SCIENTIFIC CULTURE
www.sci-cult.com

SCIENTIFIC CULTURE, Vol. 12, No. 4, (2026), pp. 3222-3233
Open Access. Online & Print

DOI: 10.5281/zenodo.12426385

THE ROLE OF ARTIFICIAL INTELLIGENCE ARBITRATION IN ENHANCING VIRTUAL ECONOMICS AND FINANCE: JUSTIFICATIONS CONDUCT LEADING TO PATENT

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Received: **16/12/2025**
Accepted: **21/02/2026**

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ABSTRACT

Conducting artificial intelligence arbitration in virtual market depends on the knowledge and the skills of artificial intelligence arbitrators, the skills and knowledge of arbitrators depend on the supply chain management in the virtual market. Artificial intelligence arbitration system works by sending to each disputant in virtual market an identical list, with several suggested solutions on it. Each party of the dispute returns the list, deleting any solution to which they object and grading the remainders in order of preference. The Artificial Intelligence system then chooses the solution from the list, in accordance with the order of preference indicated by the parties themselves as the outcome of artificial intelligence arbitration. AI arbitration can be trained in a way that it can be conducted in a highly qualified and skilled manner. It provides rapid and cost-effective support to digital economies and financial systems, especially during crises when travel and hotel reservations are abruptly canceled or rescheduled and disputes arise — as seen in the current Gulf region disruptions linked to the tensions between Iran and the United States. Based on the literature review, this paper provides an overview of the definitions, and impacts of AI on arbitration awards covering the main challenges and possible recommendations for successful implementation of AI arbitration. This research contributes to knowledge through expanding the understanding of AI arbitration challenges, and by focusing on a new interpretation of the AI arbitration function. On the other hand, as this research concentrates on AI arbitration as a disruptive challenge to resolve disputes, it includes a review of the criteria for properly applying AI arbitration, which is considered its main contribution to new practices regarding AI arbitration.

KEYWORDS: artificial intelligence, arbitration, virtual market, economics, finance, patent.

1.INTRODUCTION

Artificial Intelligence (hereafter referred to as AI) arbitration is increasingly emerging as a viable dispute resolution mechanism across various sectors of human activity, including transactions conducted within the virtual market. The fundamental mission of arbitration is to reinforce party autonomy by enabling disputants to resolve their disagreements through mutual consent. An arbitrator is not primarily tasked with delivering justice or fairness in the abstract; rather, arbitration functions as a consensual framework through which the parties' interests are identified, aligned, and ultimately reconciled. Accordingly, the arbitrator's essential role is to facilitate agreement rather than impose an outcome.

In this respect, arbitration differs substantially from adjudication and mediation. In adjudication, judges are required to assess evidence, apply legal norms, and independently determine rights and obligations. Similarly, mediators often guide parties toward equitable outcomes based on fairness considerations. By contrast, the arbitrator's function in arbitration is not to substitute the parties' will with their own judgment, but to assist disputants in reaching a self-determined resolution. This facilitative role renders arbitration particularly compatible with AI technology, which can be designed to identify, prioritize, and reconcile the parties' interests without subjective bias.

The relevance of AI arbitration becomes especially pronounced during periods of crisis in the virtual market, where disruptions such as sudden cancellations or rescheduling of airline and hotel reservations generate a surge of digital and cross-border disputes. In such circumstances, traditional dispute resolution mechanisms may lack the speed, scalability, and cost-efficiency required to address conflicts arising from virtual economic activities. AI arbitration offers a technologically responsive alternative capable of managing high volumes of disputes efficiently while preserving party autonomy.

Through advanced programming and machine-learning techniques, AI systems can be trained to allow parties to confidentially list their interests according to preference, after which the system identifies compatible outcomes based on learned patterns from large datasets. This approach enables rapid consensus-building and supports continuity in virtual economics and finance at times when market stability is most vulnerable.

The foregoing illustrates the strategic importance of AI arbitration in strengthening virtual economics and finance and serving the operational needs of digital markets, where AI arbitration may function as a procedural safeguard. Consequently, competition may arise among states to attract disputants by establishing efficient and reliable AI arbitration frameworks. In this context, states are encouraged to develop clear regulatory standards, remove legal and technical barriers, and promote accessibility to AI arbitration systems. Notably, the legislator in United Arab Emirates has taken steps in this direction by regulating virtual economics and finance under Federal Commercial Transactions Law No. (50) of 2022.

1.1.The Problem Stated and Questions of the study

The most fundamentally human function of an arbitrator is to provide appropriate and balanced evaluations of disputes arising within virtual economics and finance. Owing to the social and cognitive characteristics of the arbitrator as a human decision-maker, arbitration is traditionally regarded as a creative and flexible process, grounded in confidentiality, direct participation, and party autonomy. This raises a critical question: how can an AI arbitrator replicate the communicative, evaluative, and facilitative roles performed by a human arbitrator, particularly in assisting disputants to reach amicable settlements in matters relating to virtual economics and finance?

The challenge becomes even more complex during periods of crisis, when virtual economic activities are suddenly disrupted — such as the abrupt cancellation or rescheduling of airline and hotel reservations due to geopolitical tensions — resulting in a surge of cross-border digital disputes requiring rapid and cost-efficient resolution mechanisms. In such circumstances, reliance solely on traditional human arbitration may prove insufficient to address the volume, speed, and technological complexity of disputes emerging within fully digital markets.

