Challenges of a Digital Single Market from an Austrian perspective – towards Smart Regulations

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Abstract: This paper discusses various legal challenges of the "digitisation of the single market". The question arises to which extent the current regulatory framework appears suitable to deal with the presented challenges of digitisation and where additional regulation is required. In the field of autonomous decision-making by AI, we identified the most pressing need for new regulation. While the EU (and increasingly Austria, as well) is aware of this need, regulation to date remains scarce. Though the EU legislator has already taken specific precautions for the use of algorithms in the GDPR, such regulatory approaches are missing in most other fields of law. In contrast to this, antitrust law and product liability law already appear to be well suited to meet the challenges posed by digitisation. This is especially true for product liability law, which is in principle apt to cover the specific challenges of the convergence of software and hardware in smart products. However, uncertainty about its applicability to incorporeal goods would make clarification of current product liability legislation advisable – a view shared by the European Commission. Two more fields very recently received some legislative attention due to the changing needs of a digital society: the postal sector on the one hand, and e-government on the other hand. In both fields, new legislation – tellingly in the form of (partially) directly applicable regulations – has recently been passed by the EU – a sharp contrast to the case of self-learning AI. However, while the integration of the new regulation on cross-border parcel delivery will probably not pose major challenges for domestic markets, the implementation of the Single Digital Gateway will raise serious organisational and legal challenges for national administrations (especially when taking into account the limited success of the previous related initiative on the points of single contact under the Services Directive).

Keywords: Algorithms, Algorithm Awareness Project, Article 22 GDPR, Article 101 TFEU, Artificial Intelligence, automated decision-making, cartels, competition law, Digital Single Gateway, Digital Single Market, digital society, E-Government, European Commission, High-Level Expert Group on Artificial Intelligence, machine learning, postal services, product liability, smart regulation, software.

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I.   Introduction[1]

Increasing digitisation poses major challenges not only to the European Single Market, but to the European Union (EU) as a whole. Digitisation offers great opportunities on the one hand, while there is no question that it poses major economic and social challenges on the other hand.[2] As the "engine of (digital) integration",[3] the European Commission is endeavouring to find a general policy approach in the field of digitisation and to provide answers to urgent questions.[4] One of the central objectives of this approach is to preserve the competitiveness[5] of the internal market while respecting the values of the EU.[6]

The Commission takes various measures to achieve this objective. In some cases, it examines whether existing regulation is sufficient to meet the challenges of digitisation; in other cases the enactment of new, "smart" regulation is on the table.

This contribution is a collaboration between legal scholars from different disciplines and a data scientist. It was inspired by the authors' participation in a seminar organised by the Commission's DG Growth[7] which selected the topics according to internal priority. This selection of topics left the authors impressed as it clearly shows that the Commission is focusing on very different areas of law (public regulatory law, private law, administrative law) to meet the challenges of digitisation. While it is quite obvious that the increasing use of Artificial Intelligence (AI) may require new legal responses (2.) and that smart products are a challenge for product liability law (3.), it may at first sight come as a surprise that the EU recently adopted a new piece of postal legislation to promote the digitisation of the internal market (4.). However, we will show that this measure fits in well with the European Commission's strategy to develop the Digital Single Market. Even though the Digital Single Market is often associated with service providers only, the digital accessibility of the administration can make an important contribution to its establishment. In this respect, the European legislator has lately taken an important step by enacting a Regulation for a Single Digital Gateway (5.). It seems to the authors that the significance of this piece of legislation has not yet become fully visible to the public.

This paper aims to give an overview of the above mentioned topics (as selected by the Commission) and their potential legal implications, thus showing that the creation of a Single Digital Market covers far more areas than one might initially assume. It should also be pointed out that, despite digitisation being a European challenge, its implications cannot be analysed from an EU(ropean) perspective only. Country-specific legal requirements have to be taken into account as well. For this reason, some examples will be drawn from the Austrian legal system.

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[1]   Whenever the web address for a newspaper article is provided, the date of access is February 22nd, 2019.
[2]   According to *Harrie Temmink*, DG Growth, European Commission, at present the main challenges for the EU are "Digitisation", "Sustainability" and "Solidarity".
[3]   Commission, *A Digital Single Market Strategy for Europe* (Communication), COM (2015) 192 final.
[4]   Cf. for example Commission, *Artificial Intelligence for Europe* (Communication), COM (2018) 237 final.
[5]   Cf. to the EU's "need to catch up" in the area of AI, *AI, EU, go* THE ECONOMIST, Sept. 22, 2018, at 12.
[6]   Cf. COM (2018) 237 final.
[7]   This seminar took place in Brussels on October 18th, 2018 as a "Single Market Forum" on the topic "Legal issues of the Single Market and the challenges of digitization and digitalization".

Although the topics discussed are very diverse, one common link between them must not be overlooked: The suitable legal basis for the creation of a Digital Single Market will in most cases be provided by Art. 114 of the Treaty on the Functioning of the European Union (TFEU).[8]

II.   Machine-learning algorithms

A.   Definition, types and use cases

The first challenge for the Digital Single Market discussed in this paper is the increased use of autonomous decision making by machine-learning algorithms in all aspects of life. In contrast to conventional algorithms with a specified rule-based behaviour, these machine-learning algorithms are able to learn independently and act autonomously.[9] From a legal perspective, the handling of machine-learning algorithms and their ability of making increasingly autonomous decisions is still largely unclear. So far, there is no general codification concerning (autonomous) algorithms,[10] legislation which refers to them or regulates their use only exists to a very limited extent (see also sub-section 2.2. below).[11]

A major challenge in creating comprehensive legislation on algorithms is the rapid pace of technological development, which entails the risk of creating regulations that are outdated before even having entered into force. The difficulty of grasping this phenomenon starts with the fact that there is no uniform definition of machine-learning algorithms which could form the basis of a legal regulation. The exact meaning of the very broad term "algorithm" depends on the context in which it is used.[12]

Machine-learning algorithms are now in use throughout our life.[13] In contrast to deterministic algorithms, machine-learning algorithms learn autonomously based on a given (training) data set. This is to some extent comparable to the functioning of the human brain which "naturally" uses

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[8]   Cf. also Korte, *Art. 114 AEUV, in* EUV/AEUV, para 161 (Calliess and Ruffert ed., 5th ed. 2016). However, the limits set out in the jurisdiction of the CJEU (cf. in particular Case C-376/98 *Federal Republic of Germany v European Parliament and Council of the European Union,* ECLI:EU:C:2000:544   and Case C-380/03 *Federal Republic of Germany v European Parliament and Council of the European Union,* ECLI:EU:C:2006:772) must be observed.

[9]   Cf. Russell and Norvig, Artificial intelligence: A Modern Approach (3rd ed. global edition 2016).

[10]   Nevertheless, the question how AI could and should be regulated is already being widely discussed within the legal community. Reed, *How should we regulate artificial intelligence?,* 376 Philosophical Transactions of the Royal Society A (2018), https://doi.org/10.1098/rsta.2017.0360; Scherer, *Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies,* 29 Harvard Journal of Law & Technology 354 (2016); Yeung, *Algorithmic Regulation: A Critical Interrogation,* 12 Regulation & Governance 505 (2018).

[11]   Algorithms are mentioned explicitly in Sec 14 of the Austrian regulation on gambling machines (*Automatenglücksspielverordnung*). This provision refers to the use of an algorithm in the context of the determination of game results. Further examples in the Austrian legal system are Sec 11 of the Stock Exchange Act 2018 (*BörseG 2018*) and Sec 12 of the Federal Equal Treatment Act (*B-GlBG*). The German law professor *von Lewinski* recently attempted to arrange the punctually existing regulations of algorithmic law in the form of a matrix with the aim of bringing order into a new field of law (cf. von Lewinski, *Regulierungsbedarf und Regulierungsfelder von algorithmischen Systemen,* Zeitschrift für Innovations- und Technikrecht 168 [2018]).

