

V. SENTIENT ALGORITHMS AND CORPORATE LAW: A LEGAL ODYSSEY TO THE NEW AGE OF INTELLIGENT ENTERPRISES

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ABSTRACT

As humanity challenges itself to turn seemingly impossible imaginations into reality, the evolution of Artificial Intelligence (“AI”) is sending shockwaves through the fabric of society, impacting corporations and legal frameworks. The paper attempts to understand the implications of incorporating AI into the corporate structure with a multidisciplinary approach. The first part of the paper traces the timeline from the genesis of AI to the current state of affairs. The paper delves into understanding the technological intricacies to demystify the question, “What is AI?”. The second part unfolds by exploring the possibilities of incorporating AI in corporations and boardrooms at different levels of autonomy. After observing the existing paradigms and future trajectories, it can be discerned that corporate funding for AI integration is poised for an exponential curve. The third part analyses the existing corporate law principles, assessing their adequacy to sufficiently guide the directors in utilising the emerging technology. Notably, the existing Companies Act, 2013 lacks explicit provisions for AI, thereby precluding the appointment of AI as a director or distinct entity. However, the use of AI at assisted autonomy levels can be accommodated under the current framework. The section further explores the “liability gaps” existing in the current legal framework for ascertaining the contractual and extra-contractual liability of corporations for damages stemming from AI utilisation. The final part proposes prospective regulatory solutions, drawing inspiration from the analysis of technological aspects, judicial pronouncements, and committee reports to guide the effective governance of AI. The authors advocate for exploring regulatory frameworks with an understanding of the development and deployment of AI systems. This paper contributes to the existing literature by elucidating AI’s implications for corporations, offering prospective solutions within the Indian context, and showcasing the different mechanisms employed by AI systems and their implications for addressing the challenges and exploring solutions.

Keywords: Artificial Intelligence, Neural Networks, Liability Gaps, Corporate Law, Boardroom

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I. INTRODUCTION

All different classes of tools have influenced and molded human destiny. Fire, wheels, electricity, the Guttenberg press, and the invention of semiconductors have paved the way for new epochs. These tools have assisted or augmented human intelligence. However, none of these tools can be regarded as intelligent. This is meant to change with the emergence of Artificial Intelligence (“AI”), marking a fresh era characterized not only by machines assisting human beings but rather by *human-machine partnerships*.

This path of AI development paved the way for the fourth industrial revolution with its fair share of risks and opportunities.¹ The potential that AI holds is also home to socio-economic risks and novel challenges that are yet to be addressed.² The integration and consolidation of AI framework are currently in their nascent stage,³ and with the smooth innovation at every

¹ The UNESCO Courier, ‘The Fourth Revolution’ <<https://courier.unesco.org/en/articles/fourth-revolution>> accessed 4 September 2023

² Deirdre Ahern, ‘The Impact of AI on Corporate Law and Corporate Governance’ <<http://www.tara.tcd.ie/bitstream/handle/2262/101064/AI%20AND%20CORPORATE%20LAW%20.pdf?sequence=1&#:~:text=As%20AI%20gains%20agency%2C%20the,business%20models%2C%20culture%20and%20systems>> accessed 6 September 2023.

³ Tim Fountaine and others, ‘Getting AI to Scale’ (2021) 99(3) Harv Bus Rev 116.

corner, integration of AI into numerous sectors is taking place rapidly.⁴ In the coherence of the corporate landscape, wherein each characteristic should reflect a strategic decision, a novel form of overlap is taking center stage: an imbrication between AI and the pivotal foundation of corporate governance, as the main actors in the corporate industry try to bring this overlap of algorithmic and human intellect to the daily affairs of the company.⁵

The paper critically analyzes the feasibility of inducing AI in corporate law in essence with the current Indian legal standing. It is pertinent to address these issues at the earliest, given that several industries that AI has already captured, such as production, management, and marketing. Extensive rounds of deliberation and introspection are needed to ensure the smooth evolution of corporate law for tackling novel issues posed by AI.

II. PART I: INGENUITY OF MANKIND AND THE GENESIS OF AI

A. The Road Towards Creation of Intelligence

The aspirations of intelligent machines that can complete tasks with the same dexterity as humans can be traced long back in history. Hephaestus, the divine blacksmith in Greek mythology, forged robots that were capable of performing human tasks.⁶

⁴ Wenjun Shen, 'Analysis of the application of artificial intelligence technology in the protection of corporate governance rights and interests' *Frontiers* (12 September 2022) <<https://www.frontiersin.org/articles/10.3389/fpsyg.2022.966689/full>> accessed 6 September 2023.

⁵ Sara Castellanos, 'Microsoft AI Ethicist Guide Businesses on Responsible Algorithm Design' *The Wall Street Journal* (18 October 2018) <<https://www.wsj.com/articles/microsoft-ai-ethicist-guides-businesses-on-responsible-algorithm-design-1539881902>> accessed 12 September 2023.

⁶ Alex Shashkevich, 'Stanford researcher examines earliest concepts of artificial intelligence, robots in ancient myths' *Stanford News* (28 February 2019)

Ada Lovelace and Charles Babbage developed the *Analytical Engine*, a computational machine capable of performing any algebraic work, thereby marking the advent of an age characterised by information technology.⁷ The questions, “*What is intelligence?*” and “*What makes humans intelligent?*” remain unanswered; therefore, classifying machines as intelligent has remained a matter of debate.

The same was simplified by Alan Turing in the paper titled “*Computing Machinery and Intelligence*,” proposing that the intelligence of a machine shall not be deciphered by analysing the functioning or mechanisms by which it produces the intelligence, but instead by the manifestation of intelligence (known as the Turing Test), i.e., the capacity of the machine to reflect intelligent behaviour not distinctive from that of humans, regardless of the mechanism it utilizes for generating the outcomes.⁸ Thus, as per the Turing Test, ChatGPT is intelligent not because of the technology it utilizes to generate the text, but instead because the text generated is *humanlike*, and is difficult for a stranger to identify whether the text was generated by a machine or a human.

The term AI was coined at the Dartmouth Conference of 1956, and is known as the official birthplace of AI.⁹ Cognitive scientists Allen Newell and Herbert Simon posited in the conference that human intelligence is essentially a symbol manipulation.¹⁰ Based on this understanding of intelligence (also

<<https://news.stanford.edu/2019/02/28/ancient-myths-reveal-early-fantasies-artificial-life/>> accessed 18 September 2023.

⁷ Laura Tripaldi, *Parallel Minds* (Urbanomic Media Ltd. 2022) 53-6.

⁸ J.F. Pagel, ‘Internet Dreaming-Is the Web Conscious?’ in Jayne Gackenbach and Jonathan Brown (eds), *Boundaries of Self and Reality Online* (Academic Press 2017) 282, 295.

⁹ Roberto Cordeschi, ‘AI Turns Fifty: Revisiting Its Origins’ (2007) 21-4 *Applied Artificial Intelligence* 259, 259.

¹⁰ Luis M. AUGUSTO, ‘From Symbols to Knowledge Systems: A. Newell and H.A. Simon’s Contribution to Symbolic AI’ (2021) 2-1 *J. Knowl. Struct. Syst.* 29, 56.

known as *the physical symbol system hypothesis*) they created two computer programs, namely *Logic Theorist*, which had reasoning ability along with the generation of proofs for mathematical theorems¹¹, and *General Problem Solver*, which can solve logical problems.¹²

However, in the late 1960s, it became clear that certain skills, such as walking, that can be performed by humans effortlessly cannot be replicated by these machines. In contrast, skills considered difficult by humans such as playing chess and drug discovery, can be performed by machines easily. In the words of Steven Pinker, “*The main lesson of thirty-five years of AI research is that the hard problems are easy and the easy problems are hard,*”¹³ a phenomenon also known as *Moravec’s paradox*.¹⁴

To solve such problems, a new approach to AI development was adopted, known as *connectionism*.¹⁵ This approach proposes the creation of models, known as neural networks or artificial neural networks (“ANN”) that resemble the central nervous system of the human brain for modeling perception and cognition.¹⁶ Research by David Rumelhart and James McClelland in the 1980s demonstrated a range of psychological phenomena

¹¹ A. Newell and H. Simon, ‘The logic theory machine--A complex information processing system’ (1956) 2 IRE Transactions on Information Theory 61, 79.

¹² Parijat Banerjee, ‘When Milliseconds Cost Millions: Opportunity and Risk of Generative AI’ *Forbes* (3 November 2023) <<https://www.forbes.com/sites/forbesfinancecouncil/2023/11/03/when-milliseconds-cost-millions-opportunity-and-risk-of-generative-ai/?sh=754044882930>> accessed 14 November 2023.

¹³ Parijat Banerjee, ‘When Milliseconds Cost Millions: Opportunity and Risk of Generative AI’ *Forbes* (3 November 2023) <<https://www.forbes.com/sites/forbesfinancecouncil/2023/11/03/when-milliseconds-cost-millions-opportunity-and-risk-of-generative-ai/?sh=754044882930>> accessed 14 November 2023.

¹⁴ Anmol Arora, ‘Moravec’s paradox and the fear of job automation in health care’ (2023) *The Lancet*.

¹⁵ Bart Custers and others (eds.), *Law and Artificial Intelligence: Regulating AI and Applying AI in Legal Practice* (T.M.C Asser Press 2022) 58.

