

# ALGORITHMIC DECISION MAKING FOR THE BENEFIT OF CONSUMERS

Position Paper of the Federation of German Consumer Organisations (vzbv) - Executive Summary

## RESULTS

In more and more areas of life, (self-learning) algorithmic<sup>1</sup> decision-making systems (ADM systems) are used to make automated decisions about consumers or prepare these. These include decisions that are predominantly based on automated processing, such as determining a credit score, where the final decision made by the bank employee is often only a formality. ADM systems can have a huge impact on individuals and society as a whole but are often a complete mystery to outsiders (black boxes). Nevertheless, compliance with and enforcement of legal provisions has to be ensured – even in a world of self-learning algorithms – so that their opportunities can be seized and the risks mitigated. Possible risks include, among others, the risk of discrimination and the risk of consumers being misled.

To this end, a government-approved control system needs to be established with the aim of minimising the risks of relevant ADM processes. This system needs to be multi-layered and not anchored in only one organisation. It must incorporate multiple elements (e.g. obligations on the part of operators, certification schemes, supervisory authorities, etc.) that, together, ensure adequate control. Not all ADM systems require the same degree of control and regulation. The ADM systems that should be subject to regulation are those that have a significant impact on society and have the potential to cause harm or damage to individuals and/or society. The first step is to ascertain whether an ADM system is deemed relevant ('IF'). If it is relevant, the appropriate, case-specific regulatory instruments then can be determined ('HOW'). The approach chosen should be risk-based, i.e. an increased potential for risks has to be met with a greater degree of intervention through regulatory instruments (see diagram 1). Depending on the level of risk, obligations need to be imposed on operators of relevant ADM processes, such as transparency rules, logging requirements, ADM impact assessments and audits/certification. Notwithstanding these obligations, supervisory authorities forming part of the control system must always have the authorisation to comprehensively inspect ADM systems and verify them in detail ('content control'). This would not reveal trade and business secrets because a comprehensive, government-approved control system is obliged to treat information as confidential.

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<sup>1</sup>An algorithm is simply an instruction on what to do. It can be defined and executed using either digital or analogue means. Examples include road traffic regulations and codified laws. See the interview with Sebastian Stiller in "Algorithmen treffen ins Mark der Macht." in: Politik & Kommunikation (2017), URL: <https://www.politik-kommunikation.de/ressorts/artikel/algorithmen-treffen-ins-mark-der-macht-93003943> [Accessed: 12 April 2019] and Zweig, Katharina: "Was ist ein Algorithmus?" in: AlgorithmWatch, URL: <https://algorithmwatch.org/publication/arbeitspapier-was-ist-ein-algorithmus/> [Accessed: 12 April 2019].