[12]   Cf. different perspectives in Mohabbat Kar, Thapa and Parycek (ed.), *(Un)berechenbar? Algorithmen und Automatisierung in Staat und Gesellschaft* (2018) Fraunhofer-Institut für Offene Kommunikationssysteme FOKUS, Kompetenzzentrum Öffentliche IT https://nbn-resolving.org/urn:nbn:de:0168-ssoar-57518-2.

[13]   Cf. Makridakis, *The forthcoming Artificial Intelligence (AI) revolution: Its impact on society and firms,* 90 Futures 46 (2017).

knowledge it has learnt in the past to apply it to a new situation it is confronted with.[14] As a consequence, the reconstruction of the behaviour of machine-learning algorithms can be extremely challenging and is in most cases impossible.[15] Consequently, the term "black box" has been coined in this context since the person affected by the machine-learning algorithm knows the input data and the final result, but cannot understand how the algorithm has reached it.[16] Hence, the question arises who is responsible for its behaviour: (1) the developer, (2) the person who activated the algorithm or (3) the person delivering the (training) data set.

From a legal perspective, the use of machine-learning algorithms causes specific difficulties if such algorithms are used by the state to make decisions which interfere with the rights of individuals.[17] Whenever the state exercises sovereign action, the concept of rule of law obliges it to give reasons for a decision. An algorithm with an incomprehensible process of decision-making cannot adequately satisfy this obligation. Furthermore, the principle of legality (which is interpreted rather strictly in Austrian law) requires that executive authorities only act on the basis of a statutory authorisation. Since there are only very few explicit provisions on the use of algorithms both on EU and national level,[18] the Austrian state largely acts in a grey area when it comes to that topic.

Despite the lack of a comprehensive legal basis, many algorithms - both deterministic and machine-learning ones - are already in use today without the public being aware of it.[19] This is true for the state and the private sector, though the use of algorithms is certainly more widespread in

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[14]   Cf. Gruber and I. Eisenberger, *Wenn Fahrzeuge selbst lernen: Verkehrstechnische und rechtliche Herausforderungen durch Deep Learning? in* AUTONOMES FAHREN UND RECHT 51, 57 et seq. (I. Eisenberger, Lachmayer and G. Eisenberger ed., 2017); Russell and Norvig, *supra* note 9; LENZEN, KÜNSTLICHE INTELLIGENZ: WAS SIE KANN & WAS UNS ERWARTET 20 (2018).

[15]   Cf. Wahlster, *Künstliche Intelligenz als Grundlage autonomer Systeme,* 40 INFORMATIK-SPEKTRUM 409 (2017). For a detailed analysis of the accountability of algorithms cf. Kroll, Huey, Barocas, Felten, Reidenberg, Robinson and Yu, *Accountable Algorithms,* 165 UNIVERSITY OF PENNSYLVANIA LAW REVIEW 633 (2017). See also Ernst, *Die Gefährdung der individuellen Selbstentfaltung durch den privaten Einsatz von Algorithmen, in* DIGITALISIERUNG UND RECHT 65 (Klafki, Würkert and Winter ed., 2017): Due to the increasing complexity of algorithms and the amount of data algorithms are trained with, their functioning is becoming less understandable for third persons and particularly for users without technical know-how.

[16]   The very limited knowledge of European citizens about algorithms has been the subject of a recent survey by the German Bertelsmann Stiftung. Cf. Grzymek and Puntschuh (ed.), *Was Europa über Algorithmen weiß und denkt. Ergebnisse einer repräsentativen Bevölkerungsumfrage* (2019) Bertelsmann Stiftung https://www.bertelsmann-stiftung.de/fileadmin/files/BSt/Publikationen/GrauePublikationen/WasEuropaUEberAlgorithmenWeissUndDenkt.pdf. For analyses of the black box metaphor in context with AI cf. Bathaee, *The Artificial Intelligence Black Box and the Failure of Intent and Causation,* 31 HARVARD JOURNAL OF LAW & TECHNOLOGY 890 (2018); Guidotti, Monreale, Ruggieri, Turini, Pedreschi and Giannotti, *A Survey of Methods for Explaining Black Box Models,* 51 ACM COMPUTING SURVEYS (CSUR) 93 (2019); Kwong, *The Algorithm says you did it: The use of Black Box Algorithms to analyze complex DNA evidence,* 31 HARVARD JOURNAL OF LAW & TECHNOLOGY 275 (2017); Mühlbacher, Piringer, Gratzl, Sedlmair and Streit, *Opening the Black Box: Strategies for Increased User Involvement in Existing Algorithm Implementations,* 20 IEEE TRANSACTIONS ON VISUALIZATION AND COMPUTER GRAPHICS 1643 (2014).

[17]   Concerning the effects of the use of AI on human beings and their human rights in general cf. European Parliament resolution of 14 March 2017 on fundamental rights implications of big data: privacy, data protection, non-discrimination, security and law-enforcement [2018] OJ C263/82; Mortier, Haddadi, Henderson, Mcauley and Crowcroft, *Human-Data Interaction: The Human Face of the Data-Driven Society* (2014), available at https://haddadi.github.io/papers/HDIssrn.pdf; Raso, Hilligoss, Krishnamurthy, Bavitz and Kim, *Artificial Intelligence & Human Rights: Opportunities & Risks*, THE BERKMAN KLEIN CENTER FOR INTERNET & SOCIETY RESEARCH PUBLICATION SERIES (2018), available at https://cyber.harvard.edu/publication/2018/artificial-intelligence-human-rights.

[18]   Cf. *supra* note 11.

[19]   According to the IDC Data Age Study of 2017, humans currently have about 500 interactions with algorithms per day. This number will increase to 4700 per day by 2025. Cf. also AlgorithmWatch GmbH (ed.), *Automating Society. Taking Stock of Automated Decision-Making in the EU* (2019) Bertelsmann Stiftung https://www.bertelsmann-stiftung.de/fileadmin/files/BSt/Publikationen/GrauePublikationen/001-148_AW_EU-ADMreport_2801_2.pdf which shows that automated decisions have become part of everyday life in Europe.

the latter. Currently, AI is already implemented in e-government, e-business, e-commerce/e-shopping, e-library services, e-learning, e-tourism, e-resource services and e-group activities. Typically, machine-learning recommenders are designed to detect our preferences and to recommend news, products, webpages, trips etc.[20] These recommendations can result in echo chambers helping to spread misinformation as, for example, in the case of the BREXIT referendum.[21]

Algorithms have already been used in the public sector for some time. Only recently, however, an algorithmic system has been the topic of heated discussions in the Austrian media. Since the beginning of 2019, the Austrian Public Employment Service (AMS) has been using a machine-learning algorithm to divide job seekers into three categories based on general criteria without taking the individual circumstances of the job-seeker into account. This was criticized as a potential threat to certain groups: For example, women are generally rated more negatively in the evaluation of their job opportunities solely on the basis of their gender. The same applies to other structurally disadvantaged groups such as migrants and people with disabilities.[22]

"Predictive policing" is another example for the use of algorithms by state authorities:[23] The Austrian police uses algorithms to define zones in which there is an increased risk of burglary, thus preventing crimes of this kind more effectively.[24]

The use of machine-learning algorithms, in particular by the state, raises numerous fundamental legal questions. Regarding legislation, the question arises how accurately their use has to be regulated. As to the use of self-learning algorithms by the executive, the main questions focus on the limits of its admissibility. The assistance provided by private actors in the use of algorithms by the state, e.g. by training or by providing information to it,[25] raises further questions.

