



Impact of Artificial Intelligence on Corporate Board Diversity Policies and Regulations

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Abstract

With the use of artificial intelligence (AI) technologies in company activities, discussions on how to use AI in company management have emerged. Although AI is not legally recognised as a director in company law, there are examples of robot directors such as Vital, which have managed to get a seat in the corporate boardroom. Today, AI is on the verge of playing an important role in corporate governance. However, whether it has a seat on the board of directors or an important role in decision making is still a hot topic. Another critical discussion in the field of corporate governance in recent years is board diversity, which aims to improve the corporate decision-making process and create efficiency. This article attempts to anticipate the potential impact of AI on corporate board diversity policies and regulations. Therefore, this article seeks to examine the effects of the inevitable use of AI in the corporate decision-making process on corporate board gender diversity discussions and regulations under three possibilities: AI as a board member, AI as an enabler to assist a decision maker or AI being used to help decision making such as selecting board members.

Keywords Artificial intelligence · Board diversity · Gender quota · Corporate governance · Corporate law

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1 Introduction

Technology has a dramatic effect on many fields with the help of the internet network's widespread access at the end of the last century and the extensive usage of artificial intelligence (AI) from the beginning of this century.¹ As a result, new technological developments appear in integrated applications in all areas of daily life and make people's lives more comfortable with their rapid growth. Technology and business have always been intertwined and have supported each other in human history: steamships, electricity, railroads, aircraft, and the internet, and today the examples of artificial intelligence (AI), blockchain, metaverse and distributed ledger technologies (DLT)² prove this argument. In recent years, AI concepts have begun to offer solutions to engineering problems and affect areas such as social sciences, health sciences, and educational sciences. By ushering in a new technological revolution, organisations are now determining how to utilise AI to help them make faster, better, and more productive decisions.

As stated by Surden,³ AI not only relates to robots, and AI is not a 'thinking machine' as many people considered.⁴ Terminologically, AI may be defined as something which is not natural and is related to machines such as computers. While 'intelligence' is defined as the capacity to reason, learn, and comprehend, AI is not really intelligent since it cannot determine what or why it is doing something. AI is just analysing and following the instructions programmed and designed by humans. Therefore, AI is defined as 'using technology to automate tasks that normally require human intelligence'.⁵

AI has many different aspects,⁶ such as machine control (robotics and autonomous machines) and performs different duties, such as machine learning and expert systems.⁷ In order to demonstrate the critical role of AI in decision-making processes, the legal profession may be an excellent illustration. We have witnessed a remarkable expansion and adaptation of AI in legal practice over the years.⁸ Categorising written texts, managing information and communication, investor profiling,

¹ Godwin et al. (2021).

² See for more information on the innovative functional aspect of DLT technology and its implications for companies, Lener and Furnari (2020); and the contributions in Godwin et al. (2021).

³ See Surden (2019), p 1310.

⁴ Ibid., p 1309; Mills (2018).

⁵ See Surden (2019), p 1308.

⁶ See Legg and Bell (2020), p 38.

⁷ In this paper, all of the technical equipment that can support the decision-making process of companies is expressed with artificial intelligence as a general concept.

⁸ The 'Artificial Intelligence Judge' concept, for example, was created in China in 2019. On WeChat, a 'mobile court option' enables users to file cases, conduct hearings, and exchange evidence without physically appearing in court. In this mobile court, the WeChat app, which AI drives, enables litigants to appear via video as an 'Artificial Intelligence Judge', complete with an on-screen avatar prompting them to submit their arguments. Although this mobile court has particular critiques, given the present scenario of the processing of a large number of cases by relatively few judges in China, it would be beneficial to promote access to justice if mistakes are rectified and the system is improved. For more detailed information and analysis, see Peng and Xiang (2019), p 346; Park (2020), p 46–48. For more information about advanced technologies in dispute resolution, see Kaya et al. (2019).

summarising and reviewing related instances with intelligent search algorithms, and even following patterns by utilising decision data gathered prior to court cases and developing decision support systems for new situations can all be considered to be key application areas for AI.⁹ Nowadays, AI is used in almost all public or private institutions' decision-making processes.¹⁰ Actually, using AI is not a choice but an unavoidable necessity for almost all institutions, as it is seen that AI completes increasingly complicated tasks much better than humans. Thus, we will only witness a wider and more complicated use of AI in all decision-making processes of institutions.

Between 2020 and 2022, when the COVID-19 outbreak was most severe, the aspects of business life changed and many businesses could not continue operating normally.¹¹ This era once again demonstrated the critical nature of artificial intelligence. Because AI has a significant potential for the company's decision-making process, it can operate in a sector that can be handled remotely rather than by people, therefore avoiding losses and gaining expert guidance.¹² Indeed, an AI appointed as a manager or director may help a firm to make better decisions by bringing a professional perspective to the management and speeding up operations.¹³ As stated by Armour and Eidenmüller,¹⁴ there are numerous practical applications of AI in corporate functions, including 'information and communication management, investor profiling, product development, monitoring, profitability, risk, and compliance, and decision-making regarding corporate strategy, investment, personnel selection, procurement, manufacturing planning and control, pricing, sales, and marketing'. Therefore, AI in corporate governance has the potential to provide businesses with 'next-generation issue solving, market forecasting, and risk management techniques' that are light years ahead of traditional approaches.¹⁵

It is possible to claim that appointing AI directors/managers or at least using it in decision-making processes will have significant advantages, especially considering how busy company directors and executives are today and company management is a job that requires complete efficiency. Due to the directors' limited time, the boards delegate the majority of decision-making authority for the company's day-to-day administration to the executives, who are full-time professionals.¹⁶ Moreover, if the company decides to invest in a new country or business field, obtaining help from an AI with an extensive understanding of that area might be a massive advantage.¹⁷ As a result, regardless of who makes the decisions, AI will be at the centre of the company's decision-making process in the near future.

⁹ AI Now Institute (2018)

¹⁰ Colson (2019).

¹¹ For a more detailed analysis of the impact of the uncertainty in the COVID-19 pandemic process on companies and business life, see Enriques (2020), p 3.

¹² See Ndichu (2021).

¹³ Surden (2019), p 1309.

¹⁴ See Armour and Eidenmüller (2020), p 96.

¹⁵ Govenda (2021).

¹⁶ Davies (2000); Pugh (2019).

¹⁷ See Hoeven (2021).

In a 2017 interview with WIRED magazine, Stephen Hawking expressed one of his concerns about AI, saying, 'I fear that AI may replace humans entirely.'¹⁸ At the point that we have reached today, although AI has not completely replaced humans, it is being discussed whether AI can be appointed to replace human directors in companies.¹⁹ Indeed, due to the effect of rapid technological developments, it looks like AI will be one of the essential parts of corporations, maybe also corporate boardrooms as a director very soon. On the other hand, it should not be forgotten that the use of AI might have significant hazards in addition to its benefits, and that it may do harm, necessitating legal action.²⁰ Therefore, using AI in boardrooms as directors or in decision-making processes in companies has some advantages, but also some disadvantages and maybe some potential dangers.²¹

Using AI in the corporate decision-making process gives rise to several legal discussions. The first concerns the appointment of AI as a board member. Even though AI does not have a personality, appointing an AI as a board member has already started. The second discussion concerns leaving decision making in corporations to AI and the possible implications of this practice. The third subject of discussion is about making decisions by referring to the results of AI's analysis of the data. Appointing AI as board members has not yet been fully vitalised but leaving decision making to AI or obtaining help from AI in decision-making processes is already very common business practice.

In 2014, Deep Knowledge Ventures²² assigned an AI as the sixth member of its board called Vital (Investment Tool Verification to Advance Life Sciences).²³ Furthermore, like other human board members, this AI had the ability to 'vote on whether the business invested in a specific startup'.²⁴ In fact, this AI did not receive corporate director status due to Hong Kong's corporate law rules.²⁵ Vital was considered to be simply a 'board member with observer status' by other directors. Vital, on the other hand, is widely considered as 'the world's first AI company director' under all conditions.²⁶ Vital has importance as it is the first example of how AI can enter the company board and have an impact on decision making. According to a World Economic Forum survey²⁷ of 800 IT professionals, 45% of respondents believe that AI directors will be appointed to the board of directors by 2025.²⁸ Not long afterwards, just one year after this study, in 2016 a software company called

¹⁸ See Nast (2017).

