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ARTIFICIAL INTELLIGENCE AND THE MANAGEMENT OF STOCK CORPORATIONS – ORGANISATIONAL AND LIABILITY-RELATED ISSUES

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Abstract

Even if self-driving corporations are not yet on the horizon, some management tasks may be already performed by Artificial Intelligence (AI)[1]. This first raises the question to what extent and under which conditions the deployment of AI in the course of management of a corporation is already possible and can prove useful (I.). Secondly, the question arises whether and under which conditions the directors and the corporation can be held liable for the unlawful use of automated systems and any resulting damage (II.). The following article seeks to answer these questions mainly from the perspective of German and Swiss stock corporation law.

Keywords: Self-driving Corporations, Artificial Intelligence, AI, Management of Stock Corporations, Liability

Even if self-driving corporations are not yet on the horizon, some management tasks may be already performed by Artificial Intelligence (AI). This first raises the question to what extent and under which conditions the deployment of AI in the course of management of a corporation is already possible and can prove useful (I.). Secondly, the

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1 According to Art. 3 (1) Artificial Intelligence Act of the European Union (P9_TA[2024]0138) an "'AI system' means a machine-based system designed to operate with varying levels of autonomy, that may exhibit adaptiveness after deployment and that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments".

question arises whether and under which conditions the directors and the corporation can be held liable for the unlawful use of automated systems and any resulting damage (II.). The following article seeks to answer these questions mainly from the perspective of German and Swiss stock corporation law.

1. Use of AI in the Management of Stock Corporations

1.1. Appointment of a Robot as Member of the Board of Directors

Already ten years ago, a Hong Kong-based venture capital firm announced in a publicity stunt that a robot named "Vital" had been appointed as a board member. Vital should protect the firm from investing in trendy, but overpriced inventions by identifying overhyped projects based on the level of public awareness a certain topic generates[2]. It is clear that a formal nomination of a robot is considered void not only in jurisdictions requiring natural personhood of board members[3], but also in jurisdictions that allow legal persons to sit on the board of directors[4]. This is because AI has neither direct personhood nor indirect personhood via the personhood of a self-driving company[5]. The concept of "e-personhood", which would be equal to human or juridical personhood, is not yet recognised by any jurisdiction[6]. It is therefore not surprising that "Vital" in fact only had the legal status of an "observer" on the board. A robot may support or consult board members, but it cannot directly take part in decisions of the board.

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2 Florian Möslein: Robots in the Boardroom: Artificial Intelligence and Corporate Law. In: Woodrow Barfield – Ugo Pagallo (ed.): *Research Handbook on the Law of Artificial Intelligence*. Cheltenham, Edward Elgar Publishing, 2018. 649–670.; Tieto (meanwhile Tietoevry) is also said to be the first Nordic company to appoint an AI by the name of Alicia T. to the leadership team of a new data-driven businesses unit (https://tinyurl.com/bd8h43re).

3 As it is the case, for example, in Hungary (§ 3:22 I Polgári Törvénykönyvről – Civil Code), Germany (§ 76 III AktG – Stock Corporation Act) and Switzerland (Art. 707 OR – Code of Obligations).

4 As it is the case, for example, in French law (Art. L.225-20 C. com. – Commercial Code) and English law (according to sect. 155 Companies Act 2006 a company must have at least one director who is a natural person).

5 See for corporations as legal containers for AI Shawn Bayern: The Implications of Modern Business Entity Law for the Regulation of Autonomous Systems. *Stanford Technology Law Review* 19, 1. (2015), 93–94.

6 See concerning the debate in German law Susanne Beck: Über Sinn und Unsinn von Statusfragen – zu Vor- und Nachteilen der Einführung einer elektronischen Person. In: Eric Hilgendorf – Jan-Philipp Günther (ed.): *Robotik und Gesetzgebung, Beiträge der Tagung vom 7.–9.5.2012 in Bielefeld*. Baden-Baden, Nomos, 2013. 239–262; Lawrence B. Solum: Legal Personhood for Artificial Intelligences. *North Carolina Law Review* 70, 5. (1992), 1231–1287.

1.2. Use of AI in Support of the Board of Directors

1.2.1. Organisational Framework

One can easily imagine that an artificially intelligent agent could deliver information, scenarios and advice to members of the board. The minutes of board meetings may also be kept by automated systems if – for example according to Swiss law[7] – the president finally signs them off in person. The board may not, however, delegate decision-making powers to AI because it has to ensure the overall management of the corporation in person. It can and must delegate some tasks of the day-to-day business but remains responsible for the overall management, i. e. the strategic orientation, the main features of the organisation and the monitoring[8]. These competences are non-transferable and inalienable. The directors are also the mediators between the stakeholders and the senior executives and it is difficult to imagine that they could be substituted by AI in this respect[9].

When considering the use of automated systems in performing supporting tasks, we should keep in mind the well-known strengths and shortcomings of AI at the current stage. It is clear that AI is superhuman when it comes to strength, endurance, efficiency and speed. It is also often mentioned that AI is free from conflicts of interest[10]. But that is not quite true when taking into account that AI is programmed in accordance with goals set by human clients and relies on relevant data from perhaps biased contexts[11]. On the other hand, the shortcomings of current AI are of particular importance in the field of corporate governance. First, AI is very much dependent on sufficient quantities of appropriate data. The comparatively high volumes of data pose a problem for small and medium-sized enterprises and will often demand the tapping of external data[12]. The reliance of AI on historical and identical data will reduce flexibility and innovation, which is particularly problematic in a dynamic entrepreneurial context

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7 Art. 713 III OR (Swiss Code of Obligations).