So far, neither EU law nor domestic law offer comprehensive answers to these and many other legal questions arising from the use of AI. At the European level, however, efforts are already being

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[20]   Cf. Lu, Wu, Mao, Wang and Zhang, *Recommender system application developments: a survey,* 74 DECISION SUPPORT SYSTEMS 12 (2015), available at https://opus.lib.uts.edu.au/handle/10453/35614.

[21]   Del Vicario, Zollo, Caldarelli, Scala and Quattrociocchi, *Mapping social dynamics on Facebook: The Brexit debate,* 50 SOCIAL NETWORKS 6 (2017), available at https://www.sciencedirect.com/science/article/pii/S0378873316304166?via%3Dihub.

[22]   Cf. Stuiber, *Volksanwaltschaft prüft AMS-Algorithmus,* DER STANDARD, Nov. 2, 2018, available at https://derstandard.at/2000090540950/Volksanwaltschaft-prueft-AMS-Algorithmus. Concerning possible ways to handle "Machine Bias" cf. von Lewinski, *supra* note 11, at 173.

[23]   Cf. Knobloch, *Vor die Lage kommen: Predictive Policing in Deutschland* (2018) Bertelsmann Stiftung https://www.bertelsmann-stiftung.de/fileadmin/files/BSt/Publikationen/GrauePublikationen/predictive.policing.pdf; McCarthy, *AI & Global Governance: Turning the Tide on Crime with Predictive Policing*, CENTRE FOR POLICY RESEARCH, UNITED NATIONS UNIVERSITY, Feb. 26, 2019, available at https://cpr.unu.edu/ai-global-governance-turning-the-tide-on-crime-with-predictive-policing.html; Selbst, *Disparate Impact in Big Data Policing,* 52 GEORGIA LAW REVIEW 109 (2017).

[24]   Cf. Al-Youssef and Sulzbacher, *Polizei nutzt Algorithmen, um Verbrechen vorherzusehen – Kritiker sehen "Aberglaube",* DER STANDARD, Nov. 3, 2018, available at https://derstandard.at/2000090545361/Polizei-nutzt-Algorithmen-um-Verbrechen-vorherzusehen-Kritiker-sehen-Aberglaube; van der Aalst, Bichler and Heinzl, *Responsible Data Science,* 59 BUSINESS AND INFORMATION SYSTEMS ENGINEERING 311 (2017); van der Aalst, *Responsible Data Science: Using Big Data in a "People Friendly" Manner, in* ENTERPRISE INFORMATION SYSTEMS 3 (Hammoudi, Maciaszek, Missikoff, Camp and Cordiero ed., 2017).

[25]   This question is closely related to the one concerning the legitimation of state acts (cf. Klafki, Würkert and Winter, *Digitalisierung und Öffentliches Recht, in* DIGITALISIERUNG UND RECHT 18 (Klafki, Würkert and Winter ed., 2017).

made to explicitly address at least some aspects of the use of (machine-learning) algorithms, with Art. 22 of the General Data Protection Regulation (GDPR)[26] being the first attempt to do so (see below 2.2.1.). In addition to binding legislation, the EU seems to approach the challenges of the digitisation in general and the use of machine-learning algorithms in particular by publishing (Commission[27]) policy documents on the one hand (namely the "Communication on AI for Europe"[28] and the Communication on "Liabilities for emerging digital technology"[29]) and by raising awareness on the other hand through initiatives like the Algorithm Awareness Project.[30] In addition, the Commission established a High-Level Expert Group on Artificial Intelligence (AI HLEG). This independent expert group agreed on a definition of AI in April 2019 which could potentially become legally binding in the future.[31]

To sum up: Adequate measures are needed to address the legal challenges of the increasing use of algorithms. As a first step, awareness for the relevant (legal) challenges must be created. Without a doubt, the EU is currently working hard to achieve this goal. Its efforts are being accompanied by initiatives on the domestic[32] and the international[33] level. In some aspects of the use of AI, however, the EU has moved beyond the task of creating awareness, as legally binding instruments already address specific problems. Two examples of such legislation will be given in the next section.

B.　EU law provisions addressing the use of algorithms

As mentioned above, Art. 22 GDPR can serve as an example of an explicit regulation on the use of algorithms and will be discussed below (2.2.1.). However, the lack of explicit rules does not mean that existing legal provisions – without providing a direct link to algorithms at first sight – cannot be suitable to meet the challenges associated with their use. In subsection 2.2.2., Art. 101 TFEU will be discussed as an example of a provision that seems well suited to address the challenges without a need for further adaption even though it does not explicitly mention algorithms.

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[26] For more details on this provision, see the following remarks in this paper in chapter 2.2.2.

[27] The European Parliament has also expressed its opinion on this matter as well as related issues. Cf. European Parliament, *Report with recommendations to the Commission on Civil Law Rules on Robotics* (2015/2103 [INL], 2017).

[28] COM (2018) 237 final. Cf. also Commission, *Coordinated Plan on Artificial Intelligence* (Communication), COM (2018) 795 final.

[29] Commission, *Liability for emerging digital technologies* (Communication), SWD (2018) 137 final.

[30] Cf. COM, *Algorithmic Awareness-Building*, Apr. 25, 2018, available at https://ec.europa.eu/digital-single-market/en/algorithmic-awareness-building.

[31] High-Level Expert Group on Artificial Intelligence, *A definition of Artificial Intelligence: main capabilities and scientific disciplines*, Apr. 8, 2019, available at https://ec.europa.eu/digital-single-market/en/news/definition-artificial-intelligence-main-capabilities-and-scientific-disciplines; Reinisch, *Künstliche Intelligenz - Haftungsfragen 4.0 und weitere zivilrechtliche Überlegungen zu autonomen Systemen,* 37 Österreichische Juristenzeitung 298 (2019).

[32] According to initial reports, an Austrian robotics and AI strategy is planned for the summer of 2019 (cf. APA, *Österreichische Robotik- und KI-Strategie für Sommer 2019 geplant*, Press release, Nov. 22, 2018, available at science.apa.at/rubrik/politik_und_wirtschaft/Oesterreichische_Robotik-_und_KI-Strategie_fuer_Sommer_2019_geplant/SCI_20181122_SCI40111351045600836.

[33] In May 2019, as an important step in this direction, the OECD (with 36 Member States) formally adopted the first set of intergovernmental policy guidelines on Artificial Intelligence that were also endorsed by six more states. Cf. OECD, *Forty-two countries adopt new OECD Principles on Artificial Intelligence*, May 11, 2019, available at http://www.oecd.org/science/forty-two-countries-adopt-new-oecd-principles-on-artificial-intelligence.htm.

1.   Art. 22 GDPR as an example of an explicit regulation on the use of algorithms

By enacting the General Data Protection Regulation (GDPR),[34] the EU apparently attempted to restrain algorithmic decisions by means of explicit legal regulation for the first time. In this context, Art. 22 GDPR, which covers automated individual decision-making, should be highlighted in particular.[35]

While the provisions of the GDPR only apply to the processing of personal data,[36] this notion is understood in a broad sense.[37] Art. 22 GDPR stipulates that the data subject shall have the right not to be subject to a decision solely based on automated processing (hereinafter referred to as an "automated decision") - including profiling[38] - which produces legal effects concerning him or her or similarly significantly affects him or her. Apart from the exceptions to be discussed below, such decisions (that are made completely automated and without human intervention) are in principle prohibited. Since the wording of Art. 22 refers to "decisions", these must be distinguished from automated decision preparations that take place upstream. In this sense, if a person (at best equipped with decision-making authority and a margin of discretion) examines the decision bases prepared by an algorithm and then makes the final decision,[39] Art. 22 GDPR shall not be applicable.[40] Besides that, it is questionable whether the scope of this clause - in accordance with its wording - includes trivial algorithms (i.e. simple if-then-decisions). A minimum degree of complexity should be required in order to be able to speak of an actual automated decision, even though this assessment might be quite difficult for the individual.[41]

 Art. 22 para. 2 GDPR provides for three exceptions to the general prohibition of exclusively automated individual decision-making. On the one hand, it is permissible if it is necessary for

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[34]   In force since 25 May 2018.

