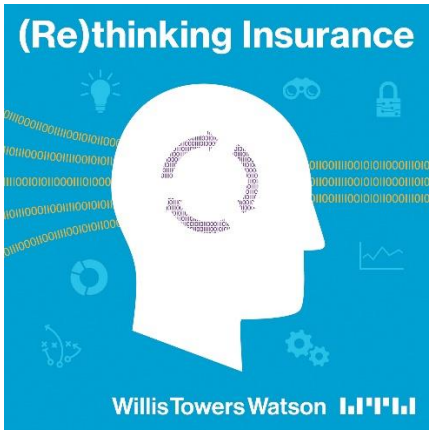

Episode 26: Machine Learning and alternative methods for reserving

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SPEAKER 1: You're listening to Rethinking Insurance, a podcast series from Willis Towers Watson, where we discuss the issues facing P&C, life, and composite insurers around the globe, as well as exploring the latest tools, techniques, and innovations that will help you to rethink insurance.

VITTORIO MAGATTI: Hello, and welcome to Rethinking Insurance. I'm your host, Vittorio Magatti. And today, I'm delighted to be joined by my guest, Lewis Maddock, leading the Nordic Insurance Consulting and Technology business and global future reserving intellectual property development. Welcome, Lewis.

LEWIS MADDOCK: Thanks, Vittoria.

VITTORIO MAGATTI: So, today we would like to have this kind of episode, exploring machine learning and alternative techniques for reserving. But first, let's find out a little bit more about our guest. So, Lewis, Googling you, it looks you are also brilliant chemist: researching on alkali metal ferret and really passionate for cooking and DJing. An amazing second life, isn't it?

LEWIS MADDOCK: Yeah, that's obviously not me. It'd be great if some of my actual achievements were recognized by Google, but it seems I'm not very search engine optimized at the moment.

LEWIS MADDOCK: But, yeah, I've had a career as an actuary and I studied in mathematics back in the UK, many years ago. I've had 15 years now working for Willis Towers Watson and consulting across reserving, capital, and pricing. And, you know, that that's my background.

VITTORIO MAGATTI: Many thanks, Lewis. Really appreciated. So, we would like to start with this podcast and I have a first question for you. So, what are the greatest challenges facing reserving teams today?

LEWIS MADDOCK: I think there's 2 main areas that I would describe as opportunity cost of inefficiencies and process controlled. Two main areas of challenges. So, in terms of opportunity cost of inefficiencies, this is really around human capital not being used effectively. Leading to opportunity costs from redeploying resource on development opportunities, and also from lower output compared to the potential. And even higher turn rates in the team as a result of not using the resource on more interesting work as they might like.

LEWIS MADDOCK: In general, the amount of time spent on reporting and monitoring is far from where it needs to be to provide the innovation and incremental developments needed for real change. In terms of process control, the reporting process itself and supporting processes are far too onerous and consume too much human capital resource to manage the operational risks and control the output to meet requirements. And there are various symptoms of this that many will recognize. So, surprises from realizations of previously unidentified risks, such as systematic case reserving and inadequacies for a cohort of claims. Perhaps, the inability to fully diagnose the underlying drivers of an emerging trend that you spot in the time available, leading to changing stories over time, from one period to the next.

LEWIS MADDOCK: Many ad hoc analysis frequently needed to supplement the necessary insights for decision support and help to try and explain some of the movements or emerging trends, which adds to resource strain. And it's not typically possible to carry out to the full extent necessary for effective decision making. And overall, this continuous compromise on deficiencies in the data and information relied upon for decision making, in reserving, as there is never an opportunity to really change the status quo.

VITTORIO MAGATTI: Many thanks, Lewis. Very, very clear. So, trying to summarize this first question-- probably that consume too much human capital reserves, could be, or looks like, one of the main challenge of these reserving team, right now. Very interesting. The title of this podcast is related to machine learning. So, I see that there is a very interesting opportunity to speak about innovation. What do you think about the innovation reserving themes today?

LEWIS MADDOCK: Well, I think a good question for reserving-- if I could just rephrase it, slightly, is why has there been so little innovation to date? And, what is actually different now? Why do we think things are going to change?