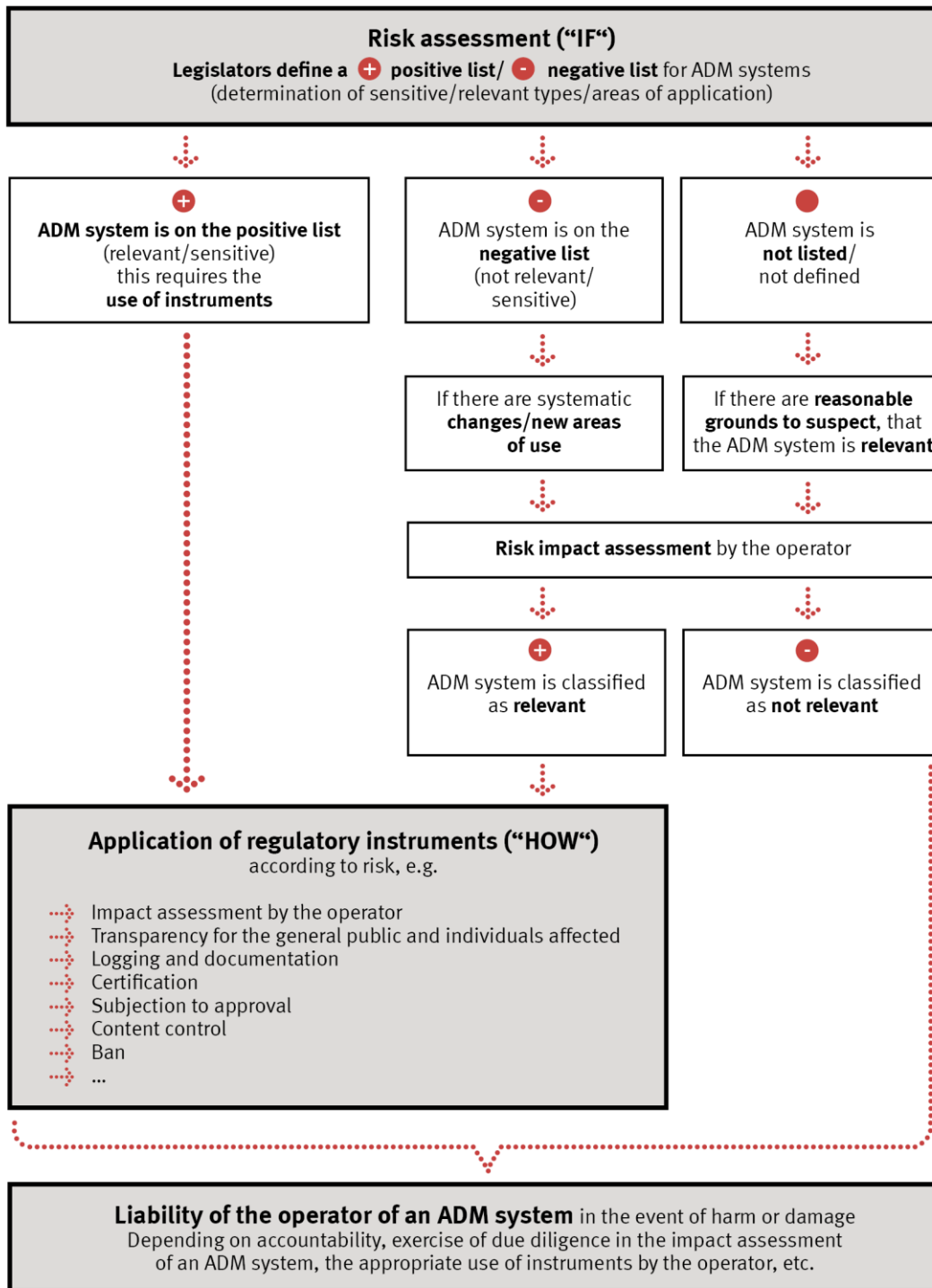


Figure 1: Risk assessment and application of regulatory instruments within the control system

vzbv's position: the main requirements for establishing an effective control system are set out below.

### **1. ESTABLISH A RISK ASSESSMENT FOR ADM SYSTEMS**

Drawing on a list of criteria and a system of verification, legislators need to define which ADM systems have high potential to cause harm or damage to individuals and/or society. The various areas/types of application need to be assigned to open positive and negative lists that are not definitive but do provide greater clarity for market participants.

### **2. CREATE TRANSPARENCY**

Transparency regarding the use and functioning of ADM systems needs to be established on two levels, firstly for the individuals affected and secondly for the general public. To this end, labelling and information obligations, a right to information and the obligation to publish a risk impact assessment need to be introduced, distinguishing between the target groups 'individuals affected' and 'general public'.

### **3. ENABLE CONTENT CONTROL**

ADM systems for use in particularly sensitive areas (such as healthcare or self-driving vehicles) need to undergo an ex ante control process, i.e. obtain approval before they are placed on the market.

The control system must also be able to conduct ex post checks on relevant ADM systems at any time. The operators of relevant ADM systems must be obliged to ensure, on an ongoing basis, that the ADM systems they employ comply with the existing legal framework. It must be possible, in particular for the competent supervisory authority, to review and verify the tests conducted by the operators. If the law has been broken the options available to the supervisory authorities must range from ordering modification of the ADM system to, as a last resort, an outright ban.

### **4. EXTEND THE SCOPE OF APPLICATION OF AUTOMATED INDIVIDUAL DECISION-MAKING**

The scope of application for automated individual decision-making (article 22 of the General Data Protection Regulation, GDPR) needs to be extended to cover not only decisions that are based solely on automated data processing but to cover also those based on predominantly automated data processing. To establish safeguards and reduce errors and risks in ADM systems, these systems must be required by law to only use data if it is pertinent to the decision being made. Automated data processing must be based on accepted mathematical-statistical methods. The method's suitability as a forecasting instrument and its validity and reliability must be scientifically proven.

### **5. ESTABLISH THE INSTITUTIONAL STRUCTURES**

Legislators need to provide the competent supervisory authorities with the necessary powers (e.g. right to obtain information, the right to inspect and access) so that they can scrutinise and evaluate these ADM systems and impose penalties if

case of law infringements. Also, a support unit endowed with technical and methodological expertise needs to be established that can assist the competent sector-specific supervisory authorities.

