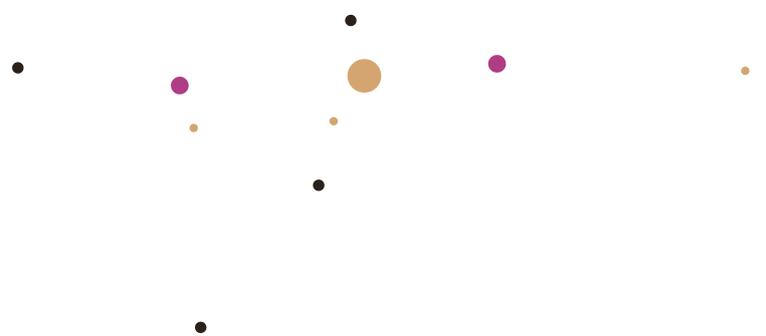


Big Data Ethics Recommendations for the Insurance Industry

A Consolidation Report outlining the results of the NRP 75 project: “Between Solidarity and Personalisation – Dealing with Ethical and Legal Big Data Challenges in the Insurance Industry”

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The National Research Programme 75 “Big Data”

Computing and communication devices accompany, influence and guide our everyday life. They are embedded in large networks and produce increasing amounts of data. Novel solutions are needed to contend with and create value from these enormous volumes of data. This results in highly relevant research questions in the area of computing and information technology. Thus, NRP 75 supports innovative foundational research with the goal of processing and managing Big Data efficiently and effectively.

Furthermore, Big Data will have a profound effect on our society. The way we live, work and interact within society will be transformed. Appropriate regulatory measures are required, and citizens must understand the implications of Big Data. To this end, NRP 75 supports research projects in law and social sciences. Finally, NRP 75 supports projects that bring together computing and domain experts to enable new, specific big data applications in business and society with a substantial potential for value creation. In this way, the National Research Programme aims to lay the foundation for responsible research and innovation in a data-driven society.

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Since the inception of the insurance industry, accurate and relevant data has been crucial for risk-based calculations. Insurance companies thus show a keen interest in the fast-growing possibility of generating, accessing and sharing multidimensional data emerging from all spheres of life. They already use many applications of Big Data analytics, such as mobility mining in car insurance, personal profiling for fraud risk rating, or applications facilitating self-measurement for health insurance.

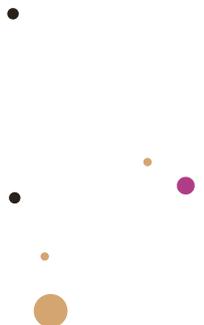
Meanwhile, insurance companies aim to balance solidarity, namely the idea of sharing risks individuals may face due to their personal background and lifestyle, with fair insurance policies for the individual. Solidarity is the foundation of compulsory social insurance, e.g. in health insurance, the healthy support the less healthy. The situation is different for non-mandatory private insurance, where risk fairness is the guiding principle. This means that the insured should carry his or her own expected cost, i.e. “good” risks do not support “bad” risks systematically. However, solidarity still plays a role in mandatory insurance that is organised as private insurance, such as car liability insurance. Here, solidarity can be understood as a moral constraint that insurance should fulfil.

Big Data influences this interrelation between solidarity and risk fairness in various ways. The power of personalisation provided by Big Data applications may involve the risk of discrimination and put values such as privacy, fairness or solidarity at risk. However, the same applications may also be used to prevent individual and societal damage and thus may not only increase the profitability of the industry but also enhance the public good; e.g., by offering insurance products to persons who were previously considered “uninsurable” because of unknown risks. The insurance industry is thus a paradigmatic case for understanding the societal acceptability of Big Data and how privacy and insurance laws are balanced with the advantages of many of the novel Big Data applications.

This Consolidation Report provides the condensed results of the research project “Between Solidarity and Personalisation – Dealing with Ethical and Legal Big Data Challenges in the Insurance Industry” which was part of the National Research Programme 75 “Big Data” (2017–2022). Within 30 months, an interdisciplinary team of researchers from the University of Zurich (UZH) and the University of Applied Sciences of the Grisons (FHGR) – in collaboration with experts from Swiss Re – investigated the ethical, legal and societal aspects of using Big Data in private insurance.

