

Big Data Analytics, Insurtech and Consumer Contracts: A European Appraisal

Marta INFANTINO*

Abstract: The article investigates, from the European perspective, to what extent the enhanced availability of granular data to insurance companies and the growing sophistication of insurers' processing capabilities through big data analytics (BDA) are fostering the increasing personalization of insurance products and services for consumers. To this purpose, the article first explores the very notion of 'automated personalization' in insurance, and then delves into the institutional, epistemic, economic and legal factors that, in Europe, work as a constraint, at least in the short-term, to paradigmatic shifts in insurance consumers contracts. The analysis will hopefully demonstrate that automated personalization in consumer insurance contracts, in Europe, is for the time being more a myth than a reality. What does exist, by contrast, is a no less problematic trend towards mass customization and robotization of consumer insurance contracts, which fully deserves lawyers' attention.

Résumé: Cet article vise à étudier dans quelle mesure la disponibilité croissante des données granulaires par les compagnies d'assurances européennes et leur capacité accrue de manipulation des données à travers l'analyse des Big Data, sont en train de favoriser la personnalisation des produits et services d'assurances pour les consommateurs en Europe. À cette fin, l'article explore d'abord la notion de 'personnalisation automatique' dans le contexte de l'assurance et examine après les facteurs institutionnels, épistémiques, économiques et juridiques qui, au moins dans le court terme, contraignent la réalisation d'une véritable révolution dans l'automatisation des contrats d'assurance européens. L'étude va ainsi démontrer que la personnalisation automatique des contrats d'assurance est, dans l'Europe contemporaine, plus un mythe qu'une réalité. Ce qui existe, en revanche, c'est une tendance générale vers la customisation de masse et la robotisation des contrats d'assurance, qui mérite pleinement l'attention des juristes.

Zusammenfassung: Dieser Artikel untersucht aus europäischer Perspektive, inwieweit die verbesserte Verfügbarkeit von granularen Daten für Versicherungsunternehmen und die zunehmende Verfeinerung der Verarbeitungsmöglichkeiten von Versicherern durch Big Data Analytics (BDA) die zunehmende Personalisierung von Versicherungsprodukten und -dienstleistungen für Verbraucher vorantreiben. Zu diesem Zweck untersucht der Artikel zunächst den eigentlichen Begriff der „automatisierten Personalisierung“ im Versicherungswesen und geht dann auf die institutionellen, erkenntnistheoretischen, wirtschaftlichen und rechtlichen Faktoren ein, die in Europa zumindest kurzfristig als Beschränkung eines Paradigmenwechsels bei Verträgen mit Versicherungsverbrauchern

* Associate Professor of Comparative Private Law, University of Trieste, Italy. The author thanks Maitreyi Misra for her language revision. The final version of this contribution was submitted on 18 Feb. 2022. Email: minfantino@units.it.

wirken. Diese Studie soll zeigen, dass die automatisierte Personalisierung von Verbraucherversicherungsverträgen in Europa vorerst eher ein Mythos als eine Realität ist. Was dagegen existiert, ist ein nicht minder problematischer Trend zur Massenindividualisierung und Robotisierung von Verbraucherversicherungsverträgen, der die Aufmerksamkeit von Juristen und Juristinnen voll und ganz verdient.

1. Introduction

1. Big data analytics (BDA) is affecting all the stages of the insurance value chain – from risk selection to marketing and sales execution, from underwriting to pricing and claims management. Inasmuch as consumers are concerned, the enhanced availability of granular data and the growing sophistication of the processing capabilities of insurers are expected to foster an increasing (and increasingly automated) personalization of insurance products and services.¹ Automated personalization in insurance, it is said, might help insurers better match the needs of consumers and optimize customer segmentation; yet, it could also ‘potentially result in risks to individual customers, as well as to the insurance sector as a whole’.²

2. Against such a background, the aim of this article is to investigate the extent to which such a trend towards automated personalization in consumer insurance contracts does exist in Europe,³ and to assess the challenges that it raises under current and prospective European legal frameworks. As we will see, much of the present-date debate in this regard is based on little (American) empirical data, and on unchecked assumptions about the power of technology, the way insurance business models work, and the role of the (European) legal infrastructure. By contrast, this article claims that, to properly evaluate the opportunities and risks of automated personalization in consumer insurance in Europe, it is important to have a more precise understanding of what automated personalization in insurance means in general, and what its operational limits are within the European context.

This is why, in the following pages, section 2 will first attempt to summarize the current scenarios associated with the rise of automated personalization in consumer insurance contracts. Section 3 will flesh out some often unarticulated (and debatable) premises of the very notion of ‘automated personalization’, such as the idea that a person’s identity is coherent, stable in time, and prone to be measured by technological tools. Sections 4–6 will then delve into the institutional, epistemic, economic and legal factors that work as a constraint, at least in the short-term, to paradigmatic shifts in consumer insurance contracts. More in

1 INTERNATIONAL ASSOCIATION OF INSURANCE SUPERVISORS (IAIS), *Issues Paper on the Use of Big Data Analytics in Insurance* (Basel: IAIS Feb. 2020), p 4 [hereinafter IAIS, *Issues Paper*], <https://www.iaisweb.org/page/supervisory-material/issues-papers>.

2 *Ibid.*

3 In this article, ‘Europe’ stands for countries members of the European Union.

particular, section 4 will shed light on the organizational, actuarial and commercial reasons underlying the cautiousness of insurance companies in the field, while sections 5 and 6 will analyse the legal foundations of the same cautiousness. The analysis will demonstrate that automated personalization in consumer insurance contracts, with all its promises and perils, is more a myth than a reality. It is, for the time being, an ‘insurance imaginary’,⁴ constrained by a number of current and prospective features that make its realization less powerful than often portrayed. What does exist, by contrast, is a no less problematic trend towards mass customization and robotization of consumer insurance contracts, as section 7 will explain. Section 8 will provide some concluding thoughts.

2. The Imaginary of Automated Personalization

3. Although there are no clear empirical data about the actual extent to which insurance companies already rely on BDA,⁵ there is little doubt that insurers have a lot to gain from it. While there is nothing unprecedented about insurers processing large volumes of data to assess the behaviour of their customers, the constantly increasing availability of digital data, coupled with the continuous refinement in the abilities of artificial intelligence (AI) algorithms to extract and spot regularities in and correlations between vast amount of data, can now provide insurers with greater granularity and frequency of information about consumer characteristics, behaviour and lifestyles.⁶ BDA could be used in the insurance sector for a myriad of purposes, such as profiling potential and actual customers, designing targeted advertising, informing product design, risk selection and pricing, providing automated advice and pre- and post-sales support, and improving claim handling.⁷

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- 4 L. MCFALL, G. MEYERS & I. VAN HOYWEGHEN, ‘Editorial: The personalisation of insurance: Data, behavior and innovation’, *BD&Soc. (Big Data & Society)* 2020, pp 1, 6, DOI: 10.1177/2053951720973707; L. MCFALL & L. MOOR, ‘Who, or what, is insurtech personalizing?: Persons, prices and the historical classifications of risk’, 19. *Distinktion (Distinktion: Journal of Social Theory)* 2018, pp 193, 197.
- 5 The lack of empirical data, especially outside the United States, is stressed by many: see EUROPEAN INSURANCE AND OCCUPATIONAL PENSIONS AUTHORITY (EIOPA), *Big Data Analytics in Motor and Health Insurance* (Frankfurt am Main: EIOPA 2019), pp 15-17, https://www.eiopa.europa.eu/document-library/fact-sheet/big-data-analytics-motor-and-health-insurance_en; J. FRICK, ‘Introduction: Digitalisation and the Insurance Value Chain’, *RTDciv. (Revue trimestrielle de droit civil)* 2020, pp 56-58; L. MCFALL, G. MEYERS & I. VAN HOYWEGHEN, *BD&Soc.* 2020, p 1; M. TANNINEN, ‘Contested Technology: Social Scientific Perspectives of Behaviour-Based Insurance’, *BD&Soc.* 2020, pp 1, 5-6, <https://doi.org/10.1177/2053951720942536>; L. MCFALL & L. MOOR, 19. *Distinktion* 2018, p 205.
- 6 IAIS, *Issues Paper*, p 38; EIOPA, *Big Data Analytics*, pp 6-14, 48.
- 7 Supervisory authorities are particularly interested in mapping the developments in the field: IAIS, *Issues Paper*, p 11; IAIS, *Issues Paper on Increasing Digitalisation in Insurance and its Potential Impact on Consumer Outcomes* (Basel: IAIS, Nov. 2018), pp 3-4 [hereinafter IAIS, *Issues Paper on Increasing Digitalisation*], <https://www.iaisweb.org/page/supervisory-material/issues-papers>; in Europe, EIOPA, *Big Data Analytics*, pp 18-41.

