



IAIS

INTERNATIONAL ASSOCIATION OF
INSURANCE SUPERVISORS

Public

Issues Paper on the Use of Big Data Analytics in Insurance

February 2020

About the IAIS

The International Association of Insurance Supervisors (IAIS) is a voluntary membership organisation of insurance supervisors and regulators from more than 200 jurisdictions. The mission of the IAIS is to promote effective and globally consistent supervision of the insurance industry in order to develop and maintain fair, safe and stable insurance markets for the benefit and protection of policyholders and to contribute to global financial stability.

Established in 1994, the IAIS is the international standard setting body responsible for developing principles, standards and other supporting material for the supervision of the insurance sector and assisting in their implementation. The IAIS also provides a forum for Members to share their experiences and understanding of insurance supervision and insurance markets.

The IAIS coordinates its work with other international financial policymakers and associations of supervisors or regulators, and assists in shaping financial systems globally. In particular, the IAIS is a member of the Financial Stability Board (FSB), member of the Standards Advisory Council of the International Accounting Standards Board (IASB), and partner in the Access to Insurance Initiative (A2ii). In recognition of its collective expertise, the IAIS also is routinely called upon by the G20 leaders and other international standard setting bodies for input on insurance issues as well as on issues related to the regulation and supervision of the global financial sector.

Issue Papers provide background on particular topics, describe current practices, actual examples or case studies pertaining to a particular topic and/or identify related regulatory and supervisory issues and challenges. Issues Papers are primarily descriptive and not meant to create expectations on how supervisors should implement supervisory material. Issues Papers often form part of the preparatory work for developing standards and may contain recommendations for future work by the IAIS.

International Association of Insurance Supervisors
c/o Bank for International Settlements

CH-4002 Basel

Switzerland

Tel: +41 61 280 8090 Fax: +41 61 280 9151

www.iaisweb.org

This document was prepared by the Market Conduct Working Group in consultation with IAIS Members.

This document is available on the IAIS website (www.iaisweb.org).

© International Association of Insurance Supervisors (IAIS), 2020.

All rights reserved. Brief excerpts may be reproduced or translated provided the source is stated.

Contents

Executive summary.....	4
Acronyms.....	6
1 Introduction.....	7
1.1 Background and purpose.....	7
1.2 Approach and structure.....	8
2 Types, sources and processing of data in insurance.....	10
2.1 Type and sources of data in insurance.....	10
2.2 Processing of data in insurance.....	11
3 The use of big data analytics across the insurance product lifecycle.....	14
3.1 Product design, marketing, sales and distribution.....	14
3.1.1 Personalised insurance cover.....	14
3.1.2 Targeted marketing.....	16
3.1.3 Sales execution.....	17
3.1.4 Distribution and advice.....	18
3.2 Pricing and underwriting.....	19
3.2.1 Increased granularity in risk selection and pricing.....	19
3.2.2 Price optimisation.....	20
3.2.3 Underwriting.....	22
3.3 Claims handling.....	25
3.3.1 Risk mitigation and loss reduction.....	25
3.3.2 Claims processing.....	26
3.3.3 Fraud detection.....	28
4 Supervisory considerations.....	31
4.1 Suitability, affordability and availability of insurance cover.....	32
4.2 Governance and oversight of algorithms.....	34
4.3 Third party risk management.....	38
4.4 Issues relating to privacy, data protection and ownership of data.....	38
4.5 Other broader considerations.....	39
Annex 1: Some examples of traditional and non-traditional data sources and data types in insurance.....	40
Annex 2: Reference material on impact of BigTechs, FinTechs and third party cloud-service providers.....	41

Executive summary

1. This paper builds on the November 2018 IAIS Issues Paper on Increasing Digitalisation in Insurance and its Potential Impact on Consumer Outcomes¹ (Digitalisation Paper) by focusing more specifically on issues relating to the use of personal and other data by insurers as a result of digitalisation.
2. The scope of this paper focuses on the use of algorithms and advanced analytics capabilities by insurers to make decisions based on patterns, trends and linkages and the availability to insurers of new data sources, collectively referred to as “big data analytics” (BDA).
3. As mentioned in the Digitalisation Paper, supervisors will need to consider how to balance the many benefits of technological innovation to the insurance sector with potential risks of poor outcomes to customers as a result of such innovation. To help understand the potential benefits and risks of the use of BDA by insurers, this paper considers the new ways in which insurers are able to collect, process and use data across various stages of the insurance product lifecycle, namely product design, marketing, sales and distribution, pricing and underwriting and claims handling. This paper also highlights potential considerations for supervisors relating to the use of BDA in insurance to ensure the fair treatment of customers as described in Insurance Core Principles (ICPs) 18 and 19.
4. The insurance sector has always been heavily reliant on data for accurate risk assessment, underwriting and pricing. The increasing availability of data and enhanced processing capabilities now accessible to insurers can result in a number of benefits for both insurers and customers. The granularity of data from multiple sources can lead to more personalised and affordable insurance products, increased choices and more efficient servicing for customers. Insurers can also benefit from BDA by expanding their distribution reach, ensuring more accurate pricing and lowering their cost margins due to improved operational efficiencies, better fraud detection and fewer claims as a result of improved risk behaviour by customers.
5. On the other hand, the complexity and opacity of algorithm technology and the ability of insurers to customise product offerings to an individual level could potentially result in risks to individual customers, as well as to the insurance sector as a whole. Supervisors may need to devise appropriate and proportionate responses to deal with such risks, suited to their respective jurisdictional frameworks and mandates. In particular supervisors may wish to consider whether the use of BDA could adversely impact the availability and affordability of insurance, potentially resulting in reduced options or no coverage for certain consumer segments. Additionally, they may find it useful to explore the need to enhance governance, oversight and third party risk management requirements specific to the use of algorithms for BDA purposes. This could include clarifying supervisory expectations on appropriate levels of transparency and insurer accountability for customer outcomes resulting from algorithm-based decisions.
6. While the collection, use and processing of data naturally raises issues about privacy, data protection and related matters, the supervision of such matters often falls outside the remit of insurance supervisors, and is not covered in detail within the scope of this paper

¹<https://www.iaisweb.org/page/supervisory-material/issues-papers//file/77816/issues-paper-on-increasing-digitalisation-in-insurance-and-its-potential-impact-on-consumer-outcomes> .

except to the extent addressed in ICP 19.12². Nevertheless, insurance supervisors may need to engage with various cross-sectoral stakeholders on potential consumer privacy and data protection risks associated with the use of BDA in insurance, most notably the relevant data protection agencies in their respective jurisdictions.

² ICP 19.12 states that “[t]he supervisor requires insurers and intermediaries to have policies and procedures for the protection and use of information on customers”.

Acronyms

A2ii	Access to Insurance Initiative
ABI	Association of British Insurers
AIDA	Artificial Intelligence and Data Analytics
APIs	Application Programming Interfaces
ACCC	Australian Competition and Consumer Commission
AFM	Autoriteit Financiële Markten (Netherlands)
AI	Artificial Intelligence
BaFin	Bundesanstalt für Finanzdienstleistungsaufsicht (Germany)
BDA	Big Data Analytics
DNB	De Nederlandsche Bank
EIOPA	European Insurance and Occupational Pensions Authority
FACI	Federal Advisory Committee on Insurance (USA)
FCA	Financial Conduct Authority (UK)
FEAT	Fairness, Ethics, Accountability and Transparency
FSCA	Financial Sector Conduct Authority (South Africa)
G20	Group of Twenty
GIA	General Insurance Association (Singapore)
GINA	Genetic Information Nondiscrimination Act of 2008 (USA)
HKFI	Hong Kong Federation of Insurers
IAIS	International Association of Insurance Supervisors
ICPs	Insurance Core Principles
IIB	Insurance Information Bureau of India
IoT	Internet of Things
IPPC	Insurance and Private Pensions Committee (OECD)
IRDA	Insurance Regulatory and Development Authority (India)
MAS	Monetary Authority of Singapore
NAIC	National Association of Insurance Commissioners (USA)
OECD	Organisation for Economic Co-operation and Development
SAICB	South African Insurance Crime Bureau
TCIP	Turkish National Catastrophe Insurance Pool
UBI	Usage Based Insurance

1 Introduction

1.1 Background and purpose

7. In November 2018 the IAIS published an Issues Paper on Increasing Digitalisation in Insurance and its Potential Impact on Consumer Outcomes³ (Digitalisation Paper). That paper considered generally the impact of various technological innovations on consumer outcomes and insurance supervision in light of Insurance Core Principles (ICPs) 18 on Intermediaries and 19 on Conduct of Business.

8. One of the areas identified in the above paper was the increasing availability of, and access to, consumer related-data by insurers as a result of many of the innovations described in that paper. The IAIS signalled that this would be an area for further exploration and discussion in a separate paper.

9. The purpose of this paper is therefore to consider the use of personal and other data by insurers as a result of digitalisation and to identify potential benefits and risks for consumers associated with such use. Specifically this paper focuses on the increasing use of algorithms and advanced data analytics by insurers, as well as the greater availability to insurers of traditional and non-traditional data sources. In the paper this will be collectively referred to as “big data analytics” (BDA).

10. Where data is processed and held by intermediaries, as may be the case in certain circumstances depending on their involvement in the insurance value chain, the issues identified in this paper will also be applicable as and when appropriate to intermediaries. In these circumstances references to “insurer” in the paper would include insurance intermediaries.

11. In this paper “consumer” refers to the “universe of all actual and potential customers for insurance products” and “customer” refers to the “[p]olicyholder or prospective policyholder with whom an insurer or insurance intermediary interacts, and includes, where relevant, other beneficiaries and claimants with a legitimate interest in the policy”, as defined in the IAIS Glossary.⁴

12. This paper does not go into technical detail on the various types of technological innovations⁵ now available to insurers, but rather discusses various applications of BDA by insurers across the insurance product lifecycle and considers the potential impact of these applications on outcomes for consumers and possible implications for supervisors as a result.

13. Customer segmentation on the basis of risk classes is a core feature of private insurance. Increasing digitalisation enables insurers to access progressively larger volumes of granular customer data. This, together with increasing access to advanced computing and analytical tools, creates opportunities for greater individualisation of risks and pricing. With more accurate risk assessments, insurers can offer more appropriate, tailored services and

³<https://www.iaisweb.org/page/supervisory-material/issues-papers//file/77816/issues-paper-on-increasing-digitalisation-in-insurance-and-its-potential-impact-on-consumer-outcomes> .

⁴ <https://www.iaisweb.org/page/supervisory-material/glossary> .

⁵ Previous IAIS material describing the various types of technological innovations available to insurers: <https://www.iaisweb.org/page/supervisory-material/other-supervisory-papers-and-reports//file/65440/report-on-fintech-developments-in-the-insurance-industry>; <https://www.iaisweb.org/page/supervisory-material/application-papers//file/77815/application-paper-on-the-use-of-digital-technology-in-inclusive-insurance>; [IAIS Digitalisation Paper](#) .

products that better match their customers' needs and preferences. More granular customer segmentation may also provide opportunities for new or incumbent insurers to specialise in certain market segments, resulting in more choice for consumers.

