



## Episode 9: Key evolutions in technology and their impact on insurance

MAGDALENA RAMADA: Even the more advanced areas of AI are not science fiction. They exist. They're being explored in the context of claims and underwriting.

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NARRATOR: You're listening to Rethinking Insurance, a podcast series from Willis Towers Watson, where we discuss the issues facing PNC, life, and composite insurers around the globe, as well as exploring the latest tools, techniques, and innovations that will help you to rethink insurance.

SIMON BLEACH: Hello, and welcome to Rethinking Insurance. I'm your host today, Simon Bleach. And I'm delighted to be joined by my guests, Magdalena Ramada, who's our Insurtech innovation leader. Hi, Magda.

MAGDALENA RAMADA: Hi, Simon.

SIMON BLEACH: And also by Duncan Anderson, who's our global leader for insurance technology. Hi, Duncan.

DUNCAN ANDERSON: Hello.

SIMON BLEACH: And in today's episode, we're going to explore what the latest trends in technology really mean for insurers. But before we dive into that, I'd like just to spend a minute or two getting to know our guests a little better. And so I've done a little bit of Googling. And Magda, turning to you first, there's a lot that comes up, but it's all related to you as a very well-known speaker on the circuit talking about Insurtech, about blockchain, and actually a little bit, too, here about becoming fitter, happier, and more productive, which I think is fabulous.

But if you were to in your dream world Google yourself, what would you like to come up?

MAGDALENA RAMADA: I would like nothing to come up, Simon. I actually Google myself once a month. I have a reminder. And I really try to have nothing personal out there. So yeah, indeed, I have a professional presence online, but my dream world would be not to be online at all. That's my answer.

Well, it looks like Duncan very much is in agreement with you when it comes to that, because Googling you, Duncan, lots of Duncan Anderson's come up, but actually virtually none of them are you, unless you're also moonlighting as the co-founder of Humanize AI or you're Tech Mill UK CEO, which I don't think is very likely.

DUNCAN ANDERSON: No, I'm none of those things, nor am I an Australian politician, nor am I a military historian. And I have to say, I'm not as organized as Magda. Checking every month is a bit organized. But no, I sort of similarly [INAUDIBLE] to have a low profile online. In fact, I'm not even on LinkedIn, much to the despair of my marketing colleagues.

I did, however, find out recently that a schoolfriend just highlighted that there is a corner of an internet where there is some evidence of the fact that in March 1983, I was the ZX Spectrum Sinclair Programmer of the Month, an achievement which won me 10 pounds, although the actual code is there visible to be seen, which I don't recommend it. But that was actually my first major technology sort of qualification, and actually also my last, because although I look after our technology business, I am by training an actuary and spent most of my career in analytics around personalized pricing.

SIMON BLEACH: OK, thank you for that.

So let's get into the meat of this particular episode. Dunc, if I could turn to you first, then, what would you say are the key evolutions in technology that are most relevant for insurers today?

DUNCAN ANDERSON: Crikey, that's a very broad question. There are so many things, so many things going on at so many different levels. So there's the sort of low level stuff around developments in hardware that continue to get more powerful in terms of enabling things like cloud computing, which in turn is enabling all sorts of things around advanced analytics and AI and high high-performance algorithms. We've got sort of related things around bots, IoT. You can't talk about insurance analytics without mentioning blockchain at some point, and then newer things, things around edge computing, and more recently, some interesting development in quantum computing.

So lots of things going on at many different levels, all talked about an awful lot, all of them relevant to insurance to a degree in different ways, but it's a bit subtle, the effect that some of those will have on the insurance industry, I think.

SIMON BLEACH: So if we were to really sort of delve into those a little more and explore, which are the ones that insurers should really be aware of? Where should we-- where should they start?

DUNCAN ANDERSON: Probably towards the end of that list. But actually, if I just start at the beginning, just by way of background, I think ultimately at the root of all this, it's development in hardware that have enabled all this change.

So I think it's interesting to note that processors continue to get more powerful. I was interested to find out the way that's happening is not through miniaturization in Moore's law, just talking about size and getting smaller looking, but actually through parallelization more now, for the simple reason that we've actually got the components almost as small as it's physically possible to get them. So we're reaching physical limits, because the components that are between 10 and 100 atoms wide these days, which just mind blowing, really. So the focus now is on having lots of calls lots of things going at the same time, so around parallelism, and also around specialism.