[35]   For a detailed analyses of Art 22 GDPR cf. Casey, Farhangi and Vogl, *Rethinking Explainable Machines: The GDPR's 'Right to Explanation' Debate and the Rise of Algorithmic Audits in Enterprise,* 34 BERKELEY TECHNOLOGY LAW JOURNAL 143 (2019), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3143325; Floridi, *Soft ethics, the governance of the digital and the General Data Protection Regulation,* 376 PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY A (2018), https://doi.org/10.1098/rsta.2018.0081; Mittelstadt, Allo, Taddeo, Wachter and Floridi, *The ethics of algorithms: Mapping the debate,* Big DATA & SOCIETY (2016), available at https://journals.sagepub.com/doi/10.1177/2053951716679679.

[36]   Cf. Art. 2 No. 1 Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (*General Data Protection Regulation - GDPR*) [2016] OJ L119/1.

[37]   According to Art. 4 para 1 GDPR, the term "personal data" comprises any information relating to an identified or identifiable natural person.

[38]   "Profiling" means any form of automated processing of personal data consisting of the use of personal data to evaluate certain personal aspects relating to a natural person, in particular to analyse or predict aspects concerning that natural person's performance at work, economic situation, health, personal preferences, interests, reliability, behavior, location or movements (Art. 4 para 4 GDPR).

[39]   A pure nod will probably not be sufficient. Cf. Ernst, *Algorithmische Entscheidungsfindung und personenbezogene Daten,* 72 JURISTENZEITUNG 1029 (2017); Veale and Edwards, *Clarity, surprises, and further questions in Art 29 Working Party draft guidance on automated decision-making and profiling,* 34 COMPUTER LAW & SECURITY REVIEW 398 (2018).

[40]   Consequently, the so-called "scoring" is not covered by Art. 22 GDPR because in this case the decision is only prepared by a machine, but is ultimately made by a human being.

[41]   Cf. von Lewinski, *Art. 22 GDPR, in* BECK'SCHER ONLINE-KOMMENTAR DATENSCHUTZRECHT, para 12 seq. (Wolff and Brink ed., 22nd ed. 2017).

entering into, or performance of, a contract between the data subject and the controller.[42] On the other hand, such decisions may be permissible if authorized by EU or Member State law. Finally, an automated individual decision is also allowed if the data subject has given its explicit consent.[43] In all of these cases, protective measures for the data subjects must be provided. If a (national or European) legal provision outside the GDPR permits automated individual decision-making, it must lay down suitable measures to safeguard the data subject's rights and freedoms and legitimate interests.[44] In the other two cases, similar suitable measures shall be implemented by the data controller, including at least the right to obtain human intervention on the part of the controller, to express one's point of view and to contest the decision.[45] As a result, the data subject must never be subjected to a final automated individual decision against his or her will. As already mentioned, Art. 22 does not bar a human decision-maker from relying predominantly on an automated decision preparation.[46] This can be questionable as people who make such final decisions will only rarely contradict the recommendations given by algorithms, since these systems give the appearance of a sophisticated objectivity.[47]

As an additional protection against automated decisions, Articles 13 and 14 of the GDPR contain specific information obligations for the controller.[48] Under these provisions, the data subject must be informed where personal data relating to him or her are collected, explicitly revealing the existence of automated decision-making, including profiling, referred to in Art. 22 GDPR. This also has to include meaningful information about the logic involved, as well as the significance and the envisaged consequences of such processing for the data subject.[49] Nevertheless, this information does not include the disclosure of the used algorithm[50] or the training data[51] of a machine learning process,[52] so that even experts could generally neither evaluate these models nor be able to assess their harmful potential (as we already pointed out in section 2.1.). While it can be assumed that the obligation to provide information includes the disclosure of relevant criteria, the benefit of this disclosure for data subjects might be limited without information on how the algorithm has been

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[42] According to Art. 22 para 4 GDPR, this exception does not apply where special categories of personal data (Art. 9 GDPR) are concerned; the stated "necessity" refers to the automated decision (reasons could lie, for example, in the speed of the decision to be taken). Cf. von Lewinski, *supra* note 41, at para 43.

[43] In this context, the general conditions for a consent according to Art. 7 GDPR must be observed.

[44] Art. 22 para. 2 b) GDPR.

[45] Art. 22 para. 3 GDPR.

[46] In practice, it will hardly be possible to verify if the actual decision-maker even has the demanded personal flexibility to do so.

[47] This supposed objectivity, however, will be hard to verify, since these systems often resort to huge amounts of data in the decision-making process and carry out unknown balancing of interests.

[48] Notably, this is not the case regarding automated decision preparations. Martini, *Algorithmen als Herausforderung für die Rechtsordnung,* 72 JURISTENZEITUNG 1020 (2017).

[49] Cf. Art. 13 para. 2 f) and Art. 14 para. 2 g) GDPR.

[50] The disclosure of algorithms could at best reveal trade secrets.

[51] The publication of the training data could be problematic due to the frequently occurring personal reference.

[52] The wording of the rule also does not allow a claim to an exact explanatory statement of the individual decision. Cf. Martini, *supra* note 48.

trained or how single criteria are weighted.[53] Art. 22 thus cannot guarantee full transparency of the machine-learning algorithmic system behind an automated decision.[54]

Since algorithmic decisions generally only represent a special type of data processing,[55] Art. 35 GDPR, which governs the data protection impact assessment, shall apply as well. Accordingly, whenever the processing is likely to result in a high risk to the rights and freedoms of natural persons, the controller shall carry out an assessment of the impact of the envisaged algorithmic processing operations. Such a high risk is given if a systematic and extensive evaluation of personal aspects relating to natural persons is carried out based on automated processing (including profiling), which may then result in decisions that produce legal effects concerning the natural person or similarly significantly affect him or her.[56]

Based on the above elaboration it can be assumed that Art. 22 GDPR, in connection with the information obligations of Articles 13 and 14 GDPR, already covers a large part of algorithmic decision making. These provisions ensure the possibility of a human review or – potentially even more desirable - that the final decision is made by a human being. Regulation of algorithmic decision-making via data protection law is a valuable first step, but does not, as we have demonstrated, cover all relevant aspects thereof. As a consequence, it seems necessary to assess on a case to case basis whether the current regulatory framework is sufficient to meet other challenges of algorithmic decision-making or whether new regulation is needed. We will now turn to Art. 101 TFEU as an example of the first category.

2.   Art. 101 para. 1 TFEU as an example of an implicit regulation on the use of algorithms

While the provision does not explicitly address the topic, several aspects of the use of machine-learning algorithms have already been discussed in the light of Art. 101 para. 1 TFEU.[57] For example, the use by online platforms of machine-learning algorithms for pricing ("digital pricing"[58]

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[53]   Cf. Ernst, *supra* note 39, at 1033. For instance, a model description is also available for the above-mentioned example of the Austrian AMS. Regardless of the ambitions to defeat human prejudices with the help of the new algorithms and thus to guarantee objective and well-founded decisions, the documentation of the methodological considerations reveals above all disadvantages for structurally disadvantaged groups. Cf. Holl, Kernbeiß and Wagner-Pinter, *Das AMS-Arbeitsmarktchancen-Modell: Dokumentation zur Methode* (2018) Konzeptunterlage der Synthesisforschung   Gesellschaft   m.b.H. http://www.forschungsnetzwerk.at/downloadpub/arbeitsmarktchancen_methode_%20dokumentation.pdf.

