learning-enabled AI. This combination of accurate risk calculation and simplicity makes for a compelling offering. To give another example, Allianz will be able to sell contents insurance to a student in the UK based entirely on the GPS of their home.

Andreas Braun: "You just say, 'insure where I am' and it gives you an offering based on the GPS position. Typically, we ask 18 questions before we insure a flat. Here, you just need the GPS position and it's done and it gives you an even better price because the back-end processes are much cheaper." ›

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› 3.1.2 Business challenges to developing IoT

The survey asked respondents to name the three main business challenges they face in launching an IoT-enabled policy. This found that four issues predominated: designing the business model (named by 201 respondents as being in the top three), demonstrating a return on investment (175), implementing a product while retaining the trust of the customer (147) and exploiting the potential of IoT to expand services, while fending off competition from non-insurers (122). There was then a big gap between the fifth-placed issue, which was the practical business of turning pilot into product (69).

The striking thing here was that it's the softer, more conceptual issues that are perceived as presenting the harder challenges. It is also notable that for many companies, the basic business rationale of bringing in an IoT product, as opposed implementing a wider digitisation agenda, is not yet self-evident.

Matteo Carbone: "Unfortunately, the average understanding of IoT opportunities in the different local insurance markets is low, and the awareness of international best practices is limited. There has been a lot of superficiality by the analysts on the various markets, which doesn't help carriers to address the opportunities they have. But I have been lucky to have the opportunity to see with my own eyes some players obtain amazing results and create the foundation for a brilliant future in insuring the hyperconnected world. I'm talking about companies such as UnipolSai, Discovery, Groupama, Ima Assistance, American Family, Allstate, Swiss Re and Munich Re, to name a few. This is the reason I created the IoT Insurance Observatory, to help companies to find the best way to make the best use of IoT, and in this way to stay relevant in the life of their customers."

To take the issue of the business model first, the essential problem is balancing the cost of fitting sensors, or otherwise obtaining the data from them, against the benefits that can be gained from possessing and processing that data. In our interviews, the companies that were most bullish about whether this added up to a viable model were those that had built an organisation around a very small number of connected products, were confident that they had got the right technology in place and were happy with ›

Figure 3a

What are the 3 main business challenges in developing Connected Insurance products? (all respondents)*

SCORE	RANK	KEY CHALLENGE
577	1	Business model design - defining value for customers in exchange for profitable services
531	2	Demonstrating ROI
431	3	Customer trust & adoption
306	4	Delivering services beyond insurance and meeting competition from non-insurance players entering the insurance market
248	5	Getting buy-in across organization
219	6	Moving from pilot programs to implementation and full rollout
184	7	Prioritizing business use of IoT data
152	8	Product Design – white label, partnerships?

*Respondents allocated 3 points to their first choice, 2 points to their second choice and 1 point to their third choice.

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› the partnerships that they'd formed with firms outside the insurance industry. A case in point is Discovery Health, which has built an IoT offering that considers diet and exercise, and which has proved profitable.

A larger insurer looking to emulate that success has a lot of choices to make, and they may relate as much to their own business as they do to the market. Cecilia Sevillano, Head of Smart Homes Solutions at Swiss Re, says the picture is more complex than with a conventional product.

It's not possible to do this alone

Cecilia Sevillano, Head Smart Homes Solutions, **Swiss Re**

Cecilia Sevillano: "Everyone understands that this is an ecosystem, where there are insurers, but there are also device manufacturers, distributors and service providers. It's not possible to do this alone. Players must assess and decide in which of the touchpoints they want to be present. For example, do they want to be in installations, do they want to be in maintenance, prevention, and then claims-handling? How broadly do they want to expand? Insurers are asking themselves these questions when they're thinking about their business models."

The question of return on investment is, of course, closely linked to the viability of a business model. Julian Combeau, European Industry Services Lead for AIG, says the picture here is just as complex, and requires insurers to understand the technology, the legal and privacy aspects involved in handling clients' personal data, the level of social acceptability in what they're doing, and whether a customer would see the benefits in deploying it (beyond merely reducing their premiums). Planners must put all those factors together before they can perform any assessment about making their money back. And just to make the calculation a little trickier, all those factors are in a state of flux.

And, as Combeau's assessment makes clear, retaining trust is closely linked to return on investment.

DLG's Trueman points out that if an insurer does anything to damage that trust, their reputation may suffer serious collateral damage. The issue is also linked to the quality of data, particularly if insurers are using it in a way that negatively affects a client, by disallowing a claim or raising a premium. The very last thing any company wants is stories in the media about their using a connected product to "wriggle out of paying claims".

Jenny Trueman: There's an element of mistrust about how that data might be used either to put people's premiums up or maybe not pay claims and, so my view is very clearly that if people are going to share the data with us then they need to experience positive outcomes for doing that and that we need to be really clear on what we're going to do with that data so that customers can be confident that it'll be used in a way that's going to help them. And that's very much the angle that we're, that we're looking at.

Put beside technical questions about information system architecture, product design and data science, it's easy to see why these nebulous issues are giving the insurance industry problems. For one thing they are logically prior, in that there's no point in solving technical issues if you haven't established the business case for using them. Here, companies need the all-important element of leadership, firstly to create a vision of where the company wants to go, and to inspire its people to set off on the journey towards it.

3.1.3 From pilot to product

The process of designing a product differs depending on the ›

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› insurance line involved: each has a different technical, legal, social and business environment. And to an extent, the experience will be different for each company, depending on where it's starting from in terms of its skills, culture and information systems.

Nevertheless, there are some basic choices that most will have to take. One is whether the company wants to aggressively pursue "first-mover" advantages, which in insurance probably amount to a head start in marketing, the chance to accumulate data and technical competence, and build effective teams. Alternatively, firms can hang back and hope to gain "free rider" benefits by studying the successes and failures of their competitors.

There are, of course, advantages and disadvantages to each choice. The pitfalls of taking a gung-ho approach is illustrated by an anecdote related by Frank Fripon of KBC in Belgium, who describes the experience of a Dutch rival that bought thousands of water sensors and sent them free of charge to their customers, only to find that half were never installed: a case of money down the drain. Dan Campany, Assistant Vice President of Innovation at Connecticut insurer The Hartford, provides a different perspective. His job is to raise the company's awareness of the possibilities of insurtech, so it can develop "a coordinated point of view around what it means to us offensively, defensively or otherwise", and at the same time to set up experiments based on "rapid fast-fail pilot approaches".

3.1.4 Where should the technology come from?

Once a company has decided how far to press the accelerator, and has chosen which line or lines it wants to go down, it has a fundamental choice about how much control it wishes to have over the technology: does it make a big investment in its own tech, or white labelled kit that it adds its own branding to, does it pay for an existing commercial product, does it does it rely on devices that most people already own – in most cases, a smartphone – or does it partner up with tech firm as part of its IoT "ecosystem".

Again, each choice has pros and cons, advocates and detractors. Andreas Braun, Head of Global Data and Analytics at Allianz Europe, believes that insurers should, as far as possible leave technology to the companies that specialise in it.

Andreas Braun: IoT is just another source of big data, but this additional data source comes with a lot of problems, starting with the technical protocols, sensor types, differences between sensors. So it goes down really to hardware problems. It also comes with a lot of privacy, not only security but especially privacy, problems, especially under the EU's General Data Protection Securing these things, making them GDPR-compliant and so on, is very, very hard. In summary, it's not a low-hanging fruit, and it's not clear how the insurance vertical can win its share of that.

On the other side of the debate is Sebastiaan Bongers, Head Strategy, Products & Technology at Swiss Re, who argues that insurers, or reinsurers, who get involved in the development of the technology are more likely to get devices that meet their own needs.

Sebastiaan Bongers: We build devices almost from the ground up and we white-label these products to make sure that our clients can use them and basically put them in the market right away. So, in automotive what we've done is we've built a telematics solution, and we've really made sure that it is really good when it comes down to risk assessment, so the data can actually be used for tariffing purposes.

Talking about automotive telematics, Carbone seems more device agnostic. ›

› Matteo Carbone: "When I advise someone on telematics data sources I stress the point that perfect data source doesn't exist. It depends on the use cases that you would like to manage: for some of them you need a professional install device, even with a technology military grade, but for other a well build app is good enough. The choice of the device is the last decision, it comes after you have developed your telematics strategy and you have designed the value proposition. Any device after 6 or 12 months will be obsolete but the value proposition last: if you fall in love of the shining device, your heart will be broken. Regarding telematics data sources, I see the best practice as moving to a portfolio strategy."

When it comes to insuring homes, shops and offices and the human body, the considerations are rather different. In the homes line, the obvious problem is that there are often no sensors to piggyback on. If you can sell services to customers, so fees and contributions by partners offset the IoT cost, the equation is solved. If not, the fundamental issue tends to be, whether companies can justify the cost of buying and installing sensors.

Leigh Calton: "If the average home insurance underwriting profit is around £20 per policy, no insurer is going to put an additional £400 worth of kit in someone's home, especially if the customer at the end of that year, says, well thanks very much, I'm now switching my insurance to someone else."

Here another choice must be made: can companies somehow expand that £20 profit by offering additional services through the connected home, say by fixing drains or boilers or leaking lavatories before they become a problem, overseeing the health case of the aged and the infirm or calling the police if there is a break in while the resident is away or asleep? On the other hand, if they want to use data from a home hub supplied by a US tech giant, how much do they need to worry that Apple, Google or (particularly) Amazon will one day open an insurance division?

For the life assurance line, the issue is different again, since almost everybody now has a smartphone that they take everywhere, and which keeps a record of where people go and, increasingly, what they buy. Here Discovery has demonstrated through its Vitality product that it is possible to enter into engaging relationships with health customers, but the difficulties should not be underestimated: collecting and use of data is tightly regulated and gaining and retaining the willingness of customers to share it will require great tact, as mentioned above, a few negative stories in the media could endanger many years of investment and patient labour.

3.1.5 In the future, insurers will be part of larger ecosystems

Alongside these issues, it has become generally accepted that insurance companies will have to form alliances with other companies to be able bring a product to market, and this is another novel challenge.

Cecilia Sevillano: "What insurers have always done, and how they have always defined their business model, has been within the vertical market. Today, their business model is impacted by other industries that are less well-known and move at a different pace. To define their winning strategy, they are much more dependent on what, for example, Amazon is going to do or what an energy company is doing in the UK market."

So, a great deal of commercial negotiation with other companies, which would share cost and risk and collaborate on service provision may be necessary, and this may have unpredictable ›

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› results. Calton, for example, has a concept of "power brands" such as Google Home, which tend to pull other service providers into orbit around them. Andreas Braun of Allianz, who shares this opinion, adds that IoT may be subsumed by the wider digital environment, becoming, as he puts it:

Andreas Braun: "Just another data source for the big data and AI ecosystem which we currently already have", albeit one that "comes with a lot of problems, starting with the technical protocols, sensor types, differences between sensors, security and privacy, especially under GDPR." ›

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› 3.2 DIGITAL TRANSFORMATION

As Calton says, insurers feeling their way in this new world often begin with the phased roll-out of a commercially available sensor, beginning with employees and moving on to a group of volunteer customers before making it available to wider segments. If the concept fails, then they can try something else, having lost nothing much but time. Success, on the other hand, poses problems. If customers are enthusiastic about the product, and data starts pouring in from flow meters, fitness trackers and smartphones, how does a "brick-and-mortar" company handle this information?

