Preparing Digital Insurance for Take Off

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Prologue

- Today, almost magical expectations are linked to digitization. Much of what comes next cannot meet these expectations.
- This is mainly because far too many things with very different goals and methods are subsumed under the term digitization.
- This makes a certain tiredness and saturation.

Prologue

- But this is dangerous - because if we succeed in isolating the essential elements, **it shows that we are** indeed **at the beginning of an epochal development**.
- Expanding the view and adding developments of other disciplines, e.g. **Biotechnology**, **robotics**, **medicine**, **genetic engineering** and **neurology** one will understand the full extent of change.

Prologue

- It is important to see how much these disciplines interact today.
- Digitization is a key driver in and for these disciplines.

Digitization as standardization and automation (layer 1)

- Many things we have developed (and are still developing) have the goal of standardization and automation
- This is the first, the simplest and perhaps most common layer of digitization issues (until now)
- The driver in this layer is normally cost efficiency and / or time to market. That was (and is still) important.

Digitization as standardization and automation (layer 1)

- An easy example of life insurance:
  - In the past, technical changes were often calculated manually by an actuary (I did it, a long time ago).
  - After thinking a little bit, a generalization of the problem (following the equivalence principle) was implemented.

Digitization as standardization and automation (layer 1)

- What really happened there?
  - The knowledge of a specialist in a well-controlled domain has been digitized. Why?
  - In order to be able to distribute this knowledge in almost any speed anywhere without further resource consumption.
- That is a great step and is why many equate the use of computers with the invention of printing

Digitization as standardization and automation (layer 1)

- The insurance industry (in the last century) was one of the drivers to introduce computers and automate business processes

Digitization as standardization and automation (layer 1)

- Conclusion: In layer 1, resource-saving and rapid distribution of knowledge is key.
- And: The distribution is done by machines.
- Restrictions in layer 1: Automation needs standardization and a well-controlled clear model, and it is limited to work only inside the domain.

Overcome domain boundaries (layer 2)

- What if a machine is not only able to distribute knowledge?
- If it is able to read and write, to hear, to see and speak, to recognize images and so on – in other words, to substitute human capabilities
- If, in addition, independently it interacts with other machines (to enrich information) and is able to understand “dirty” data
- And the machine never forgets what it has learned.
- These capabilities and interactions can be used in realtime anytime
- This leads us to layer 2

Overcome domain boundaries: Data science (layer 2)

- Data science is very important for digitization (e.g. in machine learning theory) and for actuaries too
- Many actuarial associations have formed their own working groups (My colleague Stefan Nörtemann gives a talk on the topic on Friday, 9:30)
- In this presentation I am particularly interested in the ability to work with unstructured information in digitized processes

Digitization: Overcome domain boundaries (layer 2)

- Let us come back to the limitations of layer 1
- Using AI, text-to-speech and deep learning (with data science) we are now able to overcome domain boundaries of layer 1, implementing automated e2e-processes.
- That way digitization is a means of introducing completely new business processes
- A very good example are self services (like everybody knows from online banking)

Digitization: New automated business processes (layer 2)

- Let's go back to our poor actuary who has manually fixed technical changes.
- In the next step, we were happy to automate this stupid activity.
- The actuary was also happy, as he could now think about replacing conventional commutation values with semi-markov-chains

Digitization: New automated business processes (layer 2)

- The calculation was done by a machine, but providing the algorithm with the necessary data and communicate with the policyholder about that:
  - Who did it? A machine?
  - And how is it done?
  - And was the policyholder satisfied about that?

Digitization: New automated business processes (layer 2)

- Communication and providing data today (in layer 2):
  - Self Services (device independent)
  - Chat Bots
  - Robo adviser (e.g. for unit linked products)
  - Finally the newest development, Google Duplex.
- msg life is building a full set of self-services for life insurance (replacing or enhancing the traditional business services of a policy administration system)
- It is aimed to support the whole life cycle

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Digitization: New automated business processes (layer 2)

- Self-Services are an important example to study the advantages of layer 2
  - Self-Services provide data in a direct digital form (In fact one step is eliminated completely in the process)
  - Communication is easier and more flexible for the user (I could list all the terms like customer journey or customer experience)
  - And we save time and money (the user and the company)
- Using deep learning and text-to-speech (Alexa, Duplex) a high percentage of the remaining needs of communication can be automated

Digitization: Overcome domain boundaries (layer 2)

- In addition it is a good example, of what I mean with domain boundaries
- In many situations a business process is only semi-automated
- Often there is a human interaction in between – like a gap in the process. And for a long time this was inevitable.
- Now we are able to really implement digital e2e-processes, overcoming this type of boundaries – digitization is the bridge over that gap.