¹⁶ *ibid.*

that can be demonstrated by ANN models.¹⁷

Neural networks paved the way for *deep learning*, which is a technique used for teaching computers to process data in a way processed by human brains. These deep neural networks can reach or even outperform human performance in certain tasks. In 1977, DeepMind, IBM's supercomputer, beat legendary chess player Gary Kasparov.¹⁸ Numerous breakthroughs such as driverless cars, Google Translate, Siri, and Alexa are a direct result of innovations in *deep neural networks* ("DNNs").¹⁹

Transformer architecture is considered to be the most significant innovations in deep neural networks, discussed in a paper released in 2017 titled "*Attention is All You Need*" by Ashish Vaswani et al. The generative AI (as employed in ChatGPT, Stable Diffusion, and Midjourney and so on) can be traced directly to the creation of transformers.²⁰

With the advent of robust foundational models entering practical applications, a tangible enthusiasm is arising regarding the corporate utilization of AI.²¹ The notion that AI could become essential to numerous

¹⁷ D.E. Rumelhart and others, A General Framework for Parallel Distributed Processing in *Parallel Distributed Processing: Explorations in the Microstructure of Cognition: Foundations*, (MIT Press 1987) 45, 76.

¹⁸ Will Knight, 'Defeated Chess Champ Garry Kasparov Has Made Peace with AI' *Wired* (21 February 2021) <<https://www.wired.com/story/defeated-chess-champ-garry-kasparov-made-peace-ai/>> accessed 13 November 2023.

¹⁹ Erik Brynjolfsson and Andrew McAfee, 'The Business of Artificial Intelligence' *Harvard Business Review* (18 July 2017) <<https://hbr.org/2017/07/the-business-of-artificial-intelligence>> accessed 28 September 2023.

²⁰ Rob Toews, 'Transformers Revolutionised AI. What Will Replace Them?', *Forbes* (3 September 2023) <<https://www.forbes.com/sites/robtoews/2023/09/03/transformers-revolutionized-ai-what-will-replace-them/?sh=71cfe36e9c1f>> accessed 17 November 2023.

²¹ Wharton Online, 'How Do Businesses Use Artificial Intelligence?' <<https://online.wharton.upenn.edu/blog/how-do-businesses-use-artificial-intelligence/>> accessed 26 September 2023.

facets of the corporate domain is no longer beyond contemplation.²² AI already plays a crucial role in a company's management.²³

Today, big tech companies and researchers are in a race to create Artificial General Intelligence (“AGI”). Even though there are competing definitions of AGI, one widely adopted view defines AGI as AI systems that are capable of understanding the world, learning, and applying knowledge for accomplishing broad-ranging tasks²⁴ and “*are generally smarter than humans.*”²⁵

B. Exploring the Technical Aspects of AI

This section attempts to understand the building blocks of AI for realising answering, where does AI fit in the legal domain? In the words of Prof. John McCarthy, who is considered to have coined the term, AI can be understood as “*the science and engineering of making intelligent machines.*”²⁶ The European Parliament, in furtherance of enacting the AI Act has defined AI as “[An] ‘*artificial intelligence system*’ (AI system) means a machine-based system that is designed to operate with varying levels of autonomy and that can, for explicit or implicit objectives, generate outputs such as predictions, recommendations, or decisions, that influence physical or

²² ‘Artificial Intelligence is permeating business at last’ *The Economist* (6 January 2022) <<https://www.economist.com/business/2022/12/06/artificial-intelligence-is-permeating-business-at-last>> accessed 26 September 2023.

²³ Vegard Kolbjørnsrud and others, ‘How Artificial Intelligence Will Redefine Management’ *Harvard Business Review* (2 November 2016) <<https://hbr.org/2016/11/how-artificial-intelligence-will-redefine-management>> accessed 28 September 2023.

²⁴ Gartner Glossary, <<https://www.gartner.com/en/information-technology/glossary/artificial-general-intelligence-agi>> accessed 28 September, 2023.

²⁵ OpenAI, ‘Planning for AGI and Beyond’ <<https://openai.com/blog/planning-for-agi-and-beyond>> accessed 29 September, 2023.

²⁶ Christopher Manning, ‘Artificial Intelligence Definitions’, *Stanford University Human-Centered Artificial Intelligence* (September 2020) <<https://hai.stanford.edu/sites/default/files/2020-09/AI-Definitions-HAI.pdf>> accessed 2 November 2023.

virtual environments.”²⁷

For the past half-century, machines have failed to demonstrate intelligence. They have been operating on precisely defined code. For example, a traditional computer program can identify an image of a cat only if the same image has been stored in its database (i.e., the requirement exact inputs and outputs). Thus, computer programs are considered static and rigid, unable to adapt to imprecise inputs and lacking the conceptual clarity exhibited by humans. Thus, the aspects that truly differentiate AI as a technology from its predecessors are:

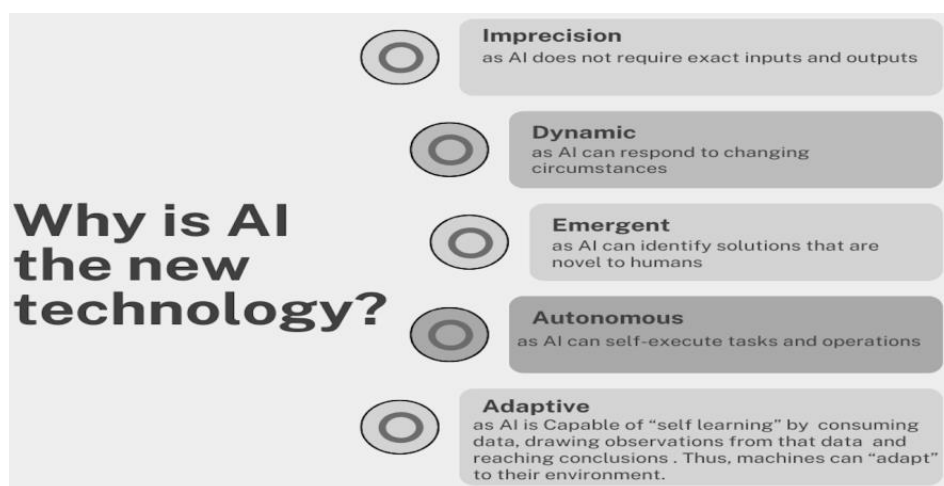


Figure 1: Characteristics of AI (Source: Author)

A better understanding of AI can be gathered by understanding the components that make it possible.²⁸ The various components of AI are

²⁷ Artificial Intelligence Act 2021, art. 3

²⁸ AI is a broad term and includes different techniques for the development of intelligent machines. The scope of this section is limited to understanding the technology behind AI systems developed using machine learning (ML).

illustrated in the figure below:

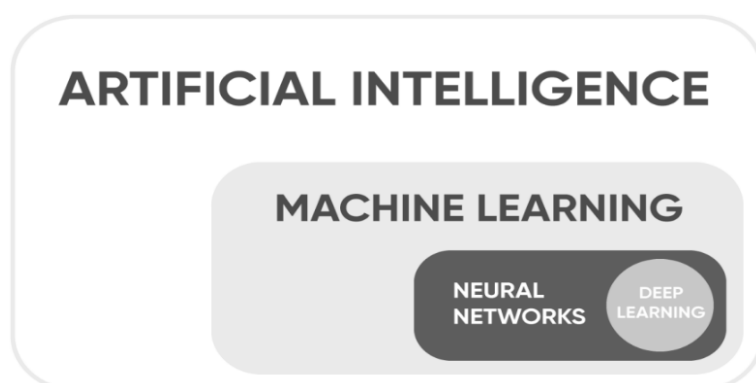


Figure 2: Various components of AI (Source: Active Wizards)²⁹

Machine Learning (ML): The building blocks of every program (app or website) that we currently use are algorithms. *Algorithms* can be understood as step-by-step instructions for completing a task.³⁰ The learning techniques employed by AI are based on these algorithms, known as *machine learning algorithms*. ML algorithms function by “*learning*” the patterns from data and generating output³¹ unlike classical algorithms that function on strictly coded inputs and outputs.³²

At present, a widely used method of ML is by developing *neural networks*.³³ They are networks designed to mimic the structure of the human brain. Technique for development of AI by utilising large neural networks is

²⁹ Active Wizards, ‘Artificial Intelligence vs. Machine Learning vs. Deep Learning: What is the Difference?’ <<https://activewizards.com/blog/artificial-intelligence-vs-machine-learning-vs-deep-learning-what-is-the-difference/>> accessed 4 November 2023.

³⁰ Wired, ‘Harvard Professor Explains Algorithms in 5 Levels of Difficulty’ <<https://www.youtube.com/watch?v=fkIvmfqX-t0>> accessed 26 November 2023.

³¹ Microsoft Azure, ‘Machine learning algorithms: An introduction to the math and logic behind machine learning’, <<https://azure.microsoft.com/en-us/resources/cloud-computing-dictionary/what-are-machine-learning-algorithms>> accessed 9 December 2023.

³² Srinivas Rao, ‘How does the ML algorithm differ from the Traditional Algorithm?’ *Medium* (17 March 2020) <<https://medium.com/@raosrinivas2580/how-does-the-ml-algorithm-differ-from-the-traditional-algorithm-b7c3a2799e10>> accessed 7 December, 2023.

³³ IBM, ‘What is a neural network?’ <<https://www.ibm.com/topics/neural-networks>> accessed 6 December 2023.

known as *deep learning*.³⁴ Deep learning through neural networks captures complex relationships. ML using neural networks creates approximations i.e., statistically generating the most probable outcome based on the data provided to it.