Accordingly, some may argue that it is inconceivable for an AI arbitrator to effectively perform the inherently human functions of communication, discretion, and contextual judgment in arbitration proceedings. Thus, the central problem of this article is how to overcome this theoretical and practical challenge. More specifically, how can a virtual economics and finance AI arbitration platform be constructed in a manner that enables parties to reach binding and enforceable agreements while preserving the core principles of arbitration?

Furthermore, this article examines the policy

justifications for adopting AI in virtual economics and finance dispute resolution. In other words, under what legal and regulatory framework should courts recognize and enforce the outcomes of AI-based arbitration within the sphere of virtual economics and finance?

1.2. Importance of the Study and its Objectives

The primary mission of arbitration is to reinforce the parties' agreement to resolve their disputes within the framework of virtual economics and finance. The significance of this article lies in examining the potential replacement of human arbitrators with technology-based arbitrators and exploring how the traditional role of arbitration can be effectively fulfilled through Artificial Intelligence (AI). In this context, AI-driven arbitration offers rapid and cost-efficient solutions, particularly during times of crisis when virtual transactions are disrupted — such as sudden cancellations or rescheduling of airline and hotel reservations, which often generate cross-border disputes, as witnessed during periods of geopolitical tension in the Gulf region.

The objective of this article is to demonstrate the smart capacity of technology to safeguard the parties' interests and facilitate dispute resolution in matters related to virtual economics and finance. Virtual economics and finance should be treated as an integrated system encompassing all its components, including virtual contracts, virtual processes, and virtual arbitration. It is no longer conceivable to sustain a fully digital market infrastructure while relying exclusively on traditional arbitration mechanisms.

This study ultimately proposes the registration of a patent for an AI-based arbitration application designed to enhance the efficiency and structural coherence of virtual economic and financial systems.

A qualitative methodology has been adopted in this research. The study identifies and analyzes the defining characteristics of AI-based arbitration and provides an analytical discussion on how such arbitration can be structured into an innovative technological application capable of strengthening virtual economics and finance, particularly from the perspective of patentability and intellectual property protection.

1.4 Structure of the Paper

This paper covers two main parts, the first part deals with the theoretical basis of virtual economics and finance AI arbitration, and the second part deals with the conduct of virtual economics and finance AI arbitration.

2. THEORETICAL BASIS OF AI ARBITRATION

This part is dealing with theoretical basis of AI arbitration. In fact, it deals with the concept of AI arbitration and its justifications.

2.1. Concept of AI Arbitration

AI arbitration is mainly depending on the intervention of arbitrator as a system. AI arbitrator, based on patterns learned from large datasets, should have the skills and qualifications required to reach the agreement between the parties to resolve the disputes arising from virtual market. AI arbitrator must use his expertise and knowledge, capability to convince the disputants to reach an agreement. AI Arbitrator has to use his AI sense to facilitate communication between the disputants in dispute helping them to make an agreement as a resolution to their dispute.[1]

As such, arbitrator as an AI system carries out a number of different AI functions during the process including promoting constructive communication, empowering the parties, and ensuring a minimum level of process and outcome fairness. AI Arbitration is an optional alternative dispute resolution including a process of negotiation between disputants conducted by AI system in order to reach a satisfactory settlement for them. AI arbitrator focuses on the interests of the parties and enables them to reach a solution to the dispute between them. It is important means of resolving disputes to reduce time, effort and expenses, and to contribute to creating an attractive and competitive investment environment.[2]

AI arbitration is distinguished from traditional arbitration in that it is a virtual arbitration that has no tangible physical existence. Generative AI as method of resolving disputes through jurisprudential rooting

[1] Stuart J. Russell and Peter Norvig. Artificial intelligence: a modern approach. Prentice Hall, Upper Saddle River, N.J, 3rd edition, 2010. ISBN 9780132071482. URL http://www.worldcat.org/oclc/688385283.Ryszard S Michalski, Jaime G Carbonell, and Tom M Mitchell. Machine learning: An artificial intelligence approach. Springer Science & Business Media, 2013. ISBN 978-3662124079. URL http://www.worldcat.org/oclc/ 864590508.Sidney Perkowitz. Digital people: From bionic humans to androids. Joseph Henry Press, 2004. ISBN 978-0309096195. URL http://www.worldcat.org/ oclc/936950712.

[2] Tutorial points,Artificial Intelligence -intellegent system, https://www.dcpehvpm.org/E-Content/BCA/BCA-III/artificial_intelligence_tutorial.pdf. Lawrence Lessing(1999:)Code and others laws of cyberspace.(new York,basic book). available at http://codev2.cc/download+remix/Lessig-Codev2.pdf.

and legal and technological organization, and such arbitration has no rules to follow. The arbitration process in generative AI is done by the input that is converted into a signal, passed through a network of artificial neurons, producing an output that is interpreted as a response to the input. By adding more neurons and layers, artificial neural networks can handle more complex problems. Deep learning simply refers to artificial neural networks with multiple layers.[3]

Such generative AI arbitration is using AI technology instead of the traditional process as a means of communication between the parties, the arbitrator, and any other actors concerned are linked using cryptography.[4] Generative AI arbitration is a machine-learning-based technology that can create novel legal content based on legal patterns learned from large legal datasets.[5]Accordingly, generative AI arbitration is the simulation of human intelligence by software-coded heuristics, The ideal characteristic of AI arbitration is its ability to rationalize and take actions that have the best chance of resolving the disputes in virtual market.[6]

In general, AI arbitration system work by ingesting large amounts of labeled training data and skills analyzing the data for correlations and patterns and using these patterns to make predictions about the solution that best serves the interest of disputants in virtual market.[7] In this way, Generative AI arbitration enable parties (e.g. disputants, arbitrators, banks, regulators and/or auditors) to come to a consensus over a shared set of facts.