One way of beginning to answer this question is to look at other analogue industries that have already begun to make the transition to digital, both in terms of what they sell to their customers and how they run themselves. One senior manager at a global engineering company that last year rebranded as a digital services provider, says successful adoption requires a move to the kind of fluid internal culture pioneered by tech companies like Google. This means a less rigid approach to departmental and professional boundaries, the use of automation to deal with paper shuffling, the elimination of routine coordination meetings, fewer internal reports, the inculcation of "group ambition and a collective growth mindset", openness to criticism and a desire to seek out challenge.

Many insurance companies are alive to this requirement.

Simone Macelloni: "I work towards the optimisation, enrichment of the day-by-day work of the company to increase its efficiency, its digitisation. I try to be an active part in changing the internal culture of the company, which in the insurance market, is not usually orientated towards innovation."

The implication is that this is a whole-company issue, and one that must be led by senior management with buy-in from all departments that will play a role in the new system.

3.2.1 The adoption journey

If we were to attempt to sum up the general mood of the insurance industry surrounding IoT, it might include curiosity, engagement and a natural emphasis on safety, rather than the joys of creative disruption and a generous pinch of scepticism. What seems to be missing in most cases is a sense of urgency. Matteo Carbone: "Nothing happens overnight in the insurance sector and I'm always sceptical about projections that forecast companies will move from zero to a market-ready product in a few years. I have a long list of unrealistic analysts' prediction for what will happen by 2020."

In Carbone's experience you have different stages of market maturity before you see material penetration:
Matteo Carbone:

1. "You have a first incubation phase, when first-mover players are studying the feasibility of combining the insurance product with the technology. Here you have many tests and failures. The main players' question is: "Does the approach make sense?"
2. "When a few pioneers find something that generates value and start to achieve some traction, through the solution rolled out on the market, the market moves to the exploration phase. In this phase, the average level of awareness in the markets is low, and other players start pilots based on a desire to emulate their competitors; their main question is 'What's the return on investment of this programme?'"
3. "The next phase is about learning. It happens when a few players start to move from focusing on quick wins to a more holistic approach – that is, developing more than one use case based on the same data. They start to exploit ›

› the potential of the solution and were thus poised to start pushing the selling phase. Some differentiation begins to appear, and the approaches become more articulate. The key question in this phase is 'What is the best way to do it for my company?' This is the point where the material adoption starts to show up, and this journey requires years."

It may be the case that individual companies have to go through a lengthy process to develop an IoT products, but the wider adoption of digital processes is being catalysed by the rise of an insurtech insurgency that understands the possibilities and potential of the IoT but lacks the underwriting firepower of the established players. Of course, many insurgents will be only too happy to sell up and cash out when the time is right, but in the meantime, they may have a larger impact in a shorter timeframe than many expect.

Michael Lebor: "The word 'insurtech', I don't believe, existed two years ago. I was able to go onto LinkedIn a year ago and register the Insurtech Group. How crazy is that? It's a very rapidly changing world. And, as a sizeable company, I think we're doing a pretty good job of being agile and recognising it. But we learn and get better every day at it."

One industry player that sees an opportunity in this is Tony Laudato, the vice president at Hannover Re in charge of partnership solutions. He suggests that Hannover could play a role in the creation of IoT insurance, a project that he has been working on for the past two years.

Tony Laudato: "Being a reinsurer, we're in an interesting position between the direct insurance companies and the insurtech companies that are starting to emerge. We see that the insurtech companies are bringing new distribution to the table, new technology, new data sources, new predictive models, and really

starting to think about how to do business in a very different way. But at the same time, we see that they struggle because they need a bridge to the direct companies to get business underwritten.

So, we're playing that role in between two different groups of people, and our ultimate goal is to help drive additional life insurance, particularly in the US. And from a reinsurance point of view, we'll do just fine if the life insurance market is thriving and growing. And as part of that, we have an automated underwriting solution that is in the middle of all that as well. So, we can adjust information from the new insurtech-type companies, or partner if they're more on the distribution side, ingest a lot of that information, partner with direct companies to get into the marketplace as well. We're starting to see ourselves as a hub of information in between these two groups of people." ›

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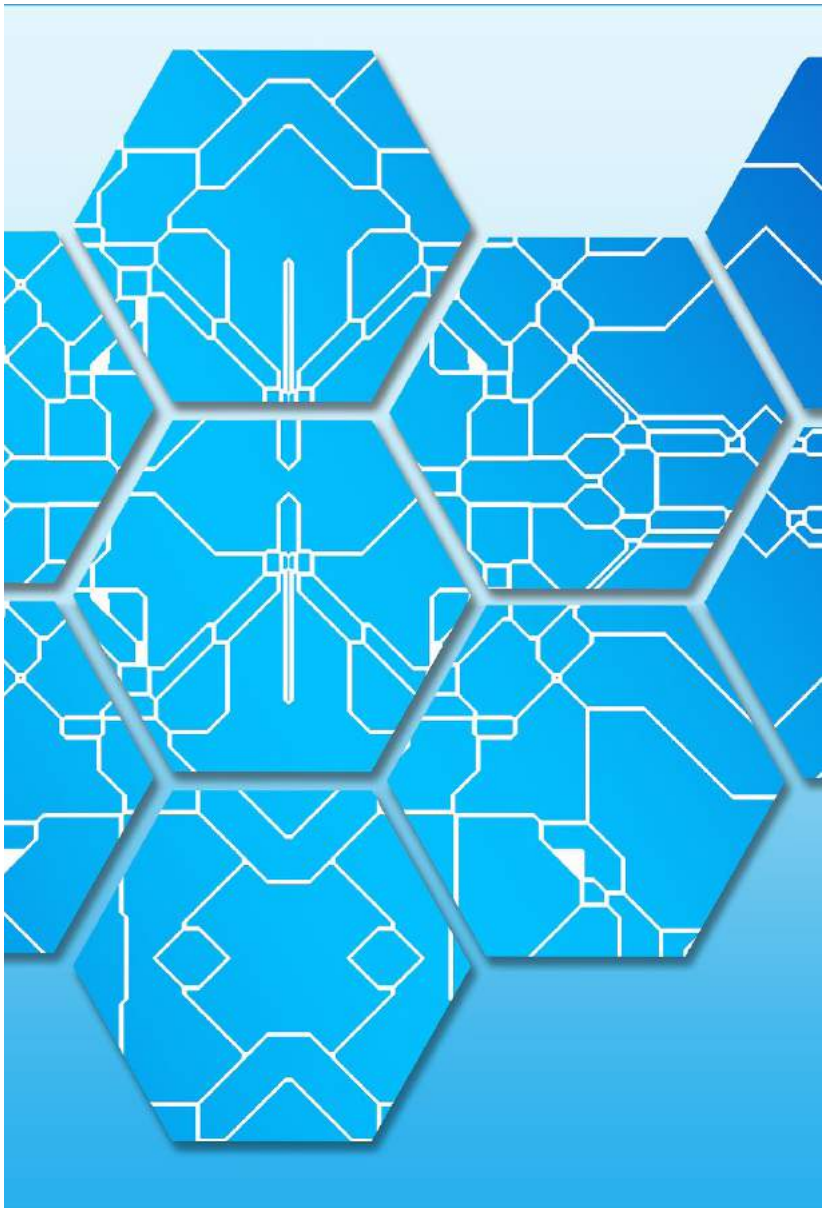


› 3.3 ORGANISATIONAL STRUCTURE

Michael Lebor: "In my opinion, IoT is not a product, it's a paradigm shift, a completely different way for technologies to interact with each other. Devices are going to be talking to each other, there are going to be hubs, and we must leverage that throughout the entire lifecycle of our product, whether for distribution, or on-boarding customers, or using it for claims and first notice of claims. It's not one product, it's a holistic way of thinking."

If he is correct in this assessment, the implication is that insurance companies should respond in a holistic way, which implies that each department should at least have a plan for how it will deal

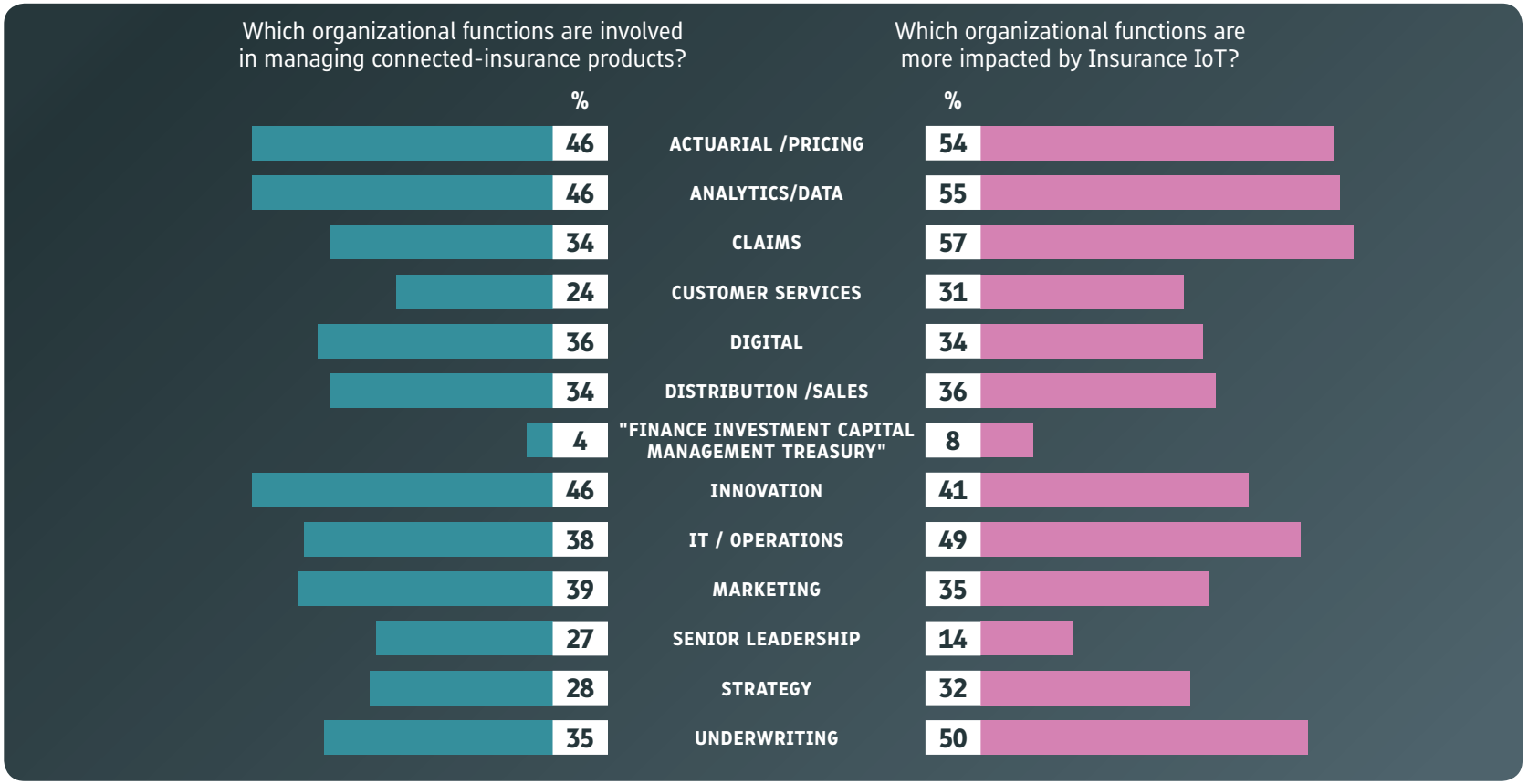
IoT is not a product, it's a paradigm shift

Michael Lebor, Chief Marketing Officer / SVP, Strategic Innovation, **AmTrust Financial Services, Inc.**

with the opportunities and threats brought by the paradigm shift. Information collected by the IoT Insurance Observatory suggests that companies that are moving to IoT best practice have succeeded in building a sustainable return on investment for their products by developing and combining multiple uses, and ways of creating value, from the same data. This, Carbone says, requires the involvement of many functions in the design and evolution of a product. So, to rephrase Amerell's question, how should a "bricks-and-mortar" insurance business set about redesigning itself to do just that?