The context of this project, the methods used and the main results are briefly outlined here. Furthermore, based on these findings, we formulate recommendations that directly emerge from the team’s research. In this way, we aim to complement existing codices with proposals that are of direct relevance for the insurance sector and that have a grounding in empirical and theoretical insights gained in this project. The Report also includes an overview on publications generated by the project team, which allow for deeper insights into the topics of this research.

The audience of this Consolidation Report are industry experts, legislators, representatives of supervisory institutions and journalists who want to gain a brief overview of the current ethical and legal Big Data challenges in insurance. The project team hopes that the insights and recommendations presented here help to provide the foundation for the effective and appropriate use of Big Data in the insurance industry.



Insurance companies are members of a genuinely data-driven industry and show a keen interest in many applications of Big Data analytics and Artificial Intelligence. Those technical developments have triggered a transformation of the insurance industry. Established insurers invest in the digitisation of their processes and products, whereas an increasing number of new InsurTech companies are entering the market with new digital solutions; digitisation takes place along the whole value chain of insurance, from product development to its distribution. Large amounts of data to assess, select, price, predict and prevent risks are key in this development.

At the same time, the insurance industry also operates in a regulated environment. In addition to insurance law, data protection laws are of key importance with regard to the leeway given to insurance companies to personalise their insurance contracts based on Big Data analytics. Although Swiss law hardly limits the personalisation of insurance contracts in private insurance, data protection law contains important barriers to analysing personal data about the potential customers and the population at large. As a result, the personalisation of insurance contracts based on Big Data analytics is clearly only possible with the customer's specific consent.

However, the very broad concepts of data protection law and the speed of the technical and societal development generate numerous "grey zones", where the law is unable to provide clear-cut answers and important ethical questions remain. Such ethical questions that emerged in the debate on Big Data go well beyond the realm of legal compliance and have the potential to damage the reputation of insurance companies if left unanswered. In addition, technological disruption, which is not sensitive to ethical values, can easily lead to loss of trust. Thus, when using Big Data to select, assess or prevent risks or to develop novel distribution models to open up new markets and therefore close the protection gap, such data must be collected and used in a manner which is not only legally sound but also consistent with societal and individual expectations and ethical norms.

Examples of Big Data in Insurance

| Type of data | Use of data | Data source | Example |
|----------------------------|--|--|---|
| Internet of Things data | Risk selection Claims management | Data collection devices | Use of driving behaviour data for risk calculation in motor liability insurance |
| Online media data | Risk selection Marketing Willingness to pay | Tech companies: Internet & search engine providers, e-commerce providers, social media platforms | Analysis of customer generated content, to determine his/her willingness to pay, e.g. for supplemental insurances |
| Insurers' own digital data | Marketing Claims management | Insurers' own customer service or call centre, insurers' websites and apps | Analysis of audio data of customer phone calls for insurance fraud detection |
| Other digital data | Risk selection Marketing Claims management Willingness to pay | Policyholders, all other possible data related to customers | Use of customer selfies to estimate biological age for life insurance |

The goals of the project were ...

- to identify the ethical and legal challenges of Big Data applications in the insurance industry,
- to detect which values customers see as being threatened by digital exposure,
- to assess to what extent the designers of Big Data applications are sensitive towards these issues,
- to propose recommendations to meet these challenges.

To achieve these goals, a mixed set of methods was used. These approaches can be summarised as follows:

- Via a qualitative and quantitative literature review and expert interviews, an overview of the current discourse of Big Data ethics was achieved, with a particular focus on applications relevant for the insurance industry. These results served as input for the following project steps.
- A media content analysis was used to identify major public expectations and concerns discussed with regard to Big Data. The analysis focused on values, opportunities and risks that are put forward in newspapers in favour or against Big Data applications.

- A comparative law analysis of the most important applicable bodies of the law related to Big Data challenges in the insurance industry, taking into account two very different regulatory approaches – Switzerland and USA/California – was performed, involving insurance law, anti-discrimination law and data protection law (including the EU General Data Protection Regulation).
- Conceptual ethics research was performed based on the literature research and other findings, in order to advance the discussion on the use of Big Data; particularly in predictive analytics, with a focus on the increasing use of machine learning.
- Empirical survey research was used to gain an understanding of how customers and experts in the insurance industry think about the ethics of Big Data in insurance and how this relates to factors such as online behaviour and trust.
- Three workshops were organised with industry experts to discuss drafts of recommendations that aim to support the ethical use of Big Data in insurance.