¹⁹ See Petrin (2020), p 1029.

²⁰ Froomkin and Colangelo (2015), p 7.

²¹ For more detailed information and discussions, see Hickman and Petrin (2021).

²² Deep Knowledge Ventures is a venture capital company expanding in Hong Kong that specialises in medications for age-related diseases and regenerative medicine initiatives.

²³ See Dudkin (2020); Wile (2014); Möslein (2018), p 649; see also the contributions in Armour and Eidenmüller (2020), p 88.

²⁴ Möslein (2018), p 649.

²⁵ Burridge (2017).

²⁶ Möslein (2018), p 650.

²⁷ World Economic Forum (2015).

²⁸ Belcastro (2019), p 272.

Tieto became the first in the Nordic nations to nominate an AI named Alicia T. to its leadership team in a new data-driven business unit, allowing this AI to participate in team meetings and to vote on the business direction.²⁹

It should be noted that utilising AI to choose directors is a feasible alternative. Indeed, well-known and prominent companies like Ikea, Intel and Vodafone already employ algorithmic decision-making computers in human resource recruiting and development.³⁰ Thus, the appointment of an AI which is practically always available to the firm's executive team, or AI to assist in decision making instead of appointing a director, may affect the company in several different aspects.³¹ For example, in 2018, the CEO of the California-based software company Salesforce stated that an AI called 'Einstein' would attend weekly employee meetings and comment on the board's ideas.³²

In improving corporate decision-making processes and creating efficiency, another important discussion in recent years is board diversity. The latest studies indicate that more diverse boards create better decision-making quality and facilitate more successful companies. There are also social justice discussions related to board diversity rules. Thus, there are political and business campaigns in almost all legal systems to accomplish more diverse corporate boards. This broad acceptance of the necessity for better board diversity also covers board gender diversity. Accordingly, corporate boards must include both men and women on them to increase the quality of decision making. Moreover, the percentage or number of women directors must reach a particular threshold to be effective.

There are many voluntary business initiatives to improve board gender diversity. On the other hand, there are also compulsory quota rules in many countries to achieve more gender-diverse boards.³³ The board diversity discussions are very vivid, having already created intensive soft and hard law regulations. Although soft law and hard law regulations, sanctions and voluntary incentives help to increase the number of women directors, there is still a need to improve board gender diversity in companies. For example, some countries have had difficulties in increasing the number of female directors on boards despite establishing a gender quota.³⁴

Moreover, there may be grounds for non-compliance with the female quota due to heavy or light sanctions, as will be discussed in this paper. However, this factor has raised the question of whether AI, one of today's most significant conveniences, can help to ensure gender diversity in companies. The examples above demonstrate that there were already some examples of AI directors despite certain significant legal obstacles.³⁵ Our question here is whether it is possible for artificial intelligence to be utilised as a director or as a management assistant in companies in order to contribute to gender diversity on the board of directors. Furthermore,

²⁹ Bloomberg (2016).

³⁰ See Köchling and Wehner (2020); Daugherty and Wilson (2018).

³¹ Pugh (2019), p 1.

³² Petrin (2020).

³³ See Eroğlu (2014).

³⁴ Cabo et al. (2019), p 612.

³⁵ Möslein (2018), p 649.

should the implementation of women's quotas in firms continue if AI accomplishes this diversity?

We believe that improving corporate board quality both by using technology and AI and diversifying boards are two of the most important current corporate governance issues. Thus, this article examines interactions between the use of AI in corporate decision making and board gender diversity. In the following sections, we will analyse the effects of the inevitable use of AI in the corporate decision-making process on corporate board gender diversity discussions and regulations under three possibilities: AI as a board member, AI as an enabler to assist the decision maker or AI being used to help decision making such as selecting board members.

Following this introduction, the first part of the article will very briefly discuss the regulation of AI taking examples from the approaches within the European Union (EU). The second part will scrutinise corporate board diversity discussions and regulations by focusing on gender diversity. The third part will consider the role of AI in the corporate decision-making process in corporations. The fourth part will examine the interaction between the role of AI and gender diversity discussions and regulations. Finally, a conclusion will follow.

2 Regulation of AI

Rapid developments in the interaction between AI and company law, such as the desire of companies to appoint AI require the regulation of AI to be discussed in detail. For example, and most importantly, the legal status of AI should be initially determined. We will only provide brief examples regarding the regulation of AI by taking developments in the EU into account.

Considering the regulation of AI, the EU is currently debating the principles and regulations that should be adopted to control the use of artificial intelligence through its draft law entitled 'the Artificial Intelligence Act.' The Artificial Intelligence Act aims to protect EU citizens' fundamental rights while also providing legal certainty in the AI industry. In addition, this Act establishes a broad framework for developing, marketing and using artificial intelligence products, services, and systems across European countries.³⁶ Consequently, one of the Act's main goals is to encourage the creation of a single market for 'lawful, safe, and trustworthy AI' applications while also limiting market fragmentation.³⁷ Academics, civil society organisations, and governments believe that the proposed Artificial Intelligence Act will address rising concerns in Europe and beyond about how AI and other types of algorithmic decision making are undermining human rights, economic rights, and social security. Indeed, individuals may not completely appreciate the influence of technology in their daily life if there are no such laws in place. Particularly for marginalised groups of skin colour, religion, or gender, artificial intelligence systems can lead to mistakes, false detention and algorithmic discrimination.³⁸ Additionally, the

³⁶ Kop (2021), p 2.

³⁷ Ibid.

³⁸ The Star (2021).

European Commission (the Commission) has focused on AI and company law and it has stated that this is an issue that it wants to investigate further.³⁹ Accordingly, in order to recognise and overcome some potential problems and dangers regarding AI, the EU published a 'Guideline' which is 'The High-Level Expert Group's Policy and Investment Recommendations for Trustworthy AI' in April 2019.⁴⁰

The Guideline aims to promote trustworthy AI by concentrating on three essential components that must be met throughout the system's life cycle. It must first be lawful, which means that it must adhere to all relevant laws and regulations. Second, it must be ethical, meaning that ethical values and principles are followed. Third, it must be technically and socially robust since AI systems may do unexpected damage even with the best intentions. According to the Guidelines, each component is essential but not sufficient for establishing trustworthy AI. In a perfect world, all three aspects work together and overlap. In reality, if there are conflicts between these elements, society should endeavour to address them.⁴¹ It is also recommended that AI systems meet seven key requirements to ensure reliable development, deployment and use. 'Human agency and supervision, technical robustness, safety, privacy and data governance, openness, diversity, non-discrimination and justice, environmental and social well-being, and accountability'⁴² are the most significant requirements.⁴³

All of the titles specified in the Guidelines⁴⁴ are fairly noteworthy and need to be addressed. Therefore, in order to provide suggestions for the use of AI in companies, there is a need to analyse various issues, especially the ethical standards that corporations (also shareholders and directors) must adhere to, as well as technological robustness and safety, privacy and data governance. We gave the EU as an example in the regulation of AI, which indicates that there is a long way to go before all-embracing regulation can be achieved. However, even without the regulation of AI, the extensive use of AI is now a reality.⁴⁵ This means that corporations are already facing all these problems when using AI at any level. Thus, we will proceed to discuss board diversity.

3 Board Diversity Discussions

In many countries around the world, rules regarding the qualifications of board members have been introduced in companies to increase economic efficiency, to increase corporate governance standards, to ensure social equality and justice, and to provide for the diversity of the board with similar concerns. These rules show that

³⁹ For more information see Hickman and Petrin (2021), p 1.

⁴⁰ European Commission, Communication from the Commission to the European Parliament, the Council and the European Economic and Social Committee and the Committee of the Regions, Building Trust in Human-Centric Artificial Intelligence, COM(2019)168 final, 8 April 2019.

⁴¹ Ibid.

⁴² For more information, see Castets-Renard (2022), p 104.

⁴³ See Leimanis and Palkova (2021).

⁴⁴ Ibid.