These neural networks develop models (a route for approximating) known as *ML models or AI models*.³⁵ Therefore, a neural network stores the training on images of animals for further recognition of them. For example, in each task to identify a cat, ML would implement ‘learning’ acquired by identifying the characteristics of a cat from provided dataset.

It must be noted that the learning mechanism employed by a model is somewhat “*opaque*” i.e., the lack of transparency as they use billions of variables at a time, making it impossible to observe the means employed by a model to learn as well as to generate outputs.³⁶

Different goals and functions require different training techniques. There are three major techniques used for ML:

Supervised Learning: It is used for applications that require a desired output for each set of inputs by creating a model that can predict outputs in

³⁴ IBM, ‘What is deep learning?’, <<https://www.ibm.com/topics/deep-learning#:~:text=the%20next%20step-,What%20is%20deep%20learning%3F,from%20large%20amounts%20of%20data>> accessed 6 December 2023.

³⁵ Microsoft, ‘What is a machine learning model?’, <<https://learn.microsoft.com/en-us/windows/ai/windows-ml/what-is-a-machine-learning-model>> accessed 12 December 2023.

³⁶ François Candeldon, ‘AI Can Be Both Accurate and Transparent’ *Harvard Business Review* (12 May 2023) <<https://hbr.org/2023/05/ai-can-be-both-accurate-and-transparent>> accessed 12 December 2023.

response to novel inputs.³⁷ While training ML models, data is to be labeled.³⁸ For example, to develop a program that requires teaching a model to identify different animals, the developers label images (*such as “dog”, “tiger”, “cat”, etc.*). The model then on its own identifies the pattern for each labelled image, such as learning that a cat has whiskers; the tiger has a different skin, and so on. Subsequently, whenever a tiger is to be identified, the model compares the provided image with what it has learned (from the training data) to generate output.

Unsupervised Learning: This technique is employed for instances involving troves of unlabelled and unclassified data and the goal is to identify the hidden patterns.³⁹ Usually, there is no definite desired output. For example, a developer may feed trillions of financial transactions to an ML model so that it can identify hidden patterns and generate useful insights. However, in this case, the model requires *fine-tuning*, i.e., a method to train the model to focus on certain characteristics of the data to generate the output, such as fine-tuning an algorithm to focus more on the transaction value than other variables such as the name of the payee or his bank account.

Reinforcement Learning: In this case, an AI functions as an “*agent*” in a controlled environment, observing and recording its responses to its environment and learning in the process.⁴⁰ Observation by the AI creates a model that generates output based on the parameters (the environment)

³⁷ Iqbal H. Sarker, ‘Cybersecurity data science: an overview from machine learning perspective’ (2020) 7 J Big Data 12, 29.

³⁸ Sara Brown, ‘Machine Learning, explained’ *Ideas Made to Matter MIT Management Sloan School* (21 April 2021) <<https://mitsloan.mit.edu/ideas-made-to-matter/machine-learning-explained>> accessed 13 September 2023.

³⁹ Michael Lee and others, ‘Current and Future Applications of Machine Learning for the US Army’ (2018) Computational and Information Sciences Directorate, ARL, 26.

⁴⁰ Daniel Huttenlocher and others, *The Age of AI: And Our Human Future* (John Murray Press 2021) 265-67.

provided to the model. One of the notable examples of AI built on reinforcement learning is AlphaGo, developed by DeepMind, an AI capable of playing a board game named Go.⁴¹ In 2016, it defeated the Go champion Lee Sedol.⁴²

For development of AlphaGo, *Firstly*, the model was coded with the rules and parameters of the game (such as how the pieces on the board are allowed to move). This step entails setting up the environment or real-world simulation. *Secondly*, the model is trained on datasets, which in this case were the previous games that were played by humans. *Lastly*, the model is given a task to play against itself and learn from trial and error.

At the heart of the last step lays a reward function.⁴³ The reward function acts as the North Star for the model which in this case was winning. Therefore, each step taken by AlphaGo that led to victory was marked as correct (reward), and others that led to defeat were marked as incorrect (punishment). In this way, the model learns to output decisions that lead to reward, in our case winning the board game. Reinforcement learning is employed for developing self-driving cars, robots, etc.

From the above analysis, it can be observed that the development of AI broadly includes two phases viz., firstly, the training phase, where an AI creates a model to itself by learning from the data provided and secondly, the inference phase, which involves giving output based on the model developed

⁴¹ Google Deepmind, 'AlphaGo' <<https://deepmind.google/technologies/alphago/>> accessed 9 November 2023.

⁴² Christopher Moyer, 'How Google's AlphaGo Beat a Go World Champion' *The Atlantic* (28 March 2016) <<https://www.theatlantic.com/technology/archive/2016/03/the-invisible-opponent/475611/>> accessed 9 November 2023.

⁴³ David Silver and others, 'Mastering the game of Go with deep neural networks and tree search' (2016) 529 *Nature* 484, 489.

in the training phase.⁴⁴

A detailed and conceptual understanding of AI development and deployment is crucial for understanding the nature of the problems posed by AI as well as for discovering prospective solutions.

III. PART- II: AI & CORPORATE MANAGEMENT

A. Utilizing AI in Corporate Realm

The importance of AI has skyrocketed in recent times, pervading through the domains of corporate law⁴⁵ from being utilized for significant decision-making within boardrooms to the scrupulous compliance of the regulatory regime in order to uphold ethical corporate governance.⁴⁶ AI in this quest can streamline transparency, accountability and responsibility⁴⁷ in corporate law.

The recent Gartner study indicates a threefold increase in technology investments, including AI, with the percentage rising from 1.3% (2017-2020) to a projected 12% by 2025.⁴⁸ The study substantiates the multifaceted role that AI can play in strategic decision making in corporate boardrooms for a

⁴⁴ Michael Copeland, 'What's the Difference between Deep Learning Training and Inference?' (*Nvidia Blogs*, 22 August 2016) <<https://blogs.nvidia.com/blog/difference-deep-learning-training-inference-ai/>> accessed 18 November 2023.

⁴⁵ Thomson Reuters, 'Embracing the AI revolution: Transforming corporate legal work with generative technology' <<https://legal.thomsonreuters.com/blog/the-new-era-redefining-how-corporate-in-house-legal-professionals-do-their-work/#:~:text=It%20is%20transforming%20the%20way,as%20document%20review%20and%20research>> accessed 19 November 2023.

⁴⁶ Jingchen Zhao, 'Artificial Intelligence and Corporate Decisions: Fantasy, Reality or Destiny' (2022) 71 4 *Cath. U. L. Rev* 663, 672-73.

⁴⁷ Deloitte, 'Transparency and Responsibility in Artificial Intelligence: A call for explainable AI' <<https://www2.deloitte.com/content/dam/Deloitte/nl/Documents/innovatie/deloitte-nl-innovation-bringing-transparency-and-ethics-into-ai.pdf>> accessed 22 November 2023.

⁴⁸ MIT Professional Education, 'Artificial Intelligence a threat to the legal sector?' <<https://professionalprograms.mit.edu/blog/technology/artificial-intelligence-a-threat-to-the-legal-sector/>> accessed 16 November 2023.

promising future ahead, with a convergence of technology and legal intricacies.⁴⁹

To enhance business operations, AI is being incorporated in thousands of areas ranging from data analysis, to storing and segregation of massive databases to support strategic decision-making. Across the globe, AI through its Natural Language Processing (“NLP”)⁵⁰ serves to advance both communication and comprehension. In the sphere of human resources, AI acts in the supporting capacity by aiding in optimal recruitment and management strategies.⁵¹

Furthermore, AI’s exponential influence in diverse sectors such as supply chain optimization, financial analysis, personalized marketing, risk assessment and making informed board decisions, is a sight to behold.⁵² These applications highlight the potential of bringing efficiency and innovation in the corporate spectrum.⁵³

Large corporations such as McKinsey, Bain and BCG have already incorporated AI to assist them with their management models.⁵⁴ Additionally,

⁴⁹ Deirdre Ahern, ‘The Impact of AI on Corporate Law and Corporate Governance’ <<http://www.tara.tcd.ie/bitstream/handle/2262/101064/AI%20AND%20CORPORATE%20LAW%20.pdf?sequence=1&#:~:text=As%20AI%20gains%20agency%2C%20the,business%20models%2C%20culture%20and%20systems>> accessed 6 September 2023.

⁵⁰ D Khurana and others, ‘Natural language processing: state of the art, current trends and challenges’ (2023) 82 *Multimed Tools Appl*.

⁵¹ Scott Likens and Nicole Wakefield, ‘Do you have an “early days” generative AI strategy?’ *PwC* (7 December 2023) <<https://www.pwc.com/gx/en/issues/technology/early-days-generative-ai-strategy.html>> accessed 9 December 2023.

⁵² Ekkehard Ernst and others, ‘The economics of artificial intelligence: Implications for the future of work’ (*International Labour Organisation*, 2018) <https://www.ilo.org/wcmsp5/groups/public/---dgreports/---cabinet/documents/publication/wcms_647306.pdf> accessed 18 November 2023.

⁵³ Holly J. Gregory, ‘AI and the Role of the Board of Directors’ *Harvard Law School Forum on Corporate Governance* (7 October 2023) <<https://corpgov.law.harvard.edu/2023/10/07/ai-and-the-role-of-the-board-of-directors/>> accessed 4 December 2023.

