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Smartsettle as An Innovative Solution For Debt Dispute Resolution: A Game Theory Approach Powered By Artificial Intellegence

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Abstract:

In the face of increasingly complex debt disputes, traditional litigation often proves inefficient due to its high costs, protracted timelines, and emotional toll. Smartsettle, an AI-powered Online Dispute Resolution (ODR) platform that integrates game theory, offers a promising alternative. This research explores Smartsettle's potential to resolve debt disputes more effectively by analyzing how artificial intelligence, when combined with strategic decision-making frameworks like Nash Equilibrium and utility modeling, can optimize negotiations between creditors and debtors. Through a normative-juridical and comparative approach, the study examines the theoretical underpinnings of AI and game theory, the current legal framework of debt obligations in Indonesian civil law, and international case studies−particularly in Canada−where Smartsettle has been successfully implemented. Results indicate that Smartsettle facilitates faster, more transparent, and cost-effective settlements while preserving business relationships. This paper also analyzes legal integration challenges, such as regulatory gaps, public trust in AI, and infrastructure readiness in Indonesia. The study concludes with policy recommendations to support AI-based ODR platforms and enhance legal modernization. Overall, Smartsettle represents a viable and forward-thinking model for addressing civil disputes in the digital era.

Keywords: Smartsettle; Artificial Intelligence; Online Dispute Resolution; Civil Law; Indonesia

INTRODUCTION

Amidst the dynamics of modern life, debt disputes continue to play an important role in civil law. At first glance, this issue seems simple as it concerns the obligation to pay a sum of money. However, the reality is often far more complicated. Not only does it take a long time and incur high costs, but resolving debt disputes can also cause serious psychological impacts on the parties involved. Business and personal relationships can be disrupted by protracted legal processes, while funds that should be circulating are instead held up.

According to the 2021 Annual Report of the Supreme Court, the number of civil cases entering Indonesian courts each year ranges from 40,000 to 50,000, and most of them are related to debt disputes (Mahkamah Agung RI, 2022). This figure does not include disputes resolved out of court or those that simply disappear without legal process. Field facts show that many parties choose to avoid formal litigation due to lengthy procedures, considerable costs, and uncertain outcomes. For business actors, especially those who interact directly with many consumers, debt disputes have become an unavoidable business risk. The author himself, as an automotive product distributor, often faces

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problems of late payments, unfulfilled requests for leniency, and uncertain promises that lead to company cash flow stagnation. Although there is an option to take cases to court, the process often takes longer than the loan period itself. In addition, lawyer fees, court administration, and document complexity become significant additional burdens.

In the context of civil law, debt disputes are generally handled through litigation. However, this mechanism is often considered less efficient. The need to hire legal counsel, prepare complex documents, and attend repeated court hearings can consume attention and energy that should be focused on business continuity. The problem becomes even more complex when one party is dissatisfied with the court's decision and chooses to file further legal remedies such as appeals or cassations. As a result, the already protracted process becomes even longer. Not only that, even small-value debt disputes can go through a series of hearings that take months or even years. If the final outcome is not commensurate with the costs incurred, both parties feel disadvantaged. Sometimes, they eventually choose to settle peacefully even at a loss to maintain good relations or avoid exhausting court proceedings.

This condition encourages the importance of innovation in resolving debt disputes. This is where Alternative Dispute Resolution (ADR) mechanisms such as mediation, conciliation, or arbitration gain their relevance (Katz, 1988). ADR offers time efficiency, cost savings, and the potential to defuse emotional conflicts. For parties who prioritize business continuity, non-litigation approaches are often considered more suitable because they involve discussion, negotiation, and finding mutually agreed solutions. Business relationships can also be maintained, as the negotiation process in ADR tends to be less harsh than litigation.

Given the large volume of disputes and the dissatisfaction of many parties with the court system, breakthroughs in this area are urgent. Regulations supporting the use of ADR can be optimized so that debt dispute resolution no longer becomes a heavy burden for businesses and consumers (McGuinness, 2010). Of course, the use of ADR must be accompanied by a monitoring mechanism so that the results have clear executive power. Support from the government, judicial institutions, and business actors is expected to reduce the backlog of civil cases in court and prevent business relationships from being destroyed by ongoing conflicts (Noone, 2025).

In conclusion, debt disputes are a serious issue that demands special attention in civil law practice. High costs, protracted processes, and emotional conflicts are negative aspects of litigation. On the other hand, many disputes are resolved outside of court, indicating the need for further regulation. Strengthening ADR is one solution that should be put forward to create efficiency and legal certainty for all parties (Boulle et al., 2024). With various innovative breakthroughs, business actors can reduce financial risks, maintain good relationships with business partners, and encourage a healthy and sustainable business climate (Ware, 2025).