⁴⁵ Castets-Renard (2022).

the shareholders do not have unlimited discretion in appointing board members and that the board of directors' primary goal is to guarantee the company's performance in the best interests of its shareholders.⁴⁶ Instead, they have specific features and a certain ratio and/or a certain number of members is required to be in the corporate boardrooms. For example, current corporate governance regulations and legislative amendments have primarily focused on board composition as a valuable tool for raising corporate governance standards.⁴⁷

The board of directors and how it takes decisions is the first thing that investors, regulators, and analysts look at when evaluating a company for investment.⁴⁸ This analysis also encourages directors and shareholders to consider their board's composition through a diversity lens to guarantee that the board has the necessary competences to carry out its responsibilities effectively.⁴⁹ In joint-stock companies, the board of directors is nominated by the shareholders as a general rule (with some exceptions). Thus, the shareholders determine the members of the board by using their rights in the annual general meeting. Qualifying rules for board membership are not intended to be an exception to this general principle. Thus, the rules determining qualifications require a particular qualified member but leave the selection of these members and the determination of the candidates to the discretion of the general meeting and the shareholders or, in exceptional cases, the authorised institution for election.

The company may determine the required qualifications of the board of directors with its own internal regulation. However, although companies have the right to determine the qualifications of members of the board of directors with their own internal regulations, they generally refrain from making regulations that limit the shareholders' discretion. For this reason, some qualifications that the members of the company board of directors should possess in matters such as professional management, institutionalisation, the protection of minority shareholders, ensuring social justice and equality, which are outside the general rules of company law, are determined by the will of the legislator or regulators from the outside, rather than the internal regulations of the company.⁵⁰

According to traditional corporate law rules, the priority of companies and company directors is to increase the wealth of the shareholders.⁵¹ However, in recent years, this view has been changed for the reasons mentioned earlier.⁵² Over the last few years, the importance of environmental, social, and governance (ESG) issues has increased dramatically. According to data from the Global Sustainable Investment Alliance, the proportion of financial assets invested based on ESG-related principles increased to 36% in 2020, up from slightly over 20% in 2012.⁵³ European

⁴⁶ See Kang (2020); Choudhury (2014), p 512.

⁴⁷ Sarhan et al. (2019).

⁴⁸ Hillman and Dalziel (2003); McIntyre et al. (2007).

⁴⁹ Kang (2020), p 10.

⁵⁰ For more discussion, see Eroğlu (2014), p 581.

⁵¹ Shill and Strand (2021), p 37.

⁵² Ibid.

⁵³ Global Sustainable Investment Alliance (2021).

asset managers have invested USD 12 trillion of the more than USD 35 trillion in sustainable assets, whereas US asset managers have invested USD 17 trillion. Moreover, especially with the increase in the importance given to ESG in companies, the diversity of the board of directors⁵⁴ has also gained in importance.⁵⁵ The diversity of board members is one of the topics that have gained importance after corporate scandals such as the Enron crisis,⁵⁶ among other things.⁵⁷ According to scholars and practitioners, a homogenous board of directors can create substantial ethical, political, and economic difficulties.⁵⁸ The focus has been mostly on demographic diversity, as many institutional investors believe that enhancing corporate governance and reaping the advantages of more demographically diverse boards is one of the most important ways to improve the business performance of companies.⁵⁹ Therefore, a study by Credit Suisse shows that investors are becoming more interested in the subject of diversity.⁶⁰

According to Solarino and Torchia,⁶¹ one of the important contributions of diversity is that diversity in boardrooms ensures the existence of a variety of thinking styles that lead to more effective problem solving and more creative decision making in company management.⁶² Scholars⁶³ promoting this argument agree that board performance is dependent on social-psychological processes in boardrooms and that board demographics enhance contacts, and task conflict,⁶⁴ thereby impeding management grouping.⁶⁵ As a result, more diversity results in less insular decision making and boosts the company's variety of views,⁶⁶ strategic shift,⁶⁷ and creativity.⁶⁸ In this case, it is also suggested that the board of directors' diversity is critical to its performance, since dealing with strategic difficulties necessitates a varied pool of skills and viewpoints.⁶⁹ Therefore, board diversity will increase the quality of

⁵⁴ The 'business case' for board diversity has historically been supported by two primary perspectives: resource dependency and agency theories, which are concerned with the service and control duties of boards. For more information, see; Ararat et al. (2015).

⁵⁵ Shill and Strand (2021), p 37.

⁵⁶ Solarino and Torchia (2021), p 3.

⁵⁷ Corporate governance, corporate social responsibility, corporate compliance, minority shareholder protection, transparency, monitoring, the liability of directors; those are some examples of topics which have gained importance after the corporate scandals in developed markets such as Enron, and World-Com. For more information see Ararat and Ugur (2003); Gillana and Martin (2007); Watson (2004), p 6; Baer (2009); Brown (2005); Griffith (2016), p 2077.

⁵⁸ Solarino and Torchia (2021), p 3.

⁵⁹ Ibid., p 4.

⁶⁰ Klerk et al. (2021).

⁶¹ Solarino and Torchia (2021), p 4.

⁶² Post et al. (2021), p 1.

⁶³ Forbes and Milliken (1999).

⁶⁴ Westphal and Bednar (2005).

⁶⁵ Knight et al. (1999).

⁶⁶ See Milliken and Martins (1996); Westphal and Milton (2000).

⁶⁷ Post et al. (2021), p 2.

⁶⁸ See Torchia et al. (2011); Kang (2020).

⁶⁹ Hakovirta et al. (2020), p 116.

corporate policy decisions and create legitimacy of representation.⁷⁰ A board with greater diversity will be perceived as more legitimate since it will better represent the wishes of the shareholders.⁷¹ Therefore, in homogenous board structures where there is no diversity, the independence of ideas may be damaged, and the bias of some parties may be influential in decisions that will adversely affect the company's business performance.⁷²

Functional and educational background, industrial experience, social connections, insider positions, gender, and ethnicity are all factors that influence board composition diversity. In addition, the individual features of directors represent their fundamental views, attitudes, and cognitive perspectives, which influence how boards work and the outcomes of organisations.⁷³ Therefore, board diversity becomes an essential factor for evaluating board selections and a requirement for the success and continuance of the company.

3.1 Regulatory Discussions on Board Gender Diversity

3.1.1 The Role of Board Gender Diversity

In recent years, among other things, diversity discussions have focused on gender diversity in corporate boardrooms.⁷⁴ Shareholders and regulators agree that increasing gender diversity in the boardroom is good practice.⁷⁵ In addition, it has been proven in several studies that there is a correlation between company performance and gender diversity.⁷⁶ A recent study by Credit Suisse tracked company performance from 2010 to 2019 and found that companies with gender diversity in senior management and the boardroom are more valuable and perform better.⁷⁷ In a similar study covering 2015 and 2016, MCSI⁷⁸ found that companies with strong female leaders on their boards outperform the market.⁷⁹ Accordingly, a recent study has evaluated the association between the number of female directors nominated and the carbon emissions of publicly traded corporations. As a consequence of this study, it has been demonstrated that a 1% increase in female managers results in a 0.5% reduction in CO₂ emissions, among other advantages.⁸⁰

⁷⁰ Shill and Strand (2021), p 34.

⁷¹ Ibid.

⁷² Ibid.; Shill (2020), p 1843; Nili (2016); Page (2009), p 237.

⁷³ Hambrick and Mason (1984).

⁷⁴ Nazliben et al. (2021), p 10; Ararat and Ugur (2003); Gul et al. (2011); Adams and Ferreira (2004); Campbell and Mínguez-Vera (2008); Jianga et al. (2021).

⁷⁵ Fetherolf (2020).

⁷⁶ Joy et al. (2007); Joecks et al. (2012), pp 61-72; Marinova et al. (2016), p 1777.

⁷⁷ Klerk et al. (2021); Credit Suisse (2019).

⁷⁸ Eastman et al. (2016), p 6.

⁷⁹ See Shill and Strand (2021), p 44; Gender diversity in corporate boardrooms is also a concern for businesses that must be ethically evaluated, as it impacts overall social welfare and community equity. For more information, see Huang et al. (2020); Kang (2020).

⁸⁰ Altunbas et al. (2021), p 20.