⁵⁴ Vinod Mahanta, ‘Top consulting firms invest big in AI solutions’ *The Economic Times* (21 September 2023) < <https://economictimes.indiatimes.com/news/company/corporate->

using AI to decide on investments in a financial product of a company is also witnessed in many nations.⁵⁵ Relatively, one specific contemporary use of governance intelligence is reflected in streamlining due diligence procedures in Mergers and Acquisitions (“M&A”).⁵⁶ Both procedures are considered to be equally important for the board resolution of the acquiring entity, which requires symphonized efforts from all legal experts, accountants, professionals, investment bankers and company personnel.⁵⁷ The amalgamation of AI into these processes makes the probability of achieving precise negotiation results, accurate valuation and a tailored deal scheme, very productive for the company. Furthermore, the directors of the company use AI to check audit reports, profile investors and determine the most optimal supply and demand structure in the market.⁵⁸

Justice Kohli, in a very recent event that celebrated the first anniversary of ‘i-Amicus’, an artificial intelligence-based platform incorporated by the ICICI Bank, that provides information to customers about disputes related to banking, highlighted that “*AI is a game-changer in the legal*

trends/top-consulting-firms-invest-big-in-ai-solutions/articleshow/103819069.cms> accessed 11 December 2023.

⁵⁵ Everis, ‘Artificial Intelligence in the Financial Sector’ <https://www.nttdata.com/global/en/-/media/nttdataglobal/1_files/services/data-and-intelligence/artificial_intelligence_in_the_financial_sector.pdf?rev=704e0e643b6b4f3bbd1ef22b04cdcd3e> accessed 19 November 2023.

⁵⁶ Satu Teerikangas, ‘Systems Intelligence in Mergers and Acquisitions a Myth or Reality?’ in Raimo P. Hamalainen and ESA Saarinen (eds.), *Systems Intelligence– Discovering a Hidden Competence in Human Action and Organizational Life, Helsinki University of Technology: Systems Analysis Laboratory Research Reports* (2004) 3.

⁵⁷ Jay Bhavesh Parekh, ‘Understanding Legalities – Mergers, Acquisitions and Combinations’ <<https://www.icsi.edu/media/webmodules/CSJ/May/17ArticleJayBhaveshParekh.pdf>> accessed 29 November 2023.

⁵⁸ Chartered Professional Accountants of Canada and American Institute of CPAs, ‘The Data-Driven Audit: How Automation and AI are Changing the Audit and the Role of the Auditor’ <<https://us.aicpa.org/content/dam/aicpa/interestareas/frc/assuranceadvisoryservices/downloadabledocuments/the-data-driven-audit.pdf>> accessed 11 December 2023.

*field, and has the potential to revolutionize the way lawyers work.*⁵⁹

It is an undeniable fact that in the business world, AI systems can be proved to be of extreme assistance in the decision-making process at the management level, while in actuality, only a few corporations worldwide have incorporated AI by granting it the power to make decisions akin to their human counterparts. The corporate investment in AI is increasing at a staggering pace (Figure 3 below) as an increasing number of corporates embed AI in their corporate structure (Figure 4 below).

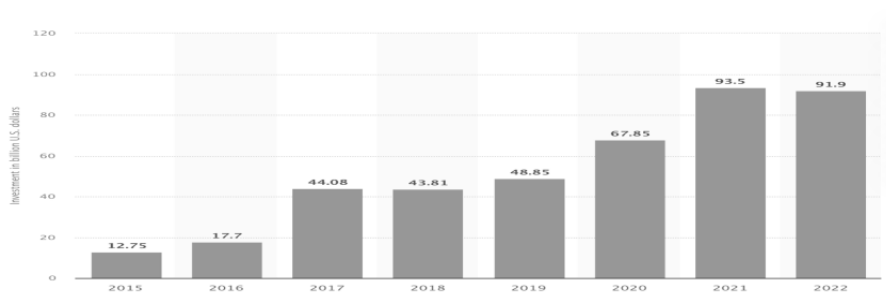


Figure 3: Global total corporate investment in AI from 2015 – 2022 (Source: Statista)⁶⁰

⁵⁹ Awstika Das, ‘AI is a Game-Changer in Legal Field: Justice Hima Kohli on Why Artificial Intelligence Does not Pose a Threat, But an Opportunity’ *LiveLaw* (12 February 2023) <<https://www-livelaw-in.elibrarynlunagpur.remotexs.in/top-stories/artificial-intelligence-threat-opportunity-game-changer-supreme-court-judge-hima-kohli-221379?infinitemscroll=1>> accessed 22 November, 2023.

⁶⁰ Statista, ‘Global total corporate artificial intelligence (AI) investment from 2015 to 2022’ <<https://www.statista.com/statistics/941137/ai-investment-and-funding-worldwide/>> accessed 9 December 2023.

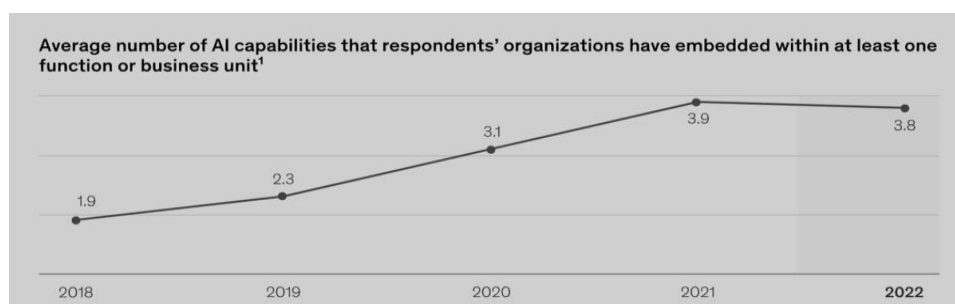


Figure 4: Showcasing the increase in the use of AI by corporates (Source: McKinsey and Co.⁶¹).

The application of what is referred to as “*artificial governance intelligence*”⁶², whether used merely as a supplementary tool for directors, raises novel corporate law concerns that necessitate a comprehensive legal examination.

B. Subsuming AI in Corporates at Different Levels of Autonomy

Incorporating AI in corporation is not merely limited to boardroom management but is beneficial in expanding the efficiency of various departments in a corporation depending upon the autonomy level of an AI.

A 2023 survey conducted on governance professionals (100 members of the Society of Corporate Governance) displayed that 42% of the professionals used AI for sales and marketing tasks and 35% accepted the use of AI for product development. They used it for risk-management, board functions, policies and training⁶³ Others deployed AI for accounting,

⁶¹ Quantum Black AI by McKinsey, ‘The state of AI in 2022-and a half decade in review’ <<https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-2022-and-a-half-decade-in-review>> accessed 11 December 2023.

⁶² Floris Mertens, ‘The use of artificial intelligence in Corporate Decision-making at Board Level: A preliminary legal analysis’ <<https://financiallawinstitute.ugent.be/wp-content/uploads/2023/11/2023-01.pdf>> accessed 19 November 2023.

⁶³ Carey Oven, ‘AI in Corporate Boardrooms’ (2023) WSJ.

financing, legal compliances and human resources.

In order to incorporate AI in the above-mentioned capacities to assist the corporation, there are different levels of automation of AI depending upon the corporate structure and the legal framework of the country.

‘*Autonomy*’ in general could be defined as a state of self-governing⁶⁴ and when the idea gets associated with an AI, it could be expanded to mean a “*technology that permits artificial intelligence functionalities to their maximum capacity, resulting in much speedier response to a given issue, without human intervention*”.⁶⁵ Earlier, the degree of autonomy was not attributed to the machine intelligence of AI, however, with the complex decisions undertaken by the organizations today, allowing the utilization of AI with a certain level of autonomy has become significant.

The research conducted by Nalder (2017), Armour and Eidenmueller (2019)⁶⁶ segregated the synergic intelligence associated with an AI into five broad categories: *assisted intelligence, augmented intelligence, amplified intelligence, autonomous intelligence, and autopoietic intelligence*⁶⁷. However, autonomy can be broadly categorised into three levels: assisted intelligence, augmented intelligence and autonomous intelligence.⁶⁸

With the emergence of AI in corporate dynamics, conventional

⁶⁴ Carina Prunkl, ‘Human autonomy in the age of artificial intelligence’ <<https://philarchive.org/archive/PRUHAI>> accessed 28 November 2023.

⁶⁵ ‘Autonomous Artificial Intelligence Guide: The future of AI’ <<https://www.algotive.ai/blog/autonomous-artificial-intelligence-guide-the-future-of-ai>> accessed 28 November, 2023.

⁶⁶ Hilb Michael, ‘Toward artificial governance? The role of artificial intelligence in shaping the future of corporate governance’ (2020) JMG.

⁶⁷ *ibid.*

⁶⁸ Xiaofeng Gao and others, ‘Effects of Augmented-Reality-Based Assisting Interfaces on Drivers Object-wise Situational Awareness in Highly Autonomous Vehicles’ (2022) IEEE Intelligent Vehicles Symposium (IV), Aachen, Germany, 563, 572.

practices conducted on the board would fade away gradually. The three forms in which AI has been visualized to show its competency as a boon to the corporate world are *firstly*, Assisted AI,⁶⁹ where the final decider to a particular matter is the board only, but some sort of reliance on limited information could be attributed to AI, without enhancing decision-making.

