
AI-ENABLED CONTRACT LIFECYCLE MANAGEMENT: AUTOMATION, COMPARATIVE ANALYSIS, LEGAL RISKS AND EXISTING LEGAL FRAMEWORKS

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ABSTRACT

The application of Artificial Intelligence (AI) in legislation and businesses processes concerning contracting has changed the process of contract life cycle management into an AI-based process, meaning that all operations connected with drafting, negotiation, signing and control of contracts are carried out through software programs based on artificial intelligence. Such software includes machine learning, natural language processing and predictive analytics to automate operations like creating standard contract clauses, identifying and interpreting risky clauses, negotiating agreement terms, signing the contract with electronic signatures and monitoring its operation. Therefore, a smart contract management system can be considered efficient, economical and low-risk as well as capable of managing thousands of contracts.

However, the present research article concentrates specifically on the impact of artificial intelligence (AI) on contract management through the usage of the doctrinal methodology of research. A comparative analysis of traditional contract management techniques and those based on AI reveals benefits that come from employing the technology under discussion. Still, there are some limitations to it as well. Even as the advantages offered by AI cannot be understated, there are also many legal issues that arise from its use, such as data privacy and protection, algorithmic bias, the inability to be transparent about decisions made by an AI, the difficulties with enforcing AI-made contracts and liability and accountability issues. The article makes the case that current legal and regulatory mechanisms are not equipped enough to handle these new challenges. Ultimately, the article makes the case for a well-balanced regulatory system that can adapt to changing times.

Keywords: Artificial Intelligence, Contract Lifecycle Management, Standard Contracts, Legal Issues, Data Privacy and Protection, Algorithmic Bias.

1. Introduction:

The digital economy has brought fundamental changes in conducting commercial transactions, and consequently, better contract management systems need to be developed. Due to an increasing number of online transactions, cross-border transactions and digital business models, the conventional ways of managing Contract Lifecycle Management (CLM) are becoming insufficient for supporting contemporary businesses. Conventional CLM is associated with numerous disadvantages of its manual nature, namely the need for drafting, negotiation, execution and supervision of the process after contract execution. These operations are rather resource intensive, time consuming and error prone.

However, modern advances in the field of computer technology, namely the progress made in AI, provide opportunities for improving contract management procedures significantly. Artificial Intelligence has become one of the most promising fields of study and numerous breakthroughs have been achieved within this field in recent years. One of such breakthroughs is a possibility to utilize AI in contract management and improve contract management procedures through automating these procedures, increasing accuracy and applying predictive analytics. Through analyse massive amounts of information in real-time, AI can detect errors, identify possible problems and help choose optimal contract terms. Nevertheless, it should be noted that with the help of all the above-discussed technologies, many issues arise. The introduction of artificial intelligence into the contract management process has its own drawbacks associated with legal and ethical aspects. Such problems are violation of user privacy, unfair treatment, lack of transparency of decision-making procedures and the issue of enforceability of AI contracts are becoming a problem.

2. Literature Review:

The academic discussion on AI in legal technology is focused on its revolutionary impact. The benefits offered by automation of the contract-drafting process due to AI have been acknowledged in various studies. It was reported that AI could help considerably increase speed and accuracy of contract review. On the other hand, numerous scholarly discussions point out challenges faced when implementing AI. One of the main problems in the field of contract management with the use of AI is the "black box" issue that is lack of transparency in how AI systems make decisions or produce outputs during contract processes. Other issues mentioned include data privacy, output bias and lack of accountability. Although certain legal

regulations were adopted in some countries, there still seems to be a gap in the field of contract management regulation.

3. Research Methodology:

The present study utilizes a combination of doctrinal and comparative methodologies for its research process. For data collection purposes, secondary sources such as journal articles, books, policy papers and case law are used in this study. The comparative methodology has been used to make comparisons between traditional CLM platforms and AI-based technology platforms. In addition to that, the study also evaluates existing legal frameworks concerning AI and digital commerce.

