

Vilnius University Faculty of Law

Department of Private Law

Diana Bulavina,

II study year, International and European Law Programme Student,

Track “Business Law”

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Artificial Intelligence in Corporate Governance

Supervisor: assoc. prof. dr. Gintautas Bartkus

Reviewer: assoc. prof. dr. Justinas Usonis

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ABSTRACT AND KEY WORDS

This work defines legal status of AI together with its types, unique features and worldwide legislative approaches. Interconnection of AI with fiduciary duties of directors and the concept of legal personality is analyzed. The evaluation conducted regards advantages and possible risks of AI implementation for other stakeholders (shareholders, employees, creditors, auditors) of the single company. Comparing opportunities and potential risks results in evaluation whether and to which extent AI should be incorporated within corporate governance.

Keywords: big data, duty of directors, machine learning, legal personality, assisting, stakeholders, replacement.

LIST OF ABBREVIATIONS

AI – artificial intelligence

AoA – articles of association

BJD – business judgment rule

BoD – board of directors

EMCA – European Model Company Act

EU – European Union

RPA – robotic process automation

UK – United Kingdom

TABLE OF CONTENT

INTRODUCTION.....	5
CHAPTER 1. FORMS OF ARTIFICIAL INTELLIGENCE TO BE IMPLEMENTED IN CORPORATE GOVERNENCE	8
SUB-CHAPTER 1.1. Understanding types of AI	8
SUB-CHAPTER 1.2. Unique features of AI able to facilitate the efficiency of corporate governance	11
CHAPTER 2. ARTIFICIAL INTELLIGENCE IN BOARDROOM	14
SUB-CHAPTER 2.1. Reasoning why AI benefit the decision-making process of directors mainly	14
SUB-CHAPTER 2.2. AI as assisting tool for board directors: interconnection with fiduciary duties.....	16
SUB-CHAPTER 2.3. AI as dully replacement of human director: issue of granting legal personality	22
CHAPTER 3. BENEFITS AND RISKS OF AI FOR OTHER STAKEHOLDERS	28
SUB-CHAPTER 3.1. Advantages of AI implementation for shareholders, employees, creditors and auditors	28
SUB-CHAPTER 3.2. Potential risks common for all stakeholders	33
CONCLUSIONS	36
LIST OF REFERENCES	38
SUMMARY	43

INTRODUCTION

The relevance, importance, and motives of the Master Thesis. As society develops, people's needs increase. This is the reason behind the development of technologies potentially benefiting humanity. One of these is artificial intelligence (hereinafter – AI), inspired by dreams developed from science fiction. Nowadays it seems that AI is talked about everywhere: universities are preparing young specialists who will be able to work with AI, companies are investing in startups designing machine learning systems, and governments are introducing legal standards to gain control over this area. Every agent desires to be with the time and not be left behind.

After several successful cases of AI implementation in various fields, such as medicine and auto-building, the turn has come to corporate governance with the motive to improve the internal processes of companies. This can potentially bring benefits to all stakeholders, increasing the well-being of the single entity. At the same time, AI challenges well-established concepts, for instance, the fiduciary duties of directors, that have been interpreted for a long time. After the appearance of the Vital system, which will be mentioned further, it became clear that machines can completely replace humans, which, in turn, questions the legal principles incorporated within law systems centuries ago. Law should not lag behind the tendencies, so research in this area is highly necessary.

Scientific novelty. The researchers mention one system of AI division posing the risk to be over-inclusive. The Thesis analyses two of them to specialize the nature of AI systems to be incorporated within corporate governance. Further, researchers discuss potential benefits AI can provide to this area, but do not cover features empowering machines to do so, while the Thesis explains them. The benefits and risks of AI in corporate governance are mainly discussed in the framework of board directors; “robo-shareholders” and “robo-stakeholders” are not mentioned. The Thesis covers both directors and shareholders, employees, creditors and auditors. To the best author’s knowledge, there is no research covering both board of directors (hereinafter – BoD) and other stakeholders in this regard.

The Master Thesis poses *the object* to analyze the benefits and risks AI may provide to the BoD and other stakeholders of the company, such as shareholders, employees, creditors, and auditors.

The aim of the Thesis is to answer the question of whether AI should be implemented within the corporate governance of the company. In case, the answer to the above is yes, then to which extent the implementation should be done. If it will appear that implementation is undesirable, the author should provide the reasoning why so.

To fulfill the aim, the author poses *four tasks* to be discovered in the Thesis. *In Chapter 1 (corresponding to the first task)* the author will define the form of true AI to be implemented in corporate governance accompanied by its unique features. The definition of AI and corporate governance as various approaches towards their defining will not be mentioned, as these issues are out of the Thesis's object. However, for the aim of the Thesis, the author defines AI as a non-natural entity able to learn and develop autonomous or partly autonomous decisions. Systems, whose output can be traced back to their developers are not treated as AI. Inter alia, for the aim of the Thesis, corporate governance is considered to determine relationships between stakeholders of a single company and define the way the company itself and its activities are managed, monitored, and controlled.

In Chapter 2 (corresponding to the second task) the author will determine AI implementation models within the BoD and from their perspective evaluate how AI may facilitate the decision process and the board itself. Further, possible obstacles to AI implementation within the board will be explored. In this regard, the interconnection of AI with fiduciary duties and the issue of legal personality will be mentioned. Should be noted, that countries have different perspectives toward directors' duties, therefore only three of them that are widely recognized worldwide, namely, the duty to comply with law and articles of association (hereinafter – AoA), the duty of care, and the duty of loyalty, will be discussed. Chapter 2 is wholly dedicated to the AI within the BoD as decisions processed by board directors are recognized to be one of the main topics in corporate governance. The reasoning why will be further discussed in Sub-chapter 2.1. In the regard to the legal personality of AI, the issues of rights and liabilities will not be touched, as to the author's opinion, due to the unique feature of AI its personality would gain a new form, therefore basing on the traditional understanding of rights and liabilities is not sufficient.

In Chapter 3 (corresponding to the third task) the author will determine and compare potential benefits and risks for shareholders, employees, creditors, and auditors to evaluate the consequences of AI implementation. Society as the stakeholder of the company will not be discussed due to the debate existing on whether it can be considered as such. Contribution to this debate is not within the task of the Thesis. Finally, *the fourth task* is to summarize the findings and address the aim posed. Should be noted, that in Chapters 2 and 3, tasks of the Thesis are performed based mainly on the European Model Company Act (hereinafter – EMCA) and law sources (codes, regulations, case law, literature) of Member States. Such a decision was taken as the author perceives European Union (hereinafter – EU) as a pioneer in AI regulation, therefore the influence of its approach towards AI in corporate governance may spread to other countries.

The methodology of the Master Thesis. The logical analysis method is the key one used in the Thesis. It was applied to determine true AI from other non-natural subjects, formulating the scope of systems planned to incorporate within company governance. Further, the method was performed to divide the duties of directors into their logical sub-parts to analyze how AI correspond to which of them. Thanks to the method, exceptions from the main rule, such as audit exemption, were identified. *The comparative method* was used to compare AI implementation models to discover their essence, advantages, and examples. The adoption of AI systems as dull replacement of human directors was compared to *negotiatio per servos communes cum peculim* to underline the main issue of granting personality to AI. *The linguistic method* was applied to analyze some legislative norms to discover potential obstacles for delegating tasks to AI as well as for the full replacement of human stakeholders with machines.

CHAPTER 1. FORMS OF ARTIFICIAL INTELLIGENCE TO BE IMPLEMENTED IN CORPORATE GOVERNENCE

SUB-CHAPTER 1.1. Understanding types of AI

To avoid putting all non-natural entities considered to be AI under one umbrella, researchers divide them into separate categories. Mainly, the line drawn is between narrow (sometimes referred to as “weak”) and general AI (sometimes referred to as “strong”). Narrow AI is designated to perform only one explicit task. General AI is “functionally equivalent to a human’s intellectual capabilities” (Feijoo et al., 2020, p. 101988) with sufficient intelligence so that it can apply its intelligence to any kind of problem. General AI does not exist in practice yet and is not exploited in any field.

However, some authors do not consider narrow AI as an “intelligent” machine, perceiving it as “misselling statistical tools” (Dignam, 2020, p. 5). The author argues that regardless that sometimes narrow AI shows processing ability that suppresses human one and can deal with particular levels of subtlety and nuance, it is still empowered by human intelligence, therefore it cannot be intelligent. The author further describes as an example the telescope which is “a complex precision tool designed to enhance human observational ability” (Dignam, 2020, p. 5). “Chess computers, AlphaGo, and IBM Watson’s ability to beat humans within a narrow gaming skill set to reinforce the illusion that computers are superior at decision-making than humans. That same assumption would not be made about a telescope [...]” (Dignam, 2020, p. 6). However, one important feature of AlphaGo was missed. Previous versions of Go-playing software, indeed, acquired their expertise by scanning and analyzing the millions of moves present in enormous data sets of games played by humans (Turner, 2019, p. 74). AlphaGo Zero, developed in 2017, was given simply the game's rules and, within a few hours, had mastered it to the point that, after only three days of self-training, it was able to defeat the previous version of AlphaGo by a score of 100 games to nil (Turner, 2019, p. 74). In other words, the newly invented program learned without human input is a good example of the capability for independent development in AI. Indeed, we should properly distinguish telescopes from true AI. The “intelligence” is perceived to represent the ability to make autonomous choices, representing the part that should be regulated by law. We cannot expect a telescope to be able to decide which concrete stars should be observed, therefore it cannot be perceived as AI.