The author's interest in Smartsettle is not only due to its success in various jurisdictions but also due to a personal family experience. The author's sister, who is married to a US citizen, once used Smartsettle in a dispute with her former company. According to her testimony, the negotiation process was much faster, and the costs incurred were significantly reduced compared to going through conventional litigation. This experience demonstrates how this AI-based ODR offers a practical and reliable solution, especially for parties who need dispute resolution without having to go through lengthy court bureaucracy.

In its development, Smartsettle has been adopted in several regions, particularly Canada and the United States. A number of district courts in both countries have begun to integrate ODR services to reduce case backlogs. Outside North America, several international dispute resolution bodies have also shown interest in piloting this platform, although not yet on the same scale of adoption as in its home countries.

Smartsettle's main appeal lies in its ability to shorten negotiation times from what typically takes months to just a few weeks, or even days. This advantage is highly valuable because traditional litigation processes often drag on and incur high costs, ultimately leading to uncertainty for the parties involved. Conceptually, Smartsettle combines various technologies. First, machine learning allows the

system to learn from past case data, understand preferences, offers, and successful common ground. Second, game theory helps map out various possible strategies from the parties involved, guiding the AI to seek optimal agreements. This platform uses a payoff matrix as an analysis tool, assessing the various utilities of each option, until finally displaying a fair equilibrium. Third, optimization algorithms explore a large number of possibilities to find a settlement scenario that satisfies all parties. Fourth, preference visualization presents user preferences and priorities in an interactive graphical format, making it easier for them to see how each decision can benefit or harm each party.

For those who want to learn more about how Smartsettle works, they can visit its official website at https://smartsettle.com. There, iCan Systems Inc. provides comprehensive information about features, case studies, and whitepapers that explain it both technically and theoretically. These whitepapers are useful for academics, legal practitioners, and policymakers interested in implementing similar concepts.

In addition to Smartsettle, there are actually other platforms that offer ODR approaches, but they do not use game theory models as deeply as Smartsettle. In Europe, some arbitration institutions have started implementing online systems to facilitate negotiations, while in Asia there are startups that are releasing limited-scale negotiation chatbots. Nevertheless, Smartsettle is often considered more attractive due to its comprehensive optimization algorithm and more structured approach in integrating AI and game theory.

Smartsettle emphasizes achieving a win-win solution. Unlike litigation processes that tend to be competitive, this platform encourages disputing parties to pursue optimal settlements that benefit both. Because the system is designed to consider the preferences of each party, the level of satisfaction with the final outcome is usually higher. This process is considered efficient because all stages are carried out online, from registration to final agreement. Time typically consumed by court schedules and administrative procedures is replaced by AI operating around the clock. In addition, costs are reduced by minimizing the need for physical meetings and ongoing legal services.

Transparency is another advantage offered. All offers or proposals are recorded by the system, so users know exactly how evaluations and calculations are performed. Users can see why a solution is considered optimal, how utility scores are calculated, and why one option is more advantageous than another. All of this increases the sense of involvement and reduces the potential for manipulation bias. On the other hand, AI continues to learn from new interactions, so every successfully resolved case adds to the system's knowledge for resolving future disputes more accurately.

In the context of Alternative Dispute Resolution (ADR), Smartsettle is a tangible example of how AI-based technology and game theory can overcome the shortcomings of conventional methods that sometimes trigger emotional conflicts, consume time, and potentially incur large costs (McGuinness, 2010). The presence of Smartsettle does not necessarily replace mediators or lawyers, but rather serves as a supporting instrument that reduces administrative burden, emphasizes rationality, and minimizes subjectivity. Mediators or legal practitioners can focus on communication and emotional resolution, while AI handles mathematical calculations and preference mapping. Overall, Smartsettle is an innovative solution that combines AI, machine learning, and game theory to facilitate the negotiation process in various types of disputes, including debt disputes. Driven by Dr. Ernest Thiessen's vision, Smartsettle has proven itself in Canada and the United States, and is starting to be noticed in other countries. Although there are several other ODR platforms, Smartsettle stands out due to its intuitive preference visualization approach and its ability to continuously learn from each new case. The transformation of ADR towards faster, more transparent, and conflict-minimizing digital processes marks an important development in the modern legal landscape.

METHODS

The research method used in this study aims to provide a comprehensive overview of how Smartsettle, which combines Artificial Intelligence and game theory, can function as an innovative solution for resolving debt disputes in Indonesian civil law. The research will rely on literature review, comparative analysis, and case studies in various jurisdictions (Patton, 2026).