14. The application of BDA may allow insurers to cluster customers in increasingly refined risk categories for different treatment in respect of risk selection, marketing, sales execution, underwriting, pricing and claims settlement. Used appropriately, BDA has the potential to improve insurance access for historically underserved consumers, such as individuals with chronic illnesses who may have previously been unable to obtain life insurance cover.⁶ However, the use of increasingly refined risk categorisations in some BDA applications could potentially signal a fundamental shift away from the defining principle of risk pooling for insurance purposes. This could result in accessibility and affordability challenges and possible market exclusion for some customers. Additionally, the opacity of algorithms can contribute to decreased comparability of products, especially if customers are only able to see or access product offerings that are individually tailored.

15. ICPs 18 and 19 contemplate the delivery of fair customer outcomes across the insurance value chain irrespective of the adoption of technology or the use of more traditional means to design, market, sell, distribute or service insurance policies. A thorough and ongoing understanding of the benefits and risks associated with the application of BDA in insurance can help supervisors to develop more appropriate and proportionate responses to such applications by insurers while ensuring that the fair treatment of customers is not compromised.

16. The application of BDA also raises important questions related to the protection, ownership, transferability and ethical use of customer data. In many jurisdictions, privacy and data protection issues generally fall outside the remit of insurance supervisors. Therefore, while this paper acknowledges the importance of these issues for insurance supervisors, it does not cover them in detail except to the extent set out in ICP 19.12, which states that “[t]he supervisor requires insurers and intermediaries to have policies and procedures for the protection and use of information on customers”.

1.2 Approach and structure

17. In line with the approach adopted in the previous Digitalisation Paper, this paper discusses the applications of BDA across the insurance product lifecycle, and covers product design, marketing, sales and distribution, pricing and underwriting, and claims handling.

18. The paper is structured as follows:

- section 2 provides an overview of traditional and new data sources, data collection methods and data processing capabilities available to insurers;
- section 3 discusses potential applications of BDA across certain aspects of the insurance product lifecycle, and the associated benefits and risks of such applications; and

⁶ <http://news.ambest.com/ArticleContent.aspx?pc=1009&altsrc=158&refnum=285595> .

- section 4 concludes with key considerations, supplementary to those highlighted in the previous Digitalisation Paper⁷, aimed at assisting supervisors to determine possible responses to the issues discussed in section 3.

⁷ [IAIS Digitalisation Paper](#) at page 24.

2 Types, sources and processing of data in insurance

2.1 Type and sources of data in insurance

19. The insurance sector has always been heavily reliant on various types of data, used for many purposes across the insurance product lifecycle, most notably risk selection, marketing, product development and claims management.⁸ Traditionally this has included - among others - demographic, medical, exposure, behavioural and loss data. This data is usually sourced directly from customers themselves.

20. Digitalisation has resulted in the availability and use of new data sources and data sets for insurers. This type of data is not always collected or produced by the insurer as a result of direct customer interactions but is also taken from indirect sources such as mobile devices, sensors, satellite technology and the internet, and may be accessible to insurers both within and outside an insurance context.

21. A non-exhaustive list of traditional and non-traditional data types and sources in insurance has been included in Annex 1, for illustrative purposes. Depending on the circumstances and, as a result of the ongoing increase in data availability, insurers may collect and use other types of data from other sources not specifically listed in Annex 1.

Examples:

Netherlands

In the Netherlands, an important source of data is MijnOverheid, where personal data is stored from different institutions, such as government services and pension funds. For example, customers that ask financial planners to develop financial plans, can download their pension data from MijnOverheid and then upload it to the server of their financial planners. This way, all their pension entitlements are immediately taken into account for their financial plans. Other data in MijnOverheid is an individual's income data.

Singapore

A key component of Singapore's National Digital Identity system is MyInfo, a digital service that enables citizens to authorise third parties to access their personal data that is stored across different government agencies. With consent, third parties can use MyInfo's application programming interfaces (APIs) to access government-verified data to authenticate their customers and make business decisions relating to them. Currently more than 20 financial institutions are using MyInfo to provide more than 110 digital financial services.

European Union

The European Insurance and Occupational Pensions Authority (EIOPA) recently conducted a thematic review on the use of BDA in motor and health insurance. The review showed how traditional data sources such as demographic data or exposure data are increasingly combined (not replaced) with new sources like online media data or telematics data, providing greater granularity and frequency of information about consumers' characteristics, behaviour and lifestyles.⁹ This enables the development of more tailored products and services and more accurate risk assessments.

⁸ Risk selection includes pricing and underwriting; marketing includes distribution and sales activities; and claims management includes fraud detection.

⁹https://eiopa.europa.eu/Publications/EIOPA_BigDataAnalytics_ThematicReview_April2019.pdf.

2.2 Processing of data in insurance

22. The processing of customer data, whether done in-house or by an outsourced third party provider, is a critical component of an insurer's business. It helps inform, for example, the insurer's business and marketing strategies, service delivery and distribution models, product range, risk selection and pricing structures.

23. Digitalisation has resulted in significant changes to the manner in which data can be processed and leveraged by insurers as they have access to greatly enhanced levels of computing power and analytical capabilities.

24. The increasing availability of customer data, more sophisticated tools for collecting, safeguarding, transferring and analysing data, and growing appetite for the use of new technologies creates increased opportunities for insurers to adopt the use of algorithms and advanced data analytics across the insurance product lifecycle.

25. Algorithms can be used by insurers for direct customer servicing (eg to provide automated advice and pre- and post-sales support, and improved claims handling) or more indirectly (eg to design targeted advertising campaigns, obtain insights on consumer preferences, influence consumer behaviour, inform product design, risk selection and pricing, determine credit history, conduct "know your customer" and other identification and verification checks).

26. The increasing reliance on the use of algorithms by insurers for the processing of customer data creates a number of potential challenges and risks.

27. Algorithms can be complex and are often treated as proprietary and highly confidential in nature. Thus, there can be a lack of transparency and strong asymmetry of understanding between those who design and use algorithms and customers and supervisors seeking to understand the outcomes generated by these algorithms. Clear documentation regarding the manner in which algorithms are intended to operate within the insurers' various business processes may assist to ensure improved transparency and understanding in this regard.¹⁰

28. The effectiveness of algorithms is dependent on the quality, accuracy and completeness of available data, and can be hampered by possible errors in its initial design or programming.

29. Some algorithms are based on machine learning, which means that as the algorithm collects and analyses more data, it is able to modify itself without human intervention after initiation. Algorithms based on machine learning may raise questions about the accountability and transparency of the decision making process as well as explainability of outcomes. Enhancements in machine learning capabilities may also result in the operation of algorithms becoming increasingly complex even for those who design them.

30. Additionally, machine learning algorithms are based on historical data and, therefore, generally reproduce the past. This can increase the likelihood that algorithms may perpetuate unforeseen biases, which in turn create risks of errors potentially resulting in inequitable or

¹⁰ See ICP 8.2 which states that "[t]he supervisor requires the insurer to establish, and operate within, an effective and documented system of internal controls". According to ICP 8.2.4, "[a]n effective internal controls system typically includes [. . .] a centralised documented inventory of insurer-wide key processes and policies and of the controls in place in respect of such processes and policies, that also may introduce a hierarchy among the policies[.]".

unsuitable customer outcomes. While the potential for biased decision making has always existed in insurance and is not unique to algorithms, the scale and speed at which such biases could be perpetuated through self-learning algorithms may merit particular attention by insurers and supervisors.

31. There is also a risk that customer segments could be differentiated on the basis of false assumptions or false conclusions drawn by algorithms on the basis of these assumptions, resulting in unlawful discrimination against certain customers.¹¹ In such cases, it would be important that the underlying assumptions or conclusions causing such differentiation are properly understood, and appropriate remedial measures are implemented where necessary.

32. Algorithms may be used alongside, rather than instead of, established techniques such as generalised linear models, to provide new insights to insurers. Nevertheless the governance and oversight of algorithm applications may prove to be challenging and could require specific technical expertise and more robust auditing mechanisms within insurers to adequately mitigate risks that could potentially arise as a result of the above factors.

Examples:

Netherlands

The Netherlands Autoriteit Financiële Markten (AFM) has published guidance on the development of algorithms used in robo advice. A key requirement is testing of the algorithm, both before and after launching the robo advisor. When developing the robo advice, the insurer must be satisfied that sufficient knowledge of financial products is present in order to ensure that the robo advice is of sufficient quality. The development and testing of the robo advice must be carried out thoroughly enough so that it can be demonstrated that the advice is suitable when the system goes live.

The supervisor's approach to supervising robo advice and its underlying algorithms is as follows:

(i) the supervisor will assess the input and output of the robo advisor. This is equivalent to the supervision of physical advice files where consideration is given to whether all relevant data has been obtained and used in order to arrive at the appropriate outcome based on the customer's needs and circumstances;

(ii) the supervisor will assess the conditions under which the algorithm was developed in order to determine whether it was developed with enough knowledge of the advice process and adequately tested; and

(iii) the supervisor is now also considering whether it should directly supervise the design of the algorithm itself.

Singapore

In its Guidelines on Provision of Digital Advisory Services, the Monetary Authority of Singapore (MAS) requires digital advisers to put in place adequate governance and supervisory arrangements to effectively mitigate the risks that stem from the use of algorithms.¹² These include requiring:

¹¹ https://www.bafin.de/SharedDocs/Downloads/EN/dl_bdai_studie_en.html at page 177.

¹² <https://www.mas.gov.sg/-/media/MAS/Regulations-and-Financial-Stability/Regulations-Guidance-and-Licensing/Securities-Futures-and-Fund-Management/Guidelines-on-Provision-of-Digital-Advisory-Services--CMGG02.pdf> .

(i) board and senior management of digital advisers to maintain effective oversight and ensure that there are sufficient resources to monitor and supervise the performance of the algorithms; and

(ii) digital advisers to have in place policies and procedures governing the development, monitoring and testing of algorithms, as well as when changes are made to the algorithms.