[54]   Cf. the basic principle of transparency outlined in Art. 5 para. 1 a) GDPR. Initiatives such as Algo-Aware (cf. COM, *algoaware,* available at https://www.algoaware.eu/), a platform procured by the European Commission, that provides for information on the opportunities and challenges of algorithmic decision-making in commercial, cultural and civic society settings, cannot replace the necessity of transparency in individual cases (which has to take the specific circumstances of an individuals into account).

[55]   Cf. Art. 4 No. 2 GDPR.

[56]   Art. 35 para. 3 a) GDPR.

[57]   This has also been stressed by Commissioner for Competition Margarethe Vestager. Cf. Vestager, *Speech at the Bundeskartellamt's 18th Conference on Competition,* BUNDESKARTELLAMT'S 18TH CONFERENCE ON COMPETITION, Mar. 16, 2017,   available   at   https://ec.europa.eu/commission/commissioners/2014-2019/vestager/announcements/bundeskartellamt-18th-conference-competition-berlin-16-march-2017_en. In this speech, Vestager said that „we need to make it very clear that companies can't escape responsibility for collusion by hiding behind a computer program".

[58]   On "Pricing algorithms" cf. OECD, *Algorithms and Collusion – Background Note by the Secretariat* (DAF/COMP, 2017) 4 para 26.

by "software agents"[59]) raises the question whether these could - albeit autonomously - collude in order to achieve higher selling prices and thus cause a (banned) "concerted practice" within the meaning of Art. 101 para. 1 TFEU.[60] Corresponding academic discussions focus on the imputability of autonomous behaviour.[61] Although the factual elements of Art. 101 para. 1 TFEU are interpreted widely by the Court of Justice of the EU (CJEU) in its case-law,[62] it should be noted that the Commission's sanctioning decision for an infringement of Art. 101 TFEU is similar in character to a decision under criminal law[63] and presupposes an element of guilt[64] which cannot be found in algorithmic decision-making. However, if an undertaking uses AI to determine prices, it seems possible to interpret the aspect of imputation in the context of competition law in a functional sense (which is by no means unfamiliar to European competition law) accompanied with a refutable presumption of knowledge.[65]

Thus, Art. 101 para. 1 TFEU is an example of existing legislation that – although not explicitly addressing the use of algorithms – seems perfectly fit to deal with the challenges of autonomous algorithmic decision-making.

III. Is the European product liability law smart enough to deal with AI?

The example of Art. 101 TFEU has already shown that questions with regard to digitisation can be answered by applying legislation that predates the digital revolution. Another example of such legislation is product liability law. Recent technological advances lead to a range of new products, the functionality of which is substantially based on the use of software. Due to the use of software, products can be modified after purchase by "updating" them. Tesla, for example, already sells cars able to update themselves without human intervention. From a legal perspective, the question arises who is responsible for an update that is carried out without human intervention. This

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[59]　Cf. in that context Keßler, *Intelligente Roboter: neue Technologien im Einsatz,* 20 MULTIMEDIA UND RECHT 589 (2017).

[60]　Cf. also OECD (DAF/COMP, 2017) 4 para 75 et seq.; Ebers, *Dynamic Algorithmic Pricing: Abgestimmte Verhaltensweise oder rechtmäßiges Parallelverhalten?,* 4 NEUE ZEITSCHRIFT FÜR KARTELLRECHT 555 (2016); Ritz and Marx, *Algorithmen im Fokus der Monopolkommission: Digital Antitrust erfordert Anpassungen kartellrechtlicher Compliance,* 10 PRAXIS IM IMMATERIALGÜTER- UND WETTBEWERBSRECHT 422 (2018); Salaschek/Serafimova, *Preissetzungsalgorithmen im Lichte von Art 101 AEUV,* 63 WIRTSCHAFT UND WETTBEWERB 12 (2018); Ylinen, *Digital Pricing und Kartellrecht,* 6 NEUE ZEITSCHRIFT FÜR KARTELLRECHT 21 (2018); the latter text with reference to the fact that an autonomous abuse of market power within the meaning of Art 102 TFEU triggered by AI is possible, too. Furthermore cf. Louven, *Antitrust by Design – Kartellrechtliche Technik-Compliance für Algorithmen, Blockchain und Plattformen?,* ZEITSCHRIFT FÜR INNOVATIONS- UND TECHNIKRECHT 176 (2018) (the English version of this article is available at https://ssrn.com/abstract=3259142 or http://dx.doi.org/10.2139/ssrn.3259142); Ezrachi and Stucke, *Artificial Intelligence and collusion: when computers inhibit competition,* UNIVERSITY OF ILLINOIS LAW REVIEW 1782 (2017).

[61]　Cf. also OECD (DAF/COMP, 2017) 4 paras 79, 100 seq.; Ezrachi and Stucke, *supra* note 60, at 1801.

[62]　Cf. more recently on the use of booking software for travel agencies Case C-74/14 *Eturas UAB and Others v Lietuvos Respublikos konkurencijos taryba,* ECLI:EU:C:2016:42.

[63]　Cf. Case C-17/10 *Toshiba Corporation and Others v Úřad pro ochranu hospodářské soutěže,* ECLI:EU:C:2012:72, Opinion of AG Kokott (ECLI:EU:C:2011:552), paras 48, 101; Kokott, *Zum Irrtum eines Unternehmens über die Kartellrechtswidrigkeit seines Verhaltens,* 1 NEUE ZEITSCHRIFT FÜR KARTELLRECHT 148 (2013).

[64]　Cf. Art. 23 para. 2 a). of Council Regulation (EC) 1/2003 of 16 December 2002 on the implementation of the rules on competition laid down in Articles 81 and 82 of the Treaty [2002] OJ L1/1.

[65]　Cf. also to the questions of imputability Salaschek and Serafimova, *supra* note 60, at 14 seq. Of course, the presumption of innocence (for antitrust law cf. Case C-74/14, *supra* note 62, at para 38) needs to be taken into account as well.

question as well as other questions related to smart products are not explicitly addressed by existing liability law.[66]

The fact that there is still no European legislative act addressing questions of liability for smart products contrasts sharply with the fact that the EU is actually a pioneer in terms of product liability. As early as 1985, the EU adopted the Product Liability Directive,[67] covering the liability of the producer for damage caused by the defectiveness of his products. Obviously, more than thirty years ago the European legislator had a different concept of a "product" in mind than we can find today. Therefore, the question arises whether the Product Liability Directive also provides appropriate answers to the challenges posed by smart products, which are able to be updated or even update themselves.

As a starting point, the fundamental question must be raised whether software is a product in the meaning of Art. 2 of the Product Liability Directive at all.[68] If so, what are the legal consequences if, for example, a self-driving vehicle does not recognize an obstacle and collides with it? Is the software producer liable according to the Product Liability Directive besides the end producer? If so, is he also liable if the car owner did not carry out software updates correctly? What are the consequences if the software has been used in a different way than intended by the software producer? Does it make a difference whether the software has been downloaded or has only been used via the internet, while the program remains in the cloud?