So things like parallelism, you've got graphic processing units with thousands of cores. A modern Nvidia GPU will have something like 5,000 cores on it, which involves 20 billion transistors, a huge number. So that's parallelism. But at the same time, we now have things emerging like field programmable gate arrays, which are hard wired to be optimal for doing a particular type of algorithm. So it's actually sort of building in an algorithm directly into the logic gates in a chip so that it goes more quickly.

Similarly, tensor processing units are sort of integrated circuits that are specific for a particular type of application around deep learning. So things are still getting faster. The way they're doing it is different, but they're getting faster. And I guess it's sort of a bit more mundane relative to that, but also, storage continues to get better. So the density and the speed of storage is just improving all the time. It's all-- so solid state, we're getting things that are now 10

times the performance of what solid state devices were just a short period ago. So really, that low level development is enabling most of what we see more generally in the technology space, and therefore in the insurance market.

If I take perhaps maybe one example of that, so the advances in underlying hardware really mean that cloud computing is maturing. So I think cloud computing is not new. It's been talked about for many years. The thing that's really happening is across many industries, there's a growing acceptance of it as it matures. And even in the insurance industry, which is quite a conservative industry in many ways, there's this clear, tangible acceptance of the cloud over the last few years. It's widely adopted. Lots of companies, including insurers, are seeing the benefit of having on demand, scalable, resilient, secure compute power.

And then within that computing power, there are lots of services that are developing. So the cloud provider's providing a range of services, things like component services, so things like identity, web deployment database stuff, but also cognitive services, things like language recognition, speech recognition, and even through to sort of data science environments and applications.

All this means that huge power and huge functionality is now available at a relatively low cost, very low barrier of entry, so a great democratization of computing power and analytics, which has enabled both small insurers but other Insurtech startups to innovate much more quickly and create new offerings and move in a much more agile, lower cost way than was previously possible.

SIMON BLEACH: Well, that's an incredible series of changes. So what you're suggesting there, then, we're looking at an enormous new range of advanced analytics, potentially, that are becoming available to a much wider audience.

DUNCAN ANDERSON: Yeah, that's right. Yeah, I mean, good advanced analytics and machine learning or high performance algorithms, it's basically-- this is an ecosystem of technologies that enable all manner of predictive analytics and data mining. So you deal with really high data volumes, unstructured data, really quickly deal with dynamically changing data formats. It's really flexural stuff, a lot of it open source, so there's sort of rapid cooperative development of some of these tools worldwide, which has increased the acceleration.

And this really is massively relevant to the insurance industry, because there are so many applications of these kind of tools. The insurance industry has embraced predictive modeling of one form or another for many, many years. I've been working 30 years, and throughout the whole period there's been predictive analytics of some form, but it's just gone into a completely different gear now.

So if you think of all the different stages in a customer insurance customer lifecycle, so from when they buy a product-- marketing, for example, marketing, underwriting, pricing, policy administration, the claims handling, the post-purchase customer service, all of those different functions in an insurance company can have great improvements brought to bear through the deployment of advanced analytics.

So we've worked with insurers all around the world and deployed advanced analytics in each one of those customer life stages to great effect. There's massive value, be it through improved insight, agility, better customer service, better segmentation, better pricing, better operational efficiency that can be achieved through advanced analytics in all of those fields. And I think it's that which is probably one of the most immediate and most obvious tangible benefits from some of the developments in the underlying technologies.

SIMON BLEACH: OK, that was really, really interesting, Duncan. Thank you. And I guess then the other area that that leads on to, Magda, would be around AI. What sort of role is that playing now?

MAGDALENA RAMADA: Well, you know, as Duncan just said, there's a whole range of things that are called AI. I'm going to really focus on the most advanced areas of AI, the new frontier.

And some are about deep learning algorithms, but then there's other areas with, like, sexy names, like automated planning and scheduling or multi-agent systems. And I think they are relevant in the context of the insurance industry.

So these methods actually emulate the way our brain works, the way in which we process information, how we process images, language, sometimes even feelings, how we develop a code of values. So to which extent are we using that? We are using convolutional neural networks to decode images, for instance. And the way that works is it imitates our brain's visual cortex and the way we actually look at things and identify objects and discard noise.