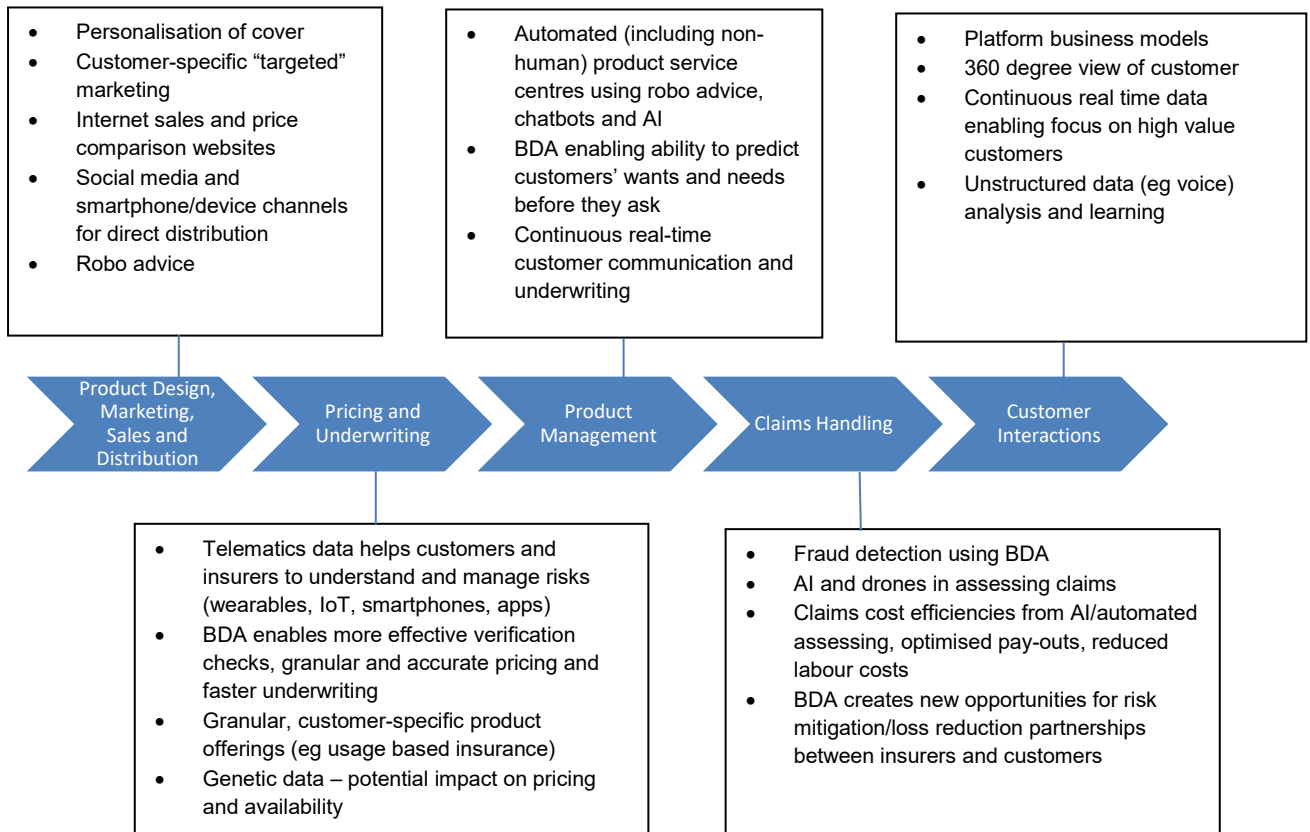
3 The use of big data analytics across the insurance product lifecycle

33. BDA can be used across various components of the insurance product lifecycle, as shown by the examples in diagram 1 below.

34. This paper does not cover all the elements contained in diagram 1, but rather focuses on a few key areas of the lifecycle where the use of BDA has been identified as potentially introducing significant benefits and risks for insurers, consumers and supervisors.

35. Some aspects such as robo advice¹³ and price comparison websites¹⁴ that were covered in the previous Digitalisation paper have not been included in this paper. In addition, the customer interaction component is not discussed separately as represented in the diagram, but rather incorporated within discussions on the other elements of the product lifecycle where relevant.

Diagram 1: The use of BDA across the insurance product lifecycle



3.1 Product design, marketing, sales and distribution

3.1.1 Personalised insurance cover

36. Generally there are a number of benefits in using BDA for product design purposes. Greater access to, and increased efficiencies in the collection and evaluation of, more data types can make (new) risks insurable and allow consumers to get cover previously not available to them when needed. The use of BDA allows insurers to better understand customers’ needs, wants and behaviours, resulting in risk profiling becoming more granular

¹³ [IAIS Digitalisation Paper](#) at page 17.

¹⁴ [IAIS Digitalisation Paper](#) at page 19.

and customised. This can enable the design of more personalised products that meet customer needs by tailoring the scope and amount of coverage and by setting premium levels according to individual preferences.

37. Access to large data sets can enable insurers to design customer specific products more cost effectively, for the benefit of individual customers or mass customer segments. The use of BDA can assist specialist intermediaries and underwriters to design increased numbers of customised products with greater efficiency and speed, potentially resulting in wider customer access and reduced underwriting costs. Mass customisation involves products/bundles that are designed for mass markets, but which are adjusted slightly for different customers based on individual customer insights obtained through the application of BDA. At their core, these products are not truly individualised, in that they simply follow a mass targeted design template, with minor refinements being made based on the preferences of particular customers.

38. The application of BDA can enable the provision of usage-based insurance (UBI) products¹⁵ and “on-demand” cover, potentially resulting in more options and improved benefits for customers. In motor vehicle insurance, UBI may be preferable and more affordable for drivers who only use their cars occasionally as insurance is charged according to the distance travelled. UBI products may also have the potential to improve driver safety by providing immediate feedback to customers on, among other things, harsh braking, dangerous manoeuvres and excessive speed. Customers may also benefit from premium reductions as a result of improved driving habits in response to such feedback. In such cases customers should be assured that any tracking or monitoring of their driving behaviour is done with their full knowledge and consent, and without undue limitations on their coverage options.

Example:

Germany

In Germany, a number of insurers offer “telematics tariffs” for their motor vehicle policies. Premiums on telematics tariffs are calculated taking into account the individual driving behaviour (eg braking, speed and acceleration) and other external factors such as time and place of the ride. Sometimes there is a maximum age limit for the policyholder. The data is recorded either via apps or “black boxes” permanently installed in the vehicles. The data evaluation (ie scoring) is usually not carried out by the insurer itself, but is outsourced to third parties.

39. “On-demand” cover, where customers purchase cover for only short periods of time when they require it, may also be useful for cover during periods of travel or when engaging in certain higher-risk sporting and recreational activities. This could make insurance cheaper and make customers more conscious of the need to avoid or mitigate risky behaviour. However, such products could create risks if customers are not periodically reminded to activate or deactivate their cover as necessary. This could also increase the possibility of fraud if customers activate their cover only after a risk has materialised.

Example:

Japan

¹⁵ [IAIS Digitalisation Paper](#) at page 11.

A Japanese insurer launched a “one time” insurance product jointly with a mobile communications company for certain periodic lifestyle and leisure activities such as golfing and mountain climbing. For example, users get a text message with a product recommendation the first time they arrive at a golf course offering insurance that will cover the expenses of treatment for any injuries and damage liabilities, and asking if they want to take this cover out immediately. The product’s design is based on users’ golf playing characteristics and allows them to be insured on a daily basis.

40. It remains the responsibility of insurers to ensure that design decisions are made transparently and can be clearly explained to customers and supervisors.¹⁶ It is also important for insurers to manage the risk of customers potentially misconstruing personalised product offerings as the provision of financial advice in the absence of any necessary suitability and needs analyses being conducted.

3.1.2 Targeted marketing

41. Insurers can use behavioural and lifestyle indicators derived from BDA to identify opportunities that are specific to certain customer segments and to nudge these customers using targeted marketing messages and campaigns in an appropriate and non-intrusive manner. For example, couples expecting children can be identified to receive life insurance messages. These messages can be delivered in real time via smart devices when a customer is passing an insurer’s branch office or visiting specific websites or other social media platforms.

42. Insurers may be able to anticipate risks and the need for an insurance product based on a customer’s day to day activities. Insurers can then interact with customers in real time to offer them a specific product or product options to fulfil that need. For example, through the use of BDA on social media updates and location tracking data an insurer can identify if a customer is planning a holiday or other type of trip and then, in a targeted manner, offer the customer travel insurance. In this way product offerings can be personalised and targeted to a specific customer.

43. In general, insights gained from BDA present opportunities for insurers to identify potential gaps in customers’ insurance needs and pre-emptively nudge them to consider seeking out appropriate cover through the use of targeted advertising. Additionally, this can enable insurers to become more effective partners with their customers to help them understand and mitigate their risks. BDA insights can also be used to identify possible protection gaps and target products at particular customer groups that have been identified as having shared characteristics, potentially expanding insurers’ reach to certain underserved population segments.

Examples:

USA

A US-based insurer gathers data from social media platforms as well as its own interactive digital services and uses sophisticated analytics systems to highly personalise all aspects of its engagement with customers. Its digital car buying service advises customers not only when they are buying motor vehicle insurance but also when they are looking to purchase, repair or sell a vehicle. Moreover, the insurer helps customers plan and manage their finances by providing them with fully-digital mobile tools tailored for various stages of life

¹⁶ https://www.bafin.de/SharedDocs/Downloads/EN/dl_bdai_studie_en.html at page 13.

and cultivates close ties with its customers by promoting social media community groups. It also has an online advisory service which addresses a wide range of professional and personal circumstances.

United Kingdom

Customers with special insurance needs, such as cover for pets or expensive gadgets, often find it difficult to find the right policy or attractive rates. Advanced analytics tools allow insurers to find and service such customers. A UK-based start-up analyses search engine and social media data to identify groups of customers with uncommon insurance requirements. It then approaches insurers on behalf of the group, in order to negotiate better rates for them.

44. While digitalisation has enabled opportunities for greater product differentiation and potentially more choices for consumers, there are also potential risks that tailored or targeted campaigns may limit the ability of consumers to compare this wider range of product offerings. This could result in less informed decision-making, reduced choice, greater difficulties in product switching and potentially loss of coverage for some customers.

45. Furthermore, targeted campaigns based on BDA insights that inadvertently perpetuate historic biases could potentially prolong the exclusion of certain consumer groups from some segments of the market, specifically in situations where there is a lack of robust oversight mechanisms within an insurer.

46. Targeted product offerings based on the use of BDA in response to specific customer behaviours, incidents or activities could also increase the risk of over-insurance as customers may be influenced to buy more insurance than they need, and/or make decisions about purchasing insurance cover within a specific context without considering their overall financial needs or affordability. This may be of particular concern in areas with lower levels of financial literacy, or where there are limited opportunities for customers to interact directly with insurers and intermediaries and ask questions before purchasing a product.

3.1.3 Sales execution

47. People may sometimes be unwilling or unable to devote time and energy to make decisions or go through lengthy administrative processes relating to their insurance. These behavioural biases may discourage customers from making decisions in their interest, such as switching to other providers or products that are more appropriate for their needs. BDA insights that reveal these types of customer biases should not be used to design sales-related processes that could nudge customers to make decisions against their interests.

48. Instead, insurers can use improved insights on customer behaviour from BDA to help design less cumbersome sales processes that overcome certain biases and possible inertia. It is possible, for instance, to use data to pre-populate forms or find other ways to minimise friction for customers in the sales process. Insurers quoting for home insurance, for example, could look at data from flood maps rather than asking customers how far they are from water sources. Shorter, simpler application forms can also make it easier for customers to engage and reduce the risk of them making mistakes in their answers, which could later be used as a basis to repudiate their claims.

Examples:

United Kingdom

A large UK insurer quoting for home insurance aims to provide accurate premiums using data customers have previously provided as well as other sources, such as land registry data, to simplify the quotation process, remove uncertainty for customers and avoid duplication. In this way, the insurer applies a shortened home insurance process to all home insurance 'quote and buy journeys' through the insurer's website, online portal and mobile app. The insurer intends to apply this to claims processes, arguing that the provision of accurate data reduces the risk of a having home insurance claims rejected.