Secondly, the augmented level is where the final decision-making is still with the human directors within the board, but where AI's particular input improves the board's or requisite authority's final decisions.⁷⁰ AI systems in such capacity refine policy insights, leading to joint decision-making by directors and AI.

A 2017 McKinsey study sheds light on the stance that automation can potentially hike productivity on global standards by 0.8 to 1.4 percent annually,⁷¹ offering a significant rise in economy and business levels. A prime example is the integration of VITAL as a director, where it was compulsory to consult this AI system for certain investment decisions.

Finally, there is *Autonomous AI*, where the AI system independently makes decisions without human intervention. The key governance powers are delegated by the company officials to AI to incorporate it with complete

⁶⁹Arto Laitinen and Otto Sahlgren, 'AI Systems and Respect for Human Autonomy' (2021) *Front. Artif. Intell.* 4.

⁷⁰'Artificial Intelligence, Autonomy, and Augmentation', Applied Research Laboratory for Intelligence and Security <<https://www.arlis.umd.edu/our-mission/artificial-intelligence-autonomy-and-augmentation>>accessed 28 November 2023.

⁷¹'A Future that Works; Automation, Employment, And Productivity (2017) McKinsey Global Institute <<https://www.mckinsey.com/~media/mckinsey/featured%20insights/Digital%20Disruption/Harnessing%20automation%20for%20a%20future%20that%20works/MGI-A-future-that-works-Executive-summary.ashx>>accessed 28 November 2023.

autonomy.⁷² For instance, a robo-director may be appointed in a boardroom with the delegated duties of human directors or a robo-taxi that is operated at the full discretion of the AI installed.

Identifying the autonomy levels at which these AIs operate is critical for development of regulations and resolving disputes concerning corporate liability.

C. Boardroom Dynamics and Decision-Making

There is no specific definition of artificial intelligence as a whole⁷³ therefore it can be interpreted based on either “*symbolic rules (knowledge-based systems) or a numeric model (data-based or ML systems)*.”⁷⁴

AI stands at an integral pivot in the corporate boardroom, profoundly for the decision-making aspect.⁷⁵ Corporate decision-making involves choosing from various options related to the primary duties of board members and key managers⁷⁶ of the company which range from strategy building, monitoring, and supervision to the daily affairs of the company. All these actions have already incorporated computer systems and other technological

⁷² ‘Artificial Intelligence and Autonomous Systems’, The Grainger College of Engineering Electrical & Computer Engineering <<https://ece.illinois.edu/research/crosscutting-themes/aias>> accessed 29 November 2023.

⁷³ Damodar Singh and Rishika Seal, ‘Legal Definition of Artificial Intelligence’ (2019) 10 *Supremo Amicus* 87.

⁷⁴ Bernhard G. Humm and others, ‘New directions for applied knowledge-based AI and machine learning’ (2022) 46 65 *Informatik Spektrum* 65, 78.

⁷⁵ Gloria Phillips and Lakhmi C. Jain, ‘Artificial Intelligence for Decision Making’ (2006) 4252 *Knowledge-Based Intelligent Information and Engineering Systems*, 10th International Conference, UK.

⁷⁶ ‘Information Systems for Business and Beyond’, <<https://ecampusontario.pressbooks.pub/informationssystemscdn/chapter/12-3-managerial-decision-making/>> accessed 21 November 2023.

means for several decades to aid the corporate decision-making.⁷⁷

Today, AI has been instrumental in effecting real-time data tracking, quick data retrieval, and analysis of market trends and financial forecasting, threat identification, logistics analysis⁷⁸ and aiding directors in strategic decision-making.⁷⁹ Worldwide companies like Merck Pharmaceuticals, Amazon, Goldman Sachs and several more have integrated AI for identifying market risks, business opportunities and to ensuring due diligence.⁸⁰

It is extremely significant to note that the process of decision-making embodies huge amounts of data to be recorded, depending upon the kind of decision to be arrived at.⁸¹ Now, in comparison to a human mind that cannot process large amounts of data beyond a certain limit for a given decision, and directors being unaware of the market analytics generally, AI and computers shall prove to be handy in such circumstances with the retrieval of information being pulled off in seconds to improve the decision-making, ultimately.⁸²

The duty of decision-making is shouldered on the various stakeholders and shareholders of the company where the latter is acknowledged for the role

⁷⁷ D.L. Olson and J.F. Courtney, 'Decision Support Models and Expert Systems' (1992) 13 New York, Macmillan, 418.

⁷⁸ 'The Transformative Role of Data and AI in Corporate Governance' <<https://www.linkedin.com/pulse/transformative-role-data-ai-corporate-governance-permutableai/>> accessed 22 November 2023.

⁷⁹ Wenjun Shen, 'Analysis of the application of artificial intelligence technology in the protection of corporate governance rights and interests' (2022) 13 Front. Psychol.

⁸⁰ Michael R. Siebecker, 'Making Corporations More Humane Through Artificial Intelligence' (2019) 45 1 The Journal of Corporation Law 97.

⁸¹ T.A. LIEDONG and others, 'Information and nonmarket strategy: Conceptualizing the interrelationship between big data and corporate political activity' (2020) 157 Technol Forecast Soc Change, 1,12.

⁸² Sally Jo Cunningham and others, 'Applications of Machine Learning in Information Retrieval' <<https://www.cs.waikato.ac.nz/~ihw/papers/00-SJC-JL-IHW-Applicationml.pdf>> accessed 23 November 2023.

in the matters of investments and voting rights,⁸³ while the former keeping the focus on the decisions related to the contractual obligations of the corporation, thus, both of them comprise the brain of the corporation. Precisely, with the help of AI, decisions can be devoid of partial uncertainties.⁸⁴ Thus, the replacement of a human mind by an AI in a corporation cannot be termed as unrealistic in the near future. Corporations require independent thinking among board members so that a majority consensus can be countered to ensure sound judgment.⁸⁵ Therefore, due to time constraints or reluctance to scrutinize the management decision, AI-generated outcomes can help reach alternative options.

In general, AI systems are alien to groupthink, except when biased data is stored externally.⁸⁶ Independent human directors are not just associated with the board of one company, they can be a part of other boards⁸⁷ as well which does not permit them to critically analyze the data and relevant information necessary to conclude on a short notice, and therefore, AI can be of great help, in quickly bifurcating the crucial information as a prerequisite for the task.⁸⁸

It is an undeniable fact that AI machines are unaffected by partiality and so the output generated is not generally tainted by friendship or other

⁸³ Adam Winkler, 'Corporate Law or the Law of Business?: Stakeholders and Corporate Governance at the End of History' (2004) 67 4 LCP, 109, 133.

⁸⁴ Ann-Kristin Weiser and Georg von Krogh, 'Artificial intelligence and radical uncertainty' (2023) EMR.

⁸⁵ Reyes Calderon and others, 'Understanding Independence: Board of Directors and CSR' (2020) 11 Front. Psychol.

⁸⁶ A. Kamalnath, 'The Perennial Quest for Board Independence - Artificial Intelligence to the Rescue?' (2019) 83 52 Alb. L. Rev.

⁸⁷ Jaspal Singh Dhanjal, 'Independent Directors' in *Patiala Chapter of NIRC of ICSI* <https://www.icsi.edu/media/filer_public/78/8b/788b6cf7-7e67-4131-b883-fe4292b4c475/independent_director_under_companies_act_2013.pdf> accessed 25th November 2023.

⁸⁸ Xiuli Cui and others, 'Can Application of Artificial Intelligence in Enterprises Promote the Corporate Governance?' (2022) 10 Front. Environ. Sci.

factors, thereby, ensuring independent decisions for the board.⁸⁹ However, one cannot claim that it is shielded from all sorts of external and internal factors.

National laws concerning corporate functions differ with the change in the country, specifically when it comes to roles and responsibilities being assigned to the board.⁹⁰ However, there is an amalgamation of three main roles of the board viz. supervisor/co-creator, supporter or co-director and controller/coach are generally present in corporate structures.⁹¹

A ***Supervisory role*** within a corporation would specifically deal with the execution and monitoring of the functions to ensure ethical and legal compliance with the statutory rules. The decision-making process with such types of roles revolves around ensuring designing, selecting and implementing the best course of action. Another role caters to ***the Co-creator/co-director*** and focuses upon the other functions of the company which involves dealing with leadership, carving corporate strategies and designing objectives having a mix of innovation, creativity and collaboration within a corporation. The third type of company function could be captured as a ***Supporter/coach*** role where the directors are responsible for recruitment and coaching of the team by adhering to the concept of credibility, authority and objectivity. Thus, directors working in this capacity take decisions related to executive appointments, compensation and composition of the board of the company and

⁸⁹ Jacques Bughin and others, 'Artificial Intelligence the next digital frontier?' *McKinsey Global Institute* (2017) <<https://www.mckinsey.com/~media/mckinsey/industries/advanced%20electronics/our%20insights/how%20artificial%20intelligence%20can%20deliver%20real%20value%20to%20companies/mgi-artificial-intelligence-discussion-paper.ashx>> accessed 27 November 2023.

⁹⁰ The Institute of Company Secretaries of India <<https://www.icsi.edu/ccgrt/research/bare-acts/other-countrys-corporate-laws/>> accessed 27 November 2023.

⁹¹ Bart Custers and Eduard Fosch-Villaronga (eds), '*Law and Artificial Intelligence*' (T.M.C. Asser Press 2022) 35.