And I think it's really fascinating how, in these areas, we are really trying to build machines that don't need rules to understand how to do things. They develop those rules themselves, because all we do is enable them to work in the same way our brain works. And these things are happening in insurance today. I mean, there's even things that try to go further and try for AIs to imitate how we take decisions, to be ethical, to develop an ethical code and a value system.

There was an experiment by Georgia Tech four years ago called Quixote, where they were trying in AI to develop values based on reading children's stories and literature. And we're not that far yet. I don't think we can actually train an AI today to take decisions in that way. But we are far enough to have them understand subtext and context and interpret language, right? And recurring neural networks is something the industry is using to unlock data assets from unstructured data to analyze voice to text in a more effective way.

And when you take all this to the next level, instead of just looking at having individual decisions taken, you actually can train an AI system to plan out a strategy with multiple decisions. And these can be concurrent or not. They can be independent or not. They can be predictable or not. And you practically train this AI to fulfill a certain goal, which could be maximize customer satisfaction along a claims journey subject to certain constraints, subject to certain unknowns, and deal with all the combinatorial complexity of all of this.

And we actually have a couple of companies exploring this right now. So I think even the more advanced areas of AI are highly relevant to the industry. As opposed to what Duncan was saying in terms of machine learning and predictive analytics, these are areas that are being explored right now. I only know of two companies that actually use them on a day-to-day basis. But it's fascinating how much you can do to automate functions transversely with an approach like this.

And the logistics industry is doing it. Autonomous driving is using these type of things. Social robotics applies these type of advanced AI areas. So I don't know. I think there's multiple things we could do on the more advanced areas of AIs. And then even if you get one agent to think strategically, then you can have multiple ones, and you can have these multi-agent systems solve a whole range of things for you.

And very complex ecosystems like health care are looking into that. There is one company that uses this approach to have front-end bots and back-end bots interacting with each other in a very automated fashion. So I guess what I'm trying to say, even the more advanced areas of AI are not science fiction. They exist. They're being explored in the context of claims and underwriting.

And the low-hanging fruit, as Duncan said, is really operational efficiencies. But in the longer term, I think they will enable us to have companies that really work as one, that grow organically, that connect functions in a very different way, and that are able to orchestrate smarter and less smarter parts of the business through technology and AI, which is what we can see on areas like bots, for instance. So you can orchestrate multiple bots, you can have very smart bots. You can have very dumb bots, and you can have external bots interacting with the customers in the sales process or in the first notice of loss process. But you can also have bots just communicate across functions and help companies with siloed information and siloed processes.

So I think all of this is really here. I mean, bots today are even a commodity, I would say. This company is specializing on insurance bots only. You can buy them out of the box and actually put them in different parts. We actually have some of that in the context of automation. So I think these things may seem far-fetched, but actually are a lot more real than we think, or at least than the insurers think. And they're being deployed and being used on the business as usual.

SIMON BLEACH: Wow. I guess, then, talking about sort of business as usual, we used to hear an awful lot about mobile and the internet of things as being a catalyst for change. Is that still the case, or what's happening now in insurance, Magda?

MAGDALENA RAMADA: The internet of things, it's just a fact that we're connected, right? So I think connectivity and ubiquity are just part of our lives, and we all know that and live with that.

For the insurance industry, I don't think it's really about that data existing or not. It's really about the next layer on that stack that has to do with-- it's a functional layer. It's about how do we use the data, how do we make sure that the data you're looking at is what you want to look at and hasn't been spoofed?

How do we manage and automate the quality of data? How do we figure out what value certain data points have, certain data sources, how they compare to each other, what the differential value is, and make sure that there is a data strategy that is versatile enough to switch from one data source to another, if that's necessary, that is sustainable in terms of data ownership? If I'm innovating a product today with a data source that I don't own, what happens in five years?

How will the price of that data evolve? How critical will it be to my product? Should I be the owner of that data, or who should be the owner of that data? So to me, really, when we talk about mobile and IoT, right now, what's relevant for the insurance industry is really how we deal with it and the functional layer that's making use of it to leverage data assets, for instance, and to unlock more value, to be closer to the customer, to make sure that the way we interact with customers is sustainable, and it's the right way of doing things. So I think that's where the interest is right now on mobile and IoT.

SIMON BLEACH: OK, thank you. And there was a time in the quite recent past where you couldn't go to an insurance conference without having someone talk about blockchain and how it was going to impact the industry. But that seems to have died down a little in the last year.