Canada

A Quebec-based digital insurance brokerage sources alternative motor vehicle and home insurance options for customers with existing cover. They build a detailed profile on behalf of customers and, before their policies expire, present them with a small number of curated alternatives that can be purchased in minutes. Powered by artificial intelligence and licensed insurance brokers, it shops around every time a policy is up for renewal, compares 10 leading options from 10 different carriers and submits the best one based on the customer's profile year by year.

3.1.4 Distribution and advice

49. Insurers can use consumer and market insights gained from BDA to extend the reach and scale of their distribution capability beyond their existing traditional branch networks and call centres. This extended capability presents opportunities for access to wider consumer bases, product updates and cross-selling, potentially resulting in more choice for consumers.

50. Insurers can use BDA insights to evaluate customers' past behaviour, recent actions and needs in order to deliver the right message, at the right time, and via the right communication channel. This can facilitate an enhanced customer interaction process through appropriately tailored communication and the use of an optimal distribution channel mix.

51. Some insurers are pursuing single direct platforms to address the growing needs of their digital-only customers in a holistic manner by consolidating various sources of data into a "single view of the customer". All product distribution, as well as the bulk of their marketing, sales, underwriting and support, is accomplished using a single digital platform. This can allow insurers to accurately develop business volume forecasts and customer lifetime value estimations, and define customer loyalty and retention campaigns, sometimes with real-time response capabilities.

Example:

France

Several insurance groups have begun moving to cross-channel content strategies ("omni-channel") in order to give their customers convenience when they decide to interact with them. One insurer is employing artificial intelligence (AI) and data analytics to better understand its sales processes. It is using these insights to develop systems that are more appealing to customers and more rewarding for its agents and partners.

52. Insurers may also utilise their customer base to curate platforms that offer complementary products, by using insights gained from BDA to make non-insurance products and services available to customers alongside insurance products. Insurers can also offer these insights to other businesses, either within their broader group structures or externally, that may wish to offer other products. Additionally, BDA insights gained from partnerships with non-insurance businesses could enable insurers to offer correlated insurance products (eg

customers having the option to purchase travel insurance directly with the insurer when booking a flight through a partner airline or travel agent).

53. Insurers engaging in these types of cross-selling strategies would need to take into account applicable data protection laws and the importance of avoiding or properly managing potential conflicts of interest that may emanate from such partnerships. Additionally, bundling of insurance and non-insurance products should not unduly limit customers' choices, or compel them to purchase packaged solutions that include one or more products having little or no value to them.

Example:

Australia

In 2016 an Australian bancassurer announced its intention to develop a customer marketplace online portal to offer its customers products manufactured, and services offered, by other companies as well as its own. The marketplace portal is premised on a strategy that recognises that customer value creation is not limited to products manufactured by the insurer itself. The centrepiece of the strategy is a mobile application that went live in 2018, and at that time the marketplace included links to businesses such as those in conveyancing and car maintenance.

3.2 Pricing and underwriting

3.2.1 *Increased granularity in risk selection and pricing*

54. Historically certain risks would have been associated with very high fixed costs so that insuring them would not be profitable or economically viable, or products would need to be priced so high resulting in the demand being too low to justify such offerings. BDA provides insurers with the ability to insure certain previously “uninsurable” risks at an affordable price.¹⁷ For example, through automated evaluation of complex, high-volume data sets on the progression of diseases, it could become possible to further extend life insurance cover to HIV-positive customers, or to offer such cover more quickly and/or at lower rates. The same could apply to homeowner insurance for buildings in flood and disaster-prone areas. Using satellite pictures and geo data, insurers can identify and assess such areas more precisely. Customers who may want to take up these policies at lower rates offered by insurers who have access to these types of BDA insights may, however, sometimes be unaware of these lower rates.¹⁸

55. On the other hand, granular individual-based approaches to pricing could also negatively affect individual insurance premiums, potentially raising affordability concerns. Whilst the consideration of factors affecting affordability is not new, historically it has tended to be limited to easily identifiable population demographics, such as geography or age. However, the use of BDA may change this. For example, affordability may depend on driving patterns which are a result of an individual's personal situation (eg shift workers driving at night, parents dropping children at school in the morning). This is particularly concerning where insurance is, in effect, an essential service or compulsory. This could raise policy level questions, particularly where insurance access levels are low, on the need to balance

¹⁷ https://www.bafin.de/SharedDocs/Downloads/EN/dl_bdai_studie_en.html at page100.

¹⁸ <https://www.fca.org.uk/publication/feedback/fs18-01.pdf> .

appropriate levels of granularity for risk categorisation purposes with the potentially greater social need to ensure the affordability and inclusiveness of insurance products.

Examples:

Netherlands

A Dutch insurer is investigating whether it can determine car insurance premiums by machine learning. Traditionally, a policyholder's premium is calculated in a linear way. For example, both the age of the car and the postal code of the area where the owner lives is used to determine the appropriateness of the premium. With algorithms and machine learning, the calculation of the premium happens in a dynamic way, for example investigating the interaction between the age of the car and the postal code. Other variables can be taken into account as well, such as the customer's driving behaviour and previous damage. The idea is that as the algorithm learns from the data, it will become increasingly accurate in determining the risk of damage (and therefore the premium).

56. One study predicts that the very nature of risk could change as a result of reduced uncertainty due to ongoing improvements in tracking and predictive technologies.¹⁹ As a consequence premiums could come under pressure, potentially shrinking revenue streams, especially if insurers are unable to adequately make up for expected shortfalls through other means (eg reducing costs by improving operational efficiencies or implementing other loss mitigation strategies). The application of BDA in pricing could, therefore, increase the incentive for insurers to exploit differences in premium levels, including through the practice of price optimisation as discussed below.

3.2.2 Price optimisation

57. Price optimisation is the practice of determining the "ideal" or highest premium that can be charged to a particular customer based on a variety of individualised factors other than just risk.

58. Price optimisation has always occurred in some form or another in insurance. In the past it was a case of underwriters using their discretion and judgement to adjust prices.²⁰ This was often done at a customer-segment level or across an entire portfolio of risks. The use of BDA has introduced the ability to adjust prices at a more granular customer-specific level.²¹

59. This can be done in two ways. First, algorithms and advanced statistical modelling can be applied to traditional data sources. Second, those algorithms and advanced statistical modelling techniques can be applied to new sources such as IoT data and online media data.

60. Linking financial transaction and behavioural data with data on preferences and needs can provide insights on a customer's willingness and ability to pay. Data potentially sourced from different and unrelated contexts may show that Customer X would pay any price for a particular product while Customer Y would be very price conscious. If a customer's demand for an insurance product is high or the customer is inert and/or unlikely to shop around the risk price will be increased. Alternatively, if the customer's demand for an insurance product is low

¹⁹<https://www.mckinsey.com/industries/financial-services/our-insights/insurance-beyond-digital-the-rise-of-ecosystems-and-platforms> .

²⁰NAIC White Paper on Price Optimization at paragraph 5. See https://www.naic.org/documents/committees_c_catf_related_price_optimization_white_paper.pdf .

²¹NAIC White paper at paragraph 6.

and they are more likely to be flexible, the risk price will be reduced. In each circumstance the specific customer would likely be asked to pay the maximum price they are prepared to pay based on the insights accumulated from the use of BDA, resulting in differential pricing for the same or similar products across different customers. In other words, the practice of price optimisation can result in two similarly situated customers paying different premiums, even if they have the same loss history and risk profile.

61. The use of BDA in this way gives rise to many potential concerns including a lack of disclosure and transparency in pricing, and issues around affordability, inclusion and possibly unlawful discrimination. It also raises fairness questions about the potential exploitation of customer inertia which is sometimes a result of customers having limited time, ability or opportunity to shop around for cheaper products. This concern would be heightened in cases of vulnerable consumer groups (eg elderly customers and/or customers with lower income or education levels). Insurers benefiting from this type of premium differential (at an individual level) may diminish the overall value of insurance by emphasising price over quality of cover. This could negatively impact consumer trust thereby causing reputational risks for the insurance sector.

Examples:

United States

In the US, state insurance supervisors are concerned that price optimisation may be a departure from traditional cost-based rate making and a move towards rate making based in part on customers' price sensitivity. Consequently, a number of states have taken preemptive action to ban the practice. Several states issued bulletins stating that price optimisation results in rates that are unfairly discriminatory. Some of these states are also requiring insurers to remove price optimisation factors from rate filings. Additionally, the National Association of Insurance Commissioners (NAIC) adopted a Price Optimization White Paper²² that provides background information on state rating law, actuarial principles, and price optimisation, including an overview of various definitions of price optimisation used by stakeholders. The White Paper also identifies potential benefits and drawbacks of price optimisation, which includes concerns raised by consumer advocacy groups.

United Kingdom

In the UK, the pricing practices of insurers are a focus of regulatory attention, in particular differential prices for new and renewing customers of home and motor insurance. In October 2018 the FCA published a discussion paper on fair pricing in financial services²³ and launched a market study into general insurance pricing practices²⁴. The market study is looking at the scale of any harm to customers from general insurance pricing practices, who it affects and, if required, what actions are required to improve the market. An interim market study report was published in October 2019.²⁵ The final report is anticipated during the first quarter of 2020, alongside a consultation paper on any proposed remedies.

Netherlands

Comparison websites in the Netherlands indicate that insurers are increasingly investigating the use of dynamic pricing and, on a smaller scale, dynamic characteristics, so that both the

²² See footnote 20.

²³ <https://www.fca.org.uk/publications/discussion-papers/dp18-9-fair-pricing-financial-services> .

²⁴ <https://www.fca.org.uk/publications/market-studies/ms18-1-general-insurance-pricing-practices-market-study> .

²⁵ <https://www.fca.org.uk/publication/market-studies/ms18-1-2-interim-report.pdf> .

price and policy conditions are determined 'on demand'. This brings challenges for supervisors. For example, there are concerns about how careful development of an insurance product can be monitored or supervised if the terms of the insurance policy differ from customer to customer.

India

Differential pricing on the basis of customer demand and/or willingness to pay is not allowed in India as product pricing is subject to regulatory approval by the Insurance Regulatory and Development Authority (IRDA). Premiums may be varied based only on narrowly defined rating criteria.

3.2.3 Underwriting

62. The use of BDA in underwriting can have a number of benefits for customers in helping identify, assess and potentially reduce their risks. It creates opportunities for risk mitigation and loss prevention partnerships between insurers and customers. BDA can enable insurers to provide feedback to customers on potentially risky behaviour and incentivise them to modify behaviour, thereby lowering their risk exposure. Insurers can also notify customers in real time of changes to their risk profile or when certain behaviours or an activity they are planning or engaged in may give rise to risks that can be mitigated with new insurance cover or adjustments to existing cover. For example, an insurer using BDA applied to social media updates and location tracking to identify that a customer is about to go on holiday and might need travel insurance, or if they need enhancements to their travel insurance with specific coverage such as when the customer is looking to undertake more hazardous activities such as skiing or mountain climbing. BDA may also assist customers by providing solutions to help them better understand the size of their risk exposure and the amount of coverage that would be appropriate to cover that exposure.