8 See, for example, Art. 716a OR (Swiss Code of Obligations) and § 76 I AktG (German Stock Corporation Act); see in Swiss law Lucas Forrer – Floris Zuur – Matthias Müller: Künstliche Intelligenz im Aktienrecht – Einsatz im Rahmen der Geschäftsführung und Verantwortlichkeit. In: Julia Meier – Nadine Zurkinden – Lukas Staffler (ed.): *Recht und Innovation – Innovation durch Recht, im Recht und als Herausforderung für das Recht.* Analysen und Perspektiven von Assistierenden des Rechtswissenschaftlichen Instituts der Universität Zürich (APARIUZ). Zürich/St. Gallen, Dike Verlag, 2020. 221./224; for German law Katja Langenbucher: Künstliche Intelligenz in der Leitungsentscheidung des Vorstands. *Zeitschrift für das gesamte Handels- und Wirtschaftsrecht (ZHR)* 187, 6. (2023), 723., 725–727.

9 Luca Enriques – Dirk A. Zetzsche: Corporate Technologies and the Tech Nirvana Fallacy. *Hastings Law Journal* 72, 1. (2020), 22–23.

10 See, for example, Assaf Hamdani – Niron Hashai – Eugene Kandel – Yishay Yafeh: Technological Progress and the Future of the Corporation. *Journal of the British Academy 6, 1. (2018)*, 225., 229.

11 See especially for the use of AI when determining compensation Enriques – Zetzsche op. cit. 31–32.

12 John Armour – Horst Eidenmüller: Self-Driving Corporations?. *Harvard Business Law Review* 10, 1. (2019/2020), 87., 98–99.

due to changing market conditions and competition[13]. In addition, AI tends to struggle with infrequent, non-rule based and complex business judgements[14], overemphasises quantitative aspects in the decision-making process[15] and shows a lack of empathy when dealing, for example, with matters of human resources[16].

Given the organisational framework as well as the strengths and shortcomings of current AI, it seems clear that this technology can only serve as a management tool requiring enhancement by human managers in order to allow improvement of their own decision-making. There ensues a necessary interaction between human managers and machines. AI works as assisted AI in conjunction with managers in order to help them accomplish their tasks better, and as augmented AI it is designed to enable managers to do things they normally can't do[17].

With regard to the shortcomings, one can also ask whether the use of AI by a company must be disclosed. If the use of AI is associated with particular risks, such use should be mentioned and explained in the management report, which large enterprises have to draw up[18]. If this is not the case, there seems to be no special need for transparency according to general disclosure rules[19]. But the deployment of AI may also be mentioned in compliance reports and non-financial statements as a tool to detect and manage risks of unlawful behaviour[20].

1.2.2. Possible Applications of AI in Corporate Management

When it comes to possible applications of current AI in corporate management, financial planning and accounting first spring to mind[21]. Current AI is supposed to give sufficient results in this field dominated by quantitative parameters and demanding only a descriptive analysis (balance sheet, income statement, cash flow statement) or a predictive analysis (liquidity management). In view of its similar design, this should also be true for non-financial reporting regarding quantitative parameters, e.g. data on

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13 Enriques – Zetzsche op. cit. 26.

14 Armour – Eidenmüller op. cit. 97.

15 See for negative effects Michael Harris – Bill Tayler: Don't let metrics undermine your business – An obsession with the numbers can sink your strategy. *Harvard Business Review* 97, 5. (2019), 62–69.

16 Roland T. Rust – Ming-Hui Huang: *The Feeling Economy*. Basel, Palgrave Macmillan, 2021. 1. / 109–128: The human worker's competitive advantage over machines currently lies in empathy and therefore AI is assuming a larger share of thinking tasks, leaving human intelligence to focus more on feeling.

17 Armour – Eidenmüller op. cit. 96–97.

18 See, for example, Art. 19 Directive 2013/34/EU.

19 See, however, Akshaya Kamalnath – Umakanth Varottil: *A Disclosure-Based Approach to Regulating AI in Corporate Governance*. NUS (National University of Singapore) Law Working Paper No 2022/001. 2022.; for some pros and cons of code disclosure Enriques – Zetzsche op. cit. 49–50.

20 See, for example, Art. 19a I let. b Directive 2013/34/EU according to which "a description of the policies pursued by the undertaking in relation to those matters [i. e. non-financial information], including due diligence processes implemented" is part of the non-financial statement of large undertakings being public-interest entities.

21 See for real time accounting with the use of the blockchain-technology David Yermack: Corporate Governance and Blockchains. *Review of Finance* 21, 1. (2017), 24–25.

carbon emissions. Furthermore, the direct publication and analysis of quantitative data by AI does not pose any technical difficulties[22]. It is merely a matter of policy as to where the boundaries of the disclosure obligations are drawn and how precisely these obligations are defined in the law. It is difficult to imagine, for example, that AI would decide on ad hoc announcements given their undefined legal conditions[23].

Another favoured field of AI-application is monitoring as AI is capable of detecting unusual behaviours and developments by analysing large amounts of data, for example, in the area of personal trading by bank employees[24]. Proponents already describe the vision of a direct control of managers by interested shareholders or proxy advisors making the board superfluous[25]. This is, however, not merely a question of technical feasibility but also one of legal competences, efficiency and confidentiality. According to Swiss law, for example, the nomination and monitoring of executive officers and senior executives is a non-transferable and inalienable competence of the board[26]. In German law, it is up to the supervisory board to nominate and monitor the directors who are managing the stock corporation on their own responsibility[27]. All board members are subject to a duty of confidentiality, which forms part of their duty of loyalty[28].