Are there still developments in that area, Magda?

MAGDALENA RAMADA: Yes, they are. And as you know, it's my favorite topic, although I don't get to talk about it as often as I used to. So essentially, to me, what is key in the context of blockchain and insurance is blockchain is one of a couple of technologies that just generate new ways of dealing with data. And insurance and blockchain can be looked at like three pillars, and there is a very short-term pillar and then a medium-term and a long-term pillar.

So in the short term, it's really about synchronization and automation and how you can automate ecosystems of value where you have multiple players, and they have conflicts of interest, and automation shouldn't be owned by anyone. You don't want to pay a third party to actually automate that ecosystem or own that ecosystem. So essentially, that's where blockchain comes into play. We're very close to B3i, and there is a range of initiatives across the industry that are looking at how can we use this technology in the context of synchronizing information, generating a single version of the truth across multiple companies and in an ecosystem where there is cooperation, but there is also competition.

Then in the second pillar, it's really about how can we use it to generate new data and new data infrastructure? And there, it's really more about data vaults, sovereign identity vaults, transparency and ownership of data assets. And essentially, when you take that to the next level, you end up in a world where you can tokenize risk, and it becomes like a digital asset.

And therefore, you can transfer it more quickly, and you could even transfer and neutralize that risk without intermediaries and/or without carrier. And there's a very cool experiment going on in the UK about that with the risk mutual that's fully coded on the blockchain and not owned by anyone generating new data through a betting platform and staking around the risk of smart contracts, where there is no data-- no historical data to look at exposure.

So I think it's really fascinating. We should be monitoring the space. It matters. But it's very experimental. But it can nurture our thinking. So decentralized finance has boomed, and I think it will be a catalyst for the decentralized insurance space.

But most importantly, besides just monitoring that, what matters is the type of ideas that you can get out of this ecosystem, so that idea of distributed data economies. And that takes you to other very cool technologies, like edge computing and federated learning, and how do we deal with distributed data? Can we run machine learning on that, although usually, we need centralized data repositories to do most of what we do in advanced analytics?

So this dealing with different structures for data ownership in the future is actually an area where we're doing a lot of thinking. It's very futuristic, but I think it is relevant, even in the context of productizing some machine learning things today when you have two or three data sources. So you don't need to have 1,000 data sources of individual vaults to solve this problem or to have this problem. You can actually just have a bank and an insurer trying to work together on bank assurance and have two different legal entities with data in two different places that need to be combined in real time into a machine learning model, and how do you productize that. So I think what really is interesting about these things that will have an impact 5 or 10 years from now is that there is a lot that you can learn from the way they think about data and business models, which is radically different from what we have today.

SIMON BLEACH: I just find it incredible, Magda, and every time I hear you talk about blockchain, it blows my mind. And I guess on the subject of blowing my mind, Duncan, you tend to have a habit of doing that on a fairly regular basis, because this is a space that you're particularly passionate about and knowledgeable in. And we've spoken about a lot of different things so far. But I'm certain there's still something left in the list that you haven't yet spoken about.

DUNCAN ANDERSON: I guess the one at the end is a bit of an esoteric one that is kind of mind-blowing stuff, and that's around quantum computing. So it was sort of science fiction for quite a while, but we're now in a scene where real hardware does actually exist that does this stuff. And we're sort of fast approaching the position where we could actually have real-world applications for quantum computing, maybe 5 or 10 years away, perhaps.

And this is all about hardware that can sort of reduce certain classes of problems to something that becomes computationally tractable and can run in minutes rather than, under conventional hardware, in billions of years. So that's the order of magnitude difference. So there are all sorts of consequences of what might happen if quantum computers can really be got to work and motor, not least of like they would render RSA encryption crackable, and therefore undermine the entire basis of global internet commerce kind of overnight.

It all boils down to, at the smallest level, instead of having a bit which recalls a series of transistors, which recalls a 0 or a 1, it consists of this physical device called a qubit, which is simultaneously 0 and 1. It's a superposition of 0 and 1. So it is both things at the same time, which is a bit hard to understand. I've always struggled with this.

What it means, though, is if you've got two qubits, then that's 2 times 2 is 4 states that can be considered simultaneously. And so within qubits or entangled qubits, you can store 2 to the n states. And you don't need a very big n to get to a very large number. So 2 to the power of 300 is larger than the number of atoms in the visible universe. And Google already has a quantum computer chip with 72 qubits. So it's getting there.