63. The application of BDA also offers new solutions to the challenge of underinsurance, including through the development of a new generation of insurance calculators offered at point of sale to aid customers to estimate the cost of repairing their homes. For example, BDA can be used to draw on and analyse large volumes of data about a particular location, its susceptibility to major disasters, weather patterns and the cost of repairs based on demand surge costs rather than at normal times to better estimate the cost of rebuilding a specific customer's home. However, such calculation processes should have appropriate levels of transparency, while balancing proprietary interests, so that customers' understanding of the final estimate is not unduly impaired.

Examples:

Netherlands

In the Netherlands, insurers make use of the services of an information technology company that calculates the reconstruction value of a home under a property insurance policy. Traditionally, this value was estimated based on year of construction, the cubic metres, the type of house and the construction. However, this company claims to have access to more than a hundred other variables that can all be used for a more adequate estimation than the traditional variables. In some cases, consumers were confronted with higher premiums, based on the new, automated way of calculating. Although algorithmic calculations might be more accurate for individual risks than the traditional way of calculating, algorithms and data are not always flawless. This shows that insurers have to make sure that the outcomes of an automated system are both explainable and traceable.

Turkey

In Turkey, the Natural Disaster Insurance Institution provides compulsory earthquake insurance through the Turkish National Catastrophe Insurance Pool (TCIP)²⁶, utilising specific data provided by customers. This data includes the address, gross area, building year and construction type of the dwelling. After receiving the required data, an algorithm calculates the insurance premium automatically. A calculation tool is available to customers on the TCIP's website which makes it possible to calculate the insurance premium before issuance of a policy.²⁷

64. As product development becomes progressively dependent on the availability of personalised customer insights there is a risk that customers who do not have access to digital devices or do not want to provide personal data (beyond what is legally required) may become marginalised and even excluded from insurance. While the widespread use and increasing portability of digital devices has created significant opportunities to broaden the reach of insurance to new or previously underserved markets, some customers simply cannot afford smart devices, do not have reliable or affordable access to the internet, or do not share data online. Other customers may simply not wish to provide arguably sensitive, personalised data about themselves to an insurer or outsourced third party. Additionally, some customers may have challenges with, or be resistant to, using innovative technologies.

65. There may also be potential for vulnerable high-risk customers to become uninsurable. The use of BDA enables insurers to personalise product offerings and to identify which customers are higher risk and therefore more likely to claim. In the interest of maximising profit margins, insurers may be less likely to provide cover to customers in instances where BDA reveals such customers to be more likely to claim or unable to consistently pay the premiums necessary to insure their risks, possibly due to wider socio-economic factors. This could result in financial exclusion, under-insurance and the creation of an uninsurable subset of customers. This is particularly concerning where insurance is, in effect, an essential service or compulsory and/or in regions with low levels of access to insurance. As discussed in section 3.2.1, in some jurisdictions this may require broader policy level consideration of appropriate strategies to facilitate inclusion while recognising the necessity of risk-based pricing to preserve the sustainability of the sector.

Example:

Australia

In its recently published North Australia Insurance Inquiry Interim Report²⁸ the Australian Competition and Consumer Commission (ACCC) observed that many insurers were seeking to reduce their exposure to high risk customers by actively not competing. This was creating accessibility and affordability issues in North Australian home insurance markets. Insurers used BDA technology to identify customers whose residences were in areas highly susceptible to cyclone and flood risk from multiple data sources including geographical surveys and historical weather reports. Insurers would then actively seek to reduce their exposure to these customer groups either directly by not writing new business in these areas or indirectly by increasing prices until their exposure decreased.

²⁶ <https://dask.gov.tr/tcip/> .

²⁷ <https://www.dask.gov.tr/e-services/portal/calculatePremiumEng> .

²⁸ <https://www.accc.gov.au/focus-areas/inquiries/northern-australia-insurance-inquiry> .

66. It is possible to predict with increasing accuracy a customer's life expectancy and likelihood of sickness using genetic data. BDA applications also have the potential to expand beyond genetic data.²⁹ These types of insights can potentially make large segments of society uninsurable. Insurers' use of genetic data and probabilistic models raises concerns about potential bias and uninsurability. In many jurisdictions legislation or industry codes of practice restrict the use of genetic and related data for insurance purposes.

Examples:

Canada

In Canada the Genetic Non-Discrimination Act, S.C. 2017, c. 3 has been in force since 2017.³⁰ The Act prohibits people and businesses from requiring the results of genetic tests when providing goods and services, entering into contractual agreements, or offering specific terms or conditions in contracts, including insurance policies. The Act also prohibits the denial of services to individuals who refuse to undergo genetic tests and requires written consent for the collection, use and disclosure of individuals' genetic test results. However, the constitutionality of the Act was challenged before the Supreme Court of Canada in October 2019.³¹ Judgment in the matter has been reserved.

United Kingdom

In October 2018 the Association of British Insurers (ABI) and the UK Government published a code of practice on the role of genetic testing in insurance.³²

Germany

The use of genetic data in the insurance sector is strictly regulated. In private health insurance the insurer may not, either before or after the conclusion of the insurance contract, require genetic tests or analysis to be carried out or require the communication of results or data from genetic tests or analysis already carried out, or receive or use such results or data. This does not apply to life insurance, occupational disability insurance, occupational disability insurance and long-term care insurance if a benefit of more than €300,000 or more than €30,000 per annum is agreed.³³

Australia

In October 2018 the Australian Financial Services Council (trade body for the life insurance industry) announced that it was consulting on a moratorium to stop the use of genetic test results as part of insurance applications, enabling every Australian to get up to \$500,000 worth of life cover without having to disclose adverse test results.³⁴ On 21 June 2019 it released FSC Standard 11: Moratorium on genetic tests in life insurance, which takes effect on 1 July 2019.³⁵

²⁹<https://www.theverge.com/2018/2/19/17027902/google-verily-ai-algorithm-eye-scan-heart-disease-cardiovascular-risk> .

³⁰<https://laws-lois.justice.gc.ca/eng/acts/G-2.5/page-1.html> .

³¹<https://www.canadianunderwriter.ca/legal/why-supreme-court-of-canada-is-looking-at-risk-based-underwriting-1004169852/> .

³²https://www.abi.org.uk/globalassets/files/publications/public/genetics/code-on-genetic-testing-and-insurance_embargoed.pdf; <https://www.abi.org.uk/news/news-articles/2018/10/abi-and-government-publish-updated-code-on-genetic-testing--insurance/>.

³³ §§18 GenDG, 213 VVG.

³⁴ <https://www.fsc.org.au/policy/life-insurance> .

³⁵<https://www.fsc.org.au/news/media-releases> .

Switzerland

The Swiss Federal Act on Genetic Testing on Humans places restrictions on the use of genetic data in insurance.³⁶ In general, for socially important insurance, the use of such data is prohibited. For other types of insurance cover, the use is strictly regulated. In third-party liability cases it is generally forbidden to use genetic data or to ask for genetic screening (eg for the assessment of claims).

United States

In the US, the Genetic Information Nondiscrimination Act of 2008 (GINA) prohibits the use of genetic information in decisions relating to health insurance eligibility or coverage.³⁷ While this prohibition does not apply to other forms of insurance (eg disability, long-term care or life insurance), some individual states have passed laws prohibiting the use of genetic data in other types of insurance.³⁸

3.3 Claims handling

3.3.1 Risk mitigation and loss reduction

67. One way insurers can use BDA to improve claims handling is to help customers avoid having to make claims in the first place. By using BDA to assess individual risk and claim behaviours more accurately, customers can be nudged, post-sale, towards decisions and actions aimed at reducing the likelihood of risks materialising or to mitigate potential losses in the event that such risks do materialise. Examples of these include improving driving habits, making healthier lifestyle choices or taking preventative measures as a result of early warnings about poor weather or other hazardous conditions.

68. While insurers have relied predominantly on historical data for actuarial calculation and risk modelling purposes, they are now able to rely on data sources that are real time or even forward-looking and may result in loss reduction. For example, "smart drivers" continuously produce data while they are driving (eg through the use of telematics devices and other "on-board" vehicle computer systems that provide instantaneous feedback on dangerous driving behaviours). The availability of this type of data can reduce the risk of accidents and potential multi-claimants, resulting in claims savings for insurers. In return, customers who use these smart devices may receive better insurance rates and potentially benefit from improved risk behaviours such as better driving.

69. The monitoring and analysis of data from IoT sources such as sensors and other connected devices in homes and businesses, coupled with alerts to customers on potential risk events, is also a strong enabler for proactive loss prevention and may result in reductions in the frequency and severity of claims and associated claims costs. Customers in turn may benefit from premium reductions due to their decreased risk exposure. Similar to the use of telematics devices for UBI purposes alluded to earlier, any monitoring of customer behaviour through IoT sources must not result in customers' privacy rights being compromised in exchange for insurance coverage options.

Examples:

Various

³⁶ <https://www.admin.ch/opc/en/classified-compilation/20011087/201401010000/810.12.pdf> .

³⁷ <https://www.congress.gov/110/plaws/publ233/PLAW-110publ233.pdf> .

³⁸ <https://www.genome.gov/about-genomics/policy-issues/Genetic-Discrimination> .

Insurers in various jurisdictions offer customers rewards or discounts on their car insurance premiums if they drive safely. Their driving behaviour is measured by a device that is plugged into the car or other connected solutions. These products could lower overall damage rates, as customers have an incentive to drive safely.

The connected home market has also attracted several major multinational equipment and service providers. Many global technology and media companies are leveraging their extensive presence in the entertainment market to deliver online security and safety products. Some insurers have also introduced successful connected home solutions that go beyond insurance and offer threat prevention and safety alerts.

The connected health and fitness market is also growing fast. There are more and more portable health devices attached to people around the world daily. Globally several insurers have launched connected solutions designed to improve the wellbeing of their customers.

Most, if not all, of these offerings are fully digital. They leverage the capabilities of analytics, mobile technology and social media channels to offer real-time protection rather than just indemnification.

Some life insurers have introduced features in their mobile apps to encourage healthy living and increase opportunities to engage with customers.

70. Behavioural changes and improved risk mitigation can contribute to greater societal issues beyond insurance. Improved awareness and prevention of dangerous driving habits may reduce motor vehicle accidents and fatalities. Likewise, BDA insights that encourage healthier lifestyles may reduce pressure on publicly-funded emergency and medical services and reliance on safety nets such as social welfare and public healthcare. The broader societal benefits of these insights must be carefully weighed against possible infringements of the rights of individual customers who may not be aware of, or comfortable with, this level of scrutiny into their daily lives by insurers.

3.3.2 Claims processing

71. The use of BDA in claims processing can lead to a number of efficiency gains resulting in reduced costs for insurers and customers. The claims settlement process could be improved through (partially) automated claims approvals or rejections, subject to appropriate consideration being given to fair customer outcomes. For example, digital loss assessment and repair can occur on the basis of picture recognition or sensor data in combination with invoice data for more accurate pay out calculations. Drone technology is also being used in many instances for video inspection of damages to assess claims quicker and with more accuracy.

Example:

Germany

In Germany most insurers offer apps in private health insurance for claims notification and processing based on pictures of receipts.

A German agricultural loss insurer is using drone technology to automatically evaluate damages based on images taken by the drones. However, the insurer also regards the human factor as important in the assessment process.