In the initial stage, this research will conduct a broad literature review to collect and analyze relevant materials. First, literature discussing the development of artificial intelligence (AI) and Large Language Models (LLM) will be reviewed to gain an understanding of the conceptual and technical foundations of AI, including how AI can predict, process large amounts of data, and perform repeated simulations. This study is important to determine the extent to which AI can support negotiation processes and conflict resolution based on game theory.

Next, this research will touch upon the issue of game theory as a theoretical foundation. Within the framework of game theory, concepts such as payoff matrix, Nash Equilibrium, and optimal strategies become the basis for understanding how parties in a dispute make decisions that are most advantageous. Through the study of academic texts and journals, the author seeks to find an adequate scientific basis to explain how game theory works in the context of law, especially civil law which often involves various interests and different preferences among the parties.

In addition, this study will also discuss ADR (Alternative Dispute Resolution) and ODR (Online Dispute Resolution). This stage includes understanding the various widely known ADR mechanisms, such as mediation, conciliation, and arbitration. Furthermore, ODR, which utilizes online technology, will be examined to highlight the potential for its application in the context of dispute resolution without having to go through litigation in court. From this study, it will be seen how AI-based technology can be integrated into ODR, especially when applied to civil debt cases.

After reviewing the literature on AI, game theory, ADR, and ODR, the research will specifically highlight Smartsettle. In it, the research will explore how this platform works, what features it offers (e.g., preference visualization or optimization algorithm), and how it is applied in various countries (Bgdan, 2025). This step is designed to see how Smartsettle is developed abroad and how successful it is in handling civil cases, especially those involving financial disputes.

In order to deepen the understanding of civil law related to debt disputes, the research will review regulations and literature on Indonesian civil law governing creditor-debtor relationships, as well as potential out-of-court dispute resolution procedures. In addition, the research will examine laws and regulations related to the use of technology in dispute resolution processes, including Law No. 30 of 1999 concerning Arbitration and Alternative Dispute Resolution. Thus, the research is expected to be able to assess the legal feasibility of Smartsettle's application in the civil law realm in Indonesia.

The next stage is comparative analysis. The author will compare the use of Smartsettle or similar platforms in other countries that have already implemented them. Some countries that will be the focus are those known to implement ODR and AI in their legal systems, such as Canada where Smartsettle was first developed as well as several other developed countries in Europe. The results of this comparison will provide a perspective on the effectiveness and efficiency of using Smartsettle in resolving commercial or debt disputes. After that, the research will compare it with conditions and practices in Indonesia, highlighting aspects of regulation, legal culture, and the level of technological literacy among the public and law enforcement.

This comparative study will be strengthened by relevant case studies. For example, a dispute case in Canada handled through Smartsettle will be used as a starting point to look at success indicators, such as resolution time, costs incurred, and party satisfaction. Then, similar case studies can be used to explore challenges and opportunities if one wants to replicate this pattern in Indonesia. In this process, the research will also attempt to find examples of local cases, if there are parties who have used AI-based ODR solutions, although it may not be as open as in developed countries.

Finally, all data and analysis collected from the literature review, comparative analysis, and case studies will be systematically compiled to answer the main research questions: to what extent can AI based on game theory be an effective solution in civil debt disputes, what are its main advantages compared to conventional litigation approaches, and how is its implementation in the Indonesian legal system which is regulated by various ADR regulations. The expected conclusion from this research method is a clear picture of the potential and challenges of Smartsettle's implementation in Indonesia. The research will highlight the alignment between the Indonesian legal framework and the features provided by Smartsettle. Furthermore, the author hopes that this research will trigger constructive

discussions among academics, legal practitioners, and relevant stakeholders regarding smart technology innovation in resolving debt disputes. Thus, the results of this research are expected to contribute to the development of civil dispute resolution systems in Indonesia, increase time and cost efficiency, and promote a fairer and more transparent win-win approach. If platforms like Smartsettle can be effectively implemented in Indonesia, it is highly likely that our legal system can develop faster towards the digital era, strengthen public trust in alternative mechanisms, and ultimately encourage the creation of a more conducive and harmonious business climate.

RESULTS

The case study from Canada shows that Smartsettle is capable of offering a fast, cheap, and adaptive negotiation path. Game theory ensures that the solutions generated are rational and win-win, while artificial intelligence helps reduce emotional conflicts by displaying objective preference data. Parties also benefit because business relationships are maintained and litigation costs can be reduced. The same, if applied correctly in Indonesia, has the potential to address various weaknesses of conventional dispute resolution methods from long times, high costs, to damaged business relationships.