When it comes to human resources management, the pre-selection of candidates from a large pool of applicants is a typical area of AI-application[29]. Conversely, the deployment of current AI in the recruitment of top level managers is difficult to imagine[30], though the use of AI in the design of compensation packages for managers

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22 Hamdani – Hashai – Kandel – Yafeh op. cit. 229–231.

23 According to Art. 53 of the SIX Swiss Exchange Listing Rules of 23 August 2023, for example, an issuer must inform the market of any price-sensitive facts which have arisen in its sphere of activity. Price-sensitive facts are facts the disclosure of which is capable of triggering a significant change in market prices. A price change is significant if it is considerably greater than the usual price fluctuations. The disclosure of the price-sensitive fact must also be capable of affecting the reasonable market participant in his investment decision. An ad hoc announcement is required as soon as the company becomes aware of the essential elements of the matter at hand.

24 See, for example, the AI-powered trade surveillance system Prometheus deployed by SIX Swiss Exchange Regulation in order to detect capital market abuses (https://tinyurl.com/4xt397k7); see in general Enriques – Zetzsche op. cit. 13–14.

25 Hamdani – Hashai – Kandel – Yafeh op. cit. 230.

26 Art. 716a I no. 4 and 5 OR (Swiss Code of Obligations).

27 §§ 76 I, 84, 111 AktG (German Stock Corporation Act).

28 See for Swiss law Christoph B. Bühler: *Art. 717 OR*. In: Lukas Handschin (ed.): *Die Aktiengesellschaft, Generalversammlung und Verwaltungsrat, Mängel in der Organisation (Art. 698–726 und 731b OR).* Zürcher Kommentar. Obligationenrecht. Zürich, Schulthess Verlag, 3rd ed., 2018. Art. 717 OR n. 165–169.; for German law Klaus J. Hopt – Markus Roth: § 93. In: Heribert Hirte – Peter O. Mülbert – Markus Roth (ed.): *Bd. IV/2 (§§ 92–94),* Aktiengesetz – Großkommentar. Berlin, De Gruyter, 5th ed., 2015. § 93 n. 279 ss.

29 Carmen Freyler: Robot-Recruiting, Künstliche Intelligenz und das Antidiskriminierungsrecht. *Neue Zeitschrift für Arbeitsrecht (NZA)* 36, 5. (2020), 284–285.

30 See, however, Isil Erel – Léa H. Stern – Chenhao Tan – Michael S. Weisbach: Selecting Directors Using Machine Learning. *The Review of Financial Studies* 34, 7. (2021), 3226–3264.

is possible[31] and quite often discussed. Proponents see AI as an opportunity to finally solve the seemingly eternal problem of fixing compensation of board members – a task, which shareholders often cannot effectively do and shouldn't be left to the conflicted board members themselves[32]. But as already mentioned, the conflict of interest remains. The managers will exert influence on the selection and programming of AI in a way that satisfies their own interests; furthermore, the AI application will rely on data distorted by similar conflicts of interest in comparable corporations[33].

As regards the core competence of the board of directors, i.e. the making of business judgements, the role of AI is limited to a supporting function. AI namely can assist with scenario planning, stress testing and processing of relevant data[34]. In the context of mergers and acquisitions, AI can help to process large amount of data to be analysed in due diligence procedures[35]. But the final decision will be and must be a human one[36].

1.2.3. Duty to Use or not to Use AI in Corporate Management

To answer the question of whether there is a legal duty to use or not to use AI in corporate management, one has to consider the three duties of the board members, i.e. the duty of care, the fiduciary duty and the duty of equal treatment of shareholders[37]. If, in the future, AI should form part of the state of the art of corporate management due to its ability to make reliable predictions by translating large sets of data into small, manageable portions, it must be deployed. Conversely, AI must not be used under any circumstances if it proves to be unreliable or unsuitable. Thus, the configuration of the AI system regarding, for example, the use of internal or external training data, the appropriateness of data and the alignment of the system with stakeholder interests as well as the testing and supervising of the automated systems themselves become important discretionary decisions of the board[38]. The board has to build up an appropriate expertise[39].

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31 Equilar for example recently introduced ERIC, an AI-powered proxy analysis tool for compensation and governance professionals, which transforms the navigation and extraction of insights from complex SEC filings and disclosure materials (https://tinyurl.com/bdcvdkwv).

32 See, for example, Hamdani – Hashai – Kandel – Yafeh op. cit. 229.; for empirical evidence on the shortcomings of different Say on Pay models see Fabrizio Ferri – Robert F. Göx: Executive Compensation, Corporate Governance, and Say on Pay. *Foundations and Trends in Accounting* 12, 1. (2018), 61–88.

33 See also Enriques – Zetzsche op. cit. 24–25., 31–32.

34 Möslein op. cit. 7.

35 Karl Michael Popp: *Automation of Mergers and Acquisitions – Due Diligence Tasks and Automation*. Digitalization M&A. Norderstedt, Books on Demand, 2021. 19 ss.

36 See above under I. 2. a).

37 See, for example, Art. 717 OR (Swiss Code of Obligations).

38 See for the growing need for a monitoring of AI and for data governance Armour – Eidenmüller op. cit. 90–91.

39 Forrer – Zuur – Müller op. cit. 224.

If AI turns out to be a remedy for conflicts of interest, it is to be used in compliance with the board's fiduciary duty. But the directors have to ensure impartiality with regard to programming and the data basis. Directors do not have any margin of discretion in this respect because the business judgement rule does not apply in case of a conflict of interest[40].