The trend towards the use of BDA by insurance companies for automating contractual personalization is especially noticeable in the pre-contractual and claim management phases, where BDA helps insurers provide consumers with automatically tailored offers and settlement proposals.⁸ This is a trend common to other business-to-consumer (B2C) transactions, in which BDA allows businesses to detect consumers' needs and desires and to modify their advertising and contractual behaviour accordingly.⁹ But the most common illustration of the rise of BDA and automated personalization in the insurance sector is the development of the so-called usage-based insurance (UBI), in which the insurance contract is filled with, and regularly adjusted to consumer-generated telemetry data provided by a connected device (most commonly, a tracking tool installed on a vehicle, but also mobile phone apps, wearable devices and connected home devices).¹⁰ Contractual arrangements of this kind – which for the time being, in Europe, are mostly used in motor insurance – are also called 'behaviour-based insurance', because the customer's behaviour has a direct and repeated impact on the insurer's performance.¹¹

4. For consumers, automated personalization of insurance contracts is said to have opened up a number of opportunities and concerns. Opportunities include individual advertising, personally tailored risk assessments and dynamically adjusted premiums, as well as the opening up of insurance to previously uninsured and uninsurable groups. But concerns are also raised with regard to the reduction of consumer autonomy in decision-making due to aggressive nudging and (self-) measurements, the risk of perpetuation through algorithms of historical bias, as well as the side-effects of insurance companies' increased granularity in risk selection and pricing, which, in the end, might result in lower prices for some but also

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- 8 IAIS, *Issues Paper*, pp 4, 11; in Europe, see EIOPA'S CONSULTATIVE EXPERT GROUP ON DIGITAL ETHICS IN INSURANCE, *Artificial Intelligence Governance Principles: Towards Ethical and Trustworthy Artificial Intelligence in the European Insurance Sector* (Brussels: Jun. 2021), pp 6, 9-10 [hereinafter EIOPA'S CONSULTATIVE EXPERT GROUP, *Artificial Intelligence Governance Principles*], https://www.eiopa.europa.eu/document-library/report/artificial-intelligence-governance-principles-towards-ethical-and_en; EIOPA, *Big Data Analytics*, pp 18-41.
- 9 This is why some commentators have proposed that contractual advertising, offers and disclosures to consumers in B2C digital transactions should be personalized as well: cf. C. BUSCH, 'Implementing Personalized Law: Personalized Disclosures in Consumer Law and Data Privacy Law', 86. *U. Chi. L. Rev. (University of Chicago Law Review)* 2019, pp 309-331; P. HACKER, 'Personalizing EU Private Law: From Disclosures to Nudges and Mandates', 25. *ERPL (European Review of Private Law)* 2017, pp 651-677.
- 10 Typical UBI models are the 'pay as you drive' (PAYD) and 'pay how you drive' (PHYD) programs in the motor insurance sector, in which the insurance premium is adjusted to the driving habits and behaviour of the customers. Another illustration is on-demand insurance, which provides insurance coverage for specific periods of time that can be turned on and off. See IAIS, *Issues Paper*, p 15; IAIS, *Issues Paper on Increasing Digitalization*, pp 7, 4, 9-13; EIOPA, *Big Data Analytics*, p 10.
- 11 IAIS, *Issues Paper*, p 15; EIOPA, *Big Data Analytics*, p 10.

in the exclusion of riskier customers.¹² As many have pointed out, automated personalization might even lead to the death of insurance as we know it, since BDA's capacity to drill down to the level of individual behaviour undermines the possibility of classifying aggregated risks and of practicing risk pooling, upon which traditional insurance is based.¹³

The following sections aim to inquire into this framework in order to better assess the promises and perils brought by automated personalization in the insurance sector. As we will see, many of the pros and cons associated with automated personalization rely upon imagined hopes and fears, starting from the very idea of machine-driven ability to capture the full extent of an individual's personality traits.

3. Contracts, Algorithms, and Identity

5. Automated personalization apparently depicts very well the working of behaviour-based insurance (which, in today's Europe, essentially coincides with telemetry motor insurance). The life of these insurance contracts is filled up with real-time information dynamically associated with the behaviour and choices of a real person. Not by chance, scholarly critiques against automated personalization typically focus on insurance contracts based on connected, self-tracking devices.¹⁴ However, the impact of consumer-generated data on the contractual terms of the insurance and its

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- 12 Compare IAIS, *Issues Paper*, pp 7-8, 14-30; EIOPA's CONSULTATIVE EXPERT GROUP, *Artificial Intelligence Governance Principles*, pp 22-26; EIOPA, *Big Data Analytics*, pp 29-40; but see also B. MCGURK, *Data Profiling and Insurance Law* (London: Hart 2018), pp 6-7, 26-29, 268-269; P. TERESZKIEWICZ & K. POŁUDNIAK-GIERZ, 'Liability for Incorrect Client Personalization in the Distribution of Consumer Insurance', 9. *Risks* 2021 (83), p 1, <https://doi.org/10.3390/risks9050083>; L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 'Fit for purpose? The GDPR and the governance of European digital health', 41. *Pol'y Stud. (Policy Studies)* 2020, pp 447, 451-452; B. PRAINSACK & I. VAN HOYWEGHEN, 'Shifting solidarities: Personalisation in insurance and medicine', in I. VAN HOYWEGHEN, V. PULIGNANO & G. MEYERS (eds), *Shifting Solidarities. Trends and Developments in European Societies* (London: Palgrave Macmillan 2020), pp 127, 130-131, 144-145; S. ZUBOFF, *The Age of Surveillance Capitalism* (New York: Public Affairs, 2019), pp 3-4, 200-206; S. MAU, *The Metric Society* (Cambridge: Polity 2019), pp 69-74, 151-153; V. EUBANKS, *Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor* (New York: St. Martin's Press 2018), pp 1-12; F. PICARD, 'Current Vision and Market Prospective', in M. CORLOSQUET-HABART & J. JANSSEN (eds), *Big Data for Insurance Companies* (London: Wiley 2018), pp 83, 125; C. O'NEIL, *Weapons of Math Destruction* (New York: Crown 2016), pp 161-178; R. SWEDLOFF, 'Risk Classification's Big Data (R) Evolution', 21. *Conn. Ins. L. J. (Connecticut Insurance Law Journal)* 2014, pp 339-374.
- 13 IAIS, *Issues Paper*, p 8; B. PRAINSACK & I. VAN HOYWEGHEN, in *Shifting solidarities*, pp 130-131; A. CEVOLINI & E. ESPOSITO, 'From Pool to Profile: Social Consequences of Algorithmic Prediction in Insurance', *BD&Soc.* 2020, pp 1-11, <https://doi.org/10.1177/2053951720939228>; S. MAU, *The Metric Society*, pp 69-74, 151-153; F. PICARD, in *Big Data*, pp 99-100, 103-104.
- 14 A. CEVOLINI & E. ESPOSITO, *BD&Soc.* 2020, pp 1-11; S. MAU, *The Metric Society*, pp 69-74, 151-153; S. ZUBOFF, *The Age of Surveillance Capitalism*, pp 200-206; G. MEYERS & I. VAN HOYWEGHEN, 'Enacting actuarial fairness in insurance: From fair discrimination to behaviour-based fairness', 27. *Science as Culture* 2018, pp 413, 428-431; C. O'NEIL, *Weapons*, pp 161-178.

management in this field is more limited than one might expect. For instance, the determination of premium rates in behaviour-based contracts is never made exclusively on consumer-generated data, since insurance companies still rely on a much wider range of information, in which behaviour-based data forms only a small fraction.¹⁵ Outside the sector of telemetric insurance, the extent to which BDA contributes to automated personalization is even less clear. Such uncertainty is partly due to the lack of empirical data,¹⁶ and is partly related to the inherent ambiguity and ‘under-specification of [automated] personalization as a concept’.¹⁷ Underlying the notion of automated personalization are implicit and shaky assumptions about how people’s identity is structured and how its machine-driven reconstruction works.