However, many prerequisites still need to be met. Reliable digital infrastructure, firm ODR regulations, socialization of game theory concepts, and increased technological literacy for business actors and legal practitioners are major tasks. Hukumonline, as a leading legal platform in Indonesia, can play a pioneering role by developing AI modules further not limited to legal data search, but also online negotiation simulations. If synergy between legal stakeholders, technology developers, and business practitioners can be closely established, then it is not impossible that Indonesia will have a platform like Smartsettle adapted to local characteristics. This will encourage faster, more efficient, and more satisfactory Alternative Dispute Resolution (ADR) practices (Marsh, 2000). In addition, optimism emerges that our legal system will become more adaptive to intelligent technology trends, thereby providing better certainty and justice for all parties. Thus, this Case Study concludes our analysis in the second chapter. Next, we will proceed to a further discussion on the implications of this digital transformation for the Indonesian civil legal system, future prospects, and various concrete steps that stakeholders can take. Hopefully, what has been learned from Canada's experience will not only be a theoretical inspiration but can also be genuinely adapted to advance the debt dispute resolution system in Indonesia.

Table 1. Comparison between the Canadian Case and the Case in Indonesia

Aspect	Canadian Case (Smartsettle)	Similar Case in Indonesia
Resolution Time	~ 4 weeks	6–18 months (or more)
Cost	~ < 20% of litigation costs	Can reach 30% of contract value
Party Relationship	Maintained, ready for future cooperation	Potentially damaged by long litigation process
Approach	Data-driven, game theory, win-win solution	Generally confrontational, potential zero-sum game
Technology	Advanced AI ODR platform (Smartsettle)	Limited, not many advanced ODRs
Regulation	Canada relatively open to ODR, clear legal framework	Law 30/1999 supports ADR, but AI ODR still lacks regulation

The comparative table above emphasizes how different resolution outcomes are when technology, game theory, and regulatory support synergize. While Canada has successfully integrated ODR into an efficient dispute resolution channel, similar efforts in Indonesia are still sporadic and unstructured.

DISCUSSION

Basic Concepts of Artificial Intelligence (AI)

Artificial Intelligence (AI) is defined as intelligence demonstrated by machines programmed to think and learn like humans. AI systems are designed to perform tasks that typically require human thought, such as speech recognition, natural language processing, decision-making, and large-scale data analysis (Fadillah, 2023). The idea of AI began to develop in the mid-20th century, when computer scientists dreamed of creating machines that could "think" like humans. Initially, the methods used were limited to rule-based systems that were only effective in very narrow areas. Over time, new paradigms emerged that prioritized machine learning and deep learning. This pushed AI to a more advanced level, where the system no longer simply followed static rules, but "learned" from data and experience. Thus, AI is able to adapt and improve performance gradually.

Machine learning is a method where machines are trained using large amounts of data to find certain patterns or tendencies. From this, the machine will build predictive models or decision-making models. This model is adaptive, meaning that the quality of predictions improves as more training data is added. One of the most dominant forms of machine learning today is deep learning, which utilizes multi-layered neural network architectures. Neural networks are inspired by the way neurons in the human brain work. In each layer, artificial neurons will perform simple mathematical processing and pass the results to the next layer. The more layers or "depth" the network has, the more complex patterns it can recognize. The power of these neural networks lies in their ability to find complex correlations that were previously difficult to identify by conventional methods. The continuous adaptation process of neural networks allows AI to perform tasks such as image recognition, natural language processing, and negotiation simulations with high accuracy.

One interesting aspect of AI is its ability to perform strategic simulations, especially when combined with game theory. In this context, AI can simulate interactions between several "players" with specific goals. AI will run hundreds or even thousands of scenarios to try various strategies, estimate opponent responses, and calculate possible final outcomes. Through a reinforcement learning approach, AI can "learn" from each trial and adjust its strategy to maximize rewards. This optimization process allows AI to produce decisions that are often more rational and more profitable in the long run compared to intuitive decision-making by humans. In legal disputes, especially debt disputes, such an approach helps AI map the preferences of both parties, calculate consequences, and then offer an optimal middle ground. In other words, AI becomes a negotiating agent that seeks to find an equitable equilibrium for all.

Introduction to Game Theory and its Relevance to Dispute Resolution

Game theory is a branch of mathematics that analyzes strategic interactions among a number of players, each with their own interests. Each player in game theory has several strategies, and the combination of strategies chosen will result in a payoff (profit, loss, or a certain value). Thus, game theory attempts to model situations of both conflict and cooperation, where the final outcome is determined by the collective choices of all players.

