Response of the AAE to:

JC/2016/86
Joint Committee Discussion Paper on The Use of Big Data by Financial institutions

Actuaries, e.g. mathematicians in the area of insurance mathematics, have always (since the first developments of mortality tables in the 17th century) used increasing amounts of data in the development of methods and algorithms to calculate premiums and reserves in insurance business. The profession of actuaries teaches their members not only in the technical use of data but it also demands a highly professional and ethical behaviour in the use of data.

For decades, the work of actuaries in their traditional fields exactly matches the definition of "predictive analytics": Actuaries carefully check the data for its relevance for the prediction to be made, actuaries "clean" the data if necessary, actuaries use the most appropriate algorithm to calculate the premium or the reserve for the requested period in the future, and finally actuaries validate the results with their judgement.

Moreover, actuaries have deep knowledge of insurance products and techniques, so that they can find the most suitable solutions. For example, it is very important to differentiate, as regards the impact of good behaviour (non-smoking, active lifestyle, etc.) in health insurance, between one-year products and lifelong products: good behaviour can lead to a lower premium in a short-term product and lead to a higher premium in a long-term product.

Actuaries with their knowledge about data and algorithms are also employed in fields not directly linked to traditional insurance mathematics like Enterprise Risk Management, Fraud Detection and Marketing. The use of actuarial skills is not restricted to insurance and pensions but they are increasingly being used in other areas of financial services such as banking.

1. Do you agree with the above description of the Big Data phenomenon? If not, please explain why. Please also mention whether you consider that other characteristics are relevant to understanding the use of Big Data.

We agree to some extent with the description. Insurance sector has historically handled large amounts of data. Earlier it had problems because of fragmented IT systems not making integrated handling of data possible. Also the systems only handle strongly structured data. There was no consistency between marketing/ sales/ customer systems/ data, and the old systems were not able to communicate with each other. Even though lots of data was stored one could talk of lack of data. With digitalisation the breaks will be overcome and data (also unstructured data) are available at every stage of the relation between customers and companies – from pre-sales to claims-handling.

Still today the situation is not perfect. Insurers are developing their systems. But compared to new possible players, insurers lack a lot. Especially insurers are not good in handling unstructured data. With new players like Facebook there are opportunities to use data in innovative ways. Insurers have not developed their analytical capabilities enough. On the other hand it can be that many new players are overconfident of their abilities and can make unfounded conclusions from whatever data

they have. Insurers have a lot to learn from new technologies. But emerging players could learn from insurers not to be overly confident with their capabilities.

It needs also to be remembered that increasing amounts of data can create situations where people will no longer get the cover they need. Societies might need to look at an equilibrium between the benefits of utilising data for the good of the society on one hand and on equitable treatment of individual citizens on the other hand.

This equilibrium would be difficult to find. If there were limitations on what data the insurer can use this certainly would not restrict the data clients can use for their benefit. This could lead to large problems of anti-selection to insurers (i.e. only those who know they are more risky than others would opt to take insurance). Anti-selection is of course not something new happening only because of Big Data, but Big Data may increase the challenges of anti-selection.

In addition, our general concern is the fact that the consultation is biased to problems related to marketing. However, Big Data has much to do with other phases of customer relationship. Especially we would point to the direction of detection of insurance fraud. Fraud detection is mentioned in Pars. 51-52 but not in the context of insurance.

2. Which financial products/activities are (likely to be) the most impacted by the use of Big Data and which type of entities (e.g. large, small, traditional financial institutions, Fintechs, etc.) are making more use of Big Data technologies?
In light of ESAs' objective to contribute to the stability and effectiveness of the financial system, to prevent regulatory arbitrage, do you consider that there is a level playing field between financial institutions using Big Data processes and those not using them (e.g. because they do not have access to data or the (IT)resources needed to implement Big Data processes) or between established financial institutions and potential new entrants (e.g. Fintechs) using Big Data processes? Please explain.

The use of Big Data will influence and change all activities of all insurance companies:
- Pre-sales: Searching for customers will be made by Big Data driven algorithms; products will be individualized with Big Data driven methods and algorithms.
- Pricing: More data will make it possible to have more granular tariffs corresponding more closely to the risk profile of the insured interest.
- Sales: Underwriting processes will be widely assisted by Big Data driven algorithms and AI.
- Big Data will and should be used in reserving techniques of insurers, i.e. in the process of calculating technical provisions and eventually solvency requirements.
- After-sales: Especially in the claims processes and in fraud detection, Big Data technologies and AI will be used more and more.