## 6. ENSURE TRANSPARENCY BY DESIGN OF ADM SYSTEMS

Mandatory standards for the technical design, logging, documentation and description of ADM systems are required so that it is possible to scrutinise them effectively (transparency by design). Operators of relevant ADM systems must be obliged to provide technical interfaces that the competent supervisory authorities can use to access the systems for the purpose of verifying their legality and checking for technical and methodological errors.

## 7. ADAPT LIABILITY RULES

Operators of relevant ADM systems need to be held strictly liable for harm or damage that occurs when a system has been used as intended by the consumer. When the product liability directive will be updated, it must cover harm and damage caused by ADM systems. The provisions in product liability legislation that govern attribution and burden of proof have to be amended in order to take into account that consumers can hardly prove an error or malfunctioning of complex, in-transparent ADM systems.

## GOLAS AND RELEVANCE FOR CONSUMERS

The growing use of ADM systems raises many new questions. They are increasingly being used to control processes and to prepare and/or make decisions about consumers. As a result, they have attracted much attention from politicians and legislators in recent years.

An ADM system is much more than just program code or an algorithm: "Algorithmic decision-making refers to the entire process from data collection, data analysis and evaluation and interpretation of the results through to the use of the results to deduct a decision or recommendation for a decision."<sup>2</sup> Typically ADM systems contain an algorithmic component (rule system) that makes a decision (output) about something on the basis of an input and expresses this decision in the form of a (numerical) value. They also include 'learning' systems that use machine learning to derive decision rules from data and adapt over time.<sup>3</sup> This working definition

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<sup>2</sup> See Vieth, Kilian; Wagner, Ben: "Teilhabe, ausgerechnet" (2017), URL: <https://www.bertelsmann-stiftung.de/de/publikationen/publikation/did/teilhabe-ausgerechnet> [Accessed: 16 April 2019]. Original citation in German.

<sup>3</sup> Compare Zweig and Krafft's definition of ADM systems: "Algorithmic decision-making systems (ADM systems) contain an algorithmic component that, based on an input, makes a decision about something, i.e. calculates a single value. If the algorithm was developed by experts, the ADM system is referred to as an expert system. There are also systems that use machine learning to independently derive the rule system from data." Zweig, Katharina; Krafft, Tobias: "Wie Gesellschaft algorithmischen Entscheidungen auf den Zahn fühlen kann", in: Mohabbat-Kar, Resa/Thapa, Basanta E.P./Parycek, Peter (Hrsg.): "(Un)berechenbar? Algorithmen und Automatisierung" in Staat und Gesellschaft, p. 471–492, Berlin, Kompetenzzentrum Öffentliche IT.

tends to also encompass systems referred to in the debate about artificial intelligence (AI).<sup>4</sup> ADM systems can have a huge impact on individuals and society as a whole and offer both risks and opportunities.<sup>5</sup> It is anticipated that the areas of life and the types of application for which these systems are used will continue to increase,<sup>6</sup> affecting how we live our lives, opportunities for participation in markets and society, consumer decisions and every individual's autonomy, as well as social life in general. This raises fundamental questions on matters such as discrimination against individuals or groups, loss of autonomy and self-determination of consumers.

Examples for the use of ADM systems include the (personalised) pricing of goods and services<sup>7</sup>, AI-based health advisors<sup>8</sup>, seat allocation on aeroplanes<sup>9</sup>, determination of individual credit risks, smart home applications, digital assistance systems<sup>10</sup>, financial portfolio management for retail investors<sup>11</sup> and self-driving vehicles.

vzbv published a discussion paper on algorithmic decision-making processes in 2017.<sup>12</sup> The aim was to contribute to the debate on this matter in relation to consumer policy. This position paper is the outcome of that debate and of two expert reports commissioned by vzbv in 2018.<sup>13</sup>

<sup>4</sup> They are also usually based on ADM systems, since AI tends to contain an algorithmic component on which the rule system is based and that is used to make decisions. AI often uses machine learning to derive the rule system from data (e.g. machine learning through neural networks) but may also contain fixed rule systems that experts have defined 'manually'. See Stanford Encyclopedia of Philosophy (as note 5) and Zweig, Katharina; Krafft, Tobias: "Transparenz und Nachvollziehbarkeit algorithmenbasierter Entscheidungsprozesse - Ein Regulierungsvorschlag aus sozioinformatischer Perspektive." Expert report commissioned by the Federation of German Consumer Organisations, p. 9.