This was one of the questions we put to our 500+ insurance survey respondents (from 300 insurers and reinsurers) to discover the present state of the industry's thinking. ›

Figure 3b



› 3.3.1 Where does leadership come from within a company?

The most surprising finding from the question of which departments feed into IoT insurance, perhaps, was how little insurers' senior leadership appears to be involved: 10% of companies said an IoT product was being driven by board-level managers, and 27% said the top team was "involved in managing" a connected insurance product. If the likes of Michael Lebor, Jac Amerell and Frank Fripon are correct, then the introduction of connected products will have a significant bearing on the future growth of a company, which ought to make their design, development and implementation a matter for board-level consideration.

Some light was shed on this finding by another question, which asked which elements of the company were affected by IoT and only 14% said senior management. Equally illuminating ›

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› were the responses we received to a question about whether companies had formed cross-departmental teams to deal with a connected product. A typical comment was that the company had not yet reached the stage where it was an issue, and part of the reason many hadn't was because senior management were not seized by its importance.

To what extent can the other departments fill the gap left by senior management?

When it comes to the development of a digital product, some groups within the company are naturally more involved than others in the design, construction and implementation process.

Jenny Trueman: "There's obviously an interest from our marketing colleagues, underwriting and claims, because we're looking very much at how we deliver this and the journeys and all those types of questions. So those people are very much around the table."

Our survey found that 46% of companies surveyed said a connected insurance product was being jointly managed by their innovation/R&D, data analytics group and the actuarial/pricing departments. Some 39% said they had a product being partly managed by marketing, 38% by IT, 35% by underwriting and 34% by claims and sales. This suggests that companies are adopting an interdisciplinary approach, not surprisingly, given the multidimensional nature of the product.

At the same time this apparent reluctance to put one department in charge of pulling the whole thing together may reflect the way that companies are being pulled in different directions by the possibilities of IoT, as well as the need to continue to take care of one's established products. AmTrust's Lebor has a product that is "well beyond the drawing board", and which is "definitely going to be rolled out". He gives an insight into the kind of juggling that companies have to practise when they go from concept to product.

Michael Lebor: "We have two completely different parallel paths. From a marketing perspective, we're trying to look at the 'martech' stack, every marketing tool, every digital tool, whether it's as simple as marketing automation or remarketing, search engine optimisation best practices, customer experience platforms. We're looking at those tools, technologies and disciplines and bringing them to bear on the Amtrust platform. And then there's the insurtech innovation parts of it, which are very much connected because they both have a common denominator when it comes to digital, but it's not the same discipline as marketing; it's a completely different job function and role. I'm very much involved in it, but we have quite a few people and team members who are a huge component of our innovation and insurtech strategy."

Other noteworthy findings are, once again, the relative lack of involvement of strategy departments (28%), and the disparity between the involvement of customer-facing departments in managing products compared with the products' impact on them.

The most eye-catching of these is in underwriting and claims. In the former case, involvement stands at 35% but impact at 50%, a significant difference that may be explained by the fact that there is a natural lag before enough data is available to understand what change, if any, it brings to the risk profile in certain cases.

Shaun Wilson: "Until there are a lot of devices providing a lot of data about specific risks in the home, the carrier is not going to have the insights about whether or not these devices mitigate risks to any level of significance. That's the promise of this approach to protecting the home, but nobody has enough data yet to validate the hypothesis." ›

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› More surprising, perhaps, is the disparity between the involvement of and the impact on claims.

In our interviews, most managers envisaged IoT as having an impact on their adjudication, payment and cost by reducing their frequency, severity and fraudulent inflation. Back-office digitisation also allows the automation of routine claims and the possibility of building extra services into them – most notably, perhaps, by calling an ambulance if a client has suffered a cardiac arrest or their car appears to have had an accident.

At the 2018 Connected Claims event in Chicago, Matteo Carbone presented statistics collected by companies that have adopted auto telematics best practices, and which have been able to double the insurer's preferred body shop usage, increase the claims settlement speed 5%, reduce injuries by up to 18% and cut material damages costs by up to 11%. All of which is a powerful argument for integrating telematics data, and he predicted an increase in uptake in North America and some European countries over the next 24 months.

From the customer's point of view, digitisation promises a whole new level of responsiveness and convenience. Allianz's Braun says his company aims to check a claim and pay it using PayPal within five seconds of its being made; others don't see why it should take so long, in many cases telematics will be able to tell from the data whether there has been an insurable event before the customer reports it.

On the other hand, it can also be envisaged that information from an IoT sensor may complicate the claims process.

Frank Fripon: "If you would connect the sensors with the fact that you give a reduction on the premium, then of course, the accountability of the client becomes much higher because you ›

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› will not be willing to pay the claim if the client did not react properly to the sensors."

All of which suggests that the claims department, with its accumulated understanding of how the process works, should be part of the core team in an IoT development project. However, our survey shows that although claims are involved in managing a little over a third of connected insurance products, they are impacted by well over a half (57%).

One interpretation of this finding is that, when it comes to developing new kinds of product, as opposed to new products per se, some departments, IT, analytics and data processing, as well as innovation, of course, are identified as change makers, whereas others, such as underwriting and, evidently, claims are change takers. But given the context of widespread cultural transformation discussed above, this may underestimate the extent to which the change-drivers are themselves having to be reinvented. To return to Michael Lebor's point about holistic changes and paradigm shifts, a whole-company problem may demand a whole-company response, in which one might expect senior leadership to be doing what their name suggests.

3.3.2 Where should IoT sit within your organisation?

Up until now we have considered the development of policies that incorporate IoT-derived data to create new kinds of insurance offerings. But once it is up and running, how should companies fit the IoT product into its organogram. Should the people running the IoT team be put together into a separate project team, or should they stay where they are, in their established lines? Our survey found that the industry is in two minds on this question. Fifty-six per cent of companies that are rolling out an IoT product have created a permanent team to handle the work, and 44% have chosen to put together a project team. The other question we put to our sample was whether they have created a multidisciplinary department to handle connected insurance, a kind of virtual subsidiary. ›

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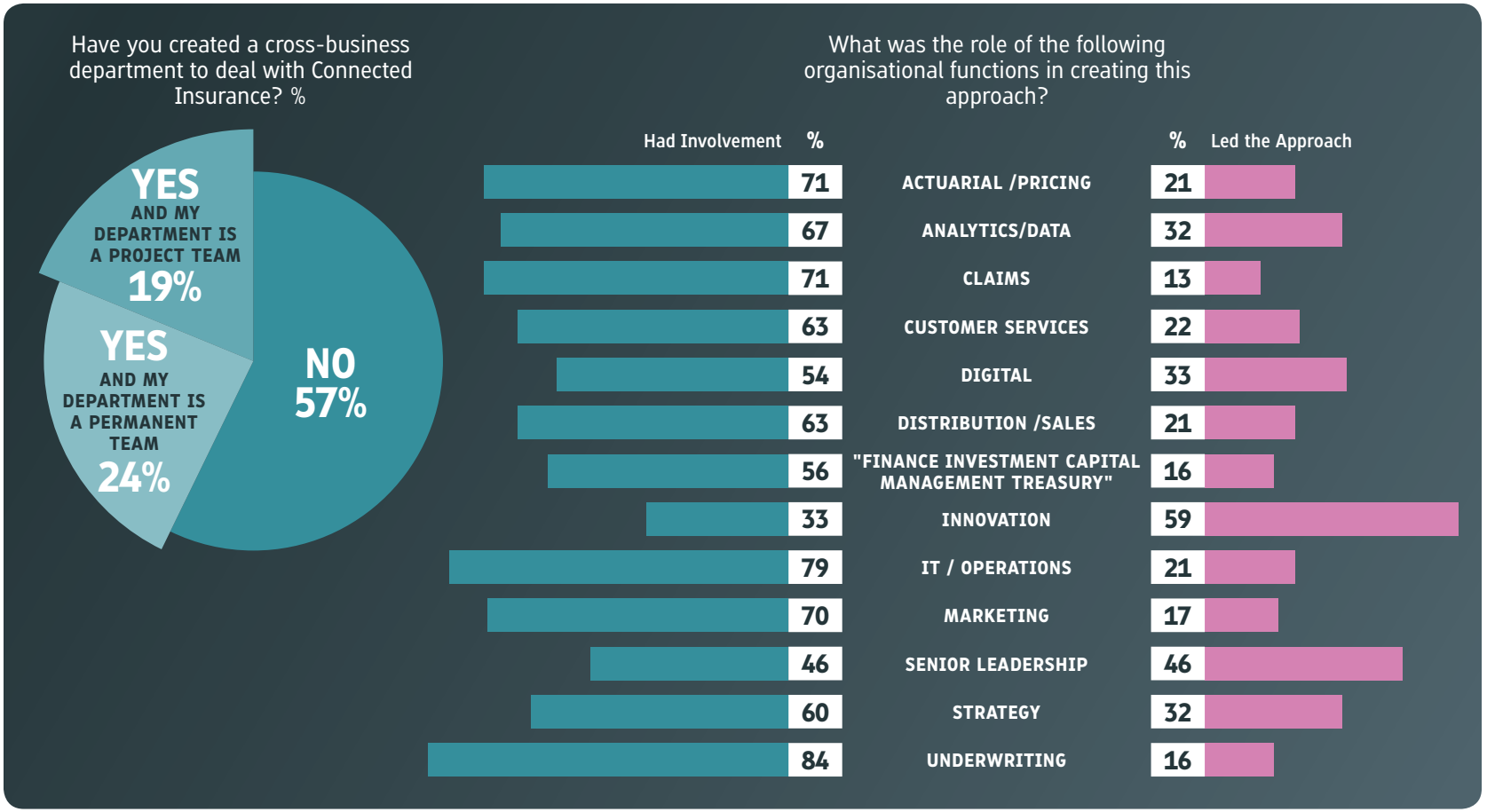
Figure 3c



› 3.3.3 "Not a topic for the board, sadly"

The companies that have not built an IoT organisation have typically not done so because they have not reached the point where it has become necessary. As mentioned above, the survey contained a text box in which respondents could comment on the reasons for forming a team or not.

The most common explanation for failing to do so was that the whole issue had yet to crystallise in such a way that there was a clear call to action. Representative comments included: "Multiple business areas are working in the connected space and consistently liaise closely together, but at this point our work is at too early a stage for the creation of a dedicated department", "The potential impact is not fully understood yet to justify", ›

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› "We don't see a need yet", "Lack of future-thinking leadership able to understand how existing and emerging tech will drive change today and in three-to-five years from now", "Not a topic in the board yet, sadly", "Unfortunately, not a priority for senior management", "Not enough buy-in at this point", "We are slow on the adoption curve. We want to see success at other insurers before we begin to evaluate".