6. Let us start with people’s identity. Discourses over automated personalization in B2C contracts imply that businesses have the technological tools to capture consumers’ identity and tailor contractual terms and arrangements around that identity.¹⁸ From this perspective, ‘personalizing processes are assumed to be acting on a pre-existing, stable, complete, conscious, free human being – but is this true?’¹⁹ People simultaneously belong to a multiplicity of groups and social ecosystems, with their individual identities being caught in a multitude of (more or less) dynamic and overlapping layers of affiliations. Affiliations are dictated by combinations of a wide range of factors: family, language(s), gender and sexual preferences, religion, education, professional and economic allegiances, political credos, ethnicity and territorial connections, to name but the most prominent ones.²⁰ These affiliations determine adherences to different communities of beliefs, needs, and expectations, deeply shaping people’s choices in a wide range of areas such as to how to behave, how to solve problems, and whom to interact with. These affiliations and their combinations are not fixed and do not live in isolation. Rather, affiliations are stratified and intertwined with each other, relentlessly changing (although with different speeds: family imprints, for instance, might be harder to relinquish or adapt) and mutually influencing one another (suffice it to think of the many ways in which economic dependency might dilute a person’s commitment to

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- 15 L. McFALL, G. MEYERS & I. VAN HOYWEGHEN, *BD&Soc.* 2020, pp 3–4; G. MEYERS & I. VAN HOYWEGHEN, 27. *Science as Culture* 2018, pp 413–438.
- 16 See the literature and sources quoted *supra* n. 5.
- 17 L. McFALL & L. MOOR, 19. *Distinktion* 2018, p 209.
- 18 P. TERESZKIEWICZ & K. POŁUDNIAK-GIERZ, 9. *Risks* 2021, p 4; A. CEVOLINI & E. ESPOSITO, *BD&Soc.* 2020, p 6.
- 19 L. McFALL & L. MOOR, 19. *Distinktion* 2018, p 195.
- 20 M. BUSSANI, *El derecho de Occidente: Geopolítica de las reglas globales* (translation by M.E. Sánchez Jordán of *Diritto dell’Occidente. Geopolitica delle regole globali* (Turin: Einaudi 2010)) (Madrid: Marcial Pons 2017), pp 178–183.

other values).²¹ None of existing devices and tools are either able to make inferences on the whole bundle of affiliations which make up a person's identity, or to follow (or predict) their developments in time.

7. Actually, the very idea of machines being able to capture people's personality traits is somewhat misplaced. What BDA does is to decontextualize complex information drawn from a wide variety of sources in numerous formats, to extract valuable meaning from them through iterative pattern-matching based on the best correlations detected within other data, and then to convert that meaning into a standardized, compatible language.²² Thus, people's identities are not found: they are more correctly constructed through processes of data harvesting, reworking, and analysis. 'Far from representing or capturing any given individual, the action of algorithmic processing results in the generation of abstracted and depersonalized "data doubles" that figure or signify individual actions'.²³ Any individual's algorithmically constructed 'double' has a tenuous factual linkage with the living individual to whom information is attached. This 'data double' constitutes a sort of virtual doppelgänger extracted from an amalgam of processed data, which in turn might be used for establishing new classifications of individuals.²⁴ While insurance companies have always relied upon classifications, generalizations, and inferences relating to individuals, traditional categorizations have historically been created and refined through human interaction, on the basis of standardized rating factors drawn from previously inferred causal links between a factor and the probability that an individual will make a certain claim or suffer a certain loss.²⁵ By contrast, any linkage between an individual and her algorithmically constructed 'double' intended to represent her is based on machine-driven correlations and stereotypifications.²⁶ BDA thus 'flattens and distorts the depiction of the individual by the construction of data doubles that are reduced to portable numerical

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- 21 M. INFANTINO, 'Legal Pluralism in the Western Law of Obligations', in F. FIORENTINI & M. INFANTINO (eds), *Comparative Lawyers: Methods, Times, and Places. Liber Discipulorum Mauro Bussani* (Cham: Springer 2020), pp 46–47.
- 22 D.L. BURK, 'Algorithmic Legal Metrics', 96. *ND L. Rev. (Notre Dame Law Review)* 2021, pp 1147, 1157–1161; L. AMOORE & V. PIOTUKH, 'Life Beyond Big Data: Governing with Little Analytics', 44. *Econ. & Soc'y (Economy and Society)* 2015, pp 341, 353–360.
- 23 D.L. BURK, 96. *ND L. Rev.* 2021, p 1160; with specific regard to insurance, H. JEANNINGROS & L. MCFALL, 'The Value of Sharing: Branding and Behaviour in a Life and Health Insurance Company', *BD&Soc.* 2020, pp 1, 3–4, <https://doi.org/10.1177/2053951720950350>; E. BERTHELÉ, *Using Big Data in Insurance*, in *Big Data*, pp 131, 137.
- 24 L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 41. *Pol'y Stud.* 2020, pp 451–452; L. MCFALL & L. MOOR, 19. *Distinktion* 2018, pp 193–213; D. BOUK, *How Your Days Became Numbered: Risk and the Rise of the Statistical Individual* (Chicago: University of Chicago Press 2015).
- 25 EIOPA, *Big Data Analytics*, p 34.
- 26 D.L. BURK, 96. *ND L. Rev.* 2021, p 1165; with specific regard to insurance, see EIOPA, *Big Data Analytics*, p 6; B. MCGURK, *Data Profiling*, pp 54–55; L. MCFALL & L. MOOR, 19. *Distinktion* 2018, p 206.

representations. Those profiles are then slotted into predictive categories that are matched to selected correlative patterns. Neither the profile nor the category reflects more than the particular pattern that the algorithm determines to be of interest [...] Far from offering more personalized law, the data-driven metrics espoused by recent commentators may be seen as offering radically depersonalized law'.²⁷

When one considers that such depersonalized information lies at the core of automated individualization in advertising, underwriting, claim management and indemnisation, it becomes clear that automated B2C insurance is anything but individualized. Rather, BDA allows insurance companies to apply more granular customer segmentation methodologies and to pursue more effectively strategies of 'mass customization' in standardized contracting. Mass customization:

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.²⁸

In B2C insurance transactions, what is usually referred to as automated personalization should therefore be more correctly understood as 'mass' customization: personalized contracts might well contain individually tailored contents and terms, but remain non-negotiated, depersonalized, standard terms contracts.²⁹ Rather than automating personalization, mass customization further depersonalizes the insurer-customer relationship.³⁰

4. Actuarial and Economic Hurdles

8. When it comes to Europe specifically, the little empirical data that is available on BDA-powered mass customization of insurance contracts suggests that companies mostly rely upon BDA to customize advertising, marketing strategies, and the

27 D.L. BURK, 96. *ND L. Rev.* 2021, pp 1165–1166 (footnotes omitted); see also B. PRAINSACK & I. VAN HOYWEGHEN, in *Shifting solidarities*, p 137; L. MCFALL & L. MOOR, 19. *Distinktion* 2018, pp 206–209; D. BOUK, *How Your Days Became Numbered*.

28 IAIS, *Issues Paper*, p 15; see also I.M. BARSAN, 'The GDPR Perspective', *RTDciv.* 2020, pp 58, 59; A. CAPPIELLO, 'The Digital (R)Evolution of Insurance Business Models', 1. *AJEB A (American Journal of Economics and Business Administration)* 2020(13), pp 1, 9, <https://doi.org/10.3844/ajebasp.2020.1.13>; L. MCFALL & L. MOOR, 19. *Distinktion* 2018, p 208.

29 P. TERESZKIEWICZ & K. POŁUDNIAK-GIERZ, 9. *Risks* 2021, p 11 (noting that the Directive 93/13/EEC on unfair terms in consumer contracts remains applicable to personalized insurance contracts).

30 A. CAPPIELLO, 1. *AJEB A* 2020, p 9.

appearance of their offers in light of consumers' (perceived/reconstructed/solicited) needs. Core insurance core activities – risk assessment and risk pooling – seem so far to be quite unaffected by BDA. Premiums are still calculated on the basis of information stemming from consumers' questionnaires and contractual behaviour (such as a client's regularity of payments), official statistics, and private internal and external sources providing exposure data and geospatial, socio-economic and demographic classifications. Even in the sectors in which insurers have at their disposal consumer-generated data, these data have no direct impact on premiums, insofar as they only provide few new variables that are added to existing statistical models.³¹ The technological break seems not, at least not yet, to have led to the 'automated personalization' of risk practices across the industry.³²

9. Several hypotheses can be, and have been put forward to explain the limited use of BDA in B2C contracts by European insurance companies. Some of them are related to the institutional, epistemic and economic models underlying insurance frameworks in Europe; others refer to the obstacles posed by the existing and emerging European regulatory infrastructure. The former will be explored in this section, while the latter will be analysed in sections 5 and 6.