New Players like Fintechs will participate in parts of the business, but also players in other fields like manufacturers of goods (cars, houses, …), internet trade companies (Amazon, …) and others (Facebook, …) can offer "insurance-like" or "fragments of insurance" products and services especially in the field of property insurance.

There is a big threat of a lack of a level playing field between established financial institutions and potential new entrants when financial institutions are treated under strong regulation and others might find ways to avoid regulation for (parts of) their business close to the business of the established financial institutions. For example, in general insurance all kinds of "guarantees" and services around goods – today covered by insurance contracts like household insurance – could be "included" in goods connected with Internet of Things (IoT). Providers of those "inclusions" might avoid the strong regulation and have a big advantage over established insurance industry.

We would also like to remind that especially when talking of Big Data we are talking of a truly global issue. EU alone could create rules that sound good. But it could easily be that rules in other countries would make European rules obsolete. We would here especially look to the direction of the U.S. where companies like Facebook have their headquarters.

3. Do you offer/are you considering using Big Data tools as part of your business model? If so, please briefly describe:

      i)   what type of entity you are, e.g., long established, start-up, a product provider, an intermediary;

      ii)   the service you provide;

      iii)   the nature of your clients;

      iv)   your business model;

      v)   whether the Big Data tools/strategy were developed by an external company or internally and whether you have related agreements with other entities (including non-financial entities);

      vi)   what are the types of data used (personal, anonymized, user data, statistical data etc.) sources of data; and

      vii)   the size of your Big Data related activity and/or forecast activity (e.g. to what extent are business decisions already taken on the basis of Big Data analysis; what other business actions could be based on Big Data in the future)?

As a professional association, the AAE is not in a position to answer i) to v) above. Our answers below are based on our observation of the market.

vi) In their core business actuaries use anonymised, statistical data to create/ calculate tariffs and to calculate reserves. Gross industry statistics which are offered for example by insurance associations play an important role at least for the quality control.

vii) There is a trend to be seen in algorithms connected to all sorts of decisions: selection of what potential customers should be addressed in marketing campaigns, underwriting processes, claims handling processes and risk management of the companies. Big Data gives the opportunity to use more complex algorithms. A problem will be to understand the results of these complex algorithms – especially for the senior management.

4. If you are a consumer or a consumer organization, do you witness any of the uses of Big Data? In what fields?

AAE is not a consumer organisation as such, but our mission is consumer focused i.e. we strive to act in the public interest.

As mentioned in our answer to question number 2, we see the uses of Big Data in all parts of the insurance business. Data science and predictive analytics will be used in all areas of insurance business. From the consumer point of view we can think of at least the following problematic dimensions:

- It will be a challenge to communicate the use of Big Data to customers.
- It is possible that the use of some criteria which are available for differentiation today might be prohibited in the future. Therefore regulation needs to be flexible enough to accommodate future developments.
- It is unclear whether customers are able to correct information concerning themselves on which decisions on their insurability or their premiums are based. Therefore customers should have the right to know what information concerning them is used and also to challenge that information in case they think it is flawed.
- Ethical issues relating to the use or mis-use of genetic information – or Big Data generated proxies for genetic information?
- Some consumers will not be able to gain access to certain kinds of insurance covers

5. Do you consider there are (non-regulatory) barriers preventing you (or which could prevent you in the future) from collecting and processing data? Are there barriers preventing you from offering/developing Big Data tools in the banking, insurance and securities sectors? If so, which barriers?

One could say there are no barriers. All depends on the future. If players like, say Facebook, can start to use all data they have and make it only exclusively available then there are huge barriers.

With respect to Big Data, we have been concerned over the fate of the IBER (Insurance Block Exemption Regulation). The expectation is that the IBER will be discontinued. In the absence of the IBER, competition regulation may in practice prevent companies from sharing data which would be used to facilitate creation of joint studies and tables covering key elements of insurance experience, essential for use in pricing and reserving. The future depends on what is possible in terms of competition legislation and so-called Horizontal Guidelines. It is important that all market participants can access sufficient data i.e.gender by pooling information from a number of companies where necessary in order that there can be a competitive market, as otherwise those participants who own a lot of data will have a huge advantange, leading to less competition in the market.

6. Do you agree with the above short, non-exhaustive, presentation of some of the main applicable requirements? If not, please explain why. Please also mention whether you consider that other legal requirements are essential and should be mentioned.