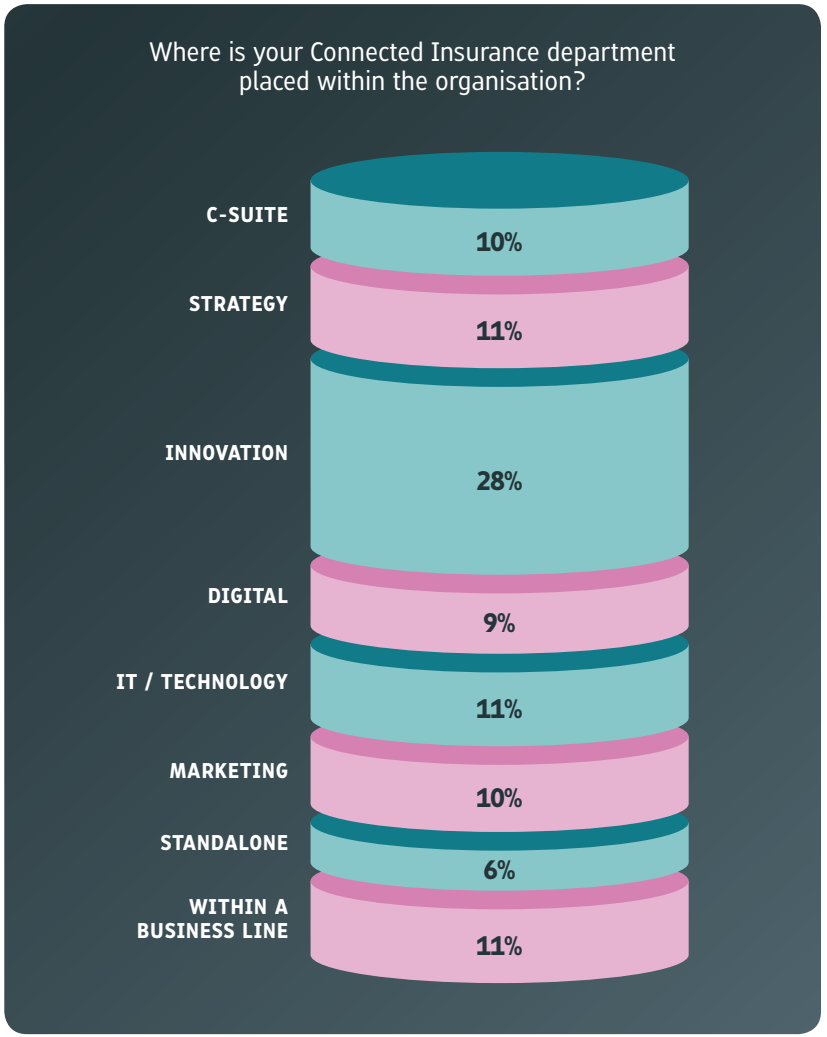
The second most common thought was that the company had begun to make internal changes, and was moving towards a product, but that getting a connected product up and running required much more time and information than a conventional equivalent. Representative responses included: "Systems not advanced enough to handle data; organisation relies on third-party information", "We are not ready for this yet; the focus is on modernising systems in preparation for IoT", "Trials were inconclusive as to how to use them in setting rates", "We are in the exploratory stage and have investigated various IoT platforms to establish which is appropriate and suitable for us adopt from 2019 onwards".

The third most common reason was an unwillingness to invest in an area that was not fully understood. "It's too complicated to implement in the company today", said one respondent, and a number added that they were "constrained by a lack of resources".

3.3.4 Where do you sit?

Another question we tried to answer was where companies sited their IoT team – an administrative decision with potentially far reaching consequences. The most popular choice – at 28% – was the innovation department. Besides being the intuitively obvious place to site a mould-breaker, there is also a sense that this allows the IoT offering to be both incubated and quarantined from the rest of the company. The aim is to let the fledgling IoT ›

Figure 3d



› offering focus on its challenges without distracting the rest of the company from its day-to-day business.

As part of the survey, we solicited comments from companies as to why they chose to locate the connected insurance product where they did. Among the comments we received for innovation was that it allowed "ideas that are outside the mainstream" to develop until they were "ready for a go/no go decision". It also provided a good environment for experimentation: "Try it there first, and if it works, develop it all over the company". A second factor was that it was the innovation department that was most likely to have initiated and led the development of an IoT product, this was the case in 59% of companies that set up permanent teams. It is quite natural for the department with responsibility for a complex and novel product to situate it where it can keep an eye on it.

Those companies that did not cite the IoT experiment in innovation were equally divided as to the best alternative. The survey found that the choices were between strategy, within a business line), IT/technology, next to the "C-suite" board-level management, marketing and digital or as a standalone department. The lack of consensus no doubt reflects the industry's general lack of experience, and the differing opinions among companies as to what an IoT product is for, and which teams within their organisations have the capability, the capacity and the enthusiasm to take the project on.

Broadly speaking, the advantages of putting the new team with the leadership in senior management or strategy were firstly that it could expect to have the support of senior staff, an obvious prerequisite for success. Secondly, it would be easier to balance the technical and the business sides of the initiative during development and, thirdly, the product could be rolled out quickly and efficiently across the business.

Those that chose a base in IT or digital did so because they were most concerned with the need to fit the IoT offering with the organisation's wider digital agenda, and it was felt that it would be quicker and easier to control and adjust the product as it's developed. By contrast, those that picked marketing as the lead department were anxious to concentrate on the business model, although they also considered it a good central site that would be able to pull the strategy together and liaise with individual lines of business.

The decision to site the department within an existing business line was taken by companies that wanted to accelerate development by bringing the product into "direct contact with business reality" and establishing it as "not just an innovation" but "part of regular business". As one comment put it, this was the "best way to evolve the consumer proposition internally by proving the value and strategic challenges it solves". ■

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CASE STUDY: BNP PARIBAS CARDIF

When all these issues have been resolved, insurers are ready to bring out their product. Again, there are choices in how the roll-out is phased, which can be anything from a maximum impact "big bang" approach to creeping expansions and soft launches. After launch, many companies will still be in R&D mode as they begin to get hard data on how the product is performing, and in a sense, they're journey will just be beginning.

This is demonstrated by the experience of BNP Paribas Cardif, which launched a connected home product as long ago as 2013. Simone Macelloni, the Head of Marketing R&D, says the results were as positive as they were unforeseen.

Simone Macelloni: "In Italy, we started to launch these products in 2013, now after four years, six or seven companies are selling a product with telematics that is like our product, which is a Wi-Fi-connected black box that has a water-leakage and smoke sensors, an AC power spike ›

› sensor and now someone is adding a very basic web camera. So, now we have sold about 20,000 policies with telematics, which is not a bad number of this kind of policies."

So, the launch was a modest success, however once the product was up and running, it provided a platform for further interaction, and further institutional learning that would not have been possible without it.

Simone Macelloni: "We had the opportunity to speak about this product and to interact with the other kinds of companies, such as utilities and telcos. So, from the point of view of value proposition and portfolio innovation, it was a very good achievement for us.

Now, managing this product, we find out that there are some features on this product that can become also a help, a solution, an additional advantage for a certain set of potential clients. So, we are working in the second version of the product specifically over these kinds of driver.

These additional advantages included a reduction in the number of claims alongside a slight increase in their frequency, which he attributes not so much to the sensors themselves but the "psychological effect" they have on the customer who is "more aware of having an insurance product to cover different aspects of their life. But the loss ratio is significantly better than traditional home insurance.

There is 20% gain for the company in terms of the reduction of cost of claims with respect to telematics and non-telematics products."

One finding that is of interest is the water sensor. Many insurance people are sceptical about whether they can raise the alarm in time to mitigate a water damage claim, well BNP Paribas has found that they do.

Simone Macelloni: "In case of the water leakages, we found that the operating sensor was warning the client of a leak, and even if it was a weekend or at night, it was possible to avoid bigger damage thanks to the telematics and thanks to the box. On the other side, it is reducing also the fraud factor over certain claims in which people are asking for payments of some claims,"

Another unexpected finding has been that it takes a long time to accumulate enough data to make actuarial decisions about varying the level of premium charged. BNP Paribas' experience is that it has taken three years to implement fully its delivery model and be confident enough in its cost model and the technology platform to guarantee a premium advantage for clients who are fitted with telematics.

Simone Macelloni: "So, at the end, we are now thinking about giving a discount to people that are using telematics." ■

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4

The Insurance Tech Stack

INSURANCENEXUS

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4.1 INTRODUCTION

To make IoT-enabled insurance happen, it is not enough to offer every customer a shiny new device, or to sign a partnership agreement with a third-party technology company that has already sold a few million of them. Each insurer must think about all the activities that have to be performed to exploit the value of data along the value chain and deliver a superior value proposition to the policyholders.

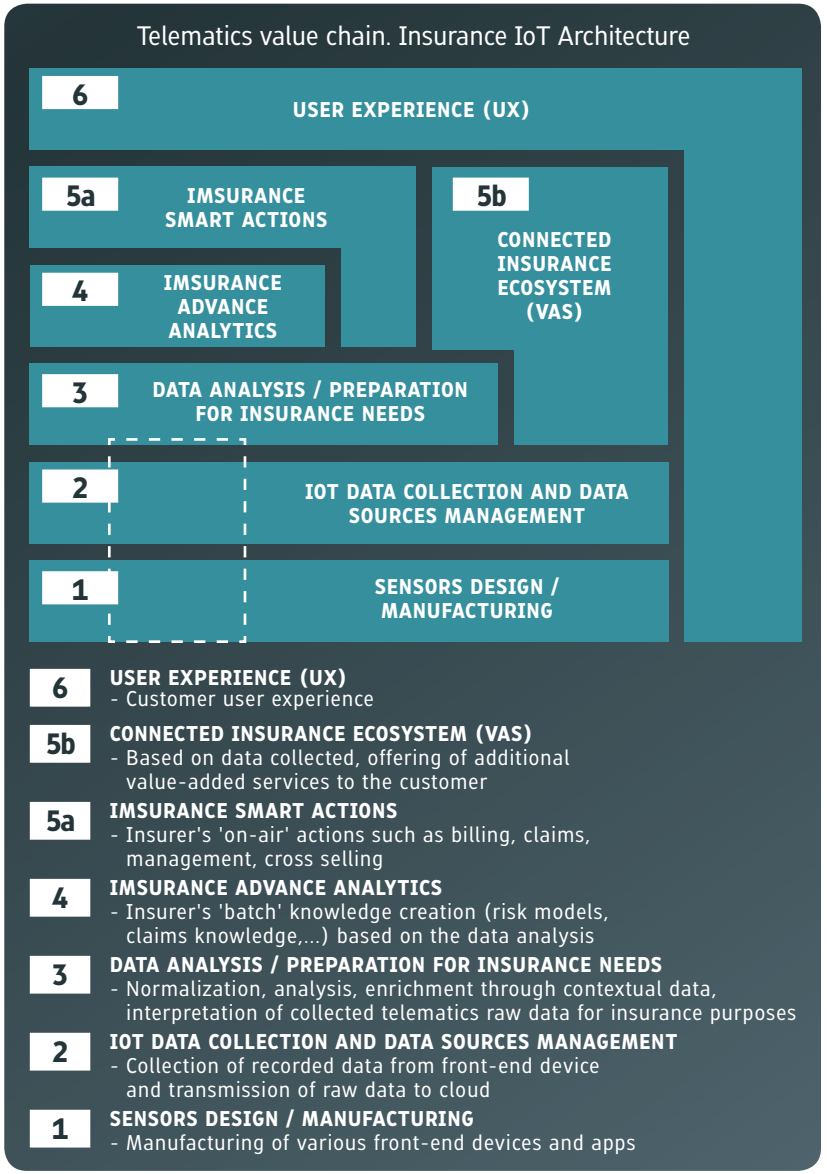
The IoT Insurance Observatory has rationalised the information systems architecture for Insurance IoT offerings as six layers. Matteo Carbone, says this gives companies a framework within which they can make decisions about their "technology stack".