72. The use of BDA can also allow insurers to calculate and produce claims pay outs quicker and more accurately based on historical claims data, allowing for the fast tracking of certain types of claims with minimal friction for the customer.

Examples:

Singapore

In August 2018, an insurer tested a blockchain-based insurance solution that offered pregnant women financial protection in the case of gestational diabetes. Through an app on their mobile device, the product can connect securely to a customer's electronic medical records to perform parametric underwriting. If a customer is eligible, a "smart contract" policy is immediately generated. Upon diagnosis, the customer's medical data triggers an automated benefit payment with no further action required. This improves data security as the insurer does not require access to the underlying medical data to confirm insurability or to review claims.

In June 2019, this solution was piloted with the country's largest newspaper and a major Singapore-based insurer to automate the life insurance claim verification process. When family members file an obituary with the newspaper, they will be informed about the product and upon their consent, the deceased's national identity number will be submitted to the Blockchain as hashed data to search for a matching life insurance policy. If a match is found, an automatic notification will be sent to the insurer to initiate the claims process.

United Kingdom

Parametric insurance is increasing in prevalence across the sector. Agreeing to payments up front can be beneficial for some customers over traditional insurance products by providing greater certainty and speed for claims payments. In the UK an insurer has developed a flood insurance product that involves an instant pay-out of a pre-agreed amount being triggered when flood water reaches a pre-agreed depth on the sensor installed by the insurer at the property. Similar models are also used in flight delay and cancellation insurance products, where integration with a data feed providing live data on flight status enables the near instant pay-out of a claim in the event of a flight being delayed or cancelled.

73. Insurers may need to consider the level of transparency and customer understanding of the algorithm process and final outcome. This would be particularly relevant if the algorithm is also used to reject a claim or determine a partial settlement.

74. Generally, specialised claims are at risk of being settled incorrectly when there is an over reliance on generic claims settlement models, which can result in negative outcomes for insurers and customers. The use of BDA to develop claims settlement models, without appropriate oversight and transparency mechanisms, could increase the likelihood of settlement algorithms mapping customers into certain categories based on unsupported associations or biases. This could potentially cause an increase in unsubstantiated rejections and unlawful discrimination in the claims decision making process, resulting in a loss of customer confidence and possible reputational damage for insurers.

75. Additionally, insurers may use historical insights generated by BDA as triggers to determine earlier which claims are more likely to result in disputes or litigation and respond accordingly, potentially speeding up the escalation process for more controversial or complex claims. However, algorithms used to trigger potentially suspicious or litigious claims could be at risk of perpetuating historical claims settlement biases that may need to be appropriately managed.

76. Claims optimisation or claims settlement optimisation is the practice of using BDA to identify claimants who are likely to accept cash settlement amounts below the true value of their claims and then use that insight to negotiate an “ideal” or minimum claims settlement value. It can enable insurers to settle claims based on customer vulnerability and other non-loss related factors rather than the actual quantifiable loss amount.³⁹ It is currently unclear how widespread the practice is. However, given that it essentially relies on the same approach and technology as price optimisation, it follows that insurers may need to further consider how to deal with potentially similar issues in the claims settlement process.

3.3.3 Fraud detection

77. The insurance sector is constantly dealing with the impact of fraudulent claims. The costs associated with fraudulent losses and fraud detection tools are often passed on to customers. Customers can also experience significant friction during fraud investigation processes which may lead to adverse psychological or financial consequences.

Examples:

USA

Insurance industry estimates generally put fraud at about 10 percent of property and casualty insurers’ incurred losses and loss adjustment expenses each year, although the figure can fluctuate based on line of business, economic conditions and other factors.⁴⁰ Using this measure, over the five-year period from 2013 to 2017, property and casualty fraud amounted to about \$30 billion each year.⁴¹

Australia

The Insurance Council of Australia (industry body for Australian general insurers) has stated that fraudulent claims cost insurers up to \$2 billion annually.⁴²

Germany

According to industry reports about nine percent of reported losses in motor, liability and property insurance show inconsistencies, meaning that the damage description does not match the picture of the damage, or the persons involved provide contradictory data or submit manipulated receipts. While not every inconsistent damage report is a case of insurance fraud, insurers are encouraged to examine inconsistent claims more closely. In 2017 property and casualty insurers estimated that insurance fraudsters caused overall losses of €4 - €5 billion a year.⁴³

Switzerland

³⁹Duncan Minty, 7 reasons why claims optimisation needs to be seen as a failure (22 March 2018) <https://ethicsandinsurance.info/2018/03/22/claims-optimisation-2/> .

⁴⁰Estimate based on research conducted by the Battelle Seattle Research Center for the Insurance Information Institute in 1992 (Fighting the Hidden Crime: A National Agenda to Combat Insurance Fraud. Insurance Information Institute, March 1992) and other industry reports (including Insurance Fraud, Renewing the Crusade, Conning, 2001).

⁴¹Insurance Information Institute, Background on: Insurance Fraud” <https://www.iii.org/article/background-on-insurance-fraud> .

⁴²Chris Sheady, “Money for Nothing” at <https://insuranceandrisk.com.au/article/money-for-nothing/> .

⁴³ <https://www.gdv.de/de/themen/news/fast-jede-zehnte-schadenmeldung-mit-ungereimtheiten-11376> .

According to an industry study undertaken by the Swiss Insurance Association⁴⁴ in 2017 about ten percent of reported losses in general insurance are fraudulent.

78. Traditionally insurers have applied a combination of rule-based indicators and scoring models to identify claims with an increased likelihood of fraud, alongside random checks (eg internal audit) to manage fraud.⁴⁵

79. The above methods have two major challenges. First, they rely on manual interventions which give rise to the risk of human error and unnecessarily long lead times from fraud detection to the settlement of claims. Second, they are also known for high false-positive rates, which could lead to adverse outcomes for customers.⁴⁶

80. BDA, when used across the entire product and claims management lifecycle, can provide insurers with the ability to identify fraud in a more holistic and sophisticated manner through early warning triggers and predictive modelling. This would be particularly helpful in pre-emptively identifying and managing potential fraud perpetrated by criminal syndicates and other organised efforts.⁴⁷

81. Early warning triggers and more efficient fraud detection capabilities enabled through the use of BDA could significantly reduce operational and claims costs, potentially resulting in lower insurance prices for customers. BDA could also be used by insurers to assist law enforcement agencies to identify, track and deal with perpetual offenders within the system.

Examples:

India

The Insurance Information Bureau of India⁴⁸ (IIB) offers an underwriting and claims search engine to all partner life insurers to enhance underwriting efficiency and mitigate fraud. IIB is also working on a risk scoring and predictive model for life insurance that can be used to provide insights for underwriting and fraud detection. Certain life insurers are using credit scores/history in financial underwriting and consent based data authentication through partner systems. Geotagging and facial recognition technology is being used for pre-issue verification and fraud mitigation purposes.

South Africa

The South African Insurance Crime Bureau (SAICB), by accessing multiple data sources and through the use of advanced analytics, provides a collaboration platform for insurers, supervisors, law enforcement agencies and other stakeholders to help prevent, detect, track and prosecute fraud and related crimes in the non-life insurance sector.⁴⁹

Hong Kong

⁴⁴ <https://www.svv.ch/en> .

⁴⁵ WNS, “WNS Decision Point: Insurance Fraud Detection and Prevention in the Era of Big Data – Curbing Fraud by Application of Advanced Analytics Across Policy Lifecycle” [https://www.wnsdecisionpoint.com/Portals/0/Documents/Reports/PDFFiles/514/38/WNS%20Decision Point Report Fighting%20Insurance%20Fraud%20with%20Big%20Data%20Analytics.pdf](https://www.wnsdecisionpoint.com/Portals/0/Documents/Reports/PDFFiles/514/38/WNS%20Decision%20Point%20Report%20Fighting%20Insurance%20Fraud%20with%20Big%20Data%20Analytics.pdf) at page 8.

⁴⁶ WNS Decision Point at page 8.

⁴⁷ https://www.eslinsurancemonitor.nsw.gov.au/sites/default/files/Big%20Data%20Occasional%20Paper%20FINAL_0.pdf at pages 27 – 29.

⁴⁸ <https://iib.gov.in/> .

⁴⁹ <https://www.saicb.co.za/> .

The Hong Kong Federation of Insurers (HKFI) launched the Insurance Fraud Prevention Claims Database in 2018.⁵⁰ The system applies artificial intelligence and BDA technology, which assists claims officers to detect different types of suspicious claims or potential insurance fraud, particularly those involving multiple claims and syndicates. The system currently covers motor vehicle, health and personal accident insurance, and will extend its coverage to life and travel insurance in the next phase.

Singapore

Since January 2017, Singapore's General Insurance Association (GIA) has implemented a Fraud Management System that utilises AI and data analytics to scrutinise motor insurance claims.⁵¹ This has allowed insurers to focus on the most suspicious cases and to investigate these claims in greater detail.

⁵⁰ <https://insuranceasianews.com/hong-kong-launches-claims-fraud-database/> .

⁵¹ <https://www.ethozgroup.com/blog/rise-insurance-fraud-cases-implications/> .

4 Supervisory considerations

82. This paper has highlighted a number of potential benefits and risks associated with the use of BDA across the insurance product life cycle. Understanding these benefits and risks can help supervisors to develop appropriate and proportionate responses to rapid advancements in BDA enabling technologies and applications in a manner that ultimately promotes and encourages the consistent delivery of fair outcomes to customers.

Examples:

Australia

In June 2018 the New South Wales Insurance Monitor published a paper that explored issues around the use of BDA by general insurers. The paper considered the potential implications of this usage for market competition and consumers as well as for regulators and policymakers.⁵²

Germany

In July 2018 the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin) published a report on Big Data and Artificial Intelligence, representing the outcomes of research done earlier with Partnerschaft Deutschland, the Fraunhofer Institute for Intelligent Analysis and Information Systems and the Boston Consulting Group.⁵³

United States

The US Federal Insurance Office (FIO), in its 2017 Annual Report, published details of various technological innovations in the insurance sector including potential risks and benefits associated with the manner in which US insurers are applying BDA across the insurance product life cycle.⁵⁴ The report also contains examples of possible supervisory responses in this regard.

The Federal Advisory Committee on Insurance (FACI), which provides advice and recommendations to the FIO, will be conducting an in-depth examination of BDA through its subcommittee dedicated to the Availability of Insurance Products.⁵⁵ This subcommittee has a consumer focus and is expected to focus on topics such as transparency in the use of data and algorithms, price optimisation, availability in light of increased granularity in risk selection and pricing, and discriminatory impact.

83. The fairness outcomes envisaged in ICPs 18 and 19 must be achieved irrespective of the adoption of new technologies or other innovations by insurers, including the use of BDA. However the means by which these outcomes are achieved, and the appropriate supervisory responses, may differ depending on the manner in which the specific innovations are applied and the impact, likelihood and complexity of any new customer risks that are introduced as a result.

84. The previous Digitalisation Paper discussed in detail a number of key challenges and considerations for insurance supervisors in attempting to maintain a balanced approach to

⁵²https://www.eslinsurancemonitor.nsw.gov.au/sites/default/files/Big%20Data%20Occasional%20Paper%20FINAL_0.pdf .