All of this requires a female thinking perspective to decision making rather than male perspectives or even genderless thinking approaches. Thus, not only one female member but also a group of female board members are more efficient as they reflect the female perspective more efficiently when there is more than one female on the board.⁸¹

After the positive effect of gender diversity was seen, the importance given to gender diversity in corporate boards of directors increased. As a result, market and regulatory initiatives are increasingly being adopted to increase female representation in corporate boardrooms.⁸² For example, in the United Kingdom (UK), progress towards equal female participation on corporate boards has been particularly notable. Using the FTSE 350 Index component corporations as a yardstick for UK progress, the Hampton-Alexander Review found that women currently occupy 34.3% of board positions.⁸³ This is a 50% increase from only 5 years ago when women accounted for just 21.9% of FTSE 350 corporate board seats.⁸⁴ While still trailing behind the UK, the United States has made tremendous progress in recent years in terms of gender balance on corporate boards. The percentage of women on the boards of Russell 3000 Index component companies has consistently increased over the last few years, rising from 16.0% in 2017 to 22.6% in 2020, as shown below.⁸⁵ BlackRock revised its proxy voting guidelines to require at least two female directors on each board,⁸⁶ and Goldman Sachs stated that it would only guarantee IPOs of companies with at least one female or diverse directors as examples of market pressure.⁸⁷

As seen from the above examples, one of the most critical discussions on board diversity focuses on gender diversity for board composition. On the one hand, scholars argue that female directors are essential for ensuring diversity on boards of directors.⁸⁸ However, on the other hand, it is argued by some scholars⁸⁹ that in cases where female executives do not have the necessary skills and qualifications to be on the board of directors, the mandatory addition of female directors only to provide the necessary number may be harmful to the company.⁹⁰ In addition, in support of this view, some studies reveal that stock market investors react negatively to government-imposed board diversity quotas.⁹¹ The requirement of a compulsory

⁸¹ Shin et al. (2020).

⁸² Greene et al. (2021).

⁸³ FTSE Women Leaders (2021).

⁸⁴ Eagle (2022).

⁸⁵ Ibid.

⁸⁶ BlackRock (2021).

⁸⁷ Green (2020).

⁸⁸ Chen et al. (2019); Huang et al. (2020); Klerk et al. (2021).

⁸⁹ Coate and Loury (1993); Greene et al. (2021).

⁹⁰ Fang (2019); Huang et al. (2020). Moreover, male directors claim that a 'lack of qualified female candidates' is the main reason why the number of women in corporate boardrooms did not increase in 2016, according to a boardroom study. See Groysberg et al. (2016).

⁹¹ See Greene et al. (2020), p 526; Hwang et al. (2020); Ahern and Dittmar (2012); Meyerinck et al. (2021).

female quota on company boards of directors can be criticised, and those critics can improve this notion. However, in our opinion, the reason as to why women directors are less frequently nominated to the boards is not due to a lack of qualifications. There is no doubt that women directors may also be as qualified or even more qualified for company management with their better academic and professional qualifications than men.⁹² However, the fact that women have more limited professional connections⁹³ than men may be a reason as to why they cannot be nominated for company board positions.⁹⁴ According to Erel et al., companies have overvalued male director candidates appointed to the boards for a lengthier period of time and those with more outstanding networks.⁹⁵ The exclusion of women from social activities and informal communication, which is more common in traditional societies, can result in a lack of cooperation, conflicts of interest, poor decision making and generally poor work performance.⁹⁶ Also, companies lack board diversity as they have established policies to prioritise recruiting candidates who are similar to existing board members.⁹⁷

3.1.2 Regulatory Developments in Board Gender Diversity

Various initiatives and strategies to attain gender equality in top business positions have been increasingly popular within political conversations and academic studies⁹⁸ in recent years due to gender diversity debates.⁹⁹ Female quotas (hard law) and voluntary initiatives (soft law) are included in these diverse projects. It is worth noting that soft law rules and sanctioning rules are generally used together.¹⁰⁰ For example, many of the regulations governing the members of the board of directors actually begin as soft law rules. Sanction-based legal rules then back them up in the event that the intended objective is not met as a result of these activities.¹⁰¹

There has been a focus on gender quotas in European countries for many years¹⁰² and they were first used in Norway in December 2003.¹⁰³ When Norway initially implemented a quota for women on boards, the quota was established at 20% and subsequently grew to 40% over time. Similarly, the French National Assembly proposed a bill requiring a minimum of 20% female representation on the boards of directors of publicly listed French enterprises after 3 years of implementation and

⁹² Fielda et al. (2020).

⁹³ Kang (2020).

⁹⁴ Allemand et al. (2021).

⁹⁵ Erel et al. (2021).

⁹⁶ Kang (2020); Fang (2019) p 550; Belle (2002); Huang et al. (2020).

⁹⁷ Greene et al. (2021).

⁹⁸ Mensi-Klarbach and Seierstad (2020), p 615.

⁹⁹ Klettner et al. (2016).

¹⁰⁰ Alstott (2014).

¹⁰¹ Eroğlu (2014), p 596.

¹⁰² To better understand the current status of gender diversity in companies located in European Union member countries, see EWOB (2021).

¹⁰³ Cabo et al. (2019).

40% after 6 years.¹⁰⁴ Gender diversity quotas appear to be especially useful for organisations that want to be seen as innovators in their fields.¹⁰⁵ For example, companies with more gender diversity have a higher concentration of research and development (R&D)¹⁰⁶ and are more likely to receive patents.¹⁰⁷ Therefore, following Norway's adoption of quotas for women on corporate boards, quotas have had a significant international influence, with advanced industrial nations adopting quotas or setting significant and strategic voluntary objectives for women's inclusion on corporate boards.¹⁰⁸ It should be highlighted, however, that the application of women's quotas to boards did not have the same success in all nations. The Spanish Gender Equality Act of 2007, for example, was the second quota legislation, mandating big corporations to choose between 40% of both genders on their boards of directors, inspired by the Norwegian quota's success. The success obtained in Norway as the initial goal could not be achieved in Spain.¹⁰⁹ According to Cabo et al. this is primarily due to the fact that, unlike the Norwegian female quota, the female quota in Spain does not impose negative sanctions on businesses that do not fulfil the quota objective.¹¹⁰ Certainly, a large part of the Norwegian initiative's success is related to the severe sanctions associated with non-compliance that come with quota restrictions.¹¹¹ However, for Spanish companies, the female quota was softer and was presented as a suggestion rather than a legal requirement which includes formal sanctions.¹¹² The sole incentive provided by Spanish law is that the government may give priority to enterprises which follow its criteria when granting public contracts, resulting in a soft approach.¹¹³ Following these developments in Spain and Norway, because females are underrepresented in corporate boardrooms, other European countries, including France,¹¹⁴ Italy,¹¹⁵ Germany,¹¹⁶ Belgium and the UK¹¹⁷ have enacted similar quota laws with sanctions to boost female participation.¹¹⁸

Apart from the debates on the effect of female representation on corporate performance, it is clear that female quotas have resulted in an increase in the number

¹⁰⁴ Sjöfjell (2015), p 35.

¹⁰⁵ Cheng and Groysberg (2020).

¹⁰⁶ Toyah and Triana (2009).

¹⁰⁷ Montagnani and Passador (2020), p 29; Chen et al. (2018), p 236.

¹⁰⁸ Klettner et al. (2016), p 396; Mensi-Klarbach and Seierstad (2020).

¹⁰⁹ Cabo et al. (2019), p 612.

¹¹⁰ Ibid.

¹¹¹ Choudhury (2014), p 535.

¹¹² Klettner et al. (2016).

¹¹³ Gabaldon et al. (2016).

¹¹⁴ Zenou et al. (2017).

¹¹⁵ Comi et al. (2019).

¹¹⁶ Burow et al. (2018), p 150.

¹¹⁷ The UK Companies Act 2006 (Strategic Report and Directors' Report) Regulations 2013, SI 2013/1970, § 414C, see <https://www.legislation.gov.uk/uk/si/2013/1970/made>. Accessed 19 April 2022.