Further, a leading AI researcher has described it as follows: “[...] these are just statistical models, the same as those that Google uses to play board games or that your

phone uses to make predictions about what word you're saying to transcribe your messages.” (The Register blog, 2017). The citation refers to the Facebook project, where developers forced two “robots” to chat using human-alike language. After chatbots began creating their own, they were shut down. Another comment on this project is as follows: “If the rules aren't explicitly taught to the agents, then what comes out won't necessarily be language-like either” (The Register blog, 2017). Citation explains the problem which is the most possible: pure designation of rules, guiding with which chatbots should process their functions. It means that mentioned chatbots are based on a “symbolic” system (which will be discussed below), therefore cannot be perceived as true AI.

Another proposed classification is the division of AI into three classes: 1) robotic process automation (hereinafter – RPA); 2) machine learning; 3) AI approximating human behavior (general AI) (Ivashkovskaya, Ivaninskiy, 2020, p. 93).

The Institute of Electrical and Electronics Engineers defines RPA as: “A preconfigured software instance that uses business rules and predefined activity choreography to complete the autonomous execution of a combination of processes, activities, transactions, and tasks in one or more unrelated software systems to deliver a result or service with human exception management”.

The literature dispute concerning RPA is as follows: whether it is acceptable to describe it as the lowest form of AI, or the form of computer systems not intelligent enough (or not intelligent at all) to be perceived as AI. One of the main arguments in favor of RPA as AI consists of the fact that RPA works in the same way as humans do, which is the main feature distinguishing RPA from other automation tools. (Moffitt et al., 2018, p. 3). Another argument involved is that RBA brings huge benefits to companies in various industries. RPA is already widely used among different business industries due to the reason that it automates a huge number of regular tasks while reducing the workflow of employees (Mendling et al., 2020, p. 300). However, not all tasks can be automated. “Robots” still require detailed instructions to operate, and concrete processes, such as invoice generating, are preferred (Moffitt et al., 2018, p. 5). Further, tasks embedded with a high possibility of unpredictable outcomes should be disregarded (Moffitt et al., 2018, p. 5). The features mentioned demonstrate the incapability of RBA to learn and make at least partly autonomous choices, which automatically turn it to be non-AI subject. Additional bafflement here is due to the so-called “AI effect”, when complex computer programs, that are toughly understandable, are described as AI.

To distinguish further between RBA and AI, two types of technologies that were initially considered to be intelligent should be described. Rule-based (also called

“symbolic”) systems use static models, where rules are written as if-then-else statements in the computer code (European Commission Report, 2021, p. 7). The decision-making process is deterministic, therefore regardless of how many steps there are, each one may theoretically be linked to choices made by the developer (Turner, 2019, p. 18). A counterweight is learning systems, which possess adaptive intelligence and the capacity to learn. As a result, they may update or discard current knowledge and develop their own rules upon gaining new information (European Commission Report, 2021, p. 7). RBA is based on “symbolic” systems. Combining the fact that RBA cannot learn with procedural requirements for precise instructions to be prescribed, one can conclude that RBA is not true AI. However, some researches state about combining learning systems with traditional rule-based ones, suggesting that such an approach will facilitate the ability of RPA to support more complex and less defined tasks. Then RPA may learn by observing how a person handles complicated cases. This mix will convert RPA to be a hybrid system, containing both a neural network and a rule-based foundation. In this case, the entity will pass the intelligence test provided if the neural network or other evaluation procedure has a determining impact on the decision made.

According to the above-mentioned division, machine learning is considered to be the most advanced type of AI. However, it is an inaccurate approach to machine learning, as it is the tool that empowers machines with the ability of processing and automate decisions. Jacob Turner presents it as a “unique feature” of AI (Turner, 2019). Other authors even state that the terms “machine learning” and “AI” are often used interchangeably (Kibria et al., 2018, p. 32330). On the other hand, some researchers explain that the capacity of the model to "update itself" as opposed to adhering to preset parameters is what makes machine learning different from other AI applications (Ivashkovskaya, Ivaninskiy, 2020, p. 93). Here can be traced confusion regarding distinguishing true AI from the computer systems proclaimed to be so, although it simply mimics human intelligence. The ability to learn independently from a human without the necessity to pre-code this requirement and depending on discovered knowledge take autonomous decisions is the unique part of machines that one calls and regulates AI. This feature cannot be extracted to be perceived as a separate category of AI, due to the reason of misunderstanding the whole concept of AI and prescribing the label of it to machines that only seems to be intelligent because of their complex structure and design; this is the negative consequence of which most researchers and legislators are feared of.

SUB-CHAPTER 1.2. Unique features of AI able to facilitate the efficiency of corporate governance

Machine learning plays a huge role in developing AI as the independent decision-maker; therefore it will be discussed below as a unique feature of AI. A machine learns whenever it modifies its code, data, or structure in a way that increases the performance it is projected to have in the future (Turner, 2019 quoted Nilsson, 2015, p. 71). Samuel A., a pioneer in AI, defined machine learning as the “field of study that gives computers the ability to learn without being explicitly programmed”.

Currently, machine learning is divided into three categories: 1) supervised, 2) unsupervised, and 3) reinforcement (Turner, 2019, p. 71). In supervised learning, training data including the “right answer” for each example is sent to the algorithm. In case the system was mistaken, it is provided by error messages and, as result, produces classification hypotheses for future unlabeled data, which it then revises in response to input. Regardless that in supervised learning human input is necessary to monitor and provide feedback, assumptions about the data, and their further development, are not pre-programmed.

Unsupervised learning involves giving system data without any labels or feedback. These learning systems work by clustering the data according to comparable feature sets (Turner, 2019, p. 72). As it was further explained, programmers are not required to have any knowledge of the data patterns because the system can identify them and make deductions on its own (Turner, 2019 quoted Boden, 2016, p. 72). During reinforcement learning, sometimes referred to as “weak supervision”, the system is not given instructions on how to process; instead, it must go through an iterative process to determine which activities result in the greatest reward (Turner, 2019, p. 73).

Forms of machine learning are lying beneath huge improvements that go beyond the weakening of the connection between humans and AI. In 2014 researchers from the University of Montreal (Turner, 2019, p. 73) created a new machine-learning method called Generative Adversarial Nets (GANs). It works as follows: two neural networks are confronted in front of each other, where one produces new data objects, while the other verify their legitimacy. The summary of the study contains the comment of Ian Goodfellow where he describes neural networks as: “analogous to a team of counterfeiters, trying to produce fake currency and use it without detection, while the discriminative model is analogous to the police, trying to detect the counterfeit currency. Competition in this game drives both teams to improve their methods until the counterfeits are indistinguishable from the genuine articles”. Later, GANs will be described as a technique that “opens the door to an entire world of possibilities”. (Turner, 2019 quoted LeCun, 2016, p. 73)

Machine learning technically empowers AI with the ability to evolve and decide without human input. Currently, overseeing by humans is still required, however, the trend is confidently approaching the unsupervised end of the spectrum. Further, defining AI through the prism of human intelligence is wrongful, as AI “thinks” completely different than humans do. In the context of corporate governance,

Data is an indispensable part of machine learning. Authors (De Mauro, Greco, Grimaldi, 2016) refer to the term “big data” and describe it as another unique feature of AI. According to research, four “themes” of big data appeared: information, technology, methods, and impact.¹

The initial reason for the rapid expansion of big data is connected to the extensive ways in which data is created, shared, and utilized currently. To understand why the data plays a significant role, the DIKW hierarchy should be mentioned. This model is used to represent connections between its elements, namely data, information, knowledge, and wisdom;² and to explain processes involved to transform the item on the lower level to the one on the top. (Rowley, 2007). In the paper was mentioned that data are symbols, representing properties of objects, events, and their environment, which cannot be used until they are in respective forms (Ackoff, 1989). Information systems process data accordingly allowing information to be obtained from it. In other words, information is inferred from data. (Ackoff, 1989; Laudon, K. C., Laudon, J. P., 2006). Successively, knowledge is based on information. Knowledge is information processed in the mind of an individual and, consequently, increases its capacity to undertake effective action (Barnes, S. 2002). Further combined with expert opinion, skills, and experience knowledge results in a valuable asset that can be used to aid decision making. (Chaffey, Wood, 2005). Knowledge is information, which facilitates our ability to perform better judgments and contributes effectively to communication and creativity inside businesses (Jashapara, 2011).