When it comes to ensuring equal treatment of shareholders, the use of AI may be necessary to identify equal treatment requirements and distinguishing features. But the decision, whether a distinguishing feature is of significant relevance or not, is a matter of discretion and requires a balancing process, and must therefore be left to the individual board members.

1.2.4. Attribution of Knowledge

A final organisational question concerns the attribution of AI knowledge to the corporation. The traditional approach, according to which only the knowledge of the current executive body members is attributed to the corporation[41], suggests that there is no such attribution since AI cannot become a formal board member. According to the more recent communication theory approach[42], however, attribution would take place if the AI application were programmed to communicate the relevant information to the information system and the person in charge of the relevant action of the corporation were obligated to retrieve such information from the system. If, for example, a corporation were to buy a stolen car whilst being represented by one of the directors in good faith, the corporation would not acquire ownership bona fide, if the artificially intelligent contract management system noticed during the document check that the seller was not the owner of the car. The management system would be programmed to communicate the information to the director, or the director would be obligated to retrieve such information from the system before concluding the sales contract. The corporation should not be allowed to benefit from the fact that the verification is carried out separately by an artificially intelligent agent.

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40 See for Swiss law Bühler op. cit. Art. 717 OR n. 67; for German law Regierungsbegründung zum Entwurf eines Gesetzes zur Unternehmensintegrität und Modernisierung des Anfechtungsrechts (UMAG), BT-Drucks. 15/5092, 11–12.

41 See for German law Reichsgericht (RG), Juristische Wochenschrift (JW) 1935, 2044; Entscheidungen des Bundesgerichtshofs in Zivilsachen (BGHZ) 41, 282, 287; BGHZ 109, 327, 331 s.; Eberhard Schilken: *Wissenszurechnung im Zivilrecht*. Schriften zum deutschen und europäischen Zivil-, Handels- und Prozessrecht. Bielefeld, Gieseking, 1983. 127 ss.; Reinhard Richardi: Die Wissensvertretung. *Archiv für die civilistische Praxis (AcP)* 169, 5 / 6. (1969), 385., 388; for Swiss law Entscheidungen des Bundesgerichts (BGE) 137 III 460; BGE 56 II 183, 188; BGE 101 Ib 422, 437; BGE 124 III 418, 420.

42 See for German law Entscheidungen des Bundesgerichtshofs in Zivilsachen (BGHZ) 132, 30, 35 ss.; Dieter Medicus: Probleme der Wissenszurechnung. *Karlsruher Forum (Sonderheft der Zeitschrift Versicherungsrecht)* 15, 4. (1994), 11 ss.; for Swiss law Bundesgericht (BGer) 4C.335/1999 E. 5; BGer 5C.104/2001 E. 4 c) bb); Han-Lin Chou: *Wissen und Vergessen bei juristischen Personen*. Basel, Helbing & Lichtenhahn, 2002. 157 ss.

2. Liability Issues

2.1. Liability of the Directors

Directors are liable at least to the stock corporation and, under certain circumstances, to shareholders and creditors when they breach their duties of care, loyalty or equal treatment by using and causing damage to the corporation or third parties[43]. Fault of the directors might be due to premature or unsuitable use of AI, its poor selection or installation, poor instruction or monitoring of AI or due to a delegation of non-transferable tasks to AI[44]. The liability might be based on general liability rules of contract, tort or corporate law[45] or – namely in the context of bankruptcy – might follow from special liability rules such as procrastination in bankruptcy[46], mismanagement[47], failure to keep proper accounts[48] or non-payment of social security contributions[49]. If, for example, a Swiss stock corporation neglects to pay private health insurance contributions[50] due to a failure of the new self-executing human resources management tool introduced by a resolution of the board, an employee, who suffers a loss because the insurance company does not reimburse treatment costs, may demand compensation from the responsible board members. He will have to prove damage, fault, causality

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43 See, for example, § 3:24 I Polgári Törvénykönyvről (Hungarian Civil Code), § 93 AktG (German Corporate Law Act) and Art. 754, 756, 757 OR (Swiss Code of Obligations).

44 See in detail Markus Becker – Philipp Pordzik: Digitalisierte Unternehmensführung. *Zeitschrift für die gesamte Privatrechtswissenschaft (ZfPW)* 6, 3. (2020), 334., 349–353; Forrer – Zuur – Müller op. cit. 222–223.

45 See, for example, Art. 97 I, 321e, 398 II (contractual liability), Art. 41 (tortious liability) and Art. 754 ss. (corporate liability) OR (Swiss Code of Obligations).

46 See, for example, § 15a I InsO (German Insolvency Act).

47 See, for example, Art. 165 I StGB (Swiss Criminal Code): "Any debtor who in a manner other than that in Article 164 through mismanagement, in particular through inadequate capital provision, excessive expenditure, hazardous speculation, the negligent granting or use of credit, the squandering of assets or gross negligence in the exercise of his profession or the management of his assets, causes or aggravates his excessive indebtedness, causes his insolvency or, in the knowledge that he is unable to pay, prejudices his financial situation, shall be liable, if bankruptcy proceedings are commenced against him or a certificate of unsatisfied claims is issued in his respect, to a custodial sentence not exceeding five years or to a monetary penalty".

48 See, for example, Art. 166 StGB (Swiss Criminal Code): "Any debtor who fails to comply with a statutory obligation to which he is subject to keep and preserve business accounts or draw up a balance sheet, with the result that his financial position is not or not fully ascertainable, shall be liable, if bankruptcy proceedings are commenced against him or a certificate of unsatisfied claims has been issued in his respect following a seizure of assets in accordance with Article 43 of the Federal Act of 11 April 1889 on Debt Enforcement and Bankruptcy (DEBA), to a custodial sentence not exceeding three years or to a monetary penalty".