⁵³https://www.bafin.de/SharedDocs/Downloads/EN/dl_bdai_studie_en.html .

⁵⁴https://www.treasury.gov/initiatives/fio/reports-and-notice/Documents/2017_FIO_Annual_Report.pdf at pages 65 to 70.

⁵⁵https://www.treasury.gov/initiatives/fio/Documents/June2019FACI_Minutes.pdf .

facilitating digital innovation while ensuring adequate levels of consumer protection.⁵⁶ This section is not intended to repeat those general observations, but rather highlights a few supplementary issues for supervisors to consider in responding specifically to the use of BDA in insurance as described in this paper.

85. These issues will require balancing a number of important interests, including the promotion of innovations in BDA that enable broader access to insurance, the need of insurers to safeguard their proprietary commercial information and the right of customers to fair and ethical use of their data. Ongoing dialogue and collaboration with stakeholders, including policymakers, market participants, consumer advocates and other standard setting bodies, will be critical in helping supervisors gain deeper insights on, and respond more effectively to, this challenge.

4.1 Suitability, affordability and availability of insurance cover

86. As highlighted in section 3, the increasing use of BDA may enable insurers to segment customers into more granular categories for potentially differential treatment in respect of risk selection, marketing, underwriting, pricing and claims settlement. Access to bigger data sets may provide deeper insights to allow more individual customisation than under traditional insurance (underwriting) practices. This can result in benefits and challenges of which supervisors should be aware.

87. Granular customisation may provide more product availability and accessibility, but some customers may find themselves not being offered specific types of cover at all, or face higher non-risk related individual premiums and potentially discriminatory claims settlement decisions. This could adversely impact the availability or affordability of insurance for certain segments of the population and may result in decreased levels of consumer confidence in the insurance sector. In this regard, supervisors may also need to consider whether certain BDA applications could potentially undermine the underlying risk pooling characteristics of insurance.

Example:

France

The collection of data and possible exclusion of customers is not a new phenomenon due to the emergence of BDA. However developments in BDA technology have amplified the issues tremendously due to the ability of insurers to now collect and process significantly larger amounts of data at much greater scale and speed. In France the “*loi EVIN n° 89-1009*” enacted in 1989, prohibits insurers from using customers’ personal health data in their risk assessment activities when providing mandatory health insurance. This requirement is still relevant and applicable in a BDA context. However, BDA can enable insurers to deduce some of the health features of customers through the sourcing and processing of new data sets. These practices may therefore require specific regulatory and supervisory responses.

88. Increasing use of BDA by insurers has the potential to strengthen the insurance market through more competitive pricing, wider availability of coverage and innovative product design. However, the use of BDA could result in consumers having fewer choices of providers. For example, insurers with strong existing customer bases and significant investment capability

⁵⁶ [IAIS Digitalisation Paper](#) at pages 24 - 33.

and knowledge resources could leverage their enhanced BDA capabilities to control and monetise access to customers and customer data. This could potentially create “winner takes all” network effects for one or a few companies (or platforms), resulting in limited options for consumers at least in the mass market. Therefore, insurance supervisors may need to engage more broadly with the relevant anti-competition agencies in their jurisdictions.

89. Increasingly in some, but not all, jurisdictions issues around access, inclusion and affordability are closely linked with the overall mandate of conduct supervisors and may require heightened focus as a result of insights gained through the use of BDA by insurers and supervisors themselves.

90. There may also be opportunities for supervisors to obtain insights from data collected and shared by insurers to assess the effectiveness of advice and suitability of products offered to customers. Supervisors could compare these insights with other metrics, such as complaints rates or product related key performance indicators to assess the effectiveness of advice and product suitability after products have been sold.

Examples:

Netherlands

In the Netherlands a few new entrants focus their marketing and brand campaigns on specific target groups (eg high education, millennials and others) to attract potentially low risk customers.

To monitor the potential pressure on access to insurance in 2017 the Dutch Association of Insurers initiated a so-called solidarity monitor to analyse the development of the premium spread and the extent to which consumers remain insurable. This analysis will be conducted on a yearly basis to monitor developments.

European Union

EIOPA’s recent thematic review on the use of BDA in motor and health insurance addressed, among other things, the topic of financial exclusion by analysing a number of indicators such as standard deviation from the average premium, consumer complaints, rejection rates and number of members in insurability schemes for high-risk consumers. Based on the information collected EIOPA observed that there is no evidence yet to indicate that a higher granularity of risk assessment factors excludes high risk consumers. However, while in the analysed sample, BDA tools such as AI or ML were found to already be actively used by 31% of European insurers across different areas of the insurance value chain, they expect the impact of BDA to increase in the years to come. The situation, therefore, needs to be closely monitored.

South Africa

The South African Financial Sector Conduct Authority (FSCA) has, in order to achieve its supervisory objective, an explicit legislative mandate to promote financial inclusion.⁵⁷ To help execute this mandate, the FSCA has established a dedicated market, customer and inclusion research unit supported by specialist data analytics tools and resources. The unit will draw on a variety of internal and external data sources to derive focused insights on customer behaviours, business model, product, distribution and servicing trends in lower income customer segments to ensure supervisory responses that appropriately promote

⁵⁷ Section 58(1)(e) of the Financial Sector Regulation Act, No. 9 of 2017; <http://www.treasury.gov.za/legislation/acts/2017/Act%209%20of%202017%20FinanSectorRegulation.pdf>.

inclusion and transformation across the financial sector, including insurance. These insights will be supplemented by analysis of insurer data submitted through statutory returns and thematic data requests designed for conduct risk monitoring purposes.⁵⁸

4.2 Governance and oversight of algorithms

91. Subsection 2.2 of this paper highlights a number of concerns about the increasing complexity of algorithms and potential lack of transparency in their development and use. As a starting point to address these concerns, supervisors may consider the applicability of existing requirements to the use of algorithms, including general principles relating to the management of risks taken by the insurer and the fair treatment of customers.

92. The simplicity, clarity and adequacy of communication and disclosures to customers in respect of the intended operation of algorithms, how their data will be used and any associated risks and avenues for recourse will also be important considerations.

93. Alongside existing requirements, some issues that may require additional consideration by supervisors in respect of the use of algorithms include the following:

- defining appropriate governance principles for the use of algorithms (eg adoption of codes of good practice and ethical use guidelines);
- measures implemented by insurers to ensure error and bias-free programming of algorithms to the extent reasonably possible; and
- the reliability of the algorithm, the accuracy and relevance of the specific data sets being used and their correlation with the specific customer outcomes that are intended to be achieved.

94. Depending on the complexity and opacity of some algorithm processes, supervisors may also want to consider taking steps either themselves or through reliance on other independent audit or validation parties to conduct, for example, sample verification and integrity checks both on the algorithm process itself as well as the outcome of the process in ensuring fair customer outcomes. Additionally, discussions between supervisors and insurers during the algorithm development process could be helpful in pre-empting potential supervisory concerns that may otherwise only be revealed much later.

Examples:

France

The French Law for a Digital Republic,⁵⁹ enacted in October 2016, introduces a principle of loyalty applicable to digital platforms. These are comprehensively and legally defined notably as “people who offer an online public communication service based on either ranking or referencing using computer algorithms”.

These platforms are subject to a duty of fair, clear and transparent disclosures to customers on a range of subjects, in particular the general terms and conditions of use of the intermediation service and the existence of a contractual/capital relationship or remuneration for their benefit. The law also regulates the disclosures that online platform operators must provide when offering pricing and other comparison services.

⁵⁸ https://www.fsca.co.za/Documents/FSCA_Strategy_2018.pdf at page 22.

⁵⁹ <https://www.lexology.com/library/detail.aspx?g=d2f9a06a-bd26-4a7a-9594-0ae639d51bd1>.

In addition, the law obliges the public administration to inform the persons concerned that an individual decision has been taken on the basis of an algorithm (via an explicit mention).

European Union

In April 2019, the European Commission published its Ethics Guidelines for Trustworthy Artificial Intelligence.⁶⁰ The Guidelines are based on the following key requirements:

- *Human agency and oversight:* AI systems should enable equitable societies by supporting human agency and fundamental rights, and not decrease, limit or misguide human autonomy.
- *Robustness and safety:* Trustworthy AI requires algorithms to be secure, reliable and robust enough to deal with errors or inconsistencies during all life cycle phases of AI systems.
- *Privacy and data governance:* Citizens should have full control over their own data, while data concerning them will not be used to harm or discriminate against them.
- *Transparency:* The traceability of AI systems should be ensured.
- *Diversity, non-discrimination and fairness:* AI systems should consider the whole range of human abilities, skills and requirements, and ensure accessibility.
- *Societal and environmental well-being:* AI systems should be used to enhance positive social change and enhance sustainability and ecological responsibility.
- *Accountability:* Mechanisms should be put in place to ensure responsibility and accountability for AI systems and their outcomes.

Additionally, as a follow up to its thematic review on the use of BDA in motor and health insurance, EIOPA has created a Consultative Expert Group on digital ethics in insurance.⁶¹ The aim of this stakeholder group is to assist EIOPA in the development of a set of principles for digital responsibility in insurance, which intends to address, from a fairness and ethical perspective, the use of new business models, data sources and technologies in insurance, with a particular focus on pricing and underwriting. The stakeholder group may also assist EIOPA in developing a sound governance framework around the use of BDA tools such as AI and ML in insurance.

Organisation for Economic Co-operation and Development (OECD)

In May 2019, the OECD adopted its Recommendation on Artificial Intelligence setting out a number of proposed policy areas for consideration by policymakers in respect of big data and AI, and providing some practical insights on specific areas for enhanced supervisory focus.⁶²

⁶⁰<https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai> .

⁶¹<https://eiopa.europa.eu/Pages/News/Call-for-expression-of-interest-EIOPA-Consultative-Expert-Group-on-digital-ethics.aspx> .

⁶² <https://www.oecd.org/going-digital/ai/principles/> .

The OECD Recommendation identified the following principles for the responsible stewardship of trustworthy AI:

- AI should benefit people and the planet by driving inclusive growth, sustainable development and well-being.
- AI systems should be designed in a way that respects the rule of law, human rights, democratic values and diversity, and they should include appropriate safeguards – for example, enabling human intervention where necessary – to ensure a fair and just society.
- There should be transparency and responsible disclosure around AI systems to ensure that people understand AI-based outcomes and can challenge them.
- AI systems must function in a robust, secure and safe way throughout their life cycles and potential risks should be continually assessed and managed.
- Organisations and individuals developing, deploying or operating AI systems should be held accountable for their proper functioning in line with the above principles.

Consistent with these principles, the OECD also provided the following recommendations to governments:

- Facilitate public and private investment in research and development to spur innovation in trustworthy AI.
- Foster accessible AI ecosystems with digital infrastructure and technologies and mechanisms to share data and knowledge.
- Ensure a policy environment that will open the way to deployment of trustworthy AI systems.
- Empower people with the skills for AI and support workers for a fair transition.
- Co-operate across borders and sectors to progress on responsible stewardship of trustworthy AI.