AI could really strengthen the structure.⁹²

D. Paradigms of AI incorporation in Boards

A jargon of AI being used directly in the corporate realm was witnessed in 2014 when the Hong Kong-based venture capital group “*Deep Knowledge Ventures*” appointed the first robo- director to its board and named it “VITAL” (*Validating Investment Tool for Advancing Life Sciences*)⁹³ majorly for the automation of due-diligence, retrieve extensive datasets and analysis of trends beyond human expertise. It is pertinent to mention that ‘VITAL’ was an observer director with voting rights, to be exercised only in the circumstances of deciding whether the firm was to invest in another company or not.⁹⁴ Additionally, with the suggestions of VITAL, the firm invested in a few biotech start-ups such as Pathway Pharmaceuticals and In Silico Medicine.⁹⁵ Several companies, such as Tietoevry (incorporated Alicia T as a member of the board to take forth a business unit driven by data) and Salesforce, have concretely incorporated AI systems into their boards.⁹⁶

A few nations where the adoption of AI as directors was supportive of

⁹² Bart Custers and Eduard Fosch-Villaronga (eds), *Law and Artificial Intelligence* (T.M.C. Asser Press 2022) 35.

⁹³ Adyasha Mohanty, ‘Artificial Intelligence and Corporate Law for Board of Directors: Indian Perspective’ *MNLU ACCLR Blog* (29 May 2019) <<https://mnlucacclrblog.home.blog/2019/05/29/artificial-intelligence-and-corporate-law-for-board-of-directors-indian-perspective/>> accessed 17 December 2023.

⁹⁴ Rob Wile, ‘A Venture Capital Firm Just Named An Algorithm To Its Board of Directors – Here’s What It Actually Does’ *Business Insider* (13 May 2014) <<https://www.businessinsider.com/vital-named-to-board-2014-5?international=true&r=US&IR=T>> accessed 27 November 2023.

⁹⁵ Biogerontology Research Foundation, ‘Deep Knowledge Ventures announces New Investment Fund for Life Sciences and Aging Research’ <www.eurekalert.org/news-releases/831727> accessed 18 November 2023.

⁹⁶ Yun Park, ‘Companies Grapple With Limits in Bringing AI Into the Boardroom’ *BlumergLaw* (11 August, 2023) <<https://news.bloomberglaw.com/artificial-intelligence/companies-grapple-with-limits-in-bringing-ai-into-the-boardroom>> accessed 18 November 2023.

the legal framework have begun deploying AI for assistance in corporate decision-making.⁹⁷ However, it is imperative to note that the present legislative background does not allow the appointment of an artificial intelligence entity as a director on boards.⁹⁸

E. Legislative Design and Corporate Law: Paperwork

AI is transforming corporate law from paperwork and legislative compliances into machine-readable legislation and NLP. This will alter the perspective on compliance and will convert reporting efficiently.⁹⁹ In nations where mandatory paper-based filings are required, AI can prove to be a beneficial tool of aid, especially where the 2020 pandemic accelerated the need for digitization¹⁰⁰. Conventionally, all the tasks performed by a competent company secretary and tasks such as incorporating the company can now be easily performed by an AI aiding in data retrieval procedures for the promoters during establishment,¹⁰¹ thus, simplifying compliance procedure. For instance, in the UK, a five-year ‘*Digital First strategy*’ along with ‘*Natural Voice Language*’¹⁰² (a form of voice recognition) is being adopted by Companies House to streamline customer services. All the steps

⁹⁷ *ibid.*

⁹⁸ Alžběta Krausová, ‘Intersections between Law and Artificial Intelligence’ (2017) 27 1 IJC 55, 68.

⁹⁹ Marcel Froehlich, ‘Enabling RegTech Upfront: Unambiguous Machine-Readable Legislation’ in Janos Barberis, Douglas W Arner and Ross P Buckley (eds), *The RegTech* (Wiley Online Books 2019).

¹⁰⁰ Rahul De and others, ‘Impact of digital surge during Covid-19 pandemic: A viewpoint on research and practice’ (2020) 55 Int J Inf Manage.

¹⁰¹ Karunjit Singh, ‘Artificial Intelligence system likely to ease name registration process for companies’ *The Economic Times* (18 May 2019) <<https://economictimes.indiatimes.com/news/economy/policy/artificial-intelligence-system-likely-to-ease-name-registration-process-for-companies/articleshow/69382285.cms>> accessed 19 November 2023.

¹⁰² Deirdre Ahern, ‘The Impact of AI on Corporate Law and Corporate Governance’ <<http://www.tara.tcd.ie/bitstream/handle/2262/101064/AI%20AND%20CORPORATE%20LAW%20.pdf?sequence=1&#:~:text=As%20AI%20gains%20agency%2C%20the,business%20models%2C%20culture%20and%20systems>> accessed 6 September 2023.

involved are made automatic with the AI recognizing the intent of the customer to incorporate his/her company and providing them with a link on SMS for the same.¹⁰³ If AI is deployed in registration offices, the accuracy of the information and documents submitted could be checked instantaneously, while smart contracts can automate the issuance of incorporation certificates. Such an application of AI is prevalent in developed countries and is yet to be used by developing nations.

IV. PART III - COMPETENCY OF LEGAL FRAMEWORK: A CRITICAL ANALYSIS

A. Scope of AI Amalgamation

Post the analysis of the Companies Act, 2013 it is evident that the Indian legal framework is not competent to fully accommodate AI's potential.¹⁰⁴ The existing law cannot address the issues revolving around AI-generated decisions, the after effects of such incorporation, the transparency of algorithmic patterns, and the liability of harm caused as a result.¹⁰⁵

It is significant to understand that an AI lacks the emotions that distinguishes it with human intelligence.¹⁰⁶ AI does not understand the

¹⁰³ Laura Boardman, 'Companies House: building a more rewarding workplace for Digital, Data and Technology Professionals' (*Digital People*, 23 August, 2019) <<https://digitalpeople.blog.gov.uk/2019/08/23/companies-house-building-a-more-rewarding-workplace-for-digital-data-and-technology-professionals/#:~:text=We%20are%20committed%20to%20being,provides%20company%20data%20for%20free>> accessed 20th November, 2023.

¹⁰⁴ Shaoshan Liu, 'India's AI Regulation Dilemma' *The Diplomat* (27 October 2023) <<https://thediplomat.com/2023/10/indias-ai-regulation-dilemma/>> accessed on 29 November 2023.

¹⁰⁵ Aashira Baburaj, 'Artificial Intelligence v Intuitive Decision Making: How far can it transform corporate governance?' 8 2 TGLR.

¹⁰⁶ Angela Koenig, 'Why AI is Not Like Human Intelligence' *Neuroscience News* (21 November 2023) <<https://neurosciencenews.com/ai-human-intelligence-25234/>> accessed 30 November 2023.

connotation of a stakeholder's interests or the shareholder's benefit in the decision-making.¹⁰⁷ AI functions in accordance with data and instructions¹⁰⁸ thereby lacking the quality of differentiating between good and bad faith¹⁰⁹ unless trained for some specific individual. The sole guidance that AI acts upon is human coding, learning and training, that makes it an unbiased decision-maker.¹¹⁰ However, one cannot deny the fact that the algorithm or the data inserted into the system may reflect the bias of the person who has developed the system, in the form of personal or social bias.¹¹¹

The current legislative norms do not take these biases under their scope. Furthermore, the duties like care and loyalty under Section 166 of the Companies Act, 2013, are beyond the scope of AI's capabilities. This leads to critical questions about the legality of using AI in corporate governance and accountability.

Section 2(10) of the Companies Act, 2013 defines the board of directors as a "*collective body of directors of the company*"¹¹² and thus, gives no specifications as to who shall be called as a director. However, a co-joint reading of Section 149 with the above-mentioned definition, it could be translated to mean that solely an individual can be inducted as a director and

¹⁰⁷ Jingchen Zhao, 'Artificial Intelligence and Corporate Decisions: Fantasy, Reality or Destiny' (2022) 71 4 Cath. U. L. Rev 663, 672-73.

¹⁰⁸ Murat Kuzlu and others, 'Role of Artificial Intelligence in the Internet of Things (IoT) cybersecurity' (2021) 1 Discover Internet of Things.

¹⁰⁹ Kimberly Houser, 'Artificial Intelligence and The Struggle Between Good and Evil' (2021) 60 Washburn Law J. 1, 23.

¹¹⁰ Elif Kartal, 'A Comprehensive Study on Bias in Artificial Intelligence Systems: Biased or Unbiased AI, That's the Question!' (2022) 18 1 IJIT, 1, 23.

¹¹¹ Jake Silberg and James Manyika, 'Tackling bias in artificial intelligence (and in humans)' (*McKinsey Global Institute*, 6 June 2019) <<https://www.mckinsey.com/featured-insights/artificial-intelligence/tackling-bias-in-artificial-intelligence-and-in-humans>> accessed 2 December 2023.

¹¹² Companies Act 2013, s 2(10).

not an artificial person.¹¹³ It could be argued that the intention behind this section must have been the concern regarding imposing liability on an artificial body. Subsequently, a mandatory requirement to be fulfilled is to secure a Director Identification Number (“**DIN**”) from the government of India.¹¹⁴ As only an individual could be eligible to become a director, AI directors are precluded from getting inducted. However, with the swift pace of development, the legal framework might allow some relaxation in the coming days.¹¹⁵ Despite AI’s internal inability to commit fraud, there is still the potential for it to be employed by human directors to escape the accountability for any harm caused to third parties.