Matteo Carbone: "There is no single right answer that applies to every situation," he says. "In my experience, the best practices consider the pros and cons of all the options on each layer and choose those with the best fit for their particular needs. What is key for the insurer, whatever was the choice on each layer, is to have control of the architecture and full access to the data.

About the single steps, some, such as insurer's advanced analytics, is a strategic area where companies can build some competitive advantages if they can combine newly acquired IoT data with what they already have on their legacy systems, so this is one of the areas where they should be concentrating their resources and looking to build up expertise."

So, in general, each option has pros and cons, and the tech decisions depend to a large extent on the insurance line that is being considered, the kind of stake that the insurer is willing to put up, the market availability of appropriate solutions and the range of use cases that will be bundled with the product. ›

Figure 4a



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› 4.2 THE TECH STACK'S SIX LAYERS

1. Sensor design and manufacture

One of the first decisions an insurer has to take when looking to establish an IoT product is whether to work with third-party sensors that are already on the market, or to buy a whitelisted device (that is, one designed and manufactured by a third-party but installed under its brand), or whether to get into the sensor design business itself (with the manufacturing outsourced).

One of the key elements to consider is the firmware inside the sensors, as this will influence the data that is collected. For example, more and more devices now involve some degree of AI, which may make decisions about the data collected, and which may also be interacting with the customer. Ideally, the insurer should know enough about how the data is acquired to take it into account when analysing it, and it will also want to fine tune the device to make sure it has enough reliable data to allow optimal operation for its front-end services and back-end processing systems, thereby achieving some of the benefits discussed in the previous chapters. The same kind of considerations must be made when the collecting device is based on an app that has access to a smartphone's array of sensors, although here the app's algorithms are the key to making the whole thing work as designed.

2. IoT data collection and management

This layer, which is not insurance-specific, performs all the basic activities of any IoT platform, such as the management of data sources and devices, real-time data transmission to the cloud and cyber-security. The general aim is to capture raw granular data for real-time processing and inspection by analytics.

3. Data analysis

The key is to consolidate data from many sources, including

contextual data, in a single cloud-based repository. This is where data is normalised, to make sure apples are being compared with apples, and to account for any skewing factors. It is also where it is interpreted and interrogated to generate comparisons and correlations between variables. The aim is to set up an AI that can give the insurer a single source of truth about its customers, their risk profiles, and any claim that might happen.

There is also an option to build in processes that reduce the complexity of the data set, and this is one of the most important choices for an insurer. Matteo Carbone comments that some ›

› insurers set an output of 60 KPI for every second of the trip, in other words, they try to work with their insurance advanced analytics on a dataset with the same granularity of the raw data. Others, he says, have defined a completely opposite approach, producing a single score at the end of the policy period, so a much smaller dataset needs to be used in layer 4.

4. Insurance advanced analytics

This is the actuarial layer where insurers can detect the patterns they consider when compiling underwriting risk models, understand how particular variables affect the frequency and severity of claims, and how the details of an incident relate to the value of the claim. This is where insurers can develop the knowledge they need to leverage the usage of algorithms and machine learning to handle routine tasks.

5a. Insurance smart actions

The job of this layer is to apply knowledge developed at the fourth layer to offer personalised products based on a customer's risk profile, price risks, manage claims.

5b. Connected insurance ecosystems

As we detail elsewhere in this report, it is assumed that insurers moving into the IoT space will be more and more part of a wider cross-sector ecosystem, and some may even be looking to build their own around their insurance IoT product. As a result, the tech stack they develop should be able to exchange data with third parties based on open APIs (application programming interfaces). This means that as well as accepting data from a variety of sources, the insurer's architecture should be able to orchestrate the interaction with third parties. This may allow the distribution of insurance coverage to the customer base of these ecosystems, offering an increasingly important alternative to the agent/broker and the direct-to-consumer distribution models.

6. User experience

This layer aims to give the customer the experience they want at any touchpoint, from the device installation to the claim submission, targeted at that individual customer and situation. ›

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Figure 4b

What are the 3 main technology challenges in developing Connected Insurance products? (all respondents)*

SCORE	RANK	KEY CHALLENGE
553	1	Data Security & Privacy
421	2	Interoperability & Compatibility
310	3	Analytics
215	4	Sensors & Devices
215	5	Manage the Service Provider Ecosystem
190	6	Regulation
172	7	Platform Choice
141	8	Automation
137	9	Connectivity
118	10	Scalability
94	11	Data Storage
55	12	Maintenance & Updates

*Respondents allocated 3 points to their first choice, 2 points to their second choice and 1 point to their third choice

› 4.3 THE TOP CHALLENGES

As part of our survey of 500+ practitioners, we asked them to nominate the three main technical challenges that companies had to meet when they designed their IoT product. This question revealed a strong consensus as to what the principal difficulties were, with the first 3 issues together winning almost as many votes as the remaining 9.

4.3.1 Data security and privacy

It was no surprise that data security and privacy were at the head of the queue. This is the point of intersection between the complex of social, legal and technical problems that have been thrown up by IoT. In many ways, the present era is an unfortunate time to be launching connected products: never has personal data been the focus of such popular concern, and such tight regulation. This applies across the range of insured risk: people demand privacy whether at home or work or in the car driving from one to the other; health data is the gold standard of information privacy; commercial data can be worth millions.

To gain the trust of a public whose suspicion borders on hostility, companies must be able to promise privacy, and then keep it. To do that, cyber security must be very good indeed, despite the volumes of data that will be flowing, and the many possible points of attack in a domestic network. This issue is particularly serious when you consider that it is the only one that conceivably poses an existential threat to IoT insurance: if the public develops the perception that a connected policy involves introducing bugs and spy cams into their own home, the job of the marketing department will become harder than it would otherwise.

4.3.2 Interoperability & compatibility

The second problem, interoperability and compatibility, reflects the relatively early stage the industry is at. At present, much of ›

› the IT sector lacks a "common data environment", and with that the common protocols required for interoperability. Typically, two systems that use different software, or the same software with different release dates, or the same software with the same release dates but configured for different operating systems, do not understand each other – even when they are, in theory, supposed to. In time, common international standards will emerge, but this may take some time. Currently, many large software vendors are working on proprietorial systems, and the advent of universal plug and play is quite distant.

4.3.3 Analytics

The third issue, analytics, suggests an understandable nervousness about the kind of issues that may be thrown up by the kind of data flows that the IoT generates. This is partly because insurers aren't used to dealing with continuous data streams, and the IT skills of most insurance companies are not particularly deeply embedded in the company.

Much will depend on the reliability and accuracy of these analytics, with the additional issue that most of the data will be digital junk, but a miniscule fraction may be very important indeed, the diamond in the rubbish heap problem. If an insurer is offering a value-added service that involves monitoring a specific situation, say, the health of someone with heart disease, then it must have analytic and reporting systems that it can rely on.

4.4 STACK BUILDING: WHO'S INVOLVED

The insurance company of the future is going to have to enter a new relationship with technology. Rather than being a concern primarily for specialists who work in a narrow technical field at some distance from the rest of the company, it will become central to the way businesses produce, market, manage and operate their products.

Companies face many decisions about their stack in the early stages of a product, based on how they choose to tackle the six layers outlined in figure x. The choices they make here are likely to have far-reaching implications for the development of the product further down the line. This section of our report will offer a high-level account of some of the issues that will be involved in moving from a generic corporate IT network to a specialised system that is able to perform actions that, as closely as possible, resemble miracles.

The first steps of any insurance IoT project are strategic choices about the role of IoT and the concept design of the value propositions. The history of IoT to the present day includes many cautionary tales about companies that began with a shining device and assumed that they would be able to define their strategy and customer value proposition once they'd seen what it could do.

Once the framework is established, companies have to consider how best to develop the tech stack. This should be an opportunity for close collaboration between the people who design the tools, the people who design whatever it is that the tools are going to be used for, and the people who are going to be affected by whatever that is. So, we should have the C-suite and the innovation and strategy people working with the IT experts and representatives from departments such as marketing, underwriting, actuarial and claims who will be depending on the finished product to make their life easier.

Our survey statistics show in 59% of cases it was the innovation department, and in 46% of case the senior leadership that took the initiative. However, there may be many potential spurs to action, in addition to the fear of being left behind by the rest of the industry.

Leigh Calton: "The project may begin in the strategy area, because you need › people who can think beyond the obvious about what

› insurance is today and where it might go, but it also has to come out of a function that's close to the customer because there's no point designing products they don't want to buy. Some of it comes out of claims, where the guys say: we're getting a lot of escape-of-water claims, what can we do to mitigate that?"

Companies should also consider hiring people with specialist skills to manage the stack, or whichever part of it is controlled by the insurer. There may be a choice to tap different consultants for each layer of figure x, depending on their in-house skills and the need to orchestrate the work of the vendors who will potentially be involved in each layer. They also must see to their future needs. One obvious issue is the need to assemble customer data, present and archival, in such a way that it can be mined to improve

There's no point designing products customers don't want to buy

Leigh Calton, Senior Consultant, Advisory, **Consumer Intelligence**

underwriting and uncover unexpected correlations between variables, car colour and accident frequency is a something of a classic, as well as personalising marketing and relationship management. However, there are many other requirements, which we turn to in the following section.

4.5 FUNCTIONALITY

4.5.1 Smart automation

One fundamental ability that all companies will require from their stacks is process automation. Smart automation is at the heart of the so-called fourth industrial revolution, at the heart of IoT and in the future it will be basic and essential to insurance companies. As we have seen elsewhere in this report, automation has the potential to transform the customer's experience for dealing with their insurer, and the provider's experience of assessing, managing and transferring risks. It will also eliminate, as far as possible, manual inputting for the insurer's employees, and it should offer managers much greater visibility of their business, with the help of dashboards displaying information based on the company's KPIs.

4.5.2 AI / machine learning

The ability to add AI/machine learning systems to layers three to five in the diagram is where a lot of the extra value and productivity of digital technology makes itself felt. The potential benefits of intelligent automation include both the creation of new knowledge, ever-increasing efficiency and the ability to take the right actions at the right moment.

4.5.3 Compatibility with 3rd party devices

The stack will also have to deal with a wide variety of third-party peripheral devices continually inputting data in various formats. Up until now, one of the big differences between insurers and banks was frequency of transaction: whereas customers continually spend and make money, the only regular contact they have with an insurer is at renewal. With the IoT, of course, all that may be about to change: usage-based insurance and the possibility of offering additional services means that insurers' networks will have to evolve into something quite other than they have now, with a different order of complexity and a radically new set of risks and opportunities.

4.5.4 Intelligent waste disposal

Another significant challenge is intelligent waste disposal. One thing we know for sure about the IoT is that it will generate huge amounts of ones and zeros that are essentially one-use, after which they are digital waste. How will this data be filtered? How much will be analysed at device level, how much discarded ›

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› and how much will be sent to the cloud and what stored? Are those decisions going to comply with data protection regimes in every jurisdiction where the company does business? This issue is of importance because it is axiomatic that the more data a company can accumulate, the more it can learn about how particular variables correlate with the frequency and severity of claims, and the more accurate its pricing algorithms will be in a given instance.