We agree with the requirements. Insurance business is based on the confidence of customers in the industry. Most of the requirements support the confidence and the credibility of products and services of the industry.

Big Data can create possibilities of new kinds of analytics leading to more "fuzzy" logics of connecting individual data to premium setting and insurability. It will be then harder than today to disclose the logic to the customer and also to the supervisor.

In addition, Solvency II is designed to naturally accept this enhanced risk knowledge and provide more specific capital requirements to entities based on their unique risks. Big Data and Solvency II should work very well together.

7. Do you consider any of these regulatory requirements as unjustified barriers preventing you from using Big Data technologies? If so, please explain why. Please also explain whether you consider that further regulation (including soft law/guidance, etc. and insofar as it falls within the scope/remit of the ESAs) should be introduced to facilitate the use of Big Data technologies.

We don´t consider that the requirements prevent the industry from using Big Data technologies. We see problems in different requirements: strong ones for the financial industry and weaker ones for other industries competing in the same or similar fields.

We also see a demand of a high qualification using Big Data technologies as well as a "code of conduct" in the development of insurance products and tariffs, including in fields outside the insurance industry. In the further differentiation of tariffs – especially in the field of long-term products – a deep knowledge of insurance and Big Data techniques is necessary to guarantee a stable fulfilling of the product promises towards the customers.

As mentioned in the introduction, actuaries are highly educated in the use of mathematics and statistics and also are guided by their professional code of conduct.

We see potential problems in regulatory arbitrage. It is important to think of a situation where Europe bans use of certain info but some other markets do not. From a customer's perspective they can buy an insurance policy across borders where the premium may be lower as the non-European insurer can use certain data not permissible in Europe to rate the individual. There might be no additional risk from the European customer perspective as European regulator might have deemed the regulations of this other market to be equivalent to Solvency II (and rating agencies will allow another way of comparing) and the policy can be bought over the internet. European IFAs and brokers may even recommend this approach.

Where an automated model may have a significant financial impact on a customer, the General Data Protection Regulation requires companies to explain how that model works if a customer demands it.

This is a very significant challenge. Many pricing models would meet that description: would the regulation apply to traditional actuarial techniques or just Big Data? In addition, to what level of degree would the explanation be required? Many models are recalibrated on a regular basis making an explanation given to a customer obsolete after a few months.

8. Do you consider the potential benefits for consumers and respectively financial institutions to be accurately described? Have you observed any of them in practice? If so, please provide examples. If not, please explain whether you are aware of any barriers that may prevent the above potential benefits from materialising?

Yes, the potential benefits are accurately described. In the struggle to find the precise risk premium – defined by the mean value and (parts of) the variance of the probability distribution of a risk – for any risk, Big Data will open new dimensions. The question is whether some of the Big Data approaches bring much more benefit than the approaches in "pre-Big Data-times" already had brought. For example: the "old" tariff model used in car insurance in Germany already has many more different prices than there are risks in Germany. A Telematics tariff model can differentiate more only in very restricted fields like between very young and very old drivers or professional drivers. The situation in other European countries seems to be different with not so sophisticated tariff models in the past. In general, we see very high advantages for consumers, if new models based on Big Data motivate customers to more claims prevention and claims reduction and this is shown credibly in the tariff structure.

9.   Do you agree with the description of the risks identified for consumers and respectively financial institutions? Have you observed any of these risks (including other risks that you are aware of) causing detriment to consumers and respectively financial institutions? If so, in what way? If not, please explain why. Please also mention whether certain risks for consumers and financial institutions have not manifested yet but have the potential of developing in the future and hence need to be closely monitored by Supervisory Authorities.

It is one of the functions of private insurance to show and to calculate risks as precisely as possible. This creates risk prevention and risk reduction, which is an important goal of the society. There are many possibilities when it comes to the customers (and public institutions/ authorities) to manage risk prevention and risk reduction. In addition to that, there are possibilities within insurance products to manage risks for example with deductibles and no-claims discounts.

Possible bans of granular segmentation should be handled extremely carefully under a deep knowledge of all circumstances and consequences. It is very questionable whether bans on the segmentation / differentiation in private insurance can solve deeper problems of the society. One example of this is the prohibition on the use of gender as a tariff factor in insurance. The intentions might be good but the result is just less cover at reasonable prices to those who need cover.