10. Let us start with the explanations concerning factors other than the regulatory environment. A few commentators have suggested that, in Europe, there might be a certain degree of 'reluctance of consumers to submit their data to their insurer'.³³ It is certainly true that there are people who do not want to share their data (provided that they can afford the price of non-disclosure) or who might wish to actively interfere with data collection (provided that they have the technical ability to do so).³⁴ Yet, the argument about European consumers' attachment to their privacy is at odds with the fact that consumers, in Europe as elsewhere, have little problem in signing away their private data.³⁵ What perhaps is more relevant, on the consumers' end, is that the collection of behaviour-based data, at least those which matter most for insurance purposes, requires a certain

31 EIOPA, *Big Data Analytics*, pp 10-14. See also L. MCFALL, G. MEYERS & I. VAN HOYWEGHEN, *BD&Soc.* 2020, p 7; L. BARRY & A. CHARPENTIER, 'Personalization as a promise: Can Big Data change the practice of insurance?', *BD&Soc.* 2020, pp 1-12, <https://doi.org/10.1177/2053951720935143>; E. BERTHELÉ, in *Big Data*, pp 139-140.

32 L. MCFALL, G. MEYERS & I. VAN HOYWEGHEN, *BD&Soc.* 2020, p 7.

33 F. PICARD, in *Big Data*, p 120; on the same lines, G. MEYERS & I. VAN HOYWEGHEN, "'Happy failures": Experimentation with behavior-based personalisation in car insurance', *BD&Soc.* 2020, pp 1-14, <https://doi.org/10.1177/2053951720935143>; E. BERTHELÉ, in *Big Data*, p 139.

34 P. TERESZKIEWICZ & K. POŁUDNIAK-GIERZ, 9. *Risks* 2021, p 11.

35 Consumers are well-known to easily accept whatever privacy terms and conditions is offered them: see for all, L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 41. *Pol'y Stud.* 2020, pp 456-457; L. DRECHSLER & J.C. BENITO SÁNCHEZ, 'The price is (not) right: Data protection and discrimination in the age of pricing algorithms', 9. *Eur. J. L. & Tech. (European Journal of Law & Technology)* 2018, pp 1, 9.

degree of commitment that people often lack not because of their explicit opposition but because of carelessness and disengagement.³⁶ It is not by chance that behaviour-based insurance has developed in the sector of motor insurance where data are generated by devices permanently installed on cars. When data collection is actually dependent on the continuous participation of consumers (e.g., in the case of wearable devices), empirical evidence shows that people tend to rapidly become forgetful and abandon the use of self-tracking tools.³⁷

11. Other persuasive explanations point to insurance companies themselves.

On the one hand, some commentators have emphasized the well-rooted cautiousness and conceptual resilience characterizing the insurance market.³⁸ At least in the last two centuries, insurance companies have been at the forefront of developments in the processing of large volumes of data and in the mathematical calculation of probability.³⁹ Yet, these developments have occurred through incremental advancements in actuarial knowledge and practices in balancing the need for aggregating all cases for compensatory purposes and the need for segmenting the pool of policy holders on the basis of variables enabling homogeneous risk categories to be defined.⁴⁰ Paradigms for customer grouping and segmentation that are based on widely shared and historically well-rooted methodologies are subject to continuous refinement, but cannot be revolutionized overnight.⁴¹ Socio-technical inertia thus ensures that changes brought by BDA in insurance models are incremental rather than radical.

On the other hand, others have noted that the shift towards more personalized policies and more fine-grained segmentation of insureds' portfolios might be

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- 36 M. TANNINEN, *BD&Soc.* 2020, p 8; H. JEANNINGROS & L. MCFALL, *BD&Soc.* 2020, pp 9-11; N. GORM & I. SHKLOVSKI, 'Episodic use: Practices of care in self-tracking', 21 *New Media & Soc'y (New Media & Society)* 2019(11-12), pp 2505-2521.
- 37 M. TANNINEN, *BD&Soc.* 2020, p 8; H. JEANNINGROS & L. MCFALL, *BD&Soc.* 2020, pp 9-11; N. GORM & I. SHKLOVSKI, 21. *New Media & Soc'y* 2019, pp 2505-2521.
- 38 A. CAPIELLO, 1. *AJEBA* 2020, p 3; L. BARRY & A. CHARPENTIER, *BD&Soc.* 2020, pp 8-9; I.M. BARSAN, *RTDciv.* 2020, p 58; A. CEVOLINI & E. ESPOSITO, *BD&Soc.* 2020, p 5; L. MCFALL, G. MEYERS & I. VAN HOYWECHEN, *BD&Soc.* 2020, p 4; M. ELING & M. LEHMANN, 'The Impact of Digitalization on the Insurance Value Chain and the Insurability of Risks', 43. *Geneva Pap (Geneva Papers on Risk and Insurance)* 2018, p 359; L. MCFALL & L. MOOR, 19. *Distinktion* 2018, p 198; F. PICARD, in *Big Data*, pp 83-89, 127.
- 39 D. BOUK, *How Your Days Became Numbered*; L. DASTON, *Classical Probability in the Enlightenment* (Princeton: Princeton University Press 1998), pp 15-33, 162-181; T.M. PORTER, *Trust in Numbers. The Pursuit of Objectivity in Science and Public Life* (Princeton: Princeton University Press 1995), pp 89-113.
- 40 See the seminal works of D. BOUK, *How Your Days Became Numbered*; T.M. PORTER, *Trust in Numbers*, pp 89-113.
- 41 L. BARRY & A. CHARPENTIER, *BD&Soc.* 2020, pp 8-9; I.M. BARSAN, *RTDciv.* 2020, p 58; A. CEVOLINI & E. ESPOSITO, *BD&Soc.* 2020, p 5; L. MCFALL & L. MOOR, 19. *Distinktion* 2018, p 198; E. BERTHELÉ, in *Big Data*, pp 139-140.

countered by its limited economic profitability. For insurance companies, over-segmentation (especially in terms of price personalization) might increase the per capita profitability of the policyholders maintained in portfolio, but might also trigger a competitive race for the creation of niche markets (with policyholders most penalized by the price changes opting for insurance companies with a less fine segmentation), thus leading to a decrease in the turnover and in the overall profitability in the entire insured portfolio.⁴² Moreover, transitioning to a system of more refined segmentation of customers nurtured by BDA implies huge costs - in terms of restructuring portfolios, reorganizing staff, updating historical data and acquiring new data, adjusting the terms of insurance policies, creating new competencies for harnessing information and producing new risk classifications. Until the gain in more accurate risk selection and pricing outweighs these costs, it might be that the transition is more costly than beneficial for European insurance companies.⁴³

Of course, all the above observations are applicable to today's European insurance companies. They might not be applicable tomorrow; they might not be applicable elsewhere. They might also not apply to today's European non-incumbent companies, such as tech companies and start-ups, that are emerging (in Europe more slowly than elsewhere) and blurring the classic roles of insurer, insurance distributor and supplier of insurance services.⁴⁴ However, one has to keep in mind that the entry of foreign and non-incumbent actors in today's European insurance market is limited by the heavily burdened EU regime of insurance regulation and supervision - currently enshrined in Directive 2009/138/EC (Solvency II Directive)⁴⁵ and Directive (EU) 2016/97 (Insurance Distribution Directive⁴⁶) - applying to all companies deemed to perform insurance services and/or distribution in Europe.⁴⁷

42 E. BERTHELÉ, in *Big Data*, p 138.

43 L. McFALL, G. MEYERS & I. VAN HOYWEGHEN, *BD&Soc.* 2020, p 4; L. BARRY & A. CHARPENTIER, *BD&Soc.* 2020, pp 6-7; H. JEANNINGROS & L. McFALL, *BD&Soc.* 2020, pp 8-9, 12.

44 IAIS, *Issues Paper on Increasing Digitalization*, pp 5, 30-31; EIOPA, *Big Data Analytics*, p 59; EIOPA, *Report on Best Practices on Licensing Requirements, Peer-to-Peer Insurance and the Principle of Proportionality in an Insurtech Context* (Frankfurt am Main: EIOPA Mar. 2019), <https://op.europa.eu/it/publication-detail/-/publication/128d0a4f-49fc-11e9-a8ed-01aa75ed71a1>; J. FRICK, *RTDciv.* 2020, p 58; M. ELING & M. LEHMANN, 43. *Geneva Pap* 2018, pp 370-371.

45 Directive 2009/138/EC of the European Parliament and of the Council of 25 Nov. 2009 on the taking-up and pursuit of the business of Insurance and Reinsurance (recast). In Sep. 2021, the European Commission has published a Proposal for a Directive of the European Parliament and of the Council amending Directive 2009/138/EC (Solvency III), COM(2021) 581 final.