Important features of big data are the volume and variety of information it contains. Data comes from a variety of sources that can be processed by AI. For instance, information and knowledge can come from “mass digitisation” projects, designed to convert traditional libraries into machine-readable files (Coyle, 2006). Another prominent example is the Internet of Things, in which artificial objects, i.e., personal devices, with unique identifying codes collaborate to accomplish shared objectives without the involvement of human

¹ Methods and impact as themes of big data will not be discussed as they are irrelevant to the object of the Thesis.

² The concept of “wisdom” will not be discussed, as it is perceived to be a highly elusive concept.

interaction. (Atzori, Iera, Morabito, 2010). As long as personal devices are connected to the Internet, they are capable to process digitalization via sensors, such as cameras, audio recorders, or GPS locators. Such sensors enable digitization, while network connections allow data collection, transformation, and ultimately organization as information. It was stated that between 2008 and 2009 the number of linked gadgets outnumbered the number of individuals. (Evans, 2011). As for variety, data can be represented in a line of divergent formats, not limited only to text, but expanded to videos, pictures, etc. (De Mauro, Greco, Grimaldi, 2016). Even Web data, e.g., blogs, tweets, and social networks are starting to be actively explored (Russom, 2011).

The next two components, namely technology and methods, illustrate the technological complexity of handling big data, taking into account its volume, variety, and velocity. It was summarized that “dealing with Big Data at the right speed implies computational and storage requirements that an average IT system might not be able to grant” (De Mauro, Greco, Grimaldi, 2016, p. 124). In other words, big data requires a superior form of system support to convert data into a valuable asset, meaning that a single human being simply cannot analyze such enormous databases and, consequently, obtain tons of information that big data offers.

In conclusion, through machine learning techniques AI systems gain information from an enormous amount of big data, that cannot be efficiently processed by humans. Thereby, they form knowledge that increases the capacity of AI systems to take effective actions concerning their environment. Taking into account that AI does not think in the way humans do, they can notice patterns and make choices, which could never be proposed by humans. People have a strict limitation in their performance – brains, while AI’s possibilities extend as far as unlimited data sets go.

CHAPTER 2. ARTIFICIAL INTELLIGENCE IN BOARDROOM

SUB-CHAPTER 2.1. Reasoning why AI benefit the decision-making process of directors mainly

An algorithm termed Vital, created by Deep Knowledge Ventures, a venture capital firm with offices in Hong Kong, was added to the BoD in 2014 (Möslein, 2017). Initial sources claim that the algorithm was granted the same authority as human board members to vote on whether the company should invest in a certain startup or not. Since Vital can automate due diligence and analyze previous data sets to find tendencies that are not immediately visible to people, it was chosen for the position. Vital was proclaimed to be the first non-human director to exist. AI was not granted the status of a corporate director under the corporate rules of Hong Kong, however, its appointment was a fundamental shift in corporate law, causing a range of legal issues to arise.

Even though specific features of the legal personalities of companies, they share several universally common characteristics, one of which is the delegation of daily management to BoD (Möslein, 2017). Directors make decisions daily, that involve information, frequently in big quantities. The more complex decision should be taken, the bigger amount of information should be provided to ensure logical judgment. In business realities, the choice should be made rapidly, therefore directors have a limited timeline to gather and scrutinize information. As was discussed in Chapter 1, AI can analyze enormous data sets, extracting information from unstructured data, such as videos or voice messages, in short periods technically equipped. Further, among other AI capabilities are quantification of uncertainty, analysis of data trends, development of data, the anticipation of users' data needs, etc. (Möslein, 2017, p. 7). Given the above, AI can improve decision-making and reduce the risk of making unreasonable choices.

Any uncertainties may be reduced with AI by both making predictions and analyzing the current situation. It means that the best outcome can be achieved by applying AI to the most complex decisions that need to be taken within corporations. The decisions in the company are made by directors, shareholders, and stakeholders (creditors, investors, employees). Shareholders are in charge of choices in areas of investments and divestments, they also vote on general meetings. Stakeholders are deciding whether to contact the company or not. Directors play the role of main decision center of the corporation, bearing the “responsibility for all but the most fundamental decisions” (Möslein, 2017, p. 5), such as strategic business ones, which directly impact the good running of the company. In comparison, the decisions of shareholders and other stakeholders are usually limited to

yes/no choices, thus they are less complicated to take. That is also the reason why the topic of ‘robo-shareholders’ or ‘robo-stakeholders’ is partly neglected in the literature.

In conclusion, the most obvious usage of AI’s ability to take autonomous choices of unique character in corporate governance is linked to the decision-making performed by the BoD. Within the company, directors take the majority of decisions, which in most cases are complicated and restricted by the tough deadline. AI is considered to be a potentially ideal ‘booster’ to the boardroom, facilitating reasonableness and effectiveness.

Currently, literature proposes three different forms of how AI can be employed within boardrooms: assistance, augmentation, and automation. The distinction between them is explained based on the division of decision-making authority between humans and machines (Baburaj, 2021, p. 241; Möslein, 2017, p. 8). How it was nicely put: “the choice of implementation can be answered through a simple question — to consult, to rely on, or to replace”. (Baburaj, 2021, p. 241). Relevant technologies are embedded within the respective AI system to perform tasks required by the respective model. Refer to the table below to see the extensive difference between models:

Table 1. Models of AI implementation within boardrooms

Model type	Function	Technology employed	Division of decision-making power	Example from business practice
Assistance	Execute specific tasks. Requires continuous human input and intervention; process only with inputs and outputs that are precisely defined.	1) Big data, the cloud, and data science; 2) Pattern recognition.	Decision rights remain solely with humans.	“Aera” employed within eponymous tech company. Can answer BoDs' inquiries about their organization and provide proactive advice. For instance, the system could answer a question about revenue by suggesting an inventory shift from one territory to another.
Augmentation	Create thorough recommendations for prompt decisions by directors.	1) Pattern recognition; 2) Model building.	Humans and machines share decision rights and learn from each other.	Alicia T supports the operative management team of the TietoEVERY Group. Supports data-driven decision-making. Equipped with a conversational interface device that enables direct questioning. Potential uses of the system includes analyzing sustainability impacts, tracking CO2 emissions, drafting reports, supporting due diligence

				processes or compliance tasks and M&A decisions.
Automation	Autonomous decision-making; dully replacement of human directors	1) Pattern recognition; 2) Model building; 3) Other technologies suitable for concrete company and its goals.	AI ultimately take over all decision rights and operates without any human intervention.	Currently not employed on practice.

Source: compiled by the author based on: Artificial intelligence v. Intuitive decision making: how far can it transform corporate governance?. Available at: <https://gnlu.ac.in/Content/the-gnlu-law-review/pdf/volume-8-issue-2/01_aashirwa_baburaj.pdf>; Robots in the Boardroom: Artificial Intelligence and Corporate Law. Available at: <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3037403>; Study on the relevance and impact of artificial intelligence for company law and corporate governance. Available at: <<https://op.europa.eu/en/publication-detail/-/publication/13e6a212-6181-11ec-9c6c-01aa75ed71a1/language-en>>

The dividing line, thus, lies between assisting corporate directors and their full replacement.

As was outlined in the report (European Commission Report, 2021, p. 13), the specific use of the AI system in businesses overall determines: 1) whether the decision proposed by AI is only an input, among many other factors, human directors took into consideration while deciding; 2) whether the decision is required to be first checked and approved by humans; 3) whether the autonomously formed decision is permitted to be automatically translated into action without first-line interactions with other (human or non-human) agents inside or outside the company. Assistance and augmentation AI (will be discussed as assisting tools in Sub-chapter 2.2.) correspond to the first and second factors respectively, while automation AI (will be discussed as dull replacement of human director in Sub-chapter 2.3.) – to the last one.

SUB-CHAPTER 2.2. AI as assisting tool for board directors: interconnection with fiduciary duties

The foremost duty of directors is to act in compliance with the AoA of the company. AoA is a core document of the company, establishing its legal existence in a wide range of jurisdictions worldwide. Section 2.04 (2) of EMCA states that “the AoA shall, when registered, bind the company and the members of it”. According to Section 10.01 (1): “A director has a duty to the company to perform the functions, according to his or her duties and according to this Act and the AoA”. To ensure that AI will comply, the requirements

and considerations set out in AoA can be transformed into algorithmic data sets, upon giving to AI for processing (Baburaj, 2021, p. 238). In this way, AI will provide outcomes with respect to AoA provisions. This will considerably reduce any doubt or contradiction, that human directors may overlook (Baburaj, 2021, p. 238).

Before the detailed discussions of supportive AI models will be started, the fiduciary duty of care posed by board directors should be outlined. According to Section 9.03 of EMCA, “director of a company must exercise reasonable care, skill, and diligence. This means the care, skill, and diligence that would be exercised by a reasonably diligent person with 1) the general knowledge, skill, and experience that may reasonably be expected of a person carrying out the functions carried out by the director in relation to the company, and 2) the general knowledge, skill, and experience that the director has”. The duty of care is considered to be the fundamental one; it is extensively relevant in a variety of jurisdictions. Irish Companies Act in Section 228 states that directors shall: “exercise the care, skill and diligence which would be exercised in the same circumstances by a reasonable person”.