Even in the absence of any specific law that regulates the incorporation of AI in the existing legal framework, AI could potentially be deployed for assistance to the human directors in complying with the Article of Association (“**AOA**”) (Section 166(1))¹¹⁶ by immediately processing the required data in adherence to the AOA. Other duties mentioned under Section 166 require the directors to act in good faith, not confuse personal interests with the interests of the company or avoid taking any undue advantage in company affairs.¹¹⁷ Since, AI works on data and algorithmic rhythm, its decisions would not be hit by factors like power and friendship making them more objective and less erroneous.

However, all the decisions do not necessitate logical or objective reasoning but the interplay of intuitive thought, human acumen and emotions,

¹¹³ Companies Act 2013, s 149.

¹¹⁴ Companies Act 2013, s 154.

¹¹⁵ Rudresh Mandal and Siddharth Sunil, ‘The road not taken: Manoeuvring through the Indian Companies Act to enable AI directors’ (2021) 21 1 OUCJL, 95, 133.

¹¹⁶ Abhinav Gupta, ‘Bringing Artificial Intelligence to Boardroom’ <<https://cbcl.nliu.ac.in/company-law/bringing-artificial-intelligence-to-boardroom/>> accessed 20 November 2023.

¹¹⁷ Companies Act 2013, s 166.

an AI is not competent to accomplish, at least as of today.¹¹⁸ Section 166(3) necessitates the directors to mandatorily exercise due diligence and reasonable care in their actions and to implement independent judgment.¹¹⁹ Since, the datasets utilised for training an AI are selected by a human, thereby, the likelihood of it being tainted by human bias cannot be completely eliminated.

An AI system would prove to be of great aid in calling on the shareholders to pay the unpaid dues by invoking the powers of the board of directors listed in Section 179 by accurately figuring out if the shareholder is legally entitled to pay the amount. Matters associated with M&A (Section 179(3)) require scrutiny of the records, which also requires risk analysis that an AI on the board could achieve with high accuracy.¹²⁰ However, this power of investing or executing M&A or amalgamation schemes can be delegated only to the principal directors holding managerial positions, i.e., by a human and not an AI as per Section 2(53).¹²¹ Thus, the present law does not permit the integration of AI into the status of directors of the board. Even the court in *In Re Central Calcutta Bank Ltd.*¹²² declared that “*Directors cannot disinvest themselves of the responsibilities by delegating the whole management to the agent and abstaining from all enquiries,*” which essentially allows us to interpret that delegation of functions of the directors cannot be made to an AI but the utilization of AI systems in the supporting capacity can still be materialized.¹²³

Corporate Governance standards are enshrined under Clause 49 of the

¹¹⁸ Sayed Fayaz Ahmad and others, ‘Impact of artificial intelligence on human loss in decision making, laziness and safety in education’ (2023) 10 311 *Humanit. soc. sci. commun.*

¹¹⁹ Companies Act 2013, s 166(3).

¹²⁰ Companies Act 2013, s 179.

¹²¹ Companies Act 2013, s 2(53).

¹²² *In Re: Central Calcutta Bank Ltd. v Unknown* [1959] AIR 625(Cal).

¹²³ Dinesh Kumar and others, ‘Legal Analysis of Artificial Intelligence in Corporate Board Rooms’ (2021) 12 7 *TURCOMAT*, 1516.

Equity Listing Agreement¹²⁴ for the companies that are to be listed. It requires the mandatory appointment of a minimum number of independent directors to the board,¹²⁵ again associating with the concept of independent individuals being eligible for the post, having no links with the employees or other shareholders of the company, to restore the equilibrium of having a neutral vision to a decision. An AI is not legally empowered for this role too, giving us a clear impression that current legal framework in India cannot yet accommodate advanced AI or robo-directors.

The ultimate aim of corporate law is to serve the goals of business and control arrangements for the participants of the organization.¹²⁶ At the same time, it is difficult to make algorithmic decision-making inherently transparent,¹²⁷ and therefore, it poses a hardship of imposing accountability. As noted above, the traditional corporate practices¹²⁸ and legal norms to comply with were framed with humans as the epicenter, leading to the current law being unprepared to deal with AI.

B. The Conundrum of Imposing Liability

From boardrooms and numerous departments to robots utilised in manufacturing activities AI is being implemented at various capacities in organisations. Moreover, AI capabilities and software are delivered as good or service to personal consumers and businesses.

Contemporary corporate and liability regimes, originally structured for

¹²⁴ Equity Listing Agreement 2014, clause 49.

¹²⁵ Equity Listing Agreement 2014, clause 49.

¹²⁶ John Armour and Michael J. Whincop, 'The Proprietary Foundations of Corporate Law' (2007) 27 3 Oxford Journal of Legal Studies, 429, 17.

¹²⁷ Andreas Tsamados, 'The ethics of algorithms: key problems and solutions' (2022) 37 AI Soc., 215, 224.

¹²⁸ M.N. Panini, 'Corporate Culture in India' (1988) 23 35 Economic and Political Weekly, 86.

human-related incidents, face issues in addressing ‘liability gaps’ for damages caused by AI, reminiscent of the 19th-century U.S. shift to tort law due to heavy machinery accidents that have been employed by various companies for quick decision-making. For example, Apple Inc. uses AI to determine the creditworthiness of an applicant to issue Apple Cards (credit cards in collaboration with Goldman Sachs). In the process, AI is also tasked with determining the credit limits.¹²⁹ Subsequently, the algorithms were accused of being “sexist” and “discriminatory” as women consistently received lower credit limits than their male counterparts.¹³⁰ More recently, the algorithm has been accused of discriminating against married women.¹³¹ This trigger us to ponder upon the liability of an AI.

Debates continue to address liability concerns about AI-caused harm by providing a solution in the form of granting it legal personhood with human-like rights and duties, though this is yet to be embraced. The recent judgment of the UK Supreme Court that dealt with recognizing an AI system as the sole inventor in the patent application i.e., giving the connotation of a person as per Section 7 of the Patents Act 1977 of the UK¹³² is significant. It was ruled that UK patent law could only be interpreted as “*An inventor within the meaning of the 1977 Act must be a natural person, and DABUS (the AI*

¹²⁹ Will Knight, ‘The Apple Card Didn’t ‘See’ Gender – and That’s the Problem’, *Wired* (19 November 2019) <<https://rb.gy/0pcdq4>> accessed 24 September 2023.

¹³⁰ Sanya Mansoor, ‘A Viral Tweet Accused Apple’s New Credit Card of Being ‘Sexist’. Now New York State Regulators Are Investigating’ *Time* (12 November 2019) <<https://time.com/5724098/new-york-investigating-goldman-sachs-apple-card/>> accessed 24 September 2023.

¹³¹ Manson Lawlor, ‘Class Action Accuses Apple and Goldman Sachs of Discriminating Against Married Women Who Apply for Apple Card’ *ALM Law.com* (19 April 2023) <<https://www.law.com/2023/04/19/class-action-accuses-apple-and-goldman-sachs-of-denying-credit-to-married-women-who-apply-for-apple-card/#:~:text=Apple%20and%20Goldman%20Sachs%20were,surfaced%20by%20Law.com%20Radar>> accessed 25 September 2023.

¹³² Patents Act 1977, s 7.

system) is not a person at all, let alone a natural person as it is a machine".¹³³ Thus, the application to grant patent rights and ownership to DABUS was rejected in various jurisdictions including the Australian High Court.¹³⁴ However, if AI is used as an aid to human inventors, a fresh perspective could be given.¹³⁵ Therefore, a strict interpretation of the term "*person or individual*" used in Companies Act, 2013 is unavoidable in the current times.

Uncertainties in targeting AI-related concerns emerge from areas like AI autonomy, opaque ML models, AI's evolving nature, and complex software-hardware interactions in autonomous vehicles and manufacturing robots. The cases giving rise to liability can usually be grouped under:

(i) *Contractual liability* arising from breach of contract. In such instances, the burden of proof is on the breaching party.

(ii) *Extra-contractual liability* arising from harm caused by conduct or negligence. In such instances, the burden of proof lies on the damaged party¹³⁶.

Thus, in the event a company is accused of discriminatory conduct (as in the Apple Card instance above), it might be difficult to prove the liability of the company, as due to the presence of AI algorithms, it might be difficult to ascertain whether the AI learned to discriminate based on the input data or

¹³³ Thaler v. Comptroller General of Patents, Designs and Trade Marks [2023] UKSC 49.

¹³⁴ Mark Marfe and Sarah Taylor, 'Australian High Court pulls plug on landmark DABUS AI patent application' (*Pinsent Masons*, 23 November, 2022) <<https://www.pinsentmasons.com/out-law/news/australian-high-court-pulls-plug-on-landmark-dabus-ai-patent-application>> accessed 13 December, 2023.

¹³⁵ Harry Muttock and Mark Marfe, 'AI cannot be an inventor under UK patent law, rules Supreme Court' <<https://www.pinsentmasons.com/out-law/news/ai-cannot-inventor-under-uk-patent-law-rules-supreme-court>> accessed 24 December 2023.

¹³⁶ Active Wizards, 'Artificial Intelligence vs. Machine Learning vs. Deep Learning: What is the Difference?' <<https://activewizards.com/blog/artificial-intelligence-vs-machine-learning-vs-deep-learning-what-is-the-difference/>> accessed 4 November 2023.

whether it was one of the unintended and unrecognized properties of the model. In the latter case, the connection between the damage and the conduct of the bank is weak, as the bank cannot be held to have wilfully obstructed the grant of a credit card.