2.2. Justification of Virtual Economics and Finance AI Arbitration

AI arbitration in virtual economic and finance can be justified for many reasons. In fact, AI arbitration provides protection for consumers, and AI arbitration makes virtual market more attractive and competitive.

2.2.1. AI Arbitration Provides Protection for Consumers in virtual market

AI arbitration offers a transformative approach to protecting consumers in virtual markets, particularly in resolving small claims where traditional dispute resolution mechanisms are often inaccessible or inefficient. In the context of virtual transactions, legislators are tasked with ensuring that consumers can safeguard their interests and assert their rights in a timely and practical manner. However, many consumers, particularly those engaging in cross-border or time-sensitive transactions, face structural barriers: they lack sufficient time, resources, or access to local legal remedies to pursue claims effectively. For instance, in the virtual airline and hotel markets, customers often cannot afford the delay or complexity involved in disputing cancellations, rescheduling, or other conflicts with service providers. Tourists, who typically stay only briefly and may be unfamiliar with local legal frameworks, are especially vulnerable, frequently foregoing their rights or attempting to resolve disputes informally with service providers.

In such scenarios, AI arbitration can serve as a critical instrument for leveling the playing field. By providing an automated, intelligent platform, AI arbitration enables consumers to assert their claims efficiently, even under the constraints of time and distance that characterize virtual markets. Generative AI systems can be programmed to balance the interests of both customers and service providers, identifying compatible outcomes and facilitating agreements that might otherwise be unattainable. This becomes particularly crucial during crises that disrupt virtual services — for example, sudden flight cancellations or hotel rescheduling triggered by geopolitical tensions in the Gulf region — when rapid, cost-effective, and reliable resolution mechanisms are essential to maintain market stability and consumer trust.

Beyond individual dispute resolution, AI

[3] Philip Boucher, Artificial intelligence: How does it work, why does it matter, and what can we do about it? https://www.europarl.europa.eu/RegData/etudes/STUD/2020/641547/EPRS_STU(2020)641547_EN.pdf

[4] AI cryptography is (a multidisciplinary field that combines cryptography, computer science, and machine learning principles. It uses AI algorithms to improve the security and efficiency of cryptographic systems) see: AI Cryptography: Enhancing Security and Privacy in the Digital Age, https://medium.com/@singularitynetambassadors/ai-cryptography-enhancing-security-and-privacy-in-the-digital-age-db5c1bbf5fdb.Daradkeh,lafi, 'Blockchain Investment Award under New York Convention of 1958: The Need for New Interpretation to Motivate Blockchain Investments. Kilaw Journal - Volume 8 - Special Supplement – Issue 8 - Rabi Al Akhar - Jumada Al Awal 1442 AH/Dec. 2020. P71.

[5]-For the meaning of AI see: R Bommasani and others, 'On the Opportunities and Risks of Foundation Models' (2021) arXiv preprint arXiv:2108.07258, 2021.

[6] https://www.investopedia.com/terms/a/artificial-intelligence-ai.asp

[7] https://www.techtarget.com/searchenterpriseai/definition/AI-Artificial-Intelligence

arbitration also generates systemic benefits for virtual market ecosystems. Service providers can enhance their competitiveness by adopting AI arbitration as a standard feature of their virtual offerings, signaling reliability and commitment to customer protection. For consumers, the availability of AI arbitration fosters confidence that their rights will be recognized and enforceable outcomes achieved, even in complex or urgent circumstances. By bridging gaps in accessibility, efficiency, and responsiveness, AI arbitration not only safeguards consumer rights but also reinforces the integrity and resilience of virtual markets, ensuring that both parties can navigate disputes effectively without compromising economic or temporal priorities.

2.2.2. AI Arbitration Makes Virtual market more attractive and Competitive

AI arbitration can be introduced as an essential factor in virtual industrial and economic developments. It can make virtual transactions more attractive and competitive than their tradition counterparts. It takes place between trading and investment entities, such as private individuals, multinational corporations and governments. Virtual transactions by means of the internet and the globalisation of electronic communications needs a method of resolving dispute from the same nature such as AI arbitration. Virtual market involves the exchange of small amounts between consumers and suppliers of goods and services. The international electronic transactions are increasing as a result of the availability of internet access 24 hours a day for any person anywhere in the world. Anyone can enter any supplier's website and order goods and services to be delivered to his address, wherever that may be.8 Therefore, one can imagine how AI arbitration will be important for virtual marking. It therefore can be used as a means to solve disputes of virtual marking in a flexible, peaceful, and speedy manner. This means that these transactions may be resumed between the disputants.