49 See, for example, Art. 52 AHVG (Swiss Act on Pension and Survivors' Insurance).

50 See for such a liability case in Swiss law Entscheidungen des Bundesgerichts (BGE) 141 III 112.

and the violation of a legal rule that serves to protect him as the injured party in a particular way[51].

When a possible breach of the duty of care and the liability of directors to the corporation is at stake, German and Swiss law apply the so-called business judgement rule, which was developed in US law[52]. According to § 93 I phr. 2 AktG (German Stock Corporation Act), there will be no violation of the duty of care, if at the time of taking an entrepreneurial decision, directors had good reason to assume that they were acting on the basis of adequate information for the benefit of the company. In any case, the decision to deploy and use a specific AI application must be considered a business judgement, i.e. a complex and multidimensional decision under uncertainty[53] principally comparable to the decision to acquire a company or not[54], to grant a loan to a company in crisis or not[55] or to conduct a trial or not[56]. In addition, the rule is only applicable to a breach of the duty of care and therefore not applicable where non-transferable tasks are delegated to AI or where there is a conflict of interest[57]. The business judgement rule is thus a privilege granted to the directors when it comes to their liability towards the corporation for breaches of the duty of care.

2.2. Liability of the Corporation

As one could see in section I., AI will gradually replace directors and employees as cause of corporate misconduct. Unless the law adapts by using classical or new imputation rules, corporations will become more and more immune to liability as they transfer tasks from directors and employees to AI[58]. As long as the legislators do not adopt new rules concerning the liability of the corporation for misconduct caused by AI, it will be up to the longstanding imputation rules and their interpretation to ensure

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51 Entscheidungen des Bundesgerichts (BGE) 141 III 112 considered Art. 159 Criminal Code as such a rule: "Any employer who breaches his obligation to make use of a deduction from an employee's salary for the payment of taxes, duties, insurance premiums or contributions or in any other way for the benefit of the employee and thus causes loss to the employee shall be liable to a custodial sentence not exceeding three years or to a monetary penalty".

52 See under Delaware General Corporation law Delaware Supreme Court opinions in Bodell v. General Gas Electric Corp., 15 Del. Ch. 119, 132 A.442; Zapata Corp. v. Maldonado, 430 A.2d 782 and Aronson v. Lewis, 473 A.2d 805 (Del. 1984); Stephen A. Radin: *The Business Judgment Rule – Fiduciary Duties of Corporate Directors.* Alphen aan den Rijn, Wolters Kluwer, 6th ed., 2009.

53 See in German law, for example, Holger Fleischer: Das Gesetz zur Unternehmensintegrität und Modernisierung des Anfechtungsrechts. *Neue Juristische Wochenschrift (NJW)* 57, 49. (2005), 3525., 3528., demanding an element of prognosis and risk.

54 In Swiss law Bundesgericht (BGer) 4A_306/2009 of 8 February 2010.

55 In Swiss law Bundesgericht (BGer) 4A_74/2012 of 18 June 2012.

56 In Swiss law Entscheidungen des Bundesgerichts (BGE) 139 III 24.

57 See for German law Regierungsbegründung zum Entwurf eines Gesetzes zur Unternehmensintegrität und Modernisierung des Anfechtungsrechts (UMAG), BT-Drucks. 15/5092, p. 11 s. and for Swiss law Bühler op. cit. Art. 717 OR n. 62–68.

58 Mihailis E. Diamantis: The Extended Corporate Mind*:* When Corporations Use AI to Break the Law. *North Carolina Law Review* 98, 4. (2020).

corporate accountability. In line with general principles of law and considering the various roles AI may play, one can distinguish five different ways of possible imputation to a corporation: AI may first be unlawfully deployed by directors. AI may furthermore act as a de facto or shadow director of the corporation, or serve as a dependant or independent agent of the corporation. The general liability for hazardous activities[59] or the liability for controlled movable things (responsabilité du gardien du fait de la chose)[60], which are not known to German or Swiss law, will not be considered here.

2.2.1. Liability for Human Directors

The corporation will be liable for damages caused by its human directors who, in the exercise of their competences, breach their duty of care, loyalty or equal treatment by using AI in a faulty manner[61]. This automatic imputation does not pose any particular problem in the field of AI because the corporation is, according to the theory of real existence of a corporation[62], directly responsible for any unlawful behaviour of its governing bodies amounting to a breach of contract or a tort in accordance with the mentioned rules. In addition, the corporation cannot invoke the privilege of the business judgement rule which is only granted to the directors when it comes to their liability towards the corporation for breaches of the duty of care. But the corporation cannot rely itself on this privilege in its relation to third parties. The rule is intended to protect directors in order to ensure that they do not shy away from risky decisions in the best interest of the corporation[63]. It is not meant to deprive injured third parties of their claims against the corporation based on general liability rules.

2.2.2. Liability for AI-Agents as De Facto or Shadow Directors

According to Swiss law, a corporation is also liable for the harmful behaviour of a de facto director[64]. De facto directors are natural or legal persons who effectively, repeatedly and decisively participate in the formation and expression of the will of the company by making decisions reserved for management bodies or by managing

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59 See §§ 6:535 ss. Polgári Törvénykönyvről (Hungarian Civil Code).

60 See Art. 1242 I C. civ. (French Civil Code) and Art. 2051 CC (Italian Civil Code).

61 See, for example, § 3:24 II Polgári Törvénykönyvről (Hungarian Civil Code), § 31 BGB (German Civil Code) and Art. 55 II ZGB (Swiss Civil Code); for the different forms of misconduct see under II.1.