4.5.5 Cloud compatibility

Other matters to consider are the need to make the stack compatible with cloud computing. The possibilities offered by the cloud should make the introduction of these evolved systems easier to execute. For one thing, the cloud should make scaling up the system easier, because companies can simply add storage and CPU power as their need for them increases. It should also allow companies to bring a product to market more quickly, because they will no longer have to worry about maintaining their own servers and back-ups.

Another advantage of the cloud is that cloud service providers have become skilled at building up cybersecurity systems, thereby potentially relieving insurers of a significant burden. The concept of "software defined perimeters" has been developed in the past few years to make it easier to patch systems, establish "endpoint protection" (in this context, establishing secure access for all the smartphones and tablets that will be accessing the network), enforcing "multifactor authentication" (typically, a password and a verification code texted to the user's phone) and the granting of information on a need-to-know basis.

4.5.6 Biometric Identification

Other issues to consider include dealing with biometric identification rather than the traditional username and password, partly to make the system quicker for the customer, partly as a ›

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› means of fraud detection and prevention.

However, although biometric recognition cannot be hacked or phished, the consequences of information leaks are more serious, since a customer can easily change a password, but not the pattern of blood vessels on their retina or their fingerprints. And there have been cases where fingerprints have been photographed and copied and irises mimicked by contact lenses, so companies should consider ways of employing multi-factor authentication without losing the convenience factor.

4.5.7 Blockchain

Another issue that falls under this heading is the blockchain, a complex problem/opportunity that gives companies access to (almost) perfectly reliable data at the cost of paying for an exponential increase in computing power to handle the verifications required. The first moves in insurance blockchaining have already been taken, with an ambitious offering already launched in Singapore,[10] as well as in specialist areas such as flight-delay cover,[11] and the marine line.[12]

4.5.8 Conclusion

Finally, the migration to a new kind of IS may seem like scaling a mountain, but beyond it are many more ridges, stretching into the distance. Even with the advantages of cloud computing, the new network will have to be upgraded continually to deal with changes in business conditions, whether driven by technology, customer demand, regulatory development or simple fashion. To illustrate just how far that journey may take a company, consider the possibility of creating a robot enterprise, run entirely on self-improving algorithms and relying on blockchain data acquired from the IoT to assess claims. In this thought experiment, the IT/IS department would be the cuckoo that pushed all the other functions out of the nest, before making all its own staff redundant. Far-fetched? Certainly, but this kind of "decentralised autonomous organisation" is now conceivable in a way it wasn't before.

4.6 AN AWKWARD LEGACY

All these issues are not just a challenge for insurance companies looking to make their IT systems do things they've never done before. A 2016/17 survey of more than 600 companies with a turnover greater than $250m in the US and Europe, commissioned by digital transformation company Virtusa and carried out by research firm Forrester, found that most were struggling with the technical challenges. As the executive summary put it: "Firms show weakness in managing and activating customer and business data. Within operational excellence, they struggle in data optimization, and within business innovation, they are most likely to struggle with digital marketing capabilities."[13]

A clue to why this should be so for insurance is given by another survey, this time by the Boston Consulting Group, published August 2016[14]. It found that the average age of core insurance systems was 13 years, this was 2003, which in computer years is several generations. It found that more than a third of insurance companies around the world were offering web-based applications that were not suited to either the cloud or mobile phones, only a third were using either a central repository for customers' data or an automated customer relationship management system, and fewer than two thirds offered products ›

[10] https://markets.businessinsider.com/news/stocks/insurance-market-launches-inmediate-a-new-eco-system-for-blockchain-insurance-in-collaboration-with-zilliqa-fwd-and-deloitte-1023113761
[11] https://medium.com/@policypalnet/new-product-launch-blockchain-empowered-flight-delay-insurance-38fcfccb5e22
[12] https://www.ey.com/gl/en/newsroom/news-releases/news-ey-worlds-first-blockchain-platform-for-marine-insurance-now-in-commercial-use
[13] http://www.virtusadigital.com/wp-content/themes/the-box/images/digital-transformation/The%20Digital%20Transformation%20Race%20Has%20Begun.pdf
[14] https://www.bcg.com/en-gb/publications/2016/building-a-digital-technology-foundation-in-insurance.aspx

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› linked to a mobile app. There is room for improvement.

The extent to which the company's legacy system can be leveraged to meet the needs of a digital product is an important question to answer. Many firms are taking an "it'll do for now" approach to their IT, which may be good enough to handle a small-scale, early-stage experiment, but is still just kicking the can down the road.

The obvious solution for many companies is to buy an off-the-shelf solution from giants such as Microsoft, Amazon Web Services, Oracle or IBM. This will allow them to get into the cloud and offers the functions they need to get an IoT product off the ground quickly, thanks to API managers that allow the insurer's product to be distributed through third-party apps and offer the ability to accept data from devices running different operating systems, as well as the availability of ready-made AI solutions such as IBM's Watson. The attraction for some companies who may have relatively modern, but not modern enough, legacy systems is that they can simply put the big vendor solution "on top" of their existing system as an inelegant but reasonably effective way to get their new offerings into the marketplace.

At the opposite extreme, companies can go down the insurtech start-up route and design an offering using open-source systems such as Hadoop specifically designed to work with the kind of data flows that come from IoT telematics. This would be suited to companies that are developing their IoT product "in the garage", at one remove from the core business. The adoption of this system has the advantage that it can tap into the fast-cycle innovations that come from working with open source code; essentially, they can tap into the work of thousands of programmers around the world who are working on plug-ins and patches that can add extra functionality to the offering.

4.7 CONCLUSION

There are many ways that an insurer can set up its tech stack, depending on how much of a rush it is in to get a product to market, there are advantages and disadvantages to being early and being late. Other factors in the decision matrix include how much money it wants to spend, the lines it specialises in, its appetite for risk, the nature of the product it wants to begin with, and the state of its existing IT/IS systems.

Ultimately, of course, this is a strategic decision par excellence: the future prosperity, even viability, of the company is likely to be at stake. Now there is no industry consensus on what the right answers are, most of the firms we interviewed for this report were in the process of trying to decide how the options introduced by IoT might possibly fit into a business model, and few had reached hard conclusions that they were willing to make public. Nevertheless, there is general agreement that the riskiest strategy of all is to take no risks, so for better or worse, it's time for companies to place their bets. ■

5

Long-Term Future Opportunities

INSURANCENEXUS

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5.1 FROM CLAIMS PREVENTION TO CUSTOMER ENGAGEMENT

In the first four sections of the report, we looked at how insurance companies are searching for ways to use flow of data they can gain from the Internet of Things to create extra value and share it with the customer. We looked at the options and strategies available to companies, and showed how the insurance people who are in front line are thinking them through. We also looked in detail at how the insurance company as a social and business organisation is responding to the challenge, and investigated the technical challenges to be overcome in order to create the end-to-end digitisation that is likely to be characterise the future of insurance.

In this section of the report we take a more speculative look at the impact of digitisation on an industry that has evolved at a remarkably slow rate over the centuries, and is now facing an environmental shock. It is possible that the traditional role of the insurer as a dedicated provider of protection against risk may mutate into something else altogether. And that means that companies have unprecedented ways to get their business strategies right – and wrong.

5.1.1 Environmental pressure

How seriously are insurance companies taking the Internet of Things? The picture that emerges from more than 20 interviews with front-line managers, and a questionnaire completed by more than 500 respondents from some 300 companies around the world, is of an industry that is at once engaged, excited, sceptical, curious and puzzled by the possibilities of digital technology in general, and IoT in particular.

That spectrum of responses is understandable, of course, and is shared with other analogue industries faced with the need to evolve in response to rapid changes in their environment and are wondering whether they need to grow gills or a couple of extra legs. As we noted in an earlier section of this report (3.2.1), what was less evident was a sense of urgency. In a way this was understandable, given the immense size of the industry and the vast sums its manages; in another way, it was surprising, because the danger it is facing is becoming increasingly apparent.

In our interviews with the business people who are being paid to think about this question, the consensus was that there was no consensus. On the one hand the home of the future will become a buzzing infohub in which all kinds of mundane devices generate data and send it somewhere. But on the other, it's not obvious quite what this means for future services. To give two contrasting examples, British Gas now offers "Boiler IQ", a monitoring service that raises the alarm if a customer's central heating system stops working, triggering a text and an engineer's visit. And many companies offer voice-activated smart TVs that record private living room conversations and sent them off in the manner of the telescreens in 1984.[15] For an insurer, of course, these examples suggest that they may be facing competition from neighbouring industries for certain kinds of insurance, and that their freedom of action is circumscribed at every step by issues of privacy and trust. Added to which, it remains to be seen what signals can be discerned amid the noise of normal life.

5.1.2 An evolutionary checklist

The first conclusion to be drawn from the discussion so far is that, for a traditional insurance carrier that writes policies in these three staple lines, the hour is later than it thinks. This is underlined by many responses in the comment box of our survey, which noted that the question of IoT and the related technologies of AI and machine learning, were not burning issues for their senior managers. The evidence does not support a policy of masterful inaction. In fact, the need is not so much to develop digitised products, but to produce digitised companies. ›

[15] https://www.cnet.com/how-to/your-tv-is-probably-tracking-you-heres-how-to-stop-it/

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› It is clear that the technology is just about there to create what one of our interviewees, Tony Laudato of Hannover Re, calls "insurance 2.0". He envisages this as the bringing together of emerging insurtech marketing and distribution, and the actuarial skills of the established players, with the reinsurers acting as matchmakers. However, it would also involve a root-and-branch reform of established companies' internal culture and practices, and the forging of a new kind of relationship with those suspicious strangers that the insurance industry usually refers to as "the customer".

The good news is that the path is becoming increasingly well-trodden, so management do not have to begin from first principles; the bad news is that they will have to say goodbye to much they are familiar with. The to do list looks something like this:

1. Double (at least) investment in IT. In 2016, insurers spent 3.2% of their revenue on IT whereas banks spent 6.8%.
2. Replace legacy information systems with their state of the art equivalents. Companies such as Microsoft and IBM have developed systems that can make high-resolution pictures of real-time data. Some of these can even process data that is unstructured, which is going to be useful when dealing with the IoT. "Process mining" applications such as Celonis produce software that can analyse a company's systems and highlight inefficiencies and should be used to do just that.
3. Invest in a second class of software that automates the routine writing of policies and paying of claims: with enough background data, insurers can do this with very little information from the customer. Insurance should be as hassle free as possible, for both sides of the transaction. Add AI and machine learning to detect fraud and sharpen efficiency.
4. Bring in new HR processes to make managers' performance more transparent, devise ways of rewarding initiative and get everybody thinking about how they can do their jobs more efficiently.
5. Dissolve the traditional departmental structure in favour of cross-functional project teams that match skills with problems. Simplify. Bring centralised departments, such as IT, closer to the business units. Create new customer care positions to create the capacity for improved customer engagement.

Once these preliminary steps have been taken, the company is positioned to launch new products, and to market them in new ways.

5.1.3 Two approaches to customer engagement

All relationships are based on the exchange of data, of one kind or another, and this also applies to the insurance company and its customer. But there is a sharp division between the kind of relationship that can be based on it.

The picture that emerged from our interviews was that customers are happy to interact with their insurer if they are doing something that is considered socially to be a good thing to be doing, and the insurer does something to recognise and validate their behaviour. The most vivid example is Discovery Healthcare's Vitality programme, which gives its customers a pat on the back and a treat when they do something that promotes their health, such as going to the gym for a work-out, or just completing a certain number of steps in a day. Similar value sharing possibilities are created by vehicle telematics, which can measure and acknowledge sensible driving styles.