As was summarized: “[f]irst, directors must exercise the requisite degree of care in the process of decision-making and act on an informed basis. Second, directors must also exercise due care in the other aspects of their responsibilities, including their delegation functions” (Petrin, 2019 quoted Finkelstein, Balotti, 2019, p. 1009). According to the requirement of duty of care, one question should be posed in regard to AI supportive models: 1) whether directors should be able to give AI decision-making authority; 2) does the obligation exist to do so.

Partly redirecting decision-making power to AI should be discussed in the framework of delegating a task. Delegation is not strictly prohibited by corporate law, since directors simply do not have enough time to address all tasks by themselves, especially in big corporations. From the very beginning of using corporate structure, it was agreed that the BoD could not feasibly run the affairs of the entity without certain powers being delegated to other agents (Goel, 1969). For instance, Section 2.08 of EMCA it is provided the implementation of board committees covering the scope of specific tasks within the company, like audit or remuneration committees. They may be granted specific authority and may be allowed to take the final decision.

Originally, national law and AoA refer to human delegates. Usually, such provisions leave room for interpretation, meaning that the issue of whether or not delegation to AI is acceptable is left open. (Möslein, 2017, p. 9). According to United Kingdom (hereinafter – UK) Model Articles stipulates that: “Subject to the articles, the directors may delegate any of the powers which are conferred on them under the articles-

(a) to such person or committee; (b) by such means (including by power of attorney); (c) to such an extent; (d) in relation to such matters or territories; and (e) on such terms and conditions; as they think fit”. Although this clause clearly allows delegation to a wide range of agents, it is still questionable whether delegation to AI is included as well. The provision does not explicitly state AI as the agent to which decision-making rights cannot be delegated, meaning that is not entirely prohibited from the outset. Further, formulated from the article sentence “the directors may delegate any of the powers which are conferred on them under the articles by such means and to such extent, as they think fit” can be interpreted as means that the transfer of decision-making rights to AI is allowed as long as directors are confident it will aid in compliance with their duties and benefit the company. Such reasoning could likely be applied to legal provisions or AoAs in other jurisdictions (Möslein, 2017, p. 10).

The other question posed in this respect is to which extent directors can delegate their decision rights to AI. Yes, corporate law put some restrictions in this regard. For instance, under US corporate law, directors are prohibited from delegating obligations that are fundamental to the operation of the business (Möslein, 2017, p. 10). According to comments under Section 8.20 of EMCA: “The board cannot, however, through such delegation relieve itself of the ultimate responsibility for the company’s organization and management or the responsibility to ensure satisfactory control of the company’s accounting, funds management, and finances”. Further, in the case of Dairy Containers v NZI Bank it was decided that “to manage the company effectively, of course, the must necessarily delegate much of their power to executives of the company, especially in respect of its day-to-day operation. [...] The directors may delegate powers and functions, using that term in a broad sense, but they cannot delegate the management function itself.” Generally speaking, the BoD must always make the key management decisions by themselves. The delegation of decision powers to artificial intelligence is subject to the same ambiguous restriction, even though the majority of company rules do not describe more specifically what those essential judgments entailed (Möslein, 2017, p. 11).

The duty of loyalty should be mentioned here. It is the following fiduciary duty of directors that is widely recognized worldwide. Under Section 9.04 EMCA addresses the duty of loyalty as such: “Directors must act in the way they consider, in good faith, would be most likely to promote the success of the company for the benefit of its members as a whole. In doing so the director should have regard to a range of factors such as the long-term interests of the company, the interests of the company’s employees, the interest of company’s creditors and the impact of the company’s operations on the community and the

environment”. The appealing feature of the duty of loyalty is that “the board’s liability for failures to exercise proper oversight is, under Delaware law, also subsumed under the duty of loyalty”, (Petrin, 2019, p. 1011) meaning that directors still have a responsibility to monitor the completion of the duties that have been assigned to other agents. Further, “whilst directors are entitled (subject to the AoA of the company) to delegate particular functions to those below them in the management chain, and to trust in their competence and integrity to a reasonable extent, the exercise of the power of delegation does not absolve a director from the duty to supervise the discharge of the delegated functions” (Möslein, 2017, quoted Parker, 1999, p. 11).

Applying the supervision requirement to AI, it seems that directors must carefully choose which AI system to use and what tasks to allocate them. To successfully perform as such, directors have to generally understand how these machines work and according to which technical guidelines they operate, although precise comprehension of their coding is not required (Möslein, 2017, p. 11). Should be noted that “a director may not assert his ignorance as an excuse for his nonfeasance” (Möslein, 2017 quoted Knepper, Bailey, 2002 p. 11), meaning that referring to complex AI structure will not relieve the director from negligence. He or she still must verify the stability of these systems, that they will not lead to basic management mistakes, and that their choices adhere to the relevant regulations (Möslein, 2017, p. 11).

Visa-versa question will be whether directors are obliged to use AI. The requirement posed on directors to make informed decisions is perceived to be the component of the duty of care. The duty to be informed applied in major jurisdictions. For instance, Article 2381(5) of the Italian Civil Code states that directors must make informed decisions and have the right to require clarification from management (Andersen et al., 2017). Spain combines the general obligation of directors to carry out their responsibilities with due diligence with the duty of being informed (Gerner-Beuerle et al., 2013, p. 90). Given that AI systems develop superior information processing skills, then the duty to act on an informed basis can easily be transformed into the duty of obtaining recommendations and/or information from AI.

However, to what extent information should be collected by directors to not breach their duty to use care in making decisions? The business judgment rule (hereinafter – BJR) was adopted to address this type of question. It was invented by US courts back in the first decades of the 19th century (Gerner-Beuerle et al., 2013, p. 115) and is modernly interpreted as following: “It is a presumption that in making a business decision the directors of a corporation acted on an informed basis, in good faith, and in the honest belief

that the action taken was in the best interests of the company” (Sharfman, 2017 quoted Aronson v. Lewis, 1984, p. 49). If the claimant cannot demonstrate that the directors acted on an uninformed basis, in bad faith, or in breach of the duty of loyalty, the courts will uphold their business judgment (Gerner-Beuerle et al., 2013, p. 115). With some exceptions Member States adopted BJR either in the respective codes or in case law. Croatia, Germany, Portugal, and Romania codified BJR with similarities to the Delaware approach, while in Austria, Belgium, Cyprus, Lithuania, and Sweden, it is acknowledged in courts cases or literature (Gerner-Beuerle et al., 2013, p. 116).

Yes, the quantity of information varies depending on the “magnitude of the decision itself” (DeMott, 1992, p. 134). According to the well-known case of *Smith v Van Gorkom*, directors made the decision to sell the company through a merger transaction for USD 750,000,000 only after a two-hour discussion. According to the court, the directors' agreement to the conditions of the merger, was made when they lacked enough knowledge regarding the company's value. The court emphasized further the following facts: 1) the BoD meeting was conducted without circulation of notice in advance; 2) before the final decision, directors were aware of little but that the corporation's chief executive officer sponsored the transaction and that 3) the sale price per share was more than what the corporation's shares had been trading for on the New York Stock Exchange. The court constitutes that it was not enough due to the reason that selling the entire company might result in the realization of value on several bases as the market price only represents the price of one share (*Smith v. Van Gorkom*). In conclusion, to establish that BoD has made an informed decision, a court has to determine “whether the directors have informed themselves “prior to making a business decision, of all material information reasonably available to them.” The court did not pose a liability to the directors because they collected little information, instead, they did not collect enough to make a decision on the reasonable ground. Worth noticing that, also, the court does not criticize the board decision itself, however, points out how poorly it had been prepared. It leads to the conclusion that “informed” element of BJR refers only to “procedural due care,” not “substantive due care.” (Sharfman, 2017, p. 49). According to the case of *Brehm v Eisner*: “Courts do not measure, weigh or quantify directors' judgments. We do not even decide if they are reasonable in this context. Due care in the decision-making context is processed due care only”. How was it nicely summarized: “In sum, meeting the requirements of procedural due care under the Rule means that a Board has not reached their decision by a grossly negligent process that includes the failure to consider all material facts reasonably available”.