¹¹⁸ Those countries have introduced gender quotas of between 30 and 40% in companies with a differing reach and levels of enforcement. See Cabo et al. (2019), p 612.

of female directors in European businesses.¹¹⁹ Similarly, many countries around the world have adopted some form of female quota regulations or have at least opted for voluntary initiatives.¹²⁰ We also note here that although most recent legislative attempts have focused on a particular appearance of diversity, such as female board presence, other rules have gone further.¹²¹ The UK Corporate Governance Code,¹²² for example, states that board nominations and career planning should encourage gender diversity as well as socio-economic and racial diversity, among other things.¹²³

Finally, as can be seen from the examples, although the female quotas have been applied in companies to increase gender diversity, there are still some challenges. Therefore, in this paper, beyond all these gender diversity and female quota discussions, we still have the question of whether AI will contribute to the provision of diversity in companies. The possible impact of AI on gender diversity and especially female quotas will be discussed in further parts of this article. Accordingly, AI and its possible effects on gender diversity will be analysed in the following sections.

4 Recent Developments and the Role of AI in Corporations

In today's society, time is critical and the decision-making process moves quickly. AI is utilised in businesses to accelerate the decision-making process in order to keep up with the pace of commercial life.¹²⁴ However, with the emergence of the need for elements that can work in the field and can be controlled remotely instead of directly by people, the question of whether AI can be used as directors instead of people in corporate boardrooms has once again emerged.

Indeed, utilising an AI as a director in a company boardroom is becoming increasingly common. Since AI is solely concerned with technology and engineering, it is more likely to become prevalent in the post-COVID-19 period. Undoubtedly, there are many advantages of using AI directors in corporate boardrooms.¹²⁵ The use of AI in corporate governance, for example, might result in a reduction in agency costs

¹¹⁹ Ekin (2018); Comi et al. (2019).

¹²⁰ Comi et al. (2019).

¹²¹ Petrin (2020), p 1002.

¹²² The UK Corporate Governance Code, see <https://www.frc.org.uk/getattachment/88bd8c45-50ea-4841-95b0-d2f4f48069a2/2018-UK-Corporate-Governance-Code-FINAL.PDF>. Accessed 19 April 2022.

¹²³ Petrin (2020), p 1002.

¹²⁴ Möslein (2018), p 650.

¹²⁵ Enriques and Zetzsche have stated that as organisations grow increasingly dependent on technology and function in an environment characterised by unpredictability and constant instability, humans would become less fit to serve on boards of directors than robots. They do, however, give an opposite perspective. That is, individuals may be less inclined to do so, since in an entirely AI-driven workplace, they will be less capable of monitoring and controlling self-learning algorithms. However, the credibility of AI as board members will also be threatened if such algorithms prove to be insufficient. See Enriques and Zetzsche (2020), p 71.

for businesses.¹²⁶ Additionally, deploying artificial intelligence as a manager has the potential to increase management performance since AI is programmed to act only in the best interests of the organisation and is not compensated or required to take a holiday.¹²⁷

The main legal question in this case is whether the existing state of national company law is prepared for the nomination of an AI as a director.¹²⁸ According to the traditional corporate law approach, we must assert that board directors must be human beings.¹²⁹ Therefore, there is a need for human directors who are accountable for their actions and can be held accountable for their harm to the organisation.¹³⁰ Leaving aside the discussions about the legal status of AI,¹³¹ we must say that many countries are not even ready for a non-human board member.¹³² It is, for example, stated in Article 9 of the Australian Companies Act that directors must be human.¹³³ Similarly, when examining US company law, we notice that Article 141 of the Delaware Corporations Law and the California Corporations Code § 164 require directors to be human.¹³⁴ It is worth noting that, although regulations vary on a state-by-state basis in the United States, it is common for company managers to be selected from among natural persons in general.¹³⁵ This is indeed the case in some countries, and when we look at the Continental European legal systems, such as Germany,¹³⁶ we notice that identical to the countries listed above, legal persons cannot be chosen as corporate directors; instead, they must be picked from among physical persons.¹³⁷

On the other hand, according to the company law rules applied in countries such as Spain,¹³⁸ France,¹³⁹ Turkey¹⁴⁰ and Belgium,¹⁴¹ it can be seen that not only 'human (natural person)' company directors are allowed, but also legal person board members, provided that a real person is physically appointed as a representative of

¹²⁶ With more AI in decision making, the company will require fewer employees. This is expected to reduce certain agency costs within firms, although new sorts of discretionary decision making for choices about installing and testing automated technologies are becoming more significant. Armour and Eidenmüller (2020), p 90; Enriques and Zetsche (2020); Erel et al. (2021).

¹²⁷ Kumar et al. (2021); Hilb (2020).

¹²⁸ The Technolawgist (2021).

¹²⁹ For more information, see Bainbridge (2017a); Bainbridge (2017b).

¹³⁰ Karatepe Kaya (2021), p 91.

¹³¹ There are plenty of academic works written on this subject in the literature. For example, see Surden (2014), p 89; Bench-Capon et al. (2012), p 277; Sales (2020); Surden (2019); Solum (1992); Saripan and Krishnan, (2016); Legg and Bell (2020), p 38; Adeyoju (2018), p 12.

¹³² Karatepe Kaya (2021), p 91.

¹³³ Sarah Davies (2016); Ashour (2020).

¹³⁴ See Delaware General Corporation Law § 141(b) and California Corporations Code § 164.

¹³⁵ For more discussion, see Talens (2018), p 615.

¹³⁶ Germany; Aktiengesetz § 76(3); Talens (2018), p 615.

¹³⁷ However, the number of lawyers who argue that legal persons should be allowed to be appointed as managers is increasing in these countries. See Portolano (2007).

¹³⁸ Spain: Art. 212.1 of the Ley de Sociedades de Capital.

¹³⁹ France: Art. 225-20 of the Code de Commerce.

¹⁴⁰ Art. 359/2 of Turkish Commercial Code No. 6102.

¹⁴¹ Belgium: Art. 61.2 of the Code des sociétés.

the legal person.¹⁴² It should be noted that when looking at the UK Companies Act 2006, there is the condition that ‘a company must have at least one director who is a natural person’.¹⁴³ Hence, legal entities are allowed to be employed as a director¹⁴⁴ in UK Company law alongside at least one human director.¹⁴⁵ However, we should note that according to the UK Small Business, Enterprise and Employment Act 2015,¹⁴⁶ ‘a person may not be appointed a director of a company unless the person is a natural person’. Therefore, there is no clarity on corporate directors who are allowed to be in corporate boardrooms, especially for public companies.¹⁴⁷

Although their titles, principles, and procedures vary, all countries’ corporation law rules provide provisions for bringing a liability case against directors. For example, in the United Kingdom, a company’s management may initiate a derivative action based on ‘a cause of action of an actual or proposed act, negligence, default, breach of duty or breach of trust’.¹⁴⁸ As underlined in the Companies Act, it is possible for the cause of action to be against the director or any other person or both of them.¹⁴⁹ Indeed, directors who engage in loan discrimination, market manipulation, or privacy violations should face legal consequences.¹⁵⁰ However, AI is not a legal entity with its own set of rights and duties.¹⁵¹ When evaluated according to the current regulations, it is already a developed field that AI tools might have legal responsibility due to their behaviour and to compensate for the damage that they cause in the future. Accordingly, a well-known expert group founded by the European Commission in March 2016 to advise on corporate law issues elaborated the following definition of digitalisation in corporate law in its report: ‘by “digitalisation” we mean the representation of communication in writing or sound by electronic means, and the concept thus concerns electronic communication...’¹⁵² Moreover, the Commission announced in February 2020 that new plans for the future use of AI and robotics in the EU had been devised, and that 200 billion euros had been set aside for research and development in this respect. Later, the Commission developed and released the first ever legislative framework on artificial intelligence in April 2021, addressing the dangers associated with AI and positioning Europe to

¹⁴² Talens (2018), p 623.

¹⁴³ Section 155 of the UK Companies Act 2006.

¹⁴⁴ Those directors are known as ‘corporate directors’ in English law.

¹⁴⁵ Petrin (2020), p 998.

¹⁴⁶ Section 87(4) of the UK Small Business, Enterprise and Employment Act 2015.

¹⁴⁷ Petrin (2020), p 998.

¹⁴⁸ For more information and discussions about derivative action, see Tang (2012), p 203; Keay and Loughrey (2008), p 469; Reisberg (2007); Mujih (2012).