The other, more counter-intuitive, way to win customer loyalty is to have as little to do with them as possible. Here the goal is to make insurance happen, as it were, by magic. What insurtech ›

› products tend to have in common is that they don't need a lot of information before they write a policy or pay out on it, and this is a goal that established players can emulate. In our interviews, Andreas Braun, Allianz's Head of Global Data, described a way of insuring a property based on nothing but a postcode. This approach is, of course, made possible by the company's hoard of public and private data about the historical risk profiles of certain postcodes. Meanwhile, routine claims can be paid out within seconds of their being made, and suspicious claims can be picked out and escalated. Other interviewees raised the possibility of paying out before a claim was even made.

5.2 THE ECOSYSTEM AND THE THREAT OF COMMODITIZATION

5.2.1 What is an ecosystem? And how do you join one?

It has become a familiar idea, particularly among business consultancies, that digitisation is leading to the creation of networks of companies from different industries who combine to offer services on a common platform, such as a smartphone, smart speaker, or social media website. These services come with AI-automation and machine learning, are usually clustered around a given human activity or concern, such as getting from A to B, or maintaining one's health and wellbeing, and the buying and selling process is typically concluded with a few clicks or taps. This kind of organisation has come to be called an "ecosystem", to suggest its complexity and interdependence, and the idea that it will be a new kind of arena for competition, containing food as well as value chains.

Business consultancies are not shy about making big claims for the ecosystem concept, nor about hanging large numbers from them. So, a recent monograph by McKinsey talks about a "paradigm shift" that will divide the global economy into 12 massive ecosystems with a combined revenue of $60 trillion by 2025.[16] Naturally, all these sectors have risks, so insurers are potentially players in everyone, to varying degrees. But what in practical terms, are the implications for how carriers write, sell and pay out on the policies that cover them? What kind of deals should they do, and with whom?

Well, first things first. The data that is going to be used to "operate" insurance policies across a given ecosystem, or sub-system, must be usable by all the players. And insurers will have to be able to rely on its integrity if they are going to base an increasingly large part of their business on what it says.

Many partnership announcements have been not followed by any execution. The implication of these stories is that before companies can enter the jungle, they must sharpen their machetes. This means forming mini-ecosystems with specific technology companies, brokers, business consultants, and anyone else who has a grasp of the technology and a vision for using it.

This is important for its own sake, of course, but it is also important because, if companies are not able to master the intricacies and esoteric details of "insurance 2.0", they are unlikely to be able to shape the kind of systems that develop. In more concrete terms, they need to maintain a direct relationship with the customer or face becoming a commoditised add-on to goods and services offered by companies that do have that link. Or, worse yet, they may find that the company at the top of the food chain decides to offer its own insurance. This last possibility is a clear and present danger, at the time of writing, the share price of some US insurers had just suffered a wobble following rumours that Amazon was planning to begin writing home insurance and connecting it in some way with its Alexa home hub.[17] At present this has yet to be substantiated, although the company is reportedly in talks over setting up a comparison website. At the time of writing, no firm proposals have been made public, although one analyst commented to the Reuters ›

[16] https://www.mckinsey.com/industries/financial-services/our-insights/insurance-beyond-digital-the-rise-of-ecosystems-and-platforms

[17] https://www.insurancebusinessmag.com/uk/news/breaking-news/insurers-shares-slip-as-amazon-home-insurance-rumoured-102714.aspx

› agency in August 2018 that "as Amazon becomes a larger part of the home ... you can make the case that insurance is the next logical step for this company".[18]

5.2.2 Touchpoints

One of our interviewees for this report was Cecilia Sevillano, the Head of Smart Homes Solutions at Swiss Re, and she gave a lucid account of the choices facing insurers as they work out where they will fit into the ecosystem, relative to device manufacturers, distributors and service providers. What kind of coalition do they build? As Sevillano says, the range of options on the home front is broad, and includes the manufacture of sensors, their installations and maintenance, their role in accident prevention and service provision and claims-handling. Each of those options is a potential "touchpoint" between the insurer and the client, and it is these touchpoints that insurers should organise themselves around.

Safety is the bonding element in these new emerging value propositions

Cecilia Sevillano, Head Smart Homes Solutions, **Swiss Re**

Cecilia Sevillano: "Insurers are asking themselves how broad a service they want to offer when they're thinking about their business models. But, equally, energy companies and telcos are also thinking about which of these touchpoints they want to be present. The solution would be partnerships, but at the same time the insurers fear they may lose client ownership, because at some point if they just accommodate, become part of the energy company's offer, the client will see only the distributor's brand."

This question is important because there is an assumption that the ecosystem will be as much about struggling for control as it will be about co-operating to provide enhanced services. And the struggle will be between which companies gets their investment strategy right.

Cecilia Sevillano: "What will be the right balance between building their own product that they can also distribute through their own network and using alternative distribution channels?"

Or, to put it another way, which touchpoints should they try and control, and if they succeed, how will that affect their bargaining position relating to the other players in the ecosystem?

In Sevillano's view, insurers are experts in understanding and pricing risk, so that automatically makes them safety consultants.

Cecilia Sevillano: "Safety is the bonding element in these new emerging value propositions and offers. So, we are shifting from a claims-handling business to a prevention one. The willingness to pay for preventing things from happening is much stronger than paying for insurance that offers a monetary benefit only in the event of a claim, which may never happen. People are therefore much more willing to engage in this offer for prevention and that's where insurers are stronger than an energy company and have more credibility than a telco or a device manufacturer."

Following this logic, home insurers should focus their investment on devices, data systems and reactive services that remove risk. What that means in practice is still to be decided, but most research is being conducted into the detection of slow water leaks and intrusion detection, for which reliable sensors are already on the market.

In the future, other possibilities may appear as sensors acquire more visual intelligence. How about a camera that sounds the alarm when it recognises that a candle is about to set fire to a pair of curtains? ›

[18] https://www.reuters.com/article/us-amazon-insurance-exclusive/exclusive-amazon-considering-uk-insurance-comparison-site-sources-idUSKBN1L10HS

› 5.2.3 Ecosystem services in the health and live lines

What is true of the home and contents insurance is also true of the life and health lines, with the difference that the safety proposition is considerably clearer.

As discussed in earlier parts of the report, the ideal relationship between an insurer and the client is one in which the insurer offers additional services that fulfil definite needs. Whether physical or psychological, the insurer can do so in a way that convinces the client that it is making a positive difference to their life, without the client having to go to the bother of having an accident. For other services, where there is no positive difference to be made, the insurer can sink into the background, but retain the possibility of intervening when, or even before, something goes wrong.

A large-scale survey by Bain & Company, a strategic business consultancy, produced some figures to back up this view. The company canvassed 173,000 policyholders and noted that the results showed "strong momentum behind ... the growth of ecosystem services. Insurers are discovering new ways to build loyalty by offering their customers an interconnected array of services that extend beyond insurance".[19]

The clearest example of the first type of approach is based on the incontrovertible fact that people in the industrialised world are, or have been, living longer and are increasingly aware of the inverse correlation between going to gyms and going to hospitals. As we know, willpower may not be enough to persuade people to make healthy choices, so some friendly cajoling on the part of a health/life insurance company looks like a service worth having. Here the ecosystem is relatively simple and involves hooking up with service providers such as gyms, food suppliers and the makers of fitness trackers to provide the basic service and the data, then adding discounts and rewards from participating retailers. The experience is enhanced by a slick smartphone interface that requires minimal data entry.

This kind of relationship is ideal from the point of view of the insurer because the technical complexity is relatively low, and it can design the whole process, and to develop it further once it has become established. For example, a company may be able to include more medical components for patients who develop diseases or disabilities that require continual monitoring, or the management of complex regimes of medication. In the future, this may involve further partners who are able to provide general ›

[19] http://www.bain.com/publications/articles/customer-behavior-loyalty-in-insurance-global-2017.aspx

› nursing on an as-needed basis, or specific services such as physiotherapy or psychotherapy.

This example illustrates the more general point that some people need more services from an insurer than others, and it is those people who will be the first adopters for these kinds of ecosystems. Besides those growing old gracefully, there is the cohort that are buying their first car, moving into their first flat, or heading off on their gap year travels. There's no doubt that many parents would welcome any help that insurers could give in keeping their offspring safe on the road, and in providing them with assistance in the event of a breakdown or accident.

5.3 TECH CONVERGENCE

In the discussion so far, we have looked at how digitisation will affect insurance within the "lines" that have developed over the course of the past century. However, digitisation is proving to be something of a universal solvent, and it is by no means sure that the 21st-century industry will retain its compartmentalised risk pools.

One intriguing possibility is that insurance could follow individuals and offer aggregated insurance for aggregated risks at an aggregated premium. So, a customer might choose what cover ›

› they wanted from a menu of options, and receive a regular bill listing the risks that had been covered under each heading. This would be based on the person's data trail, as tracked by their smartphone, watch and speaker, their connected car, and whatever other devices might be added to the mix. It's easy to see that, when analysed by an AI enhanced by machine learning, it could be build up an extremely fine-grained picture of a person's habits and activities, and thereby offer an insurance premium based on the individual's behaviour rather than which risk categories they belong to.

Frank Fripon, the general manager of strategy at KBC Insurance, predicts a demand for this kind of offering, which he says will be based on the desire of people to find companies that will make their problems go away.

Frank Fripon: "You can see that there is a new direction where the question is: don't deliver me a product, deliver me a solution," he says. "So, we are looking to use new technological possibilities to respond to this unburdening request from customers."

Of course, the technology that would enable this approach is some way away. IoT solutions are based on ad hoc alliances between technology companies. As a result, the picture is fragmented, and the industry does not have the basic interoperability standards needed to collect the data from different connected devices.

Andreas Braun: "The protocol discussion on IoT is just happening, and it's led by Intel and Apple and Google and whoever, so this is totally a tech topic driven by tech companies, and there are many discussions on many protocols, on different layers of the protocol. And the question as to where an insurer can play a role here is very difficult because, to be very honest, no insurer is very strong in technology."

Then there is the further question of what data individuals are comfortable in sharing, and what data companies can collect under the General Data Protection Regulation.

Don't deliver me a product, deliver me a solution

Frank Fripon, General Manager Life & Health, **KBC Bank & Verzekering**

Nevertheless, standards will be agreed and the technical barriers to this kind of end-to-end service will be overcome in time. For example, Warren Chaisatien, head of IoT customer engagement at Swedish IT company Ericsson, commented last year that his company was looking to put in place an "ecosystem of ecosystems". What he meant by this, is a cloud-based infrastructure that could offer app developers and device makers a place to "locate" their services, and which would come with built-in security, analytics, AI and a monetisation engine to handle billing and payment. [20]

As the business case for IoT becomes clearer, and as more and more connected devices appear in the built environment, as 5G networks become established and more smart cities and smart quarters are built, the technical challenges will be overcome. And when they are, different kinds of product will be possible, and (if Fripon is correct) desirable.

The question is, will insurers be ready in time? That depends on whether they have had the foresight and in the words of Davide Devietti, the director of auto insurance at Reale Mutua, "the courage and intelligent foolishness to invest a significant amount of money" many years before any rewards would be forthcoming. ■

[20] https://www.ericsson.com/thinkingahead/the-networked-society-blog/2017/07/12/why-iot-is-an-ecosystem-of-ecosystems/

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6 Conclusion

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CONCLUSION

The Insurance Nexus Connected Insurance report has given a picture of the insurance industry as it begins to explore how it can exploit the possibilities of the Internet of Things (IoT). At first glance, one might assume that the ability to learn more about the risks they are insuring should allow both for policies to closely follow the risk over time, and secondly that the ability to gather more information about a claim will discourage fraud. Therefore, you could assume the net result will be greater profit for companies, and lower premiums for their customers.