Given the importance of AI arbitration in the virtual market, efforts should be exerted to promote the use of AI arbitration and to keep improving the legal and institutional support for AI arbitration. States may invest significant effort in improving their arbitration rules, especially by adopting the AI arbitration, for no reason other than to be more competitive and attractive.

3. THE CONDUCT OF VIRTUAL ECONOMICS AND FINANCES AI ARBITRATION

It is important to demonstrate the practical application of AI arbitration to resolve the disputes of virtual market on one hand, and on the other hand it is also important to study the legal and technological guarantees of AI arbitration application in virtual market. Finally, it is important to protect AI arbitration application by registering patent in this regard.

3.1 Applications of Virtual Economics and Finances AI Arbitration

As mentioned above, AI arbitration is a simple ingenious way of passing information from one party to another in a fully automated and safe manner in virtual market.AI arbitration is about getting a computer, robot, or other technology to "think" and process data in the same way as a human arbitrator. Therefore, AI arbitration must examine how the human brain "thinks," learns, and makes decisions when trying to solve a problem or perform a task. The goal of AI arbitration is to improve technology by adding features related to the human thinking, learning, and problem-solving processes. 9

Constructing AI arbitration in virtual market requires joint efforts from a team composed of legal professional, computer science professional, and representative from the industry of virtual market. The team meets and each member suggests the chain that represents his interest and then the AI specialist then designs the AI arbitration according to the suggestions made by the professionals.

For instance, in the virtual hotel or airline booking industries, companies can proactively identify and categorize the recurring types of disputes with their clients. Once these categories are established, the companies can design multiple alternative solutions for each type of conflict. A dedicated platform—such as the website through which bookings are concluded—can serve as the primary interface for implementing an AI arbitration system. At the conclusion of the booking process, parties can be offered the option to include AI arbitration as part of the contract.

The AI system can be structured using a list-based

[8] RP Alford 'The Virtual World and the Arbitration World' (2001) 18(4) *Journal of International Arbitration* 449, 449-461.. The author refers to the top ten websites which are: eBay.com, or amazon.com, travelocit.com, expedia.com, dell.com, cdnow.com, etoys.com, buy.com. barnesandnoble.com, and jcpenny.com.

[9] Fundamental of artificial intelligence, https://news.microsoft.com/wp-content/uploads/prod/sites/93/2020/04/Student-Guide-Module-1-Fundamentals-of-AI.pdf

approach, where each party—whether the hotel or airline company, or the client—drafts a prioritized list of potential solutions they consider acceptable. By arranging the solutions according to their own preferences, each party provides a clear indication of their interests and expectations. The AI system then automatically cross-references the lists, identifying overlapping solutions with matching priorities to facilitate agreement. This approach minimizes the likelihood of disagreement and expedites resolution by focusing on mutually acceptable outcomes.

A practical case study illustrates the value of such a system during crisis situations, such as sudden flight cancellations or hotel rescheduling caused by geopolitical tensions in the Gulf region. In these scenarios, clients often lack the time or resources to pursue traditional remedies, and service providers face high volumes of urgent claims. By applying the AI arbitration system, both parties can quickly identify matching solutions without prolonged negotiation, ensuring that clients' immediate needs are met while the companies maintain operational continuity. This demonstrates not only the technical feasibility of AI arbitration but also its practical utility in maintaining trust, efficiency, and stability in virtual markets under stress.

In virtual market, AI can be constructed to conduct arbitration in different ways, the AI system sends to each party involved in the disputes an identical list, with several suggested solutions on it. Each party returns the list, removing any solution to which he objects and grading the remainders in order of preference. The AI system then chooses the solution from the list, in accordance with order of preference indicated by the parties themselves as the outcome of AI arbitration.

3.2. Legal and Technological Guarantees of Virtual Economics and Finance AI Arbitration

In this section, we present the legal and technological tools for the safe use of AI arbitration in the virtual market, these tools provide the necessary protection in the form of legal and technological guarantees. We first address the legal guarantees, then we study the technological guarantees.

3.2.1. Legal guarantees of Virtual Economics and Finance AI Arbitration

The existence of legal regulation of legal guarantees differs according to the type of law; some laws explicitly regulate arbitration to regulate arbitration and which can be used as a legal guarantees to practicing AI arbitration. An analysis of legal guarantees in AI arbitration, such as those in the UAE and other jurisdictions, we note that there are two types of legal guarantees, which are formal and objective legal guarantees. They are represented in defining the entities that undertake the task of dealing with the arbitration, as the UAE Federal Law No. (6) of 2021 stipulates that arbitration can take the form of judicial or non-judicial arbitration, and the system requires that these arbitrations obtain the necessary license, which requires that these arbitrations fulfill many of conditions provided by the said law. In addition, the work of such arbitration is subject to the oversight and supervision of the competent court to ensure that these arbitrations carry out their work in accordance with the provisions of the law.