LEWIS MADDOCK: I think it's fair to say the reporting process is uniquely challenging, as it has very different objective constraints and timescales than typical modeling processes Firstly, the governance controls and audit requirements are much more onerous. This adds significantly to the difficulty of maintaining the process-- let alone, considering innovative techniques and new approaches. So, to give an example of some of the considerations: in some markets, there is a requirement to print out detailed information on the model parameterization and the models used, with enough detail for someone to independently recreate the results. And this kind of thing only becomes more challenging if you start to add complexity to the models involved.

LEWIS MADDOCK: Secondly, I'd say the reserving process itself is an optimization exercise. We all recognize that there are a range of reasonable best estimates at any given valuation date and the challenge is in optimizing the selection of our best estimates to meet our reserving objectives over time. And this, in itself, is a non-trivial process control problem and real progress can only be made with a step change in how we think about and perform reserving.

LEWIS MADDOCK: There is more to reserving than the reporting process. But, until we address the fundamental issues here, there is little opportunity for growth. I would say, this has traditionally led to a common perception that reserving is a statutory requirement and nothing more. But, it should be recognized that it is a critical part of business intelligence. None of this is new, of course.

LEWIS MADDOCK: So, in terms of what is different now: the difference now in my view, is that advancements in technology provide the tools and resources necessary for the step change in capabilities that were not previously possible. So, to give some examples: workflow management solutions enable the production of much more decision support material in a shorter time-frame, whilst maintaining the necessary governance and controls. And the leaders in this space reduce the need for ad hoc analysis, have more data-driven analysis to support decision making, and free up time to embed further capabilities.

LEWIS MADDOCK: Tools of this type also provide a powerful solution for integrating software and systems in an end-to-end process, supporting a best-in-class approach to the architecture. This allows much more flexibility to use the best tool for a particular job in an end-to-end

process. So, for example: bringing in Power BI for reporting, where it better supports the reporting needs. Or, other software targeted to specific applications.

LEWIS MADDOCK: And finally, the availability of cheap computing power opens up new possibilities to leverage data assets. Robotic process automation to produce more for less with increasing granularity. Or, to interpretation techniques to support pointing decision makers at the pertinent information to avoid this being lost in large volumes of analytical output. And leveraging machine learning to unlock value from unstructured data, validate an augment, case estimates, create new synthesized data items from granular claim data, and much more.

LEWIS MADDOCK: I think, the architecture possibilities enabled by the capability to integrate a diverse range of systems and applications into a coherent process has really expanded the possibilities beyond what we could have achieved before. Not just within reserving, but across the organization. And it's definitely why I think we will see some real change in reserving practice going forward.

VITTORIO MAGATTI: Many thanks, Lewis. Very clear. I have another question for you. So, what do we actually mean when we talk about machine learning in the context of reserving, and what impact can it have?

LEWIS MADDOCK: I've deliberately not focused entirely on machine learning, in the answer to the first two questions because machine learning is just an enabler for parts of the solution for reserving, and needs to be considered in the context of a roadmap to a future target operating model. Investing in the right development, at the wrong time, is probably the biggest pitfall in regards to machine learning and reserving.

LEWIS MADDOCK: In my view, the benefits of machine learning for reserving are operational efficiency and process control. So, directly addressing the 2 problem areas. Machine learning, at its core, is an optimization problem. And in the context of the reserving process, we are running an optimization to hit a moving target. The objective for the optimization must consider the cost of being wrong, in the context of the purpose, to be able to provide meaningful outputs.

LEWIS MADDOCK: So, for instance, it must recognize that deteriorations are not generally the same utility as favorable development for reporting. And account for that in estimates at any given time by penalizing deterioration more than favorable experience. This is very different from machine learning techniques currently being used elsewhere in insurance business, where supervised learning methods are typically used with a well-defined response to simply minimize the error in fitting to historic data.

LEWIS MADDOCK: So, some example: in pricing and risk modeling, I can make the assumption that the risk differentials in my recent historic policy and claims data are representative of experience in the near future. This is a reasonable assumption in practice, such that if I fit a model that is predictive of risk relativities on the recent history it is sufficient then that I have a predictive model of experience in the near future.