Information is expensive, particularly when it comes in the form of reports or opinions written by experts like lawyers, accountants, and merchant bankers (DeMott, 1992, p. 134). The same argument can be applied to the information provided by AI, as adapting computer systems to the specific needs of companies demands meticulous and time-consuming preparation, while a burdensome quantity of costs are needed to be engaged (Möslein, 2017, p. 13). Utilizing the relevant information is a business choice itself, as a director should compare the “magnitude” of the decision and costs expenditure involved in gathering respective information. Therefore, BJR does not require directors to collect all information possible. In Section 10.01 of EMCA it is stated: “A director who makes a business judgment in good faith fulfills the duty under this Section if he or she is informed with respect to the subject of the business judgment to the extent that the director or managing director reasonably believes to be appropriate under the circumstances”. According to English case law and US corporate law: “Their negligence must not be the omission to take all possible care; it must be much more blamable than that; it must be in a business sense culpable of gross negligence” (Möslein, 2017 quoted *Lagunas Nitrate Co v Lagunas Syndicate*, 1899, p. 12). Further, the German Stock Corporation Act (AktG) stipulates that “directors shall not be deemed to have violated their duty of care if, at the time of taking the entrepreneurial decision, they had good reason to assume that they were acting on the basis of adequate information for the benefit of the company” (Möslein, 2017 quoted German Stock Corporation Act, p. 12). In conclusion, as far as directors collect information to the extent, they reasonably believe is appropriate under the certain case and it will be enough to make the decision in the best interests of the company, the duty of care, in particular, the duty to be informed, will be fulfilled.

It appears challenging to prove that directors who choose to not use AI as an aid to the decision-making process are operating in an unreasonable manner. The current employment of AI in this regard is still not widespread. According to the study (European Commission Report, 2021, p. 16), in the EU only 13% of the companies contacted use some AI solutions to support tasks related to company law and corporate governance. However, even these numbers should be treated with caution, as many respondents may refer to the standard, “off-the-shelf” AI products, boosting company tasks such as character and speech recognition (European Commission Report, 2021, p. 16). Since it is so, the usage of AI is not a widely accepted standard of directors’ conduct. The more companies will develop AI as assistance to the BoD, the more difficult it is to deviate from implemented behavior norms without breaching the duty of care. It was pointed out that the equal process was undergone by information governance that is now majorly considered to be additional tasks

for the BoD, such as the strategic definition of IT targets and IT resources, the organization of the IT department, etc. (Möslein, 2017, p. 13). The governance of AI can be developed as an extra task for the BoD in the same vein.

SUB-CHAPTER 2.3. AI as dully replacement of human director: issue of granting legal personality

An Automated AI model is the most advanced type of how AI that can be implemented within a corporate governance structure. It provides a dull replacement for a human director that can be incorporated into two forms. The first one is “hybrid boardrooms”, where human directors are mixed with artificial ones. The second form implies dully replacement of BoD with AI.

The literature points out several prominent advantages of adopting an automated AI model. The most obvious benefit, which was outlined previously, is its ability to process a high volume of data, including all specific investments, risks, opportunities, and tactics. Secondly, as AI thinks in different ways as humans do, it can bring alternative ideas, facilitating a plurality of views in the boardroom. Such a change to meetings would guarantee that all perspectives would be taken into account throughout the whole decision-making process, which may lead to better outcomes. Thirdly, AI may attend BoD meetings without prejudice or a predetermined agenda, considering any biased programming by the original programmers and developers. And, finally, AI will compile with the duty of loyalty perfectly, as these systems rely on codes and algorithms rather than on goals such as remuneration. Programmed correctly, it is not possible for AI to use company resources, opportunities, knowledge, or finances for one's own gain. As was nicely summarized: “some might suggest that artificial directors could make the best decisions because they could magnify the most desirable traits of human directors: competence, loyalty, diligence, care, and respect of the law” (Ricci, 2020, p. 901).

In turn, an automated model triggers one of the most fundamental legal concepts – legal personality. Directive (EU) 2017/1132, codifying a large part of EU company law, refers to natural or legal persons. “Personality” can be held by both of them (Turner, 2019, p. 44). AI is clearly not a natural person and never can be considered as such. It is already stated in the part of its abbreviation: “artificial”. Further, AI is not perceived as a legal person in national legislation (European Commission Report, 2021, p. 37). This could be the end of the discussion of the topic; however, it is not as clear as it seems. To go further, the author will pose the question of whether AI can be appointed as director as a matter of

principle. This question can be divided into two sub-parts: 1) “Who can be appointed as director according to national law?” 2) “Whether AI falls under these conditions?”

Mainly, humans can be appointed as directors. Due to Delaware Code, which stipulates that directors must be human, natural people, nonhuman legal persons are not permitted to hold board positions. For example, the Irish Companies Act under the Section 130 (1) states that “a company shall not have as director of the company a body corporate or an unincorporated body of persons”. Under Article 37 of Lithuanian Law on Companies: “The manager of the company must be a natural person”. Visa-versa, in some states corporate bodies are allowed to be appointed as board directors. Under Article 212 of the Spanish Corporate Enterprises Act: “Directors of corporate enterprises may be individuals or bodies corporate”. According to Article 155 (1) of the UK Companies Act: “A company must have at least one director who is a natural person”.

Indeed, companies have many of the same legal rights as people have, including the ability to own property, incur debt, engage in contracts, and conduct crimes (Ricci, 2020, p. 892). Further, they can sue and be sued, in some jurisdictions even be subject to criminal liability in their own right (Turner, 2019, p. 45). However, companies are still the collective imagination of human brains, “[...] a corporation is an abstraction. It has no mind of its own any more than it has a body of its own [...]” (Lennard’s Carrying Co Ltd v. Asiatic Petroleum Co Ltd, 1915). Contrary to how we are used to perceiving, companies cannot function without the support of their shareholders, directors, employees, and others. Alternatively saying, all transactions of the company, on the basis of which rights and obligations are acquired, suspended, or stopped, are impossible without a collective decision of stakeholders standing behind. Therefore, when it comes to the appointment of the corporate body as a board director, ultimately, human serves as such. One can imagine that Company B could decide to appoint Company A as director. Company A could not physically attend the boardroom and participate in a meeting, instead, it will designate a human to sit on the board of Company B to act on its behalf (Ricci, 2020, p. 884). In the end, companies still rely on humans to take decisions even when it is prescribed by the law that legal persons can be appointed as board directors.

In conclusion, on a company’s behalf, only people may think and act. However, not entirely all humans can serve as board directors. For instance, minors, with cognitive impairments, in comas or similar cannot be legally appointed on the board. The simple reason why so is legal agency. In this regard, the legal agency does not suppose to be considered part of the principal-agent relationship, where one entity (the principal) appoints another (the agent) to act on its behalf. Here legal agency is described as a subject “which

can control and change its behavior and understand the legal consequences of its actions or omissions” (Turner, 2019, p. 43). The legal agency is granted only to humans, that are aware of their legal rights and obligations and are capable to amend their behavior accordingly.

In such a way, the answer to the first question is that ultimately only natural persons bearing legal agency can serve as board directors. Therefore, the automatic answer to the second question is no. AI does not bear legal agency or, at least, is prescribed to not bear such. In conclusion, according to current legislation, AI cannot serve as a board director. On the other hand, formal companies still have legal personalities. Therefore, one can consider the possibility to grant it to AI systems. However, as was discussed, companies' reliance on human agents allows them to continue existing as legal persons. But there is no human safeguard net for AI particularly because these systems do not rely on human agents. As shown in Chapter 1, AI is capable of making choices autonomously without human input. Then the question can be posed whether it is logical to examine AI's legal personhood.

In its resolution of 16 February 2017, the European Parliament made recommendations to the Commission on Civil Law Rules on Robotics regarding the potential for eventually granting robots a distinct legal status by recognizing their electronic personalities in situations where they make autonomous decisions or otherwise interact with third parties independently. The proposal was heavily criticized by an expert in an open letter. The Natural Person model cannot be used to determine a robot's legal standing, as then AI can exercise rights such as the right to dignity, the right to its integrity, the right to remuneration, and the right to citizenship. This would be a direct contradiction to human rights, violating the Charter of Fundamental Rights of the EU and the Convention for the Protection of Human Rights and Fundamental Freedoms. In this regard, the legal standing of AI cannot derive from the Legal Entity model either, as it necessitates the presence of humans to represent and manage the legal person, which is not the case with AI. However, “seeking a human or even a fictional corporate agent behind every AI act is just one of many policy responses that could be chosen” (Turner, 2019, p. 63).

It is clear that AI systems cannot legally do all the tasks that a natural or legal person may. Despite this fact, AI, as humans, is an intellectual agent (Ricci, 2020, p. 882). Both humans and AI systems “can be viewed as perceiving [their] environment through sensors and acting on that environment through effectors” (Ricci, 2020 quoted Russell, Norvig, 1995, p. 882). Further, AI shows some other features, satisfying the requirements of legal agency and causation, while within jurisdictions, nature, buildings, and even concepts were

granted legal personality, despite the fact that they all eventually rely on humans, their decisions, and acts.³

One can imagine that the legal personality was granted to AI. The form of it is not especially important, as sufficient proposals require years of research in several disciplines, including not only law but such as computer science and philosophy (Ricci, 2020, p. 869). It can be according to the form proposed by the recommendations of the European Parliament, but not necessarily. Then, AI systems would be the first nonhuman beings in history to hold a tangible position on BoD (Ricci, 2020, p. 885). The appointment of AI systems as board directors differs from one of the companies because the appointed AI system would be actually making the decisions on behalf of the corporation, “the artificial director” (Ricci, 2020, p. 885).