46 Directive (EU) 2016/97 of the European Parliament and of the Council of 20 Jan. 2016 on insurance distribution.

47 A. CAPPIELLO, 1. *AJEBA* 2020, pp 2-3; M. ELING & M. LEHMANN, 43. *Geneva Pap* 2018, pp 371-372; E. BERTHELÉ, in *Big Data*, pp 155-157.

12. Regulatory compliance is another key factor that might explain the contained enthusiasm of European insurance companies in BDA. While rules on new technologies, as we will see in section 6, are still in flux,⁴⁸ consumer insurance in Europe is a highly regulated field, both at the domestic and at the EU level. What matters most, as we will see in the next section, is not only special legislation covering licencing, risk selection, underwriting and supervision of insurance companies, but also (if not especially) general legislation on anti-discrimination and data protection in B2C contracting.

5. Current Regulatory Burdens

13. When discussing European regulatory hurdles for insurance companies, the primary reference is the Solvency II Directive.⁴⁹ The Directive requires from all insurance and reinsurance companies ‘to have in place an effective system of governance which provides for sound and prudent management of the business’ (Art. 41), to supervise third parties performing outsourced functions and activities (such as, e.g., data vendors) (Arts 38 and 49), and to implement internal processes and procedures to ensure the appropriateness, completeness and accuracy of the data used in the calculation of their technical provisions (Art. 82). It has been noted the data quality requirements under the Solvency II Directive constitute a strong limitation on the use of big data for actuarial purposes in the calculation of technical provisions, insofar as they constrain the use of proxy data as predictors (such as using credit reliability or ownership of an orange car as a predictor of careful driving) – that is, exactly the kind of correlation-based information that is usually obtained through BDA.⁵⁰

Solvency II requirements affect technical provisions only. As noted by the majority of commentators, the most serious limitations for the use of BDA in

48 The European Union has yet to adopt a regulatory binding text on new technologies, although on Apr. 2021 the Commission published a Proposal for a Regulation of the European Parliament and of the Council Laying down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act), COM/2021/206 final. Among the soft law texts available, see UNESCO, *Recommendation on the ethics of artificial intelligence* (2021), <https://unesdoc.unesco.org/ark:/48223/pf0000380455> and the HIGH-LEVEL EXPERT GROUP ON ARTIFICIAL INTELLIGENCE, *Ethics Guidelines for Trustworthy Artificial Intelligence* (2019), <https://digital-strategy.ec.europa.eu/en/library/ethics-guidelines-trustworthy-ai>.

49 Directive 2009/138/EC.

50 H. JEANNINGROS & L. MCFALL, *BD&Soc.* 2020, pp 4-5; R. VERBELEN, K. ANTONIO & G. CLAESKENS, *Unraveling the predictive power of telematics data in car insurance pricing*, 67. *J. Royal Stat. Soc’y: Series C (Applied Statistics) (Journal of Royal Statistical Society)* 2018(5), pp 1275-1304; E. BERTHELÉ, in *Big Data*, pp 134, 153.

insurance arise from other legal sources, most notably EU anti-discrimination and data protection laws⁵¹ (as implemented and often strengthened at the national level⁵²).

14. In the EU foundational treaties, non-discrimination is mentioned as a fundamental value of the European Union,⁵³ as an area of competence for EU institutions,⁵⁴ and as a human rights obligation upon EU Member States⁵⁵ (an obligation that largely corresponds to that imposed on EU Member States participating in the Council of Europe by Art. 14 of the 1950 European Convention of Human Rights and Fundamental Freedoms⁵⁶). Inasmuch as horizontal relationships are concerned, non-discrimination obligations are set forth, inter alia, by Directives 2000/43/EC (the so-called Race Equality Directive)⁵⁷ and 2004/113/EC (the so-called Gender Goods and Services Directive),⁵⁸ prohibiting both direct and indirect discrimination in the access to goods and services on the grounds of racial or ethnic origins and gender. While formally leaving the principle of freedom of contract untouched, EU anti-discrimination law thus forbids differentiated treatment in mass contracting whenever such differentiation is directly or indirectly

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- 51 B. PRAINSACK & I. VAN HOYWEGHEN, in *Shifting solidarities*, p 132; L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 41. *Pol'y Stud.* 2020, pp 447-467; J. FRICK, *RTDciv.* 2020, p 57; I.M. BARSAN, *RTDciv.* 2020, pp 58-61; G. MEYERS & I. VAN HOYWEGHEN, *BD&Soc.* 2020, pp 1-14; F. THOUVENIN, F. SUTER, D. GEORGE & R.H. WEBER, 'Big data in the insurance industry: Leeway and limits for individualising insurance contracts', 10. *JIPITEC (Journal of Intellectual Property, Information Technology and Electronic Commerce Law)* 2019(29), pp 209-243; L. DRECHSLER & J.C. BENITO SÁNCHEZ, 9. *Eur. J. L. & Tech.* 2018, pp 1-23.
- 52 For instance, in the field of non-discrimination, many countries include prohibited grounds in addition to those required by EU law: EUROPEAN COMMISSION, *A comparative analysis of non-discrimination law in Europe* (Brussels: European Union 2020), pp 11-15, <https://data.europa.eu/doi/10.2838/797667>.
- 53 Article 2, Treaty of the European Union (TEU).
- 54 Article 19, Treaty on the Functioning of the European Union (TFEU).
- 55 Article 21(1)-(2), European Union Charter of Fundamental Rights; Art. 23(1) of the same Charter protects equality between men and women. Yet, these provisions do 'not extend the field of application of Union law, and cannot be used as such to expand the prohibition of discrimination in access to goods and services to other grounds': L. DRECHSLER & J.C. BENITO SÁNCHEZ, 9. *Eur. J. L. & Tech.* 2018, p 6.
- 56 European Convention of Human Rights and Fundamental Freedoms on prohibition of discrimination. Within the Council of Europe, see also Art. 11 of the Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine, of 4 Apr. 1997 (Oviedo Convention), <https://rm.coe.int/168007cf98>, and Art. 4(1) of the Additional Protocol to the Convention on Human Rights and Biomedicine, concerning Genetic Testing for Health Purposes, of 27 Nov. 2008, <https://rm.coe.int/1680084824>.
- 57 Council Directive 2000/43/EC of 29 Jun. 2000 implementing the principle of equal treatment between persons irrespective of racial or ethnic origin, especially Art. 2.
- 58 Council Directive 2004/113/EC of 13 Dec. 2004 implementing the principle of equal treatment between men and women in the access to and supply of goods and services, especially Arts 4-5.

based on certain protected characteristics. Thus, an insurance company's decision – whether based on BDA or not – to offer different prices and/or benefits for the same insurance products is considered discriminatory, and therefore prohibited, if it is taken ‘on the basis of’ customers’ race, ethnicity or gender (direct discrimination) or if it has a disproportionate impact on a group of people defined by a prohibited ground without an objective and appropriate justification (indirect discrimination).⁵⁹ When it comes to BDA, complying with this requirement becomes particularly tricky, because of the very well-known risk of BDA to ‘discriminate by proxy’.⁶⁰ Discrimination by proxy means that often BDA leads to the automated discovery of predictive characteristics that apparently have no connection with protected grounds, and yet are correlated to them in a more or less straightforward manner. Let us take the case of gender as a variable for determining the price of behaviour-based motor insurance policy. It is clear, as stated by the Court of Justice of the EU in its famous *Test-Achats* decision,⁶¹ that insurance companies should not consider gender as a factor in determining premiums. However, eliminating the ‘gender’ component from the data collected by the car insurance company and mandating the data processing algorithm to not take into account gender-related results are no guarantee that gender will be ruled out as a relevant variable. Quite certainly the opposite will occur: the algorithm will detect gender by assessing neutral information within the dataset – such as geolocational data or driving habits – and will propose some proxies that, although not framed in terms of gender, actually stand for the prohibited variable.⁶² The tendency of BDA to discriminate by proxy thus works as a potential obstacle to its wide use by insurance companies.

15. Additional problems arise from European data protection laws, and in particular from the General Data Protection Regulation (GDPR),⁶³ which sets forth the conditions for the processing of personal data (that is, data relating to an identified or

59 B. MCGURK, *Data Profiling*, pp 69-74; L. DRECHSLER & J.C. BENITO SÁNCHEZ, 9. *Eur. J. L. & Tech.* 2018, pp 5-6; see also the seminal decision *Test-Achats* by the Court of Justice of the European Union, prohibiting differential treatment of male and female policyholders when calculating premiums and benefits for insurance contracts: CJEU, Case C-236/09, *Association belge des Consommateurs Test-Achats v. Conseil des ministres*, 1 Mar. 2011.