Digitization: Overcome domain boundaries (layer 2)

- You need a lot of technical know how to do so and an adequate software architecture.
- That’s the reason why so many fintech and insurtech startups are working in this area
- As a conclusion: Digital, comfortable, simple and fast communication with the user and between companies is the key feature of layer 2
- Looking at developments like IoT and block chain the new processes are even better in the sense of providing or embedding additional information (often real-time)

Digitization: Overcome domain boundaries (layer 2)

- Cost efficiency and automation is only one aspect
- Everybody knows that the life insurance industry lives in a quite challenging environment today
- It's a great opportunity to put the relationship with the customers on a completely new basis.

Digitization: Overcome domain boundaries (layer 2)

- There are a lot of studies of behavioral economics and nudging available.
- Obviously, the valuation of a customer about his insurance will be different if he is involved in the development of his contract right from the beginning
- This is especially true if the customer has taken a number of decisions himself

Digitization and Epistemology (layer 2+3)

- Let’s take a closer look at how new knowledge arises and how decisions are made in the context of machine learning
- The common approach in science (before machine learning):
  - abstraction from the diversity of reality,
  - form a model,
  - apply the deductive method.
  - In one word: Causality

Digitization and Epistemology (layer 2+3)

- Machine learning theory is different
- Often decisions are made using correlation to detect new results
- The idea is
  - to „read" as much as possible from the whole dataset
  - and to get an understanding of the problem from reality as a whole
- That is a remarkable difference in epistemology and a reason for the discussion of „causality versus correlation" (for example: "The End of Theory, Chris Anderson, 2008)
- A remark: In truth, of course, is a lot of mathematical theory behind machine learning, but nevertheless, in the moment of taking the desicion there is a substantial difference

Digitization and Artificial Intelligence (layer 3)

- Machine learning and artificial intelligence is the the key feature in layer 3
- The methods are now freely available (as an example, an open source java library for deep learning) and the performance is much better, so that significant thresholds are exceeded
- In layer 3 we consider AI in its true meaning.
- Layer 2 has dealt mainly with communication, IoT, „Connected World“ and digitization of human interactions.

Digitization: Impacts on society

- Digitization will bring profound changes in different areas of society. That also creates fears (Unemployment, as an example)
- In fact, it will have a deep impact and will raise difficult economic, moral and legal questions (new business models, self-driving cars, Drones or other military machines, …)
- Thus: The discussion on data protection and privacy is just the beginning of a much bigger debate

Digitization: Impacts on society

- When we look back on the industrial revolution, we find some similarities
- The manual (human) work was substituted by machines in production processes
- This led to a significant change in developed countries, services in a multitude of areas were invented or developed
- Today many work in service professions

Digitization: Impacts on society

- The discussed effects of digitization just triggers a similar shift
- Most of these services will disappear as a primarily human activity
- As a consequence new types of human work will be developed or we just work less ☺

Digitization: Impacts on society

- What we need is not fear, but a serious discussion in all relevant areas.
- In the past, digitization efforts (in layer 1) have not led to more unemployment, but to better working conditions and a better life.
- Distributing the wealth generated by digitization fairly is anything but easy. Especially since this task can not be solved in a national context.

Brave new World!

- In the last section I would like to briefly take a look at some interactions of different disciplines
- This is especially interesting for actuaries
  - digitization and robotics (Car insurance, …)
  - digitization and genetic engineering (Life and Health insurance)
    - An example: I‘ve learned in a conference 2 weeks ago, that the cost of a genetic test decreases dramatically (less than 100$ is expected)

Digitization and robotics

- It seemed like a big innovation, inventing a little box that provides real-time data about the way an insured person drives and deriving valuable additional pricing information – again an interesting task for an actuary.
  (My colleague B. Lang moderates a plenary session on the topic on Thursday, "Future of Mobility)
- And what is the price of a car insurance for a self-driving car?
- The example of the car insurance can be extended to a vast number of insurances (looking at the vitality products even in life and health insurance)

Epilogue I – for actuaries

- As we have seen
  - AI, machine learning
  - and the interaction with other disciplines will change almost everything (in the insurance industry and in real life)
- But – In times of Big Data and Data Science with the ability to read and understand much more information than before **Insurance will not disappear**

Epilogue I – for actuaries

- Machine learning programs learn from man
  - thus they will make mistakes and
  - reality is still far more complicate than a machine can understand.
- Therefore, in the future we will have to handle
  - similar risks as today
  - and probably new ones
- And hopefully life will be better :-)

Epilogue II – for everybody

- Finally, let’s come back to the epochal meaning claimed at the beginning.
- After what we have learned about AI and machine learning and the relation to other disciplines, we might compare the current situation to the epoch of the Enlightenment.
- The phrase "**Have the courage to use your own understanding**!“ (Immanuel Kant, What is Enlightenment)
- might now have to be reformulated: “**Have the courage to expand your own understanding with artificial intelligence!**".

Thank you very much for your attention!

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