3.2.2. Technological Guarantees

The technological guarantees of the AI arbitration, in virtual market, can be defined as controls that simulate the traditional legal controls that control the behavior of individuals in society according to objective, formal, peremptory or complementary abstract rules. It is represented by activating a set of objective and formal technical and technical rules prepared in advance by building the AI in order to control electronic behavior or content via the network regarding everything related to AI arbitration in terms of applications and behaviors related to the process of its conduct.10

The technological guarantees of the AI arbitration are subject to technical and technical methods characterized by special specifications that distinguish it from the rest of the means of technological control of any other AI content. They are characterized by the fact that they are means of control that are not directed by the human, but rather according to pre-established technical and artistic rules. It is also characterized by the presence of various technical and technical control methods integrated into the AI system; users of the AI arbitration adhere to when they contact it through any of the modern technological means. Automatically, technical and technical control, thus controlling any electronic behavior or behavior

[10] Lawrence Lessing(1999:)Code and others laws of cyberspace.(new York,basic book). available at http://codev2.cc/download+remix/Lessig-Codev2.pdf. Joel R.Reidenberg,(1997):lex informatica:the formulation of information policy rules through technology,76 texas law review,No3.PP554-584,available at https://ir.lawnet.fordham.edu/faculty_scholarship/42/

regarding the AI arbitration in virtual market.[11]

Research in technological guarantees requires an understanding of the technological design of the generative AI system and its ability to self-absorb all formal and objective technical rules, which in turn control any electronic behavior regarding the generative AI arbitration by converting it into technical and technical controls that are already integrated into the design of the AI, which works automatically to control the behavior of generative AI arbitration users. The self-control of the AI arbitration is achieved through its technological construction, which allows a process of merging between different types of technical and technological technologies simultaneously to carry out various technical functions and so that evolve in modern formulas commensurate with technological development.12

The success of the technological guarantees of the generative AI arbitration, in virtual market, depends on the infrastructure of the AI, which is represented by hardware and network equipment, programs and applications (Software), so that it allows controlling all electronic behavior regarding the generative AI arbitration automatically without interference from the users of the AI arbitration through technical and technical controls integrated into the network.[13]

3.3. Registering patent for Blockchain Arbitration's applications Regarding Virtual Economics and Finances

This section deals briefly with the meaning of virtual market blockchain arbitration patent, its conditions, its registration, and its protection.

3.3.1 Meaning of Patent For Generative AI Arbitration in Virtual Economics and Finance

A patent is an instrument issued by the state to an inventor of virtual economics generative AI arbitration in a specified period of time in exchange for allowing the public access to the invention. In general, the right of patent granted to the owner of the generative AI arbitration invention to prevent others from manufacturing, using, selling or displaying that invention without obtaining the consent of the patent owner. It is a government license that is given to a person so that he is granted exclusive rights to a new invention.[14] As for the invention itself, the UAE legislator defined it as the idea reached by any inventor that practically provides a new technical solution to a specific problem in the field of technology.[15]

3.3.2. Conditions of Patent For generative AI Arbitration in Virtual Economics and Finance

According to Article 4 of the UAE Federal Law on the Organization and Protection of Industrial Property for Patents and Industrial Designs, a patent is granted for any new invention resulting from an innovative idea or an innovative improvement protected by a patent in all technical fields, each of which is based on scientific foundations and is amenable to industrial exploitation, whether It relates to new industrial products, innovative industrial methods, or a new application of known industrial methods or means.

Accordingly, a patent for generative AI arbitration in the virtual market must be capable of the possibility of industrial application, and that it is new and represents a creative step, whether the invention is related to new industrial products, or new industrial methods, or a new application of known industrial methods.

3.3.3. Registration of Patent For generative AI Arbitration in Virtual Economics and Finance

The formal conditions that must be met to register a patent in the UAE indicates the formal procedures that must be followed in order for the patent application to be accepted, and then to determine who are the persons who are entitled to apply for a patent within the country, and finally deciding on a patent application. [16]

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[11]Georgios Zekos (1999),internet or electronic technology:a threat to state sovereignty, the journal of information,law and technology 3.available at https://warwick.ac.uk/fac/soc/law/elj/jilt/1999_3/zekos/. Henry H. Perritt Jr.(1998) The Internet as a Threat to Sovereignty? Thoughts on the Internet's Role in Strengthening National and Global Governance, 5 Ind. J. Global Legal Stud. 423. Available at https://scholarship.kentlaw.iit.edu/fac_schol/498/ .

[1212] Tambini,D and others(2007),codifying cyberspace:communications self-regulation in the age of internet convergence, (London, Routledge).

[13] Lawrence Lessing,(1999)code and others laws of cyberspace.(new York,basic book).Reidenberg(1997):lex informatica:the formulation of information policy rules through technology,76 texas law review,No3.PP554-584.

[14] The UAE legislator organized the patent provisions in Federal Law No. (17) of 2002 regarding the organization and protection of industrial property for patents and industrial designs and models, as amended by Law No. (31) of 2006 AD, the legislator dealt with it in Articles (4-38) explaining the substantive and formal conditions required for patent registration, the rights of the inventor and the exceptions to those rights, as well as the legal protection of the patent.

[15] Article 1 of Law No. (31) of 2006 regarding amending the law Federal Law No. (17) of 2002.

[16] Article (6) of the Executive Regulations of the UAE Patent Law, the applicant for a patent must attach to his application many

Accordingly, The registration process of virtual market generative AI arbitration Patent is governed by the applicable law in the country where the patent is registered. Registering a patent is all the procedures related to patent applications submitted to the competent authority, starting from the stage in which inventor is instructed on how to submit a patent application and ending with the issuance of the final patent certificate. These procedures include a set of technical and formal processes related to the examination of the application to ensure that it meets all the conditions stipulated in the applicable law. It also includes a set of processes related to patent applications, which are implemented to meet the needs of the third party of the public, such as publication in the Official Gazette or procedures for reviewing the register.