Corporate laws typically set forth a number of prerequisites that prospective directors must meet, and certain industry-specific rules may add extra criteria. For instance, according to Article 91 (1) of Directive (EU) 2013/36/EU: “Members of the management body shall at all times be of sufficiently good repute and possess sufficient knowledge, skills and experience to perform their duties”. It is doubtful that artificial directors could possibly meet these requirements. Even if they may gain enough “knowledge, skills and experience”, AI would have a particularly tough time developing “good repute”.

It leads to the more general issue of accountability. These days artificial directors would not have any assets, and they would not have a public image or professional reputation to uphold. In particular, AI would not be held accountable even if they were given legal ability since they would not be a member of human society and, more crucially, because they would not have consciousness or conscience (at least not at this time) (Ricci, 2020, p. 883). The creation of an artificial conscience and awareness as well as a type of social structure that might offer incentives to the machines — some mix of internal moral principles and various societal relations — would be necessary to hold AI robots accountable. To put it another way, creating incentive systems for AI robots and giving them consciousness and conscience would undoubtedly be necessary for holding them accountable (Ricci, 2020, p. 883).

In order, to resolve accountability issue, the adoption of AI in the boardroom was compared to the *negotiatio per servos communes cum peculim* (“an organizational form for joint business conducted through a commonly owned slave”), the company structure

³ For a detailed analysis of such cases please see Turner J. (2019). Robot Rules: Regulating Artificial Intelligence.

created and developed in Ancient Rome (Ricci, 2020, p. 886). Please see the table below for the prominent analogy:

Table 2. Differences and similarities between *negotiatio per servos communes cum peculim* and employed artificial directors

Comparative indicators	Negotiatio per servos communes cum peculim	AI in corporate boardroom
Subject in question	Highly intelligent and skilled slaves. Many of them were highly educated and had good business sense.	AI systems
Legal status within the company	“Goods”, can be purchased and co-owned by owners of the organization. They are considered to be one of the assets of firms. Running companies on behalf of their co-owners.	
Scope of rights	Bearded basic rights of personality, strictly relating to related to their human nature, consciousness and conscience, such as exercise religion.	Currently, AI are not granted rights of any nature.
Manifestation of legal agency	Do not have legal capacity, cannot enter into agreements and do commerce with third persons.	
Manifestation of consciousness and conscience	Had consciousness and conscience. Experience human-like experiences together with moral and ethical behavior. Have souls and sentient bodies.	Due to current development do not hold such features as slaves.
Citizenship	Are excluded from citizenry.	
Relationship with owners	Consists of the system of incentives and punishments, including manumission.	The system of relationship existing between slaves and their ‘masters’ could not possibly be duplicated for artificial directors. An AI machine cannot be set free or punished in the traditional sense; instead, hitting an AI machine would either have no impact at all on its decision-making, or if it did because it was aware, hitting it should be outlawed.
<p>Conclusion: both slaves and AI can be perceived as clever “goods” without the authority to manage their businesses. Both of them are noncitizen agents, meaning the interruption of “typical societal bonds that constitute the fabric of accountability”. Even if AI directors had legal agency, this would not be enough to hold them accountable. Firstly, it is because without a feeling of citizenship and society, AI robots would not be subject to social influences that would limit their decision-making. Secondly, it would be considerably more difficult to hold artificial directors and AI machines accountable than slaves until they attained a sufficient level of consciousness and conscience to be able to practice morality and ethics and feel human-like feelings.</p>		

Source: compiled by the author based on: Artificial Agents in Corporate Boardrooms. Available at: <<https://cornelllawreview.org/2020/03/15/artificial-agents-in-corporate-boardrooms/>>;

It is important to note that, should AI ever develop into a conscious system under human control, there is a chance that highly unfavorable outcomes may occur. Technological advancements might create a pattern of usage akin to slavery in Ancient Rome through the deployment of AI with a conscience. However, anything resembling a social framework of slavery, even in the lightest way possible, is unacceptable under the morals and values of modern social structure. It was argued that AI could experience

extreme suffering or develop the capacity of feeling strong empathy (Beckers, 2017). Humanity is grappling with the decision of whether to even construct conscious AI due to fears that such a being may suffer or, alternatively, might turn hostile toward humans (Ricci, 2020, p. 894). In conclusion, accountability would ultimately depend on AI having a conscience, but a conscience would require consciousness. Providing AI with consciousness would have too numerous and large-scale ramifications that should be explored in all dimensions possible.

The key issue is to compare the risks with the benefits of adopting artificial directors. Surely, AI would bring a lot to the board, however, most of its advantages can be employed in assisting and augmented models. AI still can analyze never-ending streams of data arranging it in the form of a recommendation report, that can be used as one or even the main source of information to consider while taking a decision. Such documents still will encompass the alternative views of AI and be viewed by directors. In assisting models, loyalty to the company, knowledge of laws, and compliance with fiduciary duties will be left to the directors themselves, however, as they are accountable and bear a reputed image for society, risks of duty or law breaches are minimalized. The abilities of AI, indeed, can facilitate decision-making on the board even without the necessity to consider granting legal personality to AI and empower it with presupposed rights, conscience, and consciousness. AI with the capability of making autonomous decisions is unpredictable, as well as the outcomes of implementing its legal personality.

CHAPTER 3. BENEFITS AND RISKS OF AI FOR OTHER STAKEHOLDERS

SUB-CHAPTER 3.1. Advantages of AI implementation for employees, managers, creditors and auditors

Shareholders. Many concerns related to BoD can be minimalized within the directors' selection process. It is one of the most crucial yet little-examined issues in corporate governance (Erel et al., 2020, p. 1). The right to appoint directors is reserved for shareholders. Under Section 8.02 of EMCA, it is stated that “directors shall be appointed by the general meeting”. Member States may pass particular legislation, such as a clause allowing the national government to nominate directors directly for state-owned companies (Andersen et al., 2017, p. 174), however, the appointment of a majority of directors is still left to shareholders of the company. Should be stated that in practice, the recruitment process is not posing a clear link between "potential director-shareholders", but is more complicated often involving other agents, like nominating committees. Still, shareholders are the ones who vote on general and/or extraordinary meetings.

The requirements of national laws for the skills and education of directors are rather generalized and mainly concern compliance with the duty of loyalty formed in the provisions similar to the one under Section 8.02 (4) of EMCA: “In a public company, prior to an appointment to the board, the candidates shall provide the general meeting with information regarding their positions in other companies as well as any other fact that may cause a potential conflict of interest”. Literature poses minimum requirements towards candidates: “In the boardroom, directors are likely to rely on the particular skills, such as knowledge of the law, possessed by various of their colleagues, and on expert advice provided by the corporation’s employees and, on occasion, by its external advisers” (DeMott, 1992, p. 134). Ultimately, the precise characteristics on which the choice in favor of this or that potential candidate is based, are left to the shareholders. The selection of the directors tasked with representing their interests is mostly outside the shareholders' control, therefore the decision should be thoughtful (Erel et al., 2020, p. 1). In many ways, it is a prediction problem, as shareholders develop projections regarding the performance of probable nominees (Erel et al., 2020, p. 1).

As was discussed earlier, AI machines excel at making predictions, especially if equipped with appropriate data. Researchers created machine learning algorithms (Erel, et al., 2020, p. 1) that could aid businesses in selecting board members. More specifically, these algorithms can determine the quality of potential board candidates for a certain company. Any algorithm created to fulfill this aim must include a method for evaluating a director's performance inside a specific company. This task is complicated as the board

directors typically operate collectively, making it difficult for researchers to track down individual director behavior. The team chose the following approach: since it is a director's fiduciary duty to serve in the interests of shareholders, directors' popularity within them is a logical criterion to measure the performance. The team used a variety of machine learning techniques to forecast a potential director's performance at a certain firm while taking into account the other board members. They trained each algorithm on a training set of directors appointed between 2000 and 2011 using their sample of public corporations and then used a test set of directors appointed between 2012 and 2014 to compare the predictions to the observed out-of-sample data.

As a result, out-of-sample predictions of the distribution of results were produced by algorithms with high accuracy. In general, the directors, who the algorithms projected would do poorly, indeed, performed worse than the directors, who were expected to perform well. The team concluded that the board selection process typically results in directors who are 'nearest at hand' and may not always be the best candidates to represent the interests of shareholders. Machine learning algorithms, in addition to validating this observation, may also provide the tools to alter it. These technologies might increase the pool of prospective directors by predicting each candidate's performance and spotting possible candidates who would have been missed yet had the qualifications to be effective directors.

Although an alternative method will promise to bring positive results, it must be designed and employed carefully. The team evaluated the difference between the directors suggested by the algorithm and those actually selected by companies, as well. This allows the team to determine aspects that were exaggerated throughout the director nomination process. It appeared that "predictably bad directors are more likely to be male, have a large network, and have many past and current directorships" (Erel, et al., 2020, p. 23). Algorithms turned out to be conceptually right, as they pointed out the problem frequently underlined by institutional shareholders: "directors who are not old friends of management and come from different backgrounds are more likely to monitor management". (Erel, et al., 2020, p. 23). Indeed, the algorithms were accurate in their result, however, their further employment without proper monitoring can lead to biased outcomes.