62 In German law Otto von Gierke: *Die Genossenschaftstheorie und die Deutsche Rechtsprechung.* Berlin, Weidmannsche Buchhandlung, 1887. 5 ss. /174 ss.; Heinrich Dernburg: *Die allgemeinen Lehren des bürgerlichen Rechts des deutschen Reichs und Preussens*. Halle, Waisenhaus, 3rd ed., 1906. 179 ss. / 186–187 with fn. 6; in Swiss law Eugen Huber: *Erläuterungen zum Vorentwurf eines schweizerischen Zivilgesetzbuches, Bd. 1.* Bern, Büchler und Co., 2nd ed., 1914. 46–47; Entscheidungen des Bundesgerichts (BGE) 31 II 247.

63 See for the rationales behind the Business Judgement Rule Bernard S. Sharfman: The Importance of the Business Judgement Rule. *New York University Journal of Law and Business* 14, 1. (2017), 27–69.

64 Entscheidungen des Bundesgerichts (BGE) 87 II 184, 188; Bühler op. cit. Art. 722 OR n. 9.

the corporation without being effectively appointed to do so[65]. The requirements are met to the extent that AI does not have the status of a formal director. AI might also exert the necessary decisive and permanent influence on the will and behaviour of the corporation[66]. But the concept requires personhood, which is missing. Therefore, an analogy must be considered in the case of artificially intelligent de facto directors. Unlike an animal or a simple machine, an AI de facto director may come close to a human one in a way that the customary law concept of de facto directorship has not anticipated. The idea behind the imputation rule is that a company should not benefit from having the act performed by a de facto director instead of a duly appointed human director. The concept is intended to prevent abusive circumventions of legal rules and an analogy is a classical instrument to cope with such circumventions. The fact that an unlawfully acting de facto director is also personally responsible according to Art. 55 III ZGB (Swiss Civil Code) and other specific liability rules, and such liability requires personhood, should not be considered an argument against the analogy and the imputation of the AI's conduct to the corporation[67]. The competing personal responsibility of the de facto director should not be treated as a condition for the corporation's liability. The joint liability only serves to protect the injured person.

While in Swiss law, shadow directors are simply considered to be de facto directors for whom the corporation is responsible in the same way as for formal directors, English law, for instance, pays particular attention to this concept. According to Section 251 of the Companies Act 2006, a shadow director is a "person in accordance with whose directions or instructions the directors of the company are accustomed to act. A person is not to be regarded as a shadow director by reason only that the directors act (a) on advice given by that person in a professional capacity […]". If, for example, a stock corporation unlawfully neglects to pay health insurance contributions because the new AI legal assistant, following a wrong legal analysis, recommended that the board should refrain from making such payments, the liability of the corporation for its shadow director depends not only on the question of personhood and a possible analogy but also on the distinction between mere professional support or advice on the one side and permanent undue influence on decisions of the board on the other. In the example mentioned, the robo advice is close to a professional advice given by a lawyer and would therefore not be considered as provided in the capacity of a shadow director.

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65 See Entscheidungen des Bundesgerichts (BGE) 124 III 418, 420 s.; BGE 128 III 29, 30 s.; BGE 132 III 523, 528 s.; Michael Wyttenbach: *Formelle, materielle und faktische Organe – einheitlicher Organbegriff?*. Basel, Helbing Lichtenhahn Verlag, 2012. 239–240.; Alexander Vogel: *Die Haftung der Muttergesellschaft als materielles, faktisches oder kundgegebenes Organ der Tochtergesellschaft*. St. Galler Studien zum Privat-, Handels- und Wirtschaftsrecht. Bern, Haupt Verlag, 1997. 301.

66 Forrer – Zuur – Müller op. cit. 220. therefore consider a liability of a corporation for artificially intelligent de facto directors to be possible.

67 The Swiss Federal Tribunal, however, took a different view concerning the liability of a Market Maker who was said to have delegated services to an algorithm in violation of the prohibition of substitution. It rejected the liability of the Market Maker according to Art. 399 I OR (Swiss Code of Obligations) arguing, that the client should also have direct claims against the substitute according to Art. 399 III OR (Swiss Code of Obligations) and that these claims would require personhood of the substitute (Bundesgericht [BGer] 4A_305/2021 cons. 7.3.1).

2.2.3. Contractual Liability for AI-Agents

Jurisdictions widely recognise that a corporation is liable as debtor of an existing obligation for harmful acts of dependant or independent agents who are involved in the fulfilment of the obligation with the corporation's knowledge and will[68]. If, for instance, an airline uses a chatbot for customer contact, it will function as such an agent. If the chatbot informs the client that the airline will grant a discount on the condition that a receipt is submitted within 90 days, and the airline, referring to the contradicting information on the company website, then refuses to grant such discount retroactively, it might be responsible for the damage caused to the client by imputation of the misrepresentation by the chatbot[69].

But again, this classical imputation mechanism is not directly applicable due to AI's lack of personhood and its inability to act culpably[70]. One should, however, likewise consider an analogy when the AI is acting in an autonomous way comparable to a human being and not deployed as a mere tool[71]. The imputation according to § 6:148 Hungarian Civil Code or similar rules in other jurisdictions is based on the idea that a person who benefits from the use of an auxiliary should be liable for the associated damage, for which it would have been equally liable if it had acted on his own. The same applies to the case where a digital system is used instead of a human assistant or a legal person[72]. As with the deployment of an employee, the company is also in a position to manage the risks of an electronic division of labour. When arguing in favour of an analogy, the necessary degree of a human-like autonomy of artificially intelligent systems becomes the key question. In this respect, one can mainly differentiate between a human dominated "if-then-system" and an independently acting and self-learning system[73], or distinguish in a more sophisticated way between different degrees of autonomy ranging from a totally human dominated system via a pre-selecting or executing system to an independent system overriding the human being in the decision-making process[74]. The European Parliament defines a robot's autonomy "as the ability to take decisions and

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68 See, for example, § 6:148 Polgári Törvénykönyvről (Hungarian Civil Code), § 278 BGB (German Civil Code) and Art. 101 OR (Swiss Code of Obligations).