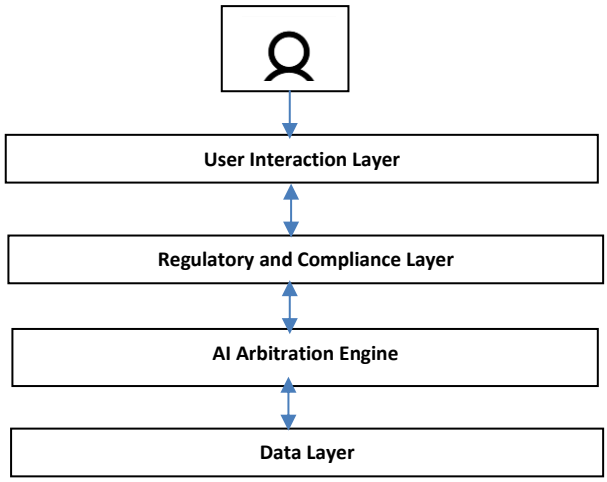
3.3.4. Protection of Patent For generative AI Arbitration in Virtual Economics and Finance

virtual market generative AI arbitration patent that meets the conditions necessary to grant a valid patent under which it can uphold the protection granted by law to the invention. Applicable law provides different kind of protection to include civil,[17] criminal,[18] and administrative protections. The protection determined by law includes the right to monopolize alone the use of the invention and exploit it economically, and thus enable him to reap profits from this exploitation in exchange for what he provided from revealing the secret of the invention to society.

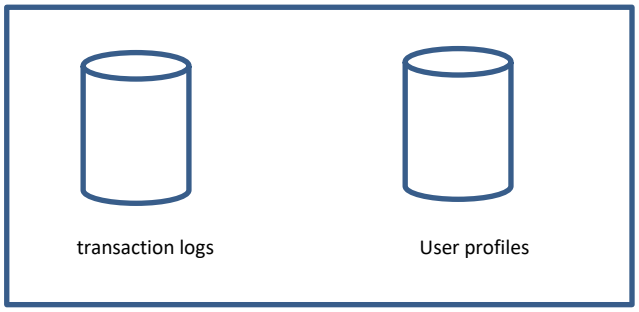
4. DESIGN OF AI-ARBITRATION BASED APPROACH IN VIRTUAL ECONOMICS AND FINANCE

Generative AI (GenAI) can optimize transactions by reducing costs and latency through real-time decision-making. It enhances fraud detection by identifying patterns and predicting risks using advanced models. For cross-border transactions, GenAI ensures dynamic regulatory compliance by interpreting evolving regulations and generating reports. Additionally, it enables predictive analytics to simulate economic trends and forecast market behavior in virtual spaces.

We have adopted a layered approach to develop the model of AI-mediated system in virtual economics and finance. The architecture is based on four interconnected layers, each playing a crucial role in achieving the system's objectives.



4.1 The **Data Layer** stores transaction logs, user profiles, and economic simulation data, leveraging blockchain for transparency and immutability while enabling real-time synchronization for GenAI models.

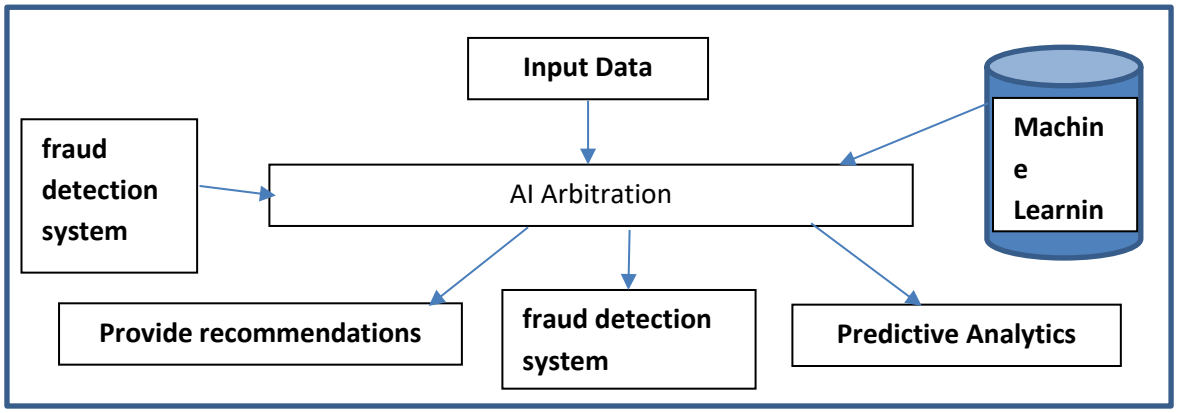


4.2 The **AI Arbitration Engine (Core Layer)** includes generative models to suggest optimal trading strategies, simulate economic scenarios, and predict market trends; a fraud detection system for real-time anomaly identification using AI (e.g., GANs); and smart contract arbitration to dynamically adjust terms for fairness and compliance.

documents that enable the invention entity to examine it to determine the extent of its entitlement to legal protection.

