Big Data and Insurance: Evaluation from an Economic Perspective

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July 2018
Outline + thesis

Big Data and it’s influence on …

… 1. Empirical research in respect to customer’s needs and willingness to pay

… 2. Measurement of efficiency (examples: regulation and precision medicine)

… 3. Distribution models, claims handling, fraud detection

… 4. Risk and customer classification via digital monitoring

5. Wrap-up
Which scenario will we see in the future?

**Scenario 1: The digital society**

This scenario is characterised by free flow and open access to data. Insurance and technology companies have equal access to a broad range of data and can use it without restriction.

**Scenario 2: Insurance at two speeds**

In this scenario, insurance companies are prevented from access to or use of enhanced data to which technology companies have access. Those who have access to data can use it without restrictions. In a sub-scenario, only a few insurers have access to data through exclusive cooperation agreements with technology companies, but other insurers do not.

**Scenario 3: Privacy regulation**

In this scenario, regulators intervene to protect certain privacy values. In one sub-scenario, regulators try to prevent discrimination at all cost. In another sub-scenario, regulators aim to avoid intrusiveness. In a third scenario, regulators apply a zero-tolerance approach to the risk of abuse in using personal data.

**Scenario 4: Digital backlash**

In this scenario, we assume that increasingly restrictive regulation prevents established insurers and new market players from the use of enhanced data in insurance.

**Scenario 5: A tale of trust**

In this scenario, people are no longer willing to share their private data such as health-related information with technology companies in general or social networks in particular. Insurance companies can act as a ‘safe harbour’, but face similar conditions to the rest of the industry with regard to accessing data.
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1. Empirical research in respect to customer’s needs and willingness to pay

Market research suffers from specific pitfalls:

1. Sample size / non-representative samples

2. Significance “by luck”

3. Bias problems (selection bias, observer bias, funding bias, recall bias …)

4. Direct questioning to derive customer’s willingness to pay
   • The right use of big data can reduce most problems coming from 1. to 3.
   • No. 4 can be solved when adapting choice-based conjoint analysis
   • However, currently we rather go for “trial and error”
1. Empirical research in respect to customer’s needs and willingness to pay

Choice-based conjoint analysis

- Is quite an old tool, but newly introduced in the insurance industry
- Reason for the delay: Pricing in the insurance industry depends on specific customers’ characteristics
- Example (term life, German market):

1. Empirical research in respect to customer’s needs and willingness to pay

- Average WTP (across all age bands, smoker & non-smokers)

<table>
<thead>
<tr>
<th></th>
<th>Product A</th>
<th>Product B</th>
<th>Product C</th>
<th>Product D</th>
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<td>75% percentile</td>
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<tr>
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<td>83</td>
<td>89</td>
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<td>140</td>
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<tr>
<td>Percentage WTP $&lt; 0$</td>
<td>61%</td>
<td>56%</td>
<td>53%</td>
<td>44%</td>
</tr>
</tbody>
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- Breakdown for subgroups and product items possible

- In connection with big data and market simulation, general results over many product forms and customer groups can be derived

- Company that uses these techniques will be in a much better position: At the very end, you don’t need another opinion; you will know what your customers want (and what he or she is willing to pay for)

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Example: Regulation

- Highly regulated industry
- Efficiency (cost / benefits analysis) of particular regulatory tools mostly unknown
- Hence, regulation is a sector with huge costs but no real performance analysis
- Why?
  - Agency problems (large industry that lives from regulation), very different tools for performance measurement are needed, legal consequences must be set (sunset law), and: lack of data
  - With big data, a performance analysis of regulation gets possible – with huge impact on the efficiency of insurance markets
2. Measurement of efficiency

Example: Precision medicine and health insurance

• Two major problems when it comes to research:

  Small samples (data used from one institution only) and funding bias (research must support a particular method)

• A huge amount of money is paid by policyholders for medical treatments which are useless or even dangerous

• Big data will show on a solid significance level which methods are helpful and which are not

• However: Research will in general come under pressure (data and correlation is everything, causation is not important)
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3. Distribution models, claims handling, fraud detection

Major effect insurance distribution

- Big data allows ex-ante information about the customer’s journey
- New distribution forms; in particular on-demand insurance

- Behavioural aspects like denomination effects may play a central role
- Sending primary risk signals
- Reducing asymmetric information
- Gamification aspects
- Via big data: Getting a general idea about policyholder’s behaviour and preferences (also apart from insurance)
3. Distribution models, claims handling, fraud detection

Claims handling and fraud detection

- Combination of digitalisation, technology and customer integration will reduce handling costs
- Reporting can in many cases be done by the insured item itself and automatically
  - Important reduction of fraud cases (reporting cannot be influenced by a second party)
  - With big data, specific factors that indicate fraud can be derived and will be reported automatically
  - Level of accuracy will be widely improved
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**Major effects**

- Incentives for loss reduction / better loss prevention
- Better risk assessment
- Better fit for policyholder’s needs / better individualization of contract features
- Larger range of risk classes and insurance prices
- Develop new (micro-)insurance markets (in connection with on-demand contracts)
- Cost reduction and possible links to robo advisory
- Gamification

**Right level of customer integration?**

- Willingness to pay is highly reduced if customer integration increases (cf. banking industry)
4. Risk and customer classification via digital monitoring

Risks

• Medial feedback in general critical (“cherry picking”)
  
  Cf. case of Generali «Vitality»

• Insurer acts educatively (but is not democratically legitimized)

• Data security / danger of a «digital dictatorship» (Harald Welzer)

• Large variance of premiums via an intensive risk selection: Some may not be able to afford insurance; additional regulation may result

• Discrimination of “low risks”, which are not willing to take part to transfer data via digital monitoring

• Reduction of risk on the individual risk level; utility reduction of insurance

• Technology companies may face advantages (mainly because they ignore data protection rules)
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