At second glance, it is just as clear that the picture is much more complicated than that. As we talked to more and more executives who have the job of turning an unprecedented technological revolution into market-ready products, it became apparent that the industry is only just beginning to work through the practical problems it faces. Indeed, questions as basic as the best way to install a sensor in a building are still the subject of lively debate.

On top of that, it was also clear that the wider digital transformation of insurance and reinsurance is something of a "many body problem". So, while policies are changing, so are the companies that sell them, the customers who buy them, and the wider commercial and social contexts in which the transaction takes place. Ultimately, the ultra-conservative world of insurance may be next in line for the kind of creative destruction that the tsunami of digitisation had brought to IT, telecoms, media, retail, hospitality, manufacturing, financial and business services.

Despite the novelty and complexity of the new world, this report has synthesised the opinions of our interviewees into a number of topics; by way of a conclusion, we will distil the main themes of the report into a number of connected propositions.

NO HALF MEASURES: INSURERS MUST BECOME FULLY DIGITISED

Cecilia Sevillano: "We are seeing that there is a transformation that is going to take place for our clients, and we want to be relevant through that time. In our relationship with our clients we need to be close to them, and what we are developing today are solutions to fast-track them into this next-generation of insurance through smart analytics."

One school of thought in the industry sees IoT as something that can be added to a company's portfolio of products and managed by their existing teams, with a little help from consultants. However, it is unlikely that an attempt to marry digital products to an analogue company will be successful. To realise the promise of digital products, the whole enterprise has to be digital, from actuarial calculations of risk and product development at the back end to marketing, customer services and claims settlement at the front.

The IoT products will act as a kind of corporate sense organ, transmitting rivers of largely irrelevant data. So, the company must develop the infrastructure to deal with it, by continuously improving its analytical power with the help of AI and machine learning.

Insurance firms in the future will compete on the simplicity of their apps and the speed and reliability of their response, as well as the keenness of their price. The true complexity of the processes will be invisible. ›

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› POLICIES PLUS: INSURERS WILL HAVE TO SELL MORE THAN JUST INSURANCE

Frank Fripon: "We are trying to focus much more on a broader range of services, to unburden the client but also to get a larger share of their wallet. We want to create the potential of new fee business that will compensate the premium pressure"

If the IoT is successful in reducing the frequency and cost of claims, it will also reduce the cost of premiums. This may expand the number of policies sold, but insurers can offset the loss on individual policies by adding extra value services. Some services will be preventative, such as alerting a customer to suspicious activity in or around their house, warning a driver of an approaching snowstorm or giving the unfit an incentive to exercise. Some will be administrative: finding lost cars and reliable plumbers and scheduling maintenance for boilers. More still will kick in after an accident occurs, such as directing emergency services to the site of an event.

Over time, insurers are likely to become more adept at designing services that use the data that flows to the company servers from IoT devices in homes, offices, vehicles and attached to the bodies of customers. So far, the greatest strides have been made in the auto line, where insurers have found many ways to help, with health and life showing promise. As those extra services are added, and as they become more personalised and responsive to individual customer's changing needs, an insurers' role may broaden into a more general guardian of their customers' assets and interests.

A NEW KIND OF CUSTOMER RELATIONSHIP

Cecilia Sevillano: "I think the key word here is trust. Ultimately, it comes down to how you position something. I think you'd have to demonstrate to customers that you're not going to misuse their data. If you say to a customer, all the data you give me means I will be able to react very quickly if I think there's something of concern – would you be happy for me to have that data? If you position it like that, in my experience, most customers will say, that's absolutely fine."

This move to a more responsive, individualised service will put a premium on customer engagement. At present insurers and their customers tend to hold a rather wary attitude to each other: according to a 2015 IBM survey, only 43% of US customers polled said they trusted their insurer.[21]

This is obviously a problem for companies that want to get their customers to share the minute details of their private life. However, it is possible to imagine a situation where the new tools offered by big data and the IoT enable companies to offer a service that is, in the right way, both personal and impersonal. That is, personal in that it is tailored to an individual's particular real time needs, and yet maintains an impersonal – and therefore non-judgmental – tone, in the manner of AI voice assistants such as Alexa, Cortana and Siri. Above all, customers must not get the idea that insurers will any way use what they know "against" the customer (unless that customer is attempting fraud, of course).

The rewards for a company that can gain customers' trust is a level of differentiation that has, up until now, rarely been possible in the insurance world, and a level of loyalty that provided a base for selling further products and services, and upselling the ones that are already being bought. ›

[21] https://www.ibm.com/blogs/watson-customer-engagement/2015/09/22/do-you-trust-your-insurance-company/

› COMPETITION WILL INTENSIFY

Dan Campany: "Anything to do with Insurtech – we need to be aware of it, and we need a coordinated point of view around what it means to us offensively, defensively or otherwise."

The need to work out a fully digital insurance-plus offering is more urgent than many companies realise, judging by the comments we received in our survey. The main risk is that if they are too slow to adopt digitised insurance, their flank will be exposed to new kinds of competition.

On one end of the scale are the nimble Insurtech start-ups, often driven by entrepreneurs from the IT sector; on the other there are giants such as Amazon, which are (in the words of a survey published in May by Capgemini) "taking slow, deliberate steps towards establishing a presence in the insurance industry by leveraging their reputation for customer experience".[22]

One lesson that we should all have absorbed from the history of digital disruption is that it tends to creates winners and losers on a grand scale, so companies' business strategies, which were always important, may now become critical.

There was a consensus among our interviewees that insurers will be cooperating with start-ups and out-of-sector companies as well as competing with them. For example, in the future insurance companies are likely to be operating within an ecosystem based around IoT hubs, such as smart phones, smart speakers and smart cars. The idea is that these hubs would control peripheral devices, such as fridges and light bulbs, collect and relay the data from those devices and at the same time act as a distribution channel for goods and services. These goods and services would include insurance as a standalone product, or as an element of other products and services.

However, it's also accepted that no such ecosystem yet exists, and that it is difficult to predict how big they would be and what the commercial implication would be of operating within them. Nevertheless, a number of our interviewees noted the danger that insurance would lose its direct relationship with the customer, and become part of an invisible and anonymous "back end" – a fate that companies had to struggle to avoid.

THE SEPARATION AND BLURRING OF INSURANCE LINES

Andreas Braun: "If you walk, we offer you an accident insurance; if you drive, it turns into motor insurance, if you have a rental car, or you're car-sharing, the app slices that into the offerings. Similarly, we have living and health in the app and it's all based on behaviour and data and what you actually do. And it always gives you the best offering."

The four main lines of the insurance industry are auto, homes, health/life and commercial. They have, until now, naturally followed different paths because the things that they're insuring have different ways of going wrong. The first experience of the IoT has tended to push the lines further apart, largely because auto turned out to be such a good natural fit with IoT. What insurers were interested in was data about time, location, velocity and acceleration – objective quantities that can be measured with great accuracy, and which can be combined with other datasets to give, in theory, a dynamic, fine-grained risk profile.

In the future, this may not necessarily be so, because the auto line has the smallest base of any insurance line, and that base appears to be morphing quite quickly as car makers adopt increasingly comprehensive safety features. The next line to undergo major changes is likely to be life and health, because, once again, we have fitness trackers and smart phones, which give objective information about the human body's position in space and ›

[22] https://www.capgemini.com/gb-en/news/world-insurance-report-2018-digital-agility-is-key-for-insurers-as-bigtechs-ponder-entering-the-market/

› time, and also information about its internal systems, such as heart rate. At some point, this line is likely to overtake cars as the most advanced, as cars become safer and the human body, demographically speaking, becomes older and more dangerous. It is possible that the third line to feel the full effects of the IoT will be commercial property, because companies and their facilities managers are set up to deal with insurance issues in a way that homeowners are not.

As to the future of insurance in the home, this is the most underdeveloped area, and also the one that holds the most intriguing possibilities, many of which were explored by our interviewees. In our survey, 58% of respondents said their company was engaged in a pilot project, and 55% said it was one they had designed themselves. So, the industry is, you might say, half serious about finding a way to make the IoT relevant to home products. But although this is potentially the largest market of all, it is also the one where there is greatest uncertainty over how data can be used, both in terms of its utility and in terms of its sensitivity. Here the future is coming into focus in certain sectors and certain countries – wealthy homeowners in France and social housing tenants in the UK were highlighted in the report – but it is possible that further clarification will come when companies launch home products over 2019 and 2020, and the IoT makes more of an appearance in the average home.

LEADERSHIP WILL BE AT A PREMIUM

Jac Amerell: "I do see [the shift to connected insurance] developing into an enterprise initiative as opposed to just myself and a number of individuals trying to raise awareness and educate people. There's so many legacy thought processes in insurance – hey, the old way we done it has been successful for 100 years, why can't it continue to be successful? But it's not only thought leadership – it's also change management."

One issue that emerged from our survey was the lack of generally accepted method for developing an IoT product. There was no agreement on whether it should be done by existing teams and departments, or whether the whole thing should be done "in the garage", at arm's length from the traditional products. Although most companies were, of necessity, assembling multidisciplinary teams, fewer than half were led by senior management, suggesting they were happy to take an incremental approach to the IoT products rather than tackling the more profound issue of digitising the whole company.

One odd response that cropped up when we asked our survey responders to comment on the reason for a lack of investment was that the implications of IoT were too unclear and the whole issue was too complicated to be tackled. It might just as well be argued that the lack of clarity and consensus are exactly why senior management should be involved. Those who pick the right strategies will really be earning their bonuses. ■

INSURANCE NEXUS

Insurance has been disrupted, and the accelerating pace of change has created many challenges and opportunities for insurance executives. New technology, innovative business models and the rise of IoT, digital transformation and customer engagement is changing the face of the industry and inspiring new products, services and strategies. Insurers must seize the opportunities that digital transformation brings.

Who we are

Situated between London's Silicon Roundabout and the City, Insurance Nexus is at the innovative heart of an industry undergoing significant disruption and innovation. We are a team of energetic professionals who are passionate about insurance, technology and innovation, and are ready to provide the tools, insights and opportunities for insurers to thrive in the future.

Our offerings

Insurance Nexus is the central hub for insurance executives. Through in-depth industry analysis, targeted research, niche events and quality content, we provide the industry with a platform to network, discuss, learn and shape the future of the insurance industry.

https://www.insurancenexus.com

IoTinsObs

IoT Insurance Observatory is a think tank created and managed by Matteo Carbone and has aggregated almost 50 organisations between North America and Europe. The members include 4 of the top 7 global reinsurers, 6 of the top 15 P&C US Insurance Group and 3 of the top 15 European Insurance Group. The Observatory vision is that insurance IoT represents a new paradigm for the industry, and the Observatory purpose is to promote IoT adoption in the insurance sector.

This think tank is constantly observing and scouting the usage of sensors in different insurance business lines around the globe. Second, it is interpreting best practices and pitfalls for the members, so providing them the most globally relevant IoT insurance knowledge. Finally, it has as core a deliverable the story-telling of this knowledge through workshops, dedicated one to ones for each of the organisations which are members of the Observatory. Since its creation the Observatory has delivered almost 900 hours of workshops and 13 plenary symposia with all the members around the same table.

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