[17] If a person infringes on a patented innovation; According to the general rules of civil liability, the owner of the patent or the one to whom its ownership has devolved has the right to claim responsibility from him to compensate him for the damage he sustained. Due to unlawful patent infringement.

[18] According to Article (62) of the UAE Law for the Organization and Protection of Industrial Property Rights, whoever imitates an invention or a method of manufacture, or infringes any of the owner's rights, shall be punished by imprisonment and a fine of not less than five thousand dirhams and not more than one hundred thousand dirhams, or one of these two penalties. The patent is protected by law, without prejudice to any harsher penalty stipulated in another law, and the same penalty may be imposed on the owner of the patent who proves against him that he submitted documents or provided incorrect or false information to obtain a patent, in addition to the possibility of ruling to confiscate the seized objects. or destroy it and remove the effects of the act that violates the law.



4.3 The regulatory and compliance layer offers an AI-powered compliance assistant for cross-border transactions and guarantees adherence to global regulations.

In order to guarantee adherence to global standards and laws, the regulatory and compliance layer is essential. The primary elements of this layer are as follows:

- Regulation analysis engine:

An automated system that monitors and analyzes developments in international regulations related to trade, security, privacy, finance, and other sectors. It makes it possible to detect legislative changes and facilitates the adaptation of processes accordingly.

- AI assistance for compliance:

An artificial intelligence (AI)-based assistant that guides users and businesses in complying with relevant regulations. It provides real-time recommendations for cross-border transaction compliance, taking into account factors like tax laws, data privacy requirements and international sanctions.

- Risk management:

Tools to assess and manage the risks associated with international transactions, ensuring that they comply with regulatory standards. This includes mechanisms to prevent fraud, combat money laundering and monitor economic sanctions.

- Monitoring of audits and reports:

Systems for creating, tracking, and generating compliance and audit reports. These tools help verify whether processes comply with standards and document actions taken to meet regulatory requirements.

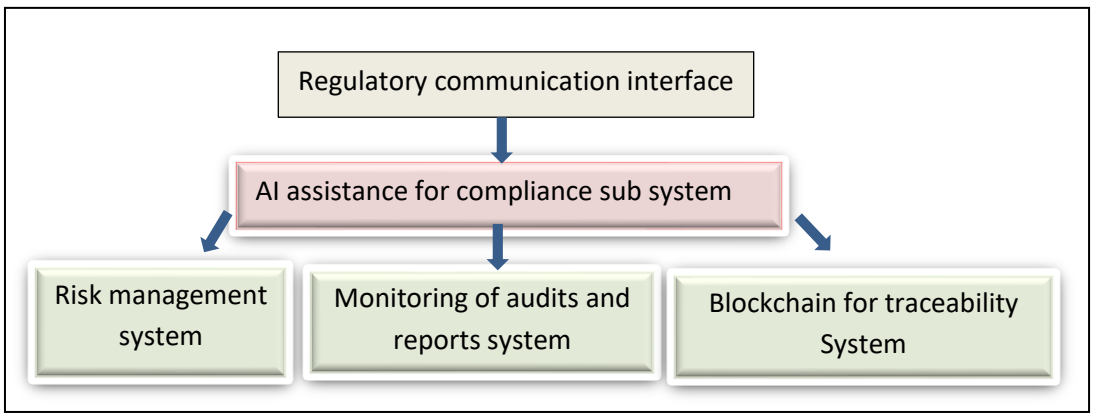
- Blockchain for traceability:

The use of blockchain ensures the traceability of transactions and their immutability, which is essential for proving compliance in the event of an audit.

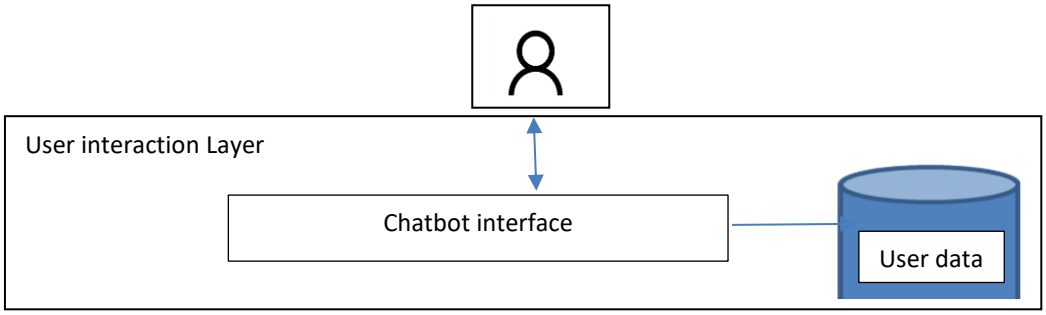
- Regulatory communication interface:

A point of interaction between the company and regulatory authorities. This could include systems for exchanging secure data to respond to requests from regulators or to submit compliance reports.

In summary, this layer enables proactive compliance management through automated tools and advanced technologies to help navigate complex international requirements in a cross-border transaction environment.



4.4 The **User Interaction Layer** offers user-friendly interfaces, delivering personalized insights and recommendations via GenAI chatbots or assistants.



5. FUNCTIONING OF THE PROPOSED APPROACH

Through the presentation layer of the system architecture, the proposed AI-powered arbitration system operates as a multi-layered architecture designed to enhance virtual economics and finance.