In the example of household insurance high flood claims frequencies often show problems in the allocation of properties by the public authorities and it is very questionable whether claims out of that should be paid by all the businesses in force via "wrong" risk premiums. On the other hand: households on normally non-insurable high risk properties (in Germany about 0,4 percent of all properties) have constructed their houses in a way that floods don´t cause high damages, so there is only a need to cover the remaining risk after a high deductible, which some insurers offer.

It is clear that discrimination between customers is always out of the question in all of insurance. It is however also clear that insurance needs the possibility to differentiate between risks. This differentiation is to some extent limited in compulsory insurance, although it should be possible when it creates benefits for the society.

In voluntary insurance individuals are free to either keep the risk with themselves or insure the risk. The choice is between carrying the risk individually and feeling the need to pool it with others. If it is not possible for the insurer to make differentiation between the risks then the whole concept of risk

pooling collapses: only the more risky individuals would opt for insurance (creating a vicious circle, with increasing average premiums and more and more insureds opting not to participate).

With Big Data more intricate differentiation will be possible. As risks are still aleatory, one cannot be certain of the outcome. But, if using Big Data would become prohibited then a) increasing adverse selection would be possible and b) an increasing number of individuals would be left without cover. Additionally, in the global playing ground certain options would be possible for global players and not European ones.

10.   Is the regulatory framework adequately addressing the risks mentioned above? Bearing in mind the constant evolution of technologies/IT developments and that some of the   above mentioned   regulatory requirements are not specific to the financial services sector (e.g. GDPR), do you think further regulation is needed to preserve the rights of consumers of financial services in a Big Data context? Please explain why.

We see the threat that the regulatory framework – especially if it is exceeded – leads to a (partial) substitution of financial institutions by other non-regulated market participants especially in the field of property insurance. Today's insurance cover potentially can be fragmented by Big Data techniques and integrated in goods and services of manufacturers, commercial enterprises and "community organizers" and then will not be under a proper regulatory framework.

11. Do you agree that Big Data will have implications on the availability and affordability of financial products and services for some consumers? How could regulatory/supervisory authorities assist those consumers having diculties to access financial services products?

Big Data potentially will lead to a reduction of risks in total because of better risk prevention and risk reduction, so that the insurance industry potentially will lose business volume.

12. Do you believe that Big Data processes may enable financial institutions to predict more accurately (and act accordingly) the behaviour of consumers (e.g. predicting which consumers are more likely to shop around, or to lodge a complaint or to accept claims settlement offers) and could therefore compromise the overarching obligations of financial institutions to treat their customers in a fair manner? Please explain your response.

It is certainly so that by using Big Data insurers can obtain a better view of the riskiness of insured individuals or insured property etc. There is much work to do in this area. Models need to be created in predictive analytics to really understand for example the relationship between a person's shopping basket and his/her health. Big Data holds the promise to give insurers better tools in dividing insured persons and objects into ever more categories and price them accordingly. This should benefit the society. It should be remembered that we still talk of stochastic risks, i.e. even with all Big Data we still do not know whose house will burn and when. So there is still room for insurance even in the age of Big Data.

Certain criteria exist that have been banned in legislation. For example, gender or genetic information can no longer be used as a tariff factor. It is important to consider what possible restrictions should be set on the use of Big Data. This should be done in advance so that possible restrictions do not come as a surprise. It should also be recognised that insurers do not categorise with the aim of discriminating. Instead, insurers differentiate between risks in order to make effective pooling of risks possible.

Customers propensity to move their insurance is another example of a parameter that insurance companies could potentially derive from big data which could affect pricing although it is not related to the underlying insurance risk. Currently, this is not banned by regulators.

13. Do you agree that Big Data increases the exposure of financial institutions to cyber risks? If yes, what type of measures has your institution adopted or is going to adopt to prevent such risks? What could supervisory/regulatory authorities do in this area?

As a professional association, the AAE is not in a position to answer these questions. Our answers below are based on our observation of the market.

We agree that digitalisation increases the exposure of financial institutions to cyber risks.
In the U.S there is currently an obligation to disclose realised cyber incidents whereas in Europe there is not. This has led to the creation of a cyber risk insurance market in the U.S. and not in Europe. We feel that the forthcoming European disclosure of cyber incidents will be good for the market and also for better awareness and prevention among clients.

14. Would you see merit in prohibiting the use of Big Data for certain types of financial products and or services, or certain types of customers, or in any other circumstances?

No. It could be appropriate to prohibit the use of big data if such prohibition meets society's need for a particular good or reduces large disparity in access to particular goods. One could imagine an authoritarian regime or a monopoly refusing to provide certain essentials (eg access to a bank account) for those who deviate from certain norms based on big data analysis.
It needs to be noted that the digital world is without borders. Europe prohibiting the use of something could result into a huge disparity between the EU and UK or the rest of the world. We would be very careful in choosing such a route.