¹⁴⁹ Section 260(3) of the UK Companies Act 2006.

¹⁵⁰ See Diamantis (2020), p 5. Also, see Belcastro, who provides information about the relationship between business judgment rules and AI directors and mentions the responsibilities of AI directors. For a detailed analysis on suing an AI as a director on the grounds of derivative action, see Belcastro (2019), p 275.

¹⁵¹ It is assumed that software developers and other individuals responsible for designing robotic systems share responsibility for actions induced by carelessness in the use of robotic instruments built using artificial intelligence technology. However, whether the robot can share these obligations is disputed.

¹⁵² European Commission (2016).

take a leadership role worldwide. The Proposal for an Artificial Intelligence Regulation¹⁵³ seeks to address the hazards associated with a particular usage of AI. Thus, the AI Regulation will ensure that Europeans can trust the artificial intelligence they use. Additionally, the Regulation is critical for establishing an ecosystem of excellence in artificial intelligence and bolstering the EU's worldwide competitiveness.¹⁵⁴ Furthermore, the European Parliament has drafted legislation on 'Electronic Personality' and robot rights, defining artificial intelligence-based robots' rights and responsibilities.¹⁵⁵ In these regulations, it is stated that by assigning legal entities to AI like companies, AI have a personality in legal transactions and can be held responsible for the damage that they cause.¹⁵⁶ In addition, the view that they can be guilty not only in private law relations but also in criminal law is increasingly common because legal persons also have criminal liability.¹⁵⁷

It should be noted that even if the legal personality issue is resolved and AI is granted legal personality, there would still be difficulties in appointing an AI to a corporation's board of directors. Since company law rules were created by considering human board members, company law requires directors to be honest and act in good faith, which is only expected to exist for humans in performing their duties.¹⁵⁸ However, AI directors can make more rational decisions than human managers because of their design.¹⁵⁹ Ultimately the subject is not human; AI is the product of human-made technology. Therefore, it is pointless to think that AI will take the initiative or behave in good faith like humans. Yes, AI can be more professional full-time employees as board members than humans. However, it is also challenging to expect AI to work with a human director's potential at this stage. Luca and Zetzsche¹⁶⁰ also claim that if AI were to take the role of human-populated boards, the options available to shareholders would be no better than they are today. As a result, the rise of AI requires corporate law to reconsider some of its ground rules to test its suitability for artificially intelligent board members.¹⁶¹

The claim that the AI director would add a professional viewpoint to the company's management and streamline operations is debatable due to the fact that it may

¹⁵³ European Commission, Proposal for a Regulation of the European Parliament and of the Council laying down harmonised rules on artificial intelligence (Artificial Intelligence Act) and amending certain Union legislative acts, SEC(2021)167 final (21 April 2021).

¹⁵⁴ *Ibid.*

¹⁵⁵ European Commission (2017) Report with Recommendations to the Commission on Civil Law Rules on Robotics, 27 January 2017. https://www.europarl.europa.eu/doceo/document/A-8-2017-0005_EN.html?redirect#title1. Accessed 10 November 2021.

¹⁵⁶ On the contrary, one may argue that by recognising artificial intelligence as a legal entity, manufacturers and other actors' legal duties are entirely lifted, and this scenario can be abused in reality.

¹⁵⁷ POLITICO (2018).

¹⁵⁸ Möslein (2018), p 651.

¹⁵⁹ *Ibid.*

¹⁶⁰ They argue that believing otherwise is based on an overly optimistic perspective of what technology is capable of and an oversimplified understanding of a board's present capabilities. See Enriques and Zetzsche (2020), p 74.

¹⁶¹ *Ibid.*

be considered to benefit from the AI director for the reduction of agency costs.¹⁶² However, the presence of AI bias and prejudice should not be overlooked since the AI director's judgments will be influenced by the designer and/or developers due to the AI system's current nature. For example, an AI director, which is appointed to the board of directors in order to become more professional, may work with the majority owners of the firm to merge the minority shareholders' rights and interests.¹⁶³ Additionally, replacing a director with AI could also end the position of the independent directors in the companies.¹⁶⁴ However, when advancing this idea, AI's bias and discrimination problem should not be forgotten. Indeed, appointing an AI director without considering bias and discrimination, even if there is a slight suspicion that certain shareholders are influencing the AI director to their advantage, might erode investors' confidence in the company and negatively influence the company's image.¹⁶⁵

On the one hand, it may be possible that the programmer or manufacturer enters into an arrangement with rival companies and harms the company's interests by using AI. Considering such circumstances, if artificial intelligence is to be used in corporate law, suitable legal protections should be in place. Consequently, merely recognising that AI has a personality and must be held responsible for its actions and operations will not be enough.¹⁶⁶ Rather than that, it might be a solution if software developers or other individuals engaged in the development of robotic systems are held accountable for a negligent error made when using AI-based management.¹⁶⁷ Thus, developers and designers should be aware that there may be alternative applications and misuses for AI creations,¹⁶⁸ and they should also be aware of the consequences. However, it should be noted that these people, designers or developers, do not have the same education and knowledge as a company manager or lawyer, as they are only artificial intelligence developers with technical knowledge.

Additionally, managers at all levels will need to adjust to the new reality created by those intelligent robots.¹⁶⁹ While the scenario mentioned above may be resolved with the assistance of IT services, it will mean leaving the existing classical company management to managers.¹⁷⁰ Therefore, policymakers should carefully arrange the nomination of AI as a director under legal norms prior to practice. Additionally, if businesses progressively reorganise their boards of directors using AI, management behaviour and choices will evolve. This would very probably have an effect on global equilibrium, which in turn would need to be examined.¹⁷¹ On the other hand,

¹⁶² Erel et al. (2021), p 3253.

¹⁶³ Rieke et al. (2014), p 12.

¹⁶⁴ Zuiderveen Borgesius (2018).

¹⁶⁵ For more information, see Daugherty et al. (2019), p 1; Buolamwini and Gebru (2018); Hardesty (2018).

¹⁶⁶ Karatepe Kaya (2021), p 89.

¹⁶⁷ Ibid.

¹⁶⁸ Coeckelbergh (2020), p 2059.

¹⁶⁹ Amico et al. (2016), p 8.

¹⁷⁰ Karatepe Kaya (2021), p 89.

¹⁷¹ Erel et al. (2021), p 3253.

leaving AI board member discussions aside, AI is already very actively used in the corporate decision-making process.¹⁷² Automating corporate procedures, gaining insights through data analysis, and communicating with customers and employees are three critical requirements of companies that AI can help with.¹⁷³ This means that directors are already using AI when they make decisions. Actually, we claim that the director's duties require using AI in decision making if the quality of the decisions requires AI interference.

As a result, AI is getting closer to becoming a board member day by day. However, AI has already become an essential enabler of directors' decision-making processes. This leads us to the question of whether board gender diversity policies and regulations are still required in the AI era, as many decisions do not require human thinking.

5 Effect of Using AI in Companies' Board Diversity Policies and Regulations

Recent academic and regulatory discussions have focused on abandoning homogeneous boards and creating more demographically diverse boards in terms of the age, education, gender or nationality of the board members to increase their effectiveness in the decision-making process.¹⁷⁴ In our opinion, the role of AI, which is considered to be impartial and able to make the most logical decisions for the company, should also be considered in board diversity discussions. This is because if the expected benefits of board diversity can be achieved with AI, the value of other factors that are important for diversity will decrease. Accordingly, Petrin¹⁷⁵ claims that with the support of AI directors, 'fused boards' may be created. The AI directors on these boards will be able to take on the roles of multiple directors. As a result, an AI director will have a diverse range of skills, decision-making abilities, and the advantages of various ideas in one position.¹⁷⁶ As mentioned earlier, there are several regulatory incentives to increase board diversity all around the world. For example, since women have been underrepresented on company boards for a long time, both nationally and globally,¹⁷⁷ the EU has recommended having at least 40% women on the corporate boards of public companies in the member states.¹⁷⁸

However, even if all the issues related to the legal status of AI are overcome and AI is appointed as a board member in the company, the question of how it would affect the calculation of the required female board member ratio or whether AI can be excluded entirely from the number of board members when calculating these ratios will still arise. Therefore, an even more radical question of whether there is

¹⁷² Trunk et al. (2020), p 878.