LEWIS MADDOCK: The difficulty in reserving is three-fold. The information necessary to inform the answer far in the future may not be in the historic data, full stop. So, fitting to historic data-- building a predictive model of historic data-- is not going to provide me the answer. Secondly, the estimates will change over time, as we have more information on what the outcome will be and the optimization needs to support control and how we adjust our estimates over time.

LEWIS MADDOCK: And finally, the reserving process, and the way we communicate results, is going to be very different from today. And needs to be supported by many more visualizations than we currently use. Back testing diagnostics, for example, will be essential. This is why the roadmap is so important for placing developments, in the right order, to get where we need to be. There's no silver bullet, in terms of a single machine learning method, that is going to magically solve all the problems in reserving. And indeed, some developments will simply exacerbate existing problems if the right parts of the wider solution are not in place beforehand.

VITTORIO MAGATTI: OK, clear. I have only one last question for you, that is really related to what have first movers done, and what has been more successful?

LEWIS MADDOCK: I think those that have made the most progress on the roadmap and what needs to be in place on the journey towards a future operating model have seen the most success. Really strategic planning on developments and clear objectives for these exercises up front is a key differentiator for the market leaders in this space. There is a lot that can be done to realize the benefits of operational efficiency and process control before resorting to machine learning. It has its place, it's not the complete solution.

LEWIS MADDOCK: Embedding a workflow management solution, like our Unify technology in the reserving processes, is a critical enabler for the journey. The step change in automation capabilities has enabled our clients to produce significantly more decision support material, whilst mitigating the problems of maintaining the governance, controls and audit, and still freeing up resources for development activities. This tooling is essential to have in place, to support any real growth in data-driven analytics, to support reserving without expenses spiraling out of control. It gives you the capabilities to readily integrate new tooling into the environment, with the governance, control and audit readily maintained, and provides a robotic process automation capabilities to produce increasingly sophisticated data-driven analysis and output in a timely manner for the same headcount.

LEWIS MADDOCK: That being said, when it comes to machine learning, I think there are several areas that are seeing investment. In terms of monitoring, some monitoring, more granular actual versus expected, and historic trend identification. Data augmentation-- so, this could be data enrichment unlocking value from unstructured data, case estimate validation, or even using machine learning techniques to determine new segmentations to use in modeling.

LEWIS MADDOCK: And finally, a gradual move, I would say, towards the use of machine learning and in projection. All these items do add value in different places, is developed at the right time. In considering the end goal for machine learning in reserving processes, I think there's quite a useful analogy in process control applications in robotics, which is obviously much cooler than reserving. So, if you consider an exercise of programming a quadcopter, to fly through a hoop that's thrown through the air at random. And this, has obviously been done. It requires the quadcopter to monitor the data feed from sensors tracking the position of the quadcopter and the hoop, to determine adjustments to the speed and direction that the quadcopter should make, at any given time, to optimize the trajectory to hit its target.

LEWIS MADDOCK: How the hoop is thrown, how the wind blows during the flight, and any other numerous variables mean that the quadcopter cannot know where that hoop will be when it eventually flies through it. The algorithms optimize a decision, given all information available at the time, to minimize the cost of being wrong at that point in time, and repeat this, at regular intervals until the target is reached. In reserving, we cannot know what the ultimate for any given cohort will be any more than the quadcopter can know where the hoop will be. But we can optimize the output from our reserving processes to acknowledge the fact that we're on a journey, and minimize the cost of being wrong at any given time.

VITTORIO MAGATTI: Lewis, many, thanks again to be our guest today. I really appreciated the way in which you define the current picture of reserving, and also design the future in this segment taking consideration the machine learning and the alternative potential techniques. So, thank you again.

LEWIS MADDOCK: Thanks, Vittorio

VITTORIO MAGATTI: Thanks also to our listeners for listening.

NARRATOR: Thank you for joining us for this Willis Towers Watson podcast. For more information, visit the Insights section of willistowerswatson.com.

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