Not all these questions are new. The issue of whether software is a product within the meaning of the Directive (or national product liability laws of the Member States) has been a matter of discussion for some time.[69] Under the Austrian Product Liability Act (in German: *Produkthaftungsgesetz*; abbreviated *PHG*), a product is any movable corporeal thing, including energy;[70] in contrast to this, the Product Liability Directive does not contain the requirement of corporality.[71] One reading of this was that only software on a physical medium (USB flash-drive, CD) is a product in the meaning of the PHG.[72] This interpretation has been criticised because, when considering the intended purpose of product liability law to create an appropriate distribution "of

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[66] On this topic cf. Weber, *Liability in the Internet of Things,* 6 JOURNAL OF EUROPEAN CONSUMER AND MARKET LAW 207 (2017); Schmon, *Product Liability of Emerging Digital Technologies,* 3 ZEITSCHRIFT FÜR INTERNATIONALES WIRTSCHAFTSRECHT 254 (2018).

[67] Council Directive 85/374/EEC of 25 July 1985 on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products [1985] OJ L210/29.

[68] According to Art. 2 of the Directive 85/474/EEC product means all movables, except for primary agricultural products and game, even though incorporated into another movable or into an immovable.

[69] Cf. Andreewitch, *Anmerkungen zum Produkthaftungsgesetz,* 43 ÖSTERREICHISCHE JURISTENZEITUNG 225 (1988); Denkmaier, *30 Jahre PHG – Software als Produkt?, in* DIGITALE TRANSFORMATION IM WIRTSCHAFTS- UND STEUERRECHT 52 (Felten, Kofler, Mayrhofer, Perner and Tumpel ed., 2019); Ennsgraber, *Software als körperliche und unkörperliche Sache, in* INTERNET OF THINGS 599 (Schweighofer, Kummer and Saarenpää ed., 2019; Whittaker, *European Product Liability and Intellectual Products,* 105 THE LAW QUARTERLY REVIEW 125 (1989); Bauer, *Produkthaftung für Software nach geltendem und künftigem deutschen Recht (Teil 2),* PRODUKTHAFTPFLICHT INTERNATIONAL 99 (1989); Welser and Vcelouch, *Haftung für mangelnde „Jahr 2000-Tauglichkeit" von Hard- und Software,* 9 ECOLEX 829 (1998); Horwath, *Software – ein Produkt?,* 11 ECOLEX 784 (2000); Fairgrieve and Rajneri, *Is Software a Product under the Product Liability Directive?,* 4 ZEITSCHRIFT FÜR INTERNATIONALES WIRTSCHAFTSRECHT 24 (2019).

[70] Sec 4 PHG.

[71] According to Art. 2 of the Directive 85/374/EEC, any movable object is considered a product.

[72] RABL, PRODUKTHAFTUNGSGESETZ Sec 4, at para 57 (2017); Oechsler, *Sec 2 ProdHaftG*, in KOMMENTAR ZUM BÜRGERLICHEN GESETZBUCH, para 65 (Staudinger ed., 2018).

the risks inherent in modern technological production"[73], the formal criteria of the technical mode of transmission or distribution does not justify different outcomes in liability.[74] In other words: Why should software purchased on a physical medium constitute product liability but not software downloaded by data transmission?

The inclusion of electric energy in Art. 2 of Directive 85/374/EEC[75] shows that its legislator was aware of the problem of non-physical goods. However, the explicit qualification of energy as a product within the meaning of the Directive does not force a reverse conclusion to the effect that non-physical goods other than electricity have to be excluded from the scope of application.[76] Instead, it should be concluded from the explicit reference to energy that the definition of a product does not preclude a teleological interpretation of the Directive. In 1984, the European legislator expressly mentioned energy as the only incorporeal good which was of relevance at the beginning of the 1980s - simply because it was produced on an industrial scale and sold in large quantities to consumers. It is submitted that in case the Directive were rewritten today, software would likely be explicitly mentioned alongside electric energy.[77] In other words: There are convincing reasons to either interpret the requirement of "corporality" in cases of carrierless data transmission from a teleological viewpoint or to apply product liability to software in analogy to energy.[78]

Even if the question whether the Product Liability Directive applies to software can be clarified, the extent of liability remains open. For example, it is unclear whether the software producer is liable for damages on the end product.[79] In general, personal injury and damage to any item of property other than the "end product" (e.g. a self-driving car) itself have to be compensated.[80] If the software is qualified as the defective product, and the end product is qualified as a separate object, the software producer's liability for damage on the end product could be positively assumed.[81] However, this interpretation would also entail that a software producer's liability would be stricter than the liability of an end producer who developed his own software as part of the end product.[82]

It remains to be seen whether new provisions will be adopted to regulate product liability specifically for smart products. However, in the light of the above mentioned examples, new legislation is not necessary.[83] It is possible to interpret the existing legal framework in a way that allows adequate solutions for questions relating to smart products. Such an approach is well

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[73] Recital 2 of Directive 85/374/EEC.

[74] Cf. KOZIOL, APATHY AND KOCH, ÖSTERREICHISCHES HAFTPFLICHTRECHT III B, at para 137 (3rd ed. 2014); Larcher, *Medizinprodukte-Software: Abgrenzung und Produkthaftung,* 25 RECHT DER MEDIZIN 134 (2018).

[75] Sec 4 PHG.

[76] Cf. Wagner, *Sec 2 ProdHaftG, in* MÜNCHENER KOMMENTAR ZUM BGB: BAND 6, para 20 (Habersack ed., 7th ed. 2017).

[77] Cf. Wagner, *supra* note 76; Förster, *Sec 2 ProdHaftG, in* BECKOK BGB, para 24 (Bamberger, Roth, Hau and Poseck ed., 47th ed. 2017).

[78] Horwath, *supra* note 69; Larcher, *supra* note 74; Wagner, *supra* note 76; Förster, *supra* note 77; dissenting Rabl, *supra* note 72, at para 54.

[79] Cf. Koziol, Apathy and Koch, *supra* note 74, at para 97.

[80] See a judgment of the Austrian Supreme Court (abbreviated OGH): OGH 11.11.1992, 1 Ob 644/92. Cf. also Koziol, Apathy and Koch, *supra* note 74, at para 96; Harnoncourt, *Haftungsrechtliche Aspekte des autonomen Fahrens,* ZEITSCHRIFT FÜR VERKEHRSRECHT 550 (2016); Harnoncourt, *Haftungsrechtliche Aspekte des autonomen Fahrens, in* AUTONOMES FAHREN UND RECHT 109, 118 (I. Eisenberger, Lachmayer and G. Eisenberger ed., 2017).

[81] Cf. Koziol, Apathy and Koch, *supra* note 74, at para 96 et seq.

[82] Cf. Wagner, *Sec 1 ProdHaftG, in* MÜNCHENER KOMMENTAR ZUM BGB: BAND 6, para 12 (Habersack ed., 7th ed. 2017).

[83] This conclusion is also reached by the Commission's Evaluation of Council Directive 85/374/EEC of 25 July 1985 on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products; cf. SWD (2018) 157 final and COM (2018) 246 final 2.

known in civil law. The Austrian Civil Code (Allgemeines Bürgerliches Gesetzbuch; abbreviated ABGB), which is still in force after more than 200 years[84] and offers quite appropriate solutions for questions of technical progress, can serve as an example. The European Commission seems to share this opinion and announced its intention to *"issue a guidance document on the interpretation of the Product Liability Directive in light of technological developments by mid-2019."*[85]

IV.　Challenges for the postal sector

The smart products mentioned above would be unthinkable without AI. It goes without saying that the demand for new and smarter products has had a big impact on the "old" economy as well. This is especially true for the increase in the market share of parcel deliveries in recent years which requires new business models. One example of a global player with such a (relatively) new business model is the e-commerce giant Amazon. AI plays a major role in Amazon's recommender generating more than a third of the company's revenue.[86] In the beginning, Amazon was an online marketplace, selling only books.[87] Its current business model can be described as a huge mall[88] in the World Wide Web. Users use a search engine to find all kinds of goods, which are delivered from a distribution point directly to the location of their choice. The location of these distribution points is determined by various factors. Geographical characteristics play a major role, as a central location and a mild climate and nearby airports permitting night flights (e.g. Cologne/Bonn) guarantee constant delivery of the goods.