69 See Moffatt v. Air Canada, 2024 BCCRT 149.

70 Sascha Briner: Die Revolution des Brokergeschäfts und deren Folgen. *Haftung und Versicherung (HAVE)* 16, 4. (2017), 372., 380–381. and Forrer – Zuur – Müller op. cit. 220–221. therefore reject the applicability of Art. 101 OR (Swiss Code of Obligations).

71 See, for example, in favour of an analogy to Art. 101 OR (Swiss Code of Obligations) Christaphor Yacoubian: Digitale Systeme als «Erfüllungsgehilfen» – Relevanz der fehlenden Rechtsfähigkeit? Zugleich Anmerkungen zu BGer 4A_305/2021 vom 2. November 2021. *Aktuelle Juristische Praxis (AJP)* 33, 4. (2023), 412., 415–419.; Beatrice Borio: Haftungsrechtliche Herausforderungen bei autonomen Pflegerobotern. *Pflegerecht* (2021), 223., 225–226.; Freyler op. cit. 289., however, denies the possibility of a sufficient autonomy of AI which always relies on human programming and training.

72 See concerning § 278 BGB (German Civil Code) Becker – Pordzik op. cit. 341.

73 See, for example, Susanne Beck: Der rechtliche Status autonomer Maschinen. *Aktuelle Juristische Praxis (AJP)* 26, 2. (2017), 183., 188.

74 See for a scheme with ten gradations of autonomy Sivio Hänsenberger: Die Haftung für Produkte mit lernfähigen Algorithmen. *Jusletter* 26 November 2018, n. 7.; Philipp Hacker: Verhaltens- und

implement them in the outside world, independently of external control or influence", while at the same time clarifying that "this autonomy is of a purely technological nature and its degree depends on how sophisticated a robot's interaction with its environment has been designed to be"[75].

If one denies imputation by way of analogy, one could also hold the company liable by arguing that in contract law, there is a fault presumption in case of misconduct of the debtor, which can only be overturned if the debtor proves that he has carefully selected, instructed and supervised the AI[76]. But this approach seems only appropriate for tool-like and not for human-like automated systems. This is because a contractual debtor is always responsible for culpably acting auxiliary human beings even if he can prove that he has carefully selected, instructed and supervised the auxiliary[77].

Another problem associated with this imputation rule concerns the standard of diligence. One may wonder if it should be based on human capabilities or on those of the AI. The answer should primarily depend on the agreement between the parties. In case of doubt, the creditor can expect the corporation as debtor to guarantee an average standard of corporate organisation characterized by the division of human labour[78]. This standard then also applies to the use of AI regardless of whether the digital systems have a humanoid appearance or demeanour. However, if the use of AI has been discussed by the parties and is an intended part of the fulfilment of the contract, the creditor may rely on special AI-abilities but, on the other hand, should not be allowed to refer to higher human standards[79]. One must determine whether the system used falls short of the technical quality standards applicable to systems of the type available at a given time. This should be considered equivalent to the requirement of culpable behaviour, which must be met in the case of a human assistant[80]. One should focus exclusively on the incorrect output of the automated system (e.g. a wrong answer

Wissenszurechnung beim Einsatz von Künstlicher Intelligenz. *Rechtswissenschaft (RW)* 9, 3. (2018), 243., 251. differentiates between week, medium and strong autonomy.

75 European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)), document no. P8_TA(2017)0051, sect. "Liability", Z.AA.

76 This is why in Moffatt v. Air Canada, 2024 BCCRT 149 the tribunal held that "the applicable standard of care requires a company to take reasonable care to ensure their representations are accurate and not misleading", rejecting Air Canada's argument that the chatbot was a separate entity and without considering any imputation rule because the chatbot had been part of Air Canada's website; see also for German law Freyler op. cit. **289.**

77 Forrer – Zuur – Müller op. cit. 221–222., however, consider this limitation of liability to be appropriate.

78 See concerning § 278 BGB (German Civil Code) and a human debtor standard Becker – Pordzik op. cit. 341.; see in general concerning Art. 101 OR (Swiss Code of Obligations) Entscheidungen des Bundesgerichts (BGE) 130 III 591, 605 and Bundesgericht (BGer) 4A_58/2010 E. 3.2.

79 See for Art. 101 OR (Swiss Code of Obligations) Yacoubian op. cit. 419.; Becker – Pordzik op. cit. 341., however, favour a human standard of liability.

80 The majority of the authors, however, states that at least current AI is not able to act culpably because this presupposes a recognition of the behaviour's consequences and an acting in accordance with this knowledge; see Silvio Hänsenberger: *Die zivilrechtliche Haftung* für *autonome Drohnen unter Einbezug von Zulassungs- und Betriebsvorschriften.* St. Gallen, Carl Grossmann Verlag, 2018a. 153.

of a chatbot due to a false data basis or an error in programming) and not require an element of "fault" due to incorrect autonomous behaviour of the system. The distinction between incorrect programming and incorrect training of the AI on the one hand and the AI's own failure on the other[81] mainly plays a role with respect to the liability of the manufacturer, but not that of the user. When it comes to the liability of the user, the human trainer or the programmer cannot be considered to be auxiliaries of the debtor when they have trained or programmed the AI, as it is usually the case, before the contractual obligation was established by the user[82].