¹⁷³ Davenport and Ronanki (2018).

¹⁷⁴ Solarino and Torchia (2021); Fernández-Temprano and Tejerina-Gaite (2020), p 325.

¹⁷⁵ Petrin (2020), p 1002.

¹⁷⁶ Ibid., p 1003.

¹⁷⁷ Leszczyńska (2017), p 36.

¹⁷⁸ Rankin (2020).

still a need for gender quotas when AI is making the decisions must be answered. To be able to answer these questions, the biases or judgements of AI should be discussed.

Seeking answers to these questions, a recent development related to this situation should not be overlooked. As a matter of fact, while noting that AI's decisions are not so independent from those who designed it and are only as good as its inputs and programming, we should also add that as long as humans design the software of AI, it is vulnerable to our internal biases.¹⁷⁹ The most well-known robot of recent times, Sophie, has recently announced that she wants to be a mother.¹⁸⁰ This development is one of the examples where the issue of whether artificial intelligence can provide diversity in companies' boards of directors is controversial. Here the following question comes to mind: why does Sophie want to be a mother, and not a father? We have stated that robots depend on the opinions of those who designed them. Is there any impact of the design process and engineers' perspectives on the wishes and interests of the AI? With the aid of the people who develop, train, and refine its systems, can AI help us overcome prejudices in companies rather than perpetuate them?

The impact of AI on corporate board diversity should be analysed from different perspectives. First of all, we will evaluate the impact of the appointment of an AI as a company director on board gender diversity. As mentioned above, the primary purpose of board diversity is to benefit from as many perspectives and experiences as possible when making decisions. However, in reality, in the homogenous boards with little variety, the independence of ideas may be harmed, and the prejudices of some parties may be effective in choices that have a negative impact on the company's business success.¹⁸¹ At this point, Ricci's¹⁸² warning about the risks that may arise from AI comes to mind. Parallel with his view, some other scholars¹⁸³ have also recently claimed that AI usage as a director might cause an accountability gap between human directors and the company. Since AI does not have consciousness and a conscience, we cannot wait for it to be accountable for its behaviour and decisions.¹⁸⁴ Additionally, AI would have no assets or obligations to preserve and no social reputation or professional identity to protect.¹⁸⁵

Given the rapid and continuous growth of AI, the problem of having legal capacity will soon be resolved by innovative work in this area. Nonetheless, even if AI directors are granted legal capacity, they will be shielded from responsibility (at least for the time being) since they will be unable to participate in human society and, more significantly, lack awareness and conscience.¹⁸⁶ This might result in another serious issue in that human directors may become entrapped in the 'views'

¹⁷⁹ Petrin (2020), p 1005.

¹⁸⁰ Analytics Insight (2021).

¹⁸¹ See Shill and Strand (2021), p 34; Shill (2020), p 1843; Nili (2016); Page (2009), p 237.

¹⁸² Gramitto Ricci (2020), p 872.

¹⁸³ See Diamantis (2022).

¹⁸⁴ Gramitto Ricci (2020), p 873.

¹⁸⁵ As claimed by Coffee, they have 'no soul to be damned and no body to be kicked'. See Coffee (1981).

¹⁸⁶ Gramitto Ricci (2020), p 886.

of artificial intelligence.¹⁸⁷ Hence, even if the accountability gap is closed, we believe that the directors' contribution to board diversity will not be sufficient at this time. Using an AI director might help organisations to make better decisions. However, as Car et al. argue,¹⁸⁸ it also poses difficulties linked with the 'dark side' of AI. One of the key reasons for this is the prospect that AI appointed as a manager may be able to influence the opinions of other managers.¹⁸⁹ Therefore, by thinking that the AI director is a machine-learning algorithm and has intelligence, human directors may abandon their own decisions and apply AI decisions in every field.¹⁹⁰

Company directors are defined in each country's own corporate law rules, and the duties and responsibilities of these directors towards the company are laid down in the provisions of those rules.¹⁹¹ When considering AI as a manager, even if the AI obeys the above provisions and makes decisions, other managers need to detail their own views instead of following the AI's views.¹⁹² The challenge is in determining whether human managers will use whatever information they get from the AI machine rather than detailing and utilising their personal and professional judgments.¹⁹³ It will not be a simple matter to determine this. Even the managers themselves may not realise this and may blindly follow the views of artificial intelligence. Such a threat may not seem likely and realistic for now. However, we believe that it is necessary to realise that AI will be present on corporate boards in the future¹⁹⁴ (there are some examples of AI managers even now).¹⁹⁵ This will create an accountability gap and a dominant opinion among the company's management; thus, precautions should be taken. It also appears to bear the risk of directors relying on unaccountable subjects' opinions.¹⁹⁶

Today, the manufacturer or the user has legal responsibility for any damage produced by AI.¹⁹⁷ Given that firm administration necessitates technical and professional skills, it is clear that manufacturers and designers are unable to fulfil this role. Since modern AI is becoming so intelligent that it may be able to make decisions independently, the European Parliament has debated the concept of electronic

¹⁸⁷ Alon-Beck (2021).

¹⁸⁸ Cao et al. (2021), p 2.

¹⁸⁹ Cao et al. (2021); Alon-Beck (2021).

¹⁹⁰ Gramitto Ricci (2020), p 898.

¹⁹¹ Section 170 et seq. of the UK Companies Act 2006; Section 141 et seq. of the Delaware Corporate Code.

¹⁹² Gramitto Ricci (2020), p 898

¹⁹³ Ibid.

¹⁹⁴ Indeed, global labour is digitising. By 2030, researchers expect algorithmic systems to supplant 45% of human-created occupations. By 2030, AI has the potential to add USD13 trillion in economic activity to the global economy or a 16% increase in overall GDP compared to today; for more information, see Diamantis (2022); Bughin et al. (2018).

¹⁹⁵ Hoeven (2021).

¹⁹⁶ Gramitto Ricci (2020), p 898.

¹⁹⁷ EPRS-JURI Committee (2017).

personhood for robots. Compulsory insurance¹⁹⁸ and automatic no-fault compensation funds¹⁹⁹ are among the solutions proposed by the European Parliament to close the accountability gap and to make significant risks caused by AI directors more bearable.²⁰⁰ However, at this point, we must say that it will be challenging to insure AI directors. At the same time, it is difficult to find an insurance company that will insure the liabilities of even human directors.²⁰¹

In our view, even if the problem regarding the accountability gap has been overcome there are still some issues to be addressed in AI decision making. Most importantly, technology is supposed to address people's cognitive biases and assist them in enhancing the quality of their judgments,²⁰² maybe even resulting in more diversity among boards. However, some scholars argue that due to the technological limits of AI, this scenario is unrealistic²⁰³ and unlikely.²⁰⁴

This article supports the idea that, even if AI is appointed to a corporate boardroom as a director, the quotas for female representation on boards should be maintained to ensure board gender diversity. As will be explained below, recent studies²⁰⁵ have revealed that AI has its own bias. As a result, even if all the legal infrastructure can be created and artificial intelligence robots can be appointed as managers to the boards, waiting for the AI director to provide diversity on the board would not be a logical step.²⁰⁶

As Barocas and Selbstand have pointed out, 'an algorithm²⁰⁷ is only as good as the data it works with.'²⁰⁸ For example, if the sub-data utilised in the algorithm's design reflects biases,²⁰⁹ the algorithm may produce biased decisions in areas where it is used.²¹⁰ Indeed, the findings of the studies and current cases reveal that artificial intelligence can make biased judgements and employ discrimination as a result of the actions of those who created it.²¹¹ In accordance with this argument, the findings of Datta et al.²¹² in their research demonstrate that women in India were less likely to receive adverts for executive coaching services. Indeed, they created AdFisher, an

¹⁹⁸ It has been speculated that they could also require their own insurance system, as well as a central agency to track every robot in operation across the EU. See Expert Group on Liability and New Technologies (2021), p 61.

¹⁹⁹ *Ibid.*, p 62.

²⁰⁰ Bertolini (2020)

²⁰¹ Karatepe Kaya (2021), p 84; Hoeven (2021).