The business models of Amazon and other companies have led to a constant rise of the market share of parcel and express delivery services, while the traditional postal service - the letter segment[89] - is steadily declining.[90] This development must also be taken into account by the EU's postal policy. This policy aims at completing the internal market for postal services and ensuring the main goals of efficiency, reliability and availability to all citizens at affordable prices.[91] Currently,

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[84]　The ABGB came into force on Jan 1st, 1812; officially published in *Justizgesetzsammlung* (JGS) No. 946/1811.

[85]　COM (2018) 237 final 16. Concerning the European Parliament cf. 2015/2103 (INL).

[86]　Morgan, *How Amazon has reorganized around Artificial Intelligence and Machine Learning,* FORBES, Jul. 16, 2018, available at https://www.forbes.com/sites/blakemorgan/2018/07/16/how-amazon-has-re-organized-around-artificial-intelligence-and-machine-learning/#2919832b7361.

[87]　Jeff Bezos, the founder and CEO of Amazon, always claimed that Amazon is not a retailer, but a technology company; cf. Hall, *Amazon.com,* ENCYCLOPAEDIA BRITANNICA, available at https://www.britannica.com/topic/Amazoncom.

[88]　Cf. Zwass, *E-commerce,* ENCYCLOPAEDIA BRITANNICA, 2019, available at https://www.britannica.com/technology/e-commerce, refers to Amazon as an "e-mall".

[89]　The letter segment still plays an important role in the postal and express market, amounting to 42% of the total revenue in 2016 (but having dropped by 5% since 2013). Cf. Cerpickis, Facino, Geus, Möller Boivie, Gårdebrink, Almqvist, Apon, Basalisco and Ballebye Okholm, *Main developments in the postal sector (2013-2016),* EUROPEAN COMMISSION, 2018, at 26, available at https://publications.europa.eu/en/publication-detail/-/publication/d22799b5-bbb7-11e8-99ee-01aa75ed71a1/language-en.

[90]　Cerpickis, Facino, Geus, Möller Boivie, Gårdebrink, Almqvist, Apon, Basalisco and Ballebye Okholm, *supra* note 89, at 7, 8, 36, 39.

[91]　European Commission, *EU postal legislation*, available at https://ec.europa.eu/growth/sectors/postal-services/legislation_en.

postal services are regulated by Directive 97/67/EC[92] as amended by Directive 2008/6/EC[93]. Directive 97/67/EC focuses primarily on fully opening the sector to competition while securing universal service obligations (including tariff principles for these), on mechanisms to encourage technical harmonisation and on the requirements for the authorization or licensing of postal services.

While today the postal sector uses technological innovations such as fully automatic distribution systems and autonomous delivery systems[94] to improve logistics,[95] it also faces challenges imposed by new and disruptive technological innovations and the above-mentioned growth of the parcel delivery sector.[96]

The market for cross-border parcel delivery services is already diverse, complex and competitive.[97] Different providers offer different services and prices depending on weight, size and format of parcels, as well as on their destination and value-added features, such as tracking. Today, even Amazon, which has used established service providers for the delivery of their parcels in the past, is working on a plan to set up its own delivery system.[98]

Because of this diversity, it is difficult to compare different providers, their services and prices. This might hinder customers from fully benefiting from the liberalisation of postal services, especially in cross-border parcel delivery. After identifying this problem, the EU enacted Regulation (EU) 2018/644[99] on cross-border parcel delivery services, which supplements the provisions of Directive 97/67/EC as amended. The aim of this Regulation is to facilitate access to relevant information about cross-border parcel delivery services. The Regulation covers parcels containing goods – with or without commercial value – with a weight of up to 31,5 kilograms.[100]

If the Regulation is able to create more price transparency in the cross-border postal delivery services sector, it will undoubtedly contribute to the EU's policy to create a Digital Single Market[101] as many business models in this market depend on cheap and reliable delivery services. The Regulation is also a good example for the necessity of accompanying legislative measures in "traditional" service sectors which are nevertheless indispensable for the further development of the digital economy.

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[92]   Directive 97/67/EC of the European Parliament and of the Council of 15 December 1997 on common rules for the development of the internal market of Community postal services and the improvement of quality of service [1997] OJ L15/14.

[93]   Directive 2008/6/EC of the European Parliament and of the Council of 20 February 2008 amending Directive 97/67/EC with regard to the full accomplishment of the internal market of Community postal services [2008] OJ L52/3.

[94]   Österreichische Post AG, *Autonome Zustellung*, available at https://www.post.at/autonome-zustellung.php/.

[95]   Österreichische Post AG, *Die Brieflogistik - Ein Blick hinter die Kulissen*, at 6, available at https://www.post.at/files/Die_Brieflogistik_09_09.pdf.

[96]   Still, the importance of postal service cannot be underestimated: With more than 677.000 outlets and about 5.3 million staff members, the post represents the largest physical network in the world (for more information, cf. the homepage of the International Postal Union which is the second oldest international organisation: Universal Postal Union, *Factsheet: About the UPU,* The postal sector's primary forum for global cooperation, Oct. 18, 2018, available at news.upu.int/no_cache/nd/factsheet-about-the-upu/).

[97]   Cerpickis, Facino, Geus, Möller Boivie, Gårdebrink, Almqvist, Apon, Basalisco and Ballebye Okholm, *supra* note 89, at 28.

[98]   Wingfield, *Amazon to Test a New Delivery Service for Sellers,* The New York Times, Feb. 9, 2018, available at https://www.nytimes.com/2018/02/09/business/amazon-delivery-service.html; Fast company, *Amazon,* available at https://www.fastcompany.com/company/amazon.

[99]   Regulation (EU) 2018/644 of the European Parliament and of the Council of 18 April 2018 on cross-border parcel delivery services [2018] OJ L112/19.

[100] Heavier parcels are part of the freight transport and logistics sector.

[101] European Commission, *Parcel delivery in the EU,* available at http://ec.europa.eu/growth/sectors/postal-services/parcel-delivery_en.

Another sector which can positively contribute to the development of the Single Digital Market is the public administration itself. If national and local administrative processes become more and quicker accessible for EU citizens, this will certainly benefit the "new economy". The latest European legislative measure to achieve this aim is the Single Digital Gateway[102] which will be discussed in the following section.

V.　The Single Digital Gateway

As the digitisation of society progresses, the public administration is expected to take advantage of the new technology and make its benefits available to citizens. The EU has recently started to focus on the digitisation of administration to consumer (A2C) contacts as consumers in particular benefit from low-threshold access to online public services.[103] In the Commission's view, recent technological developments in information and communication technologies - in particular in cross-border contacts - offers potential for growth.[104]

Most recently, the EU Parliament and Council have taken a (potential) landmark step towards digitisation in user-oriented administration. On 11 December 2018, the Regulation for a Single Digital Gateway (SDG) came into force after extensive negotiations.[105] As one of the strategies of the "Compliance Package",[106] the SDG Regulation provides for the establishment of an online portal, which shall enable EU citizens to exercise their Single Market rights comprehensively and efficiently in conjunction with cross-border administrative procedures.