The media and legal analysis and the survey research involved a cross-cultural comparison of a more European-centric perspective (represented by Switzerland) versus a US-perspective (with a focus on California in the legal analysis and on the East coast in the media analysis). The survey research also included an application of the concept of “protected values” developed in moral psychology by focusing on fairness, privacy and solidarity.

The research team involved competences in (empirical) ethics (Markus Christen & Michele Loi, UZH), law (Florent Thouvenin, Fabienne Suter & Damian George, UZH), business ethics management (Christian Hauser, FHGR), moral psychology (Carmen Tanner, UZH) and sociology (Urs Dahinden, Vincenzo Francolino, Ruth Nieffer & Alt Sharon; FHGR) as well as deep insight into the practices and problems of the insurance industry (Maria Lisiakova, Stefan Weiss & Lutz Wilhelmy, Swiss Re).



We summarise the main findings and their relationship to the recommendations below; references point to further reading, which are available open access at: www.nfp75.ch/en/projects/module-2-societal-and-regulatory-challenges/project-christen.

Media analysis

The study provides a systematic analysis of frames (interpretive patterns) present in the debate on Big Data. It was based on a quantitative content analysis of articles in Swiss (N=251) and U.S. newspapers (N=258) published between 2011 and 2018. In total, five dominating frames were identified. One focuses on the critical aspects of Big Data (abuse of data), whereas the other four emphasise the positive aspects of Big Data (advances in research, medicine and business models, product innovation, process improvement, marketing optimisation). Compared to the U.S., the critical element is somewhat stronger in Switzerland and the peak intensity of the debate is later. This indicates that the overall public discourse on Big Data is rather opportunity-oriented while simultaneously considering the risks of the applications.

Further reading

Dahinden U, Francolino V, Hauser C (2018): The media representations of Big Data – An international comparison between the USA and Switzerland. Available at NRP 75 website

Dahinden U, Francolino V, Ziegler Y, Hauser C (2019): Big Data Framing About Media Coverage in Switzerland and the USA. Available at NRP 75 website

Dahinden U, Francolino V, Ziegler Y, Hauser C (in preparation): Big Data Framing About Media Coverage in Switzerland and the USA. Contact research team for manuscript

Legal analysis

The analysis of Swiss law demonstrated that insurance law does not limit the personalisation of private insurance contracts. The leeway for personalisation is also hardly limited by anti-discrimination law, at least as long as individual offers are based on a state-of-the-art risk assessment. The comparative law analysis focused on insurance, anti-discrimination and data protection laws in Switzerland and the U.S./California, as they vary greatly with regard to the regulatory approach. Whereas private insurance law is dominated by the principle of freedom of contract in Switzerland, this sector of insurance is densely regulated in California and the rates are subject to prior approval by the California Insurance Commissioner.

In addition, U.S. law puts a much stronger emphasis on anti-discrimination, whereas data protection law is both more comprehensive and more restrictive in Switzerland. Consequently, the leeway for personalisation is much greater in Switzerland than in the U.S./California – but only if the requirements of data protection law are met. This body of the law, however, should protect privacy and provide individuals with a fair amount of control with regard to the collection and use of their personal data. This indicates that data protection law is not the suitable body of law to determine if and to what extent insurance companies should be allowed to personalise their offers. Instead, a public dialogue is needed in order to determine which types of insurance should be dominated by the principle of solidarity (e.g. mandatory health insurance law) and in which sectors the personalisation of insurance contracts should be allowed (e.g. household and car insurance). Such dialogue could be initiated and moderated by the insurance industry and provide important insights on which the regulator could base its future regulatory decisions.

Further reading

Thouvenin F (2019): Privatversicherungen: Datenschutzrecht als Grenze der Individualisierung? Available at NRP 75 website

Thouvenin F, Suter F, George D, Weber R.H (2019): Big Data in the Insurance Industry (forthcoming): Leeway and Limits for Individualizing Insurance Contracts. Contact research team for manuscript