The process begins by leveraging real-time data collected from blockchain storage, databases, and analytics pipelines in the **Data Layer**, ensuring secure, scalable, and synchronized operations.

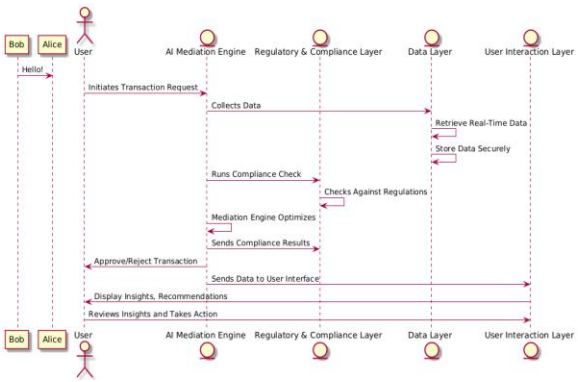
The **AI Arbitration Engine** dynamically processes this data to detect fraud, optimize transactions, and simulate economic scenarios using advanced generative AI models.

Simultaneously, the **Regulatory and Compliance Layer** ensures that all financial activities and virtual transactions adhere to legal and regulatory standards through automated compliance checks.

Using the **User Interaction Layer**, the users provide stakeholders with personalized insights, recommendations, and arbitration results through intuitive interfaces. This cohesive behavior allows the system to ensure transparency, mitigate risks, and foster trust in virtual economic ecosystems while adapting dynamically to changes in data and regulations.

The sequence diagram representing the steps from data collection to user interaction, ensuring compliance and optimizing transactions is as follow:

1. Initiates Transaction Request (User): The user (or stakeholder) initiates a cross-border transaction request on the platform.
2. Collects Data (AI Arbitration Engine): The AI Arbitration Engine collects real-time transaction data from various sources, such as blockchain, databases, and analytics pipelines.
3. Retrieves Real-Time Data (Data Layer): The Data Layer retrieves the necessary data from real-time sources, ensuring the transaction can be processed securely.
4. Stores Data Securely (Data Layer): The Data Layer securely stores the data, using encryption and blockchain technologies to maintain data integrity.
5. Runs Compliance Check (Regulatory & Compliance Layer): The system checks the transaction against the relevant regulatory frameworks (e.g., GDPR, AML, VAT).
6. Checks Against Regulations (Regulatory & Compliance Layer): The system verifies if the transaction complies with global standards and regulations.
7. AI Arbitration (AI Arbitration Engine): The AI Arbitration Engine processes the transaction data using its fraud detection, transaction optimization, and economic simulation models.
8. Compliance Results (Regulatory & Compliance Layer): The system sends the compliance status (e.g., pass/fail) to the AI Arbitration Engine for further processing.
9. Transaction Approved/Rejected (AI Arbitration Engine): Based on the analysis, the system approves or rejects the transaction.
10. Sends Data to User Interface (Data Layer): Once the transaction is processed, the data is sent to the User Interaction Layer.
11. Displays Insights, Recommendations, and Results (User Interaction Layer): The User Interaction Layer provides the user with personalized insights, transaction results, and recommendations (e.g., fraud warnings or optimization suggestions).
12. User Reviews Insights and Takes Action (User): The user reviews the displayed insights and either accepts or rejects the suggested actions based on their preferences and needs
13.



6. CONCLUSIONS AND RECOMMENDATIONS

6.1. conclusion

This article concludes that:

1. Technological developments are moving towards the introduction of generative AI arbitration in virtual markets to enhance their attractiveness. Generative AI arbitration can serve as an optimal protection mechanism for customers shopping in virtual markets created by businesses and organizations.
2. Generative AI arbitration can be programmed to ensure that arbitrators meet minimum skill and qualification requirements. It also guarantees the impartiality and independence of arbitrators in conducting arbitration.
3. Generative AI arbitration functions by matching the solutions proposed by both parties in exchanged lists, attempting to reach an agreement when both parties select the same solution with the same order of priority.
4. Generative AI arbitration is secured by technological tools that ensure the safe use of AI arbitration in virtual markets. It provides necessary protection through legal and technological safeguards.

6.2. Recommendations:

In order for AI arbitration to enhance virtual economics, this article suggest that:

1. Generative AI arbitration should be adopted in all virtual economic and financial transactions. This is because it makes virtual markets more attractive and competitive than their traditional counterparts.
2. Organizing a virtual arbitration center that adopts a generative AI arbitration system to resolve disputes in virtual marketing.
3. Raising public awareness of virtual markets and generative AI arbitration by launching initiatives and events in cooperation with governments, non-governmental organizations, and the private sector to encourage the use of AI arbitration in virtual marketing.
4. Registering a patent to protect the applications of generative AI arbitration in virtual marketing, as it includes something new, innovative, and useful for economic and industrial applications.
5. Leading the field of generative AI arbitration in virtual economics and finance as a model AI arbitration system by setting the highest standards for evaluating and providing arbitration services.

Acknowledgment: The authors would like to express sincere appreciation to the editorial board and reviewers of the Scientific Culture Journal for their valuable comments and constructive feedback, which have greatly contributed to improving the quality of this work. Special thanks are extended to colleagues and peers whose insights and discussions enriched the development of this study. The authors also acknowledges the UKB support and resources that facilitated the research and writing process.

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