60 A.E.R. PRINCE & D. SCHWARCZ, ‘Proxy Discrimination in the Age of Artificial Intelligence and Big Data’, 105. *Iowa L. Rev. (Iowa Law Review)* 2020, pp 1257-1318; L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 41. *Pol’y Stud.* 2020, pp 455-456; L. DRECHSLER & J.C. BENITO SÁNCHEZ, 9. *Eur. J. L. & Tech.* 2018, pp 3, 6-7, 11, 12-14; R. SWEDLOFF, 21. *Conn. Ins. L. J.* 2014, pp 339-374.

61 CJEU, Case C-236/09, *supra* n. 59.

62 R. VERBELEN, K. ANTONIO & G. CLAESKENS, 67. *J. Royal Stat. Soc’y* 2018, p 1295. For similar observations with regard to other prohibited variables, A.E.R. PRINCE & D. SCHWARCZ, 105. *Iowa L. Rev.* 2020, pp 1275-1276; L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 41. *Pol’y Stud.* 2020, pp 455-456; L. DRECHSLER & J.C. BENITO SÁNCHEZ, 9. *Eur. J. L. & Tech.* 2018, pp 3, 6-7, 11, 12-14; B. MCGURK, *Data Profiling*, pp 54-55.

63 Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 Apr. 2016 on the protection of natural persons with regard to the processing of personal data and on the free

identifiable person). The GDPR is informed by the so-called ‘notice-and-consent’ approach, that is, the idea that individuals should be endowed with adequate means to exercise their autonomy and individual choice over any processing concerning their personal data.⁶⁴ Insurance companies are therefore allowed to process the personal data of their customers and clients under the conditions set forth by Article 6(1) GDPR, which include first and foremost the data subject’s consent (lit (a)), but also other grounds, such as the need of processing in the performance or for the conclusion of a contract (lit (b)) and the legitimate interests of the insurance company itself (lit (f)). Insurance companies are also allowed to process the data of their customers and clients which fall within the special categories as defined in Article 9(1) GDPR (e.g., data revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, genetic data, biometric data, data concerning health or data concerning a natural person’s sex life or sexual orientation) whenever there exists a ground for legitimate processing under Article 9(2) GDPR, such as the explicit consent by the data subject (lit (a)) or archiving and statistical purposes (lit (j)). In processing personal data (including special categories of data), insurance companies have to comply with the general principles set forth by Article 5(1) GDPR, such as the principles of fairness and transparency, purpose limitation, data minimization and storage limitation (lit (a), (b), (c), (e)). Moreover, insurance companies must also adequately inform customers of their rights under Articles 15 to 22 GDPR (i.e., right to access, rectification, erasure, restriction, data portability and objection) and facilitate the exercise of these rights by the customers.⁶⁵ Finally, insurers shall comply with the general prohibition of automated profiling and automated decision-making (ADM) set forth in Article 22(1) GDPR, according to which ‘[t]he data subject shall have the right not to be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her’. The prohibition has a limited scope of application, insofar as it does not cover cases in which ADM is used in combination with relevant human involvement or does not produce legal effects or in any way significantly affects the persons

movement of such data (General Data Protection Regulation - GDPR). The right of protection of personal data is also set forth by Art. 8 of the European Union Charter of Fundamental Rights.

64 See for all, A. MANTELERO, ‘The Future of Consumer Data Protection in the E.U. Re-Thinking the “Notice and Consent” Paradigm in the New Era of Predictive Analytics’, 30. *Comp. L. & Sec. Rev. (Computer Law & Security Review)* 2014(6), pp 643-660, <https://doi.org/10.1016/j.clsr.2014.09.004>.

65 Article 12 GDPR (1)-(3). Most notably, Art. 15(1), lit (h), GDPR confers data subjects the right to request information about ‘the existence of automated decision-making, including profiling, referred to in Article 22(1) and (4) and, at least in those cases, meaningful information about the logic involved, as well as the significance and the envisaged consequences of such processing for the data subject’.

involved,⁶⁶ and further does not apply whenever automated data processing ‘is authorised by Union or Member State law to which the controller is subject’, or ‘is necessary for entering into, or performance of, a contract between the data subject and a data controller’, or ‘is based on the data subject’s explicit consent’ (under Art. 22(2) GDPR, lit (b), (a), (c)). Yet, in the latter two cases just mentioned, the data controller (that is, in our case, the insurance company) shall nevertheless implement suitable measures to safeguard the data subject’s rights, including ‘the right to obtain human intervention on the part of the controller, to express his or her point of view and to contest the decision’ (Art. 22(3) GDPR).⁶⁷

As the above makes clear, GDPR provisions raise several problems for insurers. Insurance companies wishing to automatically process data obtained from their customers for the purpose of customizing offers and/or services, must be ready to comply with the safeguards and informational requirements set forth by Article 22 GDPR – a task that gets harder as the processing algorithm becomes more complex, smart and autonomous.⁶⁸ The above requirements become more burdensome whenever insurance companies plan to run BDA upon data that have been collected for purposes other than contractual customization (e.g., data on treatments and therapies collected for billing and reimbursement purposes). According to the GDPR, insurance companies cannot reuse data originally collected for other purposes unless they inform the data subjects accordingly and obtain their consent.⁶⁹ While informing their customers about such repurposing should not be a problem for insurance companies, ‘it might be difficult or even impossible [...] to comply with this requirement if their analysis includes data about individuals who are not their customers’.⁷⁰ Reuse of data might be additionally impaired by virtue of the principles of data minimization and storage limitation, which in principle require insurance companies to retain only the data that are necessary for their activity and only for the period necessary for the initial purpose of the processing. In other words, unless reuse is explicitly allowed, the data, once

66 To avoid the application of Art. 22 GDPR it is necessary that the human being involved is able to influence the final outcome of the decision: ARTICLE 29 DATA PROTECTION WORKING PARTY, *Guidelines on Automated individual Decision-Making and Profiling for the Purposes of Regulation 2016/679* (6 Feb. 2018), 17/EN, pp 8-9, 19-20, <https://ec.europa.eu/newsroom/article29/items/612053>; with specific regard to ADM in insurance, see I.M. BARSAN, *RTDciv.* 2020, p 60; L. DRECHSLER & J. C. BENITO SÁNCHEZ, 9. *Eur. J. L. & Tech.* 2018, p 10; B. MCGURK, *Data Profiling*, pp 196-198.

67 There exists a heated debate as to whether this provision, eventually combined with Art. 15(1), lit (h), GDPR, provides for a right to explanation of automated decision-making: see for all M. BRKAN, ‘Do algorithms rule the world? Algorithmic decision-making and data protection in the framework of the GDPR and beyond’, 27. *Int’l J. L. & Infor. Tech. (International Journal of Law & Information Technology)* 2019, pp 91, 112-118.

68 I.M. BARSAN, *RTDciv.* 2020, pp 60-61; F. THOUVENIN, F. SUTER, D. GEORGE & R.H. WEBER, 10. *JIPITEC* 2019, p 229; B. MCGURK, *Data Profiling*, pp 196-198.

69 EIOPA, *Big Data Analytics*, p 56; F. THOUVENIN, F. SUTER, D. GEORGE & R.H. WEBER, 10. *JIPITEC* 2019, p 229.

70 F. THOUVENIN, F. SUTER, D. GEORGE & R.H. WEBER, 10. *JIPITEC* 2019, p 229.

used, have to be deleted and are lost for future analysis.⁷¹ At least on paper, the GDPR principles of transparency, purpose limitation, data minimization and storage limitation thus appear to clash with the core idea of BDA to gain new insights from existing data.⁷²

6. Prospective Legal Safeguards

16. Neither the EU anti-discrimination directives nor the GDPR were specifically conceived for a world of BDA contracting. Yet, from the GDPR in particular, as well as from the emerging European legal frameworks devoted to AI,⁷³ one can derive vague but increasingly defined principles (of fairness, transparency, explainability, accuracy, accountability) that might help shed light on what insurance companies can and cannot do through BDA. Of these principles, two are of utmost relevance for algorithmic insurance and mass customization: fairness and transparency.⁷⁴

17. Let us start with fairness. Among its many nuances as an open concept, algorithmic fairness includes the need to avoid biases that could ‘lead to unintended (in)direct prejudice and discrimination against certain groups or people, potentially exacerbating prejudice and marginalisation’.⁷⁵ In continuity with EU anti-discrimination legislation, but in broader terms, the idea of algorithmic fairness aims to ensure both that people are treated equally as far as they possess equal characteristics and that people are not treated differently because of characteristics that are not fair to take into consideration when contracting.⁷⁶

This is very important with regard to BDA because of its unavoidable tendency to spot regularities from non-sensitive variables, to draw often hard-to-explain correlations and to produce results that invisibly ‘discriminate by proxy’.⁷⁷ What was said in the previous section about gender, race and ethnicity could

71 F. THOUVENIN, F. SUTER, D. GEORGE & R.H. WEBER, 10. *JIPITEC* 2019, pp 229-230; B. MCGURK, *Data Profiling*, pp 57-58.