2.2.4. Tortious Liability for AI-Agents

According to a last classical rule, the tortious behaviour of dependant agents can be attributed to the corporation where the corporation, as their employer, fails to prove that it has taken all due care in selecting the agents, instructing and supervising them[83]. This last rule is not a real imputation rule. It is based on proper fault on the part of the representatives of the corporation and therefore no fault of the AI is required. If, for example, a corporation is running a taxi business with some taxis being driven by human beings and others by AI, this rule might come into play when one of the self-driving taxis causes an accident due to a lack of care in the selection, training or supervision of the automated system by the corporation's representatives. As in the before mentioned imputation rules, personhood and in this case particularly natural personhood of the agent is required. When considering an application of the rule by analogy to AI-agents[84], it is necessary to examine under which conditions an AI can be regarded as dependent[85]. A functional approach and a comparison with similar human activities and relationships appear appropriate. If, in the given example, the human taxi drivers are considered to be dependant, this should also apply to self-driving cars insofar as they function in the same way as their human counterparts when transporting clients in accordance with the instructions of the principal. Dependency cannot be dismissed simply because there is a certain degree of autonomy, e.g. with regard to driving and decision making, as this also applies to human drivers. This autonomy is precisely what is needed to justify the analogy. The dependency relationship exists with

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81 See, however, for this distinction Hänsenberger (2018a) op. cit. 150. and Freyler op. cit. **288.**

82 In this respect, the situation is the same as for manufacturers or sellers of tools, who are also not regarded as vicarious agents of a later established contractual obligation demanding the use of the tool; see, for example, in Swiss law Rolf H. Weber – Susan Emmenegger: *Allgemeine Bestimmungen, Die Folgen der Nichterfüllung (Art. 97–109 OR)*. Berner Kommentar. Schweizerisches Zivilgesetzbuch. Das Obligationenrecht. Bern, Stämpfli Verlag, 2nd ed., 2020. Art. 101 OR n. 50.

83 See, for example, § 6:540 I and § 6:542 I Polgári Törvénykönyvről (Hungarian Civil Code), § 831 BGB (German Civil Code) and Art. 55 I OR (Swiss Code of Obligations).

84 In favour of an application of § 831 BGB (German Civil Code) by analogy Becker – Pordzik op. cit. 341; against an application of Art. 55 I OR (Swiss Code of Obligations) because of the missing personhood and the legally uncertain handling of the autonomy criterion as a prerequisite for the analogy Hänsenberger (2018a) op. cit. 167.

85 Hacker op. cit. **265**–266.

respect to the corporation, which deploys the AI-system in the course of its activity and is in a position to define, influence, control and stop its use. It does not exist with regard to the person who programmed and trained it.

3. Conclusion

The management of corporations is not a preferred field of current AI applications. At present, AI may provide some support to business judgments, but it is still a long way from being able to autonomously manage companies. Self-driving companies are as yet technically and legally impossible. And this holds true even for more straightforward scenarios such as subsidiaries or special purpose vehicles. Identifying regularities or irregularities in historical data might be useful in some situations, but reliance on such data can prove to be problematic in social and dynamic contexts[86]. It is more useful in a planned economy and in large enterprises than in a market economy and in small and medium-sized enterprises.

As AI lacks legal personhood up to now, liability for AI systems can only attach to the producer and/or the user. If a corporation uses AI in the management of the corporation or in the course of its activities, the longstanding imputation rules which exist in Hungarian, German and Swiss law concerning the misconduct of directors, de facto or shadow directors and dependent or independent agents can only be applied by analogy when the AI system is acting with a certain degree of autonomy in a functional equivalence to humans and not as a simple tool. In some jurisdictions like Hungary, the general liability for hazardous activities may constitute another basis for liability[87]. This is also true concerning the liability for controlled movable things (responsabilité du gardien du fait de la chose) which is, for example, known in French or Italian law[88].

It is only in the future that AI may perform as good as or better than humans in every dimension of intelligence. Then, a robot board member and a completely self-driving company become conceivable and will challenge corporate law. Then, a general authorization of self-driving companies by the legislator will be necessary – with or without legal personhood. In accordance with the current system applicable to juridical persons, there should be at least some form of state control upon registration[89]. The AI system must be reliable and ensure compliance with all mandatory legal rules. In this context, the state might offer a legal operating system for AI applications that is based on and conforms with its corporate laws[90]. Since totally self-driving companies are able to manipulate the location, where the day-to-day management of the corporation takes place, one has also to reconsider the real seat theory in international corporate law. It must be replaced by a link to the main branch of the enterprise, the centre of

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86 Enriques – Zetzsche op. cit. 26.

87 See §§ 6:535 ss. Polgári Törvénykönyvről (Hungarian Civil Code).

88 See Art. 1242 I C. civ. (French Civil Code) and Art. 2051 CC (Italian Civil Code); proposing a comparable liability for robots under Swiss law Borio op. cit. 227–228.

89 See Beck (2017) op. cit. 190.

90 Armour – Eidenmüller op. cit. 114.

main interest or a virtual registered office with some safeguards[91]. In the future, AI may also become liable as such. One would then have to think about implementing or adapting the traditional creditor protection mechanisms such as capital requirement rules, a compulsory insurance or shareholder liability[92]. The privilege of the business judgement rule should then also apply to autonomous AI decision-making. The privilege of the rule is not specifically granted to natural persons but to business decisions under considerable uncertainty in general[93]. But all these issues should not be a problem for the near future.

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