<sup>5</sup> The use of ADM systems can increase inclusion, for example by lowering the cost of personalised offers and services (see "Automatisierte Finanzberatung - Wenn der Algorithmus das Vermögen verwaltet." in: Frankfurter Allgemeine Zeitung (2016), URL: <https://www.faz.net/aktuell/finanzen/fonds-mehr/automatisierte-finanzberatung-wenn-der-algorithmus-das-vermoegen-verwaltet-14384953.html> [Accessed: 16 April 2019]). The consistency of decisions can also be improved if ADM systems always make them in accordance with the same criteria and if human error resulting from personal perceptions and prejudices is reduced. However, this may often mean only the defined criteria are used, without incorporating any other ones, making it doubtful whether the persons affected can expect 'human' decisions to be made in one-off cases. The potential risks associated with ADM systems include security risks, threats to privacy, increased information asymmetry between consumers and companies, limited economic and social or participation of individuals and groups (e.g. discrimination), wrong decisions as a result of bias, and manipulation or unconscious influencing of individual decisions, for example by recommendation systems.

<sup>6</sup> An engagingly presented set of examples of the growing and diverse use of ADM systems can be found in "AlgorithmWatch: Automating Society – Taking Stock of Automated Decision-Making in the EU (2019), <https://algorithmwatch.org/en/automating-society/> [Accessed: 16 April 2019] and in Lischka, Konrad; Klingel, Anita. Bertelsmann Stiftung: "Wenn Maschinen Menschen bewerten." Working paper in: Bertelsmann Stiftung (2017), URL: <https://www.bertelsmann-stiftung.de/de/publikationen/publikation/did/wenn-maschinen-menschen-bewerten/> [Accessed: 04 March 2019].

<sup>7</sup> Welt.de: "Wer ein iPhone hat oder bei Chanel einkauft, zahlt bei Sixt mehr" (2019), URL: <https://www.welt.de/wirtschaft/article190490795/Sixt-Share-Wer-ein-iPhone-hat-zahlt-beim-Carsharing-mehr.html> [Accessed: 22 March 2019]

<sup>8</sup> See .Ada Health GmbH, URL: <https://ada.com/de/app/> [Accessed: 30 April 2019]

<sup>9</sup> Zweig, Katharina; Krafft, Tobias: "Transparenz und Nachvollziehbarkeit algorithmenbasierter Entscheidungsprozesse - Ein Regulierungsvorschlag aus sozioinformatischer Perspektive." Expert report commissioned by the Federation of German Consumer Organisations, p. 5.

<sup>10</sup> Such as Apple's Siri, Amazon's Alexa and Google Assistant.

<sup>11</sup> Frankfurter Allgemeine Zeitung (as note 5)

<sup>12</sup> Verbraucherzentrale Bundesverband: "Algorithmenbasierte Entscheidungsprozesse." Discussion paper published by the vzbv, URL: <https://www.vzbv.de/pressemitteilung/keine-diskriminierung-durch-blackbox-algorithmen> [Accessed 16 April 2019]

<sup>13</sup> Martini, Mario: "Grundlinien eines Kontrollsystems für algorithmenbasierte Entscheidungsprozesse." Expert report commissioned by the Federation of German Consumer Organisation (2018) Zweig, Katharina; Krafft, Tobias (as note. 10)

Even in a world of self-learning algorithms, the aim ADM regulation must be to ensure compliance with and enforcement of laws and regulations, such as in relation to non-discrimination laws as laid down in the EU Charter of fundamental rights, laws on fair trading, consumer protection or the protection of consumers' personal data. To this end, it must be possible for supervisory authorities to scrutinise and verify the legality of ADM systems so that they can impose penalties if the law is broken. It is also important to ensure consumers' self-determination when making decisions, to strengthen consumers' confidence in ADM systems by creating transparency and to foster competition and innovation.<sup>14</sup>

This is only possible if ADM systems can be scrutinised. That is why vzbv deems the following key questions as central and tries to address them:

- ❖ What parameters need to be in place to ensure that ADM systems are suitably comprehensible and transparent for the general public, consumers and supervisory authorities?
- ❖ How should a control system be designed so that ADM systems with relevance for society can be scrutinised effectively?
- ❖ What powers of control and intervention are needed in order to minimise the risks posed by ADM systems?
- ❖ What restrictions<sup>15</sup> on the use of ADM systems should be put in place, and in what contexts should the use of ADM systems be prohibited?

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<sup>14</sup> These objectives are not contradictory and often overlap (e.g. transparency about the use of personal data may strengthen competition because users switch to alternative suppliers that are more concerned about data protection).

<sup>15</sup> Examples: rules, subjection to approval and, as a last resort, bans on their use.