Key concepts in game theory include:

a. Players: The actors involved in the "game," for example, creditors and debtors in a debt dispute.

b. Strategies: The choices of actions that can be taken by players to achieve their goals. In the context of debt disputes, strategies can include negotiating payment schedules, demanding late penalties, or filing a lawsuit in court.

c. Payoff: The value or consequence obtained by a player after choosing a certain strategy, which can be in the form of financial gain or moral loss.

d. Equilibrium: A point or situation where no player can improve their payoff by unilaterally changing their strategy. One of the most famous concepts is Nash Equilibrium.

A payoff matrix is a visual tool that illustrates the gains or losses from every possible combination of strategies that can be taken by the players. In the case of two players, the payoff matrix can be

displayed in a table where the columns and rows each represent one player's strategies, and each cell contains the payoff (A,B) that reflects the outcome for both parties. The payoff matrix is relevant in legal negotiations because it helps the disputing parties recognize "best" and "worst" scenarios, and predict the opponent's reactions (Fudenberg & Tirole, 1991).

Nash Equilibrium is a state where no player will unilaterally change their strategy because such a change would not yield additional benefits. In the context of debt disputes, Nash Equilibrium is reached when both the creditor and debtor feel they will not get a better outcome by changing their negotiation approach. This game theory approach has the potential to increase negotiation efficiency because both parties are encouraged to find an optimal solution without continuously imposing their unilateral will. Through payoff matrix analysis, they can understand that mutual imposition will only prolong the conflict and cause greater losses.

Game theory has been applied in various fields, ranging from economics, politics, to law. In the legal realm, the application of game theory focuses on efforts to reduce aggressive behavior or delay negotiations that often harm both parties. By formulating disputes as "games" with a series of outcomes and certain probabilities, parties can be guided to assess the consequences of each action and reaction, and then seek strategies that lead to a win-win solution (Fisher & Ury, 2011). In mediation, for example, mediators can use a payoff matrix to show both parties that there is common ground that can be optimized. When discussions are based on data analysis rather than emotion, parties tend to be more willing to discuss rationally. Game theory also allows the process to be more transparent.

Smartsettle: Implementing AI and Game Theory in Dispute Resolution

The history of Online Dispute Resolution (ODR) can be traced back to the late 1990s, when internet access became widespread and initiatives emerged to upload legal documents to online sites. At that time, ODR was still limited to providing a legal database that could be searched through search engines. Users who needed information related to regulations or jurisprudence could enter certain keywords, and the system would display relevant documents. Although simple, this initiative became an important foundation for the birth of various digital legal platforms aimed at facilitating access to information.

In subsequent developments, AI technology began to be embedded in these legal sites. Instead of merely accepting keywords, AI systems could now "listen" to or read case descriptions submitted by users, then match them with appropriate regulations or court decisions. Thus, if a user described a specific dispute, AI could propose relevant rules or articles. This improvement made ODR more interactive, as users did not have to know the exact legal terms to find related documents. AI systems gradually became able to interpret the context of cases and suggest appropriate data.

During that phase, ODR still focused on providing information, while negotiation or mediation processes remained conventional. However, over time, the idea emerged to use AI to help parties negotiate without needing to attend face-to-face mediation. This is where the concept of case simulation was introduced, where AI not only presented relevant regulations but also performed calculations on various options or scenarios. By applying a game theory approach, the system could assess the strategies of each party and calculate specific possible outcomes. Utility functions were then included as satisfaction parameters, allowing AI to weigh the potential "wins" or total satisfaction for all disputing parties.

Smartsettle, developed by iCan Systems Inc. under the leadership of Dr. Ernest Thiessen, emerged as one of the pioneers of this simulation-based ODR. Initially, its development team sought to integrate AI ideas with game theory so that negotiation processes could be automated. This platform was designed to collect the preferences, interests, and limitations of each party, and then the AI system simulated various negotiation possibilities. The simulation results were optimized through algorithms that sought the most balanced meeting point for all parties. Thus, users not only obtained legal documents or relevant rules but could also see illustrations of the best strategies and various settlement options. This method proved to accelerate agreements, as the entire process was carried out online. Parties were no longer burdened by the cost and long time of direct negotiation. Various

scenarios were visually displayed, and each party could assess for themselves which option was most satisfactory to them. This approach represents a leap from the initial stages of ODR, which merely displayed legal databases, to an AI system capable of simulating negotiations using mathematical approaches. Now, Smartsettle is proof of how far ODR has developed, from merely a legal document search engine to a tool capable of facilitating negotiation processes until an optimal agreement is reached for all parties.