Biases are often linked to decisions that are perceived as unfair or unjust to certain people or groups of people (Turner, 2019, p. 337). To discard subjective concepts of 'unfair' and 'unjust', the following definition will be prioritized: "Bias will exist where a decision-maker's actions are changed by taking into account an irrelevant consideration or failing to take into account a relevant consideration" (Turner, 2019, p. 337). They can lead,

for instance, to illegal discriminatory employment practices, such as disregarding the potential director by his gender, because algorithms previously established that male directors perform statistically less effectively. This conclusion was produced with others such as “have a large network” and “have many past and current directorships”, but it heightens the danger that male directors will not be considered at all, despite the fact that they may not hold two latter features. In turn, it can lead to infringement of board diversity, the principle explicitly emphasized in the literature. According to the findings (Akram, F. et al., 2020), a gender-diverse board has the ability to boost the company's valuation, as the higher variety and expertise of the director is connected with the better value of the company.

The appointment of directors is only one matter from the range of decisions that shareholders are taking on the general or extraordinary meetings. They are decision-makers, as well, regardless of the fact, that they did not undergo the excessive quantity of decisions to be taken as board directors do. This is underlined in the recommendations of EMCA under Section 11.01 “The shareholders are the ultimate decision-makers in companies”. Given that the BoD has sole management authority, the general meeting may not vote on management-related matters. Instead, shareholders mainly are taking decisions concerning the company itself. For instance, under Article 119 (1) of the German AktG, in situations specifically outlined by law and AoA, the general meeting passes resolutions with relation to such matters as “the appropriation of the net income”, “amendments of the by-laws”, “measures serving the procurement of capital and the reduction of capital”, “the dissolution of the company”. These are choices that influence the main direction of the company's development, therefore play a significant role in its existence. In this case, the speed of decision-making is not important, on the contrary, the amount of information explored and the quality of the decisions count. As already described in Chapter 2, the implementation of AI as an aid in the decision-making process can increase the quality of decisions and, in turn, make the one best for the company's interests. Also, the ability of AI systems to predict events will help in a number of issues, such as investment decisions.

Although AI would not require any human features to serve as assistance to shareholders' decision-making, the author would like to mention Sophia, a “human-like robot” designed by Hanson Robotics. Sophia is said to be capable of independent operation and human-to-human communication. In the future, this kind of developed AI can serve shareholders as an advisor. In Section 11.08 EMCA covers the possibility of shareholders to “attend the general meeting together with one or two advisors”. Despite the absence of regulations on advisors at the EU level, the Companies Acts of a number of Member States

let shareholders together with one or more advisors attend the general meeting. According to Danish Companies Act Section 81: “All shareholders and proxies may attend general meetings together with an adviser”. The Swedish Companies Act in Chapter 7, Section 5 states: “shareholder or a representative may be accompanied by not more than two assistants at the general meeting”. Provisions do not explicitly refer to the nature of advisors, however, presumably, they imply that humans can act as such. The same issue arises with the nature of agents to which directors can delegate their powers, which was discussed in chapter 2. As long as provisions do not clearly prohibit AI to act as advisors and shareholders act in the best interests of the company, such appointment is permissible.

Employees. The most obvious use of AI regarding employees is the implementation of such systems in the recruitment process in order to select workers being the most suitable for the company’s needs and tasks and vice versa. However, the same issue as was detected within the board directors selecting process can badly influence the outcome of AI employment in this area. While algorithms that can be used to aid the selection process of directors are in the process of development and are not widely used, similar practices concerning employees with the negative outcome already exist. For instance, Amazon’s recruitment algorithm discriminated against female work candidates. Once the matter had become public, the algorithm was forced to be discontinued (Dignam, 2019, p. 15).

Finally, the other benefit mentioned is that AI systems may aid in the oversight and protection of employees’ rights (European Commission Report, 2021, p. 511). However, it can lead to a breach of privacy rights, which will be discussed in the following chapter.

Auditors. According to Section 12.01 of EMCA “All companies must draw up an annual report in accordance with the provisions in the national Accounting Act and the EMCA”. Mainly all Member States implement regulations for auditing of annual accounts (can be referred to as financial statements or financial accounts) with mere exemptions. For instance, in Ireland, small and dormant companies, in case of meeting all requirements, can claim audit exemption (Companies Registration Office website). However, the main rule remains the same” in order to ensure transparency, annual accounts should undergo auditing. Auditors play an important role in this process, scrutinizing the annual account prepared by the BoD and collecting all respective information appropriately proceed as so. Under Section of 12.03 EMCA: “If a company is subject to audit obligations under the national Financial Statements Act or any other statute, or if the general meeting otherwise resolves that the company’s financial statements must be audited, the general meeting must elect one or more approved auditors, and alternate auditors if applicable”. Similar to the

incorporation models of AI within the BoD, AI can serve as assisting tool for auditors to perform their duties or dully replace humans with machines.

As assisting tool, AI may facilitate the process of continuously analyzing all the data available about a company in real-time, while currently, auditors assess data samples on a quarterly basis, which is considered to be less effective (Chan, Vasarhelyi, 2011, p. 159). This enhanced model is called continuous auditing (CA). In order to improve the efficiency of an audit and raise the likelihood that substantial mistakes, omissions, and fraud may be found, CA offers consideration of the whole population of transactions in monitoring and testing. Further, with the implementation of CA, the auditor's work will change from carrying out tiresome audit processes to looking at abnormalities and exceptions to handling audit procedures that call for professional skepticism and judgment (Chan, Vasarhelyi, 2011, p. 159). is ideally suited for business operations with high levels of risk. For instance, it may be wise to continue and in real-time audit the higher-risk treasury distribution procedure in industrial enterprises (Chan, Vasarhelyi, 2011, p. 154). It can be well-employed for external auditors as well as for audit committees within the company.

The issues concerning the dull replacement of human auditors are the same as were discussed in the Sub-chapter 2.3. Currently, AI is prohibited from serving as a completely autonomous auditor. It is underlined in the national legislation of Member States as well. For instance, in Romania, according to the current legal framework, an AI system or robot cannot be appointed as auditor of the company (European Commission Report, 2021, p. 485).

Creditors are significant sources of capital for companies (Davies, 2020, p. 223). They vary in their nature. Either a bank granting a small-scale term loan to a company or an enormous firm issuing bonds that trade on a public market to generate debt financing are considered to be creditors. Despite their nature and form, once the funds have been provided, the creditors are in danger of the company's danger acting opportunistically (Davies, 2020, p. 223). It follows logically that creditors can never be certain that they would always receive the money back in return since even in the most morally honest company, the agents might experience a hazard they are unable to handle (Davies, 2020, p. 223). Therefore, it is natural that the law strives to establish regulations that protect the rights and interests of creditors. For instance, under Point 3.4 of the introduction in EMCA, it is stated that: "The shareholders must be ensured influence and profit, and creditors must be protected against losses which are not a result of taking reasonable commercial risks".

AI may aid in reducing such risks by predicting financial distress, which is a crucial and actively researched subject, given its enormous influence on loan choices and financial institutions' profitability (Bae, 2012, p. 9159). For a variety of stakeholders, accurate financial distress prediction models are crucial because they provide prompt warnings. Further, such models empowered by data mining and machine learning techniques might assist the BoD in making better decisions in case the company is in financial trouble (Bae, 2012, p. 9164). Making quality decisions in the context of financial hazard happening reduces the likelihood of the dissolution of the company, in turn, ensuring the funds of creditors are saved.

SUB-CHAPTER 3.2. Potential risks common for all stakeholders

The unpredictable outcome created thanks to the ability of AI to think originally is highly beneficial, however, may not serve well in an environment where transparency is praised. As was discussed in the 1st chapter, transparency is the principle of AI recognized worldwide. The company has a responsibility to shareholders and other stakeholders in transparent disclosure. Swedish Code of Corporate Governance underlines transparency as one of the core principles of corporate governance: “to create as much transparency as possible towards shareholders, the capital market and society in general”. French Corporate Governance Code of Listed Corporations 2020 sets recommendations to enable companies “to improve their functioning and management in an atmosphere of enhanced transparency and thus respond to the expectations of investors and the public”. The importance of transparency requirements within good corporate governance of companies is emphasized not only in the national legislation of Member States but in countries worldwide. For instance, according to the Japanese Corporate Code: “Companies should appropriately make information disclosure in compliance with the relevant laws and regulations, but should also strive to actively provide information beyond that required by law”. Further, under the guidelines of AI HLEG, transparency encompasses three elements, one of which is explainability: “AI-driven decisions – to the extent possible – must be explained to and understood by those, directly and indirectly, affected, to allow for contesting of such decisions” (Ethics Guidelines, 2019, p. 13).