Conceptual ethics research

The debate in ethics is shifting away from privacy-related aspects of collecting Big Data in insurance (and elsewhere) to the use of such data in machine learning for predictive analytics, quantifying risk and identifying willingness to pay or fraud detection. There is an increasing consensus that the distinction between direct and indirect discrimination is becoming less salient and harder to define. Personalisation shifts the attention of both the client and the regulator away from socially salient group membership, e.g. sex or race. Decisions are increasingly made based on predictive traits that are not socially salient, such as measuring driving style or lifestyle decisions such as joining a gym. This makes risk assessment less problematic from the perspective of discrimination as traditionally understood. At the same time, nonsocially salient traits (e.g. gym use) are often significantly correlated with membership to socially salient groups – and those correlations may reflect past or current discriminatory practices. However, it is often not possible to eliminate indirect discrimination without reducing the accuracy of the predictions made with Big Data. Since the accuracy of risk assessment, fraud detection and willingness to pay plays an important role in establishing the economic sustainability of companies, there can be ethical reasons to accept Big Data methods, in spite of their indirect discrimination. Therefore, implementing decisions based on “fair” predictions involve trade-offs between different fairness intuitions or other relevant ethical values. This indicates that frameworks for “fairness by design” may be required to decrease reputation risks when using machine learning in insurance.

Further reading

Loi M, Christen M (in press):

Two concepts of group privacy. Contact research team for manuscript.

Loi M, Christen M (in press):

Big data and the morality of inclusion. Available at NRP 75 website

Loi M, Hauser C, Christen M (submitted):

Big data in insurance: when are clients coerced to share their data? Contact research team for manuscript.

Loi M, Christen M (in preparation):

Choosing how to discriminate: fair algorithms and risk prediction with Big Data in the insurance sector. Available at NRP 75 website

The Geneva Association (Keller, Benno) (2018):

Big Data and Insurance: Implications for Innovation, Competition and Privacy. White Paper (written with the involvement of the project team).

Available at NRP 75 website

Empirical survey research

The survey included answers from Switzerland ($N_{\text{German}}=764$, $N_{\text{French}}=317$) and the U.S. ($N_{\text{USA}}=1083$).

Three insights are noteworthy:

First, the willingness to share information is linked to the type of information and the trust placed in institutions (e.g. insurance companies) and Internet companies.

Two main patterns were found: Individuals trusting in the “old economy” (insurance, media, government etc.) are more likely to share factual data (name, age etc.) with others, whereas people who trust in the “new economy” (Internet companies) are more likely to share emotional data (photos, comments, opinions etc.). This indicates that individuals are selective about the information they share and that they are more likely to share sensitive information if they trust the companies providing Big Data applications. Second, people show resistance to data use in insurance products as soon as the data seems to be unrelated to the object of insurance; this resistance is higher when the values fairness, privacy and solidarity are “protected”. This indicates that customers expect a plausible relationship between the data to be used in a product and the insurance target of the product.

Third, regarding the expert survey, only preliminary findings are possible due to the low number of responses ($N=23$). Experts are confronted with ethical and legal issues related to Big Data on average on a monthly basis. Ethics expertise is usually available, but guidelines tend to be missing within companies. This indicates a possible gap between the willingness to handle ethical issues and the availability of tools for doing this effectively.

Further reading

Tanner C, Christen M, et al. (in preparation):

Clients’ perceptions and responses to threats to ethical values through Big Data. Contact research team for further information.

Loi, M, Christen, M, Tanner C (in preparation):

Philosophical implications for trust and value perceptions in insurance. Contact research team for further information.

Sharon A, Hauser C et al. (in preparation):

Information sharing behaviour on social networks: Which role does trust play? Contact research team for further information.

Dahinden, U, Tanner, C, et al. (in preparation):

The relationship between client’s values and trust. Contact research team for further information.

Recommendations

The question if, under what conditions and to what extent insurance companies should be allowed to personalise their insurance contracts based on Big Data analytics should not be resolved indirectly by applying the general principles of data protection and anti-discrimination law.

The Swiss regulator should continuously monitor and anticipate the use of Big Data for the personalisation of insurance contracts, identify unwanted forms of personalisation, and create specific provisions in insurance law, where needed, to either prohibit personalisation or define the conditions and the extent of permissible personalisation.

Insurance companies should avoid using data sources that are not related to the insured risk, as this may undermine the customer's trust in the products and services of the industry.

Insurance companies should demonstrate to their clients how they protect core values such as privacy, fairness or solidarity from risks posed by Big Data analytics.

Insurance companies should increase their awareness about the nature and impact of the unwanted discriminatory use of Big Data-based machine learning in prediction, pricing and fraud detection.

Insurance companies should adapt their general business ethics principles for achieving accountability to the systematic handling of ethical issues resulting from the digitalisation of the industry.