So we've got these devices that can consider so many different things simultaneously. The tricky bit-- and this is really complicated, I don't understand how this works exactly-- is all

around the measurement, which causes all these simultaneous results to collapse down to a specific state that solves a particular problem. But lots of work going on in this area around that. There's some big physical problems as well, because to get it to work, you have to have it in a very, very noise-free environment, so very, very cold, order of magnitude 20 millikelvin, so very close to absolute zero, probably the coldest place in the known universe. And we've created these things and got them to work in at least a prototype form.

The consequence of this at the moment is-- well, there's nothing yet per se. But it could have massive changes on everything. But I think as far as the insurance industry goes, I think one thing to note is just like the Apollo 11 space program accidentally gave us a few innovations, like the non-stick frying pan, along the way, similarly, some of the work in quantum computing is throwing up, almost accidentally, these quantum-inspired algorithms. So ways we might ultimately program a quantum computer are being thought about, and that's inspired quantum-inspired algorithms which can work on traditional computing.

And some of these actually have interesting potential that could be relevant today. So some of the things potentially could have a really relevant role in, for example, financial stochastic modeling as an example. And we're continuing to look at the art of the possible in that space, so a bit of a long way away, a bit of a long shot in some ways, but more real than perhaps it might have seemed a year or two ago.

**SIMON BLEACH:** Gosh. It's been a really wide-ranging discussion talking on so many different things, from hardware through cloud, advanced analytics, artificial intelligence, blockchain-age computing, quantum computing-- so much going on. Magda, what's the impact of all this been on insurtechs?

**MAGDALENA RAMADA:** I mean, it depends on how you define an impact. I think there has been a very strong impact on the industry as a whole. When I started to look into the space, we didn't even know how to spell insurtech, and some people were using an E in "insur-." Now everyone knows what insurtech is, right? So in the past six years, we've seen an explosion, not only of start-ups that come and go, but also of awareness.

And the low-hanging fruit and the short-term impact has been about becoming cheaper, faster, more accurate in our risk assessment, not really changing our business models. And I guess in the next 5 or 10 years, we will see some of these more experimental new business models to take off and change the way we neutralize risk, at least for certain things. I don't think every idea in the insurtech space can be applied to every risk area. But there is some interesting things going on that, I guess, will get their momentum.

So I think what was interesting is a couple of years ago, the incumbents got involved, and the insurance industry decided to become part of that insurtech revolution or evolution. And that changed the agenda of the insurtechs. At the beginning, it was all about distribution and customer centricity and the interaction with the customer and the product. And today, most of these start-ups and the ecosystem around insurtech, which also has large companies like ourselves, is about continuing the evolution and enabling insurers to transform, to digitalize, to become more efficient. And it's more of a B2B model.

So I think it's really difficult to say what's the impact. There's lots of impact across multiple areas of the value chain. Some are more perceivable than others. There's also differences from one region to another. But the impact is, we're becoming more efficient, and we're becoming more customer-centric. And that is actually, at the end, what we need to better serve customers.

**SIMON BLEACH:** Duncan, anything you want to add to that?

**DUNCAN ANDERSON:** I guess all I would say is that some of the changes that we're seeing are not just in the space of small start-up insurtech companies, but it's affecting some of the bigger companies as well. So some of the big technology organizations are seeing huge increase in demand for their services. And actually, we're a sort of insurance technology firm that is sort of insurtech in the form, just sort of a bigger and older one than many. And the

demand we've seen for what we do has significantly increased over recent years.

So we have our software that is used by over 1,000 insurers at the moment. And I just inserted a gratuitous ad right into the middle of things. That looks after all sorts of aspects of advanced analytics, decision support delivery, financial capital modeling, reserving or business process excellence. And there's been a huge growth in the demand for all of those things over recent years. And we just see that increasing. So it's not just the small companies that are seeing this change. Big ones are experiencing it as well, ourselves included.

SIMON BLEACH: It's been a truly fascinating discussion. Thank you so much for joining us today. Magda, thank you.

MAGDALENA RAMADA: Thank you.

SIMON BLEACH: And Duncan, thank you.

DUNCAN ANDERSON: Thank you, pleasure.

SIMON BLEACH: And if you've enjoyed listening to this episode of Rethinking Insurance, please do join us again for future episodes.

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