15. Do you agree that Big Data may reduce the capacity of consumers to compare between financial products/services? Please explain your response.

We don´t agree that Big Data may reduce the capacity of consumers to compare between financial products/ services. It is of course a challenge to insurers to communicate what they are doing to their customers. In the short run, consumers can get confused with novel products and practices but we think this is a temporary problem. We believe also that the activities of supervisors, consumer protection organisations, press and others help customers in getting along.

16. How do you believe that Big Data could impact the provision of advice to consumers of financial products? Please explain your response.

Big Data and digitalization in general potentially lead to higher transparency of financial products. This can be utilised to extend provision of advice to consumers. There might be a threat to personal advice because the profession of insurance agents and insurance consultants have to struggle with the big changes caused by Big Data. Agents and consultants are very important in the more sophisticated situations of customers. But, advice can be better only if done well.

17. How do you believe Big Data tools will impact the implementation of product governance requirements? Please explain your response.

Big data tools will influence e.g. the supervision of product governance. Supervisors could use these tools to check compliance with the rules. We believe that there will be an impact especially in the field of long-term products in life and health insurance. On the one hand, there is the trend of differentiation via Big Data but on the other hand there is a big need of stabilisation of long-term products during their whole lifespan. This has to be covered by product governance requirements.

18. How do you believe Big Data tools will impact know-your-customer processes? Please explain your response.

Know-your-customer processes aim to protect the customer from the provider trying to sell products that are unsuitable for the customer. Providers need to be appropriately aware of the needs of their customers and offer products that are suitable taking into consideration the needs, sophistication etc. of the customer. We think that Big Data will make it easier and cheaper for the provider to arrange its processes.

19. What are key success factors for a Big Data strategy (i.e. the adaptation of the business model/plan towards Big Data driven technologies and methods)?

As a professional organisation, we can only say that without acquiring good resources in predictive analytics it will be impossible for any firm to make use of Big Data. Our profession has a long experience in this area and it will continue to be essential not only in insurance but also in other sectors.

Big Data will transform organisations and require them to form flexible operating models that can adapt to the insight provided by Big Data techniques. A successful Big Data strategy requires this kind of flexibility paired with clear goals, adequate resources and cooperation among all business areas. A Data Science team living in a silo and with little communication with other teams will rarely provide useful insight to the company.

20. What are the greatest future challenges in the development and implementation of Big Data strategies?

We believe actuaries have an important role to play in the strategy setting of insurers especially in the age of Big Data.

There are at least the following challenges:

- Existing and new Regulation, or lack/excess of regulation for insurance business and data usage
- Traditional players feeling threatened by new entrants to the market that use Big Data techniques not yet adopted by older insurers.
- Lack of a culture of sharing data.
- Fear of cyber-risk stopping insurers from leveraging cloud computing services that fuel Big Data in other industries.
- Lack of expertise and awareness in the insurance industry (insurers and regulators) about the possibilities and limitations of Big Data.

21. This Discussion paper refers to a number of measures and tools meant to ensure compliance with conduct and organisational regulatory requirements as well as data and consumer protection rules in the context of big data analytics. Are other measures and tools needed? If so, what are they and what they should cover?

In all sectors of our societies, we see fragmentation of services and providers, made possible by digitalisation including Big Data techniques. Insurance is a heavily regulated sector. It could happen that new entrants could do parts of what has traditionally been done by regulated insurers. Regulators should define what areas of insurance constitute the core of regulated insurance activity. This core should be regulated on a similar manner irrespective of whether it is done by an insurer or by some other undertaking.

22. How do you see the development of artificial intelligence or blockchain technology in connection with Big Data processes?

Artificial Intelligence will be used in all kinds of insurance processes in the future – we are only at the very beginning of this change.

Blockchain technology will definitely be used in the b2b part of insurance business, because there the current disadvantages in handling huge amounts of contract will not occur. It remains to be seen whether blockchain technology can be used in the b2c business. Blockchain will probably not have a quick impact on b2c.

23. Are there any other comments you would like to convey on the topic of use of Big Data by financial institutions? In particular, are there other relevant issues that are not covered by this Discussion Paper?

Our general concern is that the consultation is biased to problems related to marketing. In addition to marketing Big Data has much to do with other phases of customer relationship.