4. AI Automation in Contract Lifecycle Management

The development and evolution of Artificial Intelligence (AI) have played a pivotal role in shaping the concept of Contract Lifecycle Management (CLM). This is because modern day advanced technologies like machine learning, natural language processing (NLP) and data analytics into CLM systems are used in incorporation, making them more efficient and capable of automating contractual procedures. With the help of such technologies, organizations are now able to manage a vast number of contracts much more efficiently than before. Of all the benefits offered by AI technology in the field of CLM, perhaps automated contract drafting stands out the most. With the help of intelligent templates and predefined clause libraries, artificial intelligence technology makes it possible for organizations to automatically draft contracts according to their requirements. With the help of Natural Language Processing (NLP) technology, AI systems are able to interpret users' requests and automatically provide appropriate language for inclusion in the agreement.

Another important function that AI performs is related to clause detection and risk management. The AI technology enables legal experts to analyse large volumes of contracts to determine important clauses and detect deviations from typical contract terms. Moreover, it helps in detecting potentially hazardous clauses within the contract. Based on the historical data, machine learning algorithms can perform predictive risk assessment by revealing patterns that indicate risks of non-compliance or disputes. In addition to helping legal professionals in avoiding disputes, AI contributes to improving the efficiency of the negotiation process. Traditionally, contract negotiations take a lot of time and include lengthy communication.

Using an AI-powered CLM system, one can engage in efficient negotiation in real time as it allows for alternative suggestions, monitoring changes and determining the most optimal course of action based on past experience and company policy.

Execution of agreements by use of electronic signatures through digital transformation is yet another area where application of AI in CLM becomes evident. By virtue of provision of legally binding and secure e-signature, such programs help avoid any kind of physical paperwork, which is not only time-consuming but also does not meet necessary legal requirements for the transaction. Moreover, AI applications also allow organizations to engage in compliance and performance monitoring of contracts. Real time analysis of contractual obligations helps these programs track any deadlines as well as breach of contracts and issue warning in case of non-compliance. Together, these abilities indicate that artificial intelligence backed by CLM solutions go beyond automation and provide strategic benefits. They increase accuracy, decrease costs, help manage risks and enable scalability amid an ever-evolving digital economy. On the other hand, increasing adoption of AI also calls for addressing the legal, ethical and regulatory issues that may arise.

4.1. Landmark Cases

4.1.1. Trimex International FZE Ltd. v. Vedanta Aluminium Ltd.,¹

The Supreme Court of India ruled that a contract formed using e-commerce is valid and binding without any requirement of a written agreement, provided that the intentions and consent of the parties are clear and established. This case law affirms the validity of contract formation through AI technology.

4.1.2. Shakti Bhog Foods Ltd. v. Kola Shipping Ltd.,²

The Court understood that modern means of communication, which can also be electronic communication, could be recognized legally as a valid means of making contracts. AI-based CLM solutions depend on such forms of communication.

¹ (2010) 3 SCC 1

² (2009) 2 SCC 134

4.1.3. Dongue v. Stevenson³

Moreover, liability issues associated with automated technology have some link with *Donoghue v. Stevenson*, the landmark case that gave rise to the law of negligence. While there is no direct relation between *Donoghue vs Stevenson* and artificial intelligence, the principles of the former are applicable in cases of contract disputes caused by AI errors.

4.1.4. Specht v. Netscape Communications Corp.⁴

It has been established in the *Specht v. Netscape Communications Corp.* case that click-wrap and browse-wrap contracts are enforceable when there is informed and explicit consent from the user, which is very essential for AI-based CLM software in which the users provide their consent automatically.

5. Comparative Analysis: Traditional v. AI-Enabled Contract Lifecycle Management

The application of Artificial Intelligence (AI) has recognised a new era in the field of Contract Lifecycle Management (CLM), which is distinct from earlier approaches that have been more manual and time-consuming in nature. Traditional contract management techniques depend extensively on the expertise of humans in terms of creating, evaluating, negotiating and tracking contracts. Although this approach draws strength from the skills and understanding of professionals, it suffers from inefficiency and delays. These techniques are more prone to errors committed by humans.

Unlike traditional CLM systems, AI integrated CLM platforms automate and incorporate intelligence at each step of the contract lifecycle process. Firstly, one of the greatest benefits offered by AI is increased efficiency due to the fact that AI substantially decreases the time spent on such processes as drafting, reviewing and approving contracts, thus helping organizations react quickly to business requirements.