72 I.M. BARSAN, *RTDciv.* 2020, p 61; F. THOUVENIN, F. SUTER, D. GEORGE & R.H. WEBER, 10. *JIPITEC* 2019, pp 229-230.

73 See for instance the Proposal by the European Commission quoted *supra* n. 48, and HIGH-LEVEL EXPERT GROUP, *Ethics Guidelines*; but see also EIOPA’S CONSULTATIVE EXPERT GROUP, *Artificial Intelligence Governance Principles*. On the slow but steady emergence of these principles, see for all M. EBERS, ‘Regulating AI and Robotics: Ethical and Legal Challenges’, in M. EBERS & S. NAVAS NAVARRO (eds), *Algorithms and Law* (Cambridge: CUP 2020), pp 37-99; L. FLORIDI, ‘Establishing the rules for building trustworthy AI’, 1. *Nature Machine Intelligence* 2019, pp 261-262.

74 See also EIOPA, *Big Data Analytics*, p 42.

75 HIGH-LEVEL EXPERT GROUP, *Ethics Guidelines*, p 18; see also EIOPA’S CONSULTATIVE EXPERT GROUP, *Artificial Intelligence Governance Principles*, pp 21-39.

76 S. WACHTER, B. MITTELSTADT, C. RUSSELL, ‘Why fairness cannot be automated: Bridging the gap between EU non-discrimination law and AI’, 41. *Comp. L. & Sec. Rev.* 2021, DOI: doi.org/10.1016/j.clsr.2021.105567.

77 See the authors quoted *supra* n. 60.

actually apply to any other variable that might be challenged as an unfair basis for a contractual determination, such as genetics, biometric and health data, political opinions, religious beliefs, and other features fitting the special category of data under Article 9(1) GDPR.⁷⁸ Given the discriminatory potential of BDA, insurance companies should in principle verify – both before and after data processing – that the variables and criteria highlighted do not stand as proxies for unfair grounds, and discard any variable and criteria that might be a source of unfair discrimination.⁷⁹ Such a task is however complicated by the fact that BDA typically works through correlation-based information the origins of which cannot be easily explained in causal terms. As a result, in order to comply with the requirement of algorithmic fairness, insurance companies adopting BDA would be required to discard not only variables and criteria that are associated with (prohibited or) unfair traits, but also any variable and criteria for which there is no plausible causal link with a clearly identifiable risk or hazard, insofar as they might invisibly convey algorithmic unfairness.⁸⁰

18. Besides being tested by those who design and use BDA, algorithmic unfairness should be verifiable by those who are exposed to it. This is what transparency is for. A pillar of the GDPR,⁸¹ transparency is also a (quite indeterminate albeit) fundamental principle of algorithmic processing.⁸² Algorithmic transparency might be referred to as the openness of the internal properties of algorithmic processing (e.g., the source code, the parameters used, the weights learned by a neural network); yet this meaning of transparency clashes both with the proprietary regimes of corporate secrecy often applying to BDA⁸³ and with people’s general illiteracy of

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- 78 A.E.R. PRINCE & D. SCHWARCZ, 105. *Iowa L. Rev.* 2020, pp 1275–1276; L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 41. *Pol’y Stud.* 2020, pp 455–456; L. DRECHSLER & J.C. BENITO SÁNCHEZ, 9. *Eur. J. L. & Tech.* 2018, pp 3, 6–7, 11, 12–14; B. MCGURK, *Data Profiling*, pp 54–55. Thanks to BDA’s ability to spot regularities and discover correlations, any processing of personal data might quickly turn into a processing of special categories of personal data pursuant to Art. 9(1) GDPR: L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 41. *Pol’y Stud.* 2020, p 455.
- 79 A.E.R. PRINCE & D. SCHWARCZ, 105. *Iowa L. Rev.* 2020, p 1316; H. JEANNINGROS & L. MCFALL, *BD&Soc.* 2020, pp 4–5; L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 41. *Pol’y Stud.* 2020, pp 455–456; B. MCGURK, *Data Profiling*, pp 54–55.
- 80 See the authors quoted *supra* n. 79.
- 81 See in particular Art. 5(1), lit (a) and Recital 39 of the GDPR. Transparency also informs the right of the individual to receive adequate information regarding the processing of personal data under Arts 12–22 GDPR.
- 82 HIGH-LEVEL EXPERT GROUP, *Ethics Guidelines*, p 18; see also EIOPA’S CONSULTATIVE EXPERT GROUP, *Artificial Intelligence Governance Principles*, pp 40–47. As a general principle of algorithmic processing, transparency goes beyond the right of explanation (allegedly) contained in the GDPR: see *supra* n. 67.
- 83 M. BRKAN & G. BONNET, ‘Legal and Technical Feasibility of the GDPR’s Quest for Explanation of Algorithmic Decisions: of Black Boxes, White Boxes and Fata Morganas’, 11. *Eur. J. Risk Reg. (European Journal of Risk Regulation)* 2020, pp 18, 38–46; with specific regard to insurance, IAIS, *Issues Paper*, p 11; L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 41. *Pol’y Stud.* 2020, p 454.

coding, programming and computer science.⁸⁴ Most commonly, transparency is understood in a different way, as requiring interpretability and explainability of the algorithmic processing and its results: the involved subjects must be informed, in clear and comprehensible terms, about the basic logic underlying algorithmic processing, and about the reasons underpinning its outcomes.⁸⁵ Thus framed, transparency nevertheless raises technical problems concerning the shape, size and scope of the information and explanations to be offered to its addressees.⁸⁶ These problems become particularly acute whenever BDA involves black-boxes and unsupervised self-learning systems. The more complex and autonomous an algorithm is, the harder it is, even for experts, to understand its internal working, not to mention to explain its conclusions and predictions.⁸⁷ This takes us back to the conundrum just mentioned with regard to algorithmic unfairness: in a highly regulated world such as that of insurance, any variable, criteria or correlation that cannot be explained as causally related to a known risk or hazard cannot be explained and therefore cannot be used.⁸⁸ No wonder European insurance companies are overly cautious in turning to BDA.

7. Algorithmic Mass Customization and Its Perils

19. All the above calls for a reassessment of the perils that BDA poses to the European insurance sector. As we saw, the risks (and opportunities) associated with the idea of automated personalization of prices, continuous (self-)monitoring and real-time adjustment of contractual terms are for the time being more imagined than real, especially outside the field of telematic insurance. A number of technical, institutional, epistemic, economic and legal factors constrain the highly disruptive potential of BDA on European insurance's core business.

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- 84 M. INFANTINO & W. WANG, 'Algorithmic Torts: A Prospective Comparative Overview', 28. *Transnat'l L. & Contemp. Probs. (Transnational Law & Contemporary Problems)* 2019, pp 309, 318; A.D. SELBST & S. BAROCAS, 'The Intuitive Appeal of Explainable Machines', 87. *Fordham L. Rev. (Fordham Law Review)* 2018, pp 1087, 1093-1094; with specific regard to insurance, L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 41. *Pol'y Stud.* 2020, p 454.
- 85 HIGH-LEVEL EXPERT GROUP, *Ethics Guidelines*, p 18; see also with regard to transparency in insurance ADM, EIOPA'S CONSULTATIVE EXPERT GROUP, *Artificial Intelligence Governance Principles*, pp 41-45; L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 41. *Pol'y Stud.* 2020, p 454; L. DRECHSLER & J.C. BENITO SÁNCHEZ, 9. *Eur. J. L. & Tech.* 2018, pp 4-5; F. PICARD, in *Big Data*, p 96.
- 86 See for all, M. BRKAN & G. BONNET, 11. *Eur. J. Risk Reg.* 2020, pp 33-38.
- 87 M. INFANTINO & W. WANG, 28. *Transnat'l L. & Contemp. Probs.* 2019, p 318; A.D. SELBST & S. BAROCAS, 87. *Fordham L. Rev.* 2018, pp 1094-1096; with specific regard to insurance, IAIS, *Issues Paper*, p 11; L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 41. *Pol'y Stud.* 2020, p 454; I.M. BARSAN, *RTDciv.* 2020, pp 60-61; F. THOUVENIN, F. SUTER, D. GEORGE & R.H. WEBER, 10. *JIPITEC* 2019, p 229.
- 88 A.E.R. PRINCE & D. SCHWARCZ, 105. *Iowa L. Rev.* 2020, p 1316; H. JEANNINGROS & L. MCFALL, *BD&Soc.* 2020, pp 4-5; L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 41. *Pol'y Stud.* 2020, pp 455-456.