The intention behind the new Regulation is, of course, not entirely novel in EU law: The concept of the SDG is somewhat advancing the instrument of Points of Single Contact (PSC)[107] which has already been implemented by the Services Directive[108]. Besides the PSC, there have been other sectorial one-stop shops in EU legislation.[109] However, as Recital 11 of the SDG Regulation frankly admits, the sectorial nature of these acts has resulted in a fragmentation of the digital A2C

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[102]　Cf. European Parliament, *Single digital gateway: a time saver for citizens and companies,* Jul. 12, 2018, available at http://www.europarl.europa.eu/news/en/press-room/20180711IPR07739/single-digital-gateway-a-time-saver-for-citizens-and-companies.

[103]　E.g. COM (2015) 192 final; Commission, *Upgrading the Single Market: more opportunities for people and business* (Communication), COM (2015) 550 final.

[104]　See COM (2015) 192 final 16 seq.

[105]　Regulation (EU) 2018/1724 of the European Parliament and of the Council of 2 October 2018 establishing a single digital gateway to provide access to information, to procedures and to assistance and problem-solving services and amending Regulation (EU) No 1024/2012 [2018] OJ L295/1 (*SDG Regulation*).

[106]　An overview of the contents of the Compliance Package, including a proposal on the Internal Market Information Tool and measures to improve the free online Single Market Problem Solving Network, is given by Wurster and Stöbner de Mora, *Binnenmarkt: Kommissionsvorschläge zum Compliance-Package,* 28 Europäische Zeitschrift für Wirtschaftsrecht 444 (2017).

[107]　PSCs are e-government portals that allow service providers to access information and complete (certain) administrative procedures online. For detailed information, in particular on the implementation in Austria, cf. Stöger, *Der einheitliche Ansprechpartner im Bundesstaat – Ein Blick über die Grenzen, in* Vom praktischen Wert der Methode: Festschrift Heinz Mayer zum 65. Geburtstag 755 (Jabloner, Kucsko-Stadlmayer, Muzak, Perthold-Stoitzner and Stöger ed., 2011); Stolzlechner, *Einheitlicher Ansprechpartner und die Vollziehung des gewerblichen Berufsrechts, in* Gedenkschrift Robert Walter 801 (Jabloner, Kolonovits, Kucsko-Stadlmayer, Laurer, Mayer and Thienel ed. 2013).

[108]　Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on services in the internal market [2006] OJ L376/36.

[109]　An overview is given in Recital 10 of the SDG Regulation.

contacts, failing to achieve the desired success.[110] The SDG Regulation is now much more ambitious: It will create a digital single gateway (based on the existing information portal "Your Europe") "to act as a single entry point through which citizens and businesses are able to access information about the rules and requirements that they have to comply with, by virtue of EU or national law".[111] This gateway is intended to provide EU citizens with easier cross-border access to the following content:

(a) Information on the rules and requirements to be complied with under national and/or EU law in cross-border economic activities (Articles 4, 5). These include, for example, registration of a company, changes in its legal form, licensing requirements, protection of intellectual property, directors' liability, labour and social insurance law, product liability, etc.

(b) Information on the conduct of administrative[112] procedures in Member States (Art. 6). In addition, 13 basic procedures laid down in Annex II of the SDG Regulation must be completely feasible online (e.g. applying for proof of residence or study grants and loans, claiming pension benefits, etc.).

(c) Contact with support and problem-solving services (Art. 7). The service should support those seeking help with regard to comprehension or application problems.

Chapter III of the SDG Regulation lays down quality requirements, which must be met by the information and administrative procedures of the EU and the Member States accessible via the single entry point. It is not necessary to offer all information directly within the SDG, links to national homepages (e.g. local authorities) are permissible. However, all information must be translated into English (the "official language of the Union that is most widely studied as a foreign language by users across the Union")[113]. As far as online procedures are concerned, the SDG Regulation does not lay down any substantive or procedural rules, but focuses on technical requirements. Member States are obliged to grant non-discriminatory access to existing online procedures to users from other EU countries. In this respect, factual hurdles such as forms based on national data formats, which constitute indirect discrimination, are particularly inadmissible. Furthermore, the once-only principle for online administrative procedures is introduced.[114] According to this principle, individuals and companies no longer have to submit information that has already been collected by national authorities, but can request that it be exchanged between authorities.[115] In view of the exchange of sensitive data between administrations, there are detailed requirements for encryption.[116] The once-only principle could result in the reduction of bureaucratic burdens and transaction costs.[117]

The implementation of the SDG Regulation will raise serious organisational and legal challenges for national, regional and local administrations – the translation requirement not being the least

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[110] For further information on the implementation deficits of the PSC see European Commission, *The Performance of the Points of Single Contact – an assessment against the PSC Charter,* Jun. 29, 2015, available at https://ec.europa.eu/growth/content/performance-points-single-contact-%E2%80%93-assessment-against-psc-charter-0_en.

[111] Recital 12 of the SDG Regulation.

[112] Court procedures are not covered by the SDG Regulation (cf. Recital 8 of the SDG Regulation).

[113] Art. 12 para 3 of the SDG Regulation.

[114] Akkaya and Krcmar, *Towards the Implementation of the EU-Wide "Once-Only Principle": Perceptions of Citizens in the DACH-Region, in* Electronic Government (Parycek P. et al. ed., 2018).

[115] Art.14 of the SDG Regulation.

[116] Cf. Recitals 52 seq. of the SDG Regulation.

[117] Pilz, *Der Vorschlag der EU Kommission für eine Verordnung zur Errichtung eines zentralen digitalen Zugangstors,* 28 Europäische Zeitschrift für Wirtschaftsrecht 922 (2017).

of them. It is for this reason that the Regulation provides for adaptation periods (two, four or five years from its entry into force; depending on the particular contents) until all relevant information and procedures have to be provided online.

There is no doubt that the SDG has the potential to facilitate the exercise of Single Market rights and speed up cross-border procedures – in a much better way than previous instruments ever could. However, the Commission admits that the effectiveness of the SDG will largely depend on the joint efforts of the Commission itself and the Member States. This is certainly true. As the example of the Points of Single Contact under the Services Directives show, the challenges for a successful implementation of the SDG are manifold. However, if the EU and its Member States succeeded in establishing a user-friendly digital A2C portal, this would doubtlessly be a major contribution to the establishment of a digital single market for European citizens and businesses.

VI. Final remarks

This paper discusses various legal challenges of the digitisation of the Single Market which have been identified as crucial by the European Commission's DG Growth. The question arises to which extent the current regulatory framework appears suitable to deal with these challenges and where additional regulation is required.

In the field of autonomous decision-making by AI, our analysis identified the most pressing need for new regulation. While the EU (and increasingly Austria as well) is aware of this need, regulation to date remains scarce. Though the EU legislator has already taken specific precautions for the use of algorithms in the GDPR, such regulatory approaches are missing in most other fields of law.

In contrast to this, antitrust law and product liability law already appear to be well suited to meet the challenges posed by digitisation. This is especially true for product liability law, which is in principle apt to cover the specific challenges of the convergence of software and hardware in smart products. However, uncertainty about its applicability to incorporeal goods would make clarification of current product liability legislation advisable – a view shared by the European Commission.

Two more fields recently received some legislative attention due to the changing needs of a digital society: the postal sector on the one hand, and e-government on the other hand. In both fields, new legislation – tellingly in the form of (partially) directly applicable Regulations – has recently been passed by the EU – a sharp contrast to the case of machine-learning algorithms. However, while the integration of the new Regulation on cross-border parcel delivery will probably not pose major challenges for domestic markets, the implementation of the Single Digital Gateway will raise serious organisational and legal challenges for national administrations, especially when taking into account the limited success of the previous related initiative on the points of single contact under the Services Directive.