Another issue that arises is that determining liability in AI cases is complicated by the need to analyze proprietary training data and complex ML models beyond the grasp of a layman. Furthermore, AI used personally as software-only may not fall within the ambit of the Consumer Protection Act, 2019's definition of "product" thus, excluding it from "product defect" aspect in the Act.

However, liability is not so unclear when it comes to the standard of strict and absolute liability for it puts the accountability for the actions of the AI system upon the one who deploys it, by considering it just as a tool of convenience. It is an undisputable fact that some sort of human control will always be there in AI actions, even if the functions are devoid of any specific control, supervision or command, thus, the one who directs or utilizes it, is supposed to be liable.

In the landmark judgments of *In Re Caremark Int'l and Stone v. Ritter*,¹³⁷ the court held that "*only a sustained or systematic failure of the board to exercise oversight—such as an utter failure to attempt to assure a reasonable information and reporting system exists—will establish the lack of good faith that is a necessary condition to liability.*"¹³⁸ However an exception to not imposing liability was also considered in these cases in the form of "*red flag*" liability where the accountability is imposed upon the board if they were aware of the internal inadequacies of the company actions and the illegality it

¹³⁷ *Stone v Ritter* [2006] 911 A.2d 362.

¹³⁸ *In re Caremark Int'l*, 698 A.2d 959 (Del. Ch. 1996).

would lead to and still opted for not rectifying the actions.¹³⁹

In *AISC v. Rich*, the court opined that decisions on contingent events always have a scope of error, an AI can safely eliminate in forecasting for products in market, thereby exonerating the director of any liability if the decision was an outcome of reliance on AI as per Australian corporate law.¹⁴⁰ However, the Indian legal system is silent on any such grounds which is a grave matter of concern.

Therefore, in order to make the legal system robust and AI-ready, it is essential that necessary amendments and regulations are ensured for safe development and deployment of AI as well as ensuring the AI acts as a tool for the benefit of humanity and not as an enabler of undesired events.

V. PART IV - CONTEMPORARY DEVELOPMENTS AND THE WAY FORWARD

The revolutionary nature of AI poses legal concerns that are not addressed by current legislation. The lack of self-awareness and empathy in artificial intelligence makes it difficult to train AI with human ideals like fairness and good faith. AI development is expensive and generally entails post-deployment troubleshooting, but given the potential hazards of AI, this procedure should be more cautious. Pre-deployment auditing of AI for biases and norm adherence is critical, especially when utilized in business decision-making.

¹³⁹ 'Autonomous Artificial Intelligence Guide: The future of AI' <<https://www.algotive.ai/blog/autonomous-artificial-intelligence-guide-the-future-of-ai>> accessed 28 November 2023.

¹⁴⁰ Samar Ashour, 'Artificial Intelligence in the Boardroom: An Outright Exposure to Directorial Liability?' (*Oxford Business Law Blog*, 12 October, 2020) <<https://blogs.law.ox.ac.uk/business-law-blog/blog/2020/10/artificial-intelligence-boardroom-outright-exposure-directorial>> accessed 20 December 2023.

Other nations have taken the initial steps to regulate the AI industry. The *Ethics Guidelines for Trustworthy AI*¹⁴¹ released by the High-Level Expert Group in the EU establishes seven requirements before any AI system can be deemed as “trustworthy”. One of the seven requirements includes the presence of human oversight and agency while dealing with the AI systems, thereby removing scenarios involving AI systems with high-level autonomy. Singapore’s (IMDA) has created AI Verify, a governance framework and software toolkit for this purpose.¹⁴² The 11 governance principles laid down are “transparency, explainability, repeatability/reproducibility, safety, security, robustness, fairness, data governance, accountability, human agency and oversight, inclusive growth, societal and environmental well-being.”¹⁴³ The US has developed *Principles for Stewardship of AI Applications*¹⁴⁴ which emphasizes public participation and flexibility for adapting to rapid changes.

Entrepreneurs in business might have to face complexities in understanding the implications of the current legal regime when it comes to incorporating AI in the business models and processes. For such instance, the Canadian Securities Administrators’ (“CSA”) Regulatory Sandbox¹⁴⁵ was created to provide a pre-designed temporary solution of relief from the

¹⁴¹ *Ethics guidelines for trustworthy AI*, European Commission (2019).

¹⁴² Infocomm Media Development authority, ‘Artificial Intelligence in Singapore’ <<https://www.imda.gov.sg/about-imda/emerging-technologies-and-research/artificial-intelligence>> accessed 22 December 2023.

¹⁴³ Cheryl Seah, ‘Round Up of Significant Legal Developments in AI for 2023’ (*Law Gazette* December 2023) <<https://lawgazette.com.sg/feature/round-up-significant-legal-developments-ai/>> accessed 25 December 2023.

¹⁴⁴ Executive Office of the President, Washington D.C., ‘Memorandum for the Heads of Executive Departments and Agencies’ (17 November 2020) <<https://www.whitehouse.gov/wp-content/uploads/2020/11/M-21-06.pdf>> accessed 25 December 2023.

¹⁴⁵ Canadian Securities Administrators, ‘The Canadian Securities Administrators Launches a Regulatory Sandbox Initiative’ <<https://www.securities-administrators.ca/news/the-canadian-securities-administrators-launches-a-regulatory-sandbox-initiative/>> accessed 23 November 2023.

compliance requirements of the Securities laws.

Meanwhile, it is also necessary to remove ambiguities and liability gaps so that the legal framework for regulating corporations remain robust and AI ready. Based on these cases, we are inclined towards using AI for the supportive role to reduce corruption within boards to a certain extent. Furthermore, the suggestions put forth by the European Parliament with respect to solving the issue of the liability of AI models are crucial here which advocate for conferring legal status to AI robots and attributing the liability for both civil and criminal actions upon the AI system. Additionally, a Report of Committees - D on cyber security and associated concerns discussed civil liability for AI, considering that AI systems are pumped up to make decisions independently by self-acquiring the necessary knowledge, leading to civil liability.¹⁴⁶ Even stakeholders involved should consider bestowing the status of legal personhood on AI systems, along with establishing an insurance or compensation fund for damages.

Corporate dynamics is heading towards a stakeholder-centric-approach and shareholder democracy where a direct incorporation of stakeholder's interests in the features of the AI inputs could be helpful. Thus, the risks associated with AI can be mitigated by placing a specialist executive in the form of a technology director who is responsible for accuracy and wholesomeness of the data quality used in AI.¹⁴⁷ Such a scenario necessitates a specific legal framework for AI liability.

Currently, India is amidst the wave of finding a comprehensive

¹⁴⁶ *Report of Committee- D on Cyber Security, Safety, Legal and Ethical Issues*, Ministry of Electronics and Information Technology.

¹⁴⁷ Joseph Lee and Peter Underwood, 'AI in the boardroom: Let the law be in the driving seat' (2021) ICCLJ.

framework for regulating AI. Under the existing corporate framework of India, only Assisted-AI can be utilised by boards corporate departments. Therefore, an AI cannot be granted the status of a “*person*” as required by the Companies Act, 2013. The corporations developing as well as deploying AI systems shall ensure compliance with The Digital Personal Data Protection Act, 2023¹⁴⁸ and the Information Technology (Reasonable security practices and procedures and sensitive personal data or information) Rules, 2011 (SPDI Rules).¹⁴⁹ Ensuring the appropriateness of data sets utilized for training ML models is the first crucial step that corporations shall take for ensuring the development of responsible AI. This recommendation can also be traced in the report prepared by NITI Aayog titled “*Responsible AI: AI For All.*”¹⁵⁰ Data is the backbone of AI.¹⁵¹ Regulating how companies use data to train ML models is integral to developing responsible AI. Diverse datasets can help eliminate biases.

ML model training is quite prone to human biases. In supervised learning, data labelling can be affected by biases; in unsupervised learning, they influence algorithm fine-tuning based on developers’ notions of ‘correct’ outcomes. Reinforcement learning requires an extreme form of caution in setting parameters and environments.¹⁵² as the reward function, crucial in guiding AI learning, must be accurately defined. Therefore, understanding the

¹⁴⁸ Digital Personal Data Protection Act 2023.

¹⁴⁹ Information Technology (Reasonable security practices and procedures and sensitive personal data or information) Rules (SPDI Rules) 2011.

¹⁵⁰ ‘Responsible AI’, Niti Ayog (February 2021) <<https://www.niti.gov.in/sites/default/files/2021-02/Responsible-AI-22022021.pdf>> accessed 25 December 2023.

¹⁵¹ Bernard Marr, ‘Why AI Would Be Nothing without Big Data’ (2017) *Forbes* <<https://www.forbes.com/sites/bernardmarr/2017/06/09/why-ai-would-be-nothing-without-big-data/?sh=3649a414f6d0>> accessed 21 December 2023.

¹⁵² Richard S. Sutton and Andrew G. Barto, *Reinforcement Learning* (The MIT Press, Second Edition 2018).

nitty-gritty of the technology is one of the first steps that corporations shall ensure for the safe development and deployment of AI.

AI systems can arguably be described as a new species. These intelligent machines can neither be categorised as humans nor as classical machines. This requires an understanding of these systems from scratch for making corporate law AI ready and ensuring that AI is utilised for the benefit of mankind.