Yet, this does not exclude the possibility that BDA is affecting insurance life-cycles in a variety of ways, raising new problems and exacerbating old ones. In telematic insurance, behaviour-based tracking is increasingly being incorporated into existing policies. Outside the field of telematic insurance, the use of BDA is growing especially in online advertisement and product offering, which might be designed and framed through choice architecture, legal design, and selective highlighting to exploit potential customers' biases, weakness and emotions, and target them in a way, time, and manner that make them most prone to enter into an agreement.⁸⁹ In the (still few) sectors in which consumers tend to buy insurance products and services online, underwriting might be automated as well.⁹⁰ Some insurance companies have developed or are developing apps to offer assistance and automated claim reporting, claim management and settlement.⁹¹ The result is a trend towards mass customization of the pre-contractual and post-contractual management phases, and further depersonalization of the insurance-customer relationship.⁹²

20. While such a trend might bear little resemblance to nightmares of insurance-led surveillance capitalism often reported in the United States,⁹³ it remains problematic in many respects. We saw in section 5 that current European law ensures, inter alia, that consumers consent to the processing of their personal data, are informed about the (algorithmic) use and purposes of data processing, and are not discriminated against on the basis of their gender, race or ethnicity. The practical application of such rules, however, is fraught with difficulties.

The notice-and-consent approach upon which the GDPR relies suffers from well-known limitations. Besides being ill-suited to address societal harms such as those deriving from practices of algorithmic discrimination and social sorting,⁹⁴ the notice-and-consent approach is oblivious of the fact that people rarely read (and, if obliged to read, rarely understand) the disclosures they are offered, and are generally prone to consenting to any processing of their data.⁹⁵ Even when they might read, understand and doubt, consumers often have no real opportunity to opt

89 P. TERESZKIEWICZ & K. POŁUDNIAK-GIERZ, 9. *Risks* 2021, pp 2-11 (also noting that such practices could be reviewed against the Directive 2005/29/EC concerning unfair business-to-consumer commercial practices in the internal market); see also EIOPA'S CONSULTATIVE EXPERT GROUP, *Artificial Intelligence Governance Principles*, pp 28-37; EIOPA, *Big Data Analytics*, p 6; IAIS, *Issues Paper on Increasing Digitalization*, p 16.

90 EIOPA'S CONSULTATIVE EXPERT GROUP, *Artificial Intelligence Governance Principles*, pp 7, 10, 47; EIOPA, *Big Data Analytics*, p 6; M. ELING & M. LEHMANN, 43. *Geneva Pap* 2018, pp 366-370.

91 EIOPA, *Big Data Analytics*, p 6; see also I.M. BARSAN, *RTD Civ.* 2020, p 59; M. ELING & M. LEHMANN, 43. *Geneva Pap* 2018, pp 366-370.

92 A. CAPPIELLO, 1. *AJEBA* 2020, p 9.

93 Compare S. ZUBOFF, *The Age of Surveillance Capitalism*, pp 200-206; C. O'NEIL, *Weapons*, pp 161-178.

94 L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 41. *Pol'y Stud.* 2020, pp 457-458.

95 See the authors quoted *supra* n. 35.

out of data treatment, insofar as such a choice would in most cases result in denial of services.⁹⁶ True, after a person gives her consent, the GDPR confers her with many rights, including the right (in cases fitting the factual requirements set forth by Article 22 GDPR) of requesting information about ‘the existence of automated decision-making, [...] and [...] about the logic involved, as well as the significance and the envisaged consequences of such processing for the data subject’ (Art. 15(1), lit h, GDPR). This, it is said, enables consumers to uncover automated discrimination (for instance, by a pricing algorithm) and to obtain evidence establishing that an algorithmic decision is based on protected grounds.⁹⁷

Such a reading is quite optimistic and largely out of touch with reality. It assumes that individual consumers are in a condition of reacting – that is, that they have the time, the resources, and the willingness to ask for explanations, to interpret them, to assess whether there has been a difference in treatment on the basis of prohibited grounds, and to build up a persuasive argument about automated discriminatory effects vis-à-vis other categories for no legitimate reason.⁹⁸ It is pretty clear that, besides supervisors,⁹⁹ only truly motivated people and specifically dedicated associations, such as the ones that under Article 80 GDPR can be mandated to lodge complaints on behalf of multiple persons, might be able to engage in such a fight.¹⁰⁰

Even before that, the above optimistic reading implies that consumers have the awareness to suspect that something is wrong with what is offered or given to them. But ‘that’s the thing about being targeted by an algorithm: you get a sense of a pattern in the digital noise, an electronic eye turned toward you, but you can’t put your finger on exactly what’s amiss’.¹⁰¹ What characterizes automated discrimination, making it more subtle, intangible and difficult to detect than traditional forms of discrimination, is that it relies on BDA-based ‘collectives’ that people might not associate with, and might not even perceive to be wrongly attributed to them. For people who are not in the condition to recognize themselves as part of a social ‘group’ that is discriminated against, it might be almost impossible to see and address biases having implications on algorithmic fairness.¹⁰²

96 L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 41. *Pol’y Stud.* 2020, p 457.

97 L. DRECHSLER & J.C. BENITO SÁNCHEZ, 9. *Eur. J. L. & Tech.* 2018, p 12.

98 L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 41. *Pol’y Stud.* 2020, p 458.

99 IAIS, *Issues Paper*, pp 31-39, 49.

100 L. DRECHSLER & J.C. BENITO SÁNCHEZ, 9. *Eur. J. L. & Tech.* 2018, p 14.

101 V. EUBANKS, *Automating Inequality*, p 5.

102 B. PRINSACK & I. VAN HOYWEGHEN, in *Shifting solidarities*, pp 137, 141-142; L. MARELLI, E. LIEVEVROUW & I. VAN HOYWEGHEN, 41. *Pol’y Stud.* 2020, p 458; L. MCFALL & L. MOOR, 19. *Distinktion* 2018, p 208.

8. Conclusion

21. Although much of current literature and debates on automated personalization in the insurance sector embrace ‘scenarios of intensely surveillant, personalised insurance use cases [...] as ubiquitous, nearly present, already unavoidable, now’,¹⁰³ this article tried to demonstrate that, in today’s Europe, such insurance imaginary has yet to occur.¹⁰⁴ This is partly due to some fundamental misconceptions about the very ‘promise of personalization’¹⁰⁵ brought about by the growing reliance of insurance companies on BDA – a promise that should be more properly understood as involving mass customization and automation of certain aspects of B2C insurance contracts. In part, insurance experimentations with BDA are dependent upon many institutional, epistemic, economic and legal factors that make a paradigmatic shift in the insurance approach to customer segmentation quite unlikely in the short-term.

22. All the above however does not mean that everything is fine for European consumers. Even though real-time, behaviour-based insurance is for the time being limited to the field of telemetric motor insurance, the increasing information and means of control that insurance companies are able to rely on when dealing with their potential and actual customers open up the possibility for new forms of aggressive advertising, behaviour manipulation, price discrimination, financial exclusion, and other more or less unintended effects of mass (self-)measurement of society. Moreover, the automation and algorithmization of many contractual phases – from advertising to execution, from customer care to claim management – multiply the difficulties faced by consumers in discovering whether and why something went wrong, in finding evidence about what happened, and in complaining about it, as anyone who has tried to reason with a chatbot or to interact with an automated call centre knows very well. In other words, the use of BDA in European consumer insurance might be far away from provoking the dystopian scenarios envisaged by much (mostly non-European) literature on automated personalization. Yet, BDA might entail its own quiet revolution, the hardly visible dangers of which deserve further attention and action.

103 L. McFALL, G. MEYERS & I. VAN HOYWEGHEN, *BD&Soc.* 2020, p 6.

104 L. McFALL, G. MEYERS & I. VAN HOYWEGHEN, *BD&Soc.* 2020, p 6; L. BARRY & A. CHARPENTIER, *BD&Soc.* 2020, p 9; L. McFALL & L. MOOR, 19. *Distinktion* 2018, p 197.

105 L. BARRY & A. CHARPENTIER, *BD&Soc.* 2020, p 6.