One of Smartsettle's superior features is its preference visualization capability. Disputing parties can express their evaluations of various aspects of the dispute for example, installment amounts, duration, late penalties, or other potential compensation. This information is then processed by an AI algorithm that applies optimization methods (multi-criteria optimization) to find the best agreement. The results of the optimization process are displayed in an easy-to-understand graph or table, so users realize why the solution is considered optimal. In addition, Smartsettle facilitates real-time negotiation, where each party can submit new offers or requests. The system will analyze the suitability of these requests with the opponent's preferences and then provide feedback in the form of a compatibility level. This process occurs iteratively until a final agreement is reached. This approach is claimed to save time and money because discussions are no longer based on prejudice and emotion, but on mathematical calculations and data.

Smartsettle has been tested and used in several countries, especially Canada and the United States, to resolve commercial disputes and insurance cases. Courts in certain jurisdictions have also begun to initiate cooperation with ODR platforms to encourage efficiency. The results show that negotiation processes can be completed much faster than conventional litigation. Costs are also much lower due to the minimal need to attend physical hearings or hire expensive legal resources. This success provides a strong foundation that game theory applied through AI can be a transparent, efficient, and relatively fair instrument for dispute resolution, provided that all parties are willing to access the platform and comply with its procedures.

Basic Concepts of Debt in Civil Law

Debt is an agreement where one party (creditor) provides a sum of money or goods to another party (debtor), and the debtor is obliged to return it according to the agreement. In Indonesia, the legal basis for debt is regulated in the Civil Code (KUHPerdata), specifically in Articles 1754 to 1769 (Subekti, 2003). According to Salim, it states that loan agreements must meet the elements of agreement, capacity of the parties, a certain matter, and a lawful cause (Salim, 2011).

The characteristic of debt is generally reciprocal: the creditor has the right to demand repayment, while the debtor has the obligation to pay. If the debtor defaults, the creditor has the right to pursue legal action, such as a civil lawsuit or execution efforts. The problem is that if the litigation process is carried out in court, it often takes a long time and incurs high costs. Many cases exist where the value of the debt is actually smaller than the costs that must be incurred during the trial. This is one of the triggers for the need for innovation in the form of ADR and ODR technology.

Resolving debt disputes through civil courts has long been the primary path in the legal system. However, many parties consider this path inefficient, both in terms of time and cost. To understand why, we need to examine more closely the stages that parties must go through when taking a case to civil court. The first step is to prepare documents and file a lawsuit. The plaintiff, usually the creditor, must prepare a written lawsuit detailing the legal position and facts of the case. Many documents are needed, ranging from loan agreements, proof of transfer, to correspondence between the creditor and debtor. The preparation of the lawsuit requires high accuracy, and often the plaintiff feels the need to hire the services of a professional advocate or legal team. This process can take weeks, depending on the complexity of the dispute and the availability of supporting documents.

After the lawsuit is registered with the court, the court will issue a summon for the defendant. This stage alone can take time, as the defendant's address must be confirmed correctly and the summons process can be protracted if the defendant is difficult to locate or refuses to accept the summons. If the summons is successful, the defendant then has the opportunity to prepare a response. This response

document replies to the plaintiff's lawsuit, includes other evidence, or raises exceptions if necessary. Again, the defendant may need an advocate to help prepare the response, thus increasing costs.

The trial only begins after the lawsuit and response are complete, and then several hearings with different agendas will be held. At the preliminary hearing, the court usually offers mediation. If mediation fails, the process continues to the evidentiary hearing, where both parties present evidence and witnesses (MacFarlane, 2021). Each piece of evidence can be debated, and if there are many witnesses, the trial schedule can be extended. Other agendas include rejoinder, duplik, and conclusions. Each hearing agenda requires separate time, often two to four weeks apart sometimes even longer, depending on the court's busy schedule.

If all stages of evidence, witnesses, and conclusions are completed, the panel of judges will make a decision. However, this decision is not always the end of the dispute. The losing party often uses their right to appeal to the high court, which takes months, and can even proceed to cassation at the Supreme Court. Thus, a seemingly simple debt case can take more than a year before there is legal certainty.

Throughout this process, costs continue to inflate. There are court administrative fees, advocate honorariums, document photocopying, deed creation, and even potential accommodation and transportation costs if the parties are in different regions. If the court location is far away, the disputing parties must incur travel expenses, plane or train tickets, and accommodation while attending hearings. It is not uncommon for the nominal value of the dispute to be smaller than the total costs spent on resolving the case. In small-value disputes, this situation makes litigation feel disproportionate to the outcome.