AI is equipped with complex data, that can be mixed in unexpected ways to create patterns. A suitable illustration is the case of Adrian Thompson, who created a circuit that could distinguish between two audio tones using the software. The circuit used electromagnetic interference that was hardly detectable and caused as a byproduct of neighboring components. The inventor was surprised that the circuit utilized fewer

components than he had anticipated (Turner, 2019 quoted The Economist, 2001, p. 71). As illustrated, it is not always feasible to explain the reason why a model produced a specific output or choice and what mix of input elements led to it. These situations are described as “black boxes” (Ethics Guidelines, 2019). In both well-designed and poorly-designed models, black box AI models are mistaken 10% of the time or more (Dignam, 2019, p. 19). It is unclear why poorly built black box AI systems fail, and even when they succeed, it might not be feasible to ascertain what factors ultimately led to the choice. Therefore, companies may engage in illegal discriminatory hiring practices, such as in Amazon’s case, without leaving any evidence of their actions thanks to AI processes that let an ever-evolving AI system make suggestions without disclosing the reasoning behind them. The “black boxes” opacity might hide the decision-making mechanism from designers and operators as well (Godwin, 2021, p. 75).

Biases, that were mention while discussing board directors and employees selecting process, can be hidden in the “black boxes”. Dignam A.J. argues that “humans behind the tech are the problem” (Dignam, 2019, p. 19), because “[...] the human designers have not been concerned to know the basis of the decision, just that it works within certain technical parameters” (Dignam, 2019, p. 18). Further, he explains that mainly white men are involved in the technical AI roles, meaning that they are not sufficiently representative of society and have implicit and/or overt worldviews, which can significantly skew the outcomes. For instance, humans, who exhibit unconscious bias, select the image samples that will be used to test an image-based AI model. These choices may be representative of the observer's life experience, but may not be representative in general. The outcome heavily relies on data that is given to AI as input.

Algorithms that were employed for board directors' selection and employee one differ in their model structuring and, therefore, provide different results. The main measure of machine learning models developed for facilitating the board directors selection process (Erel, et al., 2020, p. 22) was the degree of support a director received from shareholders in comparison to other directors at the same company. However, as this is an individual measure that reflects the support of the director personally, alternative data, such as “the firm’s abnormal returns at the time of the announcement of a director’s appointment, high dissent, and turnover shortly after the appointment”, was used. In Amazon’s case, AI was trained against a whole decade's worth of successful candidates' CVs. Candidates were eliminated or downgraded if their CVs included language indicating membership in “women's” organizations or that they were graduates of institutions exclusively for women. More subtly, the AI favored applicants who used verbs associated with male engineers,

such as “executed” or “captured” (Dignam, 2019, p. 16). AI provided such an outcome not because of developers who intended to disregard women in this process, but because of statistics that systems discovered based on data given.

It leads to another issue, that concerns the quality of data provided to AI. Failure to plan appropriately for the ethical handling of data can cause problems for companies (Godwin, 2021, p. 77). The AIA tries to minimize such risks by putting high expectations of data used in Recital 44: “Training, validation and testing data sets should be sufficiently relevant, representative and free of errors and complete in view of the intended purpose of the system”. However, such a provision was criticized to be too idealistic. It was described as “highly desirable but rarely met in full”, giving as an example public databases that usually contain disorganized, distorted, and wrongful data (Floridi, 2021). As AI can combine large amounts of personal information, it poses potential violations of rights to privacy and data protection. Even though each piece of information could be publicly accessible, the final consolidated dataset might be seen to be overly intrusive. Comparing the combined information to the large volumes of publicly accessible yet decentralized personal information, the combined information may be seen as having a distinct quality (high privacy risk) (European Commission Report, 2021, p. 27). Overall, this raises the question of whether AI complies with handling sensitive personal data. For instance, to determine whether any circumstances would preclude shareholders and/or directors from serving in these capacities in a particular jurisdiction, legal professionals, public officials, and business registers alike may use AI to conduct background checks on shareholders and/or directors. Personal data from databases and the internet are gathered and analyzed during this process (European Commission Report, 2021, p. 27).

All described above seem to be technical issues that accompany the employment of AI in corporate governance. They are required to be addressed before AI will turn out to be an integral standard of the company's processing. Otherwise, instead of improving corporate governance, AI will make it more confusing through “black boxes”, biases, and poor work structures together with unethical bad-quality data, destroying standards such as transparency, care, and diversity, those we have long striven for. On the other hand, as AI systems evolve, they may also become less transparent and challenging to audit and evaluate. In this case, posing limits that are too tight can lead to designing less complex architecture for the sake of transparency set in regulations. Indeed, it will boost the explainability of AI, but, in turn, demolish the quality of the provided outcome.

CONCLUSIONS

Task 1

1.1. Due to the “AI effect” complex computer structures mimicking human intelligence are confused with AI. To be implemented within corporate governance AI forms are based on learning systems, empowering the ability to learn autonomously.

1.2. Through machine learning techniques AI systems gain information from the enormous amount of big data, that cannot be efficiently processed by humans. AI does not analyze the environment as humans do, therefore machines can notice patterns, make choices, and propose recommendations that could never be delivered by humans.

Task 2

2.1. Board directors make complex decisions daily, which pose tight deadlines and collection of information in large quantities. Directors’ choices directly impact the good running of the company and determine its further development. Such cases may be facilitated by AI implementation due to its unique features mentioned in Conclusion 1.2.

2.2. Incorporating AI as assisting tool to the BoD will not breach the duty to comply with law and AoA, as considerations set out therein can be structured in data sets, upon provided to AI. Until key management decisions will remain within the authority of board directors, the delegation of certain BoD tasks to AI is not prohibited. To comply with the duty of loyalty directors should monitor the process of delegated tasks completion and bear the general knowledge of how certain AI operates. BJR does not require directors to collect all information possible. As far as assisting and augmentation models of AI implementation are not considered to be recognized standard, the duty of care will not be breached.

2.3. Automation model of AI implementation represents the image of the ideal board director. However, granting legal personality to AI currently is not possible as AI cannot be accountable. Accountability requires AI to bear conscience and consciousness, granting of which should be further explored within various research fields.

Task 3

3.1. AI will improve the quality of tasks performed by shareholders, employees, creditors, and auditors. Fully replacement of human stakeholders with AI is not possible due to the reason stated in Conclusion 2.3.

3.2. AI’s abilities to think originally and process big data are both its superiority and main flaws. Poor quality data together with limited explainability of certain outcomes contradict the concept of “trustworthy” AI and pose risks to all stakeholders of the single company. The balance between transparency requirements and the development of more complex

machines should be explicitly regulated before AI will become the infeasible standard of a company's processing.

Task 4

4.1. Due to AI's unique features, it should be implemented within corporate governance. AI may improve the decision-making process of the BoD, increasing the well-being of the company and its development. AI can produce a recommendation, which can be considered a reliable source of information or one output of many possible. In this context, fiduciary duties should not be considered as obstacles towards implementation, but factors defining director-AI interconnection. Other stakeholders will benefit from AI incorporation as in the process of performing essential tasks, such as auditing and board director selection, the human factor will be removed, reducing the risk of mistakes and non-efficiency. Human auditors, and shareholders, instead, can concentrate on areas requiring professionalism, experience, and consciousness, while employees and creditors will rely on AI as a security tool for their rights.

4.2 Implementation should be done in the frames of assisting models of AI only. Human monitoring and supervision over delegated tasks together with a general understanding of AI processing are mandatorily applied. Currently, a human cannot be separated from AI processing and should re-check the output of AI. Such requirements are necessary due to issues of "black boxes", biases, and bad-quality data.

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SUMMARY

The Master Thesis poses the object to analyze benefits and risks AI may provide to the board of directors and other stakeholders of the company, such as employees, creditors and auditors. The aim of the Thesis is to answer the question whether AI should be implemented within corporate governance of the company. To fulfill the aim, four tasks were posed. Firstly, the author will define the form of true AI to be implemented in corporate governance accompanied with its unique features and regulative approaches. Secondly, the author will determine AI implementation models within the board of directors and from their perspective evaluate how AI may facilitate the decision-process and the board itself. Further, possible obstacles towards AI implementation within the board will be explored. In this regard, interconnection of AI with fiduciary duties and the issue of legal personality will be mentioned. Thirdly, the author will determine and compare potential benefits and risks for employees, creditors and auditors to evaluate the consequences of AI implementation. Finally, the findings will be summarized in conclusion that AI should be implemented within corporate governance due to its unique features. AI may improve the decision-making process of the board of directors, increasing well-being of the company and its development. Other stakeholders will benefit from AI incorporation as in the process of performing essential tasks, such as auditing and board director selection, the human factor will be removed, reducing the risk of mistakes and non-efficiency. Implementation should be done in the frames of assisting models of AI only. Human monitoring and supervision are mandatory applied. Such requirements are necessarily due to issues of “black boxes”, biases and bad-quality data. Further regulation of AI transparency and explainability should be conducted, as current ethical framework is vague. In the work, logical analysis, comparative and linguistic methods were used.