From the standpoint of accuracy, AI enabled systems substantially mitigate the risk of human error by employing standardized contractual templates by facilitating automated clause extraction and ensuring systematic consistency across contractual documentation. Thus, the

³ [1932] UKHL 100

⁴ 306 F.3d 17 (2d Cir. 2002)

use of AI ensures that all contracts will have uniform format and no mistakes will be made. Finally, risk management is greatly improved by AI due to the possibility of detecting and assessing potential problems in advance based on predictive analytics and patterns analysis.

The next crucial benefit is primarily driven by its capacity for scalability aspect. Whereas conventional tools were limited by the scope of human capabilities, artificial intelligence-based systems can handle and manage vast numbers of contracts simultaneously without affecting either precision or speed. This aspect proves to be especially relevant when used by businesses working in international and high-volume settings.

Nevertheless, while the above benefits are numerous, artificial intelligence-based contract lifecycle management tools come with some disadvantages related to their technology-based nature, security concerns and issues of accountability.

6. Legal Risks and Challenges

Though the inclusion of Artificial Intelligence (AI) in CLM provides many advantages, at the same time, there is an abundance of complicated legal issues that arise from its incorporation in CLM. This is because AI technology involves self-driven and data-based processes that may be regulated under frameworks that were never meant for them.

6.1 Data Privacy and Security

The usage of AI-based CLM systems will lead to processing enormous amounts of confidential and highly sensitive contract related data, such as financial data, intellectual property rights data and even personal data. The processing of huge volumes of information leads to numerous risks that relate to data protection issues and cyber security practices, as unapproved access to the data, breach of confidentiality or inappropriate use of information can lead to serious legal implications. It is important to note that the global nature of online operations leads to compliance with several data protection frameworks simultaneously.

6.2 Algorithmic Bias

The nature of AI is inherently linked to its training data and therefore, the possibility for the introduction of biases is high. This is because if biases and inequities were inherent in historical data used for training the AI model, there will be a likelihood that these biases will be replicated

by the algorithm. In the field of contract management, this would translate into biased clause recommendation, unequal risk assignment and unjust contract terms. Furthermore, the problem is complicated by the uncertainty of most AI models, which makes it impossible to determine the biases behind certain decisions.

6.3 Enforceability of AI-Generated Contracts

AI's usage in the formulation and implementation of contracts poses some fundamental questions about how such contracts would hold in light of traditional contract law. The concepts of offer, acceptance, intent and agreement, which are at the core of any contract, might appear to be unclear when terms are created or managed through AI with little human involvement. The court might find it difficult to decide whether there is real consent and whether both parties know what they are agreeing to.

6.4 Liability Issues

Among the most challenging issues related to CLM that involves AI is the issue of who is accountable for any problems that arise because of mistakes or malfunctioning of the system. In conventional models where accountability can be assigned easily, this does not apply to AI systems as they make their decisions independently without any direct input from people. Thus, there is always ambiguities regarding whose accountability it may be, whether the developer, user or the company that used it.

6.5 Regulatory Gaps

Current laws and regulations prove inadequate to cater for the challenges associated with the application of AI technologies. The provisions of contract law have been formulated in an era that never imagined such sophisticated computer systems. Therefore, there is a notable discrepancy between the progress made in technology and the formulation of laws to regulate it. This mismatch causes various problems including inconsistency in the interpretation of laws and possible conflicts of interests. There is a grave need to develop effective legal mechanisms for the management of the contract life cycle through AI.

7. Existing Legal Frameworks Concerning AI and Digital Commerce

The rapid adoption of AI technology into e-commerce highlights the strengths and weaknesses

in the prevailing regulatory frameworks. This is because most regulations have been formulated for the purpose of regulating electronic transactions but not those of intelligent machines. Therefore, any law that would seek to regulate business activities using AI technology such as CLM would involve the contract law, information technology law and data protection laws.

In the case of **India**, the **Information Act Technology Act⁵, 2000** is the principal piece of legislation concerning electronic records and signatures. The provisions dealing with electronic authentication and digital signatures using computer technology, facilitate entry into contractual agreements. However, one downside is that the IT Act does not make any reference to AI technology. AI regulation is further characterized by its data protection elements. With the passage of the **Digital Personal Data Protection Act⁶, 2023**, an elaborate legal framework for processing personal data with emphasis on consent, purpose restriction, and data protection is provided. Despite being very pertinent to AI-based processes involving processing of substantial contractual data, this act fails to fully cover non-personal data or regulate issues such as algorithm transparency and algorithm bias, which are important in AI processes.