In addition, previously harmonious business relationships can be disrupted. The blame game in court often creates tension, and feelings of dissatisfaction may arise even if one party "wins" legally. Negative emotions, wasted time, and financial burdens make many creditors and debtors reluctant to repeat similar experiences, thus severing their business relationships.

From the description above, it is understandable why many people consider the civil court process too complicated and lengthy. It is also not surprising that some parties seek faster and cheaper alternatives. This is where innovative approaches based on AI and game theory such as those offered by Smartsettle become relevant. Through an online platform, creditors and debtors can negotiate under the guidance of intelligent algorithms. If a common ground is found, the dispute is resolved without having to spend protracted time in court. The agreement can also be formally recorded, depending on the regulations in the relevant jurisdiction. This method is expected to reduce costs, accelerate resolution, and maintain healthy business relationships.

Non-Adjudicative Dispute Resolution (ADR) in Indonesian Civil Law

Alternative dispute resolution (ADR) in Indonesia includes mediation, negotiation, conciliation, and arbitration. Mediation requires the presence of a neutral third party (mediator) who helps the parties reach an agreement (Lim, 1998). Negotiation is conducted directly by the parties without involving a third party, while conciliation involves a third party who is more active in providing settlement proposals. Arbitration, on the other hand, involves an arbitrator or arbitral tribunal that renders a binding decision (Ginting, 2015). This group of ADR is considered more flexible because the parties have greater control over the process and outcome. The process is relatively shorter and costs can be reduced (Mackie K, Miles D, Marsh W, 2000). However, each method has its advantages and disadvantages. Often, mediation and negotiation face obstacles due to subjectivity, causing one party to be rigid or unwilling to compromise.

One of the main advantages of ADR is its ability to maintain good relationships between the disputing parties. Unlike court processes that tend to be confrontational, ADR emphasizes deliberation, respect for common interests, and finding balanced solutions. In addition, ADR can be resolved with less time and cost (Katherine, 2000). However, due to its voluntary nature, ADR also has disadvantages: if one party refuses to participate or is dishonest in stating facts, the process can drag on without conclusion.

Technological advancements, especially AI, open up opportunities to optimize ADR through Online Dispute Resolution (ODR). Systems like Smartsettle introduce a systematic, data-driven approach that is less influenced by human emotions. Negotiation processes can also be conducted anytime and anywhere, as long as the parties have internet access. In the context of debt disputes, this can save energy, time, and costs previously spent on travel, physical meetings, or court hearings. Furthermore, the application of AI in ODR also helps maintain objectivity. Through big data analysis, the system can anticipate various scenarios, facilitate measured offers, and prioritize the interests of both parties. If integrated with the Indonesian legal framework, AI solutions like Smartsettle could become an innovative solution for recurring debt disputes that demand efficiency.

From the discussion above, it is evident that artificial intelligence (AI) and game theory have a strong theoretical foundation to assist in dispute resolution, especially in the realm of debt disputes. AI, capable of performing simulations and adaptive learning, offers a new way to map parties' preferences in depth. Meanwhile, game theory, with its concepts of payoff matrix, Nash Equilibrium, and strategy analysis, guides the negotiation process toward a more rational win-win solution. The combination of both, as offered by Smartsettle, presents a data-driven and optimization algorithm-based approach to bypass traditional dispute channels that are often slow and expensive.

Indonesian civil law has opened the door for non-adjudicative mechanisms through Law No. 30 of 1999 concerning Arbitration and Alternative Dispute Resolution. Nevertheless, the practical implementation of ODR and the utilization of AI still require adjustments in terms of regulation, technological infrastructure, and socialization to the public and legal practitioners. With the increasing digitalization in various sectors, the opportunity to integrate AI platforms in dispute resolution is growing. Even in the field of debt disputes, which often cause prolonged conflicts, the use of AI and game theory is believed to be able to reduce potential financial and emotional losses, while accelerating the negotiation process. Ultimately, this theoretical basis implies that the utilization of smart technology to assist ADR processes is not just a fleeting trend, but a natural development of the need for effective dispute resolution mechanisms (Choy, Hee, 2022). If supported by clear regulations and broad acceptance among the public, AI and game theory can transform into reliable tools for resolving debt disputes in Indonesia quickly, efficiently, and fairly.