²⁰² Sunstein (2019), p 499.

²⁰³ Enriques and Zetzsche (2020), p 75.

²⁰⁴ Mayson (2019), p 2251.

²⁰⁵ Lambrecht and Tucker (2019), p 2977; Richardson et al. (2019); Daugherty et al. (2019), p 1; Buolamwini and Gebru (2018); Hardesty (2018); Buolamwini (2019).

²⁰⁶ For a similar view see Enriques and Zetzsche (2020), p 75.

²⁰⁷ An 'algorithm' is an artificial intelligence product that contains a set of instructions.

²⁰⁸ Barocas and Selbst (2016), p 671.

²⁰⁹ Richardson et al. (2019), p 206; Enriques and Zetzsche (2020), p 75.

²¹⁰ Barocas and Selbst (2016), p 672.

²¹¹ Enriques and Zetzsche (2020), p 75; Kelly-Lyth (2021).

²¹² Datta et al. (2015), p 105.

online tracking research tool that automates randomised, controlled studies. They ran 21 trials with AdFisher, collecting over 600,000 advertisements using 17,370 agents. In Google's targeted advertisements, they discovered examples of discrimination, opacity, and choice. They observed, for example, that males were exposed to more adverts encouraging them to seek coaching services for high-paying jobs than females, although they did not allege that any laws or rules were breached as a result of these acts. However, they acknowledge that these findings were proof of discrimination. Furthermore, they argued that this situation would exacerbate the gender pay gap by encouraging male candidates to seek coaching services for high-paying professions.²¹³ Similar examples can be found in a variety of studies. For example, in research on discrimination by drivers of peer transportation providers, Ge et al.²¹⁴ discovered that customers with African-American names were subjected to longer waiting times and more cancellations. They also witnessed that female passengers were taken on lengthier and more expensive rides. Similarly, Edelman et al.²¹⁵ discovered racially discriminating behaviour in an online rental market study in 2017. Finally, it has been demonstrated²¹⁶ that outcomes may still favour one group over another even when human biases are eliminated from judgments made by AI.^{217,218}

Detailed examples of bias can also be found in human resources practices. Some scholars²¹⁹ contend that AI decisions have significantly more individual and societal impacts on business optimisation than those taken by humans. Furthermore, algorithmic decision-making machines are used in human resources recruiting and development by well-known and significant firms such as Ikea, Vodafone and Intel.²²⁰ This is understandable when the primary goals of using AI are considered. Indeed, cost and time savings, higher productivity, risk reduction and better decision-making certainty are the major aims of using AI for decision-making purposes.²²¹ However, while algorithmic judgments may seem to be more objective and fair than human decision making at first glance, it is important to note that being only dependent on algorithmic judgments may result in discrimination and unfairness.²²² Finally, since training data is crucial to AI's prediction skills,²²³ arguing that AI will make unbiased decisions is worthless if the input (or training) data is biased in the first place.

Amico et al. have claimed that AI may be used for 'support in more complex problem solving and decision-making situations by asking and answering questions

²¹³ Ibid., p 103.

²¹⁴ Ge et al. (2016), p 16.

²¹⁵ Edelman et al. (2017).

²¹⁶ Datta et al. (2015).

²¹⁷ For similar approaches, see Angwin et al. (2016), p 23; Sweeney (2013), p 10.

²¹⁸ We should note that there are some other studies which support the fact that AI decisions appear to be less biased than human judgments. For views on the potential use of AI to address policy issues, see Mullainathan and Spiess (2017), pp 87–106; Cowgill (2020); Jon et al. (2017); Kleinberg et al. (2017).

²¹⁹ Chalfin et al. (2016), p 124.

²²⁰ Köchling and Wehner (2020); Daugherty and Wilson (2018).

²²¹ Woods et al. (2020); Suen et al. (2019); Köchling and Wehner (2020), p 796.

²²² Köchling and Wehner (2020), p 796; Lindebaum et al. (2020).

²²³ Enriques and Zetsche (2020), p 75.

as well as building scenarios and simulations'.²²⁴ Accordingly, it can be claimed that the selection of managers by AI or the appointment of AI as a director might help to increase gender diversity in company management. This practice that can be considered as an alternative to the appointment of robots as managers as it contributes to the diversity of the board by using robots in the selection of managers. In recent studies, it has been observed that in cases where AI is used to select managers in companies, there are managers from a more diverse background among the selected candidates than the candidates selected by traditional methods. Erel et al.²²⁵ claim that firms tend to choose managers who have similar characteristics to their current managers. As a solution, they argue, if algorithms are used to assist board members, companies will be able to select candidates with more diverse backgrounds and broader experience whom they would normally overlook.²²⁶ Indeed, considering this aspect, AI seems to contribute to the diversity of the board. However, an argument given in this study is thought-provoking at this point, because the authors also argue that it can enable companies to make better choices among current candidates without straying from the judgment of the decision makers.²²⁷ In other words, the decisions will be ultimately guided by the judgments of those on the current board, not by AI. Moreover, even if AI is used only for the selection of board members, this is still controversial due to the claims and evidence of AI's own biases.

In conclusion, AI has recently been part of many bad tales.²²⁸ Some of the worst stories relate to facial recognition apps or systems that exhibit racial or gender bias when evaluating people for work, credit, or other considerations.²²⁹ These examples demonstrate that artificial intelligence judgments are not made independently of those humans who design, develop, and enhance its systems.²³⁰ Workers in the technology sector, in particular, should do a better job of integrating inclusion and diversity into the design of artificial intelligence by using the correct data to train AI systems to be fair and taking gender roles and diversity into account when creating bots and other public-facing applications.²³¹ Ultimately, until perfect AI is achieved, humans are required to take decisions. Accordingly, using AI at any level of the decision-making process requires checks and balances. The company board is the ultimate body that is responsible for the efficiency and legality of corporate decisions. Thus, board decisions should reflect all diverse opinions. Gender diversity requires female perspectives to be taken into account when taking these decisions. As a result, gender diversity becomes even more important to facilitate the virtuous effects of technology and AI while preventing the negative effects of AI in corporate decision-making processes.

²²⁴ Amico et al. (2016), p 17.

²²⁵ Erel et al. (2021), p 3253.

²²⁶ Ibid.

²²⁷ Erel et al. (2021), p 3231.

²²⁸ Daugherty et al. (2019), p 1.

²²⁹ Buolamwini and Gebru (2018); Hardesty (2018).

²³⁰ For more examples which demonstrate the bias of AI, see Daugherty et al. (2019), p 1.

²³¹ Ibid., p 2.

6 Conclusion

If companies appoint AI as board members or make some strategic decisions with the help of AI, would this be better for the company in some respects? Does it help to ensure board diversity in companies? To seek an answer to those questions, this article has analysed the potential impact of AI on board gender diversity. Considering the outcomes of studies which have proved bias and discrimination, this article supports the position that even if AI takes the decisions (as board members or enablers to assist board members), this will not reduce the need for board gender diversity. Even if AI is appointed as a director, or is required to analyse data on which decisions are based or is only used to select directors, there will still be a need for gender quotas for providing board gender diversity. Thus, given the fact that artificial intelligence may make biased judgments, although we acknowledge that AI interference in decisions is inevitable, this should not exclude or alter gender diversity discussions and the need for more diverse boards should be promoted. As mentioned above, we have already seen examples of discriminatory conduct between men and women. It is reasonable to conclude that board diversity will be even more critical in situations where the company employs AI.

AI can be on the side of the sovereign or the vulnerable, or it can even be neutral at the decision-making stage. We do not claim that AI will always make biased decisions or have a favourable or bad influence on board gender diversity. We are certain, however, that AI will benefit companies in many areas. Nevertheless, in our opinion, AI, whether utilised as a director, in the election of directors or in the decision-making process, will not guarantee efficient company management that the board must oversee according to established company law rules.

We believe that we have not reached the level where all decisions can be taken by AI in companies. Human decision makers are still indispensable on corporate boards. When there are human decision makers a female perspective is important for the quality of the decisions and social inclusivity. Consequently, the gender quota for corporations should be maintained and further gender quota rules must be established by considering the effects of AI on the board's decision-making process.

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