At the **international** level, new regulations have begun addressing some of these weaknesses. For instance, the **EU Artificial Intelligence Act⁷** proposes the development of a risk based regulatory framework for AI based systems. The act categorizes various uses of AI into categories depending on risk levels and places obligations on AI system providers concerning transparency, accountability and human control. Likewise, the **General Data Protection Regulation⁸** provides strong data protection rules, including those relating to automated decision making and profiling, which are highly relevant in AI driven business processes.

Nevertheless, there are still some legal gaps which have emerged. Principles such as offer and acceptance as well as intention in contract law are essentially the same and do not take into account the specifically in AI generated and assisted contracting processes. In addition to this, the problem of legal liability in case of an AI mistake cannot be easily solved.

To summarize, even though existing regulatory structures give us grounds to believe that our

⁵ Information Technology Act, No. 21 of 2000, INDIA CODE (2000).

⁶ Digital Personal Data Protection Act, No. 22 of 2023, INDIA CODE (2023)

⁷ Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act), 2024 O.J. (L 1689) 1.

⁸ Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 Apr. 2016 on the Protection of Natural Persons with Regard to the Processing of Personal Data and on the Free Movement of Such Data, and Repealing Directive 95/46/EC (General Data Protection Regulation), 2016 O.J. (L 119) 1.

current system can handle problems connected with digital commerce, they are ill-equipped for tackling those issues that arise due to the use of artificial intelligence.

8. Conclusion

The use of AI in contract lifecycle management (CLM) has the capability to revolutionize the entire legal and business environment by bringing an entirely new level of efficiency, accuracy and scale into the processes involving contracts. Automation of the different processes associated with contracts like drafting, reviewing, negotiating, signing and monitoring for compliance is achieved through AI solutions that help save costs, improve speed and increase consistency in contractual processes. The use of AI in CLM becomes highly beneficial in the digital economy.

Nevertheless, the increased usage of AI in contract management requires the introduction of progressive and flexible laws aimed at solving the many problems related to those technologies. Matters of data privacy, algorithmic bias, enforceability of AI-based agreements and liability allocation are just a few examples of problems that cannot be effectively addressed in the context of current legal theories. The lack of appropriate legal measures could cause legal ambiguity, erode confidence in AI technologies and prevent their further implementation.

REFERENCES

1. SCC ONLIE
2. LIVE LAW
3. SCO
4. Information Technology Act, 2000
5. Digital Personal Data Protection Act, 2023
6. Artificial Intelligence Act (EU) 2024/1689
7. General Data Protection Regulation (GDPR) (EU) 2016/679
8. UKHL (UK House of Lords) Law Journals
9. Singh, A., Joshi, A., & Paik, H. (2025). *A survey of classification tasks and approaches for legal contracts*. *Artificial Intelligence Review*, 58(380).
10. Soman, R. (2025). *Revolutionizing Contract Lifecycle Management: The Impact of AI-Driven Automation*. *International Journal of Scientific Research in Computer Science, Engineering and Information Technology*, 11(1), 1817–1827.
11. Ali, S. O., Ali, S. A., & Jafri, R. (2026). *Data-Driven Contract Management at Scale: A Zero-Shot LLM Architecture for Big Data and Legal Intelligence*. *Technologies*, 14(2), 88.
12. Autto, H., Haapio, H., & Nuottila, J. (2024). *Contracts rethought and redesigned: A new era with AI*. *Journal of Strategic Contracting and Negotiation*, 8(1–2).
13. Rizner, J., & Krzus, M. (2025). *The AI's Philosophy of Contract: An Empirical Study of Breach, Remedies, and Model Heterogeneity*.
14. Nogueira I Alonso, M., & Chatzianastasiou, F. S. (2024). *Automating legal contracts using logic rules with large language models*.

15. Khan, M. N. I. (2023). *A systematic review of legal technology adoption in contract management*. *American Journal of Interdisciplinary Studies*, 12(3).
16. Tong, Y., et al. (2022). *Smart contract generation assisted by AI-based word segmentation*. *Applied Sciences*, 12(9), 4773.
17. Aggarwal, V., et al. (2021). *CLAUSEREC: A clause recommendation framework for AI-aided contract authoring*.
18. Hendrycks, D., Burns, C., Chen, A., & Ball, S. (2021). *CUAD: An expert-annotated NLP dataset for legal contract review*.