CONCLUSION

AI and Game Theory in Dispute Resolution

The theoretical foundation outlined in the previous chapter shows that artificial intelligence (AI) has great potential to facilitate dispute resolution. AI capable of performing machine learning and neural networks can learn patterns, interpret data, and even predict possible outcomes. In the context of legal disputes, AI can process various variables such as the preferences of the disputing parties, the context of the agreement, and the legal framework to provide solution recommendations. The key element is the application of game theory, which is a mathematical modeling that studies the strategic behavior of "players" each with their own interests. With the payoff matrix and the concept of Nash Equilibrium, AI can present data-driven negotiation results that are more rational, rather than just relying on subjective human perceptions. If not accompanied by game theory, AI will only function as an information processing machine that is inadequate in modeling interactive strategies. In short, without game theory, AI might produce suggestions that do not consider the "give-and-take" of both parties' strategies, thus less reflecting the actual negotiation scenario.

AI Development as More Cases are Simulated

The success of AI in optimizing dispute resolution rests on its adaptive learning process. The more often AI is "fed" with case data and performs simulations, the smarter it becomes in predicting the consequences of each step. Thus, AI can provide more accurate and relevant alternative solutionswhile continuously updating successful negotiation outcome patterns. The principle of reinforcement learning ensures that AI constantly learns from the feedback it receives. If the proposed solution turns out to be off target or not agreed upon by the parties, the system will adjust its algorithm so that the next results are closer to the optimal agreement point.

International Case Studies and Comparison with Indonesia

The case study chapter demonstrates the success of platforms like Smartsettle in developed countries. In Canada, for example, a commercial dispute can be resolved in weeks at a much lower cost, while in Indonesia, litigation and conventional methods often take months or even years. This reflects a gap between the "ideal" of technology and the "reality" of infrastructure and legal culture in Indonesia. Nevertheless, this does not mean that AI practice in Indonesia has no opportunities. Some legal platforms, like Hukumonline, are starting to utilize AI although currently still in the stage of legal data search and legal research. If further facilitated with game theory, AI could develop into a more comprehensive ODR (Online Dispute Resolution) platform, mirroring Smartsettle. Its application would not only be for debt disputes but also various other disputes in the civil realm.

Advantages of the Smartsettle Method

The Smartsettle method offers various advantages:

a. Time and Cost Efficiency: Disputes that usually drag on become shorter because negotiations are facilitated online, reducing physical hearings or meetings.

b. Win-Win Solution Approach: Game theory encourages both parties to optimize their interests, thus ensuring a greater sense of fairness.

c. Reduction of Emotional Conflict: Data-driven mathematical calculations minimize "hard" negotiations, reducing the potential for long-term damaging disputes.

d. Transparency and Accountability: All negotiation processes are digitally recorded, making them easy to audit and evaluate.

e. Scalability and Development: The AI system can be expanded to other types of disputes, not limited to debt or ordinary civil cases.

These advantages make Smartsettle appear fairer and more effective. When game theory and AI synergize, decisions are not just about "who speaks louder," but prioritize objective calculations.

Towards a More Responsive Legal System

From the overall discussion, it is clear that integrating AI technology, especially when underpinned by a game theory approach, has the potential to bring about a revolution in civil dispute resolution particularly in the area of debt. Traditional methods, which tend to be lengthy, expensive, and sometimes lead to dissatisfaction, can be replaced by an efficient, transparent, and relatively fair digital negotiation mechanism. International case studies, such as the implementation of Smartsettle in Canada, serve as concrete evidence that this technology is not a utopia but a reality that can be adapted.

Undeniably, the path towards full implementation of AI ODR is still long and challenging. Government, legal institutions, and practitioners need to work hand in hand to formulate specific regulations, increase digital literacy, prepare infrastructure, and build a legal culture that is open to technology. The presence of e-court in Indonesia is actually a big leap, but it still needs an "AI touch" to be able to compete and keep up with the times.

In the future, the potential for AI utilization in the legal world is not limited to debt disputes. Many other cases require data-driven negotiation and a rational approach from family cases, labor, to cross-border business disputes. If we can prepare a reliable digital legal ecosystem, it is not impossible that Indonesia will become a pioneer of an adaptive, fast, and efficient legal system in Southeast Asia. This will also gradually increase investor and public trust in our legal system. Ultimately, legal modernization is no longer an option, but a necessity to compete in the global era. Hopefully, what has been presented regarding Smartsettle, artificial intelligence, and game theory can encourage further discussion and lead to real changes in the field. It is time for us to move away from lengthy and expensive legal procedures and shift towards a system based on smart technology, while upholding the principles of justice and legal certainty.

Conflict of Interest

All the authors declare that there are no conflicts of interest.

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