In January 2020, the OECD's Insurance and Private Pensions Committee (IPPC) published a report examining the benefits and risks of big data and AI specific to the insurance industry, in the context of both the OECD Recommendation on Artificial Intelligence and the European Commission's Ethics Guidelines for Trustworthy AI mentioned above.⁶³

Singapore

In November 2018, the MAS introduced a set of principles to promote fairness, ethics, accountability and transparency (FEAT) in the use of artificial intelligence and data analytics (AIDA) in finance.⁶⁴ This was co-created with the industry and incorporated feedback from

⁶³ <http://www.oecd.org/finance/The-Impact-Big-Data-AI-Insurance-Sector.pdf> .

⁶⁴ <https://www.mas.gov.sg/publications/monographs-or-information-paper/2018/FEAT> .

financial institutions, industry associations, FinTech firms, technology providers and academia. Its four key tenets are:

- *Fairness*: AIDA-driven decisions have to be explainable, accurate and justifiable.
- *Ethics*: AIDA-driven decisions have to be aligned with the firm's existing ethical standards and minimally be held to the same standards as human driven decisions.
- *Accountability*: Financial institutions have to maintain clear responsibility for, and ownership of, their AIDA-driven decisions. For instance, they will need appropriate internal approving authorities for the use of AIDA, and data subjects should have access to channels to provide accurate information about themselves as well as to enquire or seek recourse for AIDA-driven decisions.
- *Transparency*: To increase public confidence, insurers must be transparent about the use of AIDA. This means proactively disclosing to customers as part of general communication, providing explanations of what the data is used for and its consequences for customers.

Netherlands

In July 2019, the Dutch Central Bank, De Nederlandsche Bank (DNB), published a discussion paper on *General principles for the use of Artificial Intelligence in the financial sector*.⁶⁵ The discussion paper contains a set of guidelines for the responsible use of AI by financial institutions, including insurers. These guidelines are based on 6 key principles, namely soundness, accountability, fairness, ethics, skills and transparency (SAFEST). The principles are described as follows:⁶⁶

- *Soundness*: AI applications in the financial sector should first and foremost be sound, meaning that they should be reliable and accurate, behave predictably, and operate within the boundaries of applicable rules and regulations.
- *Accountability*: Firms should also be accountable for their use of AI, as AI applications may not always function as intended and can result in damages for the firm itself, its customers and/or other relevant stakeholders.
- *Fairness*: It is vital for society's trust in the financial sector that AI applications do not inadvertently disadvantage certain groups of customers.
- *Ethics*: As AI applications take on tasks that previously required human intelligence, ethics becomes increasingly important and firms should ensure that their customers, as well as other stakeholders, can trust that they are not mistreated or harmed because of the firm's deployment of AI.
- *Skills*: People at all levels of the firm, from the work floor to the boardroom, should have a sufficient understanding of the strengths and limitations of the AI-enabled systems with which they work.

⁶⁵ https://www.dnb.nl/en/binaries/General%20principles%20for%20the%20use%20of%20Artificial%20Intelligence%20in%20the%20financial%20sector2_tcm47-385055.pdf .

⁶⁶ <https://www.dnb.nl/en/news/news-and-archive/DNBulletin2019/dnb385020.jsp#> .

- *Transparency:* Firms should be able to explain how and why they use AI in their business processes, and (where reasonably appropriate) how these applications function.

4.3 Third party risk management

95. There are various ways for insurers to organise the development and operation of digitalised processes. The development of algorithms and processing of data for BDA purposes can be done in-house by the insurer itself as part of its core business operations. However, third parties are often also used to provide ongoing support for various technical operational elements such as cloud services or other platforms, the design of algorithms and provision or sourcing of large volumes of data not previously available to insurers. Supervisors may need to consider how insurers manage potential customer risks related to data sharing with these third parties, specifically in light of ICP 19.12 as described in subsection 4.4 below.

96. Supervisors may also consider the appropriateness of requiring insurers to extend their policies and procedures on the use of BDA to third party providers as part of their general governance arrangements for outsourcing where applicable.

97. Additionally, due to the specialised technical nature of third party services that may be provided to enable and support the use of BDA, there are sometimes limitations on the number of service providers available to provide these services in a particular jurisdiction or region. This could raise concerns for supervisors about the business continuity arrangements of those providers and the ability of insurers to provide uninterrupted service to customers as a result. More active supervisory coordination and cooperation within and beyond the jurisdiction or region may be necessary to facilitate information exchange and to strengthen supervisory oversight in this regard.

4.4 Issues relating to privacy, data protection and ownership of data

98. The use of customer data and BDA generally raises important issues around privacy, data protection and ownership of data. These issues are also relevant in the insurance sector, where the increasing reliance on BDA has the potential to heighten certain risks for individual customers and insurers.

99. ICP 19.12 states that “[t]he supervisor requires insurers and intermediaries to have policies and procedures for the protection and use of information on customers”. This may raise certain challenges, because in many jurisdictions the insurance supervisor is not responsible for regulatory oversight of privacy and data protection issues. Instead this falls within the mandate of a separate data protection agency. However, insurers and insurance supervisors in these jurisdictions would still need to consider the privacy related implications of customer data usage, and specifically any conduct risks that may arise as a result.

100. Legal questions relating to the ownership of data could arise, for example, when a car's on-board system transfers data about driving behaviour to the manufacturer who provides the data to the insurer or when data from a wearable device is transmitted to a health insurer. A legal dispute could arise between the customer - who is the owner of the car or wearable device - and the insurer on the ownership of, and entitlement to, the data. In some jurisdictions, customers may be able to raise legal challenges in instances where they are restricted from accessing, or sharing, data generated by such devices for their own purposes. Disputes of

this nature could have a broader impact, such as resulting in reputational damage for the insurer and mistrust in the insurance sector as a whole.

101. In cases where data derived from non-insurance contexts is used, conflicts may arise about the potential lack of consent to, and awareness of, the sharing of this data by the customer. Additionally, customers may be adversely impacted as a result of insurers making decisions that are based on data that is incomplete or inaccurate. If customers are not aware of this type of data being used for insurance purposes, they may not be in a position, or have had the opportunity, to correct potential inaccuracies at the data source.

102. Therefore, it is important for supervisors to consider the steps taken by insurers to obtain the necessary consent to collect and use these types of data for specific purposes in a manner consistent with the fair treatment of customers.⁶⁷ It would also be useful for supervisors to collaborate with relevant data protection agencies, other consumer protection forums and industry bodies in their respective jurisdictions to determine appropriate ways to mitigate potential customer risks arising from the use of BDA for insurance purposes. Developments relating to data and consumer protection frameworks globally may also provide helpful insights in this regard.⁶⁸

4.5 Other broader considerations

103. The use of BDA in insurance also raises a number of important considerations, which may or may not fall within the mandate of insurance supervisors, stemming from the impact of increasing digitalisation on broader financial market structures, market competition and financial stability. Such considerations include, among others, the benefits and risks of non-traditional entrants such as smaller financial technology start-ups (FinTechs) and large well-established technology companies (BigTechs), including cloud-based third party data service providers, into the insurance ecosystem.

104. While detailed exploration of these overarching issues falls outside the scope of this paper, it is important that insurance supervisors understand the potentially wide-ranging implications of these developments, from a conduct, prudential and financial stability perspective. Annex 2 contains a list of some relevant reference material in this regard.

⁶⁷ See report on *Regulating for responsible data innovation: the role of insurance regulators in dealing with risks relating to consumer data protection and privacy* published by the Access to Insurance Initiative (A2ii) in October 2018, available at <https://www.a2ii.org/index.php/en/knowledge-center/icp-self-assessment/regulating-for-responsible-data-innovation-the-role-of-insurance-regulators-in-dealing-with-risks-relating-to-consumer-data-protection-and-privacy> .

⁶⁸ See report on *Effective Approaches for Financial Consumer Protection in the digital age* published by the G20/OECD Task Force on Financial Consumer Protection (Task Force) in October 2019. The report contains a number of overarching considerations that policy makers and supervisors should take into account when applying financial consumer protection principles in the digital environment, including Protection of Consumer Data and Privacy, and is available at https://www.oecd.org/finance/financial-education/Effective-Approaches-FCP-Principles_Digital_Environment.pdf .

Annex 1: Some examples of traditional and non-traditional data sources and data types in insurance

Source: *Big Data and Insurance: Implications for Innovation, Competition and Privacy*, Geneva Association, March 2018

Types of data used in insurance

Type of data	Examples	Personal / non-personal	Use ⁹⁹	Data source
Panel A: Traditional data				
Demographic data	Age, gender, civil and family status, profession, address	Personal	Risk selection	Policyholders
Medical data	Medical history, medical condition, condition of family members, genetic testing	Personal	Risk selection	Policyholders
Exposure data	Type of car, value of building contents, type and features of dwellings	Personal/ non-personal	Risk selection	Policyholders
Behavioural data	Smoking, drinking behaviour, distance driven in a year, deductible choice, life insurance lapse rates	Personal/ non-personal	Risk selection, marketing	Policyholders, industry statistics
Loss data	Claim reports from car accidents, liability cases	Personal/ non-personal	Claims management	Policyholders, information exchange within industry
Population data	Mortality rates, morbidity rates, car accidents	Anonymised and aggregated personal data	Risk selection	Government, industry statistics, academia
Hazard data	Frequency and severity of natural hazards	Non-personal	Risk selection	Government, industry statistics, academia
Other traditional data	Credit reference, claim adjustment reports, information from the auto repair shops	Personal/ non-personal	Risk selection, marketing, claims management	Policyholders, credit agents, partner adjusters or agencies involved in the claim
Panel B: New data in the era of digitisation				
IoT data	Driving behaviour (telematics), physical activity and medical condition (wearables), surveillance (smart home)	Personal	Risk selection, claims management	Data collection devices
Online media data	Web searches, online buying behaviour, social media activities	Personal	Risk selection, marketing	Technology companies (internet providers, search engine providers, e-commerce providers, social media platforms)
Insurers' own digital data	Interaction with insurers (call centre data, users' digital account information, digital claim reports, online behaviour while logging in to insurers' websites or using insurers' app)	Personal	Marketing, claims management	Insurers' own customer service or call centre, insurers' websites and apps
Other digital data	Selfie (to estimate biological age for life insurance), flight information for flight delay insurance	Personal and non-personal	Risk selection, marketing, claims management	Policyholders, all other possible data related

99 Here risk selection includes pricing and underwriting; marketing includes distribution and sales activities; claims management includes fraud detection.

Annex 2: Reference material on impact of BigTechs, FinTechs and third party cloud-service providers

- a. [Regulating and supervising the clouds: emerging prudential approaches for insurance companies](#)
Financial Stability Institute, FSI Insights on policy implementation No 13, December 2018
- b. [BigTech and the changing structure of financial intermediation](#)
Bank for International Settlements Working Papers No 779, April 2019
- c. [Big tech in finance: opportunities and risks](#)
Bank for International Settlements, Annual Economic Report, June 2019 at page 55
- d. [BigTech in finance: Market developments and potential financial stability implications](#)
Financial Stability Board, December 2019
- e. [Third-party dependencies in cloud services: Considerations on financial stability implications